

AirTAC

PRODUCTS CATALOG-2024

Actuators



AirTAC ● Pneumatic Equipment

Products Catalog-2024

Actuators



Corporate Profile

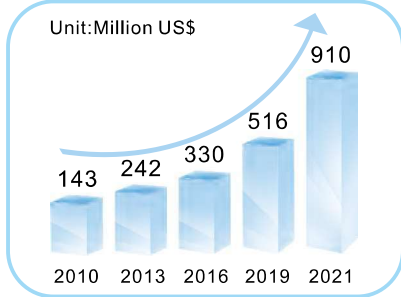


2019:
AirTAC Ningbo the second
Production base established



2018:
AirTAC USA established

Annual revenue over the years



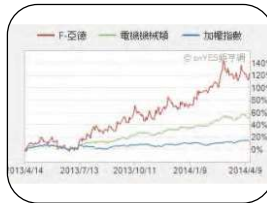
2016-2018:
AirTAC(Guangdong/Tianjin
/Fujian) Intelligent Company
established



2012-2015:
AirTAC Singapore, AirTAC
Japan, AirTAC Malaysia,
AirTAC Thailand established



2015:
AirTAC (Jiangsu)
established



2010:
AirTAC IPO In Taiwan
(Stock code:1590.TW)



2016:
New production
base of AirTAC
Tainan established

2011:
Expanded China Sales
and R&D center



2008:
AirTAC Italy
established



2002:
AirTAC Ningbo
established

1988:
AirTAC Taiwan
established



1998:
AirTAC Guangdong
established





Corporate Profile



● **2019**
AirTAC Ningbo the second Production base established

AirTAC Ningbo the second Production base
Land area: 266,667m²
Add: No.89, Nandu Rd., Fenghua District, Ningbo, Zhejiang, China

● **2016**

New production base of AirTAC Tainan established

Taiwan Tainan Production base
Land area: 71,333m²
Add: No.28, Kanxi Rd., Xinshi District, Tainan, Taiwan



● **2002**
AirTAC Ningbo established

AirTAC Ningbo the first Production base
Land area: 240,000m²
Add: No.88, Siming E. Rd., Fenghua District, Ningbo, Zhejiang, China



● **1998**

AirTAC Guangdong established

AirTAC Guangdong
Land area: 26,667m²
Add: No.7, Kaixuan Rd., Nanhai District, Foshan, Guangdong, China





Global Network of Marketing&Service

AirTAC International Group has more than 100 direct sales branches/sales sections in Chinese mainland, and thousands of distributors around the world, mainly located in Europe, the United States and Asia, etc., forming a perfect sales network and after-sales service system, which can provide customers with convenient services at any time.



Overseas Market

- USA
- Japan
- UK
- France
- Finland
- Germany
- Thailand
- Korea
- Australia
- Mexico
- Argentina
- South Africa
- Italy
- Singapore
- Malaysia
- Greece
- Sweden
- Denmark
- India
- Brazil
- Netherlands
- Sri Lanka
- Colombia
- Jordan
- VietNam
- Indonesia
- Israel
- Turkey
- Kuwait
- Austria
- Saudi Arabia
- Peru
- Canada
- Iran
- Syria
- ...





Standard cylinder

P12 SAI Series	 <ul style="list-style-type: none"> •SAI, SAID, SAIJ, SAIL, SAIF BSAI available •Bore size: 32 40 50 63 80 100 125 160 200 •Port size: 1/8" 1/4" 3/8" 1/2" 3/4" 	P25 TSAI Series	 <ul style="list-style-type: none"> •TSAIM, TSAIL available •Bore size: 32 40 50 63 80 100 •Port size: 1/8" 1/4" 3/8" 1/2"
P28 SGC Series	 <ul style="list-style-type: none"> •SGC, SGCD, SGCJ available •Bore size: 125 160 200 250 •Port size: 1/2" 3/4" 1" 	P34 SC Series	 <ul style="list-style-type: none"> •SC, SCD, SCJ, SCT available •Bore size: 32 40 50 63 80 100 125 160 200 250 •Port size: 1/8" 1/4" 3/8" 1/2" 3/4" 1"
P45 SAU Series	 <ul style="list-style-type: none"> •SAU, SAUD, SAUJ, SAUF available •Bore size: 32 40 50 63 80 100 •Port size: 1/8" 1/4" 3/8" 1/2" 	P51 JSI Series	 <ul style="list-style-type: none"> •JSI, JSID, JSIJ available •Bore size: 32 40 50 63 80 100 125 •Port size: 1/8" 1/4" 3/8" 1/2"

Roundline cylinder

P57 MI Series	 <ul style="list-style-type: none"> •MI, MID, MIJ, MSI, MTI MIC, MICD, MICJ available •Bore size: 8 10 12 16 20 25 32 40 •Port size: M5 1/8" 1/4" 	P63 TMI Series	 <ul style="list-style-type: none"> •TMIL, TMICL, TMIM, TMICM available •Bore size: 12 16 20 25 •Port size: M5, 1/8"
P66 PB Series	 <ul style="list-style-type: none"> •PB, PBD, PBJ, PSB, PTB PBR, PSBR, PTBR available •Bore size: 4 6 8 10 12 16 •Port size: Tube, M5 	P74 MF Series	 <ul style="list-style-type: none"> •MF, MFD, MFJ, MSF, MTF MFC, MFCJ, MFCJ available •Bore size: 20 25 32 40 •Port size: 1/8" 1/4"
P80 MG Series	 <ul style="list-style-type: none"> •MG, MGD, MSG, MTG MGC, MGCD available •Bore size: 20 25 32 40 50 63 •Port size: M5 1/8" 1/4" 	P86 MA Series	 <ul style="list-style-type: none"> •MA, MAD, MAJ, MSA, MTA MAC, MACD, MACJ, MAR available •Bore size: 16 20 25 32 40 50 63 •Port size: M5 1/8" 1/4"
P94 MBL Series	 <ul style="list-style-type: none"> •MBL, MBLD, MBLJ, MSBL, MTBL, MBLC, MBLCD, MBLCJ available •Bore size: 20 25 32 40 50 63 •Port size: 1/8" 1/4" 		



Compact cylinder

P100 ACE Series		<ul style="list-style-type: none"> •ACE, ACED, ACEJ, ASE, ATE TACE, TACED available •Bore size: 12 16 20 25 32 40 50 63 80 100 125 •Port size: M5 1/8" 1/4" 	P108 ACQ Series		<ul style="list-style-type: none"> •ACQ, ACQD, ACQJ ASQ, ATQ, TACQ available •Bore size: 12 16 20 25 32 40 50 63 80 100 125 140 160 •Port size: M5 1/8" 1/4" 3/8"
P122 SDA Series		<ul style="list-style-type: none"> •SDA, SDAD, SDAJ, SSA STA, SDAT, SDAW available •Bore size: 12 16 20 25 32 40 50 63 80 100 •Port size: M5 1/8" 1/4" 3/8" 			

Mini free mount cylinder and Multi-mount cylinder







P128 MU Series		<ul style="list-style-type: none"> •MU, MSU available •Bore size: 4 6 8 10 12 16 20 •Port size: M3 M5 	P132 MD, MK Series		<ul style="list-style-type: none"> •MD, MDD, MDJ, MSD, MTD MK, MKD, MKJ, MSK, MTK available •Bore size: 6 10 16 20 25 32 •Port size: M5 1/8"
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Plate cylinder and Threaded cylinder

P138 MPG Series Plate cylinder		<ul style="list-style-type: none"> •MPG, MPGH available •Bore size: 6 8 10 12 16 •Port size: M3 M5 	P142 MPE Series Threaded cylinder		<ul style="list-style-type: none"> •MPE, MPEF available •Bore size: 6 8 10 12 16 •Port size: M5
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Twin-rod cylinder

P146 TN Series		<ul style="list-style-type: none"> •TN available •Bore size: 10 16 20 25 32 •Port size: M5 1/8" 	P149 TR Series		<ul style="list-style-type: none"> •TR available •Bore size: 6 10 16 20 25 32 •Port size: M5 1/8"
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Tri-rod cylinder

P152 TC Series		<ul style="list-style-type: none"> •TCL, TCM available •Bore size: 6 10 12 16 20 25 32 40 50 63 80 100 •Port size: M3 M5 1/8" 1/4" 3/8" 			
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Slide table cylinder

P158 HGS Series slide table cylinder		<ul style="list-style-type: none"> •HGS available •Bore size: 6 8 10 12 •Port size: M3 M5 	P171 HLF Series slide table cylinder		<ul style="list-style-type: none"> •HLF available •Cross roller guide •Bore size: 8 12 16 20 •Port size: M3 M5
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Slide table cylinder

P177 HLH Series slide table cylinder		P183 HLQ Series slide table cylinder(Ball bearing type)	
	<ul style="list-style-type: none"> •HLH available •Miniature linear guide •Bore size: 6 10 16 20 •Port size: M5 		<ul style="list-style-type: none"> •HLQ, HLQL available •Miniature linear guide •Bore size: 6 8 12 16 20 25 •Port size: M5 1/8"
P201 HLS Series slide table cylinder(Cross roller type)			
	<ul style="list-style-type: none"> •HLS, HLSL available •Cross roller guide •Bore size: 6 8 12 16 20 25 •Port size: M5 1/8" 		

Rodless magnetic cylinder and Rotary table cylinder

P221 RMS Series Rodless magnetic cylinder	P225 RMT Series Rodless magnetic cylinder
	
P230 RMTL Series Rodless magnetic cylinder	P234 RMH Series Rodless magnetic cylinder
	
P237 HRQ Series Rotary table cylinder	P245 HRS Series Rotary table cylinder
	
<ul style="list-style-type: none"> •HRQ available •Size: 2 3 7 10 20 30 50 70 100 200 •Port size: M5 1/8" 	<ul style="list-style-type: none"> •HRS available •Size: 10 15 20 30 40 •Port size: M5 1/8"

Air gripper

P248 HFD Series compact air gripper	P258 HFCQ Series air gripper(Hollow type)
	
P266 HFKL Series air gripper(Long stroke)	P274 HFZ, HFK Series air gripper
	
P284 HFKP Series air gripper	P290 HFP Series air gripper
	
<ul style="list-style-type: none"> •HFKP available •Bore size: 16 20 25 32 •Port size: M5 	<ul style="list-style-type: none"> •HFCQ available •Bore size: 16 20 25 32 40 50 63 •Port size: M3 M5
<ul style="list-style-type: none"> •HFKL, HFSKL, HFTKL available •Bore size: 10 16 20 25 •Port size: M3 M5 	<ul style="list-style-type: none"> •HFZ, HFSZ, HFTZ HFK, HFSK, HFTK available •Bore size: 6 10 16 20 25 32 40 •Port size: M3 M5
<ul style="list-style-type: none"> •HFP, HFTP available •Bore size: 10 16 20 25 32 •Port size: M3 M5 	



Air gripper

P294 HFY Series air gripper



- HFY, HFTY available
- Bore size: 6 10 16 20 25 32
- Port size: M3 M5

P299 HFR Series air gripper



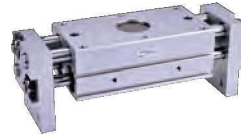
- HFR available
- Bore size: 10 16 20 25 32
- Port size: M5

P302 HFC Series air gripper



- HFCI, HFCY, HFCX available
- Bore size: 16 20 25 32 40 50 63
- Port size: M3 M5

P309 HFT Series Big size air gripper



- HFT available
- Bore size: 10 16 20 25 32
- Port size: M5 1/8"

Rotary clamp cylinder

P315 QDK Series Plane Rotary clamp cylinder



- QDK, QDK*U available
- Bore size: 20 25 32 40
- Port size: M5 1/8"

P318 QCK Series Rotary clamp cylinder



- QCK, QCK*M available
- Bore size: 12 16 20 25 32 40 50 63
- Port size: M5 1/8" 1/4"

Clamp cylinder

P323 AQK Series Pin clamp cylinder



- AQK, BAQK available
- Bore size: 50
- Port size: 1/8"

P331 MCK Serie Clamp cylinder



- MCKA, MCKB available
- Bore size: 25 32 40 50 63 80
- Port size: 1/8" 1/4" 3/8"

P336 JSCK Serie Clamp cylinder



- JSCK, JSCK*H available
- Bore size: 40 50 63 80
- Port size: 1/8" 1/4"

P354 JSK Serie Clamp cylinder



- JSK available
- Bore size: 40 50 63
- Port size: 1/4"

Cylinder joint accessory and Sensor switch

P358 Cylinder joint accessory



- I Knuckle, Y Knuckle
- F Knuckle, U Knuckle available

P362 DMS\EMS\CMS Series Sensor switch



- DMS, EMS, CMS available
- Waterproof type, General type available for DMS and EMS series
- Heat resistant type, General type available for CMS series

Shock absorber

P372 ACA\ACJ Series Shock absorber



- ACA, ACJ available
- High speed, Middle speed
- Low speed available
- No cap, Plastic cap
- Iron cap available





When designing, producing and using pneumatic system devices, one must be familiar with the requests and attentions of pneumatic components and pneumatic system. Use and operate system devices under the situation that necessary examinations have been conducted and the machinery framework, pneumatic control loop and the electrical control system of pneumatic system are ensured to be in safe condition.


For using our AirTAC products safely, the selection, operation and proper maintenance and management of the products are very important!

To guarantee to use safely, please make sure to operate according to this instruction completely!


Requests of Pneumatic System on Design-Selector and User


- Confirmation of product models and specifications prior to use The designer of pneumatic system and selector of pneumatic components shall consider the security and faults that may occur according to the requests on performance of pneumatic system and decide the specification of pneumatic components according to the latest product catalog and data. If it is necessary, they shall make relevant analysis and experiment. When the system is used in some newly developed industries or special industries, they should cooperate with the manufacturer of pneumatic components to carry out the selection.  **Attention**


- Special attention to the following conditions  **Danger**
 - Once the compressed air is wrongly used, it is dangerous. Thus the assembly, operation and maintenance of the pneumatic equipment shall be done by welltrained person with certain practical experience.
 - Before making sure that it is safe, prohibit to use pneumatic equipment or to disassemble pneumatic components from the equipment.

- After confirming that the above safe treatment has been conducted, cut off the power and air source, release the remaining air, and conduct maintenance or disassembly on the equipment.  **Warning**
- Before starting the equipment, make sure that the piston rod will not stick out rapidly.

Requests of Pneumatic System at Application Environment

- It is not allowed to use the system in the environment that includes corrosive gas, chemicals (such as organic solvent), seawater, water and steam or the place with the above substances.
- It is not allowed to use it in the place with explosive gas. (If necessary, consider adopting explosion-proof measure).
- It is not allowed to use it in the situation with oscillation and impact, or the component capacity to resist to oscillation and impact shall accord with the specification in this catalog.  **Attention**
- It is not allowed to use it in the place that has heat source around or is influenced by radiant heat. Otherwise, it is better to adopt measures to interdict the radiant heat.

- Add shields in the place with direct sunshine.  **Danger**
- In case the system is used in the place with large humidity and much dust or the place with water drop, oil drop, cutting oil and dispersing cooling fluid, proper protective measures shall be taken.
- The cylinder with magnet can not be used in the environment with strong magnetic field.

- In special temperature environment:  **Warning**
High temperature environment: please use seals resisting high temperature Low temperature environment: moisture in loop may freeze and affect the action, at this moment, the moisture shall be eliminated to avoid freeze.





Attentions on the Design and Selection of Pneumatic System

- Use the product under the stipulated application condition and scope

This catalogue stipulates the operation scope and condition. Please operate according to it. Any operation beyond the scope and condition may cause fault of and damage to the components, even result in danger and harm. Therefore, please contact our company in case that the products are used under the condition beyond the specified application condition and range, or any other fluid except the compressed air is used.



- Please design and install protective devices in the device part which may cause personal injury. The drive part of the cylinder may cause personal injury, please design and install protective devices to make sure people cannot directly contact the drive part when it works.
- Please effectively fasten the drive part of the cylinder to avoid the looseness of connective part. Especially under the circumstance with high action frequency or larger oscillation, effective fastness must be strengthened.
- Design necessary buffer loop or buffer devices
When drive objects have higher speed or heavier weight, it is difficult to absorb impact solely by cylinder cushion. Therefore, buffer loop or external buffer must be designed or used to absorb the impact. Moreover, the rigidity of the machinery devices must be considered.

- When designing the system, the devices and personal safety shall be considered under the situation of power failure or air failure. For the clamping framework, if the pressure of system loop declines due to power failure and air failure, it will result in falling off of the components and further the harm on machinery devices and people, therefore, it is necessary to consider designing antifalling loop or devices.
- When designing the system, please consider the possibility that power source may produce faults. Please adopt relevant measures to make sure that the drive devices such as air pressure and electrical power will not result in personal injury or damages of devices when the power source has faults.
- Please make a loop that can prevent it from flying out when designing system. When pneumatic system is debugged or overhauled after releasing the remaining pressure, the system starts to pressurize the piston at one side, and the driven object may be pushed in high speed. In this situation, please design loop or device which can prevent cylinder from rapidly flying out to avoid personal injury or machinery damage.



- When designing the system, please consider the action status in emergency stop situation. The design shall make sure that the action of cylinder will not cause personal injury or component and device damage under the situation that the system is in abnormal status such as emergency stop or power failure and that the safety devices and the machinery stop.
- When designing the system, please consider the actions during restarting after emergency stop and abnormal stop. The design shall make sure that the system will not cause personal injury or component damage when it restarts. In addition, for safely operation, please design return device.
- Intermediate stop
When the cylinder stop in the middle position controlled by three-position closed center type valve, due to the compressibility of the air, it is hard to control the precise position of the cylinder. In addition, it can not avoid the air leakage of valve or cylinder absolutely, so the stop position is difficult to keep on for a long time. Therefore, please design necessary devices when a long-term stay in stop position is required.
- Synchronization of several cylinders in the system
Due to the compressibility of the air, it is difficult to control several cylinders precisely by the same direction control valve. In this situation, special devices or loop shall be taken into consideration when designing.
- Please use the purified dry air in the air loop.
Do not use the air with synthetic oil (including chemicals and organic solvent), salinity and corrosive gas to avoid component damage or poor action.



Attention for the Use of Lubricant for Pneumatic System

- Generally, the pneumatic components have been lubricated by grease when producing. Therefore, they can be used without additional lubrication for a long time.
- In case of using additional lubrication, please use turbine oil (without additive) ISO-VG32. Engine oil, spindle oil or other oils are not allowed to avoid soaking and expanding of the seals like NBR.
- If lubrication is stopped in the midway, the original lubricated grease in side may have been flushed off, then the lack of lubrication will cause poor action of elements and accelerate the abrasion of relevant parts. Therefore, please make sure to supply oil constantly and an oil misting device with proper flow shall be equipped.



- When lubricating the compressed air, the oil mist quantity can not surpass 25mg/m³.
- When the system runs normally, the oil mist quantity is set as 0.2-1 drop or 0.5-5 drops/1000L.
- The simple method for testing the oil mist quantity is: put one piece of white paper at the port of cylinder control valve which is the most far from lubricator, after a while, the white paper takes on lemon yellow. If there are oil drops falling down from the white paper, it indicates the excessive lubrication.





Requests of Pneumatic System to Compressed Air

- The compressed air ejected by air compressor can not be directly used in the air loop, since it has certain moisture, oil content and dust, which should be gaseous in the high temperature of about 140-170°C through the compressor.
- Make sure to use compressed air that has been purified
 - ♦ The filtration precision of common machinery and common pneumatic loop is $< 50\mu\text{m}$;
 - ♦ The filtration precision of logic elements, jet elements and air motors is $< 10\mu\text{m}$;
 - ♦ The filtration precision of food, medicine, electron, tobacco and liquor and pneumatic bearing is $< 5\mu\text{m}$;



- The oil mist in compressed air may gather in the container of gas tank, pipeline and pneumatic system and forms combustibles which may cause harm to pneumatic system.
- The degenerative lubricant will make rubber, plastic and seals materials go bad and block the port, which may cause action failure of valve.
- Moisture and dust will cause erosion and rustiness of metal parts, abrade and trap the action parts, block the ports and lead to transmission abnormality of air pressure signal. In cold area, the freezing of moisture will cause freeze and frost-crack of pipeline and the failure of elements and components.
- It is not allowed to use the compressed air with harmful gas (such as acid and alkali). Acid and alkali will cause damage to internal parts of pneumatic components.

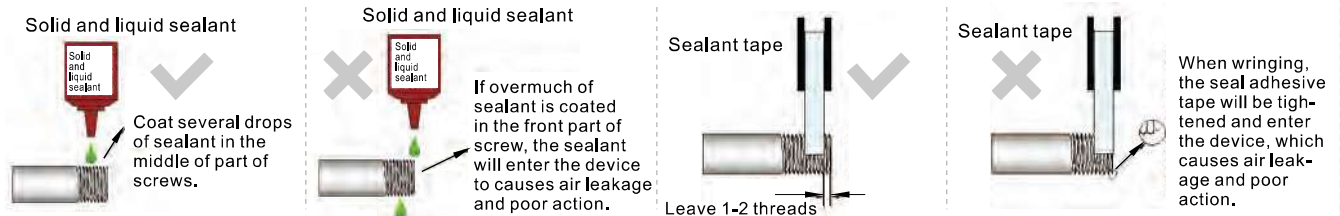


- The compressed air without the content of oxygenated oil of air compressor, tar and carbon shall be used.
- If the oxygenated oil, tar and carbon get into air pressure elements and become additive to them, the resistance of slipping parts will be increased and poor action will be caused. The mixture of oxygenated oil, tar and carbon with lubricant will abrade the slipping parts of air pressure elements.
- It is not suitable to use dry air in air pressure elements. Please use the elements corresponding to ultra-dry air. The ultra-dry compressed air will shorten the service life of air pressure elements.



Tubing and Installation Pneumatic System

- Please obey the following stipulations on the entwining method of sealant tape when connecting fitting and tube. Please start to entwine sealant tape from 1st-2nd screw thread at the front part of tube thread and on both of positive direction and inverse direction of the thread. If the sealant tape entwines out of the front part of the tubing thread, it will be torn into fragments which will cause faults and wrong action if they get in the system.



- When connecting the tubing, please fasten with proper torque to prevent air leakage and thread damage.

Table one : Reference value of Fasten torque

Unit : N.m

Connective thread	M3	M5	1/8"	1/4"	3/8"	1/2"	3/4"	1"
Fasten torque	0,3~0,6	1,0~1,5	5,0~7,0	6~8	8~10	12~15	28~30	36~40



- Pay attention to the following matters when using nylon tube or polyurethane tube materials:

- Please use flame retardant tube or metal tubing in the environment with high temperature spark; The proof pressure is different according to the bore size of tube and the working temperature



Table two : Reference data of maximum proof pressure

(Unit : kgf/cm²)

OD/ID(mm)		4/2.5	5/3	6/4	8/6	10/7.5	12/9	14/11	16/12	22/17	28/22
Maximum pressure(-40°C~20°C)	Nylon tube	28	31	25	19	24	18	15	18	15	15
	PU tube	10	11	9	9	9	9	-	-	-	-
Minimum bending radius (mm)	Nylon tube	25	2	30	50	60	75	90	95	125	160
	PU tube	6	7	9	16	17	25	-	-	-	-
Using in different working temperatures, the maximum proof pressure shall multiply the following coefficient.		+30°C		+40°C		+50°C		+60°C		+70°C	
		0.83		0.72		0.64		0.57		0.47	

- The pipeline shall be cleaned with compressed air prior to connecting the tubing and fittings to the pneumatic components.





Convert American system and British system unit to international (SI) unit

Length unit

American and british system	Conversion rates	International
1 in	= 25.4	mm
1 ft	= 0.3048	m
1 mile	= 1609.3	m
1 micron	= 10^{-6}	m

Quality unit

American and british system	Conversion rates	International
1 lb	= 453.6	g
1 cwt	= 50.8	kg
1 ton(imp)	= 1016	kg
1 ton(us)	= 907.2	kg
1 tonne	= 1000	kg

Moment unit

American and british system	Conversion rates	International
1 inlb	= 0.113	Nm
1 ft lb	= 1.356	Nm
1 kgm	= 9.807	Nm
1 ft poundal	= 0.0421	Nm

Temperature unit

American and british system	International
$(^{\circ}\text{F}-32)\times 5/9$	= $^{\circ}\text{C}$
K-273.15	= $^{\circ}\text{C}$

Flow unit

Cv value =	It's the constant value of flow, when the water flow(US gal/min)is under 60°F , the D-value of pressure between intake and outlet is 1psi (Cv \times 1000 \approx L/min)
kv value =	It's the constant value of flow, when the water flow(L/min)is under 20°C , the D-value of pressure between intake and outlet is 1kgf/cm ²
KV value =	It's the constant value of flow, when the water flow(m ³ /min)is under 20°C , the D-value of pressure between intake and outlet is 1kgf/cm ²
S.T.P =	Standard temperature and pressure (0°C and 101.3kPa absolute pressure)
N.T.P =	Normal temperature and pressure (20°C and 101.3kPa absolute pressure)
M.S.C =	Standard of metric system (15°C and 101.3kPa absolute pressure)
ANR =	Temperature : 20°C and relative humidity : 65%

Equivalence conversion

1 psi	=6.895	kPa	=0.07	kg/cm ²	=0.06895	bar	=0.0703	atm
1 standard atmosphere	=14.7	psi	=101.3	kPa	=1.01325	bar		
1 kg/cm ²	=98.07	kPa	=14.22	psi	=28.96	ins mercury		
1 ft lb	=0.13826	kgm	=1.356	Nm				
1 L	=1000	cm ³	=1.7598	pint	= 10^6	mm ³		
1 tonne	=1000	kg	=0.984	ton	=2205	lb		
1 m ³	= 10^6	cm ³						
1 cu ft/min.	=28.3	l/min	=0.0283	m ³ /min				
1 Pa	=1	N/m ²						

Area unit

American and british system	Conversion rates	International
1 in ²	= 6.45	cm ²
1 ft ²	= 0.093	m ²

Pressure unit

American and british system	Conversion rates	International
1 psi	= 6.89	kPa
1 kgf/cm ²	= 98.07	kPa
1 bar	= 100	kPa
1 bar	= 14.5	psi
1 atmosphere	= 98.1	kPa
1" (STANDARD)	= 101.33	kPa
1 cm water	= 97.89	Pa
1 in water	= 248.64	Pa
1 mm mercury	= 133.3	Pa
1 in mercury	= 3.39	kPa
1 Torr	= 133.3	Pa
1 ft water	= 0.0298	bar
1 bar	= 33.33	ft water

Unit of work and energy

American and british system	Conversion rates	International
1 lbft	= 1.356	J
1 Nm	= 1	J
1 kgm	= 9.807	J
1 kW/hr	= 3.6	MJ

Volume unit

American and british system	Conversion rates	International
1 litre	= 0.001	m ³
1 cu.ft.	= 0.0283	m ³
1 cu.in.	= 16.39	cm ³
1 gal(imp)	= 4.546	L
1 gal(us)	= 3.79	L
1 fluid oz.(imp)	= 28.41	mL
1 fluid oz.(us)	= 29.57	mL

Force unit

American and british system	Conversion rates	International
1 lbf	= 4.45	N
1 kgf	= 9.81	N
1 kp(kilopond)	= 9.81	N
1 poundal	= 138.3	mN
1 ton force	= 9.964	kM

Power unit

American and british system	Conversion rates	International
1 lbft/sec	= 1.356	W
1 kgm/sec	= 9.807	W
1 Nm/sec	= 1	W
1 Joule/sec	= 1	W
1 H.P.(imp)	= 745.7	W

Unit compilation

Unit full name	Abbreviation
Pascal	Pa
Newton	N
metre	m
litre	L
Watt	W
Newton metre	Nm
Jonle	J
Megajoule	MJ
Kelvin	K





Standard cylinder—SAI Series

In accordance with ISO15552 standard

Compendium of SAI Series

ISO15552 Standard cylinder

Bore size: 32, 40, 50, 63, 80
100, 125, 160, 200

Adjustable air buffer

With adjustable air buffer on the front and back cover

Four kinds of cylinder joints

I Knuckle Y Knuckle Floating Joint Universal Joint

Multi-mounting accessories

Multi-type cylinder

SAI: Double acting type SAID: Double rod type SAIJ: Adjustable stroke type

SAIL : Double acting with locker type SAIF: With valve type

Criteria for selection: Cylinder thrust

Unit : Newton (N)

Bore size	Rod size	Acting type	Pressure area(mm ²)	Operating pressure(MPa)									
				0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9	
32	12	Double acting	Push side	804	80,4	160,8	241,2	321,6	402,0	482,4	562,8	643,2	723,6
			Pull side	690	69,0	138,0	207,0	276,0	345,0	414,0	483,0	552,0	621,0
40	16	Double acting	Push side	1256	125,6	251,2	376,8	502,4	628,0	753,6	879,2	1002,4	1130,4
			Pull side	1055	105,5	211,0	316,5	422,0	527,5	633,0	738,5	844,0	949,5
50	20	Double acting	Push side	1963	196,3	392,6	588,9	785,2	981,5	1177,8	1374,1	1570,4	1766,7
			Pull side	1649	164,9	329,8	494,7	659,6	824,5	989,4	1154,3	1399,2	1484,1
63	20	Double acting	Push side	3117	311,7	623,4	935,1	1246,8	1558,5	1870,2	2181,9	2493,6	2805,3
			Pull side	2803	280,3	560,6	840,9	1121,2	1401,5	1681,8	1962,1	2242,4	2522,7
80	25	Double acting	Push side	5026	502,6	1005,2	1507,8	2010,4	2513,0	3015,6	3518,2	4020,8	4523,4
			Pull side	4536	453,6	907,2	1360,8	1814,4	2268,0	2721,6	3175,2	3628,8	4082,4
100	25	Double acting	Push side	7853	785,3	1570,6	2355,9	3141,2	3926,5	4711,8	5497,1	6282,4	7067,7
			Pull side	7362	736,2	1472,4	2208,6	2944,8	3681,0	4417,2	5153,4	5889,6	6625,8
125	32	Double acting	Push side	12272	1227,2	2454,4	3681,6	4908,8	6136,0	7363,2	8590,4	9817,6	11044,8
			Pull side	11468	1146,8	2293,6	3440,4	4587,2	5734,0	6880,8	8027,6	9174,4	10321,2
160	40	Double acting	Push side	20106	2010,6	4021,2	6031,8	8042,4	10053,0	12063,6	14074,2	16084,8	18095,4
			Pull side	18849	1884,9	3769,8	5654,7	7539,6	9424,5	11309,4	13194,3	15079,2	16964,1
200	40	Double acting	Push side	31416	3141,6	6283,2	9424,8	12566,4	15708,0	18849,6	21991,2	25132,8	28274,4
			Pull side	30157	3015,7	6031,4	9047,1	12062,8	15078,5	18094,2	21109,9	24125,6	27141,3

Installation and application



- When load changes in the work, the cylinder with abundant output capacity shall be selected.
- Relative cylinder with high temperature resistance or corrosion resistance shall be chosen under the condition of high temperature or corrosion.
- Necessary protection measure shall be taken in the environment with higher humidity, much dust or water drops, oil dust and welding dregs.
- Dirty substances in the pipe must be eliminated before cylinder is connected with pipeline to prevent the entrance of particles into the cylinder.
- The medium used by cylinder shall be filtered to 40μm or below.
- Anti-freezing measure shall be adopted under low temperature environment to prevent moisture freezing.
- The cylinder shall be carried out test run without load before application. Prior to run, buffer shall be turned to the minimum and gradually released to avoid the damage on cylinder caused by excessive impact.
- The cylinder shall avoid the influence of side load in operation to maintain the normal work of cylinder and extend the service life.
- If the cylinder is dismantled and stored for a long time, please conduct anti-rust treatment to the surface. Anti-dust caps shall be added in air inlet and outlet ports.



SAI Series



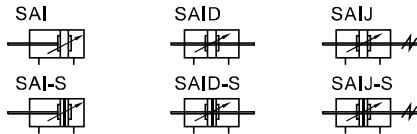
Specification

Bore size(mm)	32	40	50	63	80	100	125	160	200
Acting type	Double acting								
Fluid	Air(to be filtered by 40µm filter element)								
Mounting type	SAI	Basic FA FB CA CB CR LB TC FTC TCM1 TCM2							
SAID, SAIJ	Basic FA LB TC FTC TCM1 TCM2								
Operating pressure	0.15~1.0MPa(22~145psi)(1.5~10.0bar)								
Proof pressure	1.5MPa(215psi)(15bar)								
Temperature °C	-20~70								
Speed range mm/s	30~80						30~500		
Stroke tolerance	0~250 ^{+1,0} ₀			251~1000 ^{+1,5} ₀			1001~1500 ^{+2,0} ₀		
Cushion type	Variable cushion								
Adjustable cushion stroke	27		30		36		40		50
Port size [Note1]	1/8"		1/4"		3/8"		1/2"		3/4"

[Note1] PT thread, G thread are available.

Add) Refer to P362 for detail of sensor switch.

Symbol



Product feature

- ISO15552 (original ISO6431) standard cylinder;
- The piston seal adopts heterogeneous two way seal structure, with tight dimension and oil reservation function;
- The aluminum profile without tie rod has good corrosion resistance. With sensor switch groove on the two sides of body;
- The buffer adjustment of cylinder is smooth and steady;
- Cylinders and accessories for installation with several specifications are optional;
- The seal material with high temperature resistance is adopted, operating temperature range is 0~150°C.

Stroke

Bore size (mm)	Standard stroke (mm)	Max.std stroke	Max. stroke
32	25 50 75 80 100 125 150 160 175 200 250 300 350 400 450 500	1000	1800
40	25 50 75 80 100 125 150 160 175 200 250 300 350 400 450 500 600 700 800	1200	1800
50	25 50 75 80 100 125 150 160 175 200 250 300 350 400 450 500 600 700 800 900 1000	1200	1800
63	25 50 75 80 100 125 150 160 175 200 250 300 350 400 450 500 600 700 800 900 1000	1500	1800
80	25 50 75 80 100 125 150 160 175 200 250 300 350 400 450 500 600 700 800 900 1000	1500	1800
100	25 50 75 80 100 125 150 160 175 200 250 300 350 400 450 500 600 700 800 900 1000	1500	1800
125	25 50 75 80 100 125 150 160 175 200 250 300 350 400 450 500 600 700 800 900 1000	1500	1800
160	25 50 75 80 100 125 150 160 175 200 250 300 350 400 450 500 600 700 800 900 1000	1500	2000
200	25 50 75 80 100 125 150 160 175 200 250 300 350 400 450 500 600 700 800 900 1000	1500	2000

[Note] Consult us for non-standard stroke.

Ordering code

SAI 160 □ × 50 S □ □ □
 SAID160 □ × 50 S □ □ □
 SAIJ 160 □ × 50 - 20 S □ □ □

① ② ③ ④ ⑤ ⑥ ⑦ ⑧ ⑨

① Model	② Bore size	③ Rod Material	④ Stroke	⑤ Adjustable stroke	⑥ Magnet	⑦ Mounting type[Note1]	⑧ Seals Material	⑨ Thread type
SAI: Double acting type	32 40 50 63 80 100 125 160 200	Blank: Medium carbon steel A: SUS420J2 B: SUS304	Refer to stroke table for details	No this code	Blank: Without magnet S: With magnet	Blank	Blank: TPU H: Viton N: NBR	Blank: PT G: G
						LB		
						FA		
						FB		
						CA		
						CB		
						CR		
SAID: Double rod type						Blank		
						LB		
						FA		
SAIJ: Adjustable stroke type				10 20 30 40 50 75 100		FTC		
						TC		
						TC		
						TC		

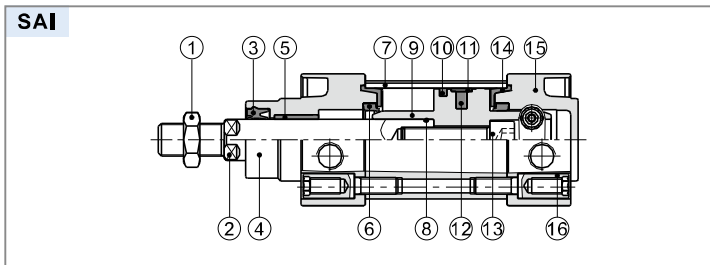
[Note1] CR is used with CB ; FTC, TC are used with TCM1, TCM2, please refer to page 22~24 for details.



ISO1552 Standard cylinder

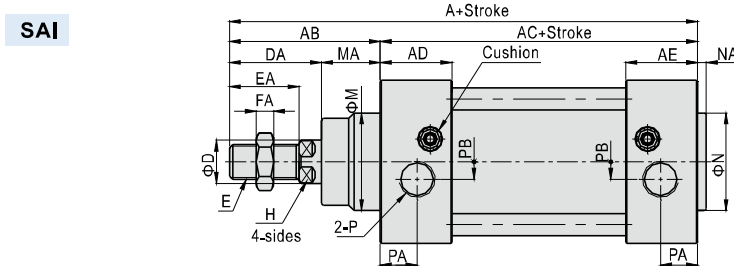
SAI Series

Inner structure and material of major parts



NO.	Item	Material
1	Rod nut	Carbon steel\Stainless steel
2	Piston rod	Carbon steel with 20μm chrome plated or Stainless steel
3	Front cover packing	TPU
4	Front cover	Aluminum alloy
5	Bushing	Wear resistant material
6	Cushing O-ring	TPU
7	Barrel	Aluminum alloy
8	O-ring	NBR
9	Piston	Aluminum alloy
10	Piston Seal	NBR
11	Wear ring	Wear resistant material
12	Magnet	Plastic(Φ100 and below)\Rubber(Others)
13	Bolt	Carbon steel
14	Buffer gasket	TPU
15	Back cover	Aluminum alloy
16	Screw	Carbon steel\Stainless steel

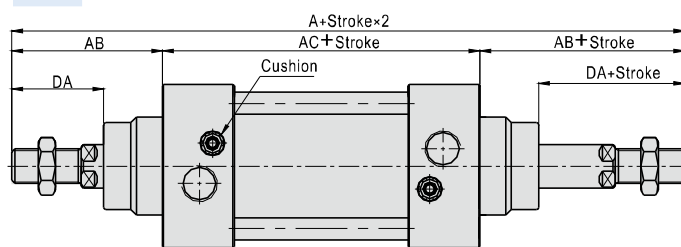
Dimensions



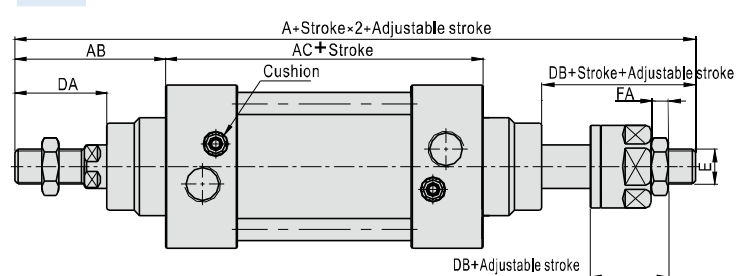
Bore size\Item	A	AB	AC	AD	AE	B	D	DA	E	EA	F	FA	M	MA	H	K	KA	KB	N	NA	P	PA	PB
32	142	48	94	27.5	27.5	47	12	29	M10×1.25	22	17	6	30	19	10	M6	16	32.5	30	3	1/8"	13	5.5
40	159	54	105	32	32	53	16	33	M12×1.25	24	17	7	35	21	13	M6	17	38	35	3.5	1/4"	17	6
50	175	69	106	31	31	65	20	42	M16×1.5	32	23	8	40	27	17	M8	17	46.5	40	3.5	1/4"	15.5	7.5
63	190	69	121	33	33	75	20	42	M16×1.5	32	23	8	45	27	17	M8	17	56.5	45	4	3/8"	16.5	7.5
80	214	86	128	33	33	95	25	53	M20×1.5	40	26	10	45	33	22	M10	19	72	45	4	3/8"	16.5	9
100	229	91	138	37	37	115	25	55	M20×1.5	40	26	10	55	36	22	M10	19	89	55	4	1/2"	18.5	9.5
125	279	119	160	46	46	140	32	74	M27×2.0	54	41	13.5	60	45	27	M12	22	110	60	4	1/2"	23	14
160	332	152	180	50	50	180	40	94	M36×2.0	72	55	18	65	58	36	M16	30	140	65	4	3/4"	25	15
200	347	167	180	50	50	220	40	100	M36×2.0	72	55	18	75	67	36	M16	30	175	75	5	3/4"	25	15

Remark: The dimensions of magnet type cylinder are the same as non-magnet type cylinder.

SAID



SAIJ



Bore size\Item	A		AB	AC	DA	DB	E	FA
	SAID	SAIJ						
32	190	188	48	94	29	27	M10X1,25	6
40	213	208	54	105	33	28	M12X1,25	7
50	244	231	69	106	42	29	M16X1,5	8
63	259	246	69	121	42	29	M16X1,5	8
80	300	282.5	86	128	53	35.5	M20X1,5	10
100	320	300.5	91	138	55	35.5	M20X1,5	10
125	398	366.5	119	160	74	42.5	M27X2,0	13.5
160	484	458	152	180	94	68	M36X2,0	18
200	514	482	167	180	100	68	M36X2,0	18

Remark:

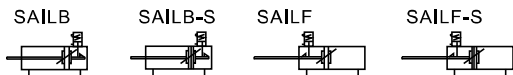
- The dimensions of magnet type cylinder are the same as non-magnet type cylinder.
- The unmarked dimension is the same as SAI standard type.

ISO15552 Standard cylinder

SAIL Series—With locker type



Symbol



Product feature

1. With lock cylinder: front cover with lock type and rear cover lock type;
2. The way of unlocking: automatic and manual.

Specification

Bore size(mm)	40	50	63	80	100	125	160	200
Acting type	Double acting							
Fluid	Air(to be filtered by 40µm filter element)							
Mounting type	Basic FA FB CA CB CR LB TC FTC TCM1 TCM2							
Operating pressure	0.15~1.0MPa(22~145psi)(1.5~10.0bar)							
Proof pressure	1.5MPa(215psi)(15bar)							
Temperature °C	-20~70							
Speed range mm/s	30~800				30~500			
Stroke tolerance	0~250 ^{+1,0} ₀		251~1000 ^{+1,5} ₀		1001~1500 ^{+2,0} ₀			
Cushion type	Variable cushion							
Adjustable cushion stroke	No locker end	27		30		36		40
	With locker end	20	20	21	22,5	24	24	28
Port size [Note1]	1/4"		3/8"		1/2"		3/4"	

[Note1] PT thread, G thread are available.

Add) Refer to P362 for detail of sensor switch.

Stroke

Bore size (mm)	Standard stroke (mm)												Max.std stroke	Max. stroke									
40	25	50	75	80	100	125	150	160	175	200	250	300	350	400	450	500	600	700	800	1200	1800		
50	25	50	75	80	100	125	150	160	175	200	250	300	350	400	450	500	600	700	800	900	1000	1200	1800
63	25	50	75	80	100	125	150	160	175	200	250	300	350	400	450	500	600	700	800	900	1000	1500	1800
80	25	50	75	80	100	125	150	160	175	200	250	300	350	400	450	500	600	700	800	900	1000	1500	1800
100	25	50	75	80	100	125	150	160	175	200	250	300	350	400	450	500	600	700	800	900	1000	1500	1800
125	25	50	75	80	100	125	150	160	175	200	250	300	350	400	450	500	600	700	800	900	1000	1500	1800
160	25	50	75	80	100	125	150	160	175	200	250	300	350	400	450	500	600	700	800	900	1000	1500	2000
200	25	50	75	80	100	125	150	160	175	200	250	300	350	400	450	500	600	700	800	900	1000	1500	2000

[Note] Consult us for non-standard stroke.

Ordering code

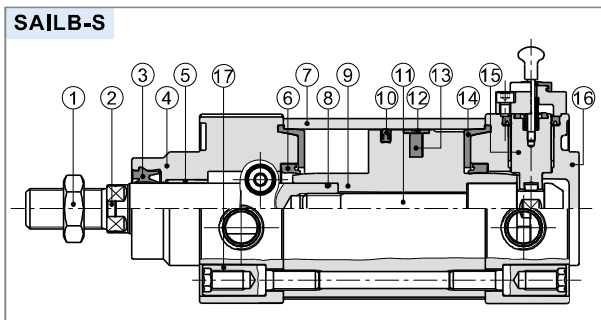
SAIL B 160 ×50 S □ □



① Model	② Locker position	③ Bore size	④ Stroke	⑤ Magnet	⑥ Mounting type[Note1]	⑦ Thread type
SAIL: Double acting type (with locker)	B: Back cover with locker F: Front cover with locker	40 50 63 80 100 125 160 200	Refer to stroke table for details	Blank: Without magnet S: With magnet	Blank	Blank: PT G: G
					LB	
					FA	
					FB	
					CA	
					CB	
					CR	
					FTC	
TC						

[Note1] CR is used with CB ; FTC、TC are used with TCM1、TCM2, please refer to page 22~24 for details.

Inner structure and material of major parts



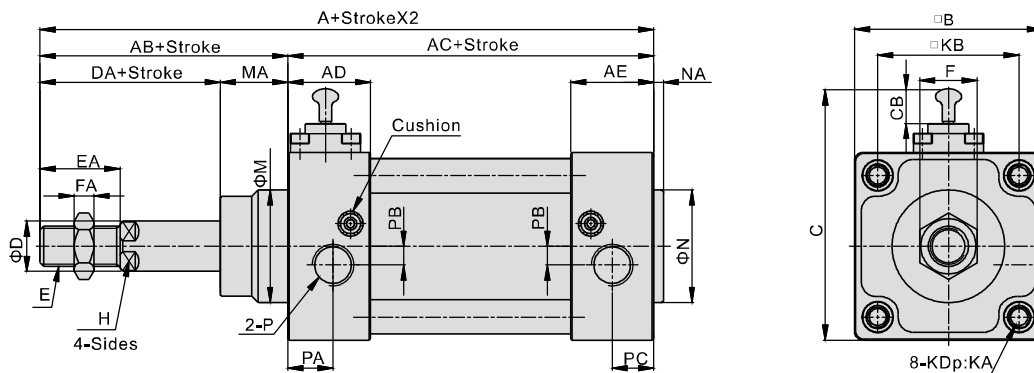
NO.	Item	Material	NO.	Item	Material
1	Rod nut	Carbon steel	9	Piston	Aluminum alloy
2	Piston rod	Carbon steel with 20µm chrome plated	10	Piston Seal	NBR
3	Front cover packing	TPU	11	Plunger	S45C
4	Front cover	Aluminum alloy	12	Wear ring	Wear resistant material
5	Bushing	Wear resistant material	13	Magnet	Plastic(≤ Φ100) Rubber(Others)
6	Cushing O-ring	TPU	14	Buffer gasket	TPU
7	Barrel	Aluminum alloy	15	Locker	
8	O-ring	NBR	16	Back cover	Aluminum alloy
			17	Screw	Carbon steel

ISO1552 Standard cylinder

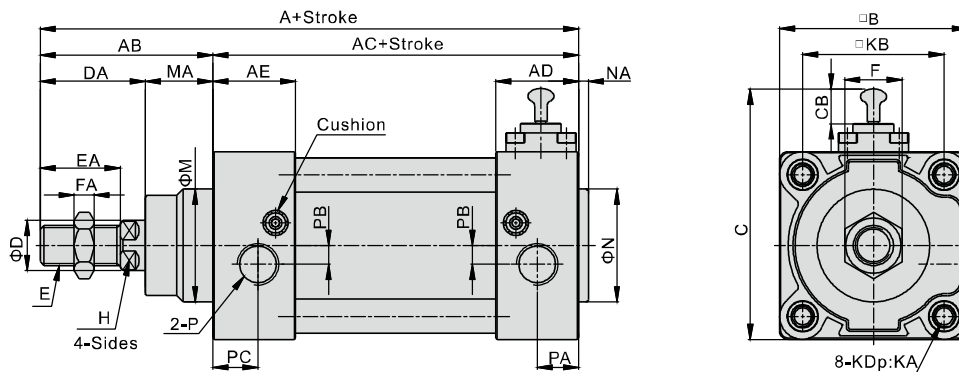
SAIL Series—With locker type

Dimensions

SAILF



SAILB

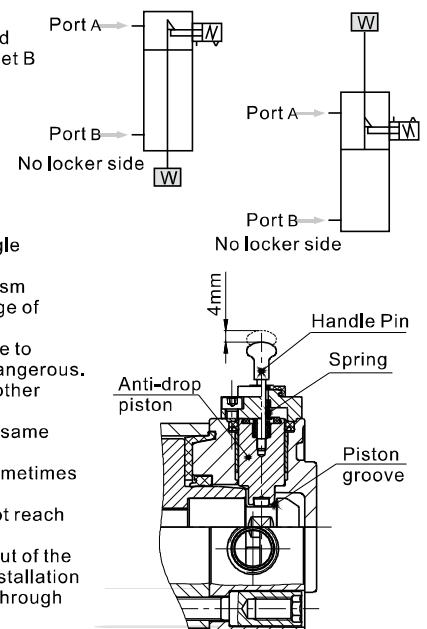


Bore size\Item	A	AB	AC	AD	AE	B	C	CB	D	DA	E	EA	F	FA	H	M	MA	K	KA	KB	N	NA	P	PA	PB	PC
40	159	54	105	32	32	53	78	13.5	16	32	M12×1.25	24	17	7	13	35	22	M6	17	38	35	3.5	1/4"	17	6	17
50	175	69	106	31	31	65	90	13.5	20	42	M16×1.5	32	23	8	17	40	27	M8	17	46.5	40	3.5	1/4"	19.5	7.5	15.5
63	190	69	121	33	33	75	100.5	14	20	40	M16×1.5	32	23	8	17	45	29	M8	17	56.5	45	4	3/8"	18	7.5	16.5
80	220	86	134	39	33	95	123	14.5	25	53	M20×1.5	40	26	10	22	45	33	M10	19	72	45	4	3/8"	22.5	9	16.5
100	231	91	140	39	37	115	142	13.5	25	55	M20×1.5	40	26	10	22	55	36	M10	19	89	55	4	1/2"	20.5	13.5	18.5
125	279	119	160	46	46	140	170.5	14.5	32	74	M27×2.0	54	41	13.5	27	60	45	M12	22	110	60	4	1/2"	23	14	23
160	332	152	180	50	50	180	210.5	14.5	40	94	M36×2.0	72	55	18	36	65	58	M16	30	140	65	4	3/4"	25	15	25
200	347	167	180	50	50	220	250.5	14.5	40	100	M36×2.0	72	55	18	36	75	67	M16	30	175	75	5	3/4"	25	15	25

Remark: The dimensions of magnet type cylinder are the same as non-magnet type cylinder.

Use and maintenance

- Under the condition of locking, there is a great danger to the gas port A when there is no pressure on both sides of the air port. There is a great danger similar to the release of locking, or the sudden release of lock and the piston rod flying. When the locking mechanism is lifted, it is necessary to supply the pressure of the air in let B and remove the lock mechanism without load.
- If the fast exhaust valve is used to speed down the drop speed, the cylinder nomenclature is sometimes started than the lock pin first and can not be removed normally. Therefore, please do not use the fast exhaust valve with the lock cylinder.
- Please do not use three solenoid valves: please do not combine with three (especially the seal type metal seal) solenoid valve. If pressure is sealed in the air inlet with the locking mechanism side, the lock will not work. In addition, even if it is temporarily locked, the air leaked from the solenoid valve will enter the cylinder, and the lock will be lifted after a period of time.
- If the locking mechanism side bears the back pressure, sometimes the lock will be lifted, so please use a single or integrated individual exhaust type solenoid valve.
- If the cylinder with adjustable cushioning is excessive, if the air cushion valve needle on the locking mechanism side is screwed too much, the piston will sometimes cause restraint at the stroke terminal, causing the damage of the locking mechanism. Therefore, the needle valve should be adjusted to make the piston not be restrained.
- When the manual operation of the locking mechanism is completed, it is necessary to reset the manual device to the in situ. In addition, please do not do manual operation outside the adjustment, otherwise it will be more dangerous.
- When the cylinder is installed and adjusted, please dissolve the lock: in the lock state of the installation and other operations, sometimes it causes the lock-in parts to be damaged.
- Please do not use multiple cylinders at the same time: please do not use more than 2 locking cylinders at the same time to drive a workpiece. Sometimes one of the cylinders will not be locked out.
- Please use the speed control valve in the exhaust throttle control state: in the intake throttling control, it is sometimes impossible to release the lock.
- In the lock side, please be sure to use the terminal of the cylinder stroke: if the piston of the cylinder does not reach the terminal, locking will fail or lock.
- Manual operation is a non locking way to release: pull the lever into the anti falling piston, and pull the bolt out of the 4mm with the force of more than 20N. After the piston is moved away, it can release the lock. (no load level installation or opposite side port pressurization), or after loosened, the anti falling piston returns to the original position through the action of the stop spring and enters the piston rod groove, and the piston becomes locked.



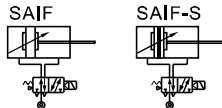
ISO1552 Standard cylinder



SAIF Series—With valve type



Symbol



Product feature

1. For Standard Cylinders: use 4M210 valve for bore size 32, 40 & 50; 4M310 valve for bore size 63, 80 & 100mm.
2. Individually control, no need for extra solenoid valves.
3. Installation time & space saving; suitable for decentralize installation in large system.
4. Options of mounting accessories & easy installation.

Stroke

Bore size (mm)	Standard stroke (mm)	Mini. stroke	Max. std stroke	Max. stroke
32	50 75 80 100 125 150 160 175 200 250 300 350 400 450 500	50 (125)	1000	1800
40	50 75 80 100 125 150 160 175 200 250 300 350 400 450 500 600 700 800	50 (125)	1200	1800
50	50 75 80 100 125 150 160 175 200 250 300 350 400 450 500 600 700 800 900 1000	50 (125)	1200	1800
63 80 100	50 75 80 100 125 150 160 175 200 250 300 350 400 450 500 600 700 800 900 1000	50 (125)	1500	1800

[Note] Consult us for non-standard stroke.
Add: The value in "()" is the mini. stroke value with TC type.

Ordering code

SAIF 50 × 1000 S □ - 06 A □ □

① ② ③ ④ ⑤ ⑥ ⑦ ⑧ ⑨

① Model	② Bore size	③ Stroke	④ Magnet	⑤ Mounting type [Note1]	⑥ Port size	⑦ Voltage	⑧ Electrical entry	⑨ Thread type
SAIF: Double acting with valve type	32 40 50 63 80 100	Refer to stroke table for details	Blank: Without magnet S: With magnet	Blank	06 : 1/8" 08 : 1/4" 10 : 3/8"	A : AC220V B : DC24V C : AC110V E : AC24V F : DC12V	Blank: Terminal I: Grommet	Blank: PT G: G
				LB				
				FA				
				FB				
				CA				
				CB				
				CR				
				FTC				
				TC				

[Note1] CR is used with CB, FTC and TC are used with TCM1 and TCM2, please refer to page 22~24 for details.

Specification

Cylinder specification						
Bore size (mm)	32	40	50	63	80	100
Acting type	Double acting					
Fluid	Air (to be filtered by 40µm filter element)					
Mounting type	Basic FA FB CA CB CR LB TC FTC TCM1 TCM2					
Operating pressure	0.15~1.0MPa (22~145psi) (1.5~10.0bar)					
Proof pressure	1.5MPa (215psi) (15bar)					
Temperature °C	-20~70					
Speed range mm/s	30~800					
Stroke tolerance	0~250 ^{+1.0} ₀ 251~1000 ^{+1.5} ₀ 1001~1500 ^{+2.0} ₀					
Cushion type	Variable cushion					
Adjustable cushion stroke	27		30		36	
Port size	1/8"		1/4"		3/8" 1/2"	
PU tube size (ODXID)	Φ8×Φ5				Φ10×Φ6.5	
Solenoid valve specification						
Model	4M210-06 & 4M210-08			4M310-08 & 4M310-10		
Fluid	Air (to be filtered by 40µm filter element)					
Acting type	Internal piloted					
Port size [Note1]	In=Exhaust=1/8" & In=1/4" Exhaust=1/8"			In=Exhaust=1/4" & In=PT3/8 Exhaust=1/4"		
Orifice size	4M210-06 : 14.0mm ² (Cv=0.78) 4M210-08 : 16.0mm ² (Cv=0.89)			4M310-08 : 25.0mm ² (Cv=1.40) 4M310-10 : 30.0mm ² (Cv=1.68)		
Valve type	5 port 2 position					
Operating pressure	0.15~0.8MPa (21~114psi)					
Proof pressure	1.2MPa (175psi)					
Temperature °C	-20~70					
Body material	Aluminum alloy					
Lubrication [Note2]	Not required					
Max. frequency [Note3]	5 cycle/sec			4 cycle/sec		
Coil specification						
Standard voltage	AC220V, AC110V, AC24V, DC24V, DC12V					
Scope voltage	AC : ±15% DC : ±10%					
Power consumption	AC : 3.5VA DC : 3.0W					
Protection	IP65 (DIN40050)					
Temperature classification	B Class					
Electrical entry	Terminal, Grommet					
Activating time	0.05 sec and below					

[Note1] PT thread, G thread are available.

[Note2] It can't stop in the midway of lubricating. Lubricants like ISO VG32 or equivalent are recommended.

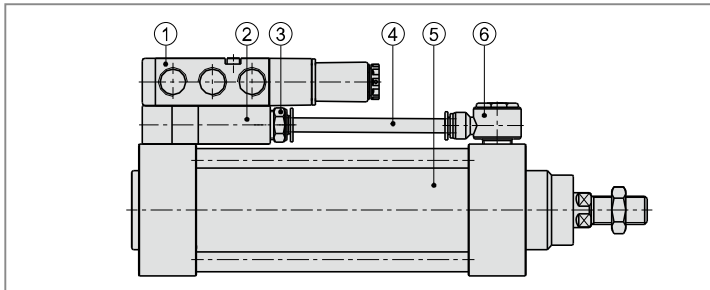
[Note3] The maximum actuation frequency is in the no-load state.
Add) Refer to P362 for detail of sensor switch.



ISO1552 Standard cylinder

SAIF Series—With valve type

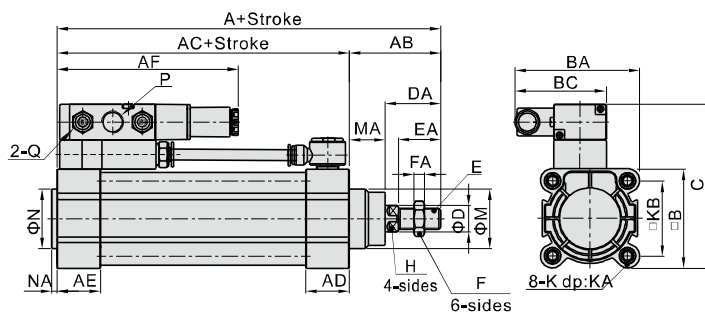
Innerstructure



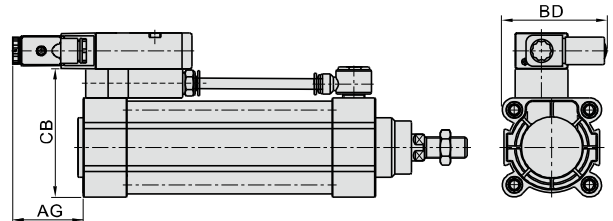
Item	
1	4M series solenoid valve
2	Unite block
3	APC series tube connector
4	PU tube
5	SAI series cylinder
6	APH series tube connector

Dimensions

Pull when energized



Push when energized



Bore size\Item	A	AB	AC	AD	AE	AF	AG	B	BA	BC	BD	C	CB
32	142	48	94	27.5	27.5	117.5	53.5	47	78.5	67	67.5	91	69
40	159	54	105	32	32	120	51	53	82	67	70	97	75
50	175	69	106	31	31	118.5	52.5	65	89.5	67	74.5	109	87
63	190	69	121	33	33	137	53	75	94.5	69.5	79.5	124	97
80	214	86	128	33	33	137	53	95	105.5	69.5	88	144	117
100	229	91	138	37	37	137.5	52.5	115	118	69.5	96	164	137

Bore size\Item	D	DA	E	EA	F	FA	H	M	MA	N	NA	Q	KB
32	12	29	M10X1.25	22	17	6	10	30	19	30	3	1/8"	32.5
40	16	33	M12X1.25	24	17	7	13	35	21	35	3.5	1/8"	38
50	20	42	M16X1.5	32	23	8	17	40	27	40	3.5	1/8"	46.5
63	20	42	M16X1.5	32	23	8	17	45	27	45	4	1/4"	56.5
80	25	53	M20X1.5	40	26	10	22	45	33	45	4	1/4"	72
100	25	55	M20X1.5	40	26	10	22	55	36	55	4	1/4"	89

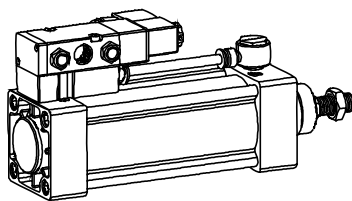
Bore size\Item	valve's type	P	K	KA
32	4M210-06	1/8"	M6	16
	4M210-08	1/4"		
40	4M210-06	1/8"	M6	16
	4M210-08	1/4"		
50	4M210-06	1/8"	M8	16
	4M210-08	1/4"		
63	4M310-08	1/4"	M8	16
	4M310-10	3/8"		
80	4M310-08	1/4"	M10	17
	4M310-10	3/8"		
100	4M310-08	1/4"	M10	17
	4M310-10	3/8"		

Remark: The dimensions of magnet type cylinder are the same as non-magnet type cylinder.

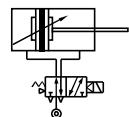
How to use

- Options for piston rod to retract or extend when solenoid coil is energized.
- Default factory setting will be piston rod to retract when energized(see Drawing one). Should you require piston rod to extend when energized, reposition the solenoid valve as shown in Drawing two.

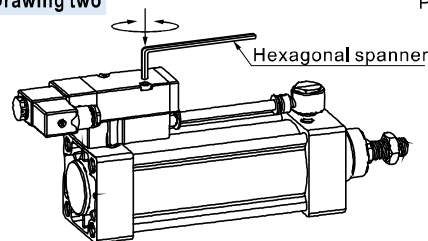
Drawing one



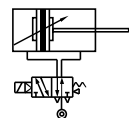
Pull when energized



Drawing two



Push when energized



Attention Ensure that the seals between the mounting block & valve are placed correctly when repositioning the valve.



Enclasp cylinder——BSAI Series

In accordance with ISO15552 standard

Compendium of BSAI Series

Spring and gripper patch enclasp equipment
Simplicity in structure
Celerity and availability locked or unlocked
State switch steadily

Multi-kinds unlocked mode
Air pressure unlocked mode and manual unlocked mode are available

Air pressure unlocked mode

Manual unlocked mode

Multi-type cylinder and bore size
BSAI, BSAID type available
Bore size: 32, 40, 50, 63, 80, 100, 125

Bidirectional lock
Can be locked no matter piston shoot out or draw back

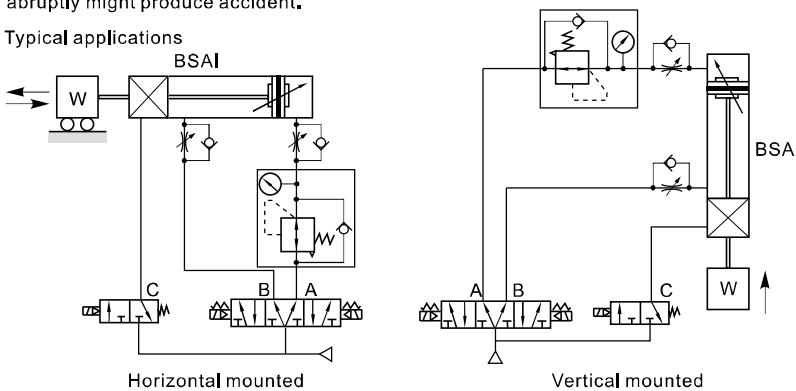
Compact enclasp equipment
Compact enclasp equipment to save space

The body is the same as SAI series
The body is SAI series standard cylinder's body for mounting expediently.
The mounting accessories (Besides FTC) and the sensor switch are the same as SAI series cylinder.

How to mount and use

- The locker equipment only be locked after cylinder stopped, can't brake the piston rod while it is moving. If the lock cylinder be used for control system with safety demand, other safety measure is required.
- The locker equipment only be unlocked when the air pressure on both sides of piston rod are equation or the cylinder stopped, otherwise piston rod moves abruptly might produce accident.

3. Typical applications



Acting type

Air inlet			State of acting	
A Port	B Port	C Port		
Yes	No	Yes	Advance	
Yes	Yes	No	Locked	
Yes	Yes	Yes	unlocked	Over 0.5S
Yes	No	Yes	Advance to rod protruded completely	0~0.5S
No	Yes	Yes	Back	
Yes	Yes	No	Locked	Over 0.5S
Yes	Yes	Yes	unlocked	
No	Yes	Yes	back to rod retracted completely	0~0.5S



ISO15552 Standard cylinder

BSAI Series—Enclasp type

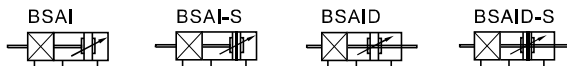


Specification

Bore size(mm)	32	40	50	63	80	100	125
Acting type	Double acting						
Fluid	Air(to be filtered by 40µm filter element)						
Mounting type	BSAI	Basic FA FB CA CB CR LB TC TCM1 TCM2		BSAID			
Operating pressure	0.15~0.7MPa(22~100psi)(1.5~7.0bar)						
Proof pressure	1.5MPa(215psi)(15bar)						
Temperature °C	-20~70						
Speed range mm/s				30~800		30~500	
Stroke tolerance	0~250 ^{+1.0} ₀		251~1000 ^{+1.5} ₀		1001~1500 ^{+2.0} ₀		
Cushion type	Variable cushion						
Adjustable cushion stroke	27		30		36		40
Port size	Cylinder	1/8"	1/4"		3/8"		1/2"
[Note1]	Enclasp equipment	G1/8					
Unlocked Pressure	0.3~0.7MPa(45~100psi)(3~7bar)						
Static holding force (N)	600	900	1400	2200	3600	5500	8600

[Note1] PT thread, G thread are available.
Add) Refer to P362 for detail of sensor switch.

Symbol



Product feature

1. Belong to SAI series standard cylinder add lock structure.
2. Can be locked at random positions in stroke scope.
3. Reasonable lock structure, the lock state no relation with the direction of piston moving.

Stroke

Bore size (mm)	Standard stroke (mm)	Max.std stroke
32	25 50 75 80 100 125 150 160 175 200 250 300 350 400 450 500	700
40	25 50 75 80 100 125 150 160 175 200 250 300 350 400 450 500 600 700 800	800
50	25 50 75 80 100 125 150 160 175 200 250 300 350 400 450 500 600 700 800 900 1000	1000
63	25 50 75 80 100 125 150 160 175 200 250 300 350 400 450 500 600 700 800 900 1000	1000
80	25 50 75 80 100 125 150 160 175 200 250 300 350 400 450 500 600 700 800 900 1000	1000
100	25 50 75 80 100 125 150 160 175 200 250 300 350 400 450 500 600 700 800 900 1000	1000
125	25 50 75 80 100 125 150 160 175 200 250 300 350 400 450 500 600 700 800 900 1000	1000

[Note] Consult us for non-standard stroke.

Ordering code

B SAI 80X50 S □ □
B SAID 80X50 S □ □

① ② ③ ④ ⑤ ⑥ ⑦

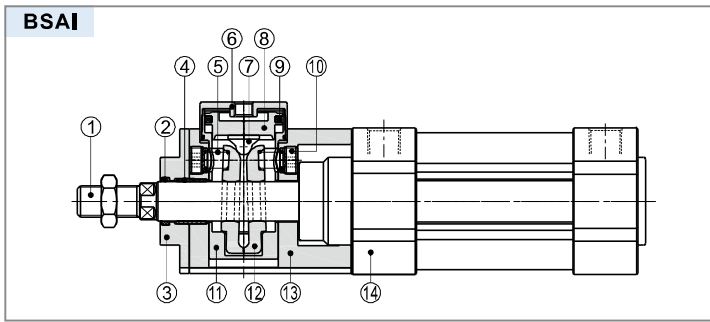
① Type	B: Enclasp cylinder			
② Model	SAI : Double acting type		SAID : Double rod type	
③ Bore size	32 40 50 63 80 100 125			
④ Stroke	Refer to stroke table for details			
⑤ Magnet	Blank: Without magnet		S: With magnet	
⑥ Mounting type [Note1]	Blank	LB	Blank	LB
	FA	FB	FA	TC
	CA	CB		
	CR	TC		
⑦ Thread type	Blank: PT G: G			

[Note1] CR is used with CB ; TC are used with TCM1、TCM2, please refer to page 22~24 for details.

ISO1552 Standard cylinder

BSAI Series—Enclasp type

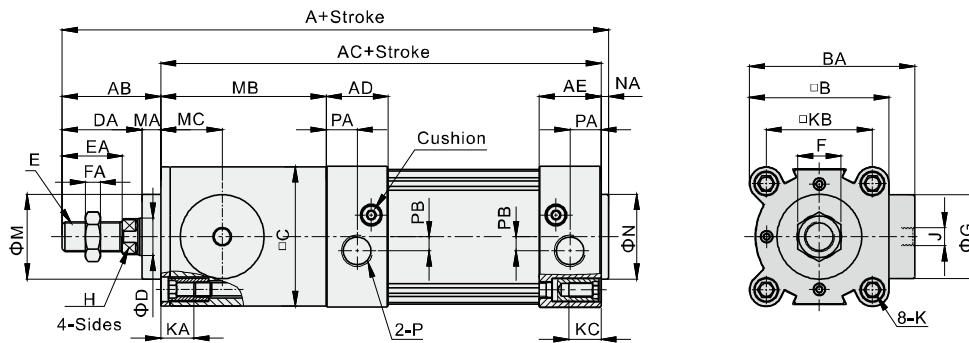
Inner structure and material of major parts



NO.	Item	Material
1	Piston rod	Carbon steel with 20μm chrome plated
2	Packing	Plastic
3	Packing holder	Aluminum alloy
4	Bearing	Carbon steel+Bronze sinter
5	Spring	Spring steel
6	Cover	Aluminum alloy
7	Unlocked header	Wear resistant material
8	Unlocked piston	Aluminum alloy
9	Piston O-ring	NBR
10	Screw	Carbon steel
11	Sleeve	Aluminum alloy
12	Clamp head	Aluminium bronze
13	Fixed holder	Aluminum alloy
14	SAI series cylinder	-

Dimensions

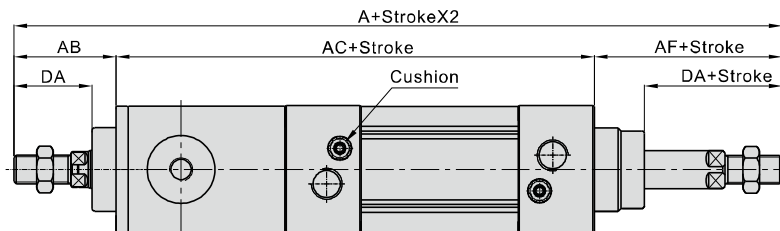
BSAI



Bore size\Item	A	AB	AC	AD	AE	B	BA	C	D	DA	E	EA	F	FA	G	H	J	K	KA	KB	KC	M	MA	MB	MC	P	PA	PB	N	NA
32	201	39	159	27.5	27.5	47	65	46.5	12	29	M10×1.25	22	17	6	30	10	G1/8	M6X1.0	14.5	32.5	16	20	10	65	25	1/8"	13.5	6	30	3
40	222.5	43	176	32	32	53	72	52.5	16	33	M12×1.25	24	17	7	36.5	13	G1/8	M6X1.0	14.5	38	17	35	10	71	27.5	1/4"	17.5	6	35	3.5
50	249.5	52	194	31	31	65	83	64	20	42	M16×1.5	32	23	8	44.5	17	G1/8	M8X1.25	17.5	46.5	17	40	10	88	33	1/4"	14	8	40	3.5
63	265	52	209	33	33	75	88	74	20	42	M16×1.5	32	23	8	44.5	17	G1/8	M8X1.25	17.5	56.5	17	45	10	88	33	3/8"	17	8	45	4
80	321	68	249	33	33	95	107	94	25	53	M20×1.5	40	26	10	55.5	22	G1/8	M10X1.5	17	72	19	45	15	121	47	3/8"	16.5	8	45	4
100	336	70	262	37	37	115	117.5	113.5	25	55	M20×1.5	40	26	10	55.5	22	G1/8	M10X1.5	17	89	19	55	15	124	47	1/2"	19.5	10	55	4
125	401	92	305	46	46	140	152	138	32	74	M27×2	54	41	13.5	70	27	G1/8	M12X1.75	21.5	110	22	60	18	145	63	1/2"	23	11	60	4

Remark: The dimensions of magnet type cylinder are the same as non-magnet type cylinder.

BSAID



Bore size\Item	A	AB	AC	AF	DA	E	FA
32	246	39	159	48	29	M10×1.25	6
40	273	43	176	54	33	M12×1.25	7
50	315	52	194	69	42	M16×1.5	8
63	330	52	209	69	42	M16×1.5	8
80	403	68	249	86	53	M20×1.5	10
100	423	70	262	91	55	M20×1.5	10
125	516	92	305	119	74	M27×2	13.5

Remark :

- The dimensions of magnet type cylinder are the same as non-magnet type cylinder.
- The unmarked dimension is the same as BSAI standard type.



SAI Series—Accessories

List for ordering code of accessories

Accessories Bore size	Mounting accessories								
	LB	FA/FB	CA	CB	CR	TC	FTC	TCM1	TCM2
32	F-SI32LB	F-SI32FA	F-SE32CA	F-SE32CB	F-SI32CR	F-SAI32TC	F-SI32FTC	F-SI32TCM1	F-SI32TCM2
40	F-SI40LB	F-SI40FA	F-SE40CA	F-SE40CB	F-SI40CR	F-SAI40TC	F-SI40FTC	F-SI40TCM1	F-SI40TCM2
50	F-SI50LB	F-SI50FA	F-SE50CA	F-SE50CB	F-SI50CR	F-SAI50TC	F-SI50FTC	F-SI40TCM1	F-SI40TCM2
63	F-SI63LB	F-SI63FA	F-SE63CA	F-SE63CB	F-SI63CR	F-SAI63TC	F-SI63FTC	F-SI63TCM1	F-SI63TCM2
80	F-SI80LB	F-SI80FA	F-SE80CA	F-SE80CB	F-SI80CR	F-SAI80TC	F-SI80FTC	F-SI63TCM1	F-SI63TCM2
100	F-SI100LB	F-SI100FA	F-SE100CA	F-SE100CB	F-SI100CR	F-SAI100TC	F-SI100FTC	F-SI125TCM1	F-SI125TCM2
125	F-SI125LB	F-SI125FA	F-SE125CA	F-SE125CB	F-SI125CR	F-SAI125TC	F-SI125FTC	F-SI125TCM1	F-SI125TCM2
160	F-SI160LB	F-SI160FA	F-SI160CA	F-SI160CB	F-SI160CR	F-SI160TC	F-SI160FTC	F-SI160TCM1	F-SI160TCM2
200	F-SI200LB	F-SI200FA	F-SI200CA	F-SI200CB	F-SI200CR	F-SI200TC	F-SI200FTC	F-SI200TCM1	F-SI160TCM2

Accessories Bore size	Knuckle				Sensor switch	
	I	Y	F	U	CMSE	DMSE
32	F-M10X125I	F-M10X125Y	F-M10X125F	F-M10X125U	CMSE	DMSE
40	F-M12X125I	F-M12X125Y	F-M12X125F	F-M12X125U		
50	F-M16X150I	F-M16X150Y	F-M16X150F	F-M16X150U		
63	F-M16X150I	F-M16X150Y	F-M16X150F	F-M16X150U		
80	F-M20X150I	F-M20X150Y	F-M20X150F	F-M20X150U		
100	F-M20X150I	F-M20X150Y	F-M20X150F	F-M20X150U		
125	F-M27X200I	F-M27X200Y	F-M27X200F	F-M27X200U		
160	F-M36X200I	F-M36X200Y	F-M36X200F	F-M36X200U		
200	F-M36X200I	F-M36X200Y	F-M36X200F	F-M36X200U		

Accessory selection

Accessories Cylinder model	Mounting accessories											Knuckle [Note1]				Sensor switch	
	LB	FA	FB	CA	CB	CR	TC	FTC	TCM1	TCM2	I	Y	U	F	CMSE	DMSE	
SAI	Standard	●	●	●	●	●	●	●	●	●	●	●	●	●	×	×	
	With magnet	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	
SAIL	Standard	●	●	●	●	●	●	●	●	●	●	●	●	●	×	×	
	With magnet	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	
SAIF	Standard	●	●	●	●	●	●	●	●	●	●	●	●	●	×	×	
	With magnet	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	
BSAI	Standard	●	●	●	●	●	●	●	×	●	●	●	●	●	×	×	
	With magnet	●	●	●	●	●	●	●	×	●	●	●	●	●	●	●	
SAID	Standard	●	●	×	×	×	×	●	●	●	●	●	●	●	×	×	
	With magnet	●	●	×	×	×	×	●	●	●	●	●	●	●	●	●	
BSAID	Standard	●	●	×	×	×	×	●	×	●	●	●	●	●	×	×	
	With magnet	●	●	×	×	×	×	●	×	●	●	●	●	●	●	●	
SAIJ	Standard	●	●	×	×	×	×	●	●	●	●	●	●	●	×	×	
	With magnet	●	●	×	×	×	×	●	●	●	●	●	●	●	●	●	

[Note1] Please refer to P358~361 for knuckle detail.

Material of accessories

Accessories Bore size	Mounting accessories										Knuckle			
	LB	FA	FB	CA	CB	CR	TC	FTC	TCM1	TCM2	I	Y	F	U
32~100	○	●	●	◇	◇	◇	◇	◇	◇	●	□	□	□	□
125~200	◇	◇	◇	◇	◇	◇	◇	◇	◇	●	◇	◇	□	□

●—Aluminum alloy, ○—SPCC, ◇—Nodular cast iron, □—Carbon steel.

Installation of TC bracket

Follow below steps to install TC brackets:

- Assemble TC bracket onto barrel and move it to the desired position.
- Slightly tighten screws and make sure the surface of groove of bracket is closely attached to protruded parts on the barrel.
- Bore 32~40: Tightening up 8 black stop screws (Light torque - Middle torque - Fastened). See below table for recommended tightening torque.
Bore 50~125: Tightening up 8 black stop screws first (Light torque - Middle torque - Fastened), then the 8 white stop screws. See below table for recommended tightening torque.

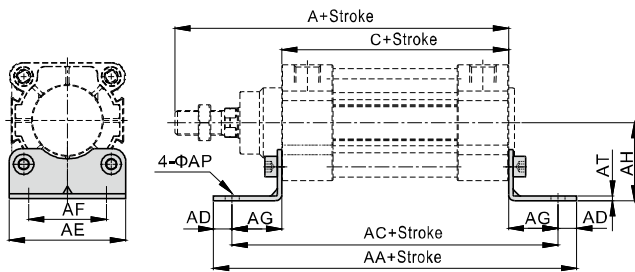
Bore size	32	40	50	63	80	100	125
Max locking moment M(N.m)	2~3	4~6	4~6	4~6	8~10	8~10	10~12
Static holding force F(N)	800	1200	2000	3000	5000	8000	12000

Note: If customer needs holding force larger than the figures stated in above table, please contact us for customization of fixed TC design (Non-movable TC bracket).



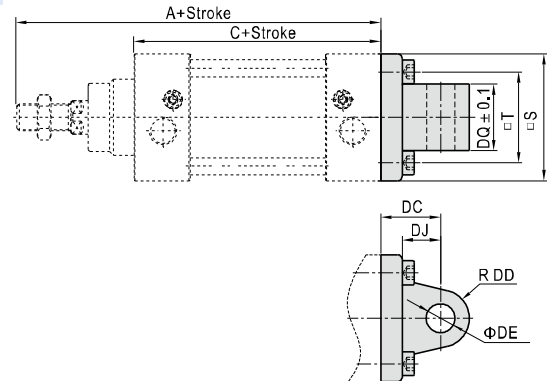
Dimensions

LB



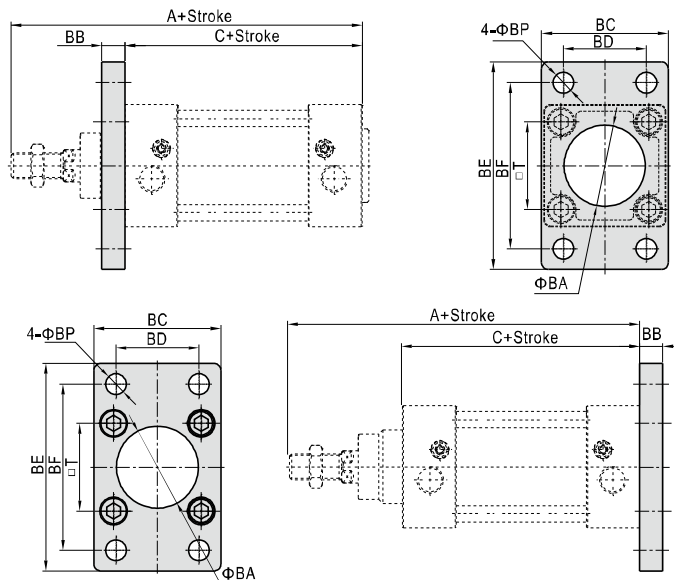
Bore size/Item	A	C	AA	AC	AD	AE	AF	AG	AH	AL	AT
32	142	94	158	142	8	47	32	24	32	7	3
40	159	105	179	161	9	53	36	28	36	9	3
50	175	106	190	170	10	65	45	32	45	9	3
63	190	121	209	185	12	75	50	32	50	9	3
80	214	128	248	210	19	95	63	41	63	12,5	4
100	229	138	266	220	23	115	75	41	71	14,5	4
125	279	160	290	250	20	140	90	45	90	16,5	8
160	332	180	340	300	20	180	115	60	115	18,5	10,5
200	347	180	380	320	30	220	135	70	135	24	9

CA



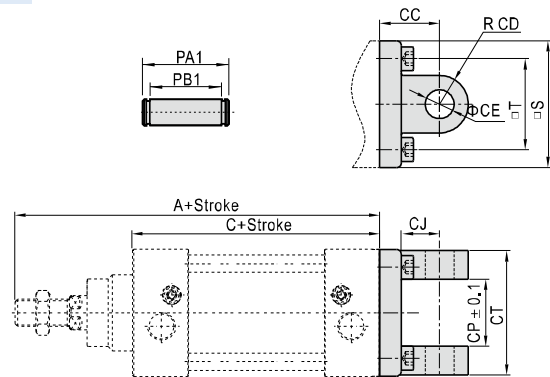
Bore size/Item	A	C	S	T	DC	DD	DE	DJ	DQ
32	142	94	46,5	32,5	22	10,5	10	13	25,8
40	159	105	54	38	25	12	12	16	27,8
50	175	106	64	46,5	27	12	12	17	31,7
63	190	121	75	56,5	32	15	16	22	39,7
80	214	128	93	72	36	15,5	16	22	49,7
100	229	138	110	89	41	20	20	27	59,7
125	279	160	134	110	50	24	25	33	69,7
160	332	180	180	140	55	30	30	35,5	89,7
200	347	180	220	175	60	30	30	37	89,7

FA/FB



Bore size/Item	A	C	BA	BB	BC	BD	BE	BF	BP	T
32	142	94	30,5	10	47	32	80	64	7	32,5
40	159	105	35,5	10	53	36	90	72	9	38
50	175	106	40,5	12	65	45	108	90	9	46,5
63	190	121	45,5	12	75	50	118	100	9	56,5
80	214	128	45,5	16	95	63	150	126	12,5	72
100	229	138	55,5	16	115	75	176	150	14,5	89
125	279	160	60,5	20	139	90	218	180	16,5	110
160	332	180	65,5	20	180	115	280	230	18,5	140
200	347	180	75,5	25	220	135	320	270	24	175

CB

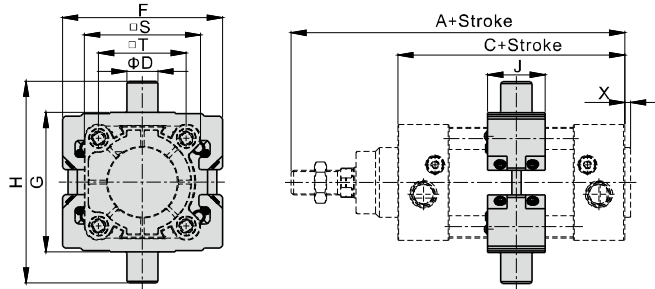


Bore size/Item	A	C	CC	CD	CE	CJ	CP	CT	PA1	PB1	S	T
32	142	94	22	10,5	10	13	26	45	51	45,5	46,5	32,5
40	159	105	25	12	12	16	28	52	59	52,5	54	38
50	175	106	27	12	12	17	32	60	67	60,5	64	46,5
63	190	121	32	15	16	22	40	70	77	70,5	75	56,5
80	214	128	36	15	16	22	50	90	97	90,5	93	72
100	229	138	41	20	20	27	60	110	119	110,5	110	89
125	279	160	50	24	25	33	70	130	139	130,5	134	110
160	332	180	55	30	30	35,5	90	170	181	170,5	180	140
200	347	180	60	30	30	36	90	170	181	170,5	220	175

ISO1552 Standard cylinder

SAI Series—Accessories

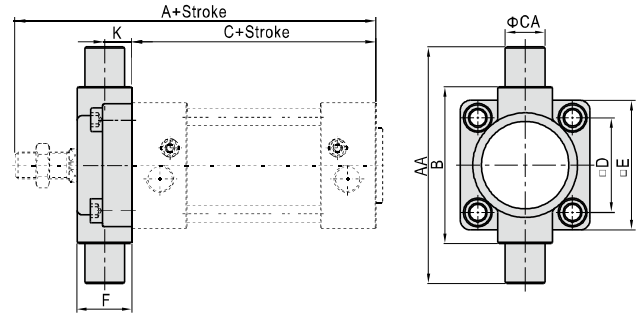
TC



Bore size/Item	A	C	D	F	G	H	J	S	X	T
32	142	94	12	68.5	52	76	31	47	3	32.5
40	159	105	16	75	63	95	31	53	3.5	38
50	175	106	16	91	75	107	35	65	3.5	46.5
63	190	121	20	103	90	130	35	75	4	56.5
80	214	128	20	126	110	150	45	95	4	72
100	229	138	25	145	132	182	45	115	4	89
125	279	160	25	175	160	210	51	140	4	110
160	332	180	32	210	200	264	50	180	4	140
200	347	180	32	255	250	314	50	220	5	175

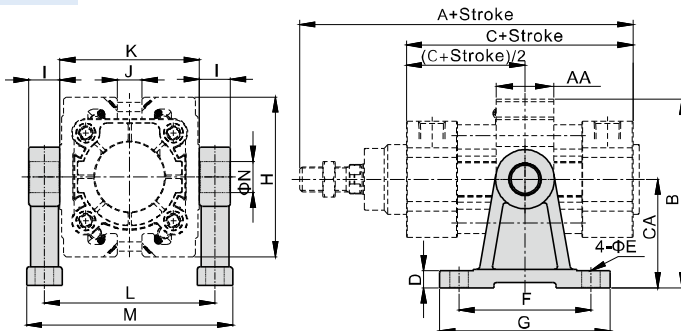
[Note] 160 and 200 TC accessory has been installed on the barrel of cylinder before it worked off, and the position of the accessories can not be adjusted arbitrarily. If consumer orders the TC solely, he will not install it on the barrel of standard cylinder directly.

FTC



Bore size/Item	A	C	AA	B	CA	D	E	F	K
32	142	94	74	50	12	32.5	46	19	10
40	159	105	95	63	16	38	52	21	10
50	175	106	107	75	16	46.5	64	26	12
63	190	121	130	90	20	56.5	74	28	12
80	214	128	150	110	20	72	94	31	16
100	229	138	182	132	25	89	114	35	16
125	279	160	210	160	25	110	139	43	20
160	332	180	264	200	32	140	179	56	20
200	347	180	314	250	32	175	218	64	20

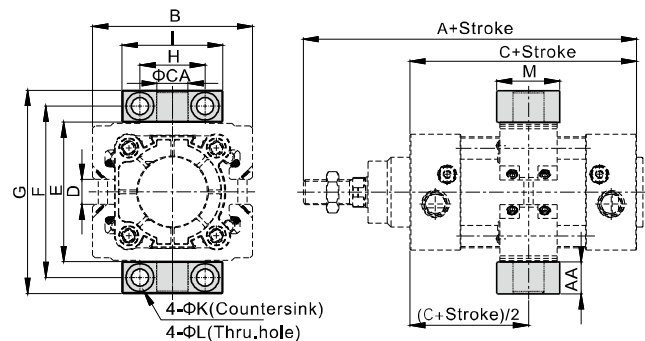
TCM1



Bore size/Item	A	C	AA	B	CA	D	E	F	G	H	I	J	K	L	M	N
32	142	94	31	72.5	40	11	9	60	80	65	12	5	52	64	79	12
40	159	105	31	91.5	54	11	12	75	100	75	16	8	63	79	98	16
50	175	106	35	99.5	54	11	12	75	100	91	16	10	75	91	110	16
63	190	121	35	121.5	70	11	12	85	110	103	20	16	90	110	133	20
80	214	128	45	133	70	11	12	85	110	126	20	20	110	130	153	20
100	229	138	45	162.5	90	19	18	115	155	145	25	28	132	157	185	25
125	279	160	51	177.5	90	19	18	115	155	175	25	40	160	185	213	25
160	332	180	50	215	110	24	22	140	190	210	32	100	200	232	267	32
200	347	180	50	262.5	135	27	22	150	200	255	32	125	250	282	317	32

[Note] 160/200 installation position of the accessories can not be adjusted arbitrarily.

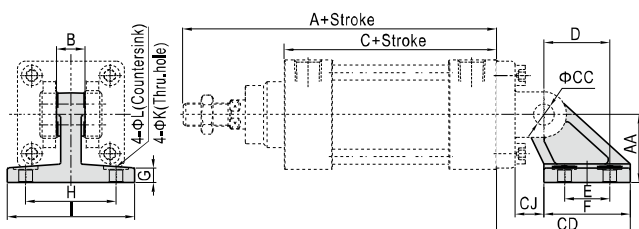
TCM2



Bore size/Item	A	AA	B	C	CA	D	E	F	G	H	I	K	L	M
32	142	14	65	94	12	5	52	68	82	32	46	11	7	30
40	159	17	75	105	16	8	63	82	99	36	55	15	9	36
50	175	17	91	106	16	10	75	94	111	36	55	15	9	36
63	190	20.5	103	121	20	16	90	113.5	134	42	65	18	11	40
80	214	20.5	126	128	20	20	110	133.5	154	42	65	18	11	40
100	229	24.5	145	138	25	28	132	159.5	184	50	75	20	14	50
125	279	24.5	175	160	25	40	160	187.5	212	50	75	20	14	50
160	332	30	210	180	32	100	200	234	264	60	92	26	18	60
200	347	30	255	180	32	125	250	284	314	60	92	26	18	60

[Note] 160/200 installation position of the accessories can not be adjusted arbitrarily.

CR



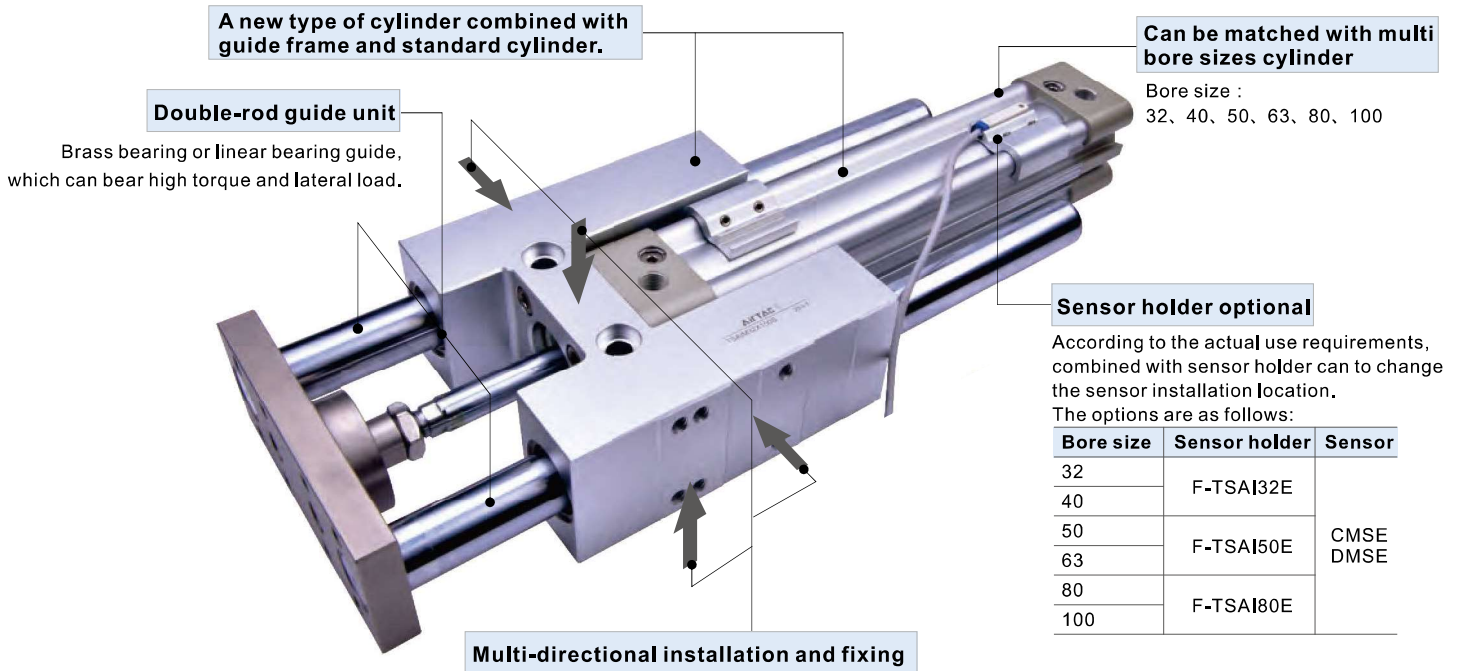
Bore size/Item	A	AA	B	C	CC	CD	CJ	D	E	F	G	H	I	K	L
32	142	32	26	94	10	49	10	21	18	30	8	38	50	6.5	10.5
40	159	36	28	105	12	55	12	24	22	34	10	41	53	6.5	10.5
50	175	45	32	106	12	67	13	33	30	44	12	50	64	9	14
63	190	50	40	121	16	76	17	37	35	49	12	52	66	9	14
80	214	63	50	128	16	92.5	19.5	47	40	59	14	66	85	11	17
100	229	71	60	138	20	105.5	22.5	55	50	69	15	76	95	11	17
125	279	90	70	160	25	134	29	70	60	88	20	94	122	13.5	20
160	332	115	90	180	30	171	25.5	97	88	126	25	118	156	13.5	20
200	347	135	90	180	30	185	31	105	90	130	30	122	162	18	26

[Note] CR can't be used alone, it must be used with CB.



TSAI series with guide frame cylinder

Compendium of TSAI series



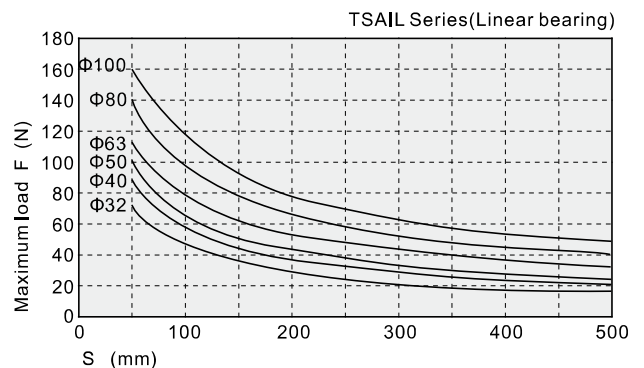
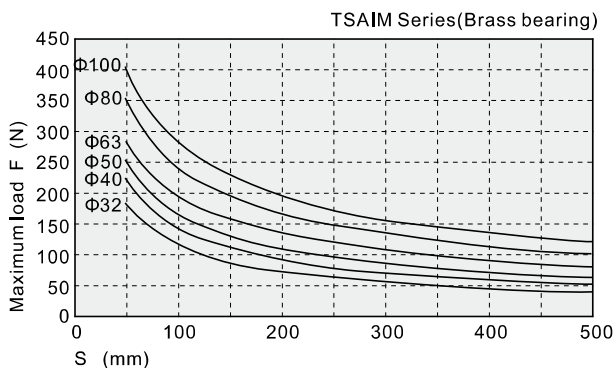
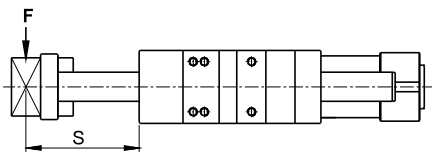
Bore size	Sensor holder	Sensor
32	F-TSAI32E	CMSE DMSE
40		
50	F-TSAI50E	
63		
80	F-TSAI80E	
100		

Criteria for selection: Cylinder thrust

Unit : Newton(N)

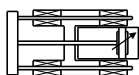
Bore size	Rod size	Acting type		Pressure area(mm ²)	Operating pressure(MPa)								
					0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9
32	12	Double acting	Push side	804	80.4	160.8	241.2	321.6	402.0	482.4	562.8	643.2	723.6
			Pull side	690	69.0	138.0	207.0	276.0	345.0	414.0	483.0	552.0	621.0
40	16	Double acting	Push side	1256	125.6	251.2	376.8	502.4	628.0	753.6	879.2	1002.4	1130.4
			Pull side	1055	105.5	211.0	316.5	422.0	527.5	633.0	738.5	844.0	949.5
50	20	Double acting	Push side	1963	196.3	392.6	588.9	785.2	981.5	1177.8	1374.1	1570.4	1766.7
			Pull side	1649	164.9	329.8	494.7	659.6	824.5	989.4	1154.3	1399.2	1484.1
63	20	Double acting	Push side	3117	311.7	623.4	935.1	1246.8	1558.5	1870.2	2181.9	2493.6	2805.3
			Pull side	2803	280.3	560.6	840.9	1121.2	1401.5	1681.8	1962.1	2242.4	2522.7
80	25	Double acting	Push side	5026	502.6	1005.2	1507.8	2010.4	2513.0	3015.6	3518.2	4020.8	4523.4
			Pull side	4536	453.6	907.2	1360.8	1814.4	2268.0	2721.6	3175.2	3628.8	4082.4
100	25	Double acting	Push side	7853	785.3	1570.6	2355.9	3141.2	3926.5	4711.8	4288.2	6282.4	7067.7
			Pull side	7362	736.2	1472.4	2208.6	2948.6	3681.0	4417.2	5153.4	5889.6	6625.8

Maximum load relationship curve

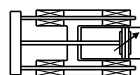




Symbol



TSAI



TSAI-S

Product feature

1. A new type of cylinder combined with guide frame and standard cylinder.
2. Brass bearing: It is suitable for the action that has radial load resistance, with greater torsion stiffness.
Linear bearing: It is suitable for push-up action, or where high precision and high load capacity are required, especially for occasions requiring low friction.
3. The special design of the guide frame body provides a multi-directional mounting.
4. The buffer adjustment of cylinder is smooth and steady.
5. According to the actual use requirements, combined with sensor holder can to change the sensor installation location.

Ordering code

TSAI M 40 X 100 S □



① Model	TSAI: With guide frame cylinder
② Bearing type	M: Brass bearing L: Linear bearing
③ Bore size	32 40 50 63 80 100
④ Stroke	Refer to stroke table for details
⑤ Magnet[Note1]	Blank: Without magnet S: With magnet
⑥ Thread type	Blank: PT G: G

[Note1] With magnet cylinders are equipped with 2 pcs sensor holders.

Ordering code(for guide frame)

F - TSAI M 40 X 100



① Accessory code	F: Accessory
② Model	TSAI: With guide frame cylinder
③ Bearing type	M: Brass bearing L: Linear bearing
④ Bore size	32 40 50 63 80 100
⑤ Stroke	Refer to stroke table for details

[Note] When ordering the guide frames separately, 2 pcs sensor holders are equipped. The matching relationship between the sensor holder and the bore size is shown in the following table.

Sensor holder type\Bore size	32	40	50	63	80	100
F-TSAI32E	•	•				
F-TSAI50E			•	•		
F-TSAI80E					•	•

Specification

Bore size(mm)	32	40	50	63	80	100
Acting type	Double acting					
Fluid	Air(to be filtered by 40µm filter element)					
Operating pressure	0.15~1.0MPa(22~145psi)(1.5~10.0bar)					
Proof pressure	1.5MPa(215psi)(15bar)					
Temperature °C	-20~70					
Speed range mm/s	30~500					
Stroke tolerance	0~250 ^{+1.0} ₀ >250 ^{+1.5} ₀					
Cushion type	Variable cushion					
Port size [Note]	1/8"	1/4"		3/8"		1/2"

[Note] PT thread, G thread are available.

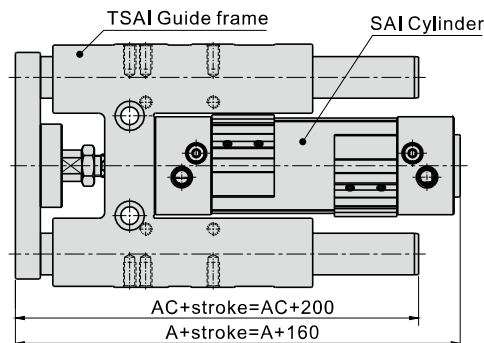
Stroke

Bore size(mm)	Standard stroke (mm)	Max.std stroke(mm)
32	50 100 150 200 250 300 350 400 450 500	500
40	50 100 150 200 250 300 350 400 450 500	500
50	50 100 150 200 250 300 350 400 450 500	500
63	50 100 150 200 250 300 350 400 450 500	500
80	50 100 150 200 250 300 350 400 450 500	500
100	50 100 150 200 250 300 350 400 450 500	500

[Note] Consult us for non-standard stroke.

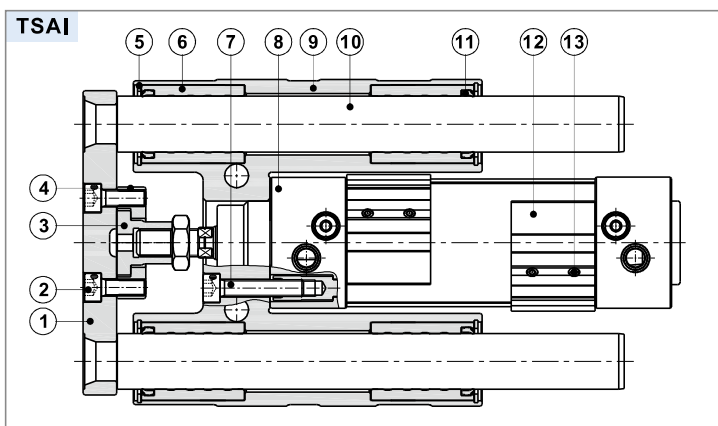
Ordering instructions :

1. When ordering guide frame separately, only standard strokes from the stroke list can be ordered. (Other stroke can only be ordered by non-standard)
2. To order non-standard stroke cylinders with guide frame, the combination is as follows:
Non-standard stroke cylinder
+ guide frame of the upper standard stroke.
Example: SAI32X160 (non-standard stroke cylinder)
+F-TSAIM32X200(Standard stroke guide frame).
The dimension is as follows:



TSAI Series

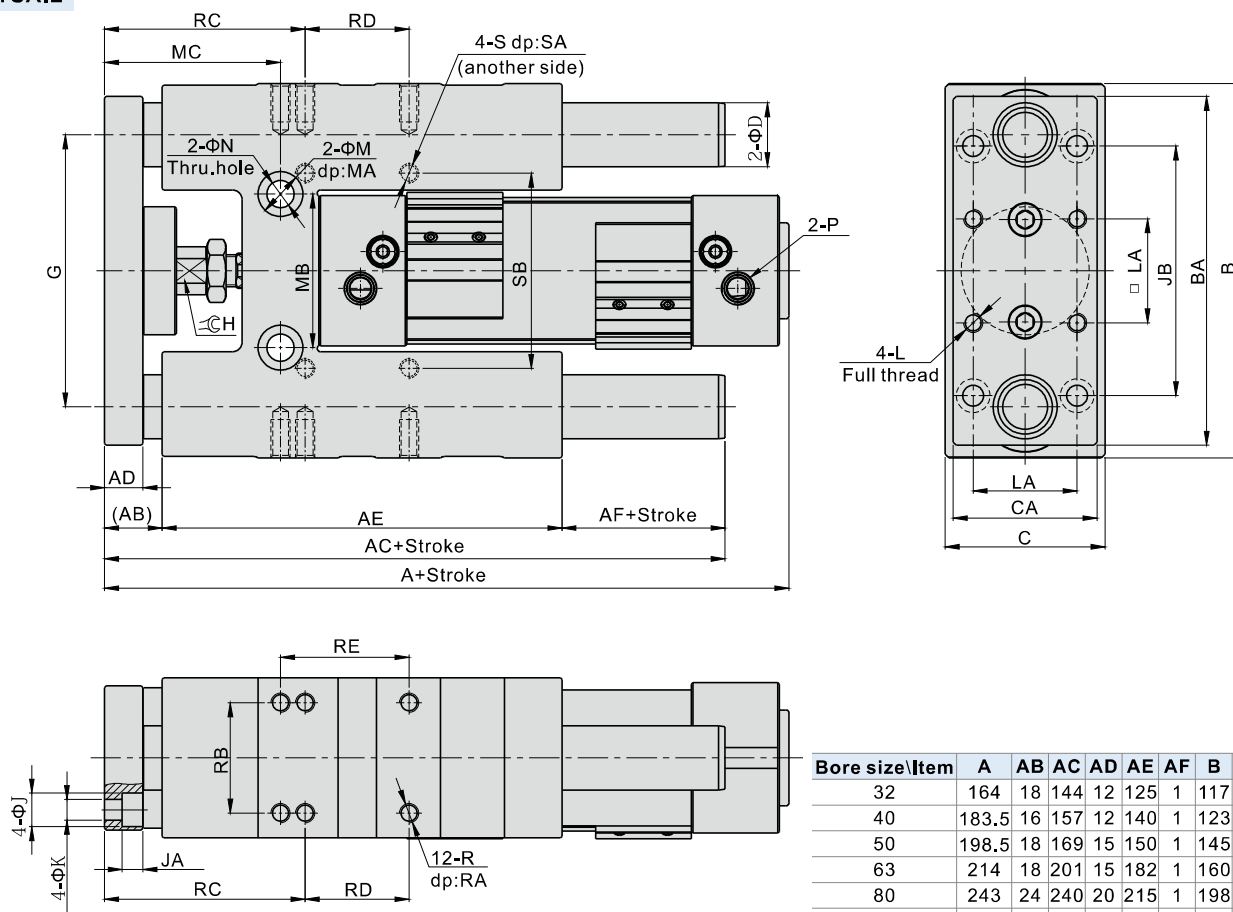
Inner structure and material of major parts



NO.	Item	Material
1	Fixed plate	Ductile iron
2	Bolt	Carbon steel
3	Floating nut	Carbon steel
4	Floating baffle	Carbon steel
5	C clip	Spring steel
6	Linear bearing	-
	Brass bearing	Brass
7	Bolt	Carbon steel
8	SAI Cylinder	Unit
9	Guide frame	Aluminum alloy
10	Guider(Linear)	Alloy steel
	Guider(Brass)	Carbon steel
11	Dust ring	Plastic
12	Sensor holder	Aluminum alloy
13	Screw	Alloy steel

Dimensions

TSAIM/TSAIL



Bore size\Item	A	AB	AC	AD	AE	AF	B	BA	C	CA
32	164	18	144	12	125	1	117	109	50	45
40	183.5	16	157	12	140	1	123	115	58	54
50	198.5	18	169	15	150	1	145	135	70	63
63	214	18	201	15	182	1	160	150	85	80
80	243	24	240	20	215	1	198	189	105	100
100	258	24	245	20	220	1	221	210	130	120

Bore size\Item	D	G	H	J	JA	JB	K	L	LA	M	MA	MB	MC	N	P	R	RA	RB	RC	RD	RE	S	SA	SB
32	20(16)	85	15	10.5	6.5	78	6.5	M6X1.0	32.5	14	4.5	48	55	8.5	1/8"	M6X1.0	12	34.5	62.7	32.5	40.2	M6X1.0	12	61
40	20(16)	91	15	10.5	6.5	84	6.5	M6X1.0	38	14	6	54	61	8.5	1/4"	M6X1.0	14	38	64	38	51	M6X1.0	14	69
50	20	108	19	14	8.5	100	8.5	M8X1.25	46.5	17	7	66	72	10.5	1/4"	M8X1.25	16	46.5	70.2	46.5	64.7	M8X1.25	16	85
63	20	123	19	14	8.5	105	8.5	M8X1.25	56.5	17	10	79	72	10.5	3/8"	M8X1.25	16	56.5	73.7	56.5	76.5	M8X1.25	16	100
80	30(25)	150	27	17	10.5	130	10.5	M10X1.5	72	-	-	-	-	-	3/8"	M10X1.5	20	72	90	72	90	M10X1.5	20	130
100	30(25)	172	27	17	10.5	150	10.5	M10X1.5	89	-	-	-	-	-	1/2"	M10X1.5	20	89	91.5	89	113	M10X1.5	20	150

[Note] The values in "()" in the above table are TSAIL series sizes.



Standard cylinder—SGC Series

In accordance with ISO15552 standard

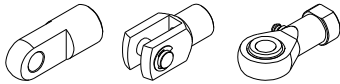
Compendium of SGC Series

ISO15552(Original ISO6431) Standard cylinder

Bore size: 125, 160, 200, 250

Multi-kinds of Seals Material

Three kinds of cylinder joints



I Knuckle Y Knuckle Universal Joint

Multi-type cylinder



SGC: Double acting type



SGCD: Double rod type



SGCJ: Adjustable stroke type

Adjustable air buffer

With adjustable air buffer on the front and back cover

Tie rod cylinder

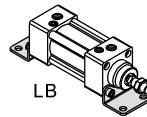
The cylinder barrel and front/rear cap are jointed by tie rods with high reliability.

Convenient and fast fix sensor switch

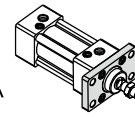
Sensor switch can be directly fixed onto the cylinder, which is convenient and fast.

the counterpart sensor switch type is: CMSG, DMSG, EMSG

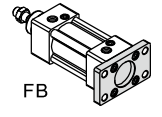
Multi-mounting accessories



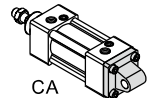
LB



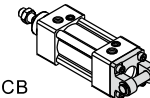
FA



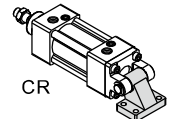
FB



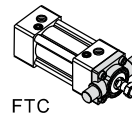
CA



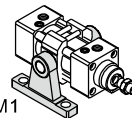
CB



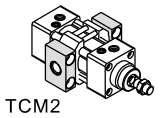
CR



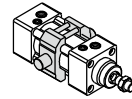
FTC



TCM1



TCM2



TC

Criteria for selection: Cylinder thrust

Unit : Newton(N)

Bore size	Rod size	Acting type	Pressure area(mm ²)	Operating pressure(MPa)										
				0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9		
125	32	Double acting Push side	12272	1227.2	2454.4	3681.6	4908.8	6136.0	7363.2	8590.4	9817.6	11044.8		
		Double acting Pull side	11468	1146.8	2293.6	3440.4	4587.2	5734.0	6880.8	8027.6	9174.4	10321.2		
160	40	Double acting Push side	20106	2010.6	4021.2	6031.8	8042.4	10053.0	12063.6	14074.2	16084.8	18095.4		
		Double acting Pull side	18849	1884.9	3769.8	5654.7	7539.6	9424.5	11309.4	13194.3	15079.2	16964.1		
200	40	Double acting Push side	31416	3141.6	6283.2	9424.8	12566.4	15708.0	18849.6	21991.2	25132.8	28274.4		
		Double acting Pull side	30157	3015.7	6031.4	9047.1	12062.8	15078.5	18094.2	21109.9	24125.6	27141.3		
250	50	Double acting Push side	49086	4908.6	9817.2	14725.8	19634.4	24543.0	29451.6	34360.2	39268.8	44177.4		
		Double acting Pull side	47123	4712.3	9424.6	14136.9	19045.5	23954.1	28862.7	33771.3	38680.0	43588.7		

Installation and application



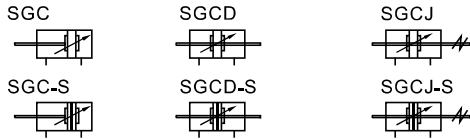
- When load changes in the work, the cylinder with abundant output capacity shall be selected.
- Relative cylinder with high temperature resistance or corrosion resistance shall be chosen under the condition of high temperature or corrosion.
- Necessary protection measure shall be taken in the environment with higher humidity, much dust or water drops, oil dust and welding dregs.
- Dirty substances in the pipe must be eliminated before cylinder is connected with pipeline to prevent the entrance of particles into the cylinder.
- The medium used by cylinder shall be filtered to 40μm or below.
- Anti-freezing measure shall be adopted under low temperature environment to prevent moisture freezing.
- The cylinder shall be carried out test run without load before application. Prior to run, buffer shall be turned to the minimum and gradually released to avoid the damage on cylinder caused by excessive impact.
- The cylinder shall avoid the influence of side load in operation to maintain the normal work of cylinder and extend the service life.
- If the cylinder is dismantled and stored for a long time, please conduct anti-rust treatment to the surface. Anti-dust caps shall be added in air inlet and outlet ports.



SGC Series



Symbol



Product feature

1. ISO15552 (original ISO6431) standard cylinder.
2. The seal of piston adopts heterogeneous two way seal structure. It's dimension is tight and it has the function of oil reservation.
3. SGC series cylinders are made of aluminum pipe.
4. The buffer adjustment of cylinder is smooth and steady.
5. Cylinders and accessories for installation with several specifications are optional.
6. The seal material with high temperature resistance is adopted, operating temperature range is 0~150°C.

Specification

Bore size(mm)	125	160	200	250
Acting type	Double acting			
Fluid	Air(to be filtered by 40µm filter element)			
Mounting type	SGC	Basic FA LB CA CB CR LC TC FTC TCM1 TCM2		
	SGCD, SGCJ	Basic FA LB TC FTC TCM1 TCM2		
Operating pressure	0.15~1.0MPa(22~145psi)(1.5~10.0bar)			
Proof pressure	1.5MPa(215psi)(15bar)			
Temperature °C	-20~70			
Speed range mm/s	30~500			
Stroke tolerance	0~250 ^{+1.0} ₀ 251~1000 ^{+1.5} ₀ 1001~1500 ^{+2.0} ₀			
Cushion type	Variable cushion			
Adjustable cushion stroke	40	50	60	
Port size [Note1]	1/2"	3/4"	1"	

[Note1] PT thread, G thread are available.

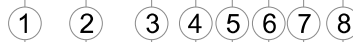
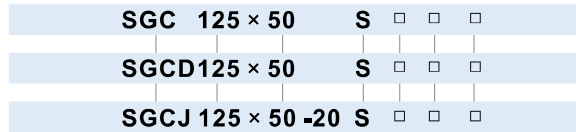
Add) Refer to P362 for detail of sensor switch.

Stroke

Bore size (mm)	Standard stroke (mm)												Max.std stroke	Max. stroke									
125	25	50	75	80	100	125	150	160	175	200	250	300	350	400	450	500	600	700	800	900	1000	1500	1800
160	25	50	75	80	100	125	150	160	175	200	250	300	350	400	450	500	600	700	800	900	1000	1500	2000
200	25	50	75	80	100	125	150	160	175	200	250	300	350	400	450	500	600	700	800	900	1000	1500	2000
250	25	50	75	80	100	125	150	160	175	200	250	300	350	400	450	500	600	700	800	900	1000	1500	2000

[Note] Consult us for non-standard stroke.

Ordering code

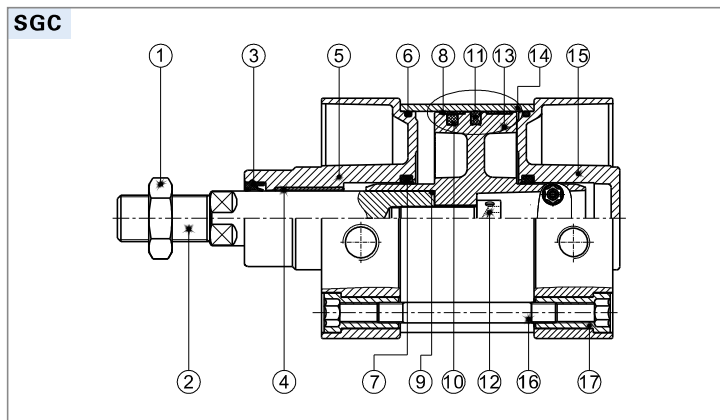


① Model	② Bore size	③ Stroke	④ Adjustable stroke	⑤ Magnet	⑥ Mounting type[Note1]	⑦ Seals Material	⑧ Thread type
SGC: Double acting type (Aluminum barrel)	125 160 200 250	Refer to stroke table for details	No this code	Blank: Without magnet S: With magnet	Blank	Blank: TPU [Note2] H: Viton N: NBR	Blank: PT G: G
SGCD: Double rod type (Aluminum barrel)					LB		
SGCJ: Adjustable stroke type (Aluminum barrel)					FA		
			10		FB		
			20		CA		
			30		CB		
			40		CR		
			50		FTC		
			75		TC		
			100		Blank		
					LB		
					FA		
					FTC		
					TC		

[Note1] CR is used with CB, FTC, TC are used with TCM1, TCM2. Please refer to page 31~33 for details. [Note2] TPU seals are not available for SGC250.

SGC Series

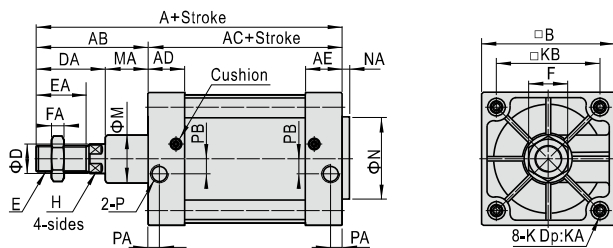
Inner structure and material of major parts



NO.	Item	Material
1	Rod nut	Carbon steel
2	Piston rod	Carbon steel with 20μm chrome plated
3	Front cover packing	NBR(SGC250)\TPU(Other)
4	Bushing	Wear resistant material
5	Front cover	Aluminum alloy
6	O-ring	NBR
7	Buffer gasket	NBR(SGC250)\TPU(Other)
8	Wear ring	Wear resistant material
9	O-ring	NBR
10	Magnet	Rubber
11	Piston Seal	NBR
12	Screw	Carbon steel
13	Piston	Aluminum alloy
14	Barrel	Aluminum alloy
15	Back cover	Aluminum alloy
16	Tie-rod	Carbon steel
17	Tie-rod nut	Carbon steel

Dimensions

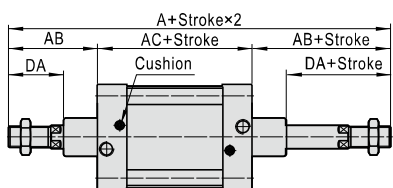
SGC



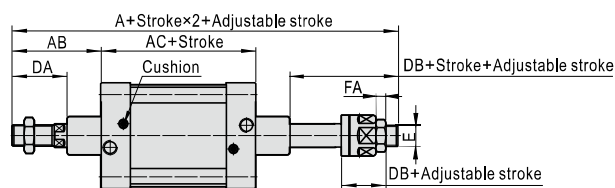
Bore size\Item	A	AB	AC	AD	AE	B	D	DA	E	EA	F	FA	H	K	KA	KB	M	MA	N	NA	P	PA	PB
125	279	119	160	46	46	140	32	74	M27×2.0	54	41	13.5	27	M12	31	110	60	45	60	4	1/2"	23	14
160	332	152	180	50	50	180	40	94	M36×2.0	72	55	18	36	M16	30	140	65	58	65	4	3/4"	25	15
200	347	167	180	50	50	220	40	100	M36×2.0	72	55	18	36	M16	30	175	75	67	75	5	3/4"	25	15
250	389	189	200	58	58	282	50	111	M42×2.0	84	65	21	46	M20	35	220	90	78	90	8	1"	31	22

Remark: The dimensions of magnet type cylinder are the same as non-magnet type cylinder.

SGCD



SGCJ



Bore size\Item	A		AB	AC	DA	DB	E	FA
	SGCD	SGCJ						
125	398	366.5	119	160	74	42.5	M27X2.0	13.5
160	484	458	152	180	94	68	M36X2.0	18
200	514	482	167	180	100	68	M36X2.0	18
250	578	547	189	200	111	80	M42X2.0	21

Remark:

- The dimensions of magnet type cylinder are the same as non-magnet type cylinder.
- The unmarked dimension is the same as SGC standard type.

ISO15552 Standard cylinder

SGC Series—Accessories

List for ordering code of accessories

Accessories Bore size	Mounting accessories								
	LB	FA/FB	CA	CB	CR	TC	FTC	TCM1	TCM2
125	F-SI125LB	F-SI125FA	F-SE125CA	F-SE125CB	F-SI125CR	F-SG125TC	F-SI125FTC	F-SI125TCM1	F-SI125TCM2
160	F-SI160LB	F-SI160FA	F-SI160CA	F-SI160CB	F-SI160CR	F-SG160TC	F-SI160FTC	F-SI160TCM1	F-SI160TCM2
200	F-SI200LB	F-SI200FA	F-SI200CA	F-SI200CB	F-SI200CR	F-SG200TC	F-SI200FTC	F-SI200TCM1	F-SI160TCM2
250	F-SG250LB	F-SG250FA	F-SG250CA	F-SG250CB	-	F-SG250TC	-	F-SG250TCM1	F-SG250TCM2

Accessories Bore size	Knuckle				Sensor switch		
	I : I Knuckle	Y : Y Knuckle	F : F Knuckle	U : U Knuckle	CMSG	DMSG	EMSG
125	F-M27X200I	F-M27X200Y	F-M27X200F	F-M27X200U	CMSG	DMSG	EMSG
160	F-M36X200I	F-M36X200Y	F-M36X200F	F-M36X200U			
200	F-M36X200I	F-M36X200Y	F-M36X200F	F-M36X200U			
250	F-M42X200I	F-M42X200Y	-	-			

Accessory selection

Accessories Cylinder model	Mounting accessories										Knuckle [Note1]			Sensor switch			
	LB	FA	FB	CA	CB	CR	TC	FTC	TCM1	TCM2	I	Y	U	CMSG	DMSG	EMSG	
SGC	Standard	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
	With magnet	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
SGCD	Standard	●	●	×	×	×	×	●	●	●	●	●	●	●	●	●	●
	With magnet	●	●	×	×	×	×	●	●	●	●	●	●	●	●	●	●
SGCJ	Standard	●	●	×	×	×	×	●	●	●	●	●	●	●	×	×	×
	With magnet	●	●	×	×	×	×	●	●	●	●	●	●	●	●	●	●

[Note1] Please refer to P358~361 for knuckle detail.

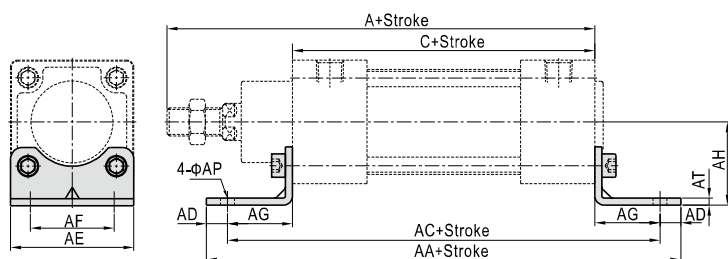
Material of accessories

Accessories Bore size	Mounting accessories										Knuckle			
	LB	FA	FB	CA	CB	CR	TC	FTC	TCM1	TCM2	I	Y	U	
125-200	■	■	■	■	■	■	■	■	■	■	■	■	■	□
250	■	■	■	■	■	×	■	×	■	■	■	■	■	×

●—Aluminum alloy, ■—Nodular cast iron, □—Carbon steel, ×—No this type.

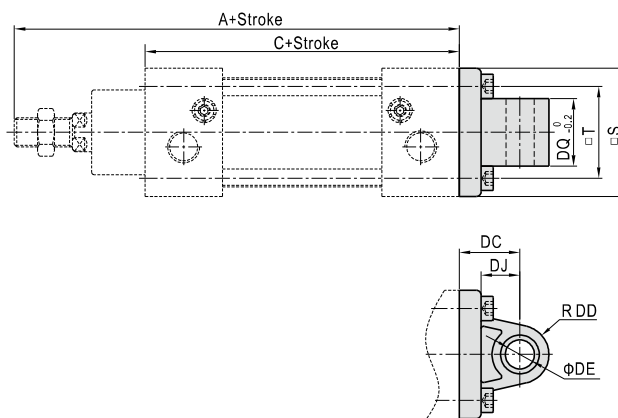
Dimensions

LB



Bore size\Item	A	C	AA	AC	AD	AE	AF	AG	AH	AP	AT
125	279	160	290	250	20	140	90	45	90	16,5	8
160	332	180	340	300	20	180	115	60	115	18,5	8
200	347	180	380	320	30	220	135	70	135	24	9
250	389	200	410	350	30	275	165	75	165	28	19

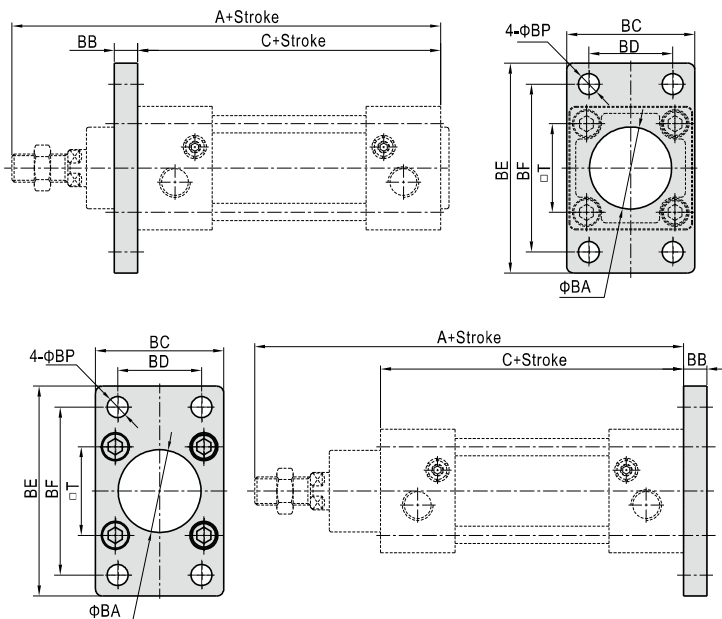
CA



Bore size\Item	A	C	S	T	DC	DD	DE	DJ	DQ
125	279	160	139	110	50	22	25	33	69,7
160	332	180	180	140	55	30	30	35,5	89,7
200	347	180	220	175	60	30	30	37	89,7
250	389	200	270	220	70	35	40	46	109,5

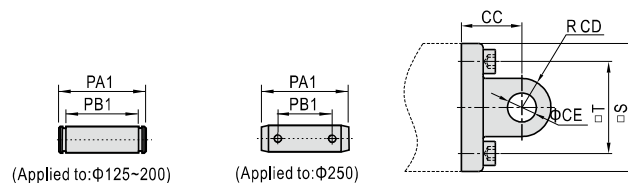
Dimensions

FA/FB



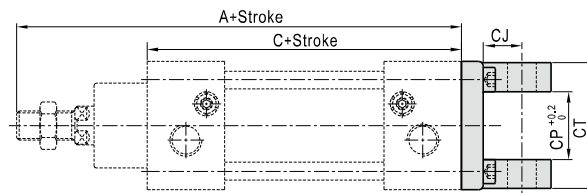
Bore size\Item	A	C	BA	BB	BC	BD	BE	BF	BP	T
125	279	160	60.5	20	139	90	218	180	16.5	110
160	332	180	65.5	20	180	115	280	230	18.5	140
200	347	180	75.5	25	220	135	320	270	24	175
250	389	200	90.5	25	267	165	376	330	26	220

CB



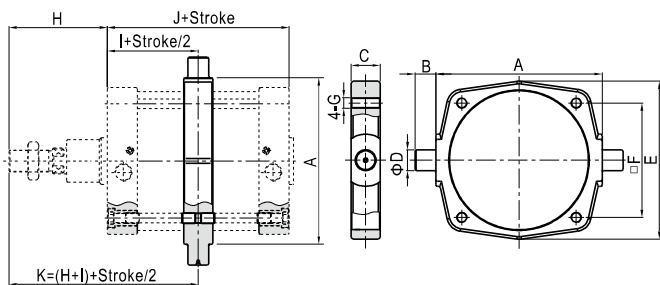
(Applied to: φ125~200)

(Applied to: φ250)



Bore size\Item	A	C	CC	CD	CE	CJ	CP	CT	PA1	PB1	S	T
125	279	160	50	21.5	25	31	70	130	139	130.5	139	110
160	332	180	55	30	30	35.5	90	170	181	170.5	180	140
200	347	180	60	30	30	36	90	170	181	170.5	220	175
250	389	200	70	35	40	46	110.3	200	230	208	270	220

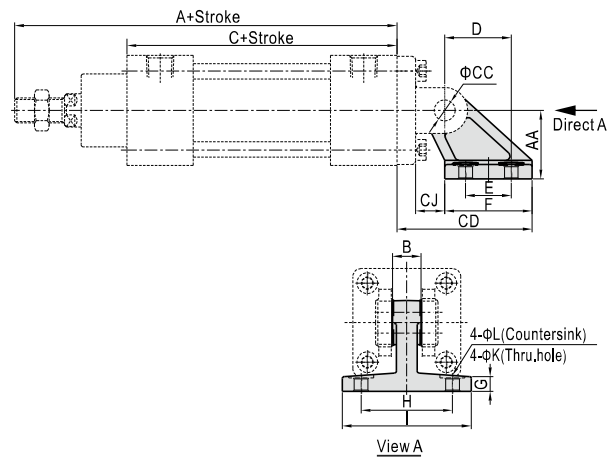
TC



Bore size\Item	A	B	C	D	E	F	G	H	I	J	K
125	160	25	40	25	158.5	110	M12	119	80	160	199
160	200	32	46	32	197.5	140	M16	152	90	180	242
200	250	32	46	32	245	175	M16	167	90	180	257
250	320	40	56	40	304	220	M20	189	100	200	289

[Note] The installation position of the accessories can not be adjusted arbitrarily.

CR



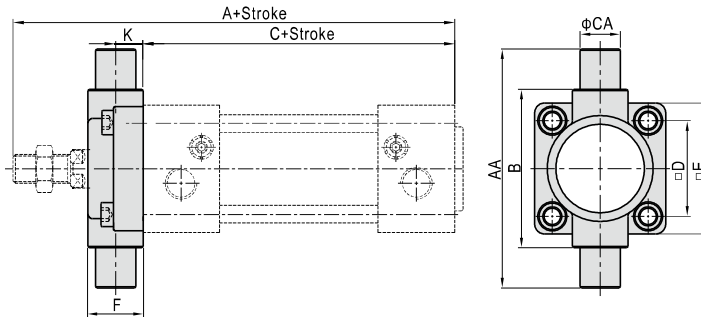
Bore size\Item	A	AA	B	C	CC	CD	CJ	D	E	F	G	H	I	K	L
125	279	90	70	160	25	135	26	70	60	90	20	94	124	14	20
160	332	115	90	180	30	171	25	97	88	126	25	118	156	14	20
200	347	135	90	180	30	185	31	105	90	130	30	122	162	18	26

[Note] CR can't be used alone, it must be used with CB.

ISO15552 Standard cylinder

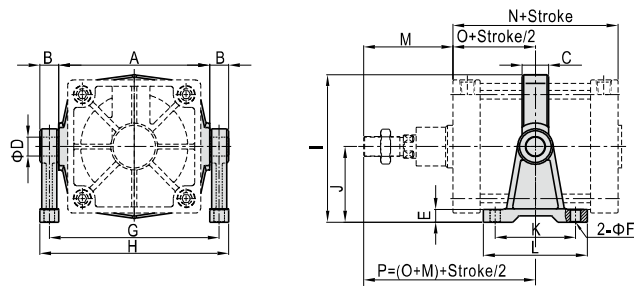
SGC Series—Accessories

FTC



Bore size\Item	A	C	AA	B	CA	D	E	F	K
125	279	160	210	160	25	110	139	43	20
160	332	180	264	200	32	140	179	56	20
200	347	180	314	250	32	175	218	64	20

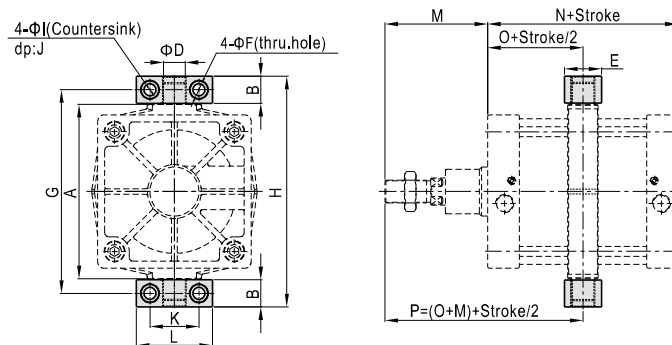
TCM1



Bore size\Item	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P
125	160	25	40	25	19	18	185	213	169.3	90	115	155	119	160	80	199
160	200	32	46	32	24	22	232	267	208.8	110	140	190	152	180	90	242
200	250	32	46	32	27	22	282	317	257.5	135	150	200	167	180	90	257
250	320	40	56	40	28	22	360	400	312	160	170	220	189	200	100	289

[Note] The installation position of the accessories can not be adjusted arbitrarily.

TCM2



Bore size\Item	A	B	D	E	F	G	H	I	J	K	L	M	N	O	P
125	160	24.5	25	50	14	187.5	212	20	14	50	75	119	160	80	199
160	200	30	32	60	18	234	264	26	17.5	60	92	152	180	90	242
200	250	30	32	60	18	284	314	26	17.5	60	92	167	180	90	257
250	320	50	40	70	22	374	424	33	22	90	140	189	200	100	289

[Note] The installation position of the accessories can not be adjusted arbitrarily.



Standard cylinder——SC Series

——Tie-rod type

Compendium of SC Series

Standard cylinder manufactured by our enterprise
Bore size:32, 40, 50, 63, 80, 100

Tie-rod cylinder
The cylinder barrel and front/rear cap is jointed by tie rods with high reliability.

Convenient and fast fix sensor switch
Sensor switch can be directly fixed on the cylinder, which is convenient and fast.
the counterpart sensor switch type is: CMSG, DMSG, EMSG

Adjustable air buffer
With adjustable air buffer on the front and back cover

Four kinds of cylinder joints

I Knuckle Y Knuckle Floating Joint Universal Joint

Multi-type cylinder

SC: Double acting type SCD: Double rod type SCJ: Adjustable stroke type

SCT: Multi-position type

Multi-mounting accessories

LB FA FB CA CB TC TCM1

Criteria for selection: Cylinder thrust

Unit : Newton(N)

Bore size	Rod size	Acting type	Pressure area(mm ²)	Operating pressure(MPa)									
				0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9	
32	12	Double acting	Push side	804	80.4	160.8	241.2	321.6	402.0	482.4	562.8	643.2	723.6
			Pull side	690	69.0	138.0	207.0	276.0	345.0	414.0	483.0	552.0	621.0
40	16	Double acting	Push side	1256	125.6	251.2	376.8	502.4	628.0	753.6	879.2	1004.8	1130.4
			Pull side	1055	105.5	211.0	316.5	422.0	527.5	633.0	738.5	844.0	949.5
50	20	Double acting	Push side	1963	196.3	392.6	588.9	785.2	981.5	1177.8	1374.1	1570.4	1766.7
			Pull side	1649	164.9	329.8	494.7	659.6	824.5	989.4	1154.3	1319.2	1484.1
63	20	Double acting	Push side	3117	311.7	623.4	935.1	1246.8	1558.5	1870.2	2181.9	2493.6	2805.3
			Pull side	2803	280.3	560.6	840.9	1121.2	1401.5	1681.8	1962.1	2242.4	2522.7
80	25	Double acting	Push side	5026	502.6	1005.2	1507.8	2010.4	2513.0	3015.6	3518.2	4020.8	4523.4
			Pull side	4536	453.6	907.2	1360.8	1814.4	2268.0	2721.6	3175.2	3628.8	4082.4
100	25	Double acting	Push side	7853	785.3	1570.6	2355.9	3141.2	3926.5	4711.8	5497.1	6282.4	7067.7
			Pull side	7362	736.2	1472.4	2208.6	2944.8	3681.0	4417.2	5153.4	5889.6	6625.8
125	32	Double acting	Push side	12272	1227.2	2454.4	3681.6	4908.8	6136.0	7363.2	8590.4	9817.6	11044.8
			Pull side	11468	1146.8	2293.6	3440.4	4587.2	5734.0	6880.8	8027.6	9174.4	10321.2
160	40	Double acting	Push side	20106	2010.6	4021.2	6031.8	8042.4	10053.0	12063.6	14074.2	16084.8	18095.4
			Pull side	18849	1884.9	3769.8	5654.7	7539.6	9424.5	11309.4	13194.3	15079.2	16964.1
200	40	Double acting	Push side	31416	3141.6	6283.2	9424.8	12566.4	15708.0	18849.6	21991.2	25132.8	28274.4
			Pull side	30159	3015.9	6031.8	9047.7	12063.6	15079.5	18095.4	21111.3	24127.2	27143.1
250	50	Double acting	Push side	49087	4908.7	9817.4	14726.1	19634.8	24543.5	29452.2	34360.9	39269.6	44178.3
			Pull side	47124	4712.4	9424.8	14137.2	18849.6	23562.0	28274.4	32986.8	37699.2	42411.6

Installation and application



- When load changes in the work, the cylinder with abundant output capacity shall be selected.
- Relative cylinder with high temperature resistance or corrosion resistance shall be chosen under the condition of high temperature or corrosion.
- Necessary protection measure shall be taken in the environment with higher humidity, much dust or water drops, oil dust and welding dregs.
- Dirty substances in the pipe must be eliminated before cylinder is connected with pipeline to prevent the entrance of particles into the cylinder.
- The medium used by cylinder shall be filtered to 40μm or below.
- Anti-freezing measure shall be adopted under low temperature environment to prevent moisture freezing.
- The cylinder shall be carried out test run without load before application. Prior to run, buffer shall be turned to the minimum and gradually released to avoid the damage on cylinder caused by excessive impact.
- The cylinder shall avoid the influence of side load in operation to maintain the normal work of cylinder and extend the service life.
- If the cylinder is dismantled and stored for a long time, please conduct anti-rust treatment to the surface. Anti-dust caps shall be added in air inlet and outlet ports.

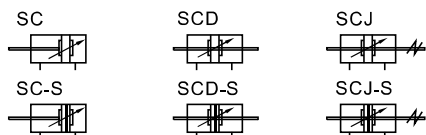


Standard cylinder(Tie-rod)

SC Series



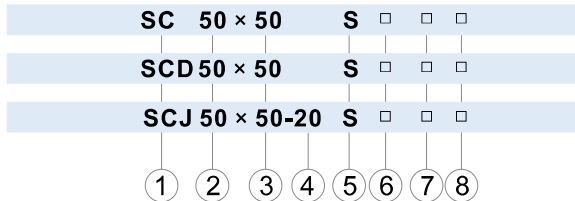
Symbol



Product feature

1. Standard cylinder manufactured by our enterprise.
2. The seal of piston adopts heterogeneous two way seal structure. It's dimension is tight and it has the function of grease reservation.
3. It is tie rod cylinder. The cylinder barrel and front/rear cap is jointed by tie rods with high reliability.
4. Compared with ISO1552 standard cylinder, SC series cylinder with the same bore size is shorter.
5. The buffer adjustment of cylinder is smooth and steady.
6. Cylinders and mounting accessories with several specifications are optional.
7. The seal material with high temperature resistance is adopted, operating temperature range is 0~150°C.

Ordering code



① Model	② Bore size	③ Stroke	④ Adjustable stroke	⑤ Magnet	⑥ Mounting type[Note1]	⑦ Seals Material	⑧ Thread type
SC: Double acting type	32 40 50 63 80 100	Refer to stroke table for details	No this code	Blank: Without magnet S: With magnet	Blank	Blank: TPU H: Viton N: NBR	Blank: PT G: G
					LB		
					FA		
SCD: Double rod type	32 40 50 63 80 100	Refer to stroke table for details	No this code	Blank: Without magnet S: With magnet	FB	Blank: TPU H: Viton N: NBR	Blank: PT G: G
					CA		
					CB		
SCJ: Adjustable stroke type	32 40 50 63 80 100	Refer to stroke table for details	10 20 30 40 50 75 100	Blank: Without magnet S: With magnet	TC	Blank: TPU H: Viton N: NBR	Blank: PT G: G
			Blank				
			LB				

Specification

Bore size(mm)	32	40	50	63	80	100
Acting type	Double acting					
Fluid	Air(to be filtered by 40µm filter element)					
Mounting type	Basic FA FB CA CB LB TC TCM1					
	SCD、SCJ Basic FA LB TC TCM1					
Operating pressure	0.15~1.0MPa(22~145psi)(1.5~10.0bar)					
Proof pressure	1.5MPa(215psi)(15bar)					
Temperature °C	-20~70					
Speed range mm/s	30~800					
Stroke tolerance	0~250 ^{+1.0} ₀ 251~1000 ^{+1.5} ₀ 1001~1500 ^{+2.0} ₀					
Cushion type	Variable cushion					
Adjustable cushion stroke	21			28		29
Port size [Note1]	1/8"		1/4"		3/8"	

[Note1] PT thread, G thread are available.

Add) Refer to P362 for detail of sensor switch.

Stroke

Bore size (mm)	Standard stroke (mm)																Max.std stroke	Max. stroke					
32	25	50	75	80	100	125	150	160	175	200	250	300	350	400	450	500	1000	2000					
40	25	50	75	80	100	125	150	160	175	200	250	300	350	400	450	500	600	700	800	900	1000	1200	2000
50	25	50	75	80	100	125	150	160	175	200	250	300	350	400	450	500	600	700	800	900	1000	1200	2000
63	25	50	75	80	100	125	150	160	175	200	250	300	350	400	450	500	600	700	800	900	1000	1500	2000
80	25	50	75	80	100	125	150	160	175	200	250	300	350	400	450	500	600	700	800	900	1000	1500	2000
100	25	50	75	80	100	125	150	160	175	200	250	300	350	400	450	500	600	700	800	900	1000	1500	2000

[Note] If the stroke is ≥1600mm within the maximum stroke scope, it is treated as non-standard one.

Please contact the company for other special strokes.

[Note1] The accessories are the same as SAU series, please refer to page 41~44 for details ;

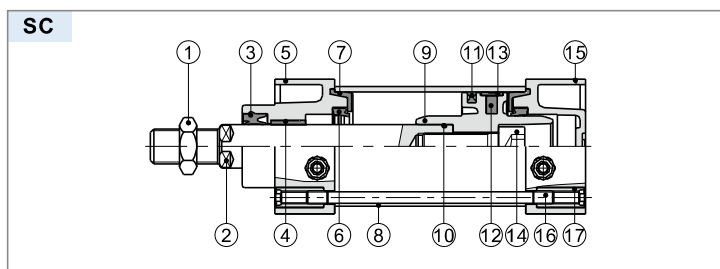
TC is used with TCM1 and can't be ordered by separately, it must be ordered together with the cylinder.



Standard cylinder(Tie-rod)

SC Series

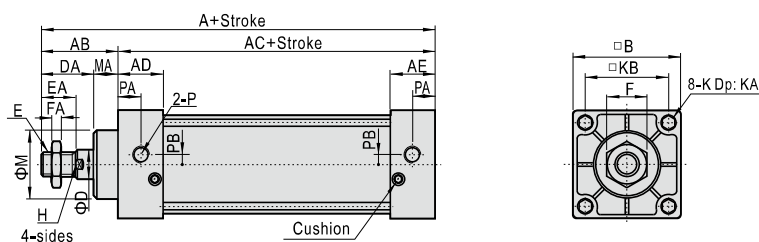
Inner structure and material of major parts



NO.	Item	Material
1	Rod nut	Carbon steel
2	Piston rod	Carbon steel with 20μm chrome plated
3	Front cover packing	TPU
4	Bushing	Wear resistant material
5	Front cover	Aluminum alloy
6	Cushing O-ring	NBR
7	Cushion gasket	TPU
8	Barrel	Aluminum alloy
9	Piston	Aluminum alloy
10	Piston rod O-ring	NBR
11	Piston seal	NBR
12	Magnet	Plastic
13	Wear ring	Wear resistant material
14	Bolt	Carbon steel
15	Back cover	Aluminum alloy
16	Tie-rod	Carbon steel
17	Tie-rod nut	Carbon steel

Dimensions

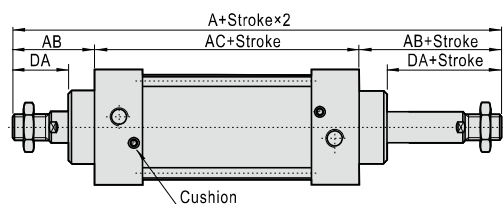
SC



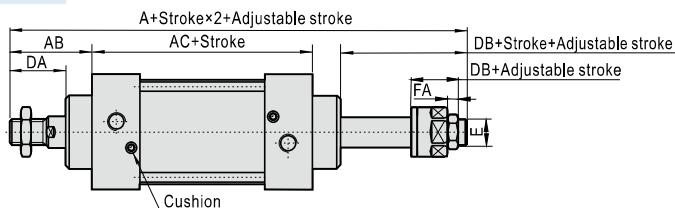
Bore size\Item	A	AB	AC	AD	AE	B	D	DA	E	EA	F	FA	H	K	KA	KB	M	MA	P	PA	PB
32	140	47	93	27.5	27.5	45	12	32	M10×1.25	22	17	6	10	M6×1.0	14.5	33	28	15	1/8"	14	5.5
40	142	49	93	27.5	27.5	50	16	34	M12×1.25	24	17	7	13	M6×1.0	14.5	37	32	15	1/4"	15	6
50	150	57	93	27.5	27.5	62	20	42	M16×1.5	32	23	8	17	M6×1.0	14.5	47	38	15	1/4"	17	8.5
63	153	57	96	27.5	27.5	75	20	42	M16×1.5	32	23	8	17	M8×1.25	14.5	56	38	15	3/8"	15	9.5
80	182	75	107	33	33	94	25	54	M20×1.5	40	26	10	22	M10×1.5	17	70	47	21	3/8"	19.5	10
100	188	75	113	33	33	112	25	54	M20×1.5	40	26	10	22	M10×1.5	17	84	47	21	1/2"	16.5	11

Remark: The dimensions of magnet type cylinder are the same as non-magnet type cylinder.

SCD



SCJ



Bore size\Item	A(SCD)	A(SCJ)	AB	AC	DA	DB	E	FA
32	187	182	47	93	32	27	M10X1.25	6
40	191	185	49	93	34	28	M12X1.25	7
50	207	194	57	93	42	29	M16X1.5	8
63	210	197	57	96	42	29	M16X1.5	8
80	257	238.5	75	107	54	35.5	M20X1.5	10
100	263	244.5	75	113	54	35.5	M20X1.5	10

Remark:

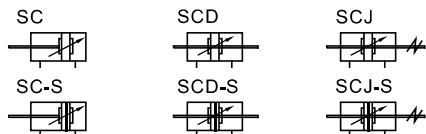
- The dimensions of magnet type cylinder are the same as non-magnet type cylinder.
- The unmarked dimension is the same as SC standard type.

Standard cylinder(Tie-rod)

SC Series—Big bore size type



Symbol



Product feature

- ISO6430 standard cylinder.
- The seal of piston adopts heterogeneous two way seal structure. It's dimension is tight and it has the function of grease reservation.
- It is tie rod cylinder. The cylinder barrel and front/rear cap is jointed by tie rods with high reliability.
- Compared with ISO15552 standard cylinder, SC series cylinder with the same bore size is shorter.
- The buffer adjustment of cylinder is smooth and steady.
- Cylinders and mounting accessories with several specifications are optional.
- The seal material with high temperature resistance is adopted, operating temperature range is 0~150°C.

Ordering code

SC 200 × 500	S	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
SCD200 × 500	S	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
SCJ 200 × 500-50	S	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

① ② ③ ④ ⑤ ⑥ ⑦ ⑧

① Model	② Bore size	③ Stroke	④ Adjustable stroke	⑤ Magnet	⑥ Mounting type[Note1]	⑦ Seals Material	⑧ Thread type
SC: Double acting type	125 160 200 250	Refer to stroke table for details	No this code	Blank: Without magnet S: With magnet	Blank	Blank: NBR H: Viton	Blank: PT G: G
					LB		
					FA		
					FB		
					CA		
					CB		
TC							
SCD: Double rod type					Blank		
					LB		
SCJ: Adjustable stroke type			10 20 30 40 50 75 100		FA		
					TC		
					TC		

[Note1] Please refer to page 41~44 for accessory parts.TC is used with TCM1.

Specification

Bore size(mm)	125	160	200	250
Acting type	Double acting			
Fluid	Air(to be filtered by 40μm filter element)			
Mounting type	Basic FA FB CA CB LB TC TCM1			
SC type	SCD、SCJ Basic FA LB TC TCM1			
Operating pressure	0.15~1.0MPa(22~145psi)(1.5~10.0bar)			
Proof pressure	1.5MPa(215psi)(15bar)			
Temperature °C	-20~70			
Speed range mm/s	30~500			
Stroke tolerance	0~250 ^{+1.0} ₀	251~1000 ^{+1.5} ₀	1001~1500 ^{+2.0} ₀	
Cushion type	Variable cushion			
Adjustable cushion stroke	28	29	33	40
Port size [Note1]	1/2"	3/4"		1"

[Note1] PT thread, G thread are available.

Add) Refer to P362 for detail of sensor switch.

Stroke

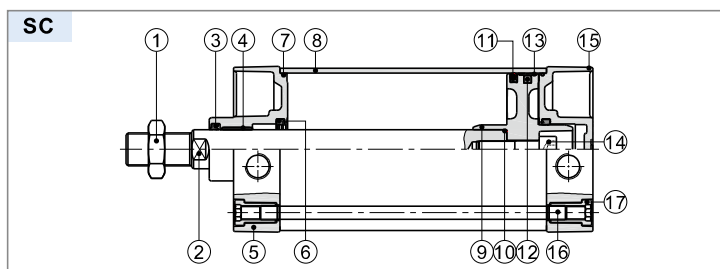
Bore size (mm)	Standard stroke (mm)										Max,std stroke	Max. stroke											
125	25	50	75	80	100	125	150	160	175	200	250	300	350	400	450	500	600	700	800	900	1000	1500	2000
160	25	50	75	80	100	125	150	160	175	200	250	300	350	400	450	500	600	700	800	900	1000	1500	2000
200	25	50	75	80	100	125	150	160	175	200	250	300	350	400	450	500	600	700	800	900	1000	1500	2000
250	25	50	75	80	100	125	150	160	175	200	250	300	350	400	450	500	600	700	800	900	1000	1500	2000

[Note] Please contact the company for other special strokes.

Standard cylinder(Tie-rod)

SC Series—Big bore size type

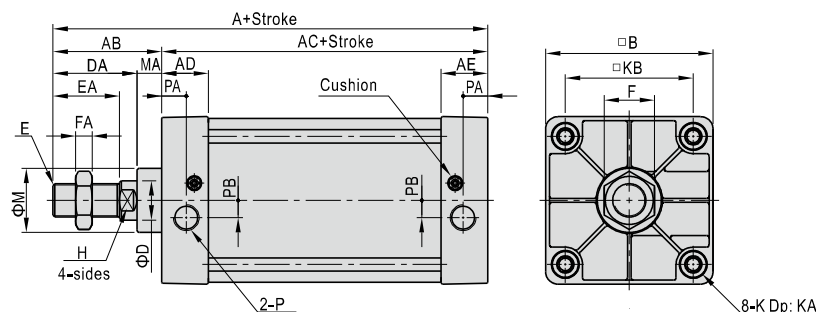
Inner structure and material of major parts



NO.	Item	Material
1	Rod nut	Carbon steel
2	Piston rod	Carbon steel with 20μm chrome plated
3	Front cover packing	TPU
4	Bushing	Wear resistant material
5	Front cover	Aluminum alloy
6	Cushing O-ring	TPU
7	O-ring	NBR
8	Barrel	Aluminum alloy
9	Piston	Aluminum alloy
10	Piston rod O-ring	NBR
11	Piston seal	NBR
12	Magnet	Plastic
13	Wear ring	Wear resistant material
14	Bolt	Carbon steel
15	Back cover	Aluminum alloy
16	Tie-rod	Carbon steel
17	Tie-rod nut	Carbon steel

Dimensions

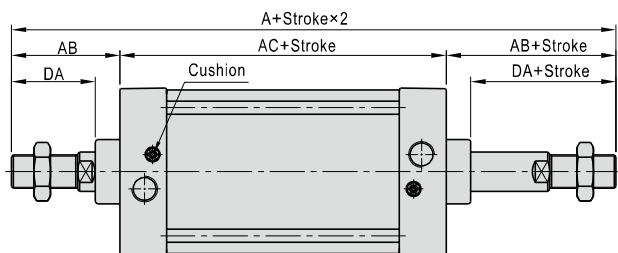
SC



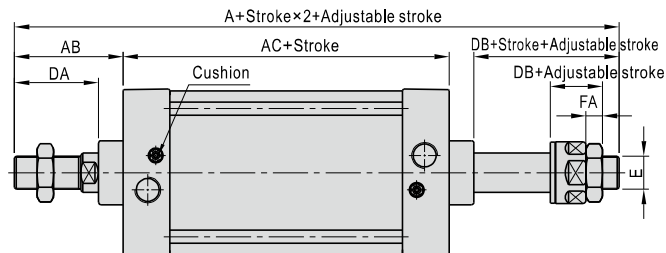
Bore size\Item	A	AB	AC	AD	AE	B	D	DA	E	EA	F	FA	H	K	KA	KB	M	MA	P	PA	PB
125	203	88	115	38	38	136	32	68	M27×2.0	54	41	13.5	27	M12×1.75	21.5	104	52	20	1/2"	20	14
160	239	113	126	38	38	174	40	88	M36×2.0	72	55	18	36	M16×2.0	21	134	62	25	3/4"	20	15
200	244	118	126	38	38	214	40	88	M36×2.0	72	55	18	36	M16×2.0	21	163	62	30	3/4"	20	15
250	294	141	153	48	48	267	50	106	M42×2.0	84	65	21	46	M20×2.5	26.5	202	86	35	1"	25.5	22

Remark: The dimensions of magnet type cylinder are the same as non-magnet type cylinder.

SCD



SCJ



Bore size\Item	A(SCD)	A(SCJ)	AB	AC	DA	DB	E	FA
125	291	265.5	88	115	68	42.5	M27X2.0	13.5
160	352	332	113	126	88	68	M36X2.0	18
200	362	342	118	126	88	68	M36X2.0	18
250	435	409	141	153	106	80	M42X2.0	21

Remark:

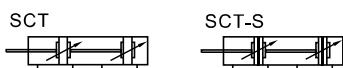
1. The dimensions of magnet type cylinder are the same as non-magnet type cylinder.
2. The unmarked dimension is the same as SC standard type.

Standard cylinder(Tie-rod)

SCT Series—Multi-position type

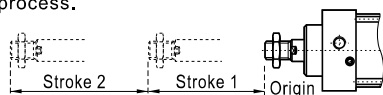


Symbol



Product feature

1. Standard cylinder manufactured by our enterprise.
2. The seal of piston adopts heterogeneous two way seal structure. It's dimension is tight and it has the function of grease reservation.
3. It is tie rod cylinder. The cylinder barrel and front/rear cap is jointed by tie rods with high reliability.
4. Piston rod can be positioned in several positions in the whole action process.



5. The buffer adjustment of cylinder is smooth and steady.
6. Cylinders and mounting accessories with several specifications are optional.
7. The seal material with high temperature resistance is adopted, operating temperature range is 0~150°C.

Specification

Bore size(mm)	32	40	50	63	80	100
Acting type	Double acting					
Fluid	Air(to be filtered by 40µm filter element)					
Mounting type	Basic FA FB CA CB LB TC TCM1					
Operating pressure	0.15~1.0MPa(22~145psi)(1.5~10.0bar)					
Proof pressure	1.5MPa(215psi)(15bar)					
Temperature °C	-20~70					
Speed range mm/s	30~800					
Stroke tolerance	0~250 ^{+1.0} ₀ 251~1000 ^{+1.5} ₀ 1001~1500 ^{+2.0} ₀					
Cushion type	Variable cushion					
Adjustable cushion stroke	21			28		29
Port size [Note1]	1/8"	1/4"	3/8"		1/2"	

[Note1] PT thread, G thread are available.
Add) Refer to P362 for detail of sensor switch.

Stroke

Bore size (mm)	Standard stroke (mm)												Max.std stroke	Max. stroke				
32	25	50	75	80	100	125	150	160	175	200	250	300	350	400	450	500	500	800
40	25	50	75	80	100	125	150	160	175	200	250	300	350	400	450	500	500	800
50	25	50	75	80	100	125	150	160	175	200	250	300	350	400	450	500	500	800
63	25	50	75	80	100	125	150	160	175	200	250	300	350	400	450	500	500	800
80	25	50	75	80	100	125	150	160	175	200	250	300	350	400	450	500	500	800
100	25	50	75	80	100	125	150	160	175	200	250	300	350	400	450	500	500	800

[Note] If the stroke is ≥800mm within the maximum stroke scope, it is treated as non-standard one.
Please contact the company for other special strokes.

Ordering code

SCT 50 × 50 × 50 S □ □ □

① ② ③ ④ ⑤ ⑥ ⑦ ⑧

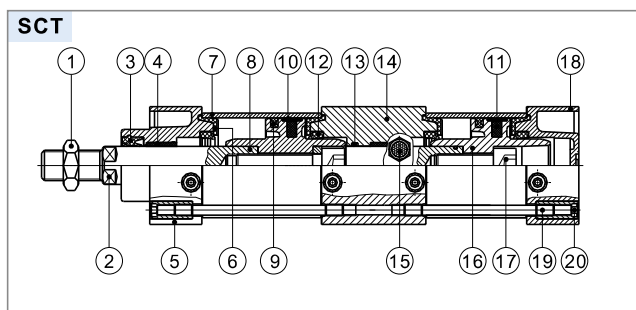
① Model	② Bore size	③ Stroke 1	④ Stroke 2	⑤ Magnet	⑥ Mounting type[Note1]	⑦ Seals Material	⑧ Thread type
SCT: Double acting Multi-position type	32 40 50 63 80 100	Refer to stroke table for details	Refer to stroke table for details	Blank: Without magnet S: With magnet	Blank	Blank: TPU H: Viton N: NBR	Blank: PT G: G
					LB		
					FA		
					FB		
					CA		
					CB		

[Note1] Please refer to page 41~44 for accessory parts.TC is used with TCM1.

Standard cylinder(Tie-rod)

SCT Series—Multi-position type

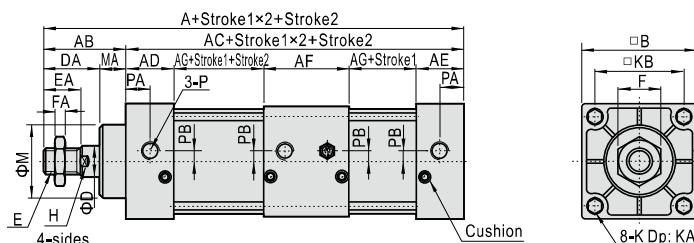
Inner structure and material of major parts



NO.	Item	Material	NO.	Item	Material
1	Rod nut	Carbon steel	11	Magnet	Plastic
2	Piston rod	Carbon steel with 20μm chrome plated	12	Gasket	NBR
			13	O-ring	NBR
			14	Joint seat	Aluminum alloy
3	Packing	TPU	15	Silencer	
4	Bushing	Wear resistant material	16	Piston	Aluminum alloy
5	Front cover	Aluminum alloy	17	Bolt	Carbon steel
6	Cushing O-ring	TPU	18	Back cover	Aluminum alloy
7	Barrel	Aluminum alloy	19	Tie-rod	Carbon steel
8	Rod O-ring	NBR	20	Tie-rod nut	Carbon steel
9	Piston seal	NBR			
10	Wear ring	Wear resistant material			

Dimensions

SCT



Bore size\Item	A	AB	AC	AD	AE	AF	AG	B	D	DA	E	EA	F	FA	H	K	KA	KB	M	MA	P	PA	PB
32	233	47	186	27.5	27.5	55	38	45	12	32	M10×1.25	22	17	6	10	M6×1.0	14.5	33	28	15	1/8"	14	5.5
40	235	49	186	27.5	27.5	55	38	50	16	34	M12×1.25	24	17	7	13	M6×1.0	14.5	37	32	15	1/4"	15	6
50	243	57	186	27.5	27.5	55	38	62	20	42	M16×1.5	32	23	8	17	M6×1.0	14.5	47	38	15	1/4"	17	8.5
63	249	57	192	27.5	27.5	55	41	75	20	42	M16×1.5	32	23	8	17	M8×1.25	14.5	56	38	15	3/8"	15	9.5
80	296	75	221	33	33	73	41	94	25	54	M20×1.5	40	26	10	22	M10×1.5	17	70	47	21	3/8"	19.5	10
100	308	75	233	33	33	73	47	112	25	54	M20×1.5	40	26	10	22	M10×1.5	17	84	47	21	1/2"	16.5	11

Remark: The dimensions of magnet type cylinder are the same as non-magnet type cylinder.

SC Series—Accessories

List for ordering code of accessories

Accessories Bore size	Mounting accessories					
	LB	FA/FA	CA	CB	TC	TCM1
32	F-SC32LB	F-SC32FA	F-SC32CA	F-SC32CB	F-SC32TC	F-SI40TCM1
40	F-SC40LB	F-SC40FA	F-SC40CA	F-SC40CB	F-SC40TC	F-SC40TCM1
50	F-SC50LB	F-SC50FA	F-SC50CA	F-SC50CB	F-SC50TC	F-SC40TCM1
63	F-SC63LB	F-SC63FA	F-SC63CA	F-SC63CB	F-SC63TC	F-SC40TCM1
80	F-SC80LB	F-SC80FA	F-SC80CA	F-SC80CB	F-SC80TC	F-SC80TCM1
100	F-SC100LB	F-SC100FA	F-SC100CA	F-SC100CB	F-SC100TC	F-SC80TCM1
125	F-SC125LB	F-SC125FA	F-SC125CA	F-SC125CB	F-SC125TC	F-SC125TCM1
160	F-SC160LB	F-SC160FA	F-SC160CA	F-SC160CB	F-SC160TC	F-SC160TCM1
200	F-SC200LB	F-SC200FA	F-SC200CA	F-SC200CB	F-SC200TC	F-SC160TCM1
250	F-SC250LB	F-SC250FA	F-SC250CA	F-SC250CB	F-SC250TC	F-SC250TCM1

Accessories Bore size	Knuckle				Sensor switch		
	I : I Knuckle	Y: Y Knuckle	F: F Knuckle	U: U Knuckle	CMSG	DMSG	EMSG
32	F-M10X125I	F-M10X125Y	F-M10X125F	F-M10X125U	CMSG	DMSG	EMSG
40	F-M12X125I	F-M12X125Y	F-M12X125F	F-M12X125U			
50	F-M16X150I	F-M16X150Y	F-M16X150F	F-M16X150U			
63	F-M16X150I	F-M16X150Y	F-M16X150F	F-M16X150U			
80	F-M20X150I	F-M20X150Y	F-M20X150F	F-M20X150U			
100	F-M20X150I	F-M20X150Y	F-M20X150F	F-M20X150U			
125	F-M27X200I	F-M27X200Y	F-M27X200F	F-M27X200U			
160	F-M36X200I	F-M36X200Y	F-M36X200F	F-M36X200U			
200	F-M36X200I	F-M36X200Y	F-M36X200F	F-M36X200U			
250	F-M42X200Y	F-M42X200Y	-	-			

Accessory selection

Accessories Cylinder model	Mounting accessories								Knuckle [Note1]				Sensor switch		
	LB	FA	FB	CA	CB	TC	TCM1	I	Y	U	F	CMSG	DMSG	EMSG	
SC	Standard	●	●	●	●	●	●	●	●	●	●	●	x	x	x
	With magnet	●	●	●	●	●	●	●	●	●	●	●	●	●	●
SCD	Standard	●	●	x	x	x	●	●	●	●	●	●	x	x	x
	With magnet	●	●	x	x	x	●	●	●	●	●	●	●	●	●
SCJ	Standard	●	●	x	x	x	●	●	●	●	●	●	x	x	x
	With magnet	●	●	x	x	x	●	●	●	●	●	●	●	●	●
SCT	Standard	●	●	●	●	●	x	x	●	●	●	●	x	x	x
	With magnet	●	●	●	●	●	x	x	●	●	●	●	●	●	●

[Note1] Please refer to P358~361 for knuckle detail.

Material of accessories

Accessories Bore size	Mounting accessories								Knuckle			
	LB	FA	FB	CA	CB	TC	TCM1	I	Y	F	U	
32~100	□	●	●	◇	◇	◇	◇	□	□	□	□	
125~200	◇	◇	◇	◇	◇	◇	◇	□	□	-	□	
250	◇	■	■	◇	◇	◇	◇	■	■	-	-	

●—Aluminum alloy, ■—Cast steel, ◇—Nodular cast iron, □—Carbon steel.

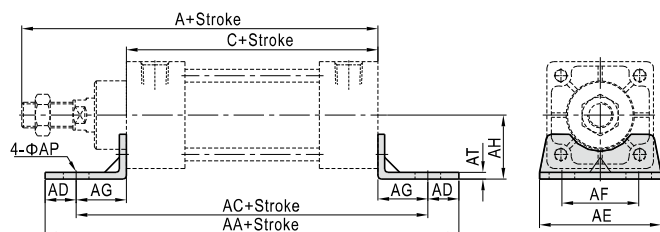
Standard cylinder(Tie-rod)

SC Series—Accessories

Dimensions

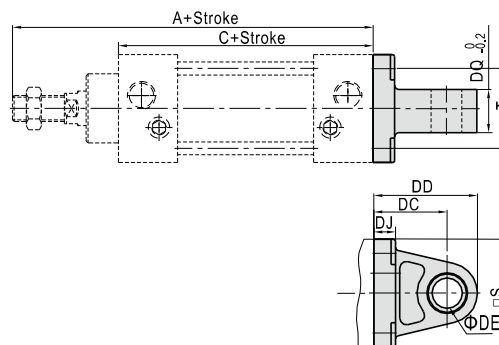
LB

Φ32~Φ100

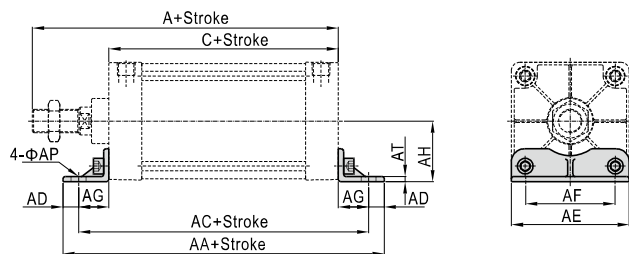


CA

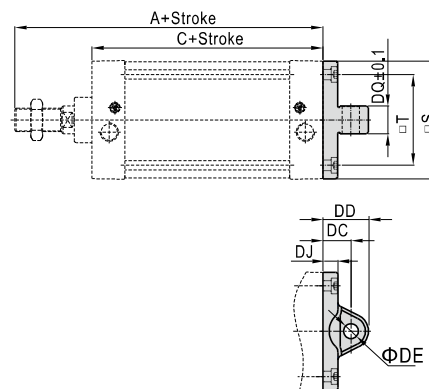
Φ32~Φ100



Φ125~Φ250



Φ125~Φ250



Bore size\Item	A	C	AA	AC	AD	AE	AF	AG	AH	AP	AT
32	140	93	153	134	9.5	50	33	20.5	28	9	3
40	142	93	169	140	14.5	57	36	23.5	30	12	3
50	150	93	173	149	12	68	47	28	36.5	12	3
63	153	96	184	158	13	80	56	31	41	12	3
80	182	107	199	167	16	97	70	30	49	14	4
100	188	113	209	173	18	112	84	30	57	14	4
125	203	115	221	185	18	136	104	35	70	17	6
160	239	126	246	206	20	174	134	40	91	17	8
200	244	126	276	226	25	214	163	50	113.5	22	9
250	294	153	323	273	25	267	201	60	141	26	15

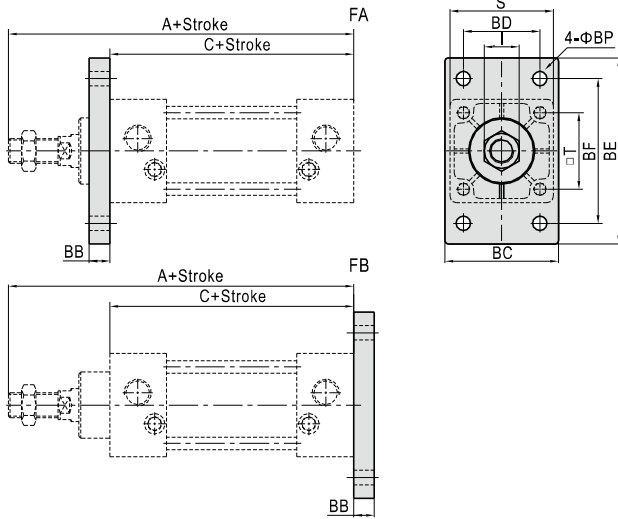
Bore size\Item	A	C	DC	DD	DE	DJ	DQ	S	T
32	140	93	34	44.5	12	9	16	45	33
40	142	93	34	45.5	14	9	20	49	37
50	150	93	34	46	14	10	20	61	47
63	153	96	34	46.5	14	10	20	74	56
80	182	107	48	64.5	20	14	32	93	70
100	188	113	48	65	20	14	32	111	84
125	203	115	32	52	20	17	31.7	135	104
160	239	126	40	68	28	19.5	39.7	173	134
200	244	126	60	90	28	23	39.7	213	163
250	294	153	70	106	36	24	49.7	255	202

Standard cylinder(Tie-rod)

SC Series—Accessories

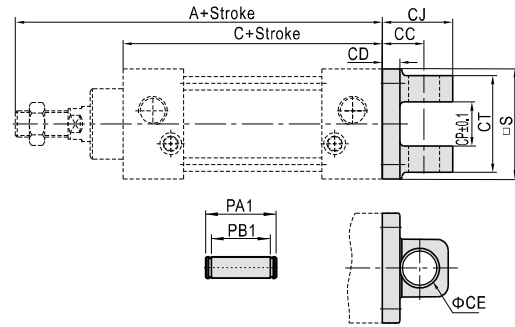
FA/FB

Φ32~Φ100

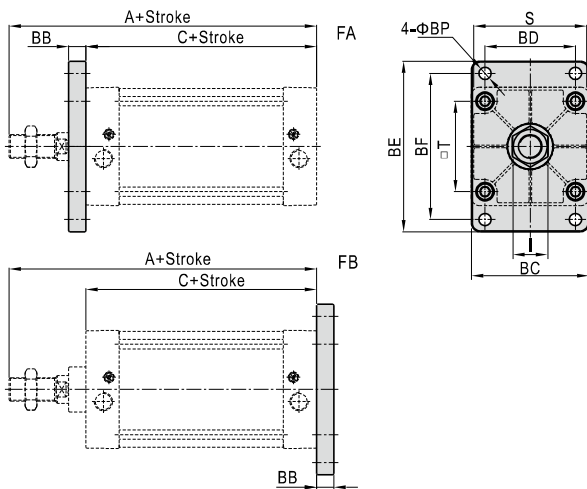


CB

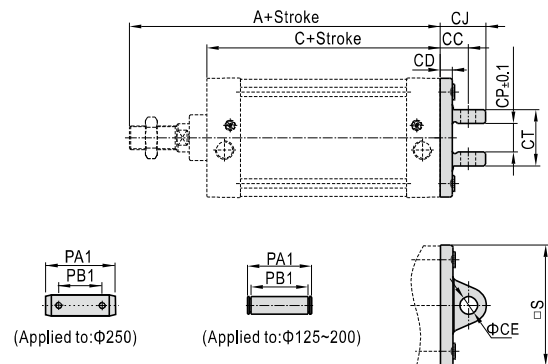
Φ32~Φ100



Φ125~Φ250



Φ125~Φ250



Bore size\Item	A	C	BB	BC	BD	BE	BF	BP	I	S	T
32	140	93	10	47	33	80	58	7	17	45	33
40	142	93	10	53	36	90	70	7	17	50	37
50	150	93	10	65	47	104	86	9	23	62	47
63	153	96	12	75	56	118	98	9	23	75	56
80	182	107	16	95	70	140	119	11	26	94	70
100	188	113	16	115	84	160	138	11	26	112	84
125	203	115	20	135	104	196	168	14	41	136	104
160	239	126	20	173	134	248	212	18	55	174	134
200	244	126	25	213	163	286	250	18	55	214	163
250	294	153	25	255	201	356	312	22	65	267	202

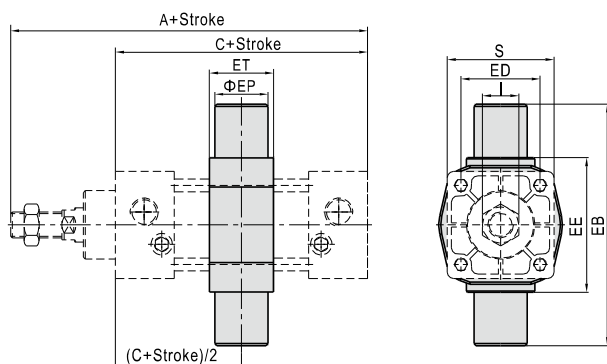
Bore size\Item	A	C	S	CC	CD	CE	CJ	CP	CT	PA1	PB1
32	140	93	45	19	9	12	29.5	16.3	32	39	32.8
40	142	93	49	19	9	14	30.5	20.3	44	51	44.8
50	150	93	61	19	10	14	31	20.3	52	59	52.8
63	153	96	74	19	10	14	31.5	20.3	52	59	52.8
80	182	107	93	32	14	20	48.5	32.3	64	73	64.8
100	188	113	111	32	14	20	49	32.3	64	73	64.8
125	203	115	135	32	14	20	52	32.1	64	73	64.8
160	239	126	173	40	15	28	68	40.1	80	90.2	80.8
200	244	126	213	60	23	28	90	40.1	80	90.2	80.8
250	294	153	255	70	24	36	106	50.1	100	130	108

Standard cylinder(Tie-rod)

SC Series—Accessories

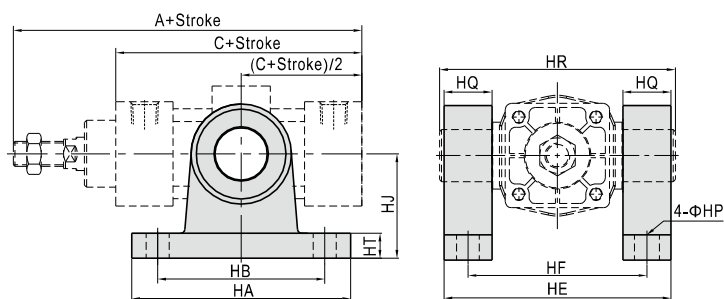
TC

Φ32~Φ100

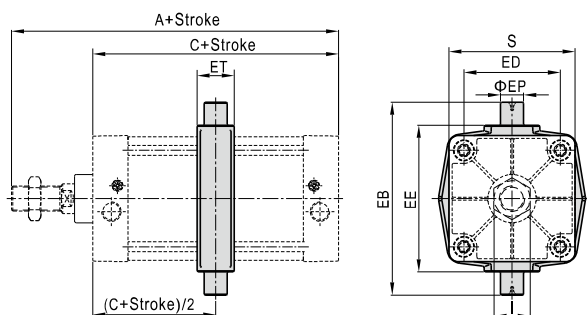


TCM1

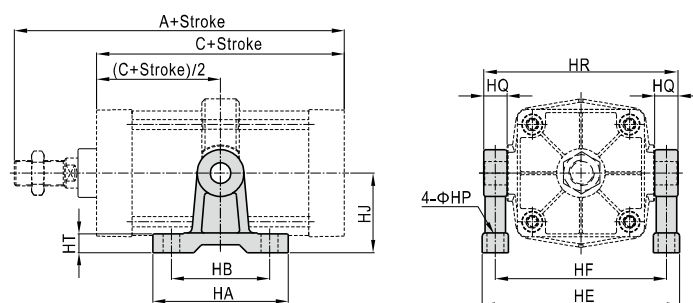
Φ32~Φ100



Φ125~Φ250



Φ125~Φ250



Bore size\Item	A	C	EB	ED	EE	EP	ET	I	S
32	140	93	87	33	55	16	22	17	45
40	142	93	113	37	63	25	28	17	50
50	150	93	126	47	76	25	28	23	62
63	153	96	138	56	88	25	30	23	75
80	182	107	164	70	114	25	32	26	94
100	188	113	182	84	132	25	38	26	112
125	203	115	208	104	158	25	40	41	136
160	239	126	272	134	200	36	46	55	174
200	244	126	318	163	246	36	46	55	214
250	294	153	394	202	304	45	56	65	267

[Note] The installation position of the accessories can not be adjusted arbitrarily.

Bore size\Item	A	C	HA	HB	HE	HF	HP	HQ	HR	HT	HJ
32	140	93	100	75	90	71	12	16	87	11	54
40	142	93	103	80	109	86	11	23	113	12	50
50	150	93	103	80	122	99	11	23	126	12	50
63	153	96	103	80	134	111	11	23	138	12	50
80	182	107	110	85	160	137	13	23	164	12	70
100	188	113	110	85	178	155	13	23	182	12	70
125	203	115	145	105	211	183	18	25	208	20	85
160	239	126	185	140	272	236	22	36	272	25	130
200	244	126	185	140	318	282	22	36	318	25	130
250	294	153	215	165	394	349	26	45	394	28	160

[Note] The installation position of the accessories can not be adjusted arbitrarily.



Standard cylinder—SAU Series

—Profile type

Compendium of SAU Series

Standard cylinder manufactured by our enterprise

Bore size: 32, 40, 50, 63, 80, 100

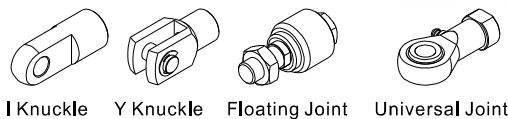
Adjustable air buffer

With adjustable air buffer on the front and back cover

No tie rod cylinder

The cylinder barrel is aluminum profile with hard anodizing treatment.

Four kinds of cylinder joints



I Knuckle Y Knuckle Floating Joint Universal Joint

Convenient and fast fix sensor switch

Sensor switch can be directly fixed onto the groove of the cylinder, which is convenient and fast.

The counterpart sensor switch type is: CMSG, DMSG, EMSG

Multi-mounting accessories

Multi-type cylinder



SAU: Double acting type



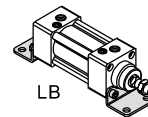
SAUD: Double rod type



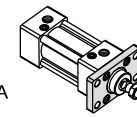
SAUJ: Adjustable stroke type



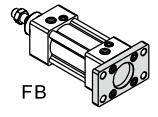
SAUF: With valve type



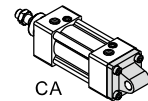
LB



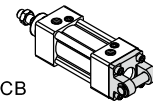
FA



FB



CA



CB

Criteria for selection: Cylinder thrust

Unit : Newton(N)

Bore size	Rod size	Acting type	Pressure area(mm ²)	Operating pressure(MPa)								
				0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9
32	12	Double Push side	804	80.4	160.8	241.2	321.6	402.0	482.4	562.8	643.2	723.6
		Double Pull side	690	69.0	138.0	207.0	276.0	345.0	414.0	483.0	552.0	621.0
40	16	Double Push side	1256	125.6	251.2	376.8	502.4	628.0	753.6	879.2	1004.8	1130.4
		Double Pull side	1055	105.5	211.0	316.5	422.0	527.5	633.0	738.5	844.0	949.5
50	20	Double Push side	1963	196.3	392.6	588.9	785.2	981.5	1177.8	1374.1	1570.4	1766.7
		Double Pull side	1649	164.9	329.8	494.7	659.6	824.5	989.4	1154.3	1319.2	1484.1
63	20	Double Push side	3117	311.7	623.4	935.1	1246.8	1558.5	1870.2	2181.9	2493.6	2805.3
		Double Pull side	2803	280.3	560.6	840.9	1121.2	1401.5	1681.8	1962.1	2242.4	2522.7
80	25	Double Push side	5026	502.6	1005.2	1507.8	2010.4	2513.0	3015.6	3518.2	4020.8	4523.4
		Double Pull side	4536	453.6	907.2	1360.8	1814.4	2268.0	2721.6	3175.2	3628.8	4082.4
100	25	Double Push side	7853	785.3	1570.6	2355.9	3141.2	3926.5	4711.8	5497.1	6282.4	7067.7
		Double Pull side	7362	736.2	1472.4	2208.6	2944.8	3681.0	4417.2	5153.4	5889.6	6625.8

Installation and application



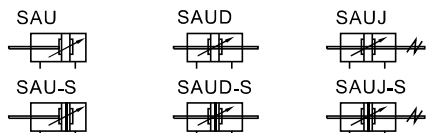
1. When load changes in the work, the cylinder with abundant output capacity shall be selected.
2. Relative cylinder with high temperature resistance or corrosion resistance shall be chosen under the condition of high temperature or corrosion.
3. Necessary protection measure shall be taken in the environment with higher humidity, much dust or water drops, oil dust and welding dregs.
4. Dirty substances in the pipe must be eliminated before cylinder is connected with pipeline to prevent the entrance of particles into the cylinder.
5. The medium used by cylinder shall be filtered to 40μm or below.
6. Anti-freezing measure shall be adopted under low temperature environment to prevent moisture freezing.
7. The cylinder shall be carried out test run without load before application. Prior to run, buffer shall be turned to the minimum and gradually released to avoid the damage on cylinder caused by excessive impact.
8. The cylinder shall avoid the influence of side load in operation to maintain the normal work of cylinder and extend the service life.
9. If the cylinder is dismantled and stored for a long time, please conduct anti-rust treatment to the surface. Anti-dust caps shall be added in air inlet and outlet ports.



SAU Series



Symbol



Product feature

1. Standard cylinder manufactured by our enterprise.
2. The seal of piston adopts heterogeneous two way seal structure. It's dimension is tight and it has the function of oil reservation.
3. It is no tie rod cylinder. The cylinder barrel is aluminum profile with hard anodizing treatment.
4. Compared with ISO15552 standard cylinder, SAU series cylinder with the same bore size is shorter.
5. The buffer adjustment of cylinder is smooth and steady.
6. Mounting accessories are the same as SC series.
7. The seal material with high temperature resistance is adopted, operating temperature range is 0~150°C.

Specification

Bore size(mm)	32	40	50	63	80	100
Acting type	Double acting					
Fluid	Air(to be filtered by 40µm filter element)					
Mounting type	Basic FA FB CA CB LB					
	Basic FA LB					
Operating pressure	0.15~1.0MPa(22~145psi)(1.5~10.0bar)					
Proof pressure	1.5MPa(215psi)(15bar)					
Temperature °C	-20~70					
Speed range mm/s	30~800					
Stroke tolerance	0~250 ^{+1,0} ₀		251~1000 ^{+1,5} ₀		1001~1500 ^{+2,0} ₀	
Cushion type	Variable cushion					
Adjustable cushion stroke	21			28		29
Port size [Note1]	1/8"		1/4"		3/8"	

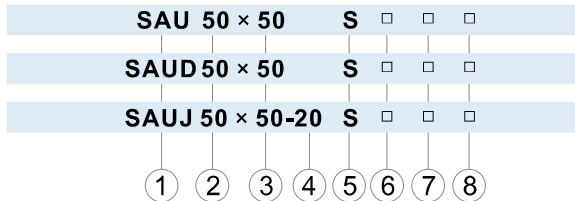
[Note1] PT thread, G thread are available.
Add) Refer to P362 for detail of sensor switch.

Stroke

Bore size (mm)	Standard stroke (mm)																Max.std stroke	Max. stroke					
32	25	50	75	80	100	125	150	160	175	200	250	300	350	400	450	500	1000	1000	1800				
40	25	50	75	80	100	125	150	160	175	200	250	300	350	400	450	500	600	700	800	900	1000	1200	1800
50	25	50	75	80	100	125	150	160	175	200	250	300	350	400	450	500	600	700	800	900	1000	1200	1800
63	25	50	75	80	100	125	150	160	175	200	250	300	350	400	450	500	600	700	800	900	1000	1500	1800
80	25	50	75	80	100	125	150	160	175	200	250	300	350	400	450	500	600	700	800	900	1000	1500	1800
100	25	50	75	80	100	125	150	160	175	200	250	300	350	400	450	500	600	700	800	900	1000	1500	1800

[Note] Consult us for non-standard stroke.

Ordering code



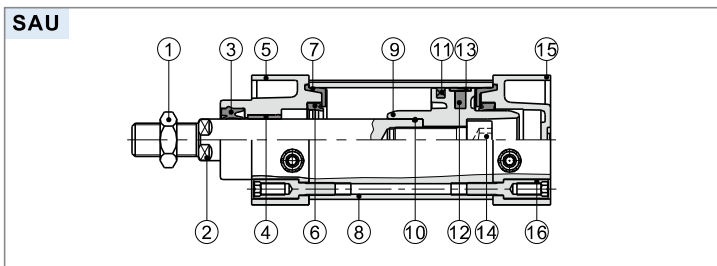
① Model	② Bore size	③ Stroke	④ Adjustable stroke	⑤ Magnet	⑥ Mounting type[Note1]	⑦ Seals Material	⑧ Thread type
SAU: Double acting type	32 40 50 63 80 100	Refer to stroke table for details	No this code	Blank: Without magnet S: With magnet	Blank	Blank: TPU H: Viton N: NBR	Blank: PT G: G
SAUD: Double rod type	Blank						
SAUJ: Adjustable stroke type	Blank						
			10 20 30 40 50 75 100		FA		

[Note1] The accessories are the same as SC series, please refer to page 41~44 for details.

Standard cylinder(Profile)

SAU Series

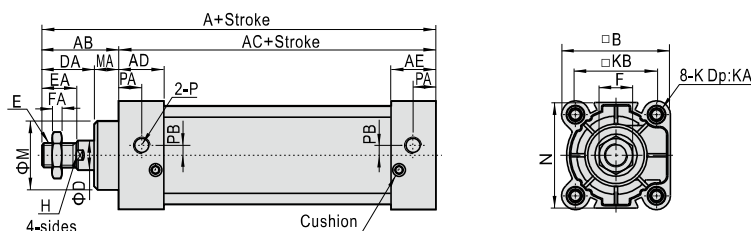
Inner structure and material of major parts



NO.	Item	Material
1	Rod nut	Carbon steel
2	Piston rod	Carbon steel with 20μm chrome plated
3	Front cover packing	TPU
4	Bushing	Wear resistant material
5	Front cover	Aluminum alloy
6	Cushing O-ring	NBR
7	Cushion gasket	TPU
8	Barrel	Aluminum alloy
9	Piston	Aluminum alloy
10	Piston rod O-ring	NBR
11	Piston seal	NBR
12	Magnet	Plastic
13	Wear ring	Wear resistant material
14	Bolt	Carbon steel
15	Back cover	Aluminum alloy
16	Tie-rod nut	Carbon steel

Dimensions

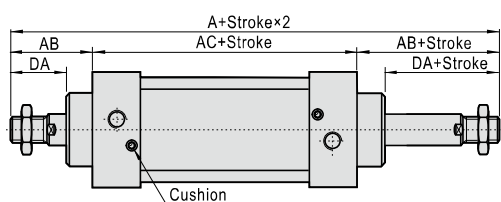
SAU



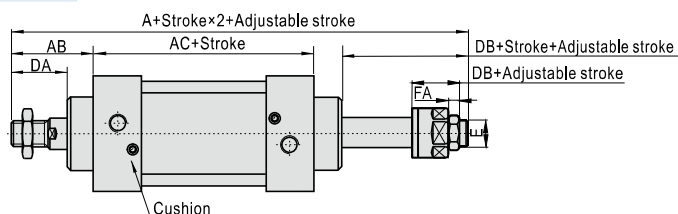
Bore size\Item	A	AB	AC	AD	AE	B	D	DA	E	EA	F	FA	M	MA	H	K	KA	KB	P	PA	PB
32	140	47	93	27.5	27.5	45	12	32	M10×1.25	22	17	6	28	15	10	M6×1.0	16	33	1/8"	14	5.5
40	142	49	93	27.5	27.5	50	16	34	M12×1.25	24	17	7	32	15	13	M6×1.0	16	37	1/4"	15	6
50	150	57	93	27.5	27.5	62	20	42	M16×1.5	32	23	8	38	15	17	M6×1.0	16	47	1/4"	17	8.5
63	153	57	96	27.5	27.5	75	20	42	M16×1.5	32	23	8	38	15	17	M8×1.25	16	56	3/8"	15	9.5
80	182	75	107	33	33	94	25	54	M20×1.5	40	26	10	47	21	22	M10×1.5	18	70	3/8"	19.5	10
100	188	75	113	33	33	112	25	54	M20×1.5	40	26	10	47	21	22	M10×1.5	18	84	1/2"	16.5	11

Remark : The dimensions of magnet type cylinder are the same as non-magnet type cylinder.

SAUD



SAUJ



Bore size\Item	A(SAUD)	A(SAUJ)	AB	AC	DA	DB	E	FA
32	187	182	47	93	32	27	M10X1.25	6
40	191	185	49	93	34	28	M12X1.25	7
50	207	194	57	93	42	29	M16X1.5	8
63	210	197	57	96	42	29	M16X1.5	8
80	257	238.5	75	107	54	35.5	M20X1.5	10
100	263	244.5	75	113	54	35.5	M20X1.5	10

Remark :

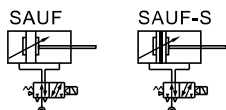
1. The dimensions of magnet type cylinder are the same as non-magnet type cylinder.
2. The unmarked dimension is the same as SAU standard type.

Standard cylinder(Profile)

SAUF Series—With valve type



Symbol



Product feature

1. For Standard Cylinders: use 4M210 valve for bore size 32, 40 & 50; 4M310 valve for bore size 63, 80 & 100mm.
2. Individually control, no need for extra solenoid valves.
3. Installation time & space saving; suitable for decentralize installation in large system.
4. Options of mounting accessories & easy installation.

Stroke

Bore size	Standard stroke (mm)	Mini. stroke	Max. std stroke	Max. stroke
32	50 75 80 100 125 150 160 175 200 250 300 350 400 450 500	50	1000	2000
40 50	50 75 80 100 125 150 160 175 200 250 300 350 400 450 500 600 700 800 900 1000	50	1200	2000
63 80 100	75 80 100 125 150 160 175 200 250 300 350 400 450 500 600 700 800 900 1000	75	1500	2000

[Note] Consult us for non-standard stroke.

Specification

Cylinder specification						
Bore size(mm)	32	40	50	63	80	100
Acting type	Double acting					
Fluid	Air(to be filtered by 40µm filter element)					
Mounting type	Basic FA FB CA CB LB					
Operating pressure	0.15~1.0MPa(22~145psi)(1.5~10.0bar)					
Proof pressure	1.5MPa(215psi)(15bar)					
Temperature °C	-20~70					
Speed range mm/s	30~800					
Stroke tolerance	0~250 ^{+1.0} ₀ 251~1000 ^{+1.5} ₀ 1001~1500 ^{+2.0} ₀					
Cushion type	Variable cushion					
Adjustable cushionstroke	21		28		29	
Port size	1/8"	1/4"	3/8"		1/2"	
PU tube size(ODXID)	φ8×φ5			φ10×φ6.5		
Solenoid valve specification						
Model	4M210-06 & 4M210-08		4M310-08 & 4M310-10			
Fluid	Air(to be filtered by 40µm filter element)					
Acting type	Internal piloted					
Port size [Note1]	In=Exhaust=1/8" & In=1/4" Exhaust=1/8"			In=Exhaust=1/4" & In=PT3/8 Exhaust=1/4"		
Orifice size	4M210-06 : 14.0mm ² (Cv=0.78)		4M310-08 : 25.0mm ² (Cv=1.40)		4M210-08 : 16.0mm ² (Cv=0.89) 4M310-10 : 30.0mm ² (Cv=1.68)	
Valve type	5 port 2 position					
Operating pressure	0.15~0.8MPa(21~114psi)					
Proof pressure	1.2MPa(175psi)					
Temperature °C	-20~70					
Body material	Aluminum alloy					
Lubrication [Note2]	Not required					
Max. frequency [Note3]	5 cycle/sec			4 cycle/sec		
Coil specification						
Standard voltage	AC220V, AC110V, AC24V, DC24V, DC12V					
Scope voltage	AC : ±15% DC : ±10%					
Power consumption	AC : 3.5VA DC : 3.0W					
Protection	IP65(DIN40050)					
Temperature classification	B Class					
Electrical entry	Terminal, Grommet					
Activating time	0.05 sec and below					

[Note1] PT thread, G thread are available.

[Note2] It can't stop in the midway of lubricating. Lubricants like ISO VG32 or equivalent are recommended.

[Note3] The maximum actuation frequency is in the no-load state.
Add) Refer to P362 for detail of sensor switch.

Ordering code

SAUF 50 ×1000 S □ -06 A □ □

① ② ③ ④ ⑤ ⑥ ⑦ ⑧ ⑨

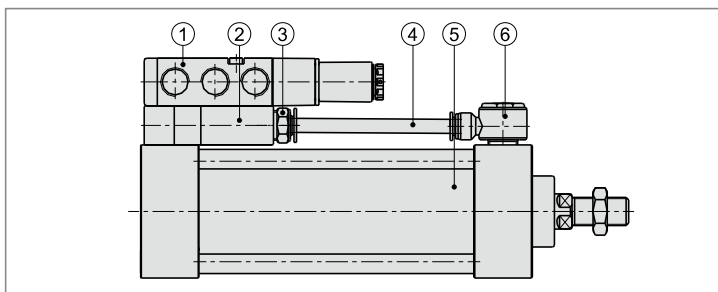
① Model	② Bore size	③ Stroke	④ Magnet	⑤ Mounting type[Note1]	⑥ Port size	⑦ Voltage	⑧ Electrical entry	⑨ Thread type
SAUF: Double acting with valve type	32 40 50 63 80 100	Refer to stroke table for details	Blank: Without magnet S: With magnet	Blank	06 : 1/8" 08 : 1/4" 10 : 3/8"	A : AC220V B : DC24V C : AC110V E : AC24V F : DC12V	Blank: Terminal I: Grommet	Blank: PT G: G
				LB				
				FA				
				FB				
				CA				
				CB				

[Note1] The accessories are the same as SC series, please refer to page 41~44 for details.

Standard cylinder(Profile)

SAUF Series—With valve type

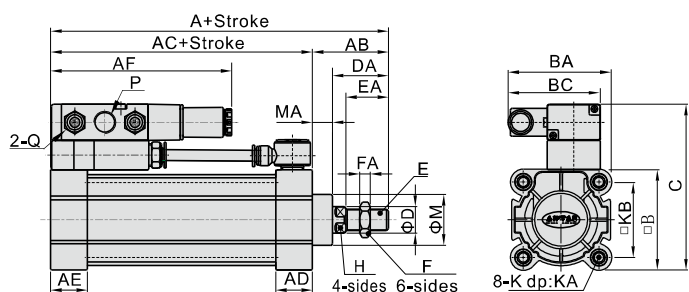
Inner structure



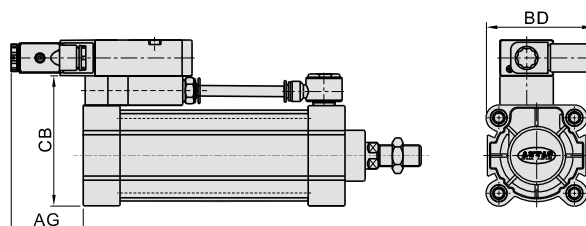
NO.	Item
1	4M series solenoid valve
2	Unite block
3	APC series tube connector
4	PU tube
5	SAU series cylinder
6	APH series tube connector

Dimensions

Pull when energized



Push when energized



Bore size\Item	A	AB	AC	AD	AE	AF	AG	B	BA	BC	BD
32	140	47	93	27.5	27.5	118	53	45	67	67	77
40	142	49	93	27.5	27.5	118	53	50	68.5	67	80.5
50	150	57	93	27.5	27.5	120	51	62	72	67	89
63	153	57	96	27.5	27.5	135.5	54.5	75	77.5	69.5	96.5
80	182	75	107	33	33	137	53	94	86.5	69.5	106.5
100	188	75	113	33	33	135.5	54.5	112	96	69.5	115

Bore size\Item	C	CB	D	DA	E	EA	F	FA	H	M	MA
32	89	67	12	32	M10X1.25	22	17	6	10	28	15
40	94	72	16	34	M12X1.25	24	17	7	13	32	15
50	106	84	20	42	M16X1.5	32	23	8	17	38	15
63	124	97	20	42	M16X1.5	32	23	8	17	38	15
80	143	116	25	54	M20X1.5	40	26	10	22	47	21
100	161	134	25	54	M20X1.5	40	26	10	22	47	21

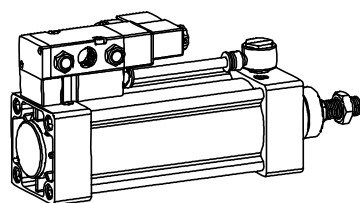
Bore size\Item	valve's type	P	Q	K	KA	KB
32	4M210-06	1/8"	1/8"	M6X1	16	33
	4M210-08	1/4"				
40	4M210-06	1/8"	1/8"	M6X1	16	37
	4M210-08	1/4"				
50	4M210-06	1/8"	1/8"	M6X1	16	47
	4M210-08	1/4"				
63	4M310-08	1/4"	1/4"	M8X1.25	16	56
	4M310-10	3/8"				
80	4M310-08	1/4"	1/4"	M10X1.5	18	70
	4M310-10	3/8"				
100	4M310-08	1/4"	1/4"	M10X1.5	18	84
	4M310-10	3/8"				

Remark: The dimensions of magnet type cylinder are the same as non-magnet type cylinder.

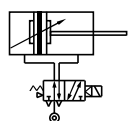
How to use

- Options for piston rod to retract or extend when solenoid coil is energized.
- Default factory setting will be piston rod to retract when energized (see Drawing one). Should you require piston rod to extend when energized, reposition the solenoid valve as shown in Drawing two.

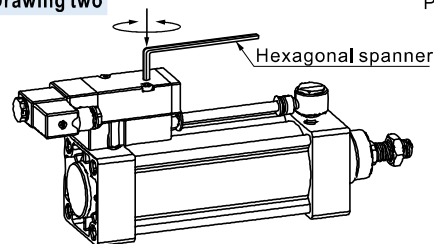
Drawing one



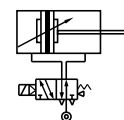
Pull when energized



Drawing two



Push when energized



Attention Ensure that the seals between the mounting block & valve are placed correctly when repositioning the valve.

SAU Series—Accessories

List for ordering code of accessories

Accessories		Mounting accessories			
Bore size	LB	FA/IFB	CA	CB	
32	F-SC32LB	F-SC32FA	F-SC32CA	F-SC32CB	
40	F-SC40LB	F-SC40FA	F-SC40CA	F-SC40CB	
50	F-SC50LB	F-SC50FA	F-SC50CA	F-SC50CB	
63	F-SC63LB	F-SC63FA	F-SC63CA	F-SC63CB	
80	F-SC80LB	F-SC80FA	F-SC80CA	F-SC80CB	
100	F-SC100LB	F-SC100FA	F-SC100CA	F-SC100CB	

Accessories		Knuckle				Sensor switch		
Bore size	I : I Knuckle	Y : Y Knuckle	F : F Knuckle	U : U Knuckle	CMSG	DMSG	EMSG	
32	F-M10X125I	F-M10X125Y	F-M10X125F	F-M10X125U	CMSG	DMSG	EMSG	
40	F-M12X125I	F-M12X125Y	F-M12X125F	F-M12X125U				
50	F-M16X150I	F-M16X150Y	F-M16X150F	F-M16X150U				
63	F-M16X150I	F-M16X150Y	F-M16X150F	F-M16X150U				
80	F-M20X150I	F-M20X150Y	F-M20X150F	F-M20X150U				
100	F-M20X150I	F-M20X150Y	F-M20X150F	F-M20X150U				

Accessory selection

Accessories		Mounting accessories					Knuckle [Note1]				Sensor switch		
Cylinder model		LB	FA	FB	CA	CB	I	Y	U	F	CMSG	DMSG	EMSG
SAU	Standard	●	●	●	●	●	●	●	●	●	x	x	x
	With magnet	●	●	●	●	●	●	●	●	●	●	●	●
SAUF	Standard	●	●	●	●	●	●	●	●	●	x	x	x
	With magnet	●	●	●	●	●	●	●	●	●	●	●	●
SAUD	Standard	●	●	x	x	x	●	●	●	●	x	x	x
	With magnet	●	●	x	x	x	●	●	●	●	●	●	●
SAUJ	Standard	●	●	x	x	x	●	●	●	●	x	x	x
	With magnet	●	●	x	x	x	●	●	●	●	●	●	●

[Note1] Please refer to P358~361 for knuckle detail.

Material of accessories

Accessories		Mounting accessories					Knuckle			
Bore size	LB	FA	FB	CA	CB	I	Y	F	U	
32~100	□	●	●	◇	◇	□	□	□	□	

●—Aluminum alloy, ◇—Cast steel, □—Carbon steel

Dimensions

The accessories are the same as SC series's accessories, please refer to P41~44 for details.



Standard cylinder—JSI Series

Compendium of JSI Series

JSI Standard cylinder
Bore size: 32, 40, 50, 63, 80, 100, 125

Adjustable air buffer
With adjustable air buffer on the front and back cover

No tie rod cylinder
The cylinder barrel is aluminum profile with hard anodizing treatment.

Convenient and fast fix sensor switch
With sensor switch groove on the two sides of body, the counterpart sensor switch type is: CMSE \ DMSE.

Four kinds of cylinder joints

- I Knuckle
- Y Knuckle
- Floating Joint
- Universal Joint

Multi-mounting accessories

- LB
- FA
- FB
- CA
- CB
- CR
- TC
- TCM1
- TCM2

Multi-type cylinder

- JSI: Double acting type
- JSID: Double rod type
- JSIJ: Adjustable stroke type

Criteria for selection: Cylinder thrust

Unit : Newton(N)

Bore size	Rod size	Acting type	Pressure area(mm ²)	Operating pressure(MPa)									
				0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9	
32	12	Double acting	Push side	804	80.4	160.8	241.2	321.6	402.0	482.4	562.8	643.2	723.6
			Pull side	690	69.0	138.0	207.0	276.0	345.0	414.0	483.0	552.0	621.0
40	16	Double acting	Push side	1256	125.6	251.2	376.8	502.4	628.0	753.6	879.2	1002.4	1130.4
			Pull side	1055	105.5	211.0	316.5	422.0	527.5	633.0	738.5	844.0	949.5
50	20	Double acting	Push side	1963	196.3	392.6	588.9	785.2	981.5	1177.8	1374.1	1570.4	1766.7
			Pull side	1649	164.9	329.8	494.7	659.6	824.5	989.4	1154.3	1399.2	1484.1
63	20	Double acting	Push side	3117	311.7	623.4	935.1	1246.8	1558.5	1870.2	2181.9	2493.6	2805.3
			Pull side	2803	280.3	560.6	840.9	1121.2	1401.5	1681.8	1962.1	2242.4	2522.7
80	25	Double acting	Push side	5026	502.6	1005.2	1507.8	2010.4	2513.0	3015.6	3518.2	4020.8	4523.4
			Pull side	4536	453.6	907.2	1360.8	1814.4	2268.0	2721.6	3175.2	3628.8	4082.4
100	32	Double acting	Push side	7853	785.3	1570.6	2355.9	3141.2	3926.5	4711.8	5497.1	6282.4	7067.7
			Pull side	7147	714.7	1429.4	2144.1	2858.9	3573.6	4288.3	5003.0	5717.7	6432.4
125	32	Double acting	Push side	12272	1227.2	2454.4	3681.6	4908.8	6136.0	7363.2	8590.4	9817.6	11044.8
			Pull side	11468	1146.8	2293.6	3440.4	4587.2	5734.0	6880.8	8027.6	9174.4	10321.2

Installation and application



- When load changes in the work, the cylinder with abundant output capacity shall be selected.
- Relative cylinder with high temperature resistance or corrosion resistance shall be chosen under the condition of high temperature or corrosion.
- Necessary protection measure shall be taken in the environment with higher humidity, much dust or water drops, oil dust and welding dregs.
- Dirty substances in the pipe must be eliminated before cylinder is connected with pipeline to prevent the entrance of particles into the cylinder.
- The medium used by cylinder shall be filtered to 40μm or below.
- Anti-freezing measure shall be adopted under low temperature environment to prevent moisture freezing.
- The cylinder shall be carried out test run without load before application. Prior to run, buffer shall be turned to the minimum and gradually released to avoid the damage on cylinder caused by excessive impact.
- The cylinder shall avoid the influence of side load in operation to maintain the normal work of cylinder and extend the service life.
- If the cylinder is dismantled and stored for a long time, please conduct anti-rust treatment to the surface. Anti-dust caps shall be added in air inlet and outlet ports.



JSI Series

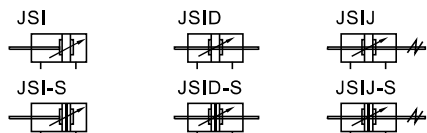


Specification

Bore size(mm)	32	40	50	63	80	100	125
Acting type	Double acting						
Fluid	Air(to be filtered by 40µm filter element)						
Mounting type	Basic FA FB CA CB CR LB TC TCM1 TCM2						
JSI, JSIJ	Basic FA LB TC TCM1 TCM2						
Operating pressure	0.15~1.0MPa(22~145psi)(1.5~10.0bar)						
Proof pressure	1.5MPa(215psi)(15bar)						
Temperature °C	-20~70						
Speed range mm/s	30~800						30~500
Stroke tolerance	0~250 ^{+1,0} ₀		251~1000 ^{+1,5} ₀		1001~1500 ^{+2,0} ₀		
Cushion type	Variable cushion						
Adjustable cushion stroke	20	20,5			29	33	
Port size [Note1]	1/8"	1/4"		3/8"		1/2"	

[Note1] PT thread, G thread are available. Add) Refer to P362 for detail of sensor switch.

Symbol



Product feature

1. JIS standard cylinder.
2. The seal of piston adopts heterogeneous two way seal structure. It's dimension is tight and it has the function of greasel reservation.
3. The cylinder barrel is aluminum profile with hard anodizing treatment.
4. Compared with ISO15552 standard cylinder, the cylinder of JSI series with the same cylinder diameter is shorter.
5. The buffer adjustment of cylinder is smooth and steady.
6. Cylinders and mounting accessories for installation with several specifications are optional.

Stroke

Bore size (mm)	Standard stroke (mm)																Max.std stroke	Max. stroke					
32	25	50	75	80	100	125	150	160	175	200	250	300	350	400	450	500	1000	1800					
40	25	50	75	80	100	125	150	160	175	200	250	300	350	400	450	500	600	700	800	900	1000	1200	1800
50	25	50	75	80	100	125	150	160	175	200	250	300	350	400	450	500	600	700	800	900	1000	1200	1800
63	25	50	75	80	100	125	150	160	175	200	250	300	350	400	450	500	600	700	800	900	1000	1500	1800
80	25	50	75	80	100	125	150	160	175	200	250	300	350	400	450	500	600	700	800	900	1000	1500	1800
100	25	50	75	80	100	125	150	160	175	200	250	300	350	400	450	500	600	700	800	900	1000	1500	1800
125	25	50	75	80	100	125	150	160	175	200	250	300	350	400	450	500	600	700	800	900	1000	1500	1800

[Note] Consult us for non-standard stroke.

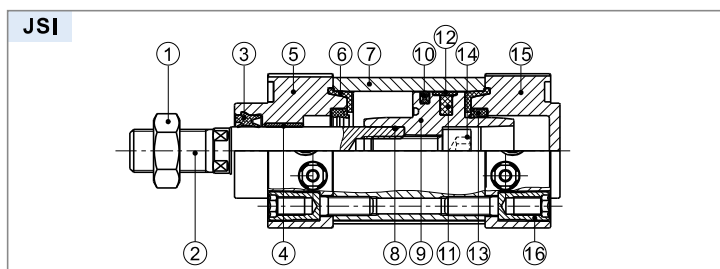
Ordering code

JSI 80 × 50 S □ □
JSID 80 × 50 S □ □
JSIJ 80 × 50-20 S □ □
 ① ② ③ ④ ⑤ ⑥ ⑦

① Model	② Bore size	③ Stroke	④ Adjustable stroke	⑤ Magnet	⑥ Mounting type[Note1]	⑦ Thread type
JSI: Double acting type	32 40 50 63 80 100 125	Refer to stroke table for details	No this code	Blank: Without magnet S: With magnet	Blank	Blank: PT G: G
					LB	
FA						
FB						
CA						
CB						
CR						
TC						
JSID: Double rod type					Blank	
					LB	
JSIJ: Adjustable stroke type			10 20 30 40 50 75 100		FA	
			TC			

[Note1] Please refer to page 54~56 for details of accessories ; TC is used with TCM1, TCM2.

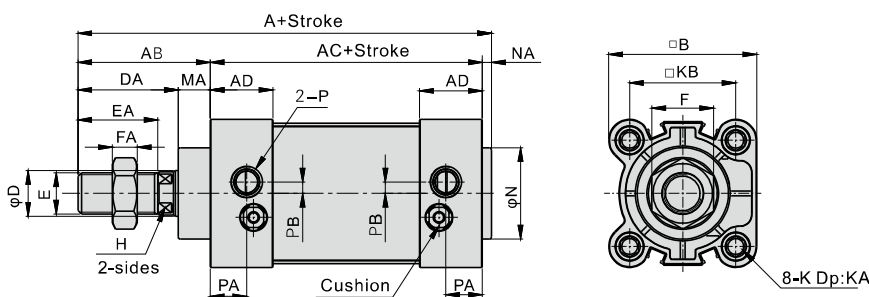
Inner structure and material of major parts



NO.	Item	Material
1	Rod nut	Carbon steel
2	Piston rod	Carbon steel with 20μm chrome plated or Stainless steel
3	Front cover packing	TPU
4	Bushing	Wear resistant material
5	Front cover	Aluminum alloy
6	O-ring	TPU
7	Barrel	Aluminum alloy
8	O-ring	NBR
9	Piston	Aluminum alloy
10	Piston seal	NBR
11	Magnet	Plastic
12	Wear ring	Wear resistant material
13	Buffer gasket	TPU
14	Screw	Carbon steel
15	Back cover	Aluminum alloy
16	Tie-rod nut	Carbon steel

Dimensions

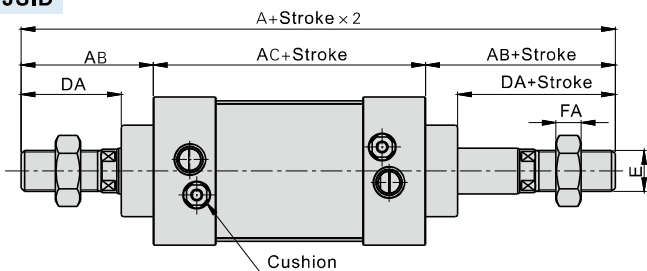
JSI



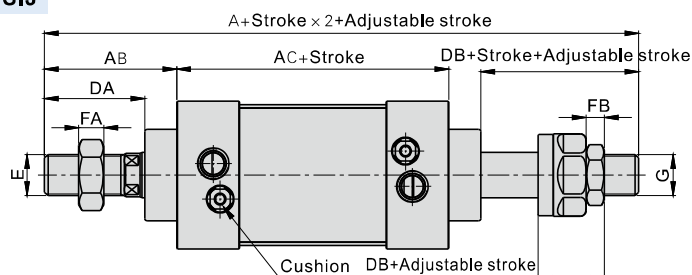
Bore size\Item	A	AB	AC	AD	B	D	DA	E	EA	F	FA	H	M	MA	K	KA	KB	N	NA	P	PA	PB
32	135	47	84	26	47	12	34	M10×1.25	22	17	6	10	30	13	M6	16	32.5	30	4	1/8"	13	5.5
40	139	51	84	25	53	16	38	M14×1.5	30	19	8	14	35	13	M6	16	38	35	4	1/4"	14	6
50	156	58	94	27.5	65	20	44	M18×1.5	35	27	11	18	40	14	M8	16	46.5	40	4	1/4"	16	5
63	156	58	94	27.5	75	20	44	M18×1.5	35	27	11	18	45	14	M8	16	56.5	45	4	3/8"	15	9
80	190	72	114	35	95	25	52	M22×1.5	40	32	13	22	45	20	M10	18	72	45	4	3/8"	19	11.5
100	190	72	114	35	115	32	52	M26×1.5	40	36	13	27	55	20	M10	18	89	55	4	1/2"	19	17
125	223	97	120	37.5	140	32	70	M27×2	54	41	13.5	27	60	27	M12	22	110	60	6	1/2"	20	17

Remark: The dimensions of magnet type cylinder are the same as non-magnet type cylinder.

JSID



JSIJ



Bore size\Item	A(JSID)	A(JSIJ)	AB	AC	DA	DB	E	FA	FB	G
32	178	171	47	84	34	27	M10X1.25	6	6	M10X1.25
40	186	176	51	84	38	28	M14X1.5	8	7	M12X1.25
50	210	195	58	94	44	29	M18X1.5	11	8	M16X1.5
63	210	195	58	94	44	29	M18X1.5	11	8	M16X1.5
80	258	241.5	72	114	52	35.5	M22X1.5	13	10	M20X1.5
100	258	248.5	72	114	52	42.5	M26X1.5	13	13.5	M27X2.0
125	314	286.5	97	120	70	42.5	M27X2.0	13.5	13.5	M27X2.0

Remark:

- The dimensions of magnet type cylinder are the same as non-magnet type cylinder.
- The unmarked dimension is the same as JSI standard type.

List for ordering code of accessories

Accessories Bore size	Mounting accessories							
	LB	FA\FB	CA	CB	CR	TC	TCM1	TCM2
32	F-JSI32LB	F-SI32FA	F-JSI32CA	F-JSI32CB	F-JSI32CR	F-SAI32TC	F-SI32TCM1	F-SI32TCM2
40	F-JSI40LB	F-SI40FA	F-JSI40CA	F-JSI40CB	F-JSI32CR	F-SAI40TC	F-SI40TCM1	F-SI40TCM2
50	F-JSI50LB	F-SI50FA	F-JSI50CA	F-JSI50CB	F-JSI50CR	F-SAI50TC	F-SI40TCM1	F-SI40TCM2
63	F-JSI63LB	F-SI63FA	F-JSI63CA	F-JSI63CB	F-JSI50CR	F-SAI63TC	F-SI63TCM1	F-SI63TCM2
80	F-JSI80LB	F-SI80FA	F-JSI80CA	F-JSI80CB	F-JSI80CR	F-SAI80TC	F-SI63TCM1	F-SI63TCM2
100	F-JSI100LB	F-SI100FA	F-JSI100CA	F-JSI100CB	F-JSI80CR	F-SAI100TC	F-SI125TCM1	F-SI125TCM2
125	F-JSI125LB	F-JSI125FA	F-JSI125CA	F-JSI125CB	F-JSI125CR	F-SAI125TC	F-SI125TCM1	F-SI125TCM2

Accessories Bore size	Knuckle				Sensor	
	I : I Knuckle	Y : Y Knuckle	F : F Knuckle	U : U Knuckle	CMSE	DMSE
32	F-M10X125I	F-M10X125Y	F-M10X125F	F-M10X125U	CMSE	DMSE
40	F-M14X150I	F-M14X150Y	F-M14X150F	F-M14X150U		
50	F-M18X150I	F-M18X150Y	F-M18X150F	F-M18X150U		
63	F-M18X150I	F-M18X150Y	F-M18X150F	F-M18X150U		
80	F-M22X150I	F-M22X150Y	F-M22X150F	-		
100	F-M26X150I	F-M26X150Y	F-M26X150F	F-M26X150U		
125	F-M27X200I	F-M27X200Y	F-M27X200F	F-M27X200U		

Accessory selection

Accessories Cylinder model	Mounting accessories										Knuckle [Note1]				Sensor	
	LB	FA	FB	CA	CB	CR	TC	TCM1	TCM2	I	Y	U	F	CMSE	DMSE	
JSI	Standard	●	●	●	●	●	●	●	●	●	●	●	●	×	×	
	With magnet	●	●	●	●	●	●	●	●	●	●	●	●	●	●	
JSID	Standard	●	●	×	×	×	×	●	●	●	●	●	●	×	×	
	With magnet	●	●	×	×	×	×	●	●	●	●	●	●	●	●	
JSIJ	Standard	●	●	×	×	×	×	●	●	●	●	●	●	×	×	
	With magnet	●	●	×	×	×	×	●	●	●	●	●	●	●	●	

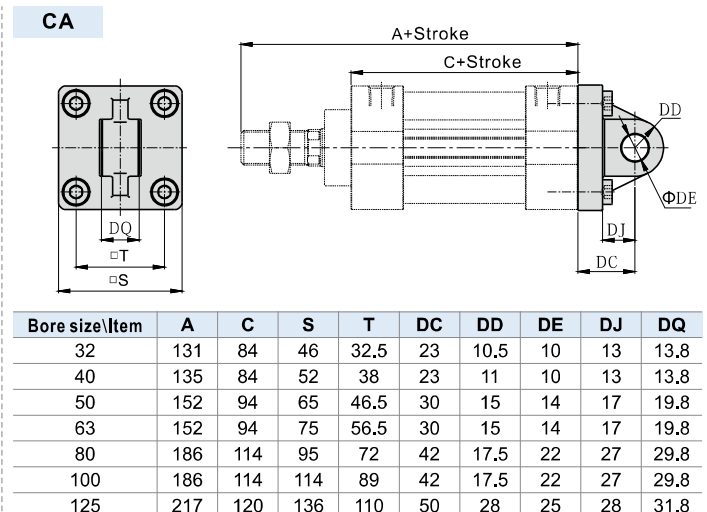
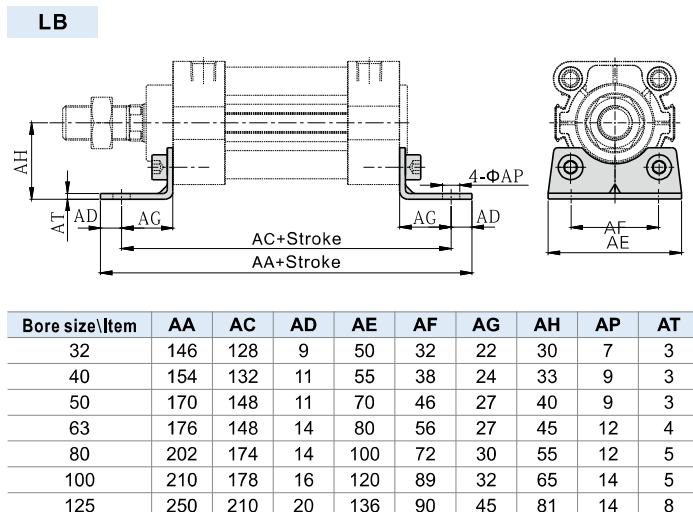
[Note1] Please refer to P358~361 for knuckle detail.

Material of accessories

Accessories Bore size	Mounting accessories										Knuckle			
	LB	FA	FB	CA	CB	CR	TC	TCM1	TCM2	I	Y	F	U	
32~63	△	●	●	◇	◇	◇	◇	◇	●	□	□	□	□	
80, 100	△	●	●	◇	◇	◇	◇	◇	●	□	◇	□	□	
125	◇	◇	◇	◇	◇	◇	◇	◇	●	◇	◇	□	□	

●—Aluminum alloy, ◇—Nodular cast iron, □—Carbon steel, △—SPCC.

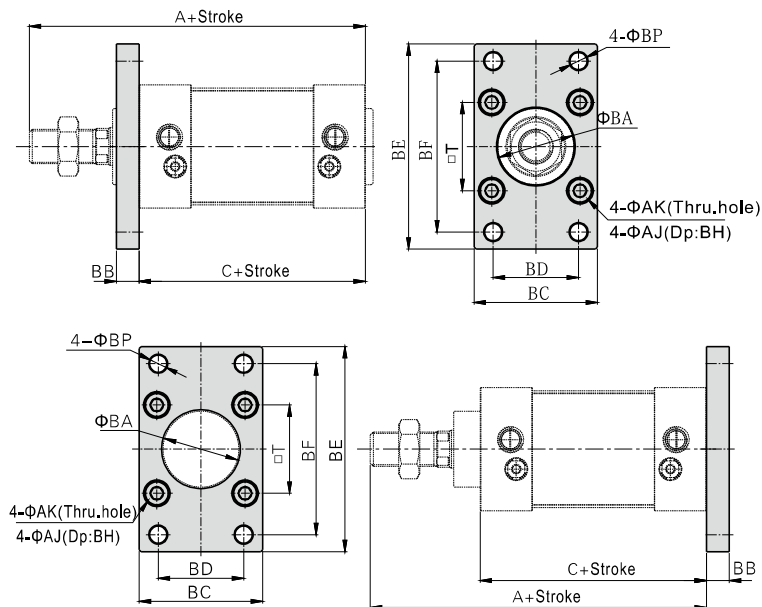
Dimensions



Standard cylinder

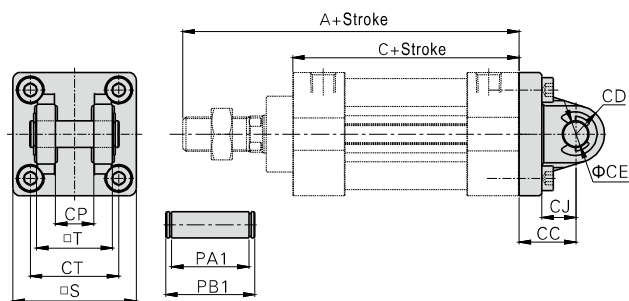
JSI Series—Accessories

FA/FB



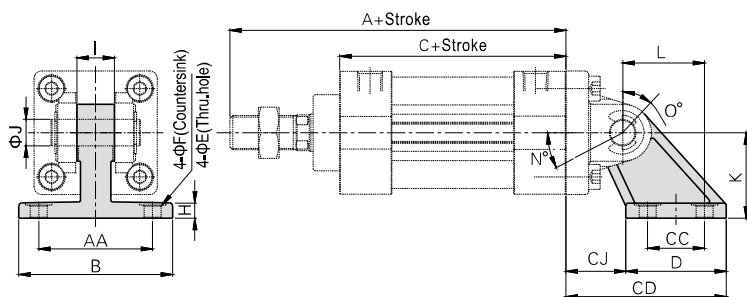
Bore size\Item	A	C	AJ	AK	BA	BB	BC	BD	BE	BF	BH	BP	T
32	131	84	11	6,5	30,5	10	47	32	80	64	6,5	7	32,5
40	135	84	11	6,5	35,5	10	53	36	90	72	6,5	9	38
50	152	94	14	9	40,5	12	65	45	108	90	8,5	9	46,5
63	152	94	14	9	45,5	12	75	50	118	100	8,5	9	56,5
80	186	114	17	11	45,5	16	95	63	150	126	10,5	12,5	72
100	186	114	17	11	55,5	16	115	75	176	150	10,5	14,5	89
125	217	120	19	13	60,5	20	138	102	216	180	12,5	14	110

CB



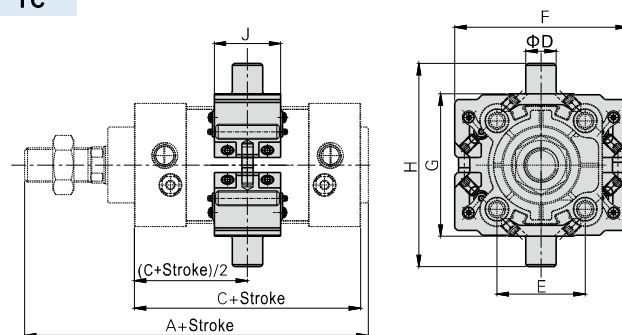
Bore size\Item	A	C	CC	CD	CE	CJ	CP	CT	PA1	PB1	S	T
32	131	84	23	10,5	10	14	14,2	32,5	28,8	34,6	46	28
40	135	84	23	11	10	14	14,2	38	28,8	34,6	52	28
50	152	94	30	15	14	18	20,2	46,5	40,8	47	65	40
63	152	94	30	15	14	18	20,2	56,5	40,8	47	75	40
80	186	114	42	20	22	27	30,2	72	60,8	69,2	95	60
100	186	114	42	20	22	27	30,2	89	60,8	69,2	114	60
125	217	120	50	25	25	32	32,2	110	64,8	73,2	136	64

CR



Bore size\Item	A	AA	B	C	CC	CD	CJ	D	E	F	H	I	J	K	L	N	O	N+O+90°
32	131	44	62	84	22	65	23	42	6,6	12	7	13,8	10	33	32	25	45	160
40	135	44	62	84	22	65	23	42	6,6	12	7	13,8	10	33	32	25	45	160
50	152	60	81	94	30	84,5	31,5	53	9	15	8	19,8	14	45	43	40	60	190
63	152	60	81	94	30	84,5	31,5	53	9	15	8	19,8	14	45	43	40	60	190
80	186	86	111	114	45	120	47	73	11	18	10	29,8	22	65	64	30	55	175
100	186	86	111	114	45	120	47	73	11	18	10	29,8	22	65	64	30	55	175
125	217	110	136	120	60	143	53	90	13,5	20	14	31,8	25	75	78	30	50	170

TC



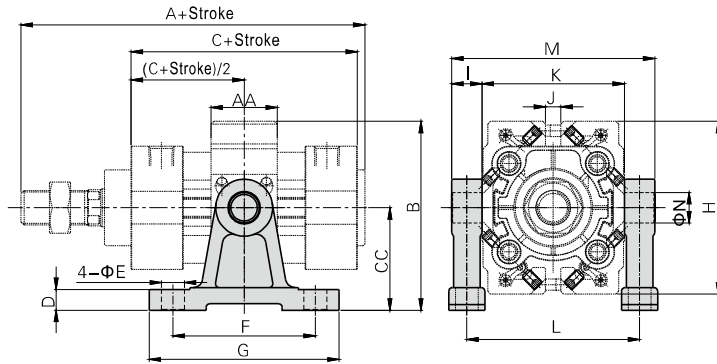
Bore size\Item	A	C	D	E	F	G	H	J
32	135	84	12	32,5	65	52	76	31
40	139	84	16	38	75	63	95	31
50	156	94	16	46,5	91	75	107	35
63	156	94	20	56,5	103	90	130	35
80	190	114	20	72	126	110	150	45
100	190	114	25	89	145	132	182	45
125	223	120	25	110	175	160	210	51

[Note] CR can't be used alone, it must be used with CB.

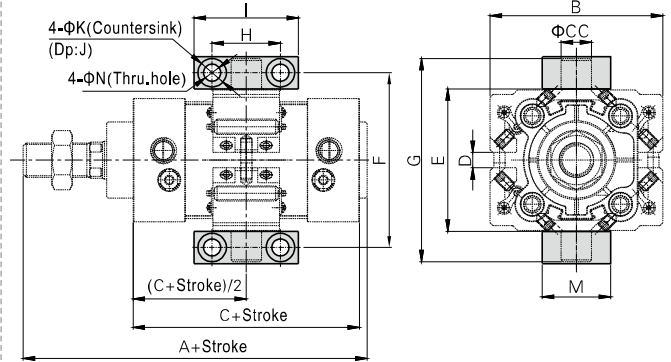
Standard cylinder

JSI Series—Accessories

TCM1



TCM2



Bore size\Item	A	AA	B	C	CC	D	E	F	G	H	I	J	K	L	M	N
32	135	31	72.5	84	40	11	9	60	80	65	12	5	52	60	79	12
40	139	31	91.5	84	54	11	12	75	100	75	16	8	63	79	98	16
50	156	35	99.5	94	54	11	12	75	100	91	16	10	75	91	110	16
63	156	35	121.5	94	70	11	12	85	110	103	20	16	90	110	133	20
80	190	45	133	114	70	11	12	85	110	126	20	20	110	130	153	20
100	190	45	162.5	114	90	19	18	115	155	145	25	28	132	157	185	25
125	223	51	177.5	120	90	19	18	115	155	175	25	40	160	185	213	25

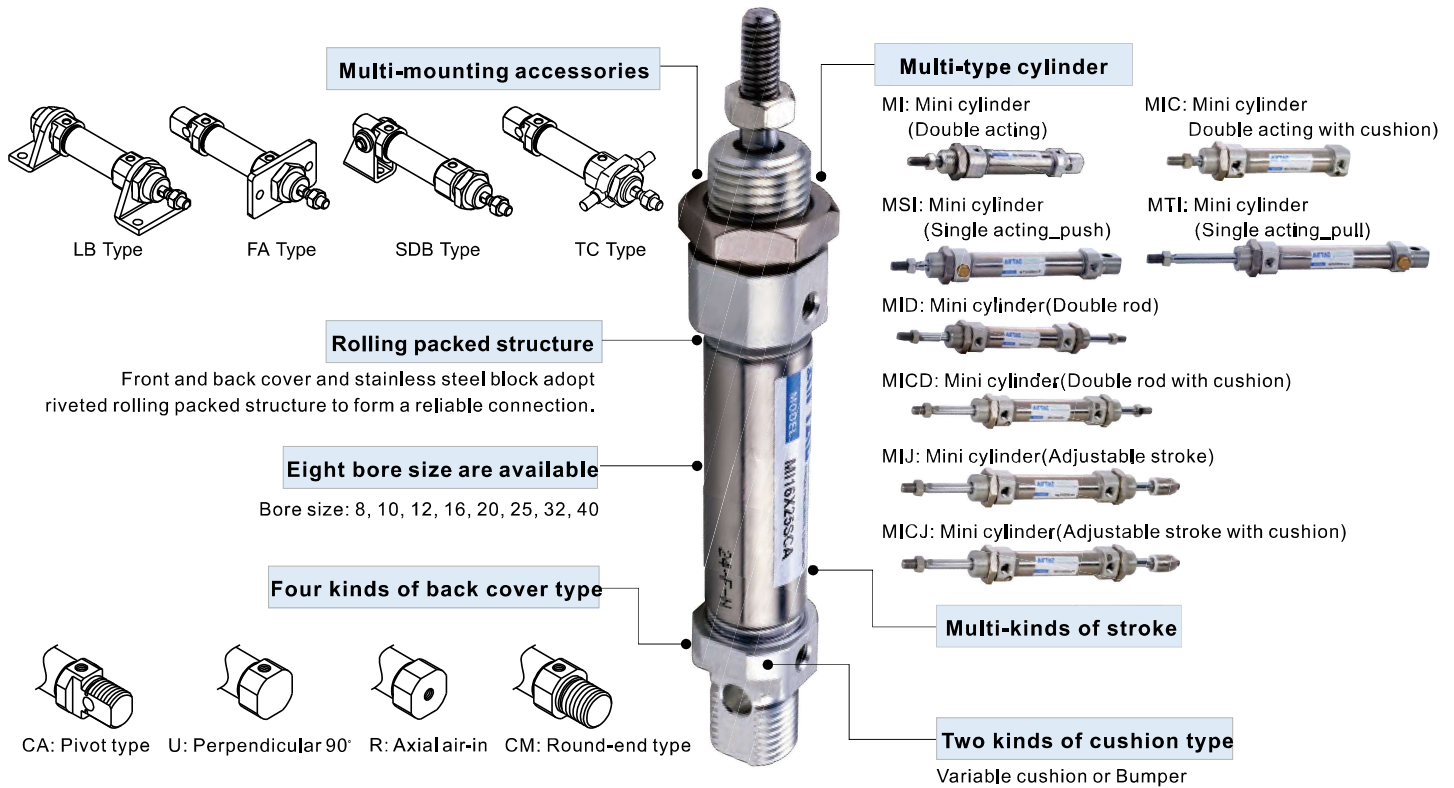
Bore size\Item	A	B	C	CC	D	E	F	G	H	I	J	K	M	N
32	135	65	84	12	5	52	68	82	32	46	6.8	11	30	7
40	139	75	84	16	8	63	82	99	36	55	9	15	36	9
50	156	91	94	16	10	75	94	111	36	55	9	15	36	9
63	156	103	94	20	16	90	113.5	134	42	65	11	18	40	11
80	190	126	114	20	20	110	133.5	154	42	65	11	18	40	11
100	190	145	114	25	28	132	159.5	184	50	75	14	20	50	14
125	223	175	120	25	40	160	187.5	212	50	75	14	20	50	14



Mini cylinder—MI Series

In accordance with ISO6432 standard

Compendium of MI Series



Criteria for selection: Cylinder thrust

Unit : Newton(N)

Bore size	Rod size	Acting type	Pressure area(mm ²)	Operating pressure(MPa)							
				0.1	0.2	0.3	0.4	0.5	0.6	0.7	
8	4	Single acting	Push side	50.2	-	3.6	8.6	13.6	18.6	23.6	28.7
			Pull side	37.7	-	1.0	4.8	8.6	12.3	16.1	19.9
		Double acting	Push side	50.2	5.0	10.1	15.1	20.1	25.1	30.1	35.2
			Pull side	37.7	3.7	7.5	11.3	15.1	18.8	22.6	26.4
10	4	Single acting	Push side	78.5	-	5.9	13.8	21.6	29.5	37.3	45.2
			Pull side	65.9	-	3.4	10.0	16.6	23.2	29.8	36.4
		Double acting	Push side	78.5	7.9	15.7	23.6	31.4	39.3	47.1	55.0
			Pull side	65.9	6.6	13.2	19.8	26.4	33.0	39.5	46.1
12	6	Single acting	Push side	113.0	-	10.1	21.4	32.7	44.0	55.3	66.6
			Pull side	84.8	-	4.5	12.9	21.4	29.9	38.4	46.9
		Double acting	Push side	113.0	11.3	22.6	33.9	45.2	56.5	67.8	79.1
			Pull side	84.8	8.5	17.0	25.4	33.9	42.4	50.9	59.4
16	6	Single acting	Push side	201.0	-	14.6	34.7	54.8	74.9	95.0	115.1
			Pull side	172.7	-	8.9	26.2	43.5	60.8	78.0	95.3
		Double acting	Push side	201.0	20.1	40.2	60.3	80.4	100.5	120.6	140.7
			Pull side	172.7	17.3	34.5	51.8	69.1	86.4	103.6	120.9
20	8	Single acting	Push side	314.0	-	25.3	56.7	88.1	119.5	150.9	182.3
			Pull side	263.8	-	15.3	41.6	68.0	94.4	120.8	147.1
		Double acting	Push side	314.0	31.4	62.8	94.2	125.6	157.0	188.4	219.8
			Pull side	263.8	26.4	52.8	79.1	105.5	131.9	158.3	184.7
25	10	Single acting	Push side	490.6	-	43.1	92.2	141.3	190.3	239.3	288.4
			Pull side	412.1	-	27.4	68.6	109.8	151.1	192.3	233.5
		Double acting	Push side	490.6	49.1	98.1	147.2	196.2	245.3	294.4	343.4
			Pull side	412.1	41.2	82.4	123.6	164.8	206.1	247.3	288.5
32	12	Single acting	Push side	804.3	30.2	110.9	191.3	277.1	352.1	432.6	513.0
			Pull side	691.2	19.1	88.2	157.4	226.5	295.6	364.7	438.8
		Double acting	Push side	804.3	80.4	160.9	241.3	321.7	402.2	482.6	563.0
			Pull side	691.2	69.1	138.2	207.4	276.5	345.6	414.7	483.8
40	16	Single acting	Push side	1256.6	64.7	190.3	316.0	441.7	567.3	693.0	818.7
			Pull side	1055.6	44.6	150.1	255.7	361.2	466.8	572.4	677.9
		Double acting	Push side	1256.6	125.7	251.3	377.0	502.6	628.3	754.0	879.6
			Pull side	1055.6	105.6	211.1	316.7	422.2	527.8	633.4	738.9

Installation and application



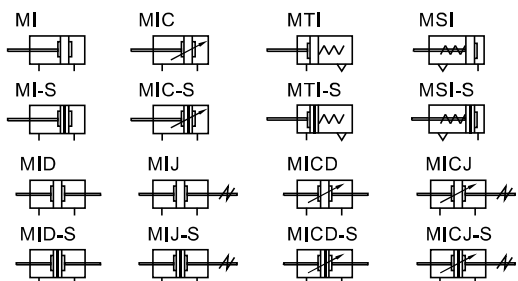
- When load changes in the work, the cylinder with abundant output capacity shall be selected.
- Relative cylinder with high temperature resistance or corrosion resistance shall be chosen under the condition of high temperature or corrosion.
- Necessary protection measure shall be taken in the environment with higher humidity, much dust or water drops, oil dust and welding dregs.
- Dirty substances in the pipe must be eliminated before cylinder is connected with pipeline to prevent the entrance of particles into the cylinder.
- The medium used by cylinder shall be filtered to 40μm or below.
- Anti-freezing measure shall be adopted under low temperature environment to prevent moisture freezing.
- The cylinder shall be carried out test run without load before application. Prior to run, buffer shall be turned to the minimum and gradually released to avoid the damage on cylinder caused by excessive impact.
- The cylinder shall avoid the influence of side load in operation to maintain the normal work of cylinder and extend the service life.
- If the cylinder is dismantled and stored for a long time, please conduct anti-rust treatment to the surface. Anti-dust caps shall be added in air inlet and outlet ports. The front and back cover can not be dismantled, which shall be especially noticed.



MI Series



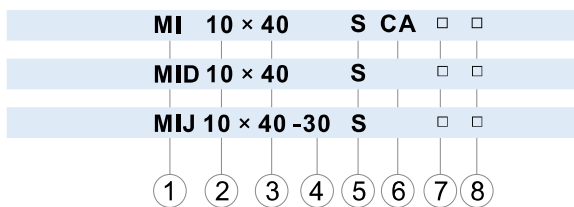
Symbol



Product feature

- In accordance with ISO6432 standard(Φ8~Φ25).
- Front and back cover owns fixed bumper pad which can reduce the impact of direction-change of the cylinder.
- There are several mode of back cover, which makes the installation of cylinder more convenient.
- Front and back cover and stainless steel block adopt riveted rolling packed structure to form a reliable connection.
- Piston rod and cylinder body with the material of stainless steel make the cylinder adapt general working environment with corrosivity.
- There are cylinders and accessories with several specifications for installation for your choice.

Ordering code



① Model	② Bore size	③ Stroke	④ Adjustable stroke	⑤ Magnet	⑥ Back cover	⑦ Mounting type[Note1]	⑧ Thread type		
MI: Mini cylinder(Double acting)	8 10 12 16 20 25 32 40	Refer to stroke table for details	No this code	Blank: Without magnet S: With magnet	Refer below table for details	Blank: No accessories FA: FA type SDB: SDB type LB: LB type TC: TC type	Blank: PT G: G		
MIC: Mini cylinder (Double acting with cushion)	16 20 25 32 40								
MSI: Mini cylinder(Single acting_push)									
MTI: Mini cylinder(Single acting_pull)	8 10 12 16 20 25 32 40				10 20 30 40 50 75 100	No this code		No this code	Blank: No accessories FA: FA type LB: LB type TC: TC type
MID: Mini cylinder(Double rod)									
MICD: Mini cylinder (Double rod with cushion)	16 20 25 32 40								
MIJ: Mini cylinder(Adjustable stroke)	8 10 12 16 20 25 32 40								
MICJ: Mini cylinder(Adjustable stroke with cushion)	16 20 25 32 40								

[Note1] Please refer to page 61~62 for accessory parts.

Model	Back cover	Bore size
MI MSI MTI	CA: Pivot type	Φ8~Φ25
	U: Perpendicular 90°	Φ8~Φ40
	R: Axial air-in	Φ16~Φ40
	CM: Round-end type	Φ16~Φ40
MIC	CA: Pivot type	Φ16~Φ25
	U: Perpendicular 90°	Φ16~Φ40
	CM: Round-end type	Φ16~Φ40
Others	No this code	

Specification

Bore size(mm)	8	10	12	16	20	25	32	40
Acting type	Double acting、Single acting_Push、Single acting_Pull							
	-				Double acting with cushion			
Fluid	Air(to be filtered by 40μm filter element)							
Operating pressure	0.15~1.0MPa(22~145psi)(1.5~10.0bar)							
	0.2~1.0MPa(28~145psi)(2.0~10.0bar)							
Proof pressure	1.5MPa(215psi)(15bar)							
Temperature °C	-20~70							
Speed range mm/s	Double acting : 30~800				Single acting : 50~800			
Stroke tolerance	0~150 ^{+1.0} ₀ >150 ^{+1.5} ₀							
Cushion type	MIC Series: Variable cushion				Other series: Bumper			
Port size [Note1]	M5×0.8				1/8"		1/4"	

[Note1] PT thread, G thread are available.

Add) Refer to P362 for detail of sensor switch.

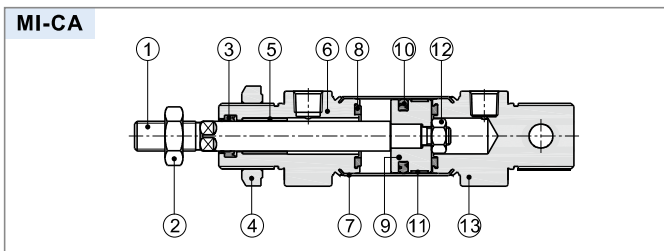
Stroke

Bore size (mm)	Standard stroke (mm)	Max,std stroke	Max, stroke	
MI	8	10 15 20 25 30 40 50 60 75 80 100 125 150	150	200
	10	10 15 20 25 30 40 50 60 75 80 100 125 150 160 175 200	200	200
	12	10 15 20 25 30 40 50 60 75 80 100 125 150 160 175 200 250	250	500
MI MIC	16	10 15 20 25 30 40 50 60 75 80 100 125 150 160 175 200 250 300	500	600
	20 25 32 40	350 400 450 500	500	800
MID MIJ	8	10 15 20 25 30 40 50 60 75 80 100	100	-
	10	10 15 20 25 30 40 50 60 75 80 100	100	-
	12	10 15 20 25 30 40 50 60 75 80 100 125 150 160 175 200	200	-
MID MIJ	16 20	10 15 20 25 30 40 50 60 75 80 100 125 150 160 175 200 250 300	300	-
	25	10 15 20 25 30 40 50 60 75 80 100 125 150 160 175 200 250 300	300	-
	32	10 15 20 25 30 40 50 60 75 80 100 125 150 160 175 200 250 300	500	-
MICD MICJ	40	350 400 450 500	500	-
	8 10 12	10 15 20 25 30 40 50	-	-
MSI MTI	16	10 15 20 25 30 40 50 60 75 80 100	-	-
	20 25 32 40	10 15 20 25 30 40 50 60 75 80 100 125 150	-	-

[Note] Consult us for non-standard stroke.

MI Series

Inner structure and material of major parts

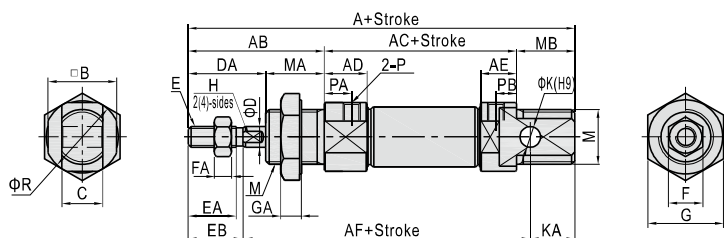


NO.	Item	Material
1	Rod	SUS304
2	Rod nut	Carbon steel
3	Front cover packing	NBR
4	Front cover nut	Carbon steel
5	Bushing	Wear resistant material
6	Front cover	Aluminum alloy
7	Barrel	SUS304(Φ8~Φ12)\SUS316L(Others)
8	Bumper	TPU
9	Piston	SUS303(Φ8~Φ12)\Aluminum alloy(Others)
10	Piston seal	NBR
11	Wear ring	Wear resistant material
12	Nut	Carbon steel
13	Back cover	Aluminum alloy

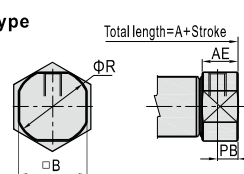
Dimensions

MI

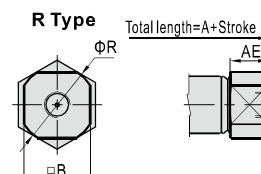
CA Type



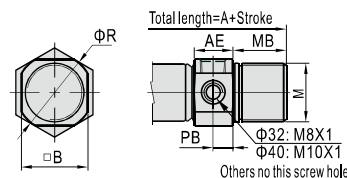
U Type



R Type



CM Type

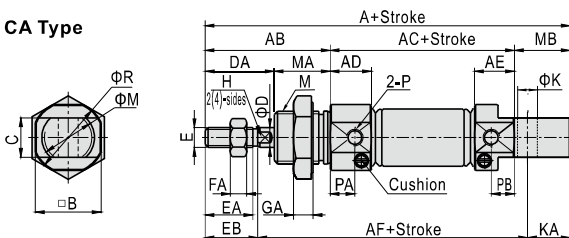


Bore size\Item	A				AB	AC	AD	AE		AF	B	C	D	DA	E	EA	EB	F	FA	G	GA	H	K	KA	M	MA	MB	P	PA	PB		R
	CA	U	R	CM				CA	U/R/CM																					CA	U/CM	
8	86	74	-	-	28	46	11.5	9.5	9.5	64	15	8	4	16	M4×0.7	10.5	12	7	3	17	6	-	4	10	M12×1.25	12	12	M5×0.8	7	5	5	17
10	86	74	-	-	28	46	11.5	9.5	9.5	64	15	8	4	16	M4×0.7	10.5	12	7	3	17	6	-	4	10	M12×1.25	12	12	M5×0.8	7	5	5	17
12	105	88	-	-	38	50	12.5	10.5	10.5	75	18	12	6	21	M6×1.0	14.5	16	10	5	22	6	5(2-Sides)	6	14	M16×1.5	17	17	M5×0.8	8	6	6	20
16	111	94	94	111	38	56	12.5	10.5	10.5	82	20	12	6	21	M6×1.0	14.5	16	10	5	22	6	5(2-Sides)	6	13	M16×1.5	17	17	M5×0.8	8	6	6	22
20	126	106	106	126	44	62	14.5	14.5	14.5	95.5	25	16	8	24	M8×1.25	18	19.5	12	6	29	7	6(2-Sides)	8	11	M22×1.5	20	20	1/8"	7.5	7.5	7.5	29
25	137	114.5	115	137	50	65	16	16	16	104.5	30	16	10	28	M10×1.25	20	21.5	17	6	29	7	8(4-Sides)	8	11	M22×1.5	22	22	1/8"	8	8	8	33.5
32	-	125	126	140	58	-	16.5	-	16.5	-	34.5	-	12	28	M10×1.25	18.5	20	17	6	36	7	10(4-Sides)	-	-	M30×1.5	30	14	1/8"	9	-	8/9	37.5
40	-	158	158	174	69	-	22	-	22	-	42.5	-	16	34	M12×1.25	22.5	24	17	7	46	8	14(4-Sides)	-	-	M38×1.5	35	16	1/4"	12	-	11.5/12	46.5

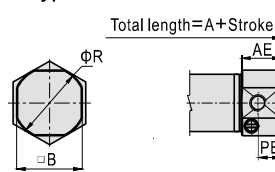
Remark: The dimensions of magnet type cylinder are the same as non-magnet type cylinder.

MIC Φ16-Φ25

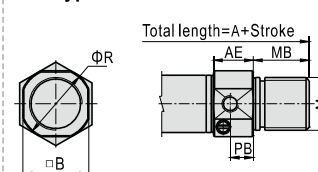
CA Type



U Type



CM Type



Bore size\Item	A				AB	AC	AD	AE		AF	B	C	D	DA	E	EA	EB	F	FA	G	GA	H	K	KA	M	MA	MB	P	PA	PB	R
	CA/CM	U	CA/CM	U																											
16	111	94	38	56	12.5	12	12	82	20	12	6	21	M6×1.0	14.5	16	10	5	22	6	5(2-Sides)	6	13	M16×1.5	17	17	M5×0.8	7.5	7	22		
20	126	106	44	62	14.5	14.5	14.5	95.5	25	16	8	24	M8×1.25	18	19.5	12	6	29	7	6(2-Sides)	8	11	M22×1.5	20	20	1/8"	7.5	7.5	29		
25	137	113.5	50	65	16	16	14.5	104.5	30	16	10	28	M10×1.25	20	21.5	17	6	29	7	8(4-Sides)	8	11	M22×1.5	22	22	1/8"	8	8	33.5		

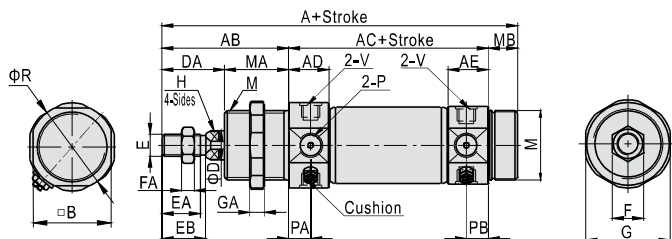
Remark: The dimensions of magnet type cylinder are the same as non-magnet type cylinder.

Mini cylinder(ISO6432)

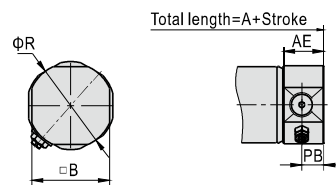
MI Series

MIC $\phi 32/\phi 40$

CM Type



U Type

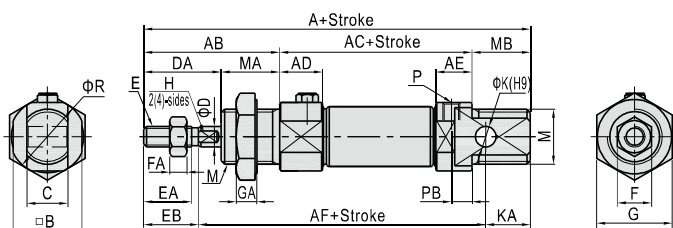


Bore size/Item	A		AB	AC	AD	AE		B	D	DA	E	EA	EB	F	FA	G	GA	H	M	MA	MB	P	PA	PB		R	V
	U	CM				U	CM																	U	CM		
32	124	140	58	68	16,5	14,5	16,5	34,5	12	28	M10×1,25	18,5	20	17	6	36	7	10(4-Sides)	M30×1,5	30	14	1/8"	9	7,5	9	37,5	M8X1
40	157,5	174	69	89	22	21,5	22	42,5	16	34	M12×1,25	22,5	24	17	7	46	8	14(4-Sides)	M38×1,5	35	16	1/4"	12	11,5	12	46,5	M10X1

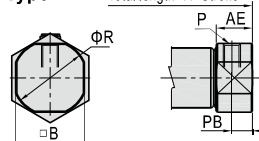
Remark: The dimensions of magnet type cylinder are the same as non-magnet type cylinder.

MSI

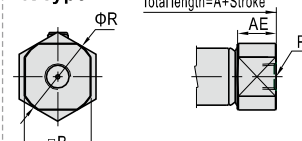
CA Type



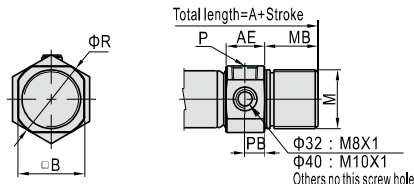
U Type



R Type

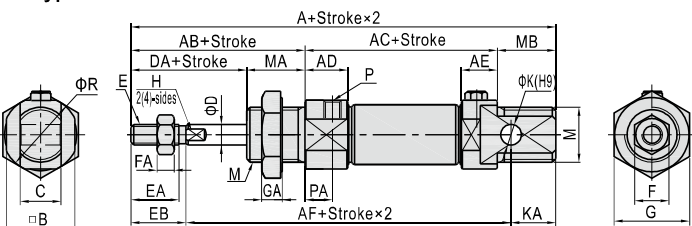


CM Type

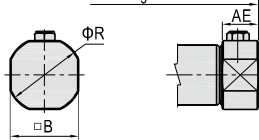


MTI

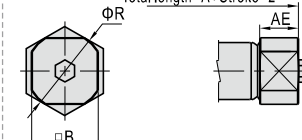
CA Type



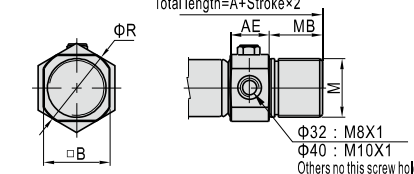
U Type



R Type



CM Type



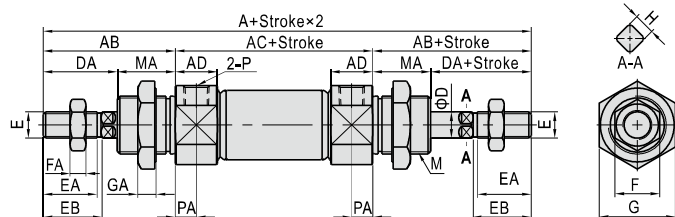
Item	CA			A			R			CM			AB	AC			AD	AF		
	0~50	51~10	101~150	0~50	51~100	101~150	0~50	51~100	101~150	0~50	51~100	101~150		0~50	51~100	101~150		0~50	51~100	101~150
8	111	-	-	99	-	-	-	-	-	-	-	-	28	71	-	-	11,5	89	-	-
10	111	-	-	99	-	-	-	-	-	-	-	-	28	71	-	-	11,5	89	-	-
12	130	-	-	113	-	-	-	-	-	-	-	-	38	75	-	-	12,5	100	-	-
16	136	161	-	119	144	-	119	144	-	136	161	-	38	81	106	-	12,5	107	132	-
20	151	176	201	131	156	181	131	156	181	151	176	201	44	87	112	137	14,5	120,5	145,5	170,5
25	162	187	212	139,5	164,5	189,5	140	165	190	162	187	212	50	90	115	140	16	129,5	154,5	179,5
32	-	-	-	150	175	200	151	176	201	165	190	215	58	-	-	-	16,5	-	-	-
40	-	-	-	183	208	233	183	208	233	199	224	249	69	-	-	-	22	-	-	-

Bore size/Item	AE		B	C	D	DA	E	EA	EB	F	FA	G	GA	H	K	KA	M	MA	MB	P	PA	PB		R
	CA	U/R/CM																				CA	U/CM	
8	9,5	9,5	15	8	4	16	M4×0,7	10,5	12	7	3	17	6	-	4	10	M12×1,25	12	12	M5×0,8	7	5	5	17
10	9,5	9,5	15	8	4	16	M4×0,7	10,5	12	7	3	17	6	-	4	10	M12×1,25	12	12	M5×0,8	7	5	5	17
12	10,5	10,5	18	12	6	21	M6×1,0	14,5	16	10	5	22	6	5(2-Sides)	6	14	M16×1,5	17	17	M5×0,8	8	6	6	20
16	10,5	10,5	20	12	6	21	M6×1,0	14,5	16	10	5	22	6	5(2-Sides)	6	13	M16×1,5	17	17	M5×0,8	8	6	6	22
20	14,5	14,5	25	16	8	24	M8×1,25	18	19,5	12	6	29	7	6(2-Sides)	8	11	M22×1,5	20	20	1/8"	7,5	7,5	7,5	29
25	16	16	30	16	10	28	M10×1,25	20	21,5	17	6	29	7	8(4-Sides)	8	11	M22×1,5	22	22	1/8"	8	8	8	33,5
32	-	16,5	34,5	-	12	28	M10×1,25	18,5	20	17	6	36	7	10(4-Sides)	-	-	M30×1,5	30	14	1/8"	9	-	8/9	37,5
40	-	22	42,5	-	16	34	M12×1,25	22,5	24	17	7	46	8	14(4-Sides)	-	-	M38×1,5	35	16	1/4"	12	-	11,5/12	46,5

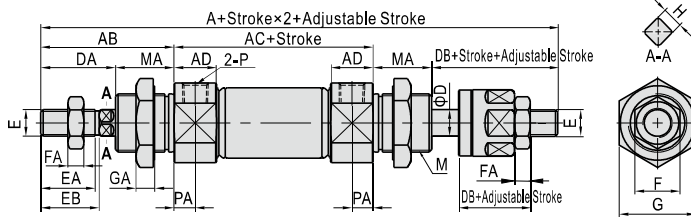
Remark: The dimensions of magnet type cylinder are the same as non-magnet type cylinder.

MI Series

MID



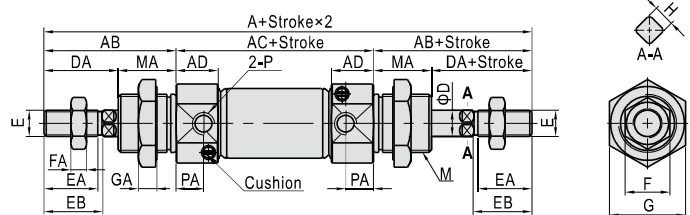
MIJ



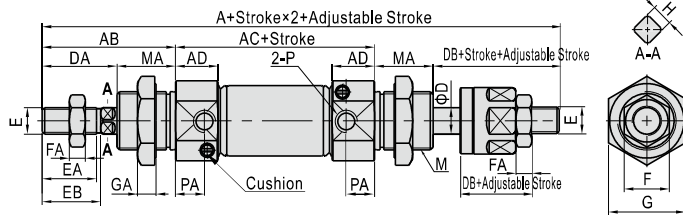
Bore size\Item	A(MID)	A(MIJ)	AB	AC	AD	D	DA	DB	E	EA	EB	F	FA	G	GA	H	M	MA	P	PA
8	104	103	28	48	11.5	4	16	15	M4×0.7	10.5	12	7	3	17	6	-	M12×1.25	12	M5×0.8	7
10	104	103	28	48	11.5	4	16	15	M4×0.7	10.5	12	7	3	17	6	-	M12×1.25	12	M5×0.8	7
12	128	128	38	52	12.5	6	21	21	M6×1.0	14.5	16	10	5	22	6	5(2-Sides)	M16×1.5	17	M5×0.8	8
16	134	134	38	58	12.5	6	21	21	M6×1.0	14.5	16	10	5	22	6	5(2-Sides)	M16×1.5	17	M5×0.8	8
20	150	151	44	62	14.5	8	24	25	M8×1.25	18	19.5	12	6	29	7	6(2-Sides)	M22×1.5	20	1/8"	7.5
25	165	164	50	65	16	10	28	27	M10×1.25	20	21.5	17	6	29	7	8(4-Sides)	M22×1.5	22	1/8"	8
32	184	183	58	68	16.5	12	28	27	M10×1.25	18.5	20	17	6	36	7	10(4-Sides)	M30×1.5	30	1/8"	9
40	227	222	69	89	22	16	34	29	M12×1.25	22.5	24	17	7	46	8	14(4-Sides)	M38×1.5	35	1/4"	12

Remark: The dimensions of magnet type cylinder are the same as non-magnet type cylinder.

MICD Φ16~Φ40



MICJ Φ16~Φ40



Bore size\Item	A(MICD)	A(MICJ)	AB	AC	AD	D	DA	DB	E	EA	EB	F	FA	G	GA	H	M	MA	P	PA
16	132.5	132.5	38	56.5	12.5	6	21	21	M6×1.0	14.5	16	10	5	22	6	5(2-Sides)	M16×1.5	17	M5×0.8	7.5
20	150	151	44	62	14.5	8	24	25	M8×1.25	18	19.5	12	6	29	7	6(2-Sides)	M22×1.5	20	1/8"	7.5
25	165	164	50	65	16	10	28	27	M10×1.25	20	21.5	17	6	29	7	8(4-Sides)	M22×1.5	22	1/8"	8
32	184	183	58	68	16.5	12	28	27	M10×1.25	18.5	20	17	6	36	7	10(4-Sides)	M30×1.5	30	1/8"	9
40	227	222	69	89	22	16	34	29	M12×1.25	22.5	24	17	7	46	8	14(4-Sides)	M38×1.5	35	1/4"	12

Remark: The dimensions of magnet type cylinder are the same as non-magnet type cylinder.

List for ordering code of accessories

Accessories Bore size	Mounting accessories				Knuckle				Sensor switch		
	LB	FA	SDB	TC	I	Y	F	U	CMSG	DMSG	EMSG
8	F-MI10LB	F-MI8FA	F-MI8SDB	F-MI10TC	F-M4X070I	F-M4X070Y	F-M4X070F	F-M4X070U	CMSG	DMSG	EMSG
10											
12	F-MI12LB	F-MI12FA	F-MI12SDB	F-MI12TC	F-M6X100I	F-M6X100Y	F-M6X100F	F-M6X100U			
16											
20	F-MI20LB	F-MI20FA	F-MI20SDB	F-MI20TC	F-M8X125I	F-M8X125Y	F-M8X125F	F-M8X125U			
25											
32	F-MI32LB	-	F-MI32SDB	F-MI32TC	F-M10X125I	F-M10X125Y	F-M10X125F	F-M10X125U			
40											
40	F-MI40LB	-	F-MI40SDB	F-MI40TC	F-M12X125I	F-M12X125Y	F-M12X125F	F-M12X125U			

Accessory selection

Accessories Cylinder model	Mounting accessories	Knuckle [Note1]				Sensor switch					
		LB	FA	SDB	TC	I	Y	U	CMSG	DMSG	EMSG
MI	Standard	•	•	•	•	•	•	•	x	x	x
MIC	With magnet	•	•	•	•	•	•	•	•	•	•
MSI	Standard	•	•	•	•	•	•	•	x	x	x
MTI	With magnet	•	•	•	•	•	•	•	•	•	•
MID	Standard	•	•	x	•	•	•	•	x	x	x
MICD	With magnet	•	•	x	•	•	•	•	•	•	•
MIJ	Standard	•	•	x	•	•	•	•	x	x	x
MICJ	With magnet	•	•	x	•	•	•	•	•	•	•

Material of accessories

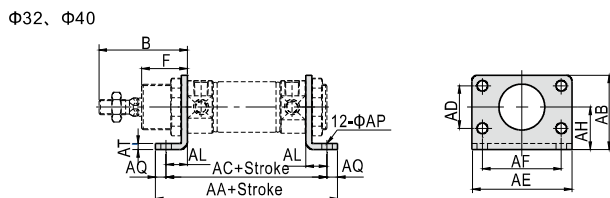
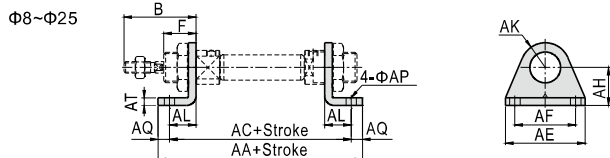
Accessories Bore size	Mounting accessories				Knuckle			
	LB	FA	SDB	TC	I	Y	F	U
8~40	△	△	△	▲	□	□	□	□

▲—SUS304; △—SPCC; □—Carbon steel;

[Note1] Please refer to P358~361 for knuckle detail.

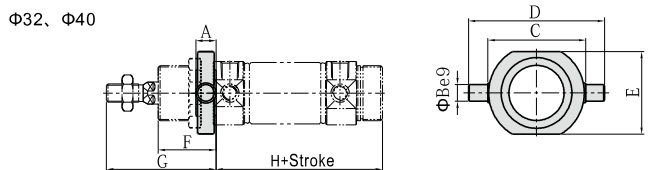
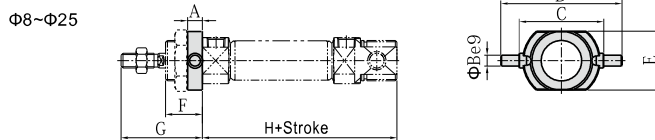
Dimensions

LB



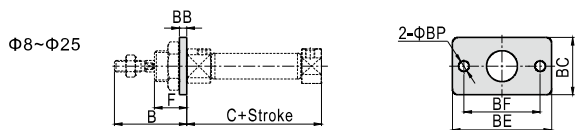
Bore size\Item	AA	AB	AC	AD	AE	AF	AH	AK	AL	AP	AQ	AT	B	F
8	78	-	68	-	35	25	16	10	11	4.5	5	2	28	12
10	78	-	68	-	35	25	16	10	11	4.5	5	2	28	12
12	90	-	78	-	42	32	20	13	14	5.5	6	2.5	38	17
16	96	-	84	-	42	32	20	13	14	5.5	6	2.5	38	17
20	112	-	96	-	54	40	25	20	17	7	8	3	44	20
25	115	-	99	-	54	40	25	20	17	7	8	3	50	22
32	110	49	96	28	66	52	28	-	14	7	7	3.5	58	30
40	149	58	129	30	80	60	33	-	20	9	10	3.5	69	35

TC



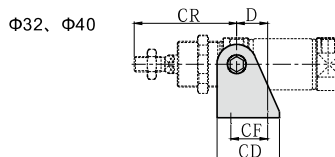
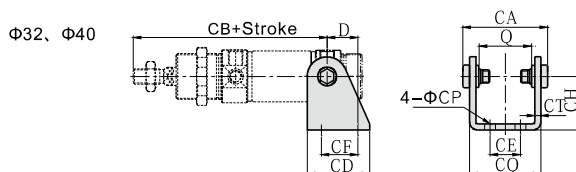
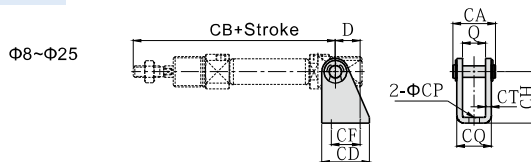
Bore size\Item	A	B	C	D	E	F	G	H
8	6	4	26	38	20	12	28	58
10	6	4	26	38	20	12	28	58
12	8	6	38	58	25	17	38	67
16	8	6	38	58	25	17	38	73
20	8	6	46	66	32	20	44	82
25	8	6	46	66	32	22	50	87
32	11	9	54	74	45	31.5	59.5	80.5
40	12	10	64	84	55	36.5	70.5	103.5

FA



Bore size\Item	B	C	BB	BC	BE	BF	BP	F
8	28	46	2	22	40	30	4.5	12
10	28	46	2	22	40	30	4.5	12
12	38	50	3	26	52	40	5.5	17
16	38	56	3	26	52	40	5.5	17
20	44	62	3.5	38	64	50	7	20
25	50	65	3.5	38	64	50	7	22

SDB



Bore size\Item	D	Q	CA	CB	CD	CE	CF	CH	CP	CQ	CT	CR
8	11	8.1	16.4	76	20	-	12.5	24	4.5	12.1	2	-
10	11	8.1	16.4	76	20	-	12.5	24	4.5	12.1	2	-
12	13	12.1	21.2	91	25	-	15	27	5.5	16.1	2	-
16	13	12.1	21.2	98	25	-	15	27	5.5	16.1	2	-
20	16	16.1	26.6	115	32	-	20	30	7	21.1	2.5	-
25	16	16.1	26.6	126	32	-	20	30	7	21.1	2.5	-
32	20	34.6	53.6	117	41	20	24	35	7	44.6	3	67
40	27	42.6	65.6	146	52	28	30	40	9	54.6	3	81

[Note] SDB is attached with relevant PIN.



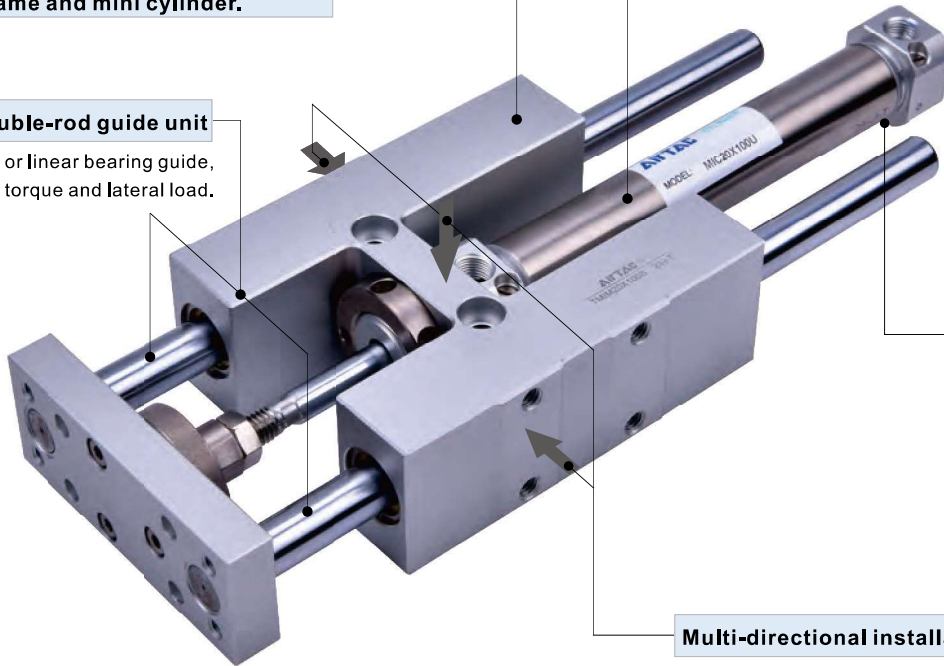
TMI/TMIC series with guide frame cylinder

Compendium of TMI/TMIC series

A new type of cylinder combined with guide frame and mini cylinder.

Double-rod guide unit

Brass bearing or linear bearing guide, which can bear high torque and lateral load.



Can be matched with multi bore sizes cylinder

Bore size : 12, 16, 20, 25

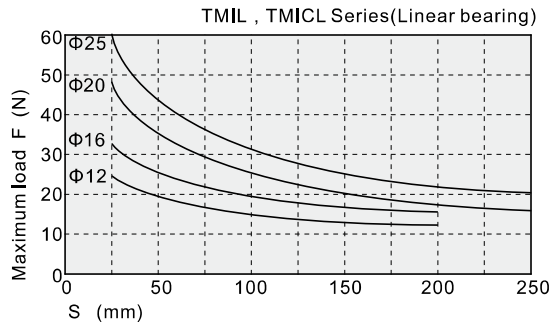
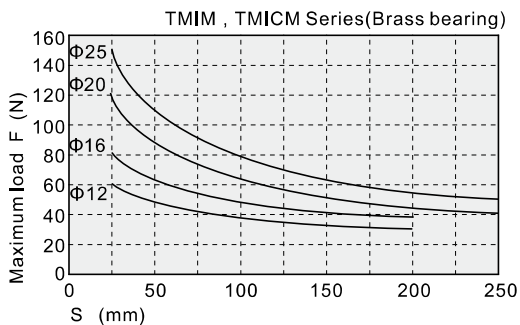
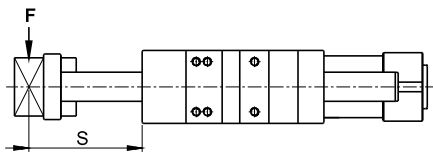
Multi-directional installation and fixing

Criteria for selection: Cylinder thrust

Unit : Newton(N)

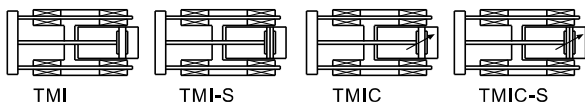
Bore size	Rod size	Acting type	Pressure area(mm ²)	Operating pressure(MPa)							
				0.1	0.2	0.3	0.4	0.5	0.6	0.7	
12	6	Double acting	Push side	113.0	11.3	22.6	33.9	45.2	56.5	67.8	79.1
			Pull side	84.8	8.5	17.0	25.4	33.9	42.4	50.9	59.4
16	6	Double acting	Push side	201.0	20.1	40.2	60.3	80.4	100.5	120.6	140.7
			Pull side	172.7	17.3	34.5	51.8	69.1	86.4	103.6	120.9
20	8	Double acting	Push side	314.0	31.4	62.8	94.2	125.6	157.0	188.4	219.8
			Pull side	263.8	26.4	52.8	79.1	105.5	131.9	158.3	184.7
25	10	Double acting	Push side	490.6	49.1	98.1	147.2	196.2	245.3	294.4	343.4
			Pull side	412.1	41.2	82.4	123.6	164.8	206.1	247.3	288.5

Maximum load relationship curve





Symbol

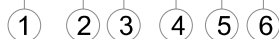


Product feature

1. A new type of cylinder combined with guide frame and MI series mini cylinder.
2. Brass bearing: It is suitable for the action that has radial load resistance, with greater torsion stiffness.
Linear bearing: It is suitable for push-up action, or where high precision and high load capacity are required, especially for occasions requiring low friction.
3. The special design of the guide frame body provides a multi-directional mounting.

Ordering code

TMIC M 20 X 50 S □

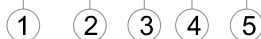


① Model	TMI: With guide frame cylinder	TMIC: With guide frame cylinder(with cushion)
② Bearing type	M: Brass bearing	L: Linear bearing
③ Bore size	12	16 20 25
④ Stroke	Refer to stroke table for details	
⑤ Magnet	Blank: Without magnet	S: With magnet
⑥ Thread type	Blank: PT thread(or metric thread)	G: G thread

【Note】 TMI, TMIC matching cylinder is Perpendicular 90° back cover.

Ordering code(for guide frame)

F - TMIC M 20 X 50

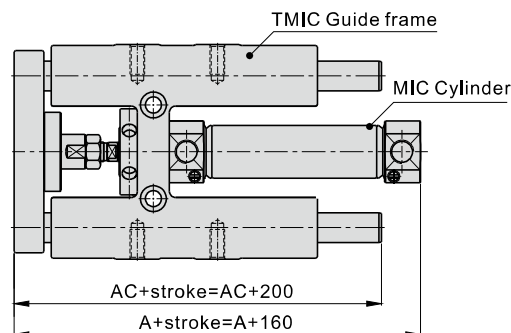


① Accessory code	F: Accessory	
② Model	TMI: With guide frame cylinder	TMIC: With guide frame cylinder(with cushion)
③ Bearing type	M: Brass bearing	L: Linear bearing
④ Bore size	12	16 20 25
⑤ Stroke	Refer to stroke table for details	

Ordering instructions :

1. When ordering guide frame separately, only standard strokes from the stroke list can be ordered.
(Other stroke can only be ordered by non-standard)
2. To order non-standard stroke cylinders with guide frame, the combination is as follows:
Non-standard stroke cylinder + guide frame of the upper standard stroke.
Example: MIC20X160 (non-standard stroke cylinder)
+F-TMICM20X200(Standard stroke guide frame).

The dimension is as follows:



Specification

Bore size(mm)	12	16	20	25
Acting type	Double acting			
Fluid	Air(to be filtered by 40µm filter element)			
Operating pressure	0.15~1.0MPa(22~145psi)(1.5~10.0bar)			
Proof pressure	1.5MPa(215psi)(15bar)			
Temperature °C	-20~70			
Speed range mm/s	30~500			
Stroke tolerance	0~150 ^{+1.0} ₀ >150 ^{+1.5} ₀			
Cushion type	Bumper	Variable cushion		
Port size	M5×0.8		1/8"	

Stroke

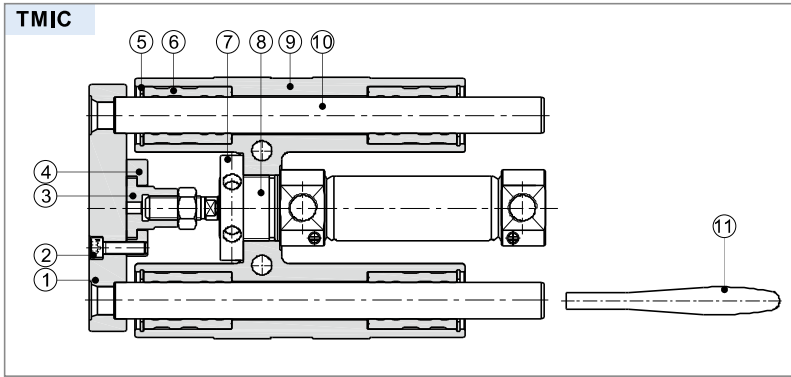
Bore size(mm)	Standard stroke (mm)	Max.std stroke(mm)
12	25 50 75 100 125 150 200	200
16	25 50 75 100 125 150 200	200
20	25 50 75 100 125 150 200 250	250
25	25 50 75 100 125 150 200 250	250

【Note】 Consult us for non-standard stroke.

With guide frame cylinder

TMI , TMIC Series

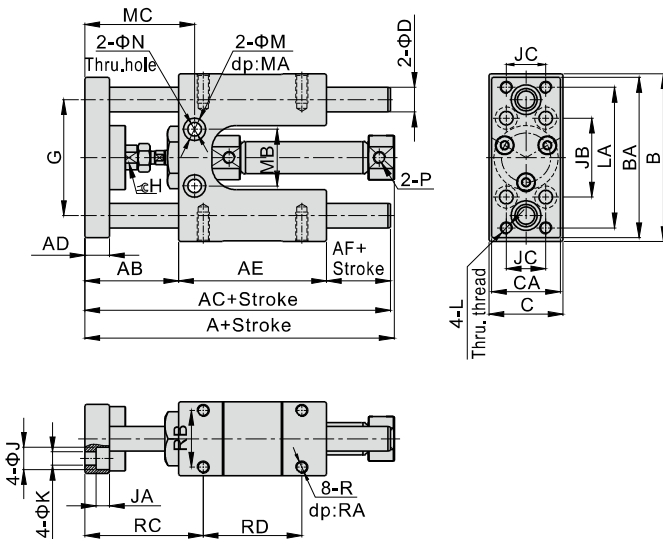
Inner structure and material of major parts



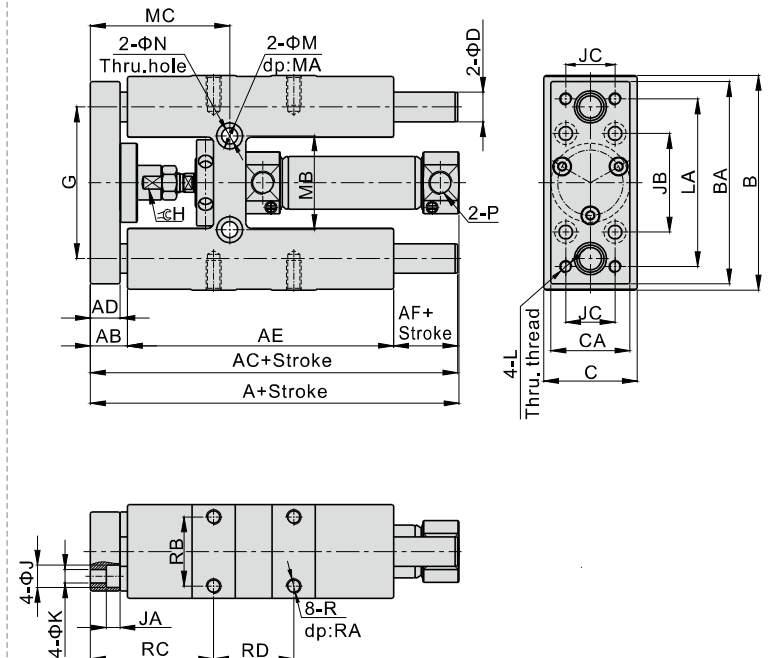
NO.	Item	Material
1	Fixed plate	Aluminum alloy
2	Bolt	Carbon steel
3	Floating nut	Carbon steel
4	Floating baffle	Carbon steel
5	C clip	Spring steel
6	Linear bearing	-
	Brass bearing	Brass
7	Nut	Carbon steel
8	MI, MIC Cylinder	Unit
9	Guide frame	Aluminum alloy
10	Guider(Linear)	Alloy steel
	Guider(Brass)	Carbon steel
11	Wrench	Carbon steel

Dimensions

TMI12/TMIC16



TMIC20/TMIC25



Bore size\Item	A	AB	AC	AD	AE	AF	B	BA	C	CA	D	G	H	J	JA	JB	JC	K
12	100.5	38	99	10	60	1	68	65	30	28	10(8)	47	9	9	5.5	32	16	5.5
16	106.5	38	99	10	60	1	68	65	30	28	10(8)	47	9	9	5.5	32	16	5.5
20	124	15	124	12	108	1	87	82	38	32	12(10)	61.5	13	9	5.5	40	20	5.5
25	125.5	15	124	12	108	1	87	82	38	32	16(12)	61.5	13	9	5.5	40	20	5.5

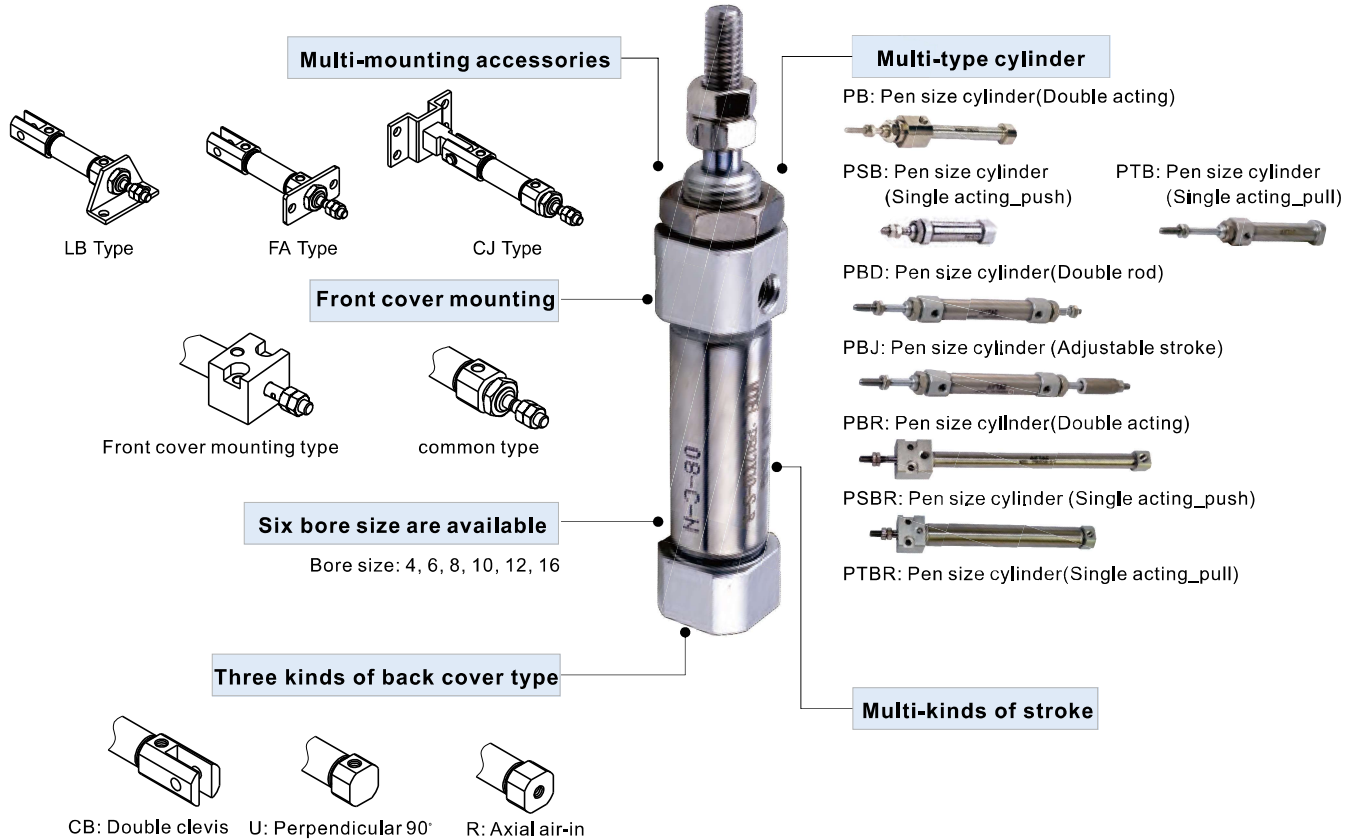
Bore size\Item	L	LA	M	MA	MB	MC	N	P	R	RA	RB	RC	RD
12	M5×0.8	57	9	4	23	44.5	5.5	M5×0.8	M5×0.8	12	23	48	40
16	M5×0.8	57	9	4	23	44.5	5.5	M5×0.8	M5×0.8	12	23	48	40
20	M5×0.8	68	10.5	6.5	38	56.5	6.5	1/8"	M6×1.0	12	28	50	32.5
25	M5×0.8	68	10.5	6.5	38	56.5	6.5	1/8"	M6×1.0	12	28	50	32.5

[Note]The values in "()" in the above table are TMI, TMICL series sizes.



Pen size cylinder—PB Series

Compendium of PB Series



Criteria for selection: Cylinder thrust

Unit : Newton(N)

Bore size	Rod size	Acting type	Pressure area(mm ²)	Operating pressure(MPa)						
				0.1	0.2	0.3	0.4	0.5	0.6	0.7
4	2	Single acting_Push side	12.6	-	0.3	1.6	2.8	4.1	5.3	6.6
		Double acting	12.6	1.3	2.5	3.8	5.0	6.3	7.6	8.8
6	3	Single acting	28.3	-	2.2	5.0	7.8	10.6	13.5	16.3
		Double acting	28.3	2.8	5.7	8.5	11.3	14.2	17.0	19.8
		Single acting	21.2	-	0.7	2.9	5.0	7.1	9.2	11.3
		Double acting	21.2	2.1	4.2	6.4	8.5	10.6	12.7	14.8
8	4	Single acting	50.3	-	3.6	8.6	13.6	18.7	23.7	28.7
		Double acting	50.3	5.0	10.1	15.1	20.1	25.2	30.2	35.2
		Single acting	37.7	-	1.0	4.8	8.6	12.4	16.1	19.9
		Double acting	37.7	3.8	7.5	11.3	15.1	18.9	22.6	26.4
10	4	Single acting	78.5	-	6.2	14.1	21.9	29.8	37.6	45.5
		Double acting	78.5	7.9	15.7	23.6	31.4	39.3	47.1	55.0
		Single acting	65.9	-	3.7	10.3	16.9	23.5	30.1	36.7
		Double acting	65.9	6.6	13.2	19.8	26.4	33.0	39.5	46.2
12	5	Single acting	113.0	-	9.0	20.3	31.6	42.9	54.2	65.5
		Double acting	113.0	11.3	22.6	33.9	45.2	56.5	67.8	79.1
		Single acting	93.4	-	5.1	14.4	23.8	33.1	42.4	51.8
		Double acting	93.4	9.3	18.7	28.0	37.4	46.7	56.0	65.4
16	5	Single acting	201.0	-	14.5	34.6	54.7	74.8	94.9	115.0
		Double acting	201.0	20.1	40.2	60.3	80.4	100.5	120.6	140.7
		Single acting	181.3	-	10.6	28.7	46.8	65.0	83.1	101.2
		Double acting	181.3	18.1	36.3	54.4	72.5	90.7	108.8	126.9

Installation and application



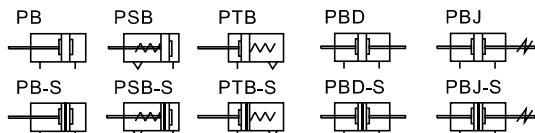
1. When load changes in the work, the cylinder with abundant output capacity shall be selected.
2. Relative cylinder with high temperature resistance or corrosion resistance shall be chosen under the condition of high temperature or corrosion.
3. Necessary protection measure shall be taken in the environment with higher humidity, much dust or water drops, oil dust and welding dregs.
4. Dirty substances in the pipe must be eliminated before cylinder is connected with pipeline to prevent the entrance of particles into the cylinder.
5. The medium used by cylinder shall be filtered to 40μm or below.
6. Anti-freezing measure shall be adopted under low temperature environment to prevent moisture freezing.
7. The load of the cylinder with the diameter of Φ4 needs to be coaxial with the cylinder to avoid side load, otherwise, piston rod will be bent and deformed and damage the thread at the end of the rod. Single-acting type can not be added in return.
8. If the cylinder is dismantled and stored for a long time, Please to conduct anti-rust treatment to the surface. Anti-dust caps shall be added in air inlet and outlet ports. The front and back cover can not be dismantled, which shall be especially noticed.



PB Series



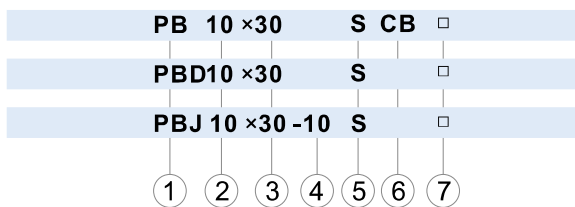
Symbol



Product feature

1. JIS standard is implemented.
2. It belongs to mini cylinder that has compact structure, small volume and light weight.
3. The guide precision of piston rod is high and no additional lubricant is needed.
4. PB4 and PB6 can only be front mounted, PB10, PB12 and PB16 has the flexibility of both front and rear mount.
5. Piston rod and cylinder body with the material of stainless steel make the cylinder adapt general working environment with corrosivity.
6. There are cylinders and accessories with several specifications for installation for your choice.
7. It has small cylinder diameter and quick reaction, suitable for the working environment with higher frequency.

Ordering code



① Model	② Bore size	③ Stroke	④ Adjustable stroke	⑤ Magnet	⑥ Back cover			⑦ Mounting type [Note1]							
PB: Pen size cylinder (Double acting)	4	Refer to stroke table for details	No this code	Blank: Without magnet	Model	Back cover	Bore size	Model	Mounting type						
	6					CB: Double clevis				Φ10~Φ16	PB				
	10				U: Perpendicular 90°	Φ10~Φ16	PSB								
	12				R: Axial air-in	Φ6~Φ16				PTB					
16	Blank: Without magnet			CB: Double clevis	Φ10~Φ16	PBD									
PSB: Pen size cylinder (Single acting_push)	6			Refer to stroke table for details	No this code		S: With magne	Model	Back cover	Bore size	Model	Mounting type			
	10					R: Axial air-in			Φ6~Φ16				PBJ		
	12					Blank: Without magnet		CB: Double clevis	Φ10~Φ16	PBD					
	16					S: With magne		R: Axial air-in	Φ6~Φ16				PBJ		
PTB: Pen size cylinder (Single acting_pull)	6					Refer to stroke table for details	10 20 30 40 50 75 100	Blank: Without magnet	Model	Back cover	Bore size	Model		Mounting type	
	10									Blank: Without magnet			-		PBD
	12								S: With magne	-	PBJ				
	16								Blank: Without magnet	-			PBD		
PBD: Pen size cylinder (Double rod)	6							Refer to stroke table for details	10 20 30 40 50 75 100	S: With magne	Model	Back cover		Bore size	Model
	10											Blank: Without magnet	-		
	12										S: With magne	-	PBJ		
	16	Blank: Without magnet	-								PBD				
PBJ: Pen size cylinder (Adjustable stroke)	6	Refer to stroke table for details	10 20 30 40 50 75 100							S: With magne		Model	Back cover	Bore size	Model
	10										Blank: Without magnet		-		
	12										S: With magne	-	PBJ		
	16										Blank: Without magnet	-		PBD	

[Note1] Please refer to page 73 for accessory parts.

Specification

Bore size (mm)	4	6	10	12	16
Acting type	Double acting、Single acting_Push		Double acting、Single acting		
Fluid	Air (to be filtered by 40μm filter element)				
Operating pressure	Double acting	0.2~0.7MPa(28~100psi)(2.0~7.0bar)		0.15~0.7MPa(22~100psi)(1.5~7.0bar)	
	Single acting	0.3~0.7MPa(45~100psi)(3.0~7.0bar)		0.2~0.7MPa(28~100psi)(2.0~7.0bar)	
Proof pressure	1.2MPa(175psi)(12bar)				
Temperature °C	-20~70				
Speed range mm/s	50~500		50~800		
Stroke tolerance	+0.5 0		0~150 ^{+1.0} ₀ >150 ^{+1.5} ₀		
Cushion type	No cushion		Bumper		
Port size	Tube		M5×0.8		

Add) Refer to P362 for detail of sensor switch.

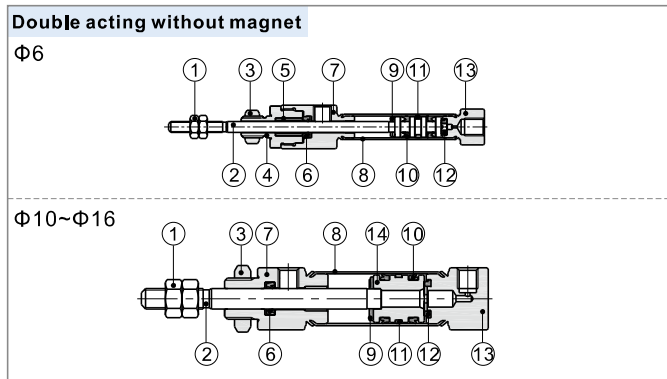
Stroke

Bore size (mm)	Standard stroke (mm)										Max.std stroke	Max. stroke							
	4	5	10	15	20	25	30	40	50	60									
PB	4	5	10	15	20						20	20							
	6	10	15	20	25	30	40	50	60		60	60							
	10	10	15	20	25	30	40	50	60	75	80	100	125	150	160	175	200	200	200
	12	10	15	20	25	30	40	50	60	75	80	100	125	150	160	175	200	200	300
PBD	6	5	10	15	20	25	30	40	50		50	-							
	10	10	15	20	25	30	40	50	60	75	80	100	100	-					
PBD PBJ	12	10	15	20	25	30	40	50	60	75	80	100	125	150	160	175	200	200	-
	16	10	15	20	25	30	40	50	60	75	80	100	125	150	160	175	200	200	-
PSB	4	5	10	15	20						-	-							
	6	5	10	15	20	25	30	40	50	60	-	-							
PSB PTB	10	5	10	15	20	25	30	40	50	60	-	-							
	12	5	10	15	20	25	30	40	50	60	-	-							
PTB	16	5	10	15	20	25	30	40	50	60	-	-							

[Note] Consult us for non-standard stroke.

PB Series

Inner structure and material of major parts

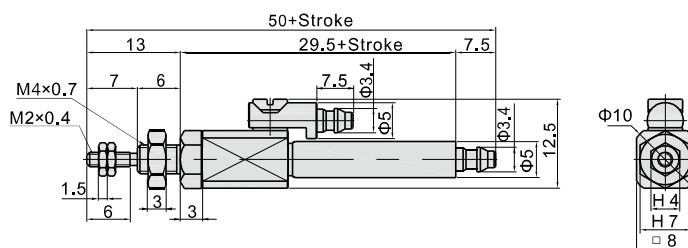


NO.	Item	Material
1	Rod nut	Carbon steel
2	Piston rod	SUS304
3	Front cover nut	Carbon steel
4	Packing retainer	Brass(Φ4)\Aluminum alloy(Others)
5	Bushing	Wear resistant material
6	Front cover O-ring	NBR
7	Front cover	Brass(Φ4)\Aluminum alloy(Others)
8	Barrel	Bronze(Φ4)\SUS304(Others)
9	Bumper	TPU
10	Piston seal	NBR
11	Wear ring	Wear resistant material
12	Bumper	TPU
13	Back cover	Brass(Φ4)\Aluminum alloy(Others)
14	Piston	Aluminum alloy(Φ16)\Stainless steel(Others)

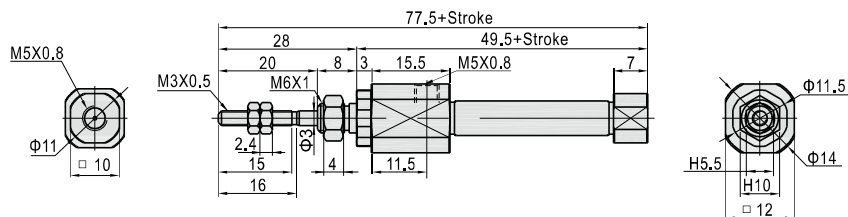
Dimensions

PB

Φ4(Without magnet)(R Type)



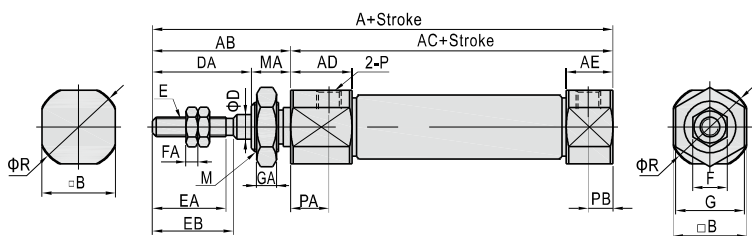
Φ6(R Type)



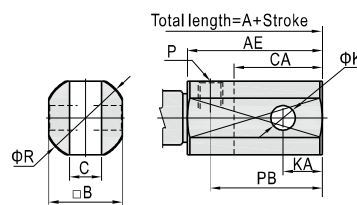
Note) Only axial air intake type of back cover is available for Φ4, Φ6mm bore size.

Φ10~Φ16

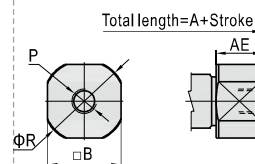
U Type(Perpendicular 90°)



CB Type(Double clevis)



R Type(Axial air-in)



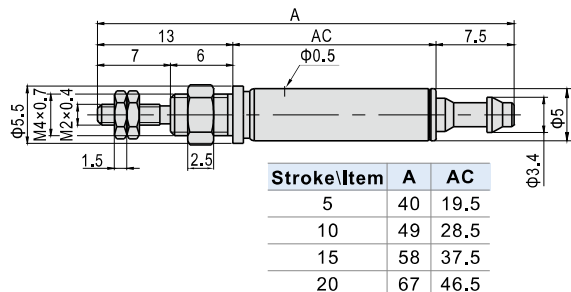
Bore size\Item	A			AB	AC	AD	AE		B	C	CA	D	DA	E	EA	EB	F	FA	G	GA	K	KA	M	MA	P	PA	PB		
	U	CB	R				U/R	CB																			U	CB	R
10	74	87	74	28	46	11.5	9.5	22.5	12	3.3	13	4	20	M4×0.7	15	16.5	7	3	11	4	3.3	5	M8×1.0	8	M5×0.8	7.5	5	18	14
12	74	92	74	28	46	11.5	9.5	27.5	15	6.6	18	5	20	M5×0.8	15	16.5	8	4	14	4	5	8	M10×1.0	8	M5×0.8	7.5	5	23	17
16	76	94	76	28	48	12	9.5	27.5	18	6.6	18	5	20	M5×0.8	15	16.5	8	4	14	4	5	8	M10×1.0	8	M5×0.8	7.5	5	23	20

Remark: The dimensions of magnet type cylinder are the same as non-magnet type cylinder.

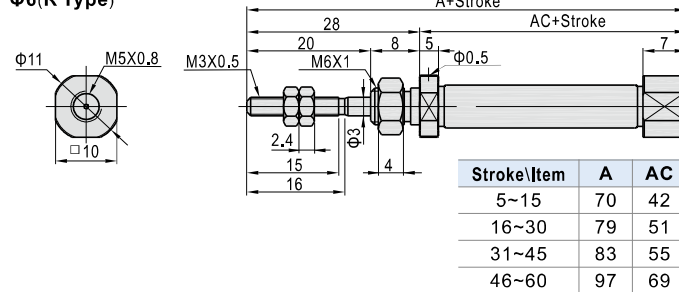
Pen size cylinder

PB Series

PSB $\Phi 4$ (Without magnet)(R Type)



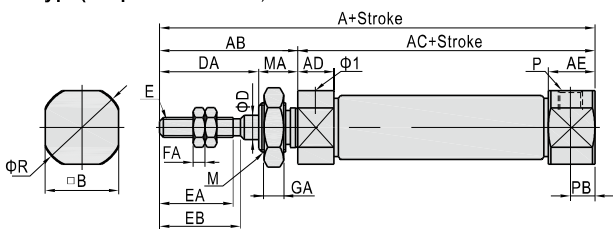
Φ6(R Type)



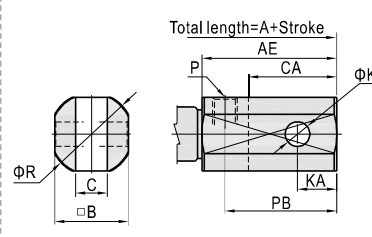
Note) Only axial air intake type of back cover is available for $\Phi 4$, $\Phi 6$ mm bore size.

Φ10~Φ16

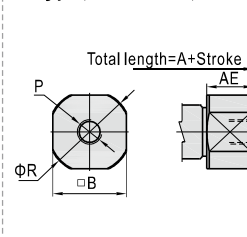
U Type(Perpendicular 90°)



CB Type(Double clevis)



R Type(Axial air-in)

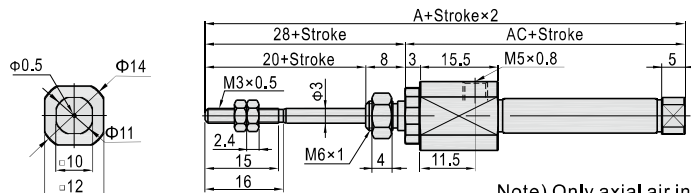


Bore size\Item	A												AB	AC				AD	AE				
	U				CB				R					5~15	16~30	31~45	46~60		-	U/R	CB	B	C
Stroke	5~15	16~30	31~45	46~60	5~15	16~30	31~45	46~60	5~15	16~30	31~45	46~60	5~15	16~30	31~45	46~60	5	5	5	9.5	22.5	12	3.3
10	73.5	81	93	105	86.5	94	106	118	73.5	81	93	105	28	45.5	53	65	77	5	9.5	22.5	12	3.3	
12	73.5	81	93	105	91.5	99	111	123	73.5	81	93	105	28	45.5	53	65	77	5	9.5	27.5	15	6.6	
16	74.5	83	95	107	92.5	101	113	125	74.5	83	95	107	28	46.5	55	67	79	5	9.5	27.5	18	6.6	

Bore size\Item	Back cover	CA	D	DA	E	EA	EB	F	FA	G	GA	K	KA	M	MA	P	PB		
		U	CB	R															
10		13	4	20	M4×0.7	15	16.5	7	3	11	4	3.3	5	M8×1.0	8	M5×0.8	5	18	14
12		18	5	20	M5×0.8	15	16.5	8	4	14	4	5	8	M10×1.0	8	M5×0.8	5	23	17
16		18	5	20	M5×0.8	15	16.5	8	4	14	4	5	8	M10×1.0	8	M5×0.8	5	23	20

Remark : The dimensions of magnet type cylinder are the same as non-magnet type cylinder.

PTB $\Phi 6$ (R Type)

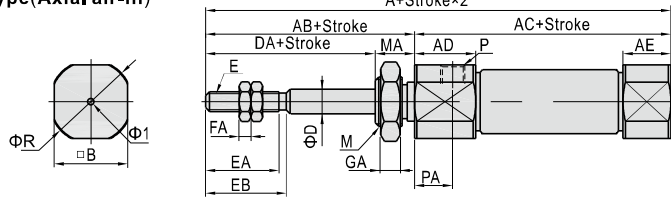


Stroke\Item	A	AC
5~15	82	54
16~30	91	63
31~45	95	67
46~60	109	81

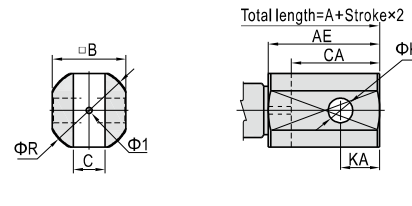
Note) Only axial air intake type of back cover is available for $\Phi 6$ mm bore size.

Φ10~Φ16

R Type(Axial air-in)



CB Type(Double clevis)



Bore size\Item	A												AB	AC				AD
	R				CB				5~15	16~30	31~45	46~60						
Stroke	5~15	16~30	31~45	46~60	5~15	16~30	31~45	46~60	5~15	16~30	31~45	46~60	5~15	16~30	31~45	46~60	11.5	
10	76.5	84	96	108	89.5	97	109	121	28	48.5	56	68	80	11.5				
12	76.5	84	96	108	94.5	102	114	126	28	48.5	56	68	80	11.5				
16	77.5	86	98	110	95.5	104	116	128	28	49.5	58	70	82	12				

Bore size\Item	Back cover	AE	R		B	C	CA	D	DA	E	EA	EB	F	FA	G	GA	K	KA	M	MA	P	PA	R
		R	CB																				
10		5	18	12	3.3	13	4	20	M4×0.7	15	16.5	7	3	11	4	3.3	5	M8×1.0	8	M5×0.8	7.5	14	
12		5	23	15	6.6	18	5	20	M5×0.8	15	16.5	8	4	14	4	5	8	M10×1.0	8	M5×0.8	7.5	17	
16		5	23	18	6.6	18	5	20	M5×0.8	15	16.5	8	4	14	4	5	8	M10×1.0	8	M5×0.8	7.5	20	

Note) $\Phi 10$ ~ $\Phi 16$ bore sizes don't have perpendicular(90°) air-in.

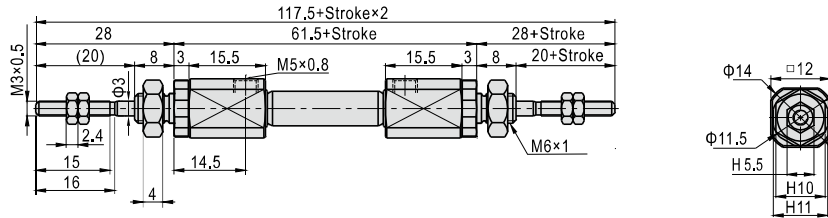
Remark : The dimensions of magnet type cylinder are the same as non-magnet type cylinder.



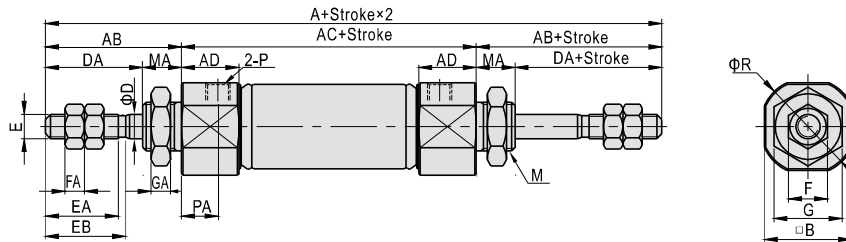
PB Series

PBD

Φ6

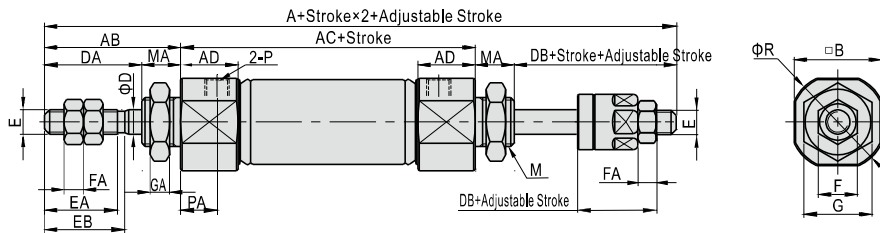


Φ10-Φ16



PBJ

Φ10-Φ16



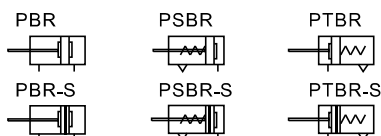
Bore size\Item	A		AB	AC	AD	B	D	DA	DB	E	EA	EB	F	FA	G	GA	M	MA	P	PA
	PBD	PBJ																		
10	104	99	28	48	11.5	12	4	20	15	M4×0.7	15	16.5	7	3	11	4	M8×1.0	8	M5×0.8	7.5
12	104	101	28	48	11.5	15	5	20	17	M5×0.8	15	16.5	8	4	14	4	M10×1.0	8	M5×0.8	7.5
16	107	104	28	51	12	18	5	20	17	M5×0.8	15	16.5	8	4	14	4	M10×1.0	8	M5×0.8	7.5

Remark : The dimensions of magnet type cylinder are the same as non-magnet type cylinder.

PBR Series



Symbol



Product feature

1. JIS standard is implemented.
2. It belongs to mini cylinder that has compact structure, small volume and light weight.
3. The guide precision of piston rod is high and no additional lubricant is needed.
4. Screw holes are designed for mounting directly at the front cover without any accessories.
5. Piston rod stainless steel barrel make the cylinder adapt general corrosive working environment.
6. It has small cylinder diameter and quick reaction, suitable for the working environment with higher frequency.

Specification

Bore size(mm)	6	8	10	12	16
Acting type	Double acting、Single acting				
Fluid	Air(to be filtered by 40μm filter element)				
Operating pressure	Double acting	0.15~0.7MPa(22~100psi)(1.5~7.0bar)			
	Single acting	0.2~0.7MPa(28~100psi)(2.0~7.0bar)			
Proof pressure	1.2MPa(175psi)(12bar)				
Temperature °C	-20~70				
Speed range mm/s	50~800				
Stroke tolerance	0~150 ^{+1.0} ₀ >150 ^{+1.5} ₀				
Cushion type	Bumper				
Port size	M5×0.8				

Add) Refer to P362 for detail of sensor switch.

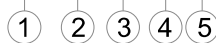
Stroke

Bore size (mm)	Standard stroke (mm)	Max, std stroke	Max, stroke	
PBR	6	10 15 20 25 30 40 50 60	60	60
	8	10 15 20 25 30 40 50 60 75 80 100 125 150	150	200
	10	10 15 20 25 30 40 50 60 75 80 100 125 150 160 175 200	200	200
	12	10 15 20 25 30 40 50 60 75 80 100 125 150 160 175 200	200	300
	16	10 15 20 25 30 40 50 60 75 80 100 125 150 160 175 200 250 300	300	300
PSBR PTBR	6	5 10 15 20 25 30 40 50 60	-	-
	8	5 10 15 20 25 30 40 50 60	-	-
	10	5 10 15 20 25 30 40 50 60	-	-
	12	5 10 15 20 25 30 40 50 60 75	-	-
	16	5 10 15 20 25 30 40 50 60 75 100	-	-

[Note] Consult us for non-standard stroke.

Ordering code

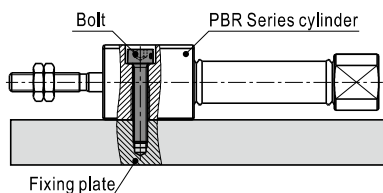
PBR 16 × 30 S U



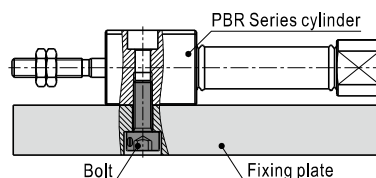
① Model	② Bore size	③ Stroke	④ Magnet	⑤ Back cover		
				Model	Back cover	Bore size
PBR: Pen size cylinder(Double acting) PSBR: Pen size cylinder (Single acting_push) PTBR: Pen size cylinder(Single acting_pull)	6	Refer to stroke table for details	Blank: Without magnet S: With magnet	PBR	U: Perpendicular 90°	Φ8~Φ16
	8			PSBR	R: Axial air-in	Φ6~Φ16
	10			PTBR	R: Axial air-in	Φ6~Φ16
	12					
	16					

Mounting type

Top bolt mounting



Bottom bolt mounting



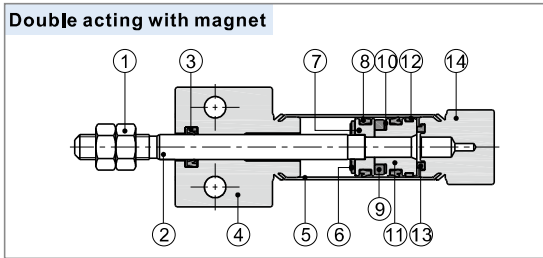
Note: Select appropriate bolt based on actual working conditions when mounting from the bottom.

Pen size cylinder

PBR Series

Inner structure and material of major parts

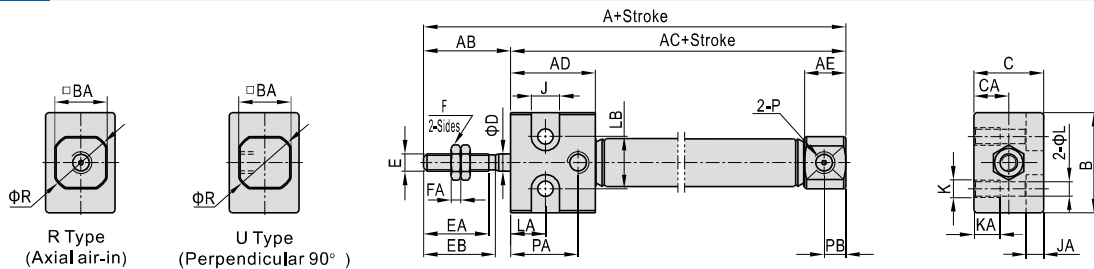
Double acting with magnet



NO.	Item	Material	NO.	Item	Material
1	Rod nut	Carbon steel	8	Piston seal	NBR
2	Piston rod	SUS304	9	Magnet	Sintered metal(Neodymium-iron-boron)
3	Front cover O-ring	NBR	10	Magnet washer	NBR
4	Front cover	Aluminum alloy	11	Magnet holder	SUS303/Aluminum alloy
5	Barrel	SUS316L	12	Wear ring	Wear resistant material
6	Bumper	TPU	13	Bumper	TPU
7	Piston	SUS303/Aluminum alloy	14	Back cover	Aluminum alloy

Dimensions

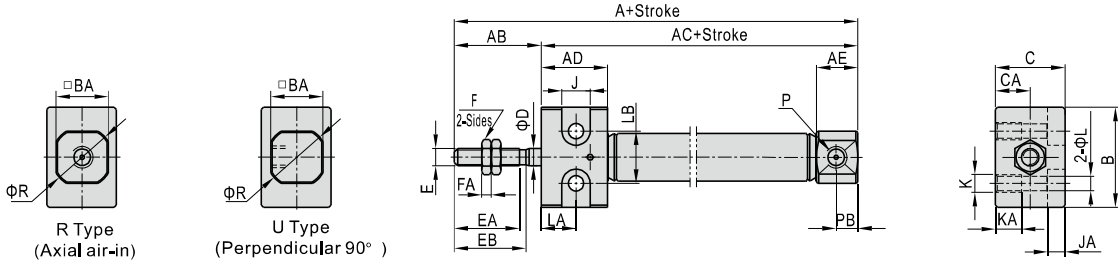
PBR



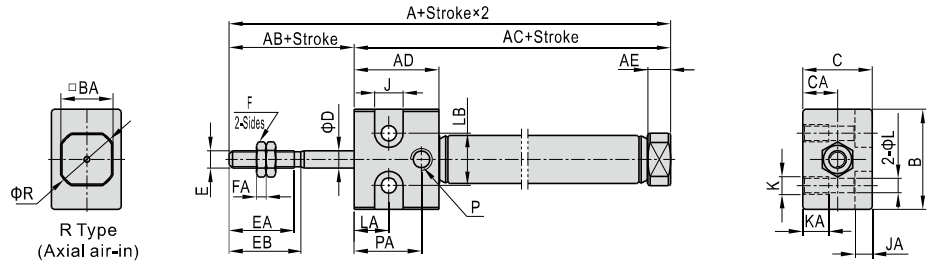
Bore size\Item	A	AB	AC	AD	AE	B	BA	C	CA	D	E	EA	EB	F	FA	J	JA	K	KA	L	LA	LB	P	PA	PB	R
6	70	20	50	19	7	17	10	14	7	3	M3×0.5	15	16	5.5	2.4	6.5	4	M4×0.7	7	3.3	8	10	M5×0.8	14	-	11
8	74	20	54	19.5	9.5	19	12	16	8	4	M4×0.7	15	16.5	7	3	6.5	4	M4×0.7	7	3.3	8	12	M5×0.8	15	5	14
10	74	20	54	19.5	9.5	19	12	16	8	4	M4×0.7	15	16.5	7	3	6.5	4	M4×0.7	7	3.3	8	12	M5×0.8	15.5	5	14
12	74	20	54	19.5	9.5	24	15	20	10	5	M5×0.8	15	16.5	8	4	8	5	M5×0.8	8	4.3	8	16	M5×0.8	15.5	5	17
16	76	20	56	20	9.5	24	18	20	10	6	M5×0.8	15	16.5	8	4	8	5	M5×0.8	8	4.3	8	16	M5×0.8	15.5	5	20

Remark: The dimensions of magnet type cylinder are the same as non-magnet type cylinder. Only axial air intake type of back cover is available for Φ6mm bore size.

PSBR



PTBR



Bore size\Item	A												AC											
	PSBR						PTBR						PSBR						PTBR					
Stroke	5~15	16~30	31~45	46~60	61~75	76~100	5~15	16~30	31~45	46~60	61~75	76~100	5~15	16~30	31~45	46~60	61~75	76~100	5~15	16~30	31~45	46~60	61~75	76~100
6	70	79	83	97	-	-	74.5	83.5	87.5	101.5	-	-	50	59	63	77	-	-	54.5	63.5	67.5	81.5	-	-
8	76.5	82.5	93.5	101.5	-	-	78.5	84.5	95.5	103.5	-	-	56.5	62.5	73.5	81.5	-	-	58.5	64.5	75.5	83.5	-	-
10	73.5	81	93	105	-	-	76.5	84	96	108	-	-	53.5	61	73	85	-	-	56.5	64	76	88	-	-
12	73.5	81	93	105	111.5	-	76.5	84	96	108	114.5	-	53.5	61	73	85	91.5	-	56.5	64	76	88	94.5	-
16	74.5	83	95	107	113	119	77.5	86	98	110	116	122	54.5	63	75	87	93	99	57.5	66	78	90	96	102

Bore size\Item	AD		AE		B	BA	C	CA	D	E	EA	EB	F	FA	J	JA	K	KA	L	LA	LB	P	PA	PB	R	
	PSBR	PTBR	PSBR	PTBR																						
6	13	19	20	7	5	17	10	14	7	3	M3×0.5	15	16	5.5	2.4	6.5	4	M4×0.7	7	3.3	8	10	M5×0.8	14	-	11
8	13	19.5	20	9.5	5	19	12	16	8	4	M4×0.7	15	16.5	7	3	6.5	4	M4×0.7	7	3.3	8	12	M5×0.8	15	5	14
10	13	19.5	20	9.5	5	19	12	16	8	4	M4×0.7	15	16.5	7	3	6.5	4	M4×0.7	7	3.3	8	12	M5×0.8	15.5	5	14
12	13	19.5	20	9.5	5	24	15	20	10	5	M5×0.8	15	16.5	8	4	8	5	M5×0.8	8	4.3	8	16	M5×0.8	15.5	5	17
16	13	20	20	9.5	5	24	18	20	10	6	M5×0.8	15	16.5	8	4	8	5	M5×0.8	8	4.3	8	16	M5×0.8	15.5	5	20

Remark: The dimensions of magnet type cylinder are the same as non-magnet type cylinder. Only axial air intake type of back cover is available for Φ6mm bore size.

List for ordering code of accessories

Accessories Bore size	Mounting accessories			Knuckle				Sensor switch		
	LB	FA	CJ	I	Y	F	U	CMSG	DMSG	EMSG
4	-	-	-	-	-	-	-	-	-	-
6	F-PB6LB	F-PB6FA	-	F-PB6I	F-PB6Y	F-M3X040F	-	-	-	-
10	F-PB10LB	F-PB10FA	F-PB10CJ	F-PB10I	F-PB10Y	F-M4X070F	F-M4X070U	CMSG	DMSG	EMSG
12	F-PB12LB	F-PB12FA	F-PB12CJ	F-PB12I	F-PB12Y	F-M5X080F	F-M5X080U	-	-	-
16	-	-	F-PB16CJ	-	-	-	-	-	-	-

Accessory selection

Accessories Cylinder model	Mounting accessories			Knuckle				Sensor switch		
	LB	FA	CJ	I	Y	U [1]	F	CMSG	DMSG	EMSG
PB	Standard	•	•	•	•	•	•	×	×	×
	With magnet	•	•	•	•	•	•	•	•	•
PSB	Standard	•	•	•	•	•	•	×	×	×
PTB	With magnet	•	•	•	•	•	•	•	•	•
PBD	Standard	•	•	×	•	•	•	×	×	×
PBJ	With magnet	•	•	×	•	•	•	•	•	•

Material of accessories

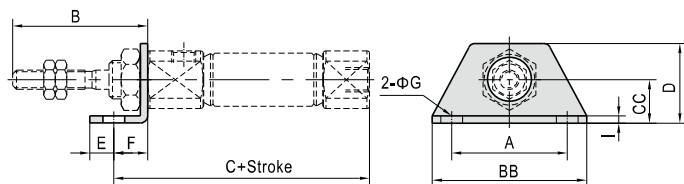
Accessories Bore size	Mounting accessories			Knuckle			
	LB	FA	CJ	I	Y	F	U
4~16	△	△	△	□	□	□	□

△—SPCC ; □—Carbon steel ;

[Note1] Please refer to P358~361 for knuckle detail.

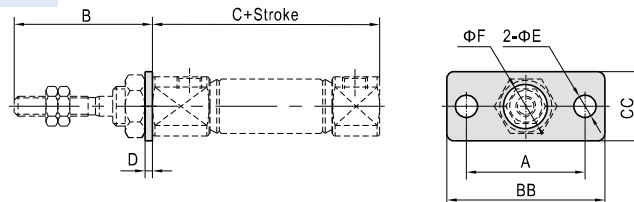
Dimensions

LB



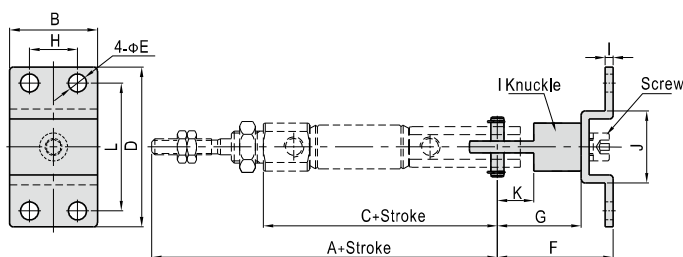
Bore size\Item	A	B	BB	C	CC	D	E	F	G	I
6	24	28	32	56.5	9	16.5	5	7	4.5	1.5
10	24	28	32	53	9	16.5	5	7	4.5	2
12	33	28	42	55	14	25	6	9	5.5	2.5
16	33	28	42	57	14	25	6	9	5.5	2.5

FA



Bore size\Item	A	B	BB	C	CC	D	E	F
6	24	28	32	49.5	14	1.5	4.5	6.3
10	24	28	32	46	14	2	4.5	8.2
12	33	28	42	46	20	3	5.5	10.2
16	33	28	42	48	20	3	5.5	10.2

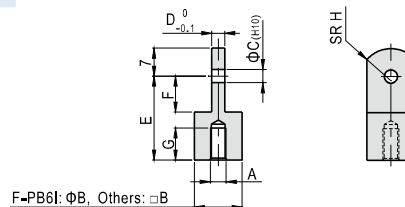
CJ



Bore size\Item	A	B	C	D	E	F	G	H	I	J	K	L
10	82	22	54	40	4.5	29	21	12	2	18	9.1	32
12	84	28	56	48	5.5	35	25	16	2.5	20.4	14.1	38
16	86	28	58	48	5.5	35	25	16	2.5	20.4	14.1	38

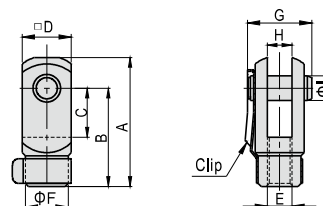
[Note] CJ type accessory includes I knuckle and PIN. It need to be matched with I knuckle and with relevant PIN.

I Knuckle



Bore size\Item	A	B	C	D	E	F	G	H
F-PB6I	M3×0.5	6	3	3	12	5	5	5
F-PB10I	M4×0.7	12	3.3	3	21	9.1	7.5	8
F-PB12I	M5×0.8	12	5	6.3	25	14.1	7.5	12

Y Knuckle



Bore size\Item	A	B	C	D	E	F	G	H	I
F-PB6Y	15.5	12	5	6	M3×0.5	6	9	3	3
F-PB10Y	28	21	10.2	12	M4×0.7	10	15.5	3.2	3.3
F-PB12Y	28	21	10.2	12	M5×0.8	10	15.5	6.5	5



Compendium of MF Series

Multi-mounting accessories

LB Type FA Type SDB Type TC Type

Rolling packed structure

Front and back cover and stainless steel block adopt riveted rolling packed structure to form a reliable connection.

Four bore size are available

Bore size: 20, 25, 32, 40

Three kinds of back cover type

CA: Pivot type U: Flat-end type CM: Round-end type

Multi-type cylinder

MF: Mini cylinder(Double acting)

MSF: Mini cylinder (Single acting_push) MTF: Mini cylinder (Single acting_pull)

MFD: Mini cylinder(Double rod)

MFJ: Mini cylinder(Adjustable stroke)

MFC: Mini cylinder(Double acting with cushion)

MFCD: Mini cylinder(Double rod with cushion)

MFCJ: Mini cylinder(Adjustable stroke with cushion)

Two kinds of cushion type

Variable cushion or Bumper

Criteria for selection: Cylinder thrust

Unit : Newton(N)

Bore size	Rod size	Acting type	Pressure area(mm ²)	Operating pressure(MPa)							
				0.1	0.2	0.3	0.4	0.5	0.6	0.7	
20	8	Single acting	Push side	314.0	-	24.3	55.7	87.1	117.5	149.9	181.3
			Pull side	263.8	-	14.3	40.6	67.0	93.4	119.8	146.1
		Double acting	Push side	314.0	31.4	62.8	94.2	125.6	157.0	188.4	219.8
			Pull side	263.8	26.4	52.8	79.1	105.5	131.9	158.3	184.7
25	10	Single acting	Push side	490.6	-	45.6	94.7	143.8	192.8	241.9	290.9
			Pull side	412.1	-	29.9	71.1	112.4	153.6	194.8	236.0
		Double acting	Push side	490.6	49.1	98.1	147.2	196.2	245.3	294.4	343.4
			Pull side	412.1	41.2	82.4	123.6	164.8	206.1	247.3	288.5
32	12	Single acting	Push side	804.3	-	82.2	162.6	242.9	323.3	403.7	484.1
			Pull side	691.2	-	59.6	128.6	197.7	266.8	335.9	405.0
		Double acting	Push side	804.3	80.4	160.9	241.3	321.7	402.2	482.6	563.0
			Pull side	691.2	69.1	138.2	207.4	276.5	345.6	414.7	483.8
40	16	Single acting	Push side	1256.6	-	158.5	284.1	409.7	535.3	660.9	786.5
			Pull side	1055.6	-	118.3	223.8	329.3	434.8	540.3	645.8
		Double acting	Push side	1256.6	125.7	251.3	377.0	502.6	628.3	754.0	879.6
			Pull side	1055.6	105.6	211.1	316.7	422.2	527.8	633.4	738.9

Installation and application

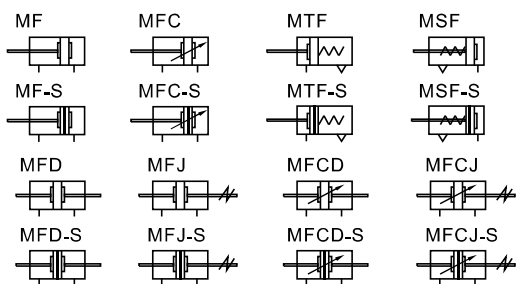


- When load changes in the work, the cylinder with abundant output capacity shall be selected.
- Relative cylinder with high temperature resistance or corrosion resistance shall be chosen under the condition of high temperature or corrosion.
- Necessary protection measure shall be taken in the environment with higher humidity, much dust or water drops, oil dust and welding dregs.
- Dirty substances in the pipe must be eliminated before cylinder is connected with pipeline to prevent the entrance of particles into the cylinder.
- The medium used by cylinder shall be filtered to 40μm or below.
- Anti-freezing measure shall be adopted under low temperature environment to prevent moisture freezing.
- The cylinder shall be carried out test run without load before application. Prior to run, buffer shall be turned to the minimum and gradually released to avoid the damage on cylinder caused by excessive impact.
- To avoid side load, otherwise, piston rod will be bent and deformed and damage the thread at the end of the rod. Single-acting type can not be added in return.
- If the cylinder is dismantled and stored for a long time, please conduct anti-rust treatment to the surface. Anti-dust caps shall be added in air inlet and outlet ports. The front and back cover can not be dismantled, which shall be especially noticed.

MF Series



Symbol



Product feature

- JIS standard is implemented.
- Piston adopts heterogeneous two way seal structure. It has compact size and has the function of oil reservation.
- Front cover owns fixed anti-impact pad which can reduce the impact of direction-change of the cylinder.
- There are several modes of back cover, which makes the installation of cylinder more convenient.
- Front and back cover and stainless steel block adopt riveted rolling packed structure to form a reliable connection.
- The cylinder body has stainless steel pipes with high precision to produce high strength and corrosion resistance.
- With the same bore size and stroke, cylinders of MF series are shorter than ISO6432 standard cylinders.
- There are cylinders and mounting accessories with several specifications for your choice.

Ordering code

MF 32 × 50	S CM	<input type="checkbox"/>	<input type="checkbox"/>
MFD 32 × 50	S	<input type="checkbox"/>	<input type="checkbox"/>
MFJ 32 × 50 - 20	S	<input type="checkbox"/>	<input type="checkbox"/>

① ② ③ ④ ⑤ ⑥ ⑦ ⑧

① Model	② Bore size	③ Stroke	④ Adjustable stroke	⑤ Magnet	⑥ Back cover	⑦ Mounting type[Note1]	⑧ Thread type
MF: Mini cylinder(Double acting) MFC: Mini cylinder (Double acting with cushion) MSF: Mini cylinder (Single acting_push) MTF: Mini cylinder (Single acting_pull)	20 25	Refer to stroke table for details	No this code	Blank: Without magnet S: With magnet	CA: Pivot type U: Flat-end type CM: Round-end type	Blank: No accessories FA: FA type SDB: SDB type LB: LB type TC: TC type	Blank: PT G: G T: NPT
MFD: Mini cylinder(Double rod) MFCJ: Mini cylinder (Double rod with cushion)	32 40		10 20 30 40 50 75 100		No this code	Blank: No accessories FA: FA type LB: LB type TC: TC type	
MFJ: Mini cylinder (Adjustable stroke) MFCJ: Mini cylinder (Adjustable stroke with cushion)							

[Note1] Please refer to page 78~79 for accessory parts.

Specification

Bore size(mm)	20	25	32	40
Acting type	Double acting、Double acting with cushion、Single acting			
Fluid	Air(to be filtered by 40μm filter element)			
Operating pressure	Double acting 0.15~1.0MPa(22~145psi)(1.5~10.0bar)			
	Single acting 0.2~1.0MPa(28~145psi)(2.0~10.0bar)			
Proof pressure	1.5MPa(215psi)(15bar)			
Temperature °C	-20~70			
Speed range mm/s	Double acting : 30~800 Single acting : 50~800			
Stroke tolerance	0~150 ^{+1.0} ₀ >150 ^{+1.5} ₀			
Cushion type	MFC/MFCD/MFCJ Series: Variable cushion; Other series: Bumper			
Port size [Note1]	1/8"			1/4"

[Note1] PT thread, G thread and NPT thread are available.
Add) Refer to P362 for detail of sensor switch.

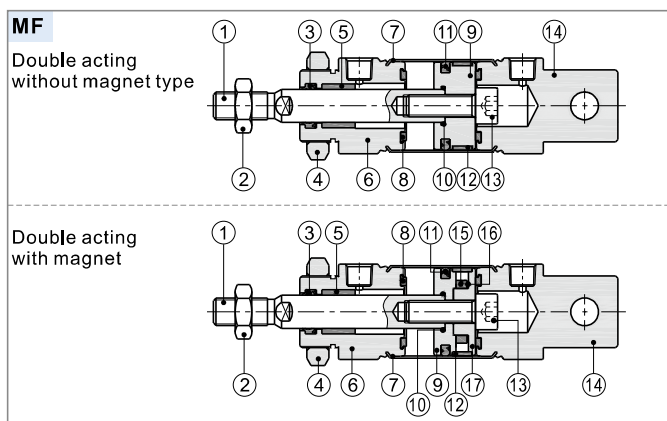
Stroke

Bore size (mm)	Standard stroke (mm)																Max.std stroke	Max. stroke							
MF	20	10	15	20	25	30	40	50	60	75	80	100	125	150	160	175	200	250	300	350	400	450	500	500	800
	25	10	15	20	25	30	40	50	60	75	80	100	125	150	160	175	200	250	300	350	400	450	500	500	800
MFC	32	10	15	20	25	30	40	50	60	75	80	100	125	150	160	175	200	250	300	350	400	450	500	500	800
	40	10	15	20	25	30	40	50	60	75	80	100	125	150	160	175	200	250	300	350	400	450	500	500	800
MFD	20	10	15	20	25	30	40	50	60	75	80	100	125	150	160	175	200	250	300	300	-				
MFCJ	25	10	15	20	25	30	40	50	60	75	80	100	125	150	160	175	200	250	300	300	-				
MFJ	32	10	15	20	25	30	40	50	60	75	80	100	125	150	160	175	200	250	300	350	400	450	500	500	-
MFCJ-S	40	10	15	20	25	30	40	50	60	75	80	100	125	150	160	175	200	250	300	350	400	450	500	500	-
MSF	20	10	15	20	25	30	40	50	60	75	80	100	125	150	-	-									
	25	10	15	20	25	30	40	50	60	75	80	100	125	150	-	-									
MTF	32	10	15	20	25	30	40	50	60	75	80	100	125	150	-	-									
	40	10	15	20	25	30	40	50	60	75	80	100	125	150	-	-									

[Note] Consult us for non-standard stroke.

MF Series

Inner structure and material of major parts

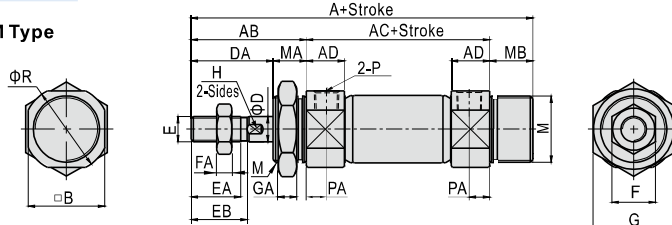


NO.	Item	Material
1	Piston rod	Carbon steel with 20 μ m chrome plated
2	Rod nut	Carbon steel
3	Front cover packing	NBR
4	Front cover nut	Carbon steel
5	Bushing	Wear resistant material
6	Front cover	Aluminum alloy
7	Barrel	SUS304
8	Bumper	TPU
9	Piston	Aluminum alloy
10	O-ring	NBR
11	Piston seal	NBR
12	Wear ring	Wear resistant material
13	Screw	Carbon steel
14	Back cover	Aluminum alloy
15	Magnet	Sintered metal (Neodymium-iron-boron)
16	Magnet washer	NBR
17	Magnet holder	Aluminum alloy

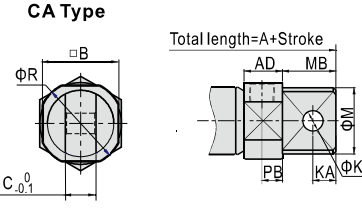
Dimensions

MF\MFC

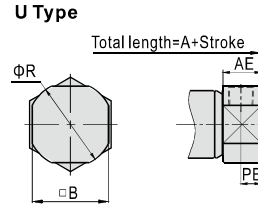
CM Type



CA Type



U Type



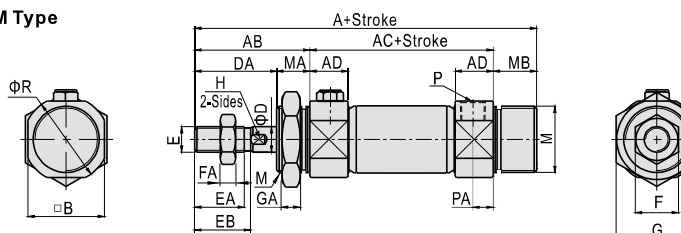
Bore size\Item Back cover	A			M								D	DA	E	EA	EB	F	FA	G	GA	H	K	KA	P	PA	PB	R			
	CM	U	AB	AC	AD	AE	B	C	CM	CA	MA																	CA	CM	
20	116	124	103	41	62	14.5	14.5	25	12	M20×1.5	20	14	21	13	8	27	M8×1.25	16.5	18	12	6	26	8	6	8	9	1/8"	7.5	7.5	29
25	120	128	108	45	62	14.5	15.5	30	12	M26×1.5	26	14	21	13	10	31	M10×1.25	20.5	22	17	6	32	8	8	8	9	1/8"	7.5	8	33.5
32	122	136	110	45	64	14.5	15.5	34.5	20	M26×1.5	26	14	27	13	12	31	M10×1.25	20.5	22	17	6	32	8	10	10	12	1/8"	7.5	8	37.5
40	154	165	138.5	50	88	21.5	22	42.5	20	M32×2.0	32	16	27	16	16	34	M14×1.5	22.5	24	19	8	41	10	14	10	12	1/4"	11	11.5	46.5

Remark :

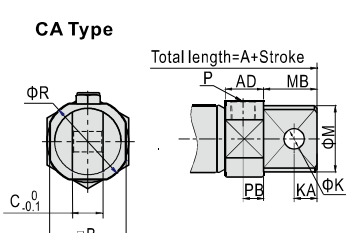
1. The dimensions of magnet type cylinder are the same as non-magnet type cylinder.
2. The dimensions of MFC series are the same as MF series.

MSF

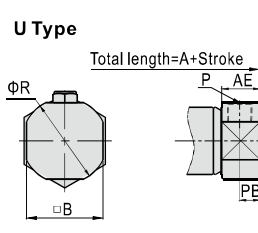
CM Type



CA Type



U Type



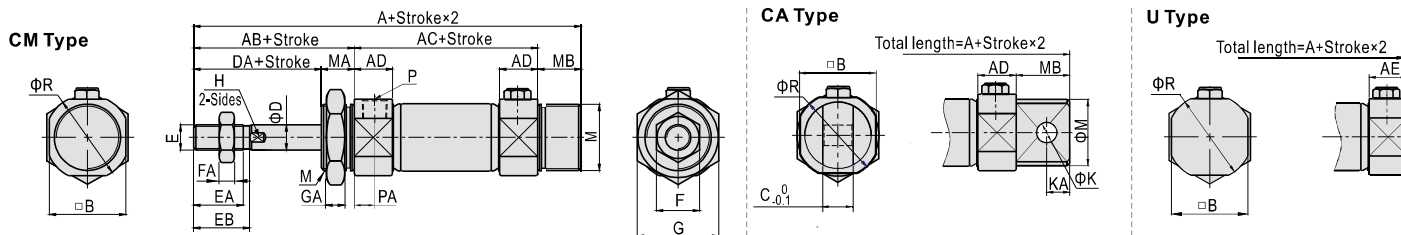
Bore size\Item Back cover	A									AC		
	CM			CA			U			-		
Stroke	1~50	51~100	101~150	1~50	51~100	101~150	1~50	51~100	101~150	1~50	51~100	101~150
20	141	166	191	149	174	199	128	153	178	87	112	137
25	145	170	195	153	178	203	133	158	183	87	112	137
32	147	172	197	161	186	211	135	160	185	89	114	139
40	179	204	229	190	215	240	163.5	188.5	213.5	113	138	163

Bore size\Item Back cover	AB	AD	AE	B	C	D	DA	E	EA	EB	F	FA	G	GA	H	K	KA	M			MB		P	PA	PB	R
																		CM	CA	MA	CA	CM				
20	41	14.5	14.5	25	12	8	27	M8×1.25	16.5	18	12	6	26	8	6	8	9	M20×1.5	20	14	21	13	1/8"	7.5	7.5	29
25	45	14.5	15.5	30	12	10	31	M10×1.25	20.5	22	17	6	32	8	8	8	9	M26×1.5	26	14	21	13	1/8"	7.5	8	33.5
32	45	14.5	15.5	34.5	20	12	31	M10×1.25	20.5	22	17	6	32	8	10	10	12	M26×1.5	26	14	27	13	1/8"	7.5	8	37.5
40	50	21.5	22	42.5	20	16	34	M14×1.5	22.5	24	19	8	41	10	14	10	12	M32×2.0	32	16	27	16	1/4"	11	11.5	46.5

Remark : The dimensions of magnet type cylinder are the same as non-magnet type cylinder.

MF Series

MTF

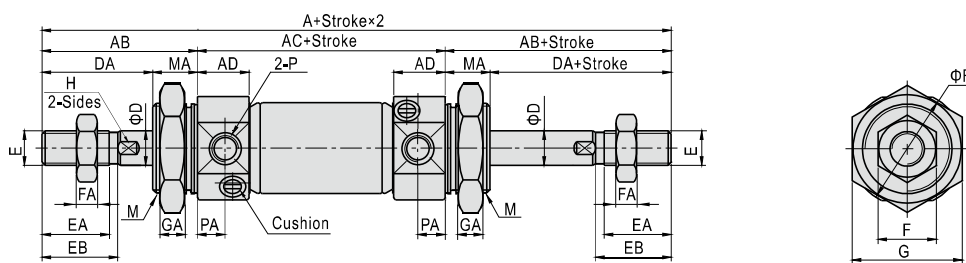


Bore size\Item	A									AC			M	MA	MB		
	CM			CA			U			-			CM	CA	-	CA	CM
Stroke	1~50	51~100	101~150	1~50	51~100	101~150	1~50	51~100	101~150	1~50	51~100	101~150	-	-	-	-	-
20	141	166	191	149	174	199	128	153	178	87	112	137	M20×1.5	20	14	21	13
25	145	170	195	153	178	203	133	158	183	87	112	137	M26×1.5	26	14	21	13
32	147	172	197	161	186	211	135	160	185	89	114	139	M26×1.5	26	14	27	13
40	179	204	229	190	215	240	163.5	188.5	213.5	113	138	163	M32×2.0	32	16	27	16

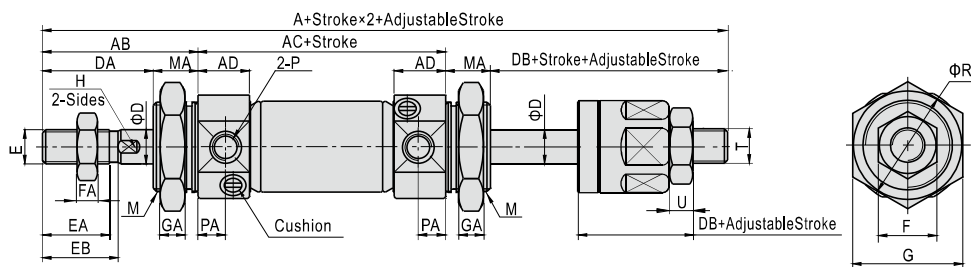
Bore size\Item	AB	AD	AE	B	C	D	DA	E	EA	EB	F	FA	G	GA	H	K	KA	P	PA	R
20	41	14.5	14.5	25	12	8	27	M8×1.25	16.5	18	12	6	26	8	6	8	9	1/8"	7.5	29
25	45	14.5	15.5	30	12	10	31	M10×1.25	20.5	22	17	6	32	8	8	8	9	1/8"	7.5	33.5
32	45	14.5	15.5	34.5	20	12	31	M10×1.25	20.5	22	17	6	32	8	10	10	12	1/8"	7.5	37.5
40	50	21.5	22	42.5	20	16	34	M14×1.5	22.5	24	19	8	41	10	14	10	12	1/4"	11	46.5

Remark : The dimensions of magnet type cylinder are the same as non-magnet type cylinder.

MFD/MFCD



MFJ/MFCJ



Bore size\Item	A																						
	MFD\MFCD	MFJ\MFCJ	AB	AC	AD	D	DA	DB	E	EA	EB	F	FA	G	GA	H	M	MA	P	PA	R	T	U
20	144	141	41	62	14.5	8	27	24	M8×1.25	16.5	18	12	6	26	8	6	M20×1.5	14	1/8"	7.5	29	M8×1.25	5
25	152	148	45	62	14.5	10	31	27	M10×1.25	20.5	22	17	6	32	8	8	M26×1.5	14	1/8"	7.5	33.5	M10×1.25	6
32	154	150	45	64	14.5	12	31	27	M10×1.25	20.5	22	17	6	32	8	10	M26×1.5	14	1/8"	7.5	37.5	M10×1.25	6
40	188	182	50	88	21.5	16	34	28	M14×1.5	22.5	24	19	8	41	10	14	M32×2.0	16	1/4"	11	46.5	M12×1.25	7

Remark : The dimensions of magnet type cylinder are the same as non-magnet type cylinder.

List for ordering code of accessories

Accessories Bore size	Mounting accessories				Knuckle				Sensor switch		
	LB	FA	TC	SDB	I	Y	F	U	CMSG	DMSG	EMSG
20	F-MF20LB	F-MF20FA	F-MF20TC	F-MF20SDB	F-MF20I	F-MF20Y	F-M8X125F	F-M8X125U	CMSG	DMSG	EMSG
25	F-MF32LB	F-MF32FA	F-MF32TC		F-MF25I	F-MF25Y	F-M10X125F	F-M10X125U			
32				F-MF40LB	F-MF40FA	F-MF40TC	F-MF32SDB	F-MF40Y			
40							F-MF40I	F-MF40Y			

Accessory selection

Cylinder model	Accessories	Mounting accessories				Knuckle				Sensor switch		
		LB	FA	SDB	TC	I	Y	U [1]	F	CMSG	DMSG	EMSG
MF	Standard	•	•	•	•	•	•	•	•	x	x	x
MFC	With magnet	•	•	•	•	•	•	•	•	•	•	•
MSF	Standard	•	•	•	•	•	•	•	•	x	x	x
MTF	With magnet	•	•	•	•	•	•	•	•	•	•	•
MFD	Standard	•	•	x	•	•	•	•	•	x	x	x
MFCD	With magnet	•	•	x	•	•	•	•	•	•	•	•
MFJ	Standard	•	•	x	•	•	•	•	•	x	x	x
MFCJ	With magnet	•	•	x	•	•	•	•	•	•	•	•

Material of accessories

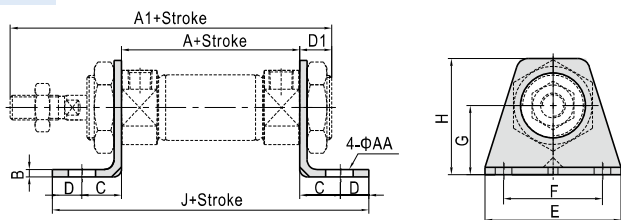
Accessories Bore size	Mounting accessories				Knuckle			
	LB	FA	SDB	TC	I	Y	F	U
20~40	△	△	△	■	□	□	□	□

■—Cast steel ; △—SPCC ; □—Carbon steel

[Note1] Please refer to P358~361 for knuckle detail.

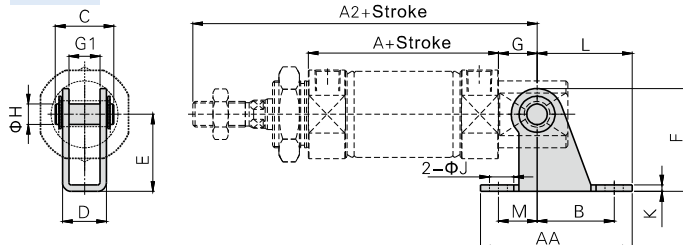
Dimensions

LB



Bore size\Item	A	A1	AA	B	C	D	D1	E	F	G	H	J
20	62	116	7	3	20	8	13	55	40	25	40	118
25	62	120	7	3.5	20	8	13	55	40	28	47	118
32	64	122	7	3.5	20	8	13	55	40	28	47	120
40	88	154	7	3.5	23	10	16	75	55	30	54	154

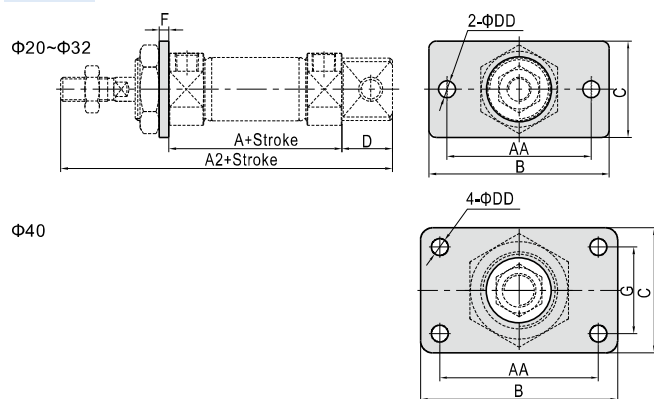
SDB



Bore size\Item	A	A2	AA	B	C	D	E	F	G	G1	H	K	J	L	M
20	62	115	59	30	22.7	17.1	30	40	12	12.1	8	2.5	7	37	15
25	62	119	59	30	22.7	17.1	30	40	12	12.1	8	2.5	7	37	15
32	64	124	75	40	32.7	26.1	40	53	15	20.1	10	3	9	50	15
40	88	153	75	40	32.7	26.1	40	53	15	20.1	10	3	9	50	15

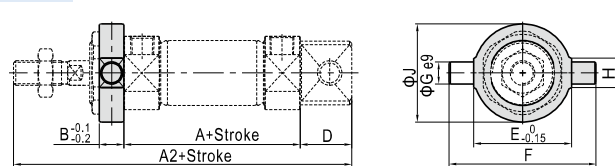
[Note] SDB is attached with relevant PIN.

FA



Bore size\Item	A	A2	AA	B	C	D	DD	F	G
20	62	124	60	75	34	21	7	3.5	-
25	62	128	60	75	40	21	7	4	-
32	64	136	60	75	40	27	7	4	-
40	88	165	66	82	52	27	7	4	36

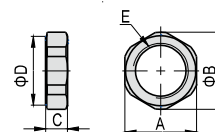
TC



Bore size\Item	A	A2	B	D	E	F	G	H	J
20	62	124	10	21	32	52	8	12	32
25	62	128	10	21	40	60	9	12	40
32	64	136	10	27	40	60	9	12	40
40	88	165	11	27	53	77	10	14	53

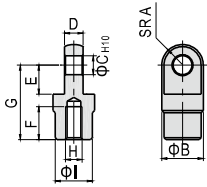
Special nut for TC

Bore size\Item	A	B	C	D	E
20	26	28	8	25	M20×1.5
25	32	34	8	31	M26×1.5
32	32	34	8	31	M26×1.5
40	41	45	10	40	M32×2.0

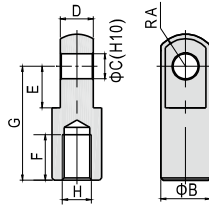


I Knuckle

F-MF20I, F-MF25I



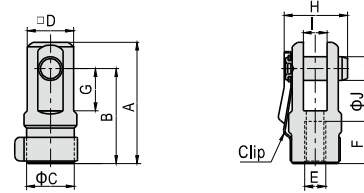
F-MF40I



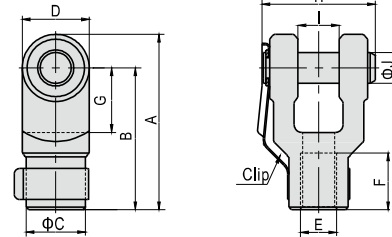
Type\Item	A	B	C	D	E	F	G	H	I
F-MF20I	9,5	20	9	9	14	16	36	M8×1,25	18
F-MF25I	9,5	20	9	9	14	18	38	M10×1,25	18
F-MF40I	15	24	12	16	20	22	55	M14×1,5	-

Y Knuckle

F-MF20Y
F-MF25Y



F-MF40Y



Type\Item	A	B	C	D	E	F	G	H	I	J
F-MF20Y	46	36	18	17,5	M8×1,25	16	16	24	9	9
F-MF25Y	48	38	18	17,5	M10×1,25	18	16	24	9	9
F-MF40Y	68	55	23	26	M14×1,5	22	25	44	16	12



Compendium of MG Series

Multi-mounting accessories

LB Type FA Type
SDB+CB Type CB Type

Six bore size are available
Bore size: 20, 25, 32, 40, 50, 63

Rolling packed structure
Front and back cover and stainless steel block adopt riveted rolling packed structure to form a reliable connection.

Multi-type cylinder

- MG: Mini cylinder(Double acting)
- MSG: Mini cylinder (Single acting_push)
- MTG: Mini cylinder(Single acting_pull)
- MGD: Mini cylinder(Double rod)
- MGC: Mini cylinder(Double acting with cushion)
- MGCD: Mini cylinder(Double rod with cushion)

Two kinds of cushion type
Variable cushion or Bumper

Criteria for selection: Cylinder thrust

Unit : Newton(N)

Bore size	Rod size	Acting type	Pressure area(mm ²)	Operating pressure(MPa)							
				0.1	0.2	0.3	0.4	0.5	0.6	0.7	
20	8	Single acting	Push side	314.0	-	15.7	47.1	78.5	109.9	141.3	172.7
			Pull side	263.8	-	5.7	32.0	58.4	84.8	111.2	137.5
		Double acting	Push side	314.0	31.4	62.8	94.2	125.6	157.0	188.4	219.8
			Pull side	263.8	26.4	52.8	79.1	105.5	131.9	158.3	184.7
25	10	Single acting	Push side	490.6	-	24.6	73.7	122.8	171.8	220.9	269.9
			Pull side	412.1	-	8.9	50.1	91.4	132.6	173.8	215.0
		Double acting	Push side	490.6	49.1	98.1	147.2	196.2	245.3	294.4	343.4
			Pull side	412.1	41.2	82.4	123.6	164.8	206.1	247.3	288.5
32	12	Single acting	Push side	804.3	-	40.2	120.6	200.9	281.3	361.7	442.1
			Pull side	691.2	-	17.6	86.6	155.7	224.8	293.9	363.0
		Double acting	Push side	804.3	80.4	160.9	241.3	321.7	402.2	482.6	563.0
			Pull side	691.2	69.1	138.2	207.4	276.5	345.6	414.7	483.8
40	16	Single acting	Push side	1256.6	-	62.8	188.4	314.0	439.6	565.2	690.8
			Pull side	1055.6	-	22.6	128.1	233.6	339.1	444.6	550.1
		Double acting	Push side	1256.6	125.7	251.3	377.0	502.6	628.3	754.0	879.6
			Pull side	1055.6	105.6	211.1	316.7	422.2	527.8	633.4	738.9
50	20	Double acting	Push side	1962.5	196.3	392.5	588.8	785.0	981.3	1177.5	1373.8
		Pull side	1648.5	164.9	329.7	494.6	659.4	824.3	989.1	1154.0	
63	20	Double acting	Push side	3115.7	311.6	623.1	934.7	1246.3	1557.9	1869.4	2181.0
		Pull side	2801.7	280.2	560.3	840.5	1120.7	1400.9	1681.0	1961.2	

Installation and application

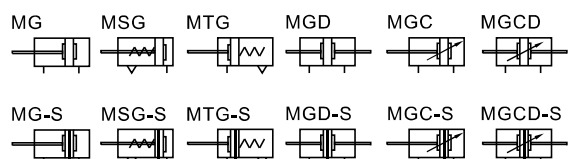


1. When load changes in the work, the cylinder with abundant output capacity shall be selected.
2. Relative cylinder with high temperature resistance or corrosion resistance shall be chosen under the condition of high temperature or corrosion.
3. Necessary protection measure shall be taken in the environment with higher humidity, much dust or water drops, oil dust and welding dregs.
4. Dirty substances in the pipe must be eliminated before cylinder is connected with pipeline to prevent the entrance of particles into the cylinder.
5. The medium used by cylinder shall be filtered to 40μm or below.
6. Anti-freezing measure shall be adopted under low temperature environment to prevent moisture freezing.
7. The cylinder shall be carried out test run without load before application. Prior to run, buffer shall be turned to the minimum and gradually released to avoid the damage on cylinder caused by excessive impact.
8. To avoid side load, otherwise, piston rod will be bent and deformed and damage the thread at the end of the rod. Single-acting type can not be added in return.
9. If the cylinder is dismantled and stored for a long time, please conduct anti-rust treatment to the surface. Anti-dust caps shall be added in air inlet and outlet ports. The front and back cover can not be dismantled, which shall be especially noticed.

MG Series



Symbol



Product feature

1. JIS standard is implemented.
2. Piston adopts heterogeneous two way seal structure. It has compact size and has the function of oil reservation.
3. Front cover owns fixed anti-impact pad which can reduce the impact of direction-change of the cylinder.
4. Front and back cover and stainless steel block adopt riveted rolling packed structure to form a reliable connection.
5. The cylinder body has stainless steel pipes with high precision to produce high strength and corrosion resistance.
6. There are cylinders and mounting accessories with several specifications for your choice.

Specification

Bore size(mm)		20	25	32	40	50	63	
Acting type	MSG/MTG	Single acting					-	
	MG/MGD	Double acting					-	
	MGC/MGCD	Double acting with cushion					-	
Fluid		Air(to be filtered by 40µm filter element)						
Operating pressure	Double acting	0.15~1.0MPa(22~145psi)(1.5~10.0bar)						
	Single acting	0.2~1.0MPa(28~145psi)(2.0~10.0bar)						
Proof pressure		1.5MPa(215psi)(15bar)						
Temperature °C		-20~70						
Speed range mm/s		Double acting : 30~800			Single acting : 50~800			
Stroke tolerance		0~150 ^{+1.0} ₀ >150 ^{+1.5} ₀						
Cushion type		Variable cushion, Bumper				Variable cushion		
Port size	Variable cushion	M5×0.8	1/8"		1/4"			
[Note1]	Bumper	1/8"					-	

[Note1] PT thread, G thread and NPT thread are available.
Add) Refer to P362 for detail of sensor switch.

Stroke

Bore size (mm)	stroke (mm)										Max.std stroke	Max. stroke									
	Standard stroke												Longer stroke								
MG MGC	20	10	15	20	25	30	40	50	60	75	80	100	125	150	175	200	201~500	500	800		
	25	10	15	20	25	30	40	50	60	75	80	100	125	150	175	200	250	300	301~500	500	800
	32	10	15	20	25	30	40	50	60	75	80	100	125	150	175	200	250	300	301~500	500	800
	40	10	15	20	25	30	40	50	60	75	80	100	125	150	175	200	250	300	301~500	500	800
	50	10	15	20	25	30	40	50	60	75	80	100	125	150	175	200	250	300	301~500	500	800
MGD MGCD	63	10	15	20	25	30	40	50	60	75	80	100	125	150	175	200	250	300	301~500	500	800
	20	10	15	20	25	30	40	50	60	75	80	100	125	150	175	200	250	300	-	300	-
	25	10	15	20	25	30	40	50	60	75	80	100	125	150	175	200	250	300	-	300	-
	32	10	15	20	25	30	40	50	60	75	80	100	125	150	175	200	250	300	-	500	-
	40	10	15	20	25	30	40	50	60	75	80	100	125	150	175	200	250	300	-	500	-
MSG MTG	50	10	15	20	25	30	40	50	60	75	80	100	125	150	175	200	250	300	-	500	-
	63	10	15	20	25	30	40	50	60	75	80	100	125	150	175	200	250	300	-	500	-
	20	10	15	20	25	30	40	50	60	75	80	100	125	150							
	25	10	15	20	25	30	40	50	60	75	80	100	125	150							
	32	10	15	20	25	30	40	50	60	75	80	100	125	150							

[Note] Consult us for non-standard stroke.

Ordering code

MG 20 × 100 S FA □

① ② ③ ④ ⑤ ⑥

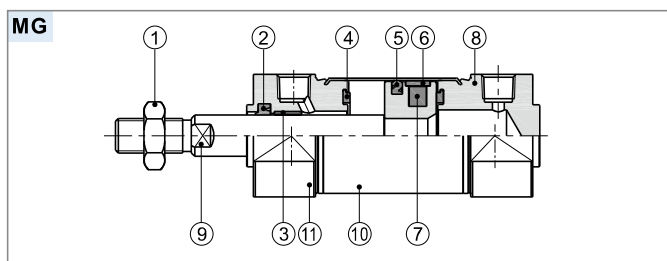
① Model	② Bore size		③ Stroke	④ Magnet	⑤ Mounting type[Note1]	⑥ Thread type [Note2]
MG: Mini cylinder(Double acting) MGC: Mini cylinder (Double acting with cushion) MSG: Mini cylinder (Single acting_push) MTG: Mini cylinder (Single acting_pull)	Model	Bore size	Refer to stroke table for details	Blank: Without magnet S: With magnet	Blank: No accessories FA: FA type LB: LB type CB: CB type SDB: SDB type	Blank: PT G: G T : NPT
MGD: Mini cylinder(Double rod) MGCD: Mini cylinder (Double rod with cushion)	MGC MGCD	20 25 32 40 50 63				

[Note1] Please refer to page 84~85 for accessory parts. SDB must be used with CB.

[Note2] Standard thread is blank here.

MG Series

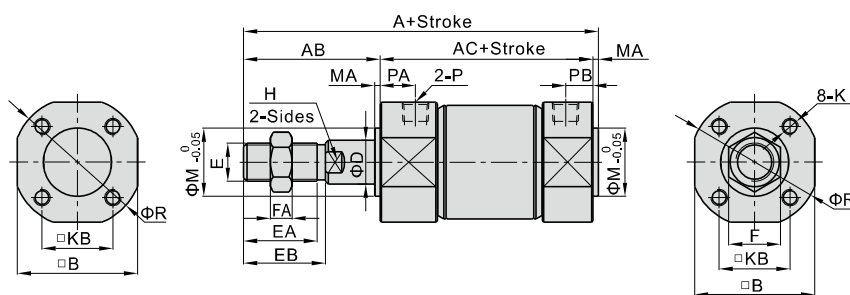
Inner structure and material of major parts



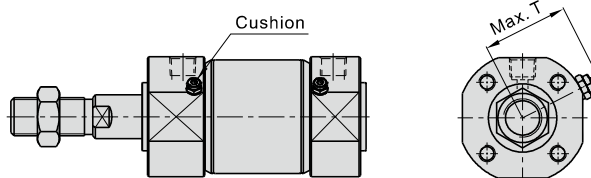
NO.	Item	Material
1	Rod nut	Carbon steel
2	Front cover packing	NBR
3	Bushing	Wear resistant material
4	Bumper	TPU
5	Piston seal	NBR
6	Wear ring	Wear resistant material
7	Magnet	Rubber
8	Back cover	Aluminum alloy
9	Piston rod	Carbon steel with 20 μ m chrome plated
10	Barrel	SUS304
11	Front cover	Aluminum alloy

Dimensions

MG $\Phi 20\sim\Phi 40$



MGC $\Phi 20\sim\Phi 63$



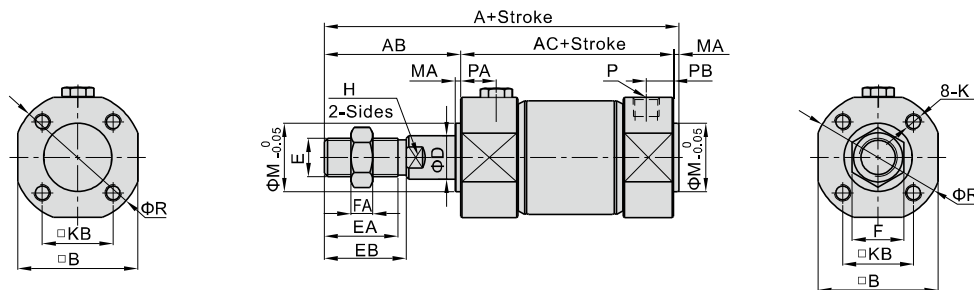
Bore size\Item	Standard stroke	Longer stroke	A	AB	AC	B	D	E	EA	EB	F	FA
20	≤ 200	201~500	106(114)	35	69(77)	24	8	M8 $\times 1.25$	16.5	18	12	6
25	≤ 300	301~500	111(119)	40	69(77)	29	10	M10 $\times 1.25$	20.5	22	17	6
32	≤ 300	301~500	113(121)	40	71(79)	35.5	12	M10 $\times 1.25$	20.5	22	17	6
40	≤ 300	301~500	130(139)	50	78(87)	44	16	M14 $\times 1.5$	28.5	30	19	8
50	≤ 300	301~500	150(162)	58	90(102)	55	20	M18 $\times 1.5$	33.5	35	27	11
63	≤ 300	301~500	150(162)	58	90(102)	69	20	M18 $\times 1.5$	33.5	35	27	11

Bore size\Item	H	K	KB	M	MA	P		PA		PB		R	T
						MG	MGC	MG	MGC	MG	MGC		
20	6	M4 $\times 0.7$ dp:7	14	12	2	1/8"	M5 $\times 0.8$	11.5(14)	14(16.5)	8	10	26.5	22.5
25	8	M5 $\times 0.8$ dp:7.5	16.5	14	2	1/8"	PT1/8	11.5(14.5)	11.5(14.5)	8.5	8.5	31.5	24.5
32	10	M5 $\times 0.8$ dp:7.5	20	18	2	1/8"	PT1/8	12(14.5)	12(14.5)	9.5	9.5	38.5	30.5
40	14	M6 $\times 1.0$ dp:12	26	25	2	1/8"	PT1/8	13(13.5)	13(13.5)	12	12	47.5	35
50	18	M8 $\times 1.25$ dp:16	32	30	2	-	PT1/4	-	15.5(22.5)	-	13	58.5	40.5
63	18	M10 $\times 1.5$ dp:16	38	32	2	-	PT1/4	-	15.5(22.5)	-	13	72	47.5

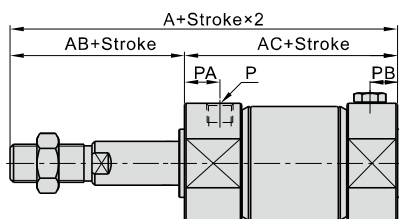
Remark : The dimensions of magnet type cylinder are the same as non-magnet type cylinder. The values in the "(")" are for longer strokes.

MG Series

MSG $\Phi 20 \sim \Phi 40$



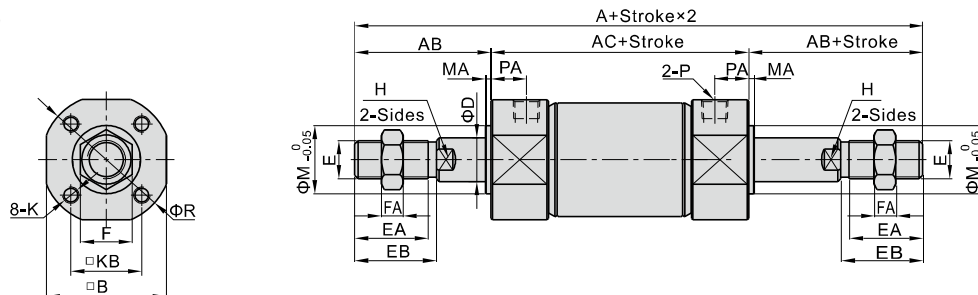
MTG $\Phi 20 \sim \Phi 40$



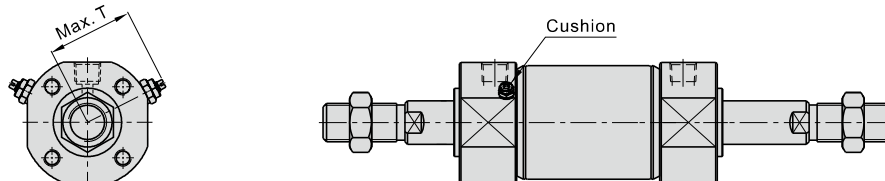
Bore size\Item	A			AB	AC			B	D	E	EA	EB	F	FA	H	K	KB	M	MA	P	PA	PB	R
	1~50	51~100	101~150		1~50	51~100	101~150																
20	131	156	181	35	94	119	144	24	8	M8×1,25	16,5	18	12	6	6	M4×0,7 Dp:7	14	12	2	1/8"	11,5	8	26,5
25	136	161	186	40	94	119	144	29	10	M10×1,25	20,5	22	17	6	8	M5×0,8 Dp:7,5	16,5	14	2	1/8"	11,5	8,5	31,5
32	138	163	188	40	96	121	146	35,5	12	M10×1,25	20,5	22	17	6	10	M5×0,8 Dp:7,5	20	18	2	1/8"	12	9,5	38,5
40	155	180	205	50	103	128	153	44	16	M14×1,5	28,5	30	19	8	14	M6×1,0 Dp:12	26	25	2	1/8"	13	12	47,5

Remark : The dimensions of magnet type cylinder are the same as non-magnet type cylinder.

MGD $\Phi 20 \sim \Phi 40$



MGCD $\Phi 20 \sim \Phi 63$



Bore size\Item	A	AC	AB	B	D	E	EA	EB	F	FA	H	K	KB	M	MA	P		PA		R	T
																MGD	MGCD	MGD	MGCD		
20	147	77	35	24	8	M8×1,25	16,5	18	12	6	6	M4×0,7 Dp:7	14	12	2	1/8"	M5×0,8	11,5	14	26,5	22,5
25	157	77	40	29	10	M10×1,25	20,5	22	17	6	8	M5×0,8 Dp:7,5	16,5	14	2	1/8"	1/8"	11,5	11,5	31,5	24,5
32	159	79	40	35,5	12	M10×1,25	20,5	22	17	6	10	M5×0,8 Dp:7,5	20	18	2	1/8"	1/8"	12	12	38,5	30,5
40	187	87	50	44	16	M14×1,5	28,5	30	19	8	14	M6×1,0 Dp:12	26	25	2	1/8"	1/8"	13	13	47,5	35
50	218	102	58	55	20	M18×1,5	33,5	35	27	11	18	M8×1,25 Dp:16	32	30	2	-	1/4"	-	15,5	58,5	40,5
63	218	102	58	69	20	M18×1,5	33,5	35	27	11	18	M10×1,5 Dp:16	38	32	2	-	1/4"	-	15,5	72	47,5

Remark : The dimensions of magnet type cylinder are the same as non-magnet type cylinder.

MG Series—Accessories

List for ordering code of accessories

Accessories Bore size	Mounting accessories				Knuckle		Sensor switch		
	LB	FA	SDB	CB	I	Y	CMSG	DMSG	EMSG
20	F-MG20LB	F-MG20FA	F-MG20SDB	F-MG20CB	F-ACQ20I	F-ACQ20Y	CMSG	DMSG	EMSG
25	F-MG25LB	F-MG25FA	F-MG25SDB	F-MG25CB	F-ACQ25I	F-ACQ25Y			
32	F-MG32LB	F-MG32FA	F-MG32SDB	F-MG32CB	F-ACQ32I	F-ACQ32Y			
40	F-MG40LB	F-MG40FA	F-MG40SDB	F-MG40CB	F-ACQ32I	F-ACQ32Y			
50	F-MG50LB	F-MG50FA	F-MG50SDB	F-MG50CB	F-ACQ50I	F-ACQ50Y			
63	F-MG63LB	F-MG63FA	F-MG63SDB	F-MG63CB					

Accessory selection

Cylinder model	Accessories	Mounting accessories				Knuckle		Sensor switch		
		LB	FA	SDB	CB	I	Y	CMSG	DMSG	EMSG
MG	Standard	•	•	•	•	•	•	x	x	x
MGC	With magnet	•	•	•	•	•	•	•	•	•
MSG	Standard	•	•	•	•	•	•	x	x	x
MTG	With magnet	•	•	•	•	•	•	•	•	•
MGD	Standard	•	•	x	x	•	•	x	x	x
MGCD	With magnet	•	•	x	x	•	•	•	•	•

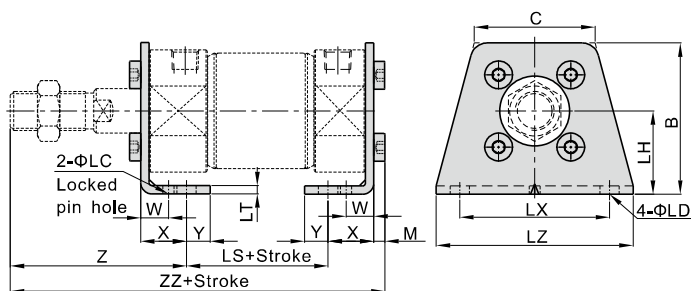
Material of accessories

Accessories Bore size	Mounting accessories				Knuckle	
	LB	FA	SDB	CB	I	Y
20 25	△	○	△	△	□	□
32~63	△	○	△	△	□	◇

△—SPCC ; ○—cast iron ; □—S45C ; ◇—cast steel

Dimensions

LB

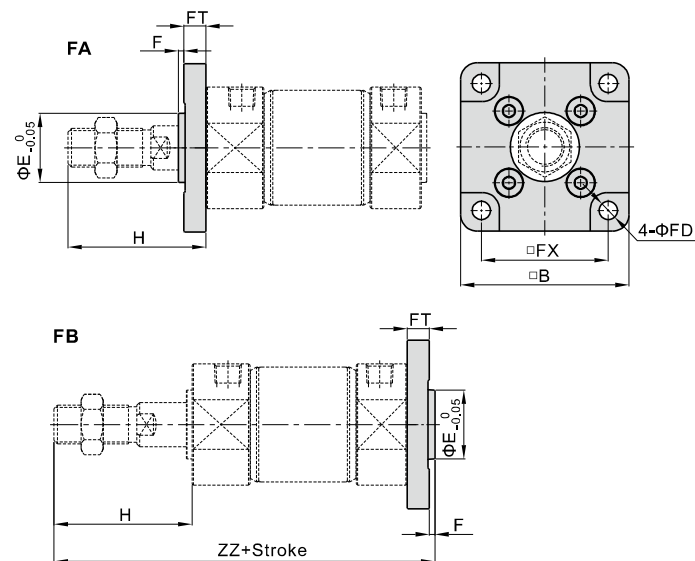


Bore size\Item	Standard stroke	Longer stroke	B	C	LC	LD	LH	LS
20	≤200	201~500	34	27,5	4	6	20	45(53)
25	≤300	301~500	38,5	30	4	6	22	45(53)
32	≤300	301~500	45	35,5	4	7	25	46(54)
40	≤300	301~500	54,5	43,5	4	7	30	52(61)
50	≤300	301~500	70,5	50,5	5	10	40	55(67)
63	≤300	301~500	82,5	64	5	12	45	55(67)

Bore size\Item	LT	LX	LZ	M	W	X	Y	Z	ZZ
20	3	32	44	2,8	10	15	7	47	110(118)
25	3	36	49	3,5	10	15	7	52	115,5(123,5)
32	3,5	44	58	3,5	10	16	8	52,5	117,5(125,5)
40	3,5	54	71	4	10	16,5	8,5	63	135(144)
50	4,5	66	86	5	17,5	22	11	75,5	157,5(169,5)
63	4,5	82	106	6	17,5	22	13	75,5	158,5(170,5)

Remark : The values in the "()" are for longer strokes.

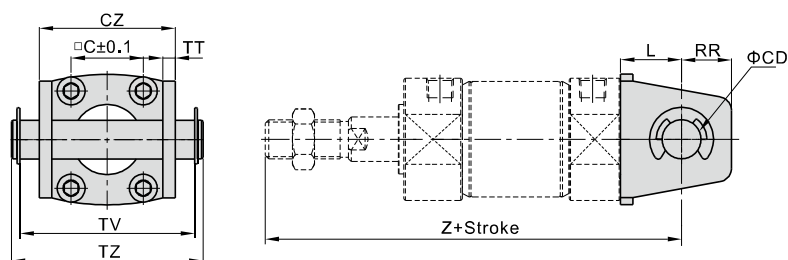
FA/FB



Bore size\Item	Standard stroke	Longer stroke	B	E	F	FD	FX	FT	H	ZZ
20	≤200	201~500	40	12	2	5,5	28	6	35	112(120)
25	≤300	301~500	44	14	2	5,5	32	7	40	118(126)
32	≤300	301~500	53	18	2	6,5	38	7	40	120(128)
40	≤300	301~500	61	25	2	6,5	46	8	50	138(147)
50	≤300	301~500	76	30	2	9	58	9	58	159(171)
63	≤300	301~500	92	32	2	11	70	9,5	58	159,5(171,5)

Remark : The values in the "()" are for longer strokes.

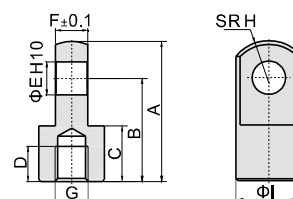
CB



Bore size\Item	Standard stroke	Longer stroke	C	CD	CZ	L	RR	TT	TV	TZ	Z
20	≤200	201~500	14	8	29	14	11	2.5	41	46	118(126)
25	≤300	301~500	16.5	10	33	16	13	2.5	44	50	125(133)
32	≤300	301~500	20	12	40	20	15	3	54	60.5	131(139)
40	≤300	301~500	26	14	49	22	18	3	63	69.5	150(159)
50	≤300	301~500	32	16	60	25	20	4	77	83	173(185)
63	≤300	301~500	38	18	74	30	22	4	95	103	178(190)

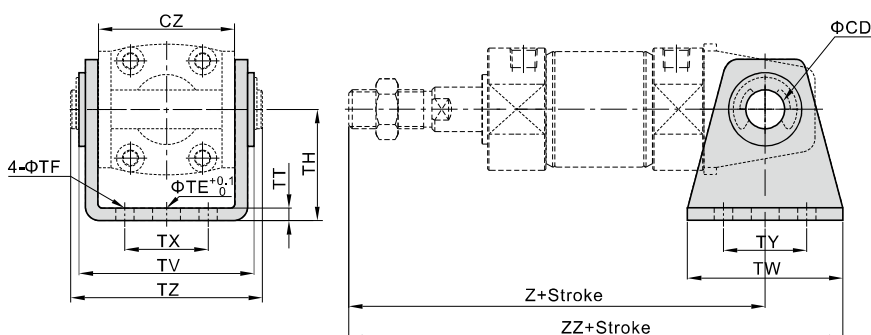
Remark : The values in the “()” are for longer strokes.

I Knuckle



Type\Item	A	B	C	D	E	F	G	H	I
F-ACQ20I	34	25	13.5	8.5	8	7.7	M8×1.25	10.3	16
F-ACQ25I	41	30	16	11	10	9.7	M10×1.25	12.8	20
F-ACQ32I	42	30	16	14	10	17.6	M14×1.5	12	22
F-ACQ50I	56	40	20	18	14	21.6	M18×1.5	16	28

SDB(+CB)



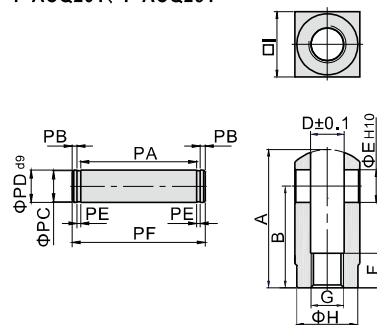
Bore size\Item	Standard stroke	Longer stroke	CD	CZ	TE	TF	TH	TT	TV	TW	TX	TY	TZ	Z	ZZ
20	≤200	201~500	8	29	10	5.5	25	2.5	40.5	42	16	28	46	118(126)	139(147)
25	≤300	301~500	10	33	10	5.5	30	2.5	43.5	42	20	28	50	125(133)	146(154)
32	≤300	301~500	12	40	10	6.5	35	3	53.5	48	22	28	60.5	131(139)	155(163)
40	≤300	301~500	14	49	10	6.5	40	3	62.5	56	30	30	69.5	150(159)	178(187)
50	≤300	301~500	16	60	20	9	50	4	76	64	36	36	83	173(185)	205(217)
63	≤300	301~500	18	74	20	11	60	4	94	74	46	46	103	178(190)	215(227)

Remark : SDB is attached with relevant PIN.

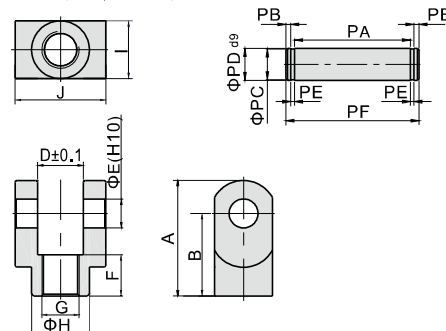
The values in the “()” are for longer strokes.

Y Knuckle

F-ACQ20Y, F-ACQ25Y



F-ACQ32Y, F-ACQ50Y



Type\Item	A	B	D	E	F	G
F-ACQ20Y	34	25	8.3	8	8.5	M8×1.25
F-ACQ25Y	41	30	10.3	10	10.5	M10×1.25
F-ACQ32Y	42	30	18.4	10	16	M14×1.5
F-ACQ50Y	56	40	22.4	14	20	M18×1.5

Type\Item	H	I	J	PA	PB	PC	PD	PE	PF
F-ACQ20Y	15	16	-	16.3	1.5	7	8	0.9	21
F-ACQ25Y	19	20	-	20.3	2	8	10	1.1	26.4
F-ACQ32Y	22	22	36	36.3	2	8	10	1.1	42.4
F-ACQ50Y	28	28	44	44.3	2	12	14	1.1	50.4



Mini cylinder—MA Series

Compendium of MA Series

Multi-mounting accessories

FA Type SDB Type LB Type

Multi-type cylinder

MA: Mini cylinder(Double acting)

MSA: Mini cylinder (Single acting_push) MTA: Mini cylinder (Single acting_pull)

MAD: Mini cylinder(Double rod)

MAJ: Mini cylinder(Adjustable stroke)

MAR: Mini cylinder(Double acting with cushion)

MAC: Mini cylinder(Double acting with cushion)

MACD: Mini cylinder(Double rod with cushion)

MACJ: Mini cylinder(Adjustable stroke with cushion)

Rolling packed structure

Front and back cover and stainless steel block adopt riveted rolling packed structure to form a reliable connection.

Seven bore size are available

Bore size: 16, 20, 25, 32, 40, 50, 63

Three kinds of back cover type

CA: Pivot type U: Flat-end type CM: Round-end type

Two kinds of cushion type

Variable cushion or Bumper

Criteria for selection: Cylinder thrust

Unit : Newton(N)

Bore size	Rod size	Acting type	Pressure area(mm ²)	Operating pressure(MPa)							
				0.1	0.2	0.3	0.4	0.5	0.6	0.7	
16	6	Single acting	Push side	201.0	-	-	20.1	40.2	60.3	80.4	100.5
			Pull side	172.7	-	-	11.6	28.9	46.2	63.4	80.7
		Double acting	Push side	201.0	20.1	40.2	60.3	80.4	100.5	120.6	140.7
			Pull side	172.7	17.3	34.5	51.8	69.1	86.4	103.6	120.9
20	8	Single acting	Push side	314.0	-	15.7	47.1	78.5	109.9	141.3	172.7
			Pull side	263.8	-	5.7	32.0	58.4	84.8	111.2	137.5
		Double acting	Push side	314.0	31.4	62.8	94.2	125.6	157.0	188.4	219.8
			Pull side	263.8	26.4	52.8	79.1	105.5	131.9	158.3	184.7
25	10	Single acting	Push side	490.6	-	24.6	73.7	122.8	171.8	220.9	269.9
			Pull side	412.1	-	8.9	50.1	91.4	132.6	173.8	215.0
		Double acting	Push side	490.6	49.1	98.1	147.2	196.2	245.3	294.4	343.4
			Pull side	412.1	41.2	82.4	123.6	164.8	206.1	247.3	288.5
32	12	Single acting	Push side	804.3	-	40.2	120.6	200.9	281.3	361.7	442.1
			Pull side	691.2	-	17.6	86.6	155.7	224.8	293.9	363.0
		Double acting	Push side	804.3	80.4	160.9	241.3	321.7	402.2	482.6	563.0
			Pull side	691.2	69.1	138.2	207.4	276.5	345.6	414.7	483.8
40	16	Single acting	Push side	1256.6	-	62.8	188.4	314.0	439.6	565.2	690.8
			Pull side	1055.6	-	22.6	128.1	233.6	339.1	444.6	550.1
		Double acting	Push side	1256.6	125.7	251.3	377.0	502.6	628.3	754.0	879.6
			Pull side	1055.6	105.6	211.1	316.7	422.2	527.8	633.4	738.9
50	16	Double acting	Push side	1962.5	196.3	392.5	588.8	785.0	981.3	1177.5	1373.8
		Pull side	1761.5	176.2	352.3	528.5	704.6	880.8	1056.9	1233.1	
63	16	Double acting	Push side	3115.7	311.6	623.1	934.7	1246.3	1557.9	1869.4	2181.0
		Pull side	2914.7	291.5	582.9	874.4	1165.9	1457.4	1748.8	2040.3	

Installation and application



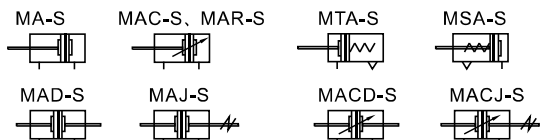
- When load changes in the work, the cylinder with abundant output capacity shall be selected.
- Relative cylinder with high temperature resistance or corrosion resistance shall be chosen under the condition of high temperature or corrosion.
- Necessary protection measure shall be taken in the environment with higher humidity, much dust or water drops, oil dust and welding dregs.
- Dirty substances in the pipe must be eliminated before cylinder is connected with pipeline to prevent the entrance of particles into the cylinder.
- The medium used by cylinder shall be filtered to 40µm or below.
- Anti-freezing measure shall be adopted under low temperature environment to prevent moisture freezing.
- The cylinder shall be carried out test run without load before application. Prior to run, buffer shall be turned to the minimum and gradually released to avoid the damage on cylinder caused by excessive impact.
- To avoid side load, otherwise, piston rod will be bent and deformed and damage the thread at the end of the rod. Single-acting type can not be added in return.
- If the cylinder is dismantled and stored for a long time, please to conduct anti-rust treatment to the surface. Anti-dust caps shall be added in air inlet and outlet ports. The front and back cover can not be dismantled, which shall be especially noticed.



MA Series



Symbol



Product feature

1. Standard cylinder manufactured by our enterprise.
2. Piston adopts heterogeneous two-way seal structure. It has compact size and has the function of grease reservation.
3. Front cover has fixed bumper which can reduce the impact of direction change of the cylinder.
4. There are several modes of back cover, which makes the installation of cylinder more convenient.
5. Front and back cover and stainless steel block adopt riveted rolling packed structure to form a reliable connection.
6. The cylinder body has stainless steel pipes with high precision to produce high strength and corrosion resistance.
7. There are cylinders and mounting accessories with several specifications for your choice.
8. All cylinders of this series have magnet.

Ordering code

MA	20 × 50	S	CM	<input type="checkbox"/>	<input type="checkbox"/>
MAD	20 × 50	S		<input type="checkbox"/>	<input type="checkbox"/>
MAJ	20 × 50 -20	S		<input type="checkbox"/>	<input type="checkbox"/>
MAR	U 20 × 50	S			<input type="checkbox"/>

① ② ③ ④ ⑤ ⑥ ⑦ ⑧ ⑨

① Model	② Front cover	③ Bore size	④ Stroke	⑤ Adjustable St.	⑥ Magnet	⑦ Back cover	⑧ Mounting type[Note1]	⑨ Thread type[Note2]
MA: Mini cylinder(Double acting) MAC: Mini cylinder (Double acting with cushion) MSA: Mini cylinder(Single acting_push) MTA: Mini cylinder(Single acting_pull)	No this code	Model	Bore size	Refer to stroke table for details	No this code	S: With magnet	CA: Pivot type U: Flat-end type CM: Round-end type	Blank: No accessories FA: FA type SDB: SDB type LB: LB type
MAD: Mini cylinder(Double rod) MACD: Mini cylinder (Double rod with cushion)		MA 16 MSA 20 MTA 25 MAD 32 MAJ 40						
MAJ: Mini cylinder(Adjustable stroke) MACJ: Mini cylinder (Adjustable stroke with cushion)		MAC 16 MACD 16 MACJ 16						
MAR: Mini cylinder (Double acting with cushion)		MAC 20 MAR 25 MACD 32 MACJ 40 MACD 50 MACJ 63						
	F: Front mounting U: Up mounting					No this code	Blank: No accessories FA: FA type LB: LB type	Blank: PT G: G T: NPT

[Note1] Please refer to page 92~93 for accessory parts.

[Note2] Standard thread is blank here.

Specification

Bore size(mm)		16	20	25	32	40	50	63	
Acting type	MSA/MTA	Single acting						-	
	MA/MAD/MAJ	Double acting						-	
	MAR	-	Double acting						
	MAC/MACD/MACJ	Double acting with cushion							
Fluid		Air(to be filtered by 40μm filter element)							
Operating pressure	Double acting	0.15~1.0MPa(22~145psi)(1.5~10.0bar)							
	Single acting	0.2~1.0MPa(28~145psi)(2.0~10.0bar)							
Proof pressure		1.5MPa(215psi)(15bar)							
Temperature °C		-20~70							
Speed range mm/s		Double acting : 30~80 Single acting : 50~800							
Stroke tolerance		0~150 ^{+1.0} ₀ >150 ^{+1.5} ₀							
Cushion type		MAC/MACD/MACJ Series: Variable cushion; Other series: Bumper							
Port size [Note1]		M5×0.8			1/8"		1/4"		

[Note1] PT thread, G thread and NPT thread are available.

Add) Refer to P362 for detail of sensor switch.

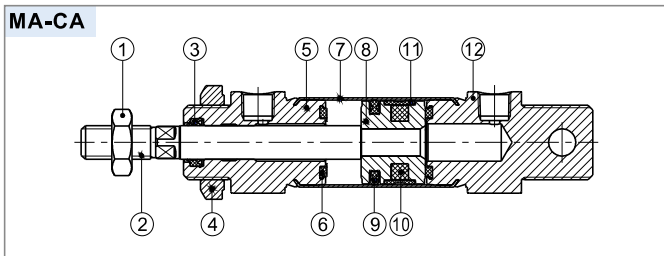
Stroke

Bore size (mm)	Standard stroke (mm)																Max.std stroke	Max. stroke							
MA/MAC	16	10	15	20	25	30	40	50	60	75	80	100	125	150	160	175	200	250	300	350	400	450	500	500	600
	20	10	15	20	25	30	40	50	60	75	80	100	125	150	160	175	200	250	300	350	400	450	500	500	800
	25	10	15	20	25	30	40	50	60	75	80	100	125	150	160	175	200	250	300	350	400	450	500	500	800
	32	10	15	20	25	30	40	50	60	75	80	100	125	150	160	175	200	250	300	350	400	450	500	500	800
MAR	40	10	15	20	25	30	40	50	60	75	80	100	125	150	160	175	200	250	300	350	400	450	500	500	800
	50	10	15	20	25	30	40	50	60	75	80	100	125	150	160	175	200	250	300	350	400	450	500	500	800
	63	10	15	20	25	30	40	50	60	75	80	100	125	150	160	175	200	250	300	350	400	450	500	500	800
	MAD MAJ MACD MACJ	16	10	15	20	25	30	40	50	60	75	80	100	125	150	160	175	200	250	300					300
20		10	15	20	25	30	40	50	60	75	80	100	125	150	160	175	200	250	300					300	-
25		10	15	20	25	30	40	50	60	75	80	100	125	150	160	175	200	250	300					300	-
32		10	15	20	25	30	40	50	60	75	80	100	125	150	160	175	200	250	300	350	400	450	500	500	-
MACD MACJ	40	10	15	20	25	30	40	50	60	75	80	100	125	150	160	175	200	250	300	350	400	450	500	500	-
	50	10	15	20	25	30	40	50	60	75	80	100	125	150	160	175	200	250	300	350	400	450	500	500	-
	63	10	15	20	25	30	40	50	60	75	80	100	125	150	160	175	200	250	300	350	400	450	500	500	-
	MSA	16	10	15	20	25	30	40	50	60	75	80	100												
20		10	15	20	25	30	40	50	60	75	80	100	125	150											-
25		10	15	20	25	30	40	50	60	75	80	100	125	150											-
32		10	15	20	25	30	40	50	60	75	80	100	125	150											-
MTA	40	10	15	20	25	30	40	50	60	75	80	100	125	150											-
	16	10	15	20	25	30	40	50	60	75	80	100													-
	20	10	15	20	25	30	40	50	60	75	80	100													-
	25	10	15	20	25	30	40	50	60	75	80	100													-
	32	10	15	20	25	30	40	50	60	75	80	100													-
	40	10	15	20	25	30	40	50	60	75	80	100													-
	16	10	15	20	25	30	40	50	60	75	80	100													-
	20	10	15	20	25	30	40	50	60	75	80	100													-

[Note] Consult us for non-standard stroke.

MA Series

Inner structure and material of major parts

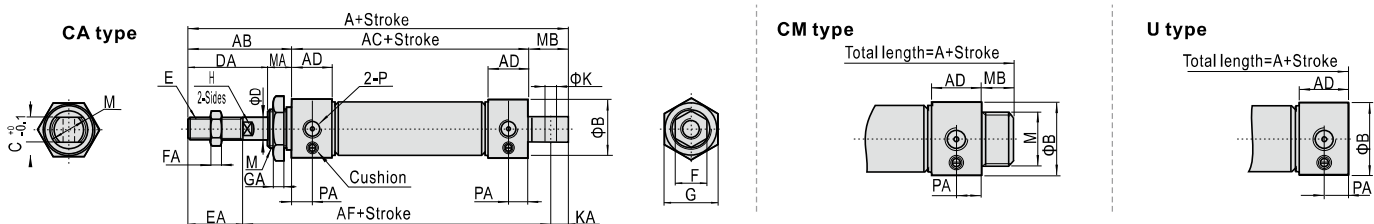


NO.	Item	Material
1	Rod nut	Stainless steel/Carbon steel
2	Piston rod	Carbon steel with 20μmchrome plated
3	Front cover packing	NBR
4	Front cover nut	Carbon steel
5	Front cover	Aluminum alloy
6	Bumper	TPU
7	Barrel	Stainless steel
8	Piston	Aluminum alloy
9	Piston seal	NBR
10	Magnet	Plastic
11	Wear ring	Wear resistant material
12	Back cover	Aluminum alloy

Dimensions

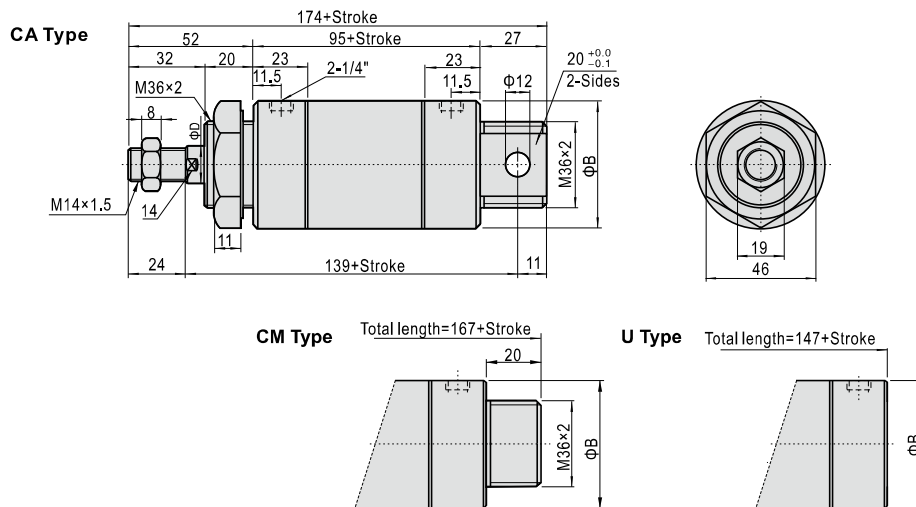
MA $\Phi 16 \sim \Phi 40$

MAC $\Phi 16 \sim \Phi 40$



Bore size/Item	A			AB	AC	AD	AF	B	C	D	DA	E	EA	F	FA	G	GA	H	K	KA	M	MA	MB		P	PA
	CA	CM	U																				CA	CM		
16	114	114	98	38	60	12.5	91	21	12	6	22	M6×1.0	16	10	5	22	6	5	6	7	M16×1.5	16	16	16	M5×0.8	7.5
20	137	128	116	40	76	16	108	27	16	8	28	M8×1.25	20	12	6	29	7	6	8	9	M22×1.5	12	21	12	1/8"	8
25	141	134	120	44	76	16	110	30	16	10	30	M10×1.25	22	17	6	29	7	8	8	9	M22×1.5	14	21	14	1/8"	8
32	147	134	120	44	76	16	113	35	16	12	30	M10×1.25	22	17	6	32	8	10	10	12	M24×2.0	14	27	14	1/8"	8
40	149	136	122	46	76	16.5	113	41.5	20	16	32	M12×1.25	24	17	7	41	8	14	12	12	M30×2.0	14	27	14	1/8"	9

MAC $\Phi 50 \setminus \Phi 63$



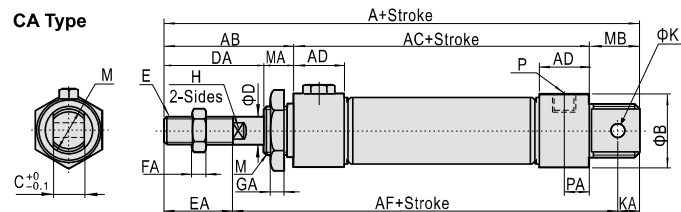
Bore size/Item	B	D
50	53	16
63	67	16

Mini cylinder

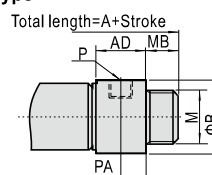
MA Series

MSA $\Phi 16\sim\Phi 40$

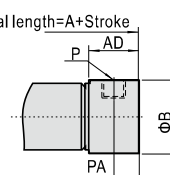
CA Type



CM Type



U Type

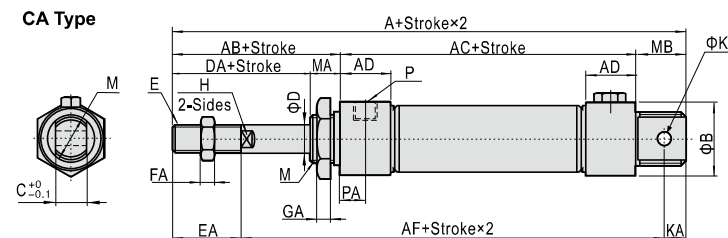


Item	A									AB	AC			AD	AF		
	CA			CM			U				-				-		
Back cover	CA			CM			U			-			-				
Bore size/Stroke	≤50	51~100	≥101	≤50	51~100	≥101	≤50	51~100	≥101	-	≤50	51~100	≥101	-	≤50	51~100	≥101
16	139	164	-	139	164	-	123	148	-	38	85	110	-	12.5	116	141	-
20	162	187	212	153	178	203	141	166	191	40	101	126	151	16	133	158	183
25	166	191	216	159	184	209	145	170	195	44	101	126	151	16	135	160	185
32	172	197	222	159	184	209	145	170	195	44	101	126	151	16	138	163	188
40	174	199	224	161	186	211	147	172	197	46	101	126	151	16.5	138	163	188

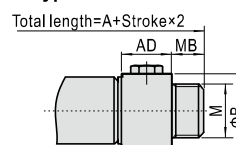
Bore size/Item	Back cover	B	C	D	DA	E	EA	F	FA	G	GA	H	K	KA	M	MA	MB		P	PA
																	CA	CM		
16		21	12	6	22	M6×1.0	16	10	5	22	6	5	6	7	M16×1.5	16	16	16	M5×0.8	7.5
20		27	16	8	28	M8×1.25	20	12	6	29	7	6	8	9	M22×1.5	12	21	12	1/8"	8
25		30	16	10	30	M10×1.25	22	17	6	29	7	8	8	9	M22×1.5	14	21	14	1/8"	8
32		35	16	12	30	M10×1.25	22	17	6	32	8	10	10	12	M24×2.0	14	27	14	1/8"	8
40		41.5	20	16	32	M12×1.25	24	17	7	41	8	14	12	12	M30×2.0	14	27	14	1/8"	9

MTA $\Phi 16\sim\Phi 40$

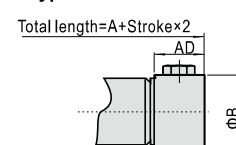
CA Type



CM Type



U Type



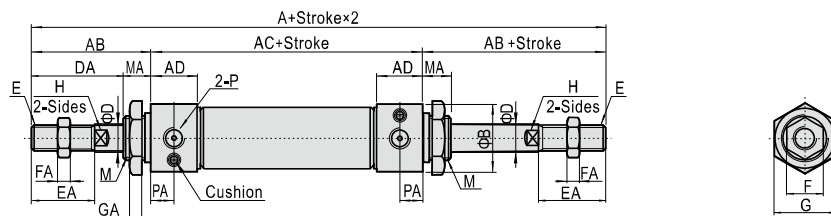
Item	A												AC				AF			
	CA				CM				U				-				-			
Back cover	CA				CM				U				-				-			
Bore size/Stroke	≤25	≤50	≤75	≤100	≤25	≤50	≤75	≤100	≤25	≤50	≤75	≤100	≤25	≤50	≤75	≤100	≤25	≤50	≤75	≤100
16	129	139	154	164	129	139	154	164	113	123	138	148	75	85	100	110	106	116	131	141
20	152	162	177	187	143	153	168	178	131	141	156	166	91	101	116	126	123	133	148	158
25	156	166	181	191	149	159	174	184	135	145	160	170	91	101	116	126	125	135	150	160
32	162	172	192	202	149	159	179	189	135	145	165	175	91	101	121	131	128	138	158	168
40	164	174	194	204	151	161	181	191	137	147	167	177	91	101	121	131	128	138	158	168

Bore size/Item	Back cover	AB	AD	B	C	D	DA	E	EA	F	FA	G	GA	H	K	KA	M	MA	MB		P	PA
																			CA	CM		
16		38	12.5	21	12	6	22	M6×1.0	16	10	5	22	6	5	6	7	M16×1.5	16	16	16	M5×0.8	7.5
20		40	16	27	16	8	28	M8×1.25	20	12	6	29	7	6	8	9	M22×1.5	12	21	12	1/8"	8
25		44	16	30	16	10	30	M10×1.25	22	17	6	29	7	8	8	9	M22×1.5	14	21	14	1/8"	8
32		44	16	35	16	12	30	M10×1.25	22	17	6	32	8	10	10	12	M24×2.0	14	27	14	1/8"	8
40		46	16.5	41.5	20	16	32	M12×1.25	24	17	7	41	8	14	12	12	M30×2.0	14	27	14	1/8"	9

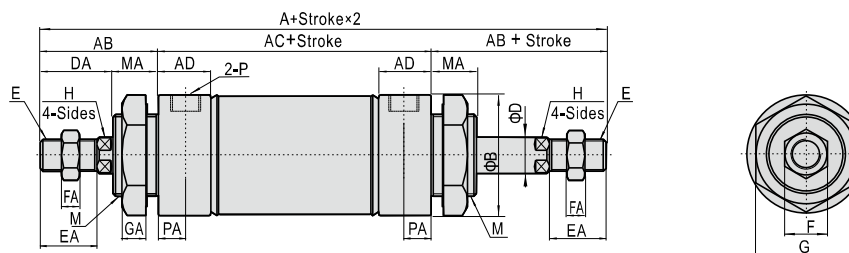
MA Series

MAD/MACD

Φ16~Φ40



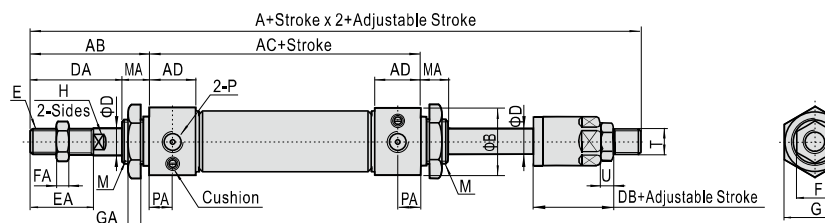
Φ50/Φ63



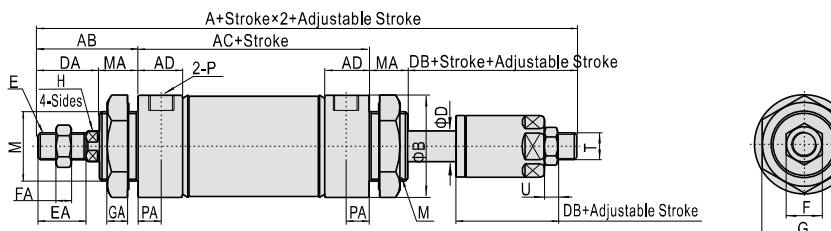
Bore size/Item	A	AB	AC	AD	B	D	DA	E	EA	F	FA	G	GA	H	M	MA	P	PA
16	136	38	60	12.5	21	6	22	M6×1.0	16	10	5	22	6	5	M16×1.5	16	M5×0.8	7.5
20	156	40	76	16	27	8	28	M8×1.25	20	12	6	29	7	6	M22×1.5	12	1/8"	8
25	164	44	76	16	30	10	30	M10×1.25	22	17	6	29	7	8	M22×1.5	14	1/8"	8
32	164	44	76	16	35	12	30	M10×1.25	22	17	6	32	8	10	M24×2.0	14	1/8"	8
40	168	46	76	16.5	41.5	16	32	M12×1.25	24	17	7	41	8	14	M30×2.0	14	1/8"	9
50	199	52	95	23	53	16	32	M14×1.5	24	19	8	46	11	14	M36×2.0	20	1/4"	11.5
63	199	52	95	23	67	16	32	M14×1.5	24	19	8	46	11	14	M36×2.0	20	1/4"	11.5

MAJ/MACJ

Φ16~Φ40



Φ50/Φ63

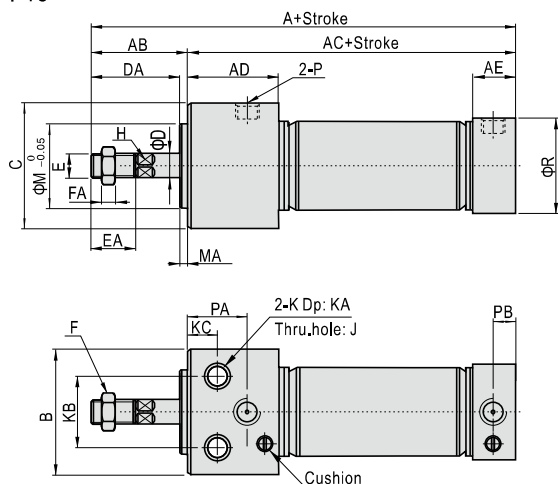


Bore size/Item	A	AB	AC	AD	B	D	DA	DB	E	EA	F	FA	H	M	MA	P	PA	G	GA	T	U
16	135	38	60	12.5	21	6	22	21	M6×1.0	16	10	5	5	M16×1.5	16	M5×0.8	7.5	22	6	M6×1.0	5
20	153	40	76	16	27	8	28	25	M8×1.25	20	12	6	6	M22×1.5	12	1/8"	8	29	7	M8×1.25	6
25	161	44	76	16	30	10	30	27	M10×1.25	22	17	6	8	M22×1.5	14	1/8"	8	29	7	M10×1.25	6
32	161	44	76	16	35	12	30	27	M10×1.25	22	17	6	10	M24×2.0	14	1/8"	8	32	8	M10×1.25	6
40	164	46	76	16.5	41.5	16	32	28	M12×1.25	24	17	7	14	M30×2.0	14	1/8"	9	41	8	M12×1.25	7
50	195	52	95	23	53	16	32	28	M14×1.5	24	19	8	14	M36×2.0	20	1/4"	11.5	46	11	M12×1.25	7
63	195	52	95	23	67	16	32	28	M14×1.5	24	19	8	14	M36×2.0	20	1/4"	11.5	46	11	M12×1.25	7

MA Series

MARU(Up mounting type)

Φ20~Φ40

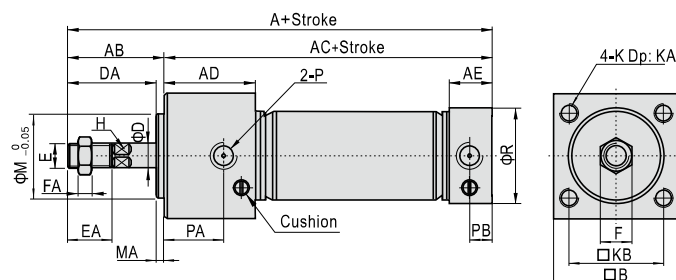


Bore size\Item	A	AB	AC	AD	AE	B	C	D	DA	E	EA	F	FA
20	120	31	89	29	16	33.5	30.5	8	28	M8×1.25	20	13	5
25	122	33	89	29	16	39	36.5	10	30	M10×1.25	22	17	6
32	122	33	89	29	16	47	42.5	12	30	M10×1.25	22	17	6
40	132.5	35	97.5	37.5	16.5	58.5	52.5	16	32	M14×1.5	24	19	8

Bore size\Item	H	J	K	KA	KB	KC	M	MA	P	PA	PB	R
20	6	Φ5.5	Φ9.5	6.5	21	12	20	3	1/8"	22	8	27
25	8	Φ6.5	Φ11.0	7.5	25	12	26	3	1/8"	22	8	30
32	10	Φ9.0	Φ14.0	10	30	12	26	3	1/8"	22	8	35
40	14	Φ11	Φ17.5	12.5	38	15	32	3	1/8"	27	9	41.5

MARF(Front mounting type)

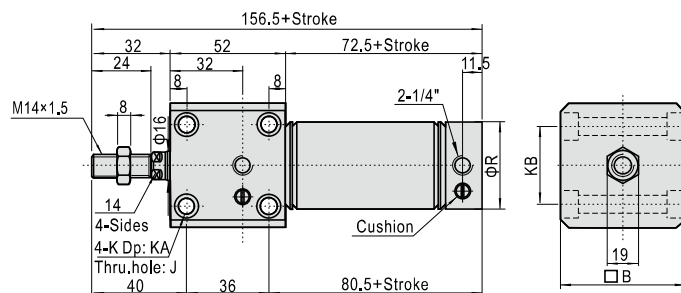
Φ20~Φ40



Bore size\Item	A	AB	AC	AD	AE	B	D	DA	E	EA
20	120	31	89	29	16	30.5	8	28	M8×1.25	20
25	122	33	89	29	16	36.5	10	30	M10×1.25	22
32	122	33	89	29	16	42.5	12	30	M10×1.25	22
40	132.5	35	97.5	37.5	16.5	52.5	16	32	M14×1.5	24

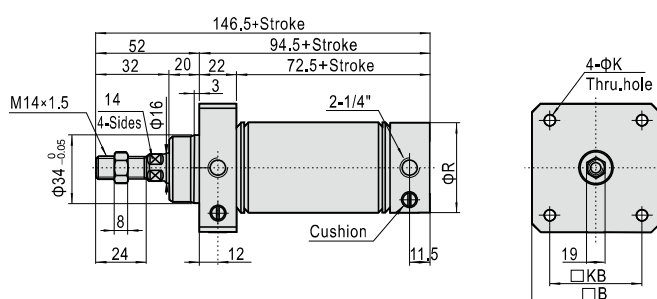
Bore size\Item	F	FA	H	K	KA	KB	M	MA	P	PA	PB	R
20	13	5	6	M5×0.8	9	22	20	3	1/8"	22	8	27
25	17	6	8	M6×1.0	11	26	26	3	1/8"	22	8	30
32	17	6	10	M6×1.0	11	30	26	3	1/8"	22	8	35
40	19	8	14	M8×1.25	14	36	32	3	1/8"	27	9	41.5

Φ50/Φ63



Bore size\Item	B	J	K	KA	KB	R
50	62	Φ6.5	2-Sides: Φ11.0	6.5	44	53
63	74	Φ9.0	2-Sides: Φ14.0	8.5	48	67

Φ50/Φ63



Bore size\Item	B	K	KB	R
50	62	6.5	48	53
63	74	9.0	58	67

List for ordering code of accessories

Accessories Bore size	Mounting accessories			Knuckle				Sensor switch		
	LB	FA	SDB	I	Y	F	U	CMSG	DMSG	EMSG
16	F-MA16LB	F-MA16FA	F-MA16SDB	F-MA16I	F-MA16Y	F-M6X100F	F-M6X100U	CMSG	DMSG	EMSG
20	F-MA20LB	F-MA20FA	F-MA20SDB	F-MA20I	F-MA20Y	F-M8X125F	F-M8X125U			
25										
32	F-MA32LB	F-MA32FA	F-MA32SDB	F-MA25I	F-MA25Y	F-M10X125F	F-M10X125U			
40	F-MA40LB	F-MA40FA	F-MA40SDB	F-MA40I	F-MA40Y	F-M12X125F	F-M12X125U			
50	F-MA50LB	F-MA50FA		F-MA40I	F-MA40Y	F-M12X125F	F-M12X125U			
63	F-MA63LB	F-MA50FA	F-MA40SDB	F-MAC50I	F-MAC50Y	F-M14X150F	F-M14X150U			

Accessory selection

Accessories Cylinder model	Mounting accessories			Knuckle[Note1]				Sensor switch		
	LB	FA	SDB	I	Y	U	F	CMSG	DMSG	EMSG
MA/MAC	•	•	•	•	•	•	•	•	•	•
MSA/MTA	•	•	•	•	•	•	•	•	•	•
MAD/MACD	•	•	x	•	•	•	•	•	•	•
MAJ/MACJ	•	•	x	•	•	•	•	•	•	•
MARF/MARU	x	x	x	•	•	•	•	•	•	•

Material of accessories

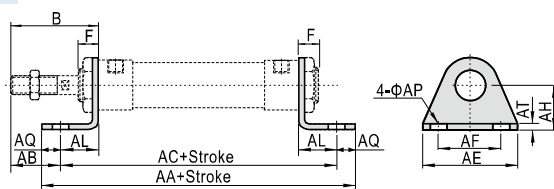
Accessories Bore size	Mounting accessories			Knuckle			
	LB	FA	SDB	I	Y	F	U
16-63	○	○	○	□	□	□	□

○—Lower carbon steel ; □—Carbon steel ;

[Note1] Please refer to P358~361 for knuckle detail.

Dimensions

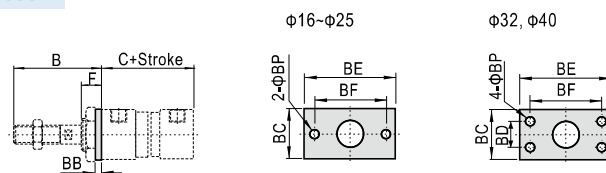
LB



Bore size\Item Stroke	AA	AA(MSA)			AC	AC(MSA)		
	(MA/MAC)	0~50	51~100	101~150	(MA/MAC)	0~50	51~100	101~150
16	98	123	148	-	86	111	136	-
20	122	147	172	197	106	131	156	181
25	122	147	172	197	106	131	156	181
32	142	167	192	217	126	151	176	201
40	142	167	192	217	126	151	176	201
50	175	-	-	-	151	-	-	-
63	183	-	-	-	157	-	-	-

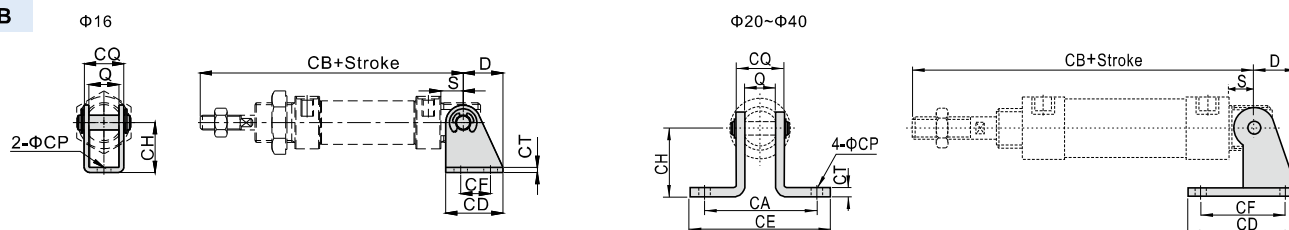
Bore size\Item	B	F	AB	AE	AF	AL	AQ	AP	AT	AH
16	38	16	25	44	32	13	6	5.5	2.5	20
20	40	12	25	54	40	15	8	6.5	3	25
25	44	14	29	54	40	15	8	6.5	3	25
32	44	14	19	59	45	25	8	7	3.5	32
40	46	14	21	64	50	25	8	7	3.5	36
50	52	20	24	86	66	28	12	11	4.5	40
63	52	20	21	106	82	31	13	11	4.5	45

FA



Bore size\Item Stroke	B	C	C(MSA)			BB	BC	BD	BE	BF	BP	F
	(MA/MAC)	0~50	51~100	101~150	3.5	3.8	-	64	50	7	12	
16	38	60	85	110	-	3	26	-	52	40	5.5	16
20	40	76	101	126	151	3.5	38	-	64	50	7	12
25	44	76	101	126	151	3.5	38	-	64	50	7	14
32	44	76	101	126	151	4	47	33	72	58	6.5	14
40	46	76	101	126	151	4	50	36	84	70	6.5	14
50	54	147				4.5	65	47	104	86	9	22
63	54	147				4.5	65	47	104	86	9	22

SDB

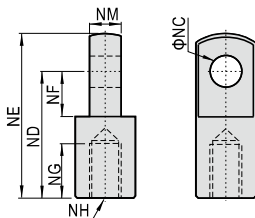


Bore size\Item Stroke	D	S	Q	CA	CB	CB(MSA)			CD	CE	CF	CH	CT	CP	CQ
	(MA)	0~50	51~100	101~150	23	-	12	20	2	5.5	16				
16	16	9	12	-	107	132	157	-	23	-	12	20	2	5.5	16
20	21	12	16	51	128	153	178	203	48	67	32	32	2.5	7	21
25	21	12	16	51	132	157	182	207	48	67	32	32	2.5	7	21
32	27	15	16	51	135	160	185	210	52	67	36	36	3	7	22
40	27	15	20	55	137	162	187	212	56	71	40	40	3	7	26

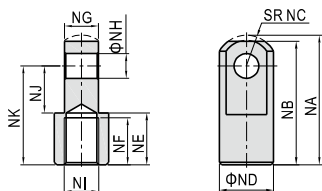
[Note] SDB is attached with relevant PIN.

MA Series—Accessories

I Knuckle

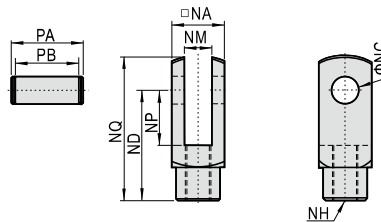


Type\Item	NC	ND	NE	NF	NG	NH	NM
F-MA16I	5	21	28	8.5	8	M6×1.0	6
F-MA20I	8	30	40	11	15	M8×1.25	8
F-MA25I	10	40	50	15	20	M10×1.25	10
F-MA40I	10	45	57	16	23	M12×1.25	14

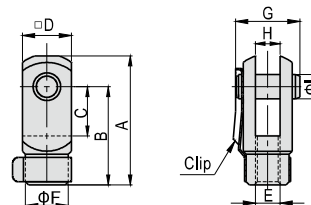


Type\Item	NA	NB	NC	ND	NE	NG	NH	NJ	NK	NI	
F-MAC50I	52.5	50	12.5	22	21	19	13.8	10	19	40	M14×1.5

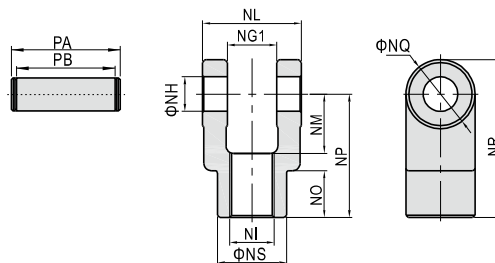
Y Knuckle



Type\Item	NA	NC	ND	NP	NQ	NM	NH	PA	PB
F-MA16Y	12	5	21	8.5	27.4	6	M6×1.0	16.8	12.4
F-MA40Y	25.4	10	45	20	57	14	M12×1.25	32	26.2



Type\Item	A	B	C	D	E	F	G	H	I
F-MA20Y	42	32	16	16	M8×1.25	14	21	8	8
F-MA25Y	52	40	20	19	M10×1.25	18	25	10	10



Type\Item	Ng1	NH	NI	NL	NM	NO	NP	NQ	NR	NS	PA	PB
F-MAC50Y	14.2	10	M14×1.5	27.8	19	17	40	22	51	22	34.6	28.8



Mini cylinder(Aluminum barrel)——MBL Series

Compendium of MBL Series

Multi-mounting accessories

LB Type FA Type

SDB Type

Rolling packed structure

Front and back cover and stainless steel block adopt riveted rolling packed structure to form a reliable connection.

Six bore size are available

Bore size: 20, 25, 32, 40, 50, 63

Two kinds of back cover type

U: Flat-end type CA: Pivot type

Multi-type cylinder

MBL: Mini cylinder(Double acting)

MBLC: Mini cylinder(Double acting with cushion)

MSBL: Mini cylinder(Single acting_push)

MTBL: Mini cylinder(Single acting_pull)

MBLD: Mini cylinder(Double rod)

MBLCD: Mini cylinder(Double rod with cushion)

MBLJ: Mini cylinder(Adjustable stroke)

MBLCJ: Mini cylinder(Adjustable stroke with cushion)

Multi-kinds of stroke

Two kinds of cushion type

Variable cushion or Bumper

Criteria for selection: Cylinder thrust

Unit : Newton(N)

Bore size	Rod size	Acting type	Pressure area(mm ²)	Operating pressure(MPa)							
				0.1	0.2	0.3	0.4	0.5	0.6	0.7	
20	8	Single acting	Push side	314.0	-	15.7	47.1	78.5	109.9	141.3	172.7
			Pull side	263.8	-	5.7	32.0	58.4	84.8	111.2	137.5
		Double acting	Push side	314.0	31.4	62.8	94.2	125.6	157.0	188.4	219.8
			Pull side	263.8	26.4	52.8	79.1	105.5	131.9	158.3	184.7
25	10	Single acting	Push side	490.6	-	24.6	73.7	122.8	171.8	220.9	269.9
			Pull side	412.1	-	8.9	50.1	91.4	132.6	173.8	215.0
		Double acting	Push side	490.6	49.1	98.1	147.2	196.2	245.3	294.4	343.4
			Pull side	412.1	41.2	82.4	123.6	164.8	206.1	247.3	288.5
32	12	Single acting	Push side	804.3	-	40.2	120.6	200.9	281.3	361.7	442.1
			Pull side	691.2	-	17.6	86.6	155.7	224.8	293.9	363.0
		Double acting	Push side	804.3	80.4	160.9	241.3	321.7	402.2	482.6	563.0
			Pull side	691.2	69.1	138.2	207.4	276.5	345.6	414.7	483.8
40	16	Single acting	Push side	1256.6	-	62.8	188.4	314.0	439.6	565.2	690.8
			Pull side	1055.6	-	22.6	128.1	233.6	339.1	444.6	550.1
		Double acting	Push side	1256.6	125.7	251.3	377.0	502.6	628.3	754.0	879.6
			Pull side	1055.6	105.6	211.1	316.7	422.2	527.8	633.4	738.9
50	16	Double acting	Push side	1962.5	196.3	392.5	588.8	785.0	981.3	1177.5	1373.8
			Pull side	1761.5	176.2	352.3	528.5	704.6	880.8	1056.9	1233.1
		Double acting	Push side	3115.7	311.6	623.1	934.7	1246.3	1557.9	1869.4	2181.0
			Pull side	2914.7	291.5	582.9	874.4	1165.9	1457.4	1748.8	2040.3

Installation and application



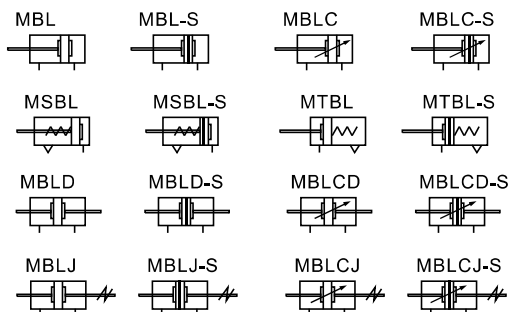
- When load changes in the work, the cylinder with abundant output capacity shall be selected.
- Relative cylinder with high temperature resistance or corrosion resistance shall be chosen under the condition of high temperature or corrosion.
- Necessary protection measure shall be taken in the environment with higher humidity, much dust or water drops, oil dust and welding dregs.
- Dirty substances in the pipe must be eliminated before cylinder is connected with pipeline to prevent the entrance of particles into the cylinder.
- The medium used by cylinder shall be filtered to 40μm or below.
- Anti-freezing measure shall be adopted under low temperature environment to prevent moisture freezing.
- To avoid side load, otherwise, piston rod will be bent and deformed and damage the thread at the end of the rod. Single-acting type can not be added in return;
- If the cylinder is dismantled and stored for a long time, please to conduct anti-rust treatment to the surface. Anti-dust caps shall be added in air inlet and outlet ports. The front and back cover can not be dismantled, which shall be especially noticed.



MBL Series



Symbol



Product feature

1. Manufactured by our enterprise.
2. Riveted structure is adopted to connect front and bak cover and cylinder tube to make it credibility.
3. Piston adopts heterogeneous two-way seal structure. It has compact size and has the function of grease reservation.
4. There are several modes of back cover, which makes the installation of cylinder more convenient.
5. There are cylinders and mounting accessories with several specifications for your choice.

Specification

Bore size(mm)		20	25	32	40	50	63	
Acting type	MSBL/MTBL	Single acting					-	
	MBL/MBLD/MBLJ	Double acting					-	
	MBLC/MBLCD/MBLCJ	Double acting with cushion					-	
Fluid		Air(to be filtered by 40µm filter element)						
Operating pressure	Double acting	0.15~1.0MPa(22~145psi)(1.5~10.0bar)					-	
	Single acting	0.2~1.0MPa(28~145psi)(2.0~10.0bar)				-		
Proof pressure		1.5MPa(215psi)(15bar)						
Temperature °C		-20~70						
Speed range mm/s		Double acting : 30~800				Single acting : 50~800		
Stroke tolerance		0~150 ^{+1.0} ₀					>150 ^{+1.5} ₀	
Cushion type		MBLC, MBLCD, MBLCJ: Adjustable cushion; Others: Bumper						
Port size [Note1]		1/8"				1/4"		

[Note1] PT thread, G thread thread and NPT thread are available.
Add) Refer to P362 for detail of sensor switch.

Stroke

Bore size (mm)		Standard stroke (mm)																Max.std stroke	Max. stroke						
		10	15	20	25	30	40	50	60	75	80	100	125	150	160	175	200			250	300	350	400	450	500
MBL	20/25	10	15	20	25	30	40	50	60	75	80	100	125	150	160	175	200	250	300	350	400	450	500	500	800
	32/40	10	15	20	25	30	40	50	60	75	80	100	125	150	160	175	200	250	300	350	400	450	500	500	800
MBLC	50/63	10	15	20	25	30	40	50	60	75	80	100	125	150	160	175	200	250	300	350	400	450	500	500	800
	50/63	10	15	20	25	30	40	50	60	75	80	100	125	150	160	175	200	250	300	350	400	450	500	500	800
MBLD	20/25	10	15	20	25	30	40	50	60	75	80	100	125	150	160	175	200	250	300	350	400	450	500	300	-
	32/40	10	15	20	25	30	40	50	60	75	80	100	125	150	160	175	200	250	300	350	400	450	500	500	-
MBLJ	50/63	10	15	20	25	30	40	50	60	75	80	100	125	150	160	175	200	250	300	350	400	450	500	500	-
	50/63	10	15	20	25	30	40	50	60	75	80	100	125	150	160	175	200	250	300	350	400	450	500	500	-
MSBL	20/25	10	15	20	25	30	40	50	60	75	80	100	125	150									-	-	
	32/40	10	15	20	25	30	40	50	60	75	80	100	125	150									-	-	
MTBL	20/25	10	15	20	25	30	40	50	60	75	80	100											-	-	
	32/40	10	15	20	25	30	40	50	60	75	80	100											-	-	

[Note] Consult us for non-standard stroke.

Ordering code

MBL 20×50 S CA □ □

MBLD 20×50 S □ □

MBLJ 20×50-20 S □ □

① ② ③ ④ ⑤ ⑥ ⑦ ⑧

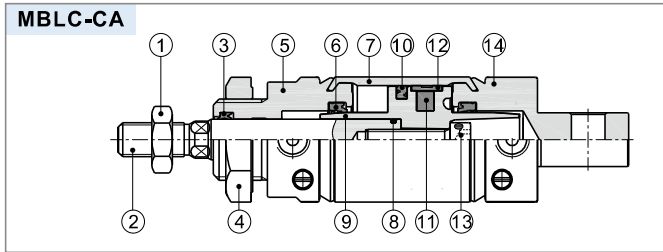
① Model	② Bore size	③ Stroke	④ Adjustable Stroke	⑤ Magnet	⑥ Back cover	⑦ Mounting type [Note1]	⑧ Thread type
MBL: Mini cylinder(Double acting)	20 25 32	Refer to stroke table for details	No this code	Blank: Without magnet S: With magnet	CA: Pivot type U: Flat-end type	Blank: No accessories FA: FA type SDB: SDB type LB: LB type	Blank: PT G: G T: NPT
MBLC: Mini cylinder(Double acting with cushion)	40 50 63						
MSBL: Mini cylinder(Single acting_push)	20 25 32 40						
MTBL: Mini cylinder(Single acting_pull)	20 25 32 40						
MBLD: Mini cylinder(Double rod)	20 25 32						
MBLCD: Mini cylinder(Double rod with cushion)	40 50 63						
MBLJ: Mini cylinder(Adjustable stroke)	40 50 63						
MBLCJ: Mini cylinder(Adjustable stroke with cushion)	40 50 63	10 20 30 40 50 75 100		No this code		Blank: No accessories FA: FA type LB: LB type	

[Note1] Please refer to page 98~99 for accessory parts.

Mini cylinder(Aluminum barrel)

MBL Series

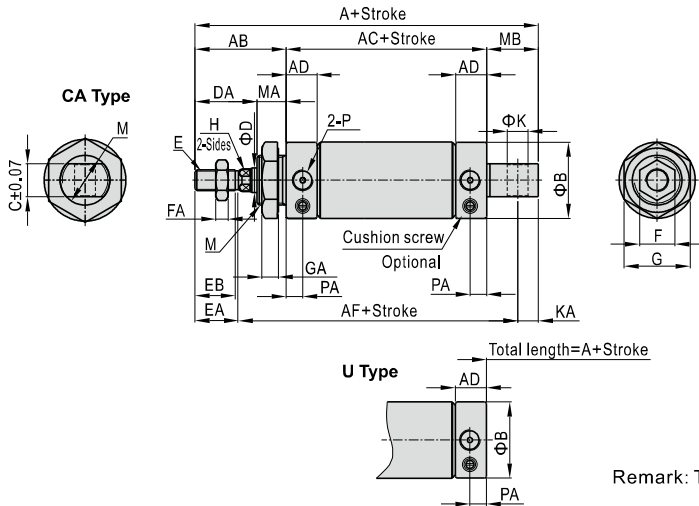
Inner structure and material of major parts



NO.	Item	Material
1	Rod nut	Carbon steel
2	Piston rod	Carbon steel with 20μm chrome plated
3	Front cover packing	NBR
4	Front cover nut	Carbon steel
5	Front cover	Aluminum alloy
6	Bumper	TPU
7	Barrel	Aluminum alloy
8	O-ring	NBR
9	Piston	Aluminum alloy
10	Piston seal	NBR
11	Magnet	Plastic
12	Wear ring	Wear resistant material
13	Bolt	Carbon steel
14	Back cover	Aluminum alloy

Dimensions

MBL/MBLC

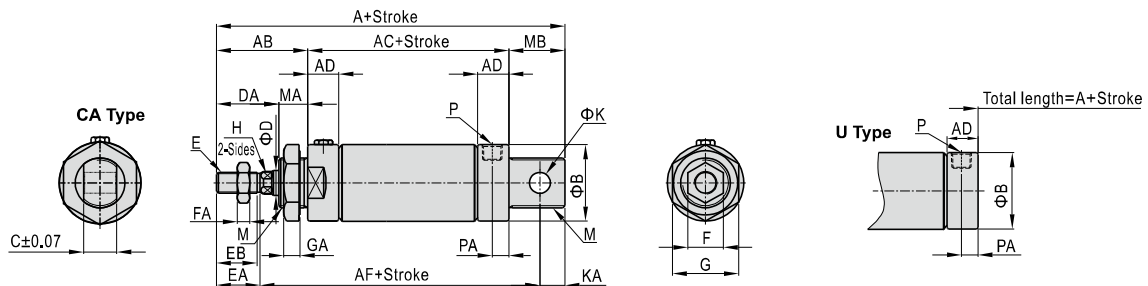


Bore size\Item	A		AB	AC	AD	AF	B	C	D	DA	M	MA	MB
	CA	U											
20	131	110	40	70	15.5	102	27	16	8	26	M22×1.5	14	21
25	135	114	44	70	15.5	105	30	16	10	30	M22×1.5	14	21
32	141	114	44	70	15.5	108	37	16	12	28	M24×2.0	16	27
40	165	138	46	92	22	130.5	45	20	16	30	M30×2.0	16	27
50	173	146	54	92	22	138	55	20	16	32	M36×2.0	22	27
63	173	146	54	92	22	138	68	20	16	32	M36×2.0	22	27

Bore size\Item	E	EA	EB	F	FA	G	GA	H	P	K	KA	PA
25	M10×1.25	21	19.5	17	6	29	7	8	1/8"	8	9	7.5
32	M10×1.25	21	19.5	17	6	32	8	10	1/8"	10	12	7.5
40	M12×1.25	22.5	21	17	7	41	8	14	1/4"	12	12	11
50	M14×1.5	24	22.5	19	8	46	11	14	1/4"	12	11	11
63	M14×1.5	24	22.5	19	8	46	11	14	1/4"	12	11	11

Remark: The dimensions of magnet type cylinder are the same as non-magnet type cylinder.

MSBL



Item	A						AB	AC			AD	AF			B	C
	CA			U				≤50	51~100	≥101		≤50	51~100	≥101		
Bore size\Stroke	≤50	51~100	≥101	≤50	51~100	≥101	≤50				51~100				≥101	≤50
20	156	181	206	135	160	185	40	95	120	145	15.5	127	152	177	27	16
25	160	185	210	139	164	189	44	95	120	145	15.5	130	155	180	30	16
32	166	191	216	139	164	189	44	95	120	145	15.5	133	158	183	37	16
40	190	215	240	163	188	213	46	117	142	167	22	155.5	180.5	205.5	45	20

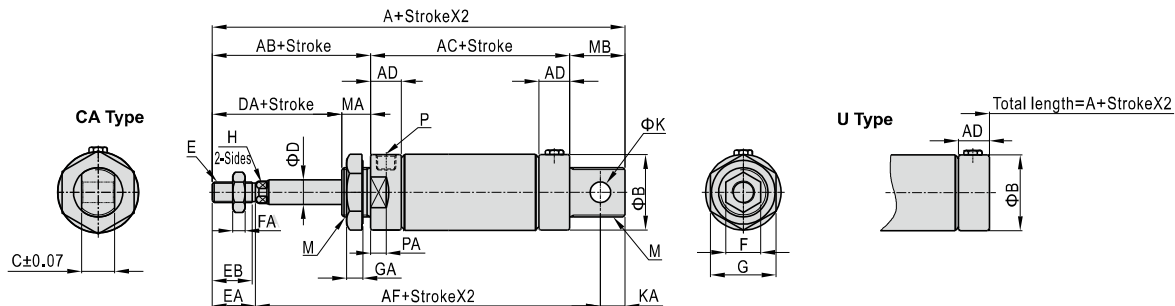
Bore size\Item	D	DA	E	EA	EB	F	FA	G	GA	H	K	KA	M	MA	MB	P	PA
25	10	30	M10×1.25	21	19.5	17	6	29	7	8	8	9	M22×1.5	14	21	1/8"	7.5
32	12	28	M10×1.25	21	19.5	17	6	32	8	10	10	12	M24×2.0	16	27	1/8"	7.5
40	16	30	M12×1.25	22.5	21	17	7	41	8	14	12	12	M30×2.0	16	27	1/4"	11

Remark: The dimensions of magnet type cylinder are the same as non-magnet type cylinder.

Mini cylinder(Aluminum barrel)

MBL Series

MTBL

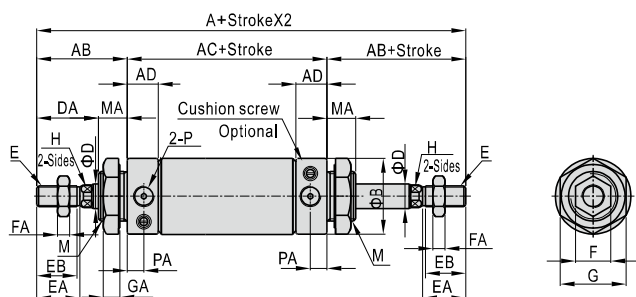


Item	A				AB	AC		AD	AF		B	C	D	DA
	CA		U			≤50	51~100		≤50	51~100				
Bore size\Stroke	≤50	51~100	≤50	51~100		≤50	51~100		≤50	51~100				
20	156	181	135	160	40	95	120	15.5	127	152	27	16	8	26
25	160	185	139	164	44	95	120	15.5	130	155	30	16	10	30
32	166	191	139	164	44	95	120	15.5	133	158	37	16	12	28
40	190	215	163	188	46	117	142	22	155.5	180.5	45	20	16	30

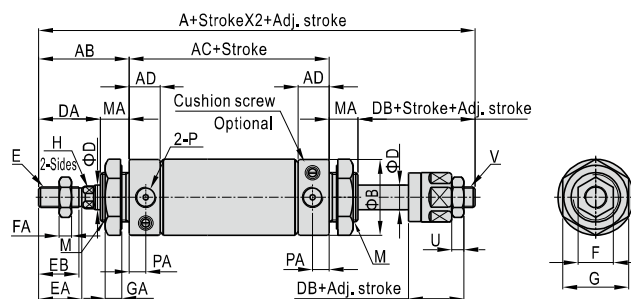
Bore size\Item	E	EA	EB	F	FA	G	GA	H	K	KA	M	MA	MB	P	PA
20	M8×1.25	20	18.5	12	6	29	7	6	8	9	M22×1.5	14	21	1/8"	7.5
25	M10×1.25	21	19.5	17	6	29	7	8	8	9	M22×1.5	14	21	1/8"	7.5
32	M10×1.25	21	19.5	17	6	32	8	10	10	12	M24×2.0	16	27	1/8"	7.5
40	M12×1.25	22.5	21	17	7	41	8	14	12	12	M30×2.0	16	27	1/4"	11

Remark: The dimensions of magnet type cylinder are the same as non-magnet type cylinder.

MBLD/MBLCD



MBLJ/MBLCJ



Bore size\Item	A				AB	AC	AD	B	D	DA	DB	E
	Model	MBLD	MBLCD	MBLJ								
20		150		149	40	70	15.5	27	8	26	25	M8×1.25
25		158		155	44	70	15.5	30	10	30	27	M10×1.25
32		158		157	44	70	15.5	37	12	28	27	M10×1.25
40		184		182	46	92	22	45	16	30	28	M12×1.25
50		200		196	54	92	22	55	16	32	28	M14×1.5
63		200		196	54	92	22	68	16	32	28	M14×1.5

Bore size\Item	EA	EB	F	FA	G	GA	H	M	MA	P	PA	U	V
20	20	18.5	12	6	29	7	6	M22×1.5	14	1/8"	7.5	6	M8×1.25
25	21	19.5	17	6	29	7	8	M22×1.5	14	1/8"	7.5	6	M10×1.25
32	21	19.5	17	6	32	8	10	M24×2.0	16	1/8"	7.5	6	M10×1.25
40	22.5	21	17	7	41	8	14	M30×2.0	16	1/4"	11	7	M12×1.25
50	24	22.5	19	8	46	11	14	M36×2.0	22	1/4"	11	7	M12×1.25
63	24	22.5	19	8	46	11	14	M36×2.0	22	1/4"	11	7	M12×1.25

Remark: The dimensions of magnet type cylinder are the same as non-magnet type cylinder.

MBL Series—Accessories

List for ordering code of accessories

Accessories Bore size	Mounting accessories			Knuckle				Sensor switch			
	LB	FA	SDB	I	Y	F	U	CMSG	DMSG	EMSG	
20	F-MA20LB	F-MA20FA	F-MA20SDB	F-MA20I	F-MA20Y	F-M8X125F	F-M8X125U	CMSG	DMSG	EMSG	
25				F-MA25I	F-MA25Y	F-M10X125F	F-M10X125U				
32	F-MA32LB	F-MA32FA	F-MA32SDB	F-MA40SDB	F-MA40I	F-MA40Y	F-M12X125F				F-M12X125U
40	F-MA40LB	F-MA40FA	F-MA40SDB		F-MA40I	F-MA40Y	F-M12X125F				F-M12X125U
50	F-MA50LB	F-MA50FA			F-MA40SDB	F-MAC50I	F-MAC50Y				F-M14X150F
63	F-MA63LB		F-MA50FA	F-MA40SDB	F-MAC50I	F-MAC50Y	F-M14X150F	F-M14X150U			

Accessory selection

Accessories Cylinder model	Mounting accessories	Knuckle[Note1]				Sensor switch					
		LB	FA	SDB	I	Y	U	F	CMSG	DMSG	EMSG
MBL MBLC	Standard	●	●	●	●	●	●	●	×	×	×
	With magnet	●	●	●	●	●	●	●	●	●	●
MSBL MTBL	Standard	●	●	●	●	●	●	●	×	×	×
	With magnet	●	●	●	●	●	●	●	●	●	●
MBLD MBLCD	Standard	●	●	×	●	●	●	●	×	×	×
	With magnet	●	●	×	●	●	●	●	●	●	●
MBLJ MBLCJ	Standard	●	●	×	●	●	●	●	×	×	×
	With magnet	●	●	×	●	●	●	●	●	●	●

Material of accessories

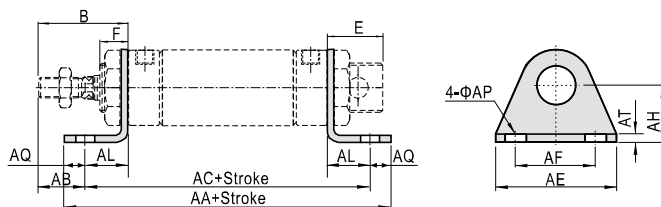
Accessories Bore size	Mounting accessories			Knuckle			
	LB	FA	SDB	I	Y	F	U
20~63	○	○	○	□	□	□	□

○—Lower carbon steel ; □—Carbon steel ;

[Note 1] Please refer to P358~361 for knuckle detail.

Dimensions

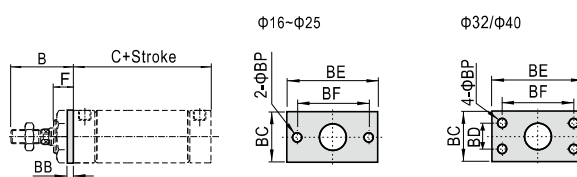
LB



Bore size\Item Stroke	AA	AA(MSBL)		AC	AC(MSBL)			
	(MBL)	0~50	51~100	101~150	(MBL)	0~50	51~100	101~150
20	116	141	166	191	100	125	150	175
25	116	141	166	191	100	125	150	175
32	136	161	186	211	120	145	170	195
40	158	183	208	233	142	167	192	217
50	172	-	-	-	148	-	-	-
63	180	-	-	-	154	-	-	-

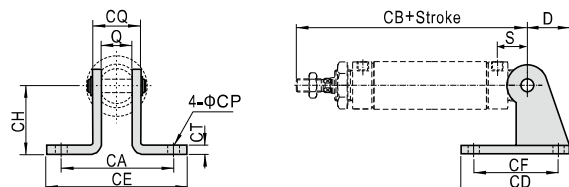
Bore size\Item	B	E	F	AB	AE	AF	AL	AQ	AP	AT	AH
20	40	21	14	25	54	40	15	8	6.5	3	25
25	44	21	14	29	54	40	15	8	6.5	3	25
32	44	27	16	19	59	45	25	8	7	3.5	32
40	46	27	16	21	64	50	25	8	7	3.5	36
50	54	27	22	26	86	66	28	12	11	4.5	40
63	54	27	22	23	106	82	31	13	11	4.5	45

FA



Bore size\Item Stroke	B	C	C(MSBL)			BB	BC	BD	BE	BF	BP	F
	(MBL)	0~50	51~100	101~150								
20	40	70	95	120	145	3.5	38	-	64	50	7	14
25	44	70	95	120	145	3.5	38	-	64	50	7	14
32	44	70	95	120	145	4	47	33	72	58	6.5	16
40	46	92	117	142	167	4	50	36	84	70	6.5	16
50	54	92	-	-	-	4.5	65	47	104	86	9	22
63	54	92	-	-	-	4.5	65	47	104	86	9	22

SDB

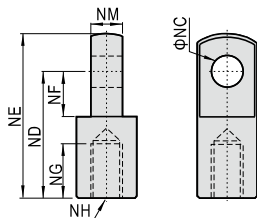


Bore size\Item Stroke	D	S	Q	CA	CB	CB(MSBL)			CD	CE	CF	CH	CT	CP	CQ
	(MBL)	0~50	51~100	101~150											
20	21	12	16	51	122	147	172	197	48	67	32	32	2.5	7	22
25	21	12	16	51	126	151	176	201	48	67	32	32	2.5	7	22
32	27	15	16	51	129	154	179	204	52	67	36	36	3	7	24
40	27	15	20	55	153	178	203	228	56	71	40	40	3	7	28

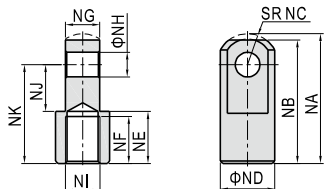
[Note] SDB is attached with relevant PIN.

MBL Series—Accessories

I Knuckle

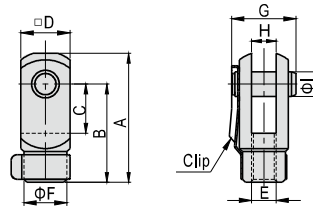


Type\Item	NC	ND	NE	NF	NH	NG	NM
F-MA20I	8	30	40	11	M8×1.25	15	8
F-MA25I	10	40	50	15	M10×1.25	20	10
F-MA40I	10	45	57	16	M12×1.25	23	14

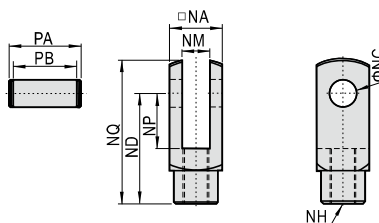


Type\Item	NA	NB	NC	ND	NE	NF	NG	NH	NJ	NK	NI
F-MAC50I	52.5	50	12.5	22	21	19	13.8	10	19	40	M14×1.5

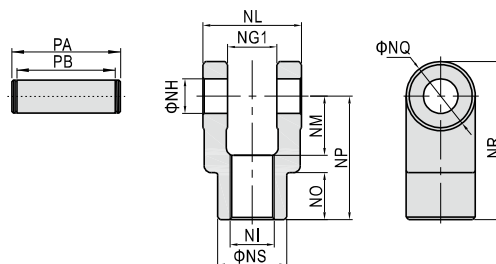
Y Knuckle



Type\Item	A	B	C	D	E	F	G	H	I
F-MA20Y	42	32	16	16	M8×1.25	14	21	8	8
F-MA25Y	52	40	20	19	M10×1.25	18	25	10	10



Type\Item	NA	NC	ND	NP	NQ	NM	NH	PA	PB
F-MA40Y	25.4	10	45	20	57	14	M12×1.25	32	26.2



Type\Item	Ng1	NH	NI	NL	NM	NO	NP	NQ	NR	NS	PA	PB
F-MAC50Y	14.2	10	M14×1.5	27.8	19	17	40	22	51	22	34.6	28.8



Compact cylinder—ACE Series

In accordance with ISO21287 standard

Compendium of ACE Series

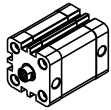
In accordance with ISO21287 standard

In accordance with ISO21287 standard, the mounting size is vogue.

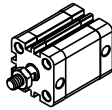
Magnetic switch slots around the cylinder body

There are magnetic switch slots around the cylinder body convenient to install inducting switch.

Two kinds of rod type

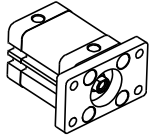


Female thread

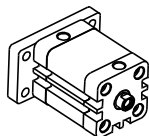


Male thread

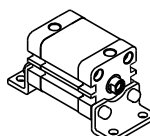
Multi-mounting accessories



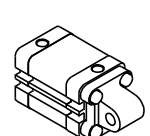
FA Type



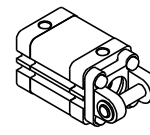
FB Type



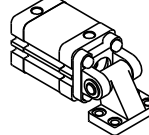
LB Type



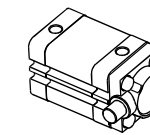
CA Type



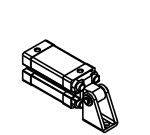
CB Type



CR Type



FTC Type



SDB Type

Multi-type cylinder

ACE: Compact cylinder (Double acting)



ASE: Compact cylinder (Single acting-push)



ATE: Compact cylinder (Single acting-pull)



ACED: Compact cylinder (Double rod)



ACEJ: Compact cylinder (Adjustable stroke)



TACE: Compact cylinder (Double acting non-rotating with yoke)



TACED: Compact cylinder (Double rod non-rotating with yoke)



Compact structure

Compact structure can effectively save fifty percent installation space with ISO15552 standard cylinder.

Eleven bore size are available

Bore size: 12, 16, 20, 25, 32, 40, 50, 63, 80, 100, 125

Criteria for selection: Cylinder thrust

Unit : Newton(N)

Bore size	Rod size	Acting type	Pressure area(mm ²)	Operating pressure(MPa)							Bore size	Rod size	Acting type	Pressure area(mm ²)	Operating pressure(MPa)								
				0.1	0.2	0.3	0.4	0.5	0.6	0.7					0.1	0.2	0.3	0.4	0.5	0.6	0.7		
12	6	Single acting	Push side	113.1	-	6.1	17.4	28.7	40.0	51.4	62.7	40	12	Single acting	Push side	1256.6	54.2	179.8	305.5	431.2	556.8	682.5	808.1
			Pull side	84.8	-	0.5	8.9	17.4	25.9	34.4	42.9				1143.5	42.9	157.2	271.6	385.9	500.3	614.6	729.0	
		Double acting	Push side	113.1	11.3	22.6	33.9	45.2	56.5	67.9	79.2			1256.6	125.7	251.3	377.0	502.7	628.3	754.0	879.6		
			Pull side	84.8	8.5	17.0	25.4	33.9	42.4	50.9	59.4			1143.5	114.4	228.7	343.1	457.4	571.8	686.1	800.5		
16	8	Single acting	Push side	201.1	-	18.1	38.2	58.3	78.4	98.5	118.6	50	16	Single acting	Push side	1963.5	90.1	286.5	482.8	679.2	875.5	1071.9	1268.2
			Pull side	150.8	-	8.1	23.1	38.2	53.3	68.4	83.5				1762.4	70.0	246.3	422.5	598.8	775.0	951.3	1127.5	
		Double acting	Push side	201.1	20.1	40.2	60.3	80.4	100.5	120.6	140.7			1963.5	196.3	392.7	589.0	785.4	981.7	1178.1	1374.4		
			Pull side	150.8	15.1	30.2	45.2	60.3	75.4	90.5	105.6			1762.4	176.2	352.5	528.7	705.0	881.2	1057.5	1233.7		
20	10	Single acting	Push side	314.2	-	33.1	64.5	96.0	127.4	158.8	190.2	63	16	Single acting	Push side	3117.2	173.6	485.3	797.1	1108.8	1420.5	1732.2	2044.0
			Pull side	235.6	-	17.4	41.0	64.5	88.1	111.7	135.2				2916.2	153.5	411.1	736.8	1028.4	1320.0	1611.6	1903.2	
		Double acting	Push side	314.2	31.4	62.8	94.2	125.7	157.1	188.5	219.9			3117.2	311.7	623.4	935.2	1246.9	1558.6	1870.3	2182.1		
			Pull side	235.6	23.6	47.1	70.7	94.2	117.8	141.4	164.9			2916.2	291.6	583.2	874.9	1166.5	1458.1	1749.7	2041.3		
25	10	Single acting	Push side	490.9	13.8	62.9	112.0	161.0	210.1	259.2	308.3	80	20	Single acting	Push side	5026.5	305.6	808.2	1310.9	1813.5	2316.2	2818.8	3321.5
			Pull side	412.3	5.9	47.2	88.4	129.6	170.9	212.1	253.3				4712.4	274.1	745.4	1216.6	1687.9	2159.1	2630.3	3101.6	
		Double acting	Push side	490.9	49.1	98.2	147.3	196.3	245.4	294.5	343.6			5026.5	502.7	1005.3	1508.0	2010.6	2513.3	3015.9	3518.6		
			Pull side	412.3	41.2	82.5	123.7	164.9	206.2	247.4	288.6			4712.4	471.2	942.5	1413.7	1885.0	2356.2	2827.4	3298.7		
32	12	Single acting	Push side	804.2	30.8	111.2	191.7	272.1	352.5	432.9	513.4	100	20	Single acting	Push side	7854.0	499.1	1284.5	2069.9	2855.3	3640.7	4426.1	5211.5
			Pull side	691.2	19.5	88.6	157.7	226.9	296.0	365.1	434.2				7539.8	467.7	1221.7	1975.7	2729.6	3483.6	4237.6	4991.6	
		Double acting	Push side	804.2	80.4	160.8	241.3	321.7	402.1	482.5	563.0			7854.0	785.4	1570.8	2356.2	3141.6	3927.0	4712.4	5497.8		
			Pull side	691.2	69.1	138.2	207.3	276.5	345.6	414.7	483.8			7539.8	754.0	1508.0	2262.0	3015.9	3769.9	4523.9	5277.9		
Double acting	Push side	1227.1	122.7	245.4	368.1	490.8	613.5	736.3	859.3	12271.8	1227.2	2454.4	3681.5	4908.7	6135.9	7363.1	8590.3						
	Pull side	1178.0	117.8	235.6	353.4	471.2	589.5	708.6	824.6	11780.9	1178.1	2356.2	3534.3	4712.4	5890.5	7086.5	8246.6						

Installation and application



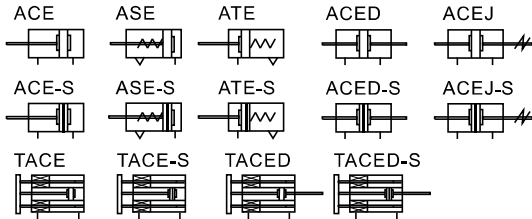
- When load changes in the work, the cylinder with abundant output capacity shall be selected.
- Relative cylinder with high temperature resistance or corrosion resistance shall be chosen under the condition of high temperature or corrosion.
- Necessary protection measure shall be taken in the environment with higher humidity, much dust or water drops, oil dust and welding dregs.
- Dirty substances in the pipe must be eliminated before cylinder is connected with pipeline to prevent the entrance of particles into the cylinder.
- The medium used by cylinder shall be filtered to 40µm or below.
- As both of the front cover and piston of the cylinder are short, typically too large stroke can not be selected.
- Anti-freezing measure shall be adopted under low temperature environment to prevent moisture freezing.
- The cylinder shall avoid the influence of side load in operation to maintain the normal work of cylinder and extend the service life.
- If the cylinder is dismantled and stored for a long time, please conduct anti-rust treatment to the surface. Anti-dust caps shall be added in air inlet and outlet ports. The front and back cover can not be dismantled, which shall be especially noticed.



ACE Series



Symbol



Product feature

- In accordance with ISO21287 standard, the mounting size is vogue.
- The cylinder body connects with the threads of the front and back cover, forming high strength and convenient maintenance.
- The internal diameter of the body is treated with rolling followed by the treatment of hard anodizing, forming an excellent abrasion resistance and durability.
- The seal of piston adopts heterogeneous two-way seal structure. It has compact dimension and the function of oil reservation.
- Compact structure can effectively save fifty percent installation space with ISO15552 standard cylinder.
- There are magnetic switch slots around the cylinder body, which is convenient to install inducting switch.
- Bumper is available and it can availably absorb excrement energy.
- Installing accessories with various specifications are optional.

Ordering code

ACE 20 × 30 S B □ □
ACED 20 × 30 S B □ □
ACEJ 20 × 30 -30 S B □ □

① ② ③ ④ ⑤ ⑥ ⑦ ⑧

① Model	② Bore size	③ Stroke	④ Adjustable Stroke	⑤ Magnet	⑥ Rod type	⑦ Mounting type [Note1]	⑧ Thread type [Note2]
ACE: Compact cylinder (Double acting)	12 16 20 25 32 40 50 63 80 100 125	Refer to stroke table for details	No this code	Blank: Without magnet S: With magnet	Blank: Female thread B: Male thread	Blank: No accessories FA: FA type FB: FB type CA: CA type CB: CB type	Blank: PT G: G
ASE: Compact cylinder (Single acting-push)	12 16 20 25 32 40 50 63 80 100						
ATE: Compact cylinder (Single acting-pull)							
TACE: Compact cylinder (Double acting non-rotating with yoke)							
TACED: Compact cylinder (Double rod non-rotating with yoke)							
ACED: Compact cylinder (Double rod)	12 16 20 25 32 40 50 63 80 100 125						
ACEJ: Compact cylinder (Adjustable stroke)							

[Note1] Please refer to page 105~107 for accessory parts; CR must be used with CB, SDB must be used with CA, FTC must be used with TCM2.

[Note2] Standard thread is blank here.

Specification

Bore size (mm)	12	16	20	25	32	40	50	63	80	100	125
Acting type	Double acting										
	Single acting_Push type、Single acting_Pull type										
Fluid	Air (to be filtered by 40μm filter element)										
Operating pressure	Double acting 0.15~1.0MPa(22~145psi)										
	Single acting 0.2~1.0MPa(28~145psi)										
Proof pressure	1.5MPa(215psi)										
Temperature °C	-20~70										
Speed range mm/s	Double acting : 30~500 Single acting : 50~500										
Stroke tolerance	Stroke ≤ 100 ^{+1.0} Stroke > 100 ^{+1.5}										
Cushion type	Bumper										
Port size [Note1]	M5×0.8						1/8"			1/4"	

[Note1] PT thread, G thread are available.

Add) Refer to P362 for detail of sensor switch.

Stroke

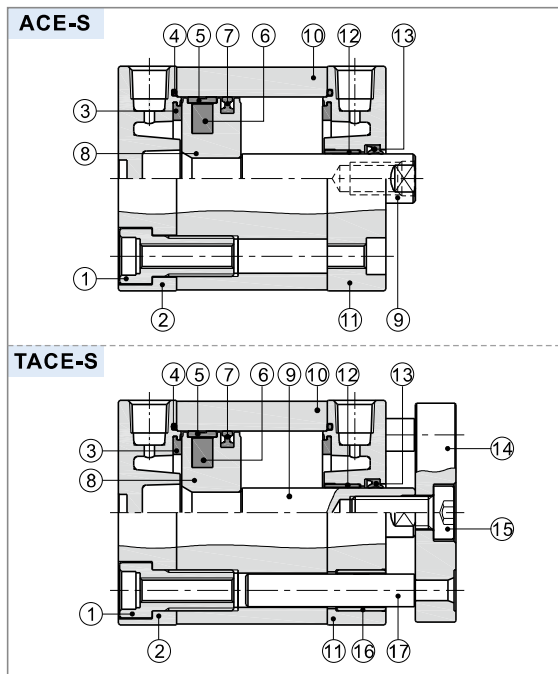
Bore size (mm)	Standard stroke (mm)											Max.stroke																					
Common type	Double acting	12	5	10	15	20	25	30	35	40	45	50	50																				
		16	5	10	15	20	25	30	35	40	45	50	55	60	70	75	75																
		20	5	10	15	20	25	30	35	40	45	50	55	60	70	75	80	90	100	100													
	25	5	10	15	20	25	30	35	40	45	50	55	60	70	75	80	90	100	110	120	125	150	150										
	32 40	5	10	15	20	25	30	35	40	45	50	55	60	70	75	80	90	100	110	120	125	150	160	175	200	200							
	50 63	5	10	15	20	25	30	35	40	45	50	55	60	70	75	80	90	100	110	120	125	150	160	175	200	225	250	250					
Non-rotating with yoke	Double acting	80 100 125	5	10	15	20	25	30	35	40	45	50	55	60	70	75	80	90	100	110	120	125	150	160	175	200	225	250	275	300	300		
		12	5	10	16~100	5	10	15	20	25	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10
		16	5	10	15	20	25	30	35	40	45	50	55	60	70	75	80	90	100	110	120	125	150	160	175	200	225	250	275	300	300		
	20	5	10	15	20	25	30	35	40	45	50	55	60	70	75	80	90	100	110	120	125	150	160	175	200	225	250	275	300	300			
	32 40	5	10	15	20	25	30	35	40	45	50	55	60	70	75	80	90	100	110	120	125	150	160	175	200	225	250	275	300	300			
	50 63	5	10	15	20	25	30	35	40	45	50	55	60	70	75	80	90	100	110	120	125	150	160	175	200	225	250	275	300	300			
80 100	5	10	15	20	25	30	35	40	45	50	55	60	70	75	80	90	100	110	120	125	150	160	175	200	225	250	275	300	300				

Note) 1. Please contact the company for other special strokes.

2. The dimensions of non-std stroke cylinder has the same dimensions as the next longer stroke std. stroke cylinder, e.g. 23mm stroke cylinder has the same dimensions of 25 std. stroke cylinder.

ACE Series

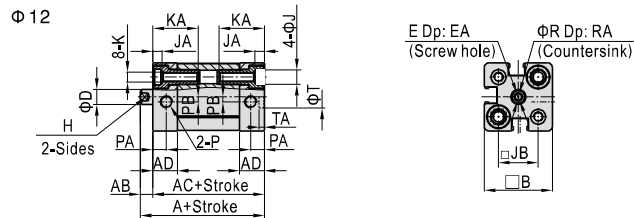
Inner structure and material of major parts



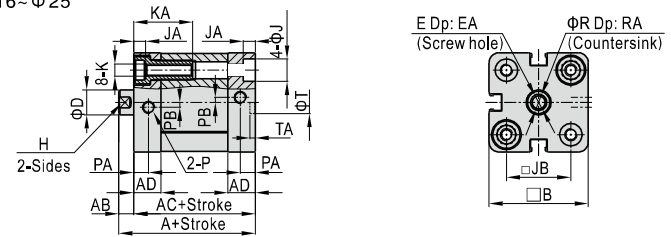
NO.	Item	Material
1	Screw	Carbon steel
2	Back cover	Aluminum alloy
3	Bumper	TPU
4	O-ring	NBR
5	Wear ring	No(Φ12~20)\Wear resistant material(Others)
6	Magnet	Sintered metal(Neodymium-iron-boron)(Φ12~20)\Plastic(Others)
7	Piston seal	NBR
8	Piston	Aluminum alloy
9	Piston rod	S45C
10	Body	Aluminum alloy
11	Front cover	Aluminum alloy
12	Bushing	No(Φ12~25)\Wear resistant material(Others)
13	Front cover packing	NBR
14	Panel	Aluminum alloy
15	Screw	Carbon steel
16	Bushing	Wear resistant material
17	Guide rod	Stainless steel(Φ12~40)\S45C(Others)

Dimensions

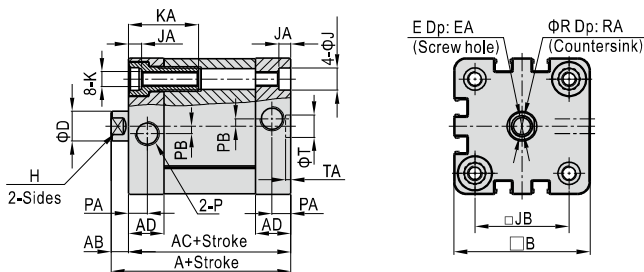
ACE



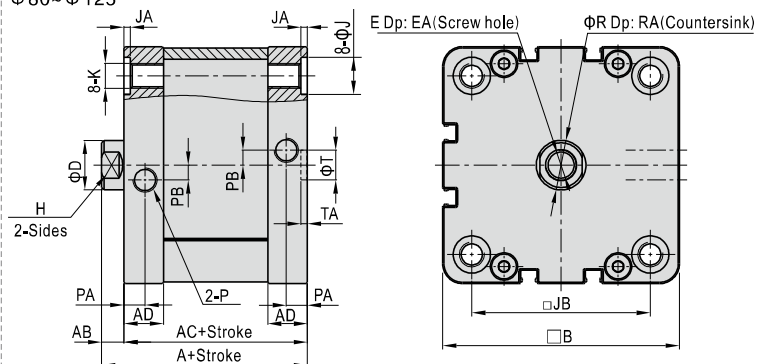
Φ16~Φ25



Φ32~Φ63



Φ80~Φ125



Bore size\Item	A	AB	AC	AD	B	D	E	EA	H	J	JA	JB	K	KA	P	PA	PB	R	RA	T	TA
12	40	5	35	10	27.5	6	M3×0.5	8	5	6	3.5	16	M4×0.7	18.5	M5×0.8	5.5	2	3.5	1.5	9	2.1
16	40	5	35	10	30	8	M4×0.7	10	7	6	3.5	18	M4×0.7	18.5	M5×0.8	5.5	2	4.5	1.5	9	2.1
20	43	6	37	10.5	35.5	10	M6×1.0	14	9	9	4.5	22	M5×0.8	23.5	M5×0.8	6	2	6.5	2.5	9	2.1
25	45	6	39	11	40	10	M6×1.0	14	9	9	4.5	26	M5×0.8	23.5	M5×0.8	6	2	6.5	2.5	9	2.1
32	51	7	44	14	49.5	12	M8×1.25	16	10	9	4.5	32.5	M6×1.0	28.5	G1/8	7.5	3	8.5	3.5	9	2.1
40	52.5	7	45.5	14.5	55	12	M8×1.25	16	10	9	4.5	38	M6×1.0	28.5	G1/8	7.5	3	8.5	3.5	9	2.1
50	53.5	8	45.5	14.5	65.5	16	M10×1.5	20	13	11	4.5	46.5	M8×1.25	30.5	G1/8	7.5	3	10.5	4.5	12	2.6
63	57	8	49	15	75.5	16	M10×1.5	20	13	11	4.5	56.5	M8×1.25	30.5	G1/8	7.5	4	10.5	4.5	12	2.6
80	63	9	54	16	95.5	20	M12×1.75	20	17	15	2.5	72	M10×1.5	-	G1/8	8.5	6	12.5	6	12	2.6
100	76	9	67	19	113.5	20	M12×1.75	20	17	15	2.5	89	M10×1.5	-	G1/8	10.5	7	12.5	6	12	2.6
125	92	11	81	20	134.5	25	M16×2.0	25	21	-	-	110	M12×1.75	-	G1/4	10.5	8	16.5	7	12	2.6

Remark: The dimensions of magnet type cylinder are the same as non-magnet type cylinder. Please refer to page 104 for male thread dimensions.

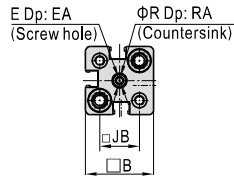
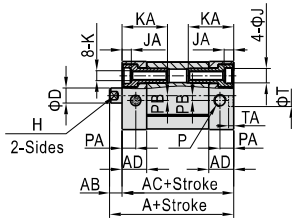


ISO21287 Compact cylinder

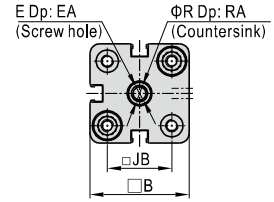
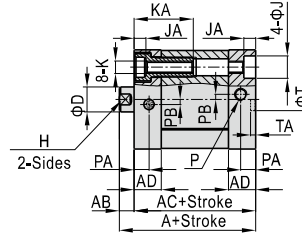
ACE Series

ASE

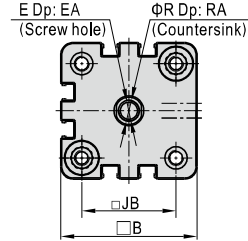
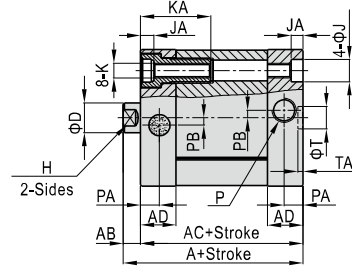
Φ 12



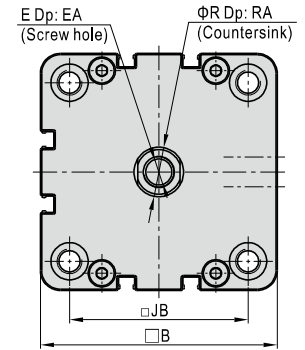
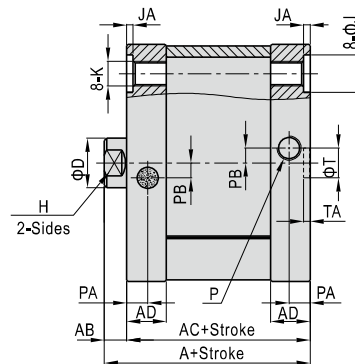
Φ 16~Φ 25



Φ 32~Φ 63

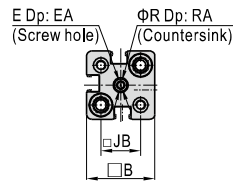
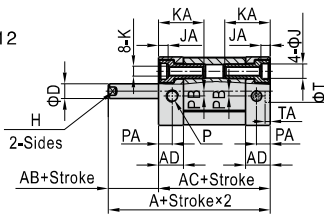


Φ 80/Φ 100

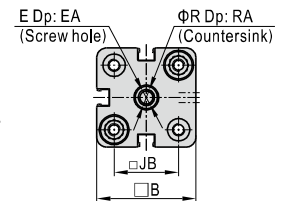
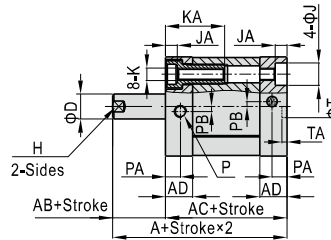


ATE

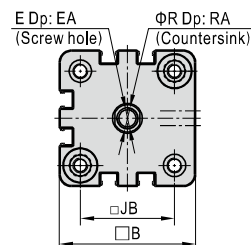
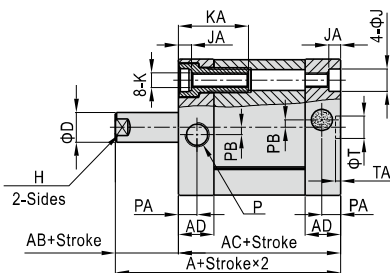
Φ 12



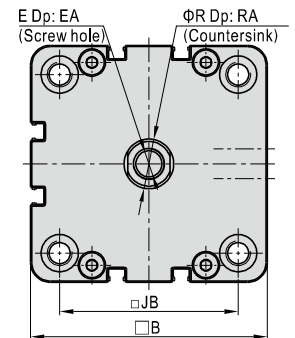
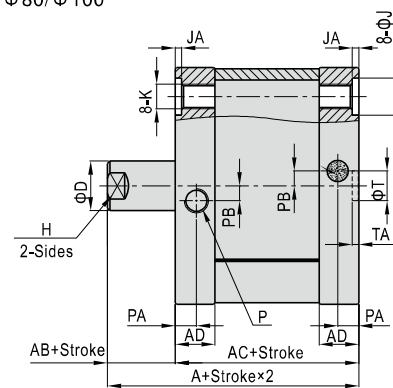
Φ 16~Φ 25



Φ 32~Φ 63



Φ 80/Φ 100



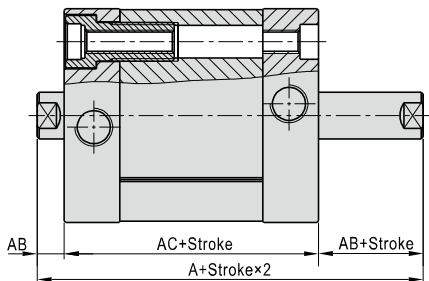
Bore size\Item	A	AB	AC	AD	B	D	E	EA	H	J	JA	JB	K	KA	P	PA	PB	R	RA	T	TA
12	40	5	35	10	27,5	6	M3×0,5	8	5	6	3,5	16	M4×0,7	18,5	M5×0,8	5,5	2	3,5	1,5	9	2,1
16	40	5	35	10	30	8	M4×0,7	10	7	6	3,5	18	M4×0,7	18,5	M5×0,8	5,5	2	4,5	1,5	9	2,1
20	43	6	37	10,5	35,5	10	M6×1,0	14	9	9	4,5	22	M5×0,8	23,5	M5×0,8	6	2	6,5	2,5	9	2,1
25	45	6	39	11	40	10	M6×1,0	14	9	9	4,5	26	M5×0,8	23,5	M5×0,8	6	2	6,5	2,5	9	2,1
32	51	7	44	14	49,5	12	M8×1,25	16	10	9	4,5	32,5	M6×1,0	28,5	G1/8	7,5	3	8,5	3,5	9	2,1
40	52,5	7	45,5	14,5	55	12	M8×1,25	16	10	9	4,5	38	M6×1,0	28,5	G1/8	7,5	3	8,5	3,5	9	2,1
50	53,5	8	45,5	14,5	65,5	16	M10×1,5	20	13	11	4,5	46,5	M8×1,25	30,5	G1/8	7,5	3	10,5	4,5	12	2,6
63	57	8	49	15	75,5	16	M10×1,5	20	13	11	4,5	56,5	M8×1,25	30,5	G1/8	7,5	4	10,5	4,5	12	2,6
80	63	9	54	16	95,5	20	M12×1,75	20	17	15	2,5	72	M10×1,5	-	G1/8	8,5	6	12,5	6	12	2,6
100	76	9	67	19	113,5	20	M12×1,75	20	17	15	2,5	89	M10×1,5	-	G1/8	10,5	7	12,5	6	12	2,6

Remark: The dimensions of magnet type cylinder are the same as non-magnet type cylinder. Please refer to page 104 for male thread dimensions.

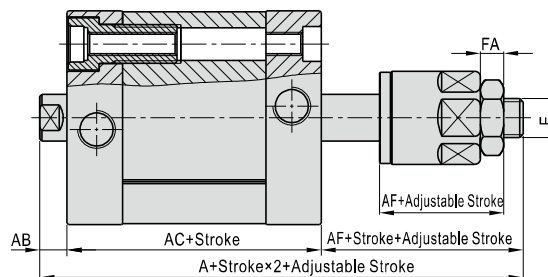
ISO21287 Compact cylinder

ACE Series

ACED



ACEJ

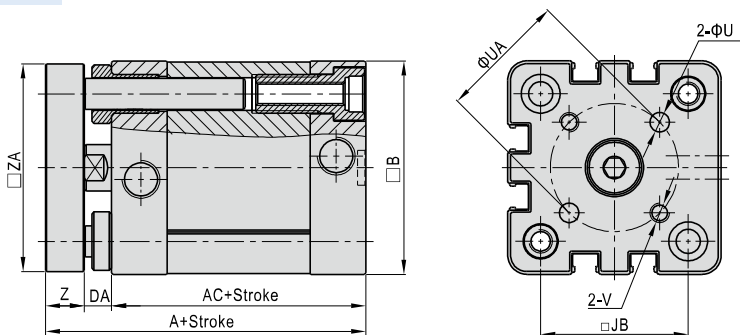


Bore size/Item	A(ACED)	A(ACEJ)	AB	AC	AF	FA	E
12	45	57	5	35	17	4	M5×0,8
16	45	61	5	35	21	5	M6×1,0
20	49	68	6	37	25	6	M8×1,25
25	51	70	6	39	25	6	M8×1,25
32	58	78	7	44	27	6	M10×1,25
40	59,5	79,5	7	45,5	27	6	M10×1,25
50	61,5	81,5	8	45,5	28	7	M12×1,25
63	65	85	8	49	28	7	M12×1,25
80	72	92	9	54	29	8	M16×1,5
100	85	105	9	67	29	8	M16×1,5
125	103	127,5	11	81	35,5	10	M20×1,5

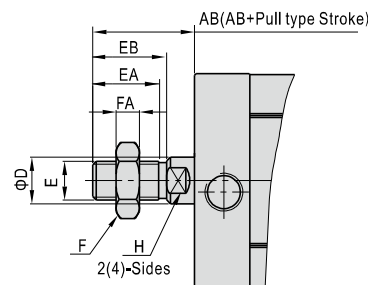
Remark:

1. The unmarked dimension is the same as ACE standard type
2. The dimensions of magnet type cylinder are the same as non-magnet type cylinder.

TACE

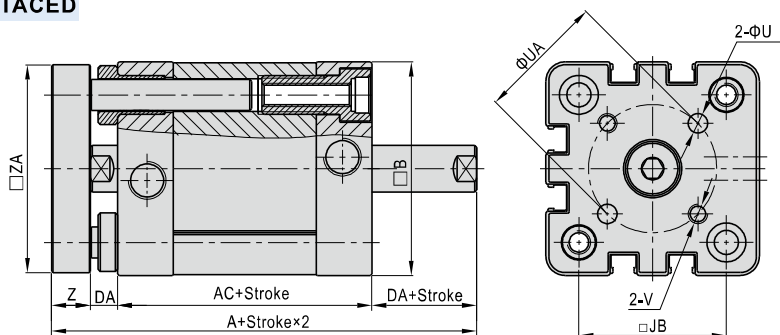


Male thread



Bore size/Item	AB	D	E	EA	EB	F	FA	H
12	15	6	M5×0,8	9	10	8	4	5
16	17	8	M6×1,0	11	12	10	5	6
20	22	10	M8×1,25	15	16	12	6	8
25	22	10	M8×1,25	15	16	12	6	8
32	26	12	M10×1,25	17	19	17	6	10
40	26	12	M10×1,25	17	19	17	6	10
50	30	16	M12×1,25	20	22	17	7	14
63	30	16	M12×1,25	20	22	17	7	14
80	37	20	M16×1,5	26	28	23	8	17
100	37	20	M16×1,5	26	28	23	8	17
125	51	25	M20×1,5	38	40	26	10	21

TACED



Bore size/Item	A(TACE)	A(TACED)	AC	B	DA	JB	U	UA	V	Z	ZA
12	46	51	35	27,5	5	16	3	12	M3×0,5	6	26,5
16	46	51	35	30	5	18	3	14	M3×0,5	6	29
20	51	57	37	35,5	6	22	4	17	M4×0,7	8	34,5
25	53	59	39	40	6	26	5	22	M5×0,8	8	39
32	61	68	44	49,5	7	32,5	5	28	M5×0,8	10	48
40	62,5	69,5	45,5	55	7	38	5	33	M5×0,8	10	53,5
50	65,5	73,5	45,5	65,5	8	46,5	6	42	M6×1,0	12	64
63	69	77	49	75,5	8	56,5	6	50	M6×1,0	12	74
80	77	86	54	95,5	9	72	8	65	M8×1,25	14	94
100	90	99	67	113,5	9	89	10	80	M10×1,5	14	112

Remark:

1. The unmarked dimension is the same as ACE standard type
2. The dimensions of magnet type cylinder are the same as non-magnet type cylinder.

List for ordering code of accessories

Accessories Bore size	Mounting accessories								Knuckle				Sensor switch	
	LB	FA/FB	CA	CB	CR	SDB	FTC	TCM2	I	Y	F	U	CMSE	DMSE
12	F-ACE12LB	F-ACE12FA	F-ACE12CA	-	-	F-M12SDB	-	-	F-ACQ12I	F-ACQ12Y	F-M5X080F	F-M5X080U	CMSE	DMSE
16	F-ACP12LB	F-ACE16FA	F-ACE16CA	-	-	F-M12SDB	-	-	F-M6X100I	F-M6X100Y	F-M6X100F	F-M6X100U		
20	F-ACP20LB	F-ACE20FA	F-ACE20CA	-	-	F-M20SDB	-	-	F-M8X125I	F-M8X125Y	F-M8X125F	F-M8X125U		
25	F-ACP25LB	F-ACE25FA	F-ACE25CA	-	-	F-M20SDB	-	-	F-M10X125I	F-M10X125Y	F-M10X125F	F-M10X125U		
32	F-ACE32LB	F-SI32FA	F-SE32CA	F-SE32CB	F-SI32CR	-	F-SI32FTC	F-SI32TCM2						
40	F-ACE40LB	F-SI40FA	F-SE40CA	F-SE40CB	F-SI40CR	-	F-SI40FTC	F-SI40TCM2	F-M12X125I	F-M12X125Y	F-M12X125F	F-M12X125U		
50	F-ACE50LB	F-SI50FA	F-SE50CA	F-SE50CB	F-SI50CR	-	F-SI50FTC	F-SI40TCM2						
63	F-ACE63LB	F-SI63FA	F-SE63CA	F-SE63CB	F-SI63CR	-	F-SI63FTC	F-SI63TCM2	F-M16X150I	F-M16X150Y	F-M16X150F	F-M16X150U		
80	F-ACE80LB	F-SI80FA	F-SE80CA	F-SE80CB	F-SI80CR	-	F-SI80FTC	F-SI63TCM2						
100	F-ACE100LB	F-SI100FA	F-SE100CA	F-SE100CB	F-SI100CR	-	F-SI100FTC	F-SI125TCM2	F-M20X150I	F-M20X150Y	F-M20X150F	F-M20X150U		
125	-	F-SI125FA	F-SE125CA	F-SE125CB	F-SI125CR	-	F-SI125FTC	F-SI125TCM2						

Accessory selection

Cylinder model\Accessories			Mounting accessories									Knuckle[Note 1]				Sensor switch		
			LB	FA	FB	CA	CB	CR	SDB	FTC	TCM2	I	Y	U	F	CMSE	DMSE	
ACE	Female thread	Without magnet										x	x	x	x	x	x	
		With magnet	•	•	•	•	•	•	•	•	•					•	•	
	Male thread	Without magnet											•	•	•	•	x	x
		With magnet	•	•	•	•	•	•	•	•	•	•					•	•
ASE ATE	Female thread	Without magnet										x	x	x	x	x	x	
		With magnet	•	•	•	•	•	•	•	•	•					•	•	
	Male thread	Without magnet											•	•	•	•	x	x
		With magnet	•	•	•	•	•	•	•	•	•	•					•	•
ACED ACEJ	Female thread	Without magnet										x	x	x	x	x	x	
		With magnet	•	•	x	x	x	x	x	•	•					•	•	
	Male thread	Without magnet											•	•	•	•	x	x
		With magnet	•	•	•	•	•	•	•	•	•	•					•	•
TACE	Female thread	Without magnet	x	x	•	•	•	•	•	•	•	x	x	x	x	x	x	
		With magnet															•	•
TACED	Female thread	Without magnet	x	x	•	x	x	x	x	x	x	x	x	x	x	x	x	
		With magnet															•	•

[Note1] The I knuckle and Y knuckle for bore Φ12 are adaptable to ACQ cylinders, and other knuckles are common parts. Please refer to P358~361 for knuckle detail.

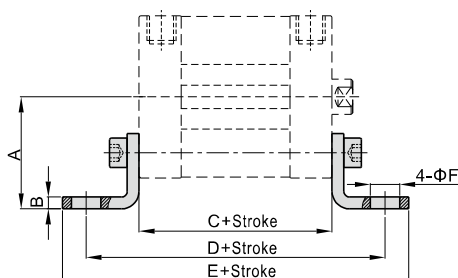
Material of accessories

Accessories Bore size	Mounting accessories									Knuckle			
	LB	FA	FB	CA	CB	CR	SDB	FTC	TCM2	I	Y	F	U
12~25	△	•	•	•	-	-	△	■	•	□	□	□	□
32~100	△	•	•	◇	◇	◇	-	■	•	□	□	□	□
125	-	◇	◇	◇	◇	◇	-	■	•	□	□	□	□

●—Aluminum alloy ; ■—Cast steel ; ◇—Ductile Iron ; △—SPCC ; □—Carbon Steel

Dimensions

LB



Bore size/Item	A	B	C	D	E	F	G	H
12	21	3	35	61	71	5.5	16	25
16	22	3	35	61	70.6	5.5	18	27
20	27	3.8	37	69	81.6	6.5	22	34
25	29	3.8	39	71	83.6	6.5	26	38
32	33.5	4	44	76	89	7	32	48
40	38	4	45.5	81.5	97.5	10	36	54
50	45	5	45.5	87.5	103.5	10	45	65
63	50	5	49	91	107	10	50	75
80	63	6	54	106	127	12	63	95
100	74	6	67	121	146	14.5	75	112

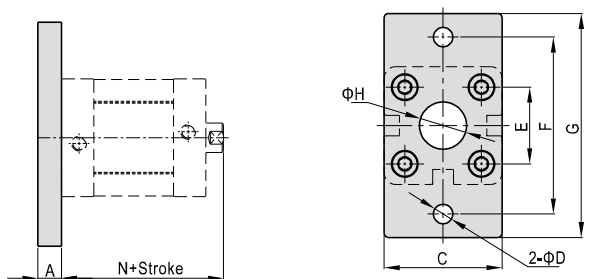
[Note] Value C in the above table is only for ACE series. Please refer to relevant content for value C of other series.

ISO21287 Compact cylinder

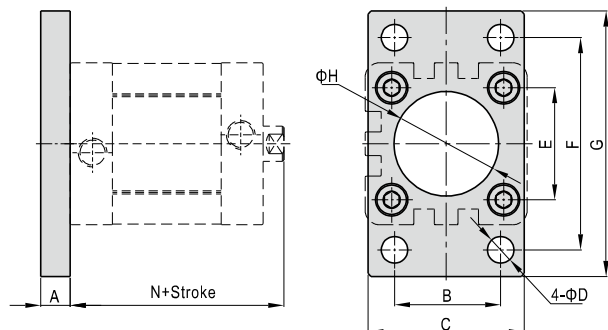
ACE Series—Accessories

FA/FB

Φ12~Φ25



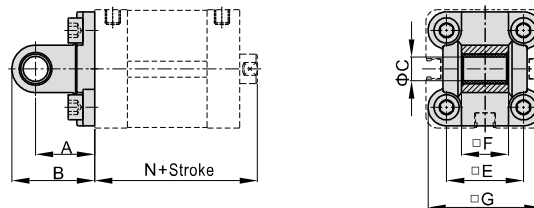
Φ32~Φ125



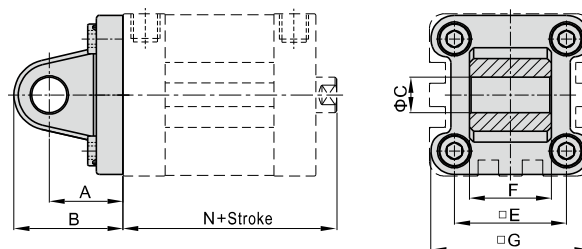
Bore size\Item	A	B	C	D	E	F	G	H	N
12	8	-	25	5.5	16	40	55	10	40
16	8	-	30	5.5	18	43	55	10	40
20	8	-	35	6.6	22	55	68	16	43
25	8	-	39.5	6.6	26	60	76	16	45
32	10	32	47	7	32.5	64	80	30.5	51
40	10	36	53	9	38	72	90	35.5	52.5
50	12	45	65	9	46.5	90	108	40.5	53.5
63	12	50	75	9	56.5	100	118	45.5	57
80	16	63	95	12.5	72	126	150	45.5	63
100	16	75	115	14.5	89	150	176	55.5	76
125	20	90	139	16.5	110	180	218	60.5	92

CA

Φ12~Φ25

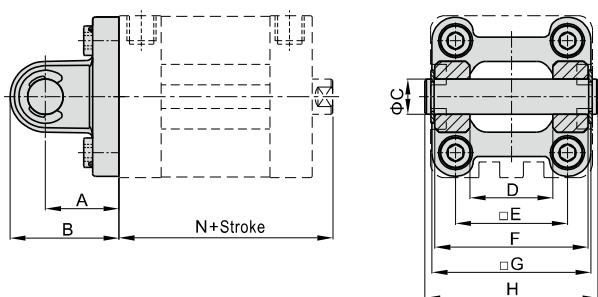


Φ32~Φ125



Bore size\Item	A	B	C	E	F	G	N
12	16	22	6	16	11.9	24	40
16	16	22	6	18	11.9	28.5	40
20	20	28	8	22	15.9	34.5	43
25	20	28	8	26	15.9	38.5	45
32	22	32.5	10	32.5	25.8	46.5	51
40	25	37	12	38	27.8	54	52.5
50	27	39	12	46.5	31.7	64	53.5
63	32	47	16	56.5	39.7	75	57
80	36	51.5	16	72	49.7	93	63
100	41	61	20	89	59.7	110	76
125	50	74	25	110	69.7	134	92

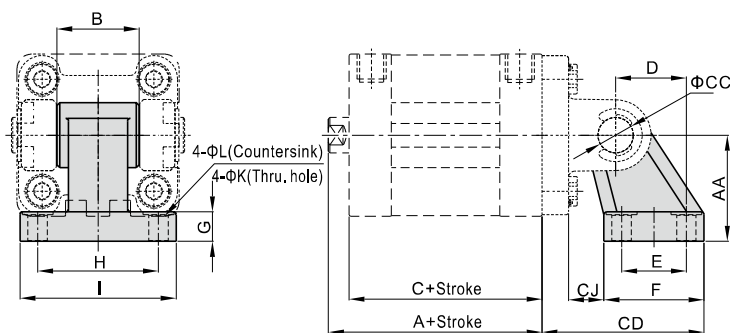
CB Φ32~Φ125



Bore size\Item	A	B	C	D	E	F	G	H	N
32	22	32.5	10	26	32.5	45	46.5	51	51
40	25	37	12	28	38	52	54	59	52.5
50	27	39	12	32	46.5	60	64	67	53.5
63	32	47	16	40	56.5	70	75	77	57
80	36	51.5	16	50	72	90	93	97	63
100	41	61	20	60	89	110	110	119	76
125	50	74	25	70	110	130	134	139	92

[Note] CB is attached with relevant PIN.

CR Φ32~Φ125



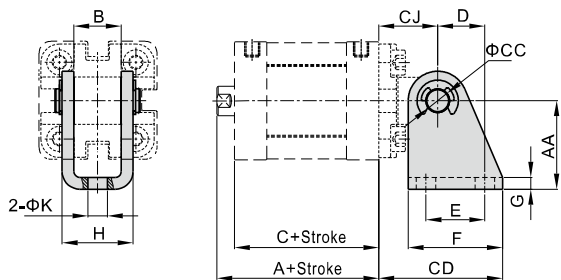
Bore size\Item	A	AA	B	C	CC	CD	CJ	D	E	F	G	H	I	K	L
32	51	32	26	44	10	50	10	21	18	31	8	38	51	6.6	11
40	52.5	36	28	45.5	12	56	12	24	22	35	10	41	54	6.6	11
50	53.5	45	32	45.5	12	68	13	33	30	45	12	50	65	9	14
63	57	50	40	49	16	77	17	37	35	50	12	52	67	9	14
80	63	63	50	54	16	93	19	47	40	60	14	66	86	11	17
100	76	71	60	67	20	106	22	55	50	70	15	76	96	11	17
125	92	90	70	81	25	135	26	70	60	90	20	94	124	14	20

[Note] CR can't be used alone, it must be used with CB.

ISO21287 Compact cylinder

ACE Series—Accessories

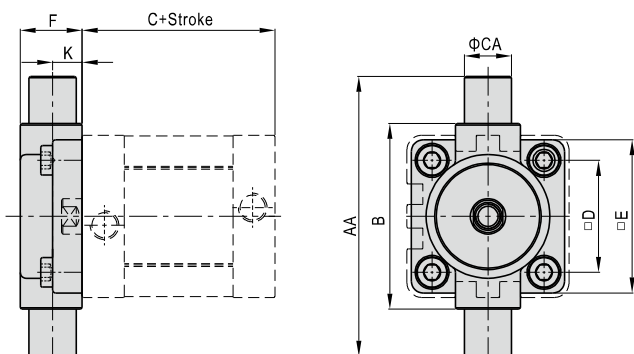
SDB $\Phi 12\sim\Phi 25$



Bore size/Item	A	AA	B	C	CC	CD	CJ	D	E	F	G	H	K
12	40	27	12.1	35	6	34	16	13	15	25	2	18.1	5.5
16	40	27	12.1	35	6	34	16	13	15	25	2	18.1	5.5
20	43	30	16.1	37	8	42	20	16	20	32	2.5	24.1	6.6
25	45	30	16.1	39	8	42	20	16	20	32	2.5	24.1	6.6

[Note] SDB can't be used alone, it must be used with CA.

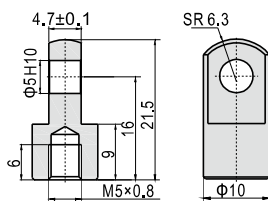
FTC $\Phi 32\sim\Phi 125$



Bore size/Item	A	AA	B	C	CA
32	63	74	50	44	12
40	66.5	95	63	45.5	16
50	71.5	107	75	45.5	16
63	77	130	90	49	20
80	85	150	110	54	20
100	102	185	132	67	25
125	124	210	160	81	25

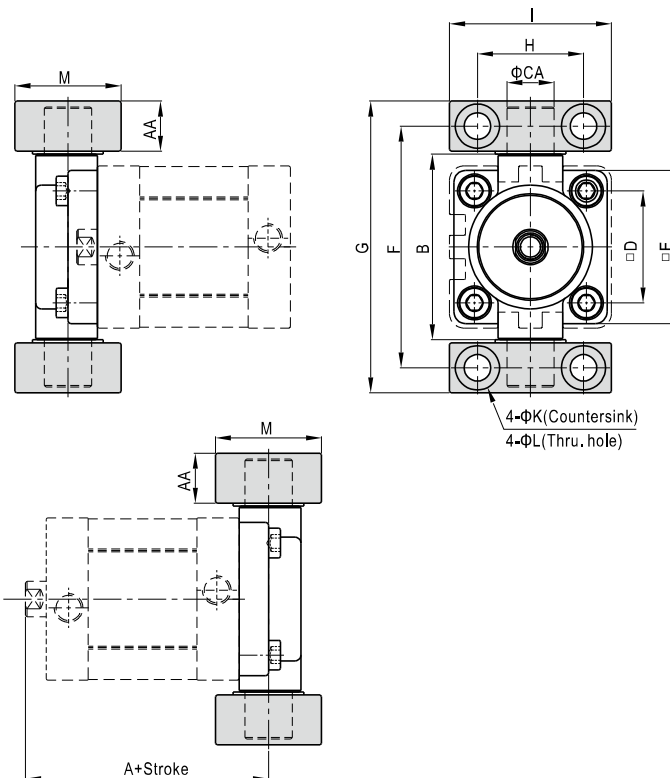
Bore size/Item	D	E	F	K
32	32.5	46	19	10
40	38	52	21	10
50	46.5	64	26	12
63	56.5	74	28	12
80	72	94	31	16
100	89	114	35	16
125	110	139	43	20

I Knuckle F-ACQ12I



[Note] Other I knuckles are common parts.
Please refer to P358 for knuckle detail.

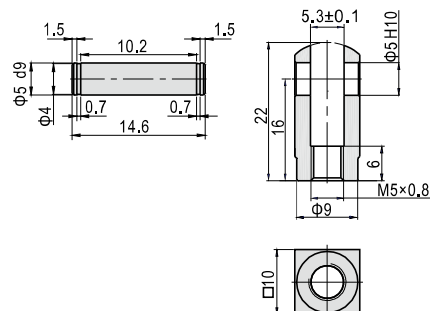
TCM2 $\Phi 32\sim\Phi 125$



Bore size/Item	A	AA	B	CA	D	E	F	G	H	I	K	L	M
32	63	14	52	12	32.5	46	66	80	32	46	11	7	30
40	66.5	17	65	16	38	52	82	99	36	55	15	9	36
50	71.5	17	75	16	46.5	64	94	111	36	55	15	9	36
63	77	20.5	90	20	56.5	74	113.5	134	42	65	18	11	40
80	85	20.5	112	20	72	94	133.5	154	42	65	18	11	40
100	102	24.5	135	25	89	114	159.5	184	50	75	20	14	50
125	124	24.5	170	25	110	139	187.5	212	50	75	20	14	50

[Note] TCM2 can't be used alone, it must be used with FTC.
The installation position of the accessories can not be adjusted arbitrarily.

Y Knuckle F-ACQ12Y



[Note] Other Y knuckles are common parts.
Please refer to P359 for knuckle detail.



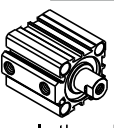
Compact cylinder—ACQ Series

Compendium of ACQ Series

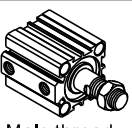
In accordance with JIS standard

Magnetic switch slots around the cylinder body
There are magnetic switch slots around the cylinder body convenient to install inducting switch.

Two kinds of rod type

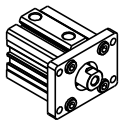


Female thread

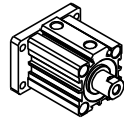


Male thread

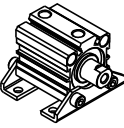
Multi-mounting accessories



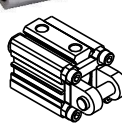
FA Type



FB Type









LB Type



CB Type

Thirteen bore size are available
Bore size: 12, 16, 20, 25, 32, 40, 50, 63, 80, 100, 125, 140, 160

Multi-type cylinder

ACQ: Compact cylinder (Double acting)	
ASQ: Compact cylinder (Single acting-push)	
ATQ: Compact cylinder (Single acting-pull)	
ACQD: Compact cylinder (Double rod)	
ACQJ: Compact cylinder (Adjustable stroke)	
TACQ: Compact cylinder (Double acting with guider)	

Compact structure
C clip is adopted to connect the cylinder body and back cover or front cover, and riveted structure is adopted to connect piston and piston rod to make it compact and reliable.

Criteria for selection: Cylinder thrust

Unit : Newton(N)

Bore size	Rod size	Acting type	Pressure area(mm ²)	Operating pressure(MPa)							Bore size	Rod size	Acting type	Pressure area(mm ²)	Operating pressure(MPa)								
				0.1	0.2	0.3	0.4	0.5	0.6	0.7					0.1	0.2	0.3	0.4	0.5	0.6	0.7		
12	6	Single acting	Push side	113.1	-	13.6	24.9	36.2	47.5	58.9	70.2	40	16	Single acting	Push side	1256.6	44.7	170.3	296.0	421.7	547.3	673.0	798.6
			Pull side	84.8	-	8.0	16.4	24.9	33.4	41.9	50.4				1055.6	24.6	130.1	235.7	341.2	446.8	552.3	657.9	
		Double acting	Push side	113.1	11.3	22.6	33.9	45.2	56.5	67.9	79.2			1256.6	125.7	251.3	377.0	502.7	628.3	754.0	879.6		
			Pull side	84.8	8.5	17.0	25.4	33.9	42.4	50.9	59.4			1055.6	105.6	211.1	316.7	422.2	527.8	633.3	738.9		
16	8	Single acting	Push side	201.1	-	27.0	47.1	67.2	87.3	107.4	127.5	50	20	Single acting	Push side	1963.5	96.3	292.7	489.0	685.4	881.7	1078.1	1274.4
			Pull side	150.8	-	17.0	32.0	47.1	62.2	77.3	92.4				1649.3	64.9	229.9	394.8	559.7	724.7	889.6	1054.5	
		Double acting	Push side	201.1	20.1	40.2	60.3	80.4	100.5	120.6	140.7			1963.5	196.3	392.7	589.0	785.4	981.7	1178.1	1374.4		
			Pull side	150.8	15.1	30.2	45.2	60.3	75.4	90.5	105.6			1649.3	164.9	329.9	494.8	659.7	824.7	989.6	1154.5		
20	10	Single acting	Push side	314.2	-	36.8	68.2	99.7	131.1	162.5	193.9	63	20	Single acting	Push side	3117.2	141.7	453.4	765.2	1076.9	1388.6	1700.3	2012.1
			Pull side	235.6	-	21.1	44.7	68.2	91.8	115.4	138.9				2803.1	110.3	390.6	670.9	951.2	1231.5	1511.9	1792.2	
		Double acting	Push side	314.2	31.4	62.8	94.2	125.7	157.1	188.5	219.9			3117.2	311.7	623.4	935.2	1246.9	1558.6	1870.3	2182.1		
			Pull side	235.6	23.6	47.1	70.7	94.2	117.8	141.4	164.9			2803.1	280.3	560.6	840.9	1121.2	1401.5	1681.9	1962.2		
25	12	Single acting	Push side	490.9	18.1	67.2	116.3	165.3	214.4	263.5	312.6	80	25	Double acting	Push side	5026.5	502.7	1005.3	1508.0	2010.6	2513.3	3015.9	3518.6
			Pull side	377.8	6.8	44.6	82.3	120.1	157.9	195.7	233.4				4535.7	453.6	907.1	1360.7	1814.3	2267.8	2721.4	3175.0	
		Double acting	Push side	490.9	49.1	98.2	147.3	196.3	245.4	294.5	343.6			7854.0	785.4	1570.8	2356.2	3141.6	3927.0	4712.4	5497.8		
			Pull side	377.8	37.8	75.6	113.3	151.1	188.9	226.7	264.4			7049.7	705.0	1409.9	2114.9	2819.9	3524.9	4229.8	4934.8		
32	16	Single acting	Push side	804.2	27.4	107.8	188.3	268.7	349.1	429.5	510.0	100	32	Double acting	Push side	12271.8	1227.2	2454.4	3681.5	4908.7	6135.9	7363.1	8590.2
			Pull side	603.2	7.3	67.6	128.0	188.3	248.6	308.9	369.2				11467.6	1146.8	2293.5	3440.3	4587.0	5733.8	6880.6	8027.3	
		Double acting	Push side	804.2	80.4	160.8	241.3	321.7	402.1	482.5	563.0			15393.8	1539.4	3078.8	4618.1	6157.5	7696.9	9236.3	10775.7		
			Pull side	603.2	60.3	120.6	181.0	241.3	301.6	361.9	422.2			14589.6	1459.0	2917.9	4376.9	5835.8	7294.8	8753.8	10212.7		
140	32	Double acting	Push side	20106.2	2010.6	4021.2	6031.9	8042.5	10053.1	12063.7	14074.3	160	40	Double acting	Push side	18849.6	1885.0	3769.9	5654.9	7539.8	9424.8	11309.8	13194.7
			Pull side	14589.6	1459.0	2917.9	4376.9	5835.8	7294.8	8753.8	10212.7												

Installation and application



1. When load changes in the work, the cylinder with abundant output capacity shall be selected.
2. Relative cylinder with high temperature resistance or corrosion resistance shall be chosen under the condition of high temperature or corrosion.
3. Necessary protection measure shall be taken in the environment with higher humidity, much dust or water drops, oil dust and welding dregs.
4. Dirty substances in the pipe must be eliminated before cylinder is connected with pipeline to prevent the entrance of particles into the cylinder.
5. The medium used by cylinder shall be filtered to 40µm or below.
6. As both of the front cover and piston of the cylinder are short, typically too large stroke can not be selected.
7. Anti-freezing measure shall be adopted under low temperature environment to prevent moisture freezing.
8. The cylinder shall avoid the influence of side load in operation to maintain the normal work of cylinder and extend the service life.
9. If the cylinder is dismantled and stored for a long time, please conduct anti-rust treatment to the surface. Anti-dust caps shall be added in air inlet and outlet ports. The front and back cover can not be dismantled, which shall be especially noticed.
10. C clip Installation:
 - 10.1. Removal & Installation of C clip must be done with proper tool & care.
 - 10.2. Ensure C clip is securely fitted into the proper slot to prevent leakage.

ACQ Series

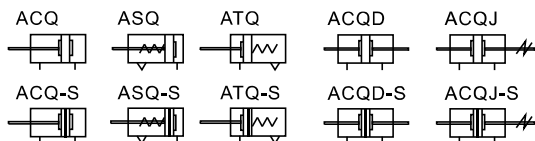


Specification

Bore size(mm)	12	16	20	25	32	40	50	63	80	100
Acting type	Double acting									
	Single acting_Push type、Single acting_Pull type									-
Fluid	Air(to be filtered by 40μm filter element)									
Operating pressure	Double acting	0.15~1.0MPa(22~145psi)								
	Single acting	0.2~1.0MPa(28~145psi)								
Proof pressure	1.5MPa(215psi)									
Temperature °C	-20~70									
Speed range mm/s	Double acting : 30~500					Single acting : 50~500				
Stroke tolerance	Stroke≤100 ^{+1.0} ₀					Stroke>100 ^{+1.5} ₀				
Cushion type	Bumper									
Port size [Note1]	M5×0.8					1/8"	1/4"	3/8"		

[Note1] PT thread, G thread and NPT thread are available.
Add) Refer to P362 for detail of sensor switch.

Symbol



Product feature

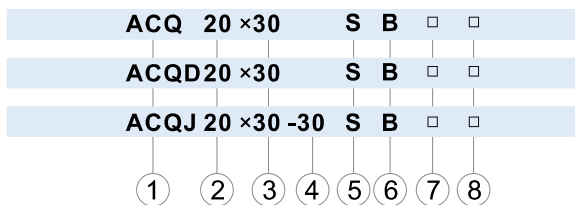
- JIS standard is implemented.
- C clip is adopted to connect the cylinder body and back cover or front cover, and riveted structure is adopted to connect piston and piston rod to make it compact and reliable.
- The internal diameter of the body is treated with rolling followed by the treatment of hard anodizing, forming an excellent abrasion resistance and durability.
- The seal of piston adopts heterogeneous two-way seal structure. It has compact dimension and the function of grease reservation.
- Compact structure can effectively save installation space.
- There are magnetic switch slots around the cylinder body, which is convenient to install inducting switch.
- Installing accessories with various specifications are optional.

Stroke

Bore size (mm)	Standard stroke (mm)										Max.std stroke							
12	Double acting	5	10	15	20	25	30	35	40	45	50	50						
	Single acting	5	10	15	20							20						
16	Double acting	5	10	15	20	25	30	35	40	45	50	55	60	60				
	Single acting	5	10	15	20							20						
20	Double acting	5	10	15	20	25	30	35	40	45	50	60	70	75	80	90	100	100
		5	10	15	20	25	30							30				
25	Double acting	5	10	15	20	25	30	35	40	45	50	60	70	75	80	90	100	100
		5	10	15	20	25	30											
32	Double acting	5	10	15	20	25	30	35	40	45	50	60	70	75	80	90	100	100
		5	10	15	20	25	30											
40	Double acting	5	10	15	20	25	30	35	40	45	50	60	70	75	80	90	100	100
		5	10	15	20	25	30											
50	Double acting	5	10	15	20	25	30	35	40	45	50	60	70	75	80	90	100	100
		5	10	15	20	25	30											
63	Double acting	5	10	15	20	25	30	35	40	45	50	60	70	75	80	90	100	100
		5	10	15	20	25	30											
80	Double acting	5	10	15	20	25	30	35	40	45	50	60	70	75	80	90	100	100
		5	10	15	20	25	30											
100	Double acting	5	10	15	20	25	30	35	40	45	50	60	70	75	80	90	100	100
		5	10	15	20	25	30											

- Note) 1. Please contact the company for other special strokes.
2. The dimensions of non-std stroke cylinder has the same dimensions as the next longer stroke std. stroke cylinder. e.g. 23mm stroke cylinder has the same dimensions of 25 std. stroke cylinder.

Ordering code



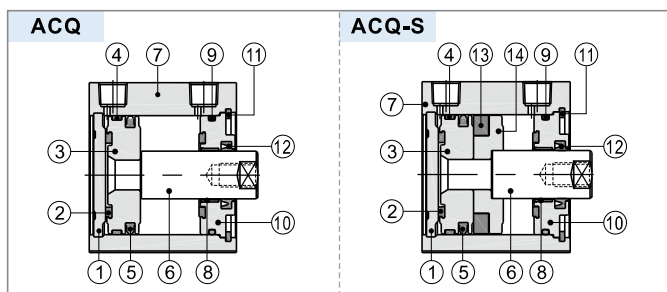
① Model	② Bore size	③ Stroke	④ Adjustable Stroke	⑤ Magnet	⑥ Rod type	⑦ Mounting type [Note1]	⑧ Thread type [Note2]
ACQ: Compact cylinder (Double acting)	12 16 20 25 32 40 50 63 80 100	Refer to stroke table for details	No this code	Blank: Without magnet S: With magnet	Blank: Female thread B: Male thread	Blank: No accessories FA: FA type FB: FB type CB: CB type LB: LB type	Blank: PT G: G T: NPT
ASQ: Compact cylinder (Single acting-push)	12 16 20 25 32 40 50 63						
ATQ: Compact cylinder (Single acting-pull)	12 16 20 25 32 40 50 63						
ACQD: Compact cylinder (Double rod)	12 16 20 25 32 40 50 63						
ACQJ: Compact cylinder (Adjustable stroke)	80 100		10 20 30 40 50 75 100				

[Note1] Please refer to page 120~121 for accessory parts.

[Note2] Standard thread is blank here.

ACQ Series

Inner structure and material of major parts

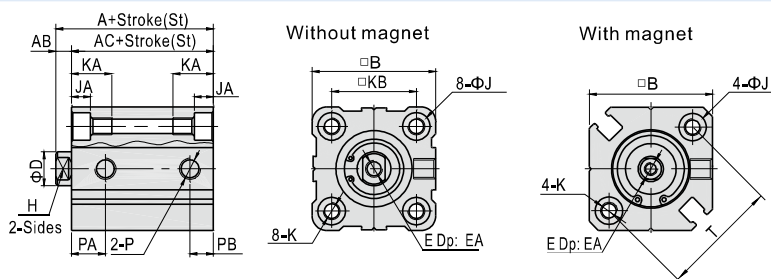


NO.	Item	Material
1	Back cover	No(Φ12, 16)\Aluminum alloy(Others)
2	Bumper	TPU(Φ12~25)\NBR(Others)
3	Piston	Brass(Φ12, 16)\Aluminum alloy(Others)
4	Wear ring	No(Φ12~32)\Wear resistant material(Others)
5	Piston seal	NBR
6	Piston rod	Carbon steel with 20μm chrome plated
7	Body	Aluminum alloy
8	Bushing	No(Φ12~32)\Wear resistant material(Others)
9	O-ring	NBR
10	Front cover	Aluminum alloy
11	C clip	Spring steel
12	Front cover packing	NBR
13	Magnet	Sintered metal(Neodymium-iron-boron)(Φ12~25)\Plastic(Others)
14	Magnet holder	Brass(Φ12, 16)\Aluminum alloy(Others)

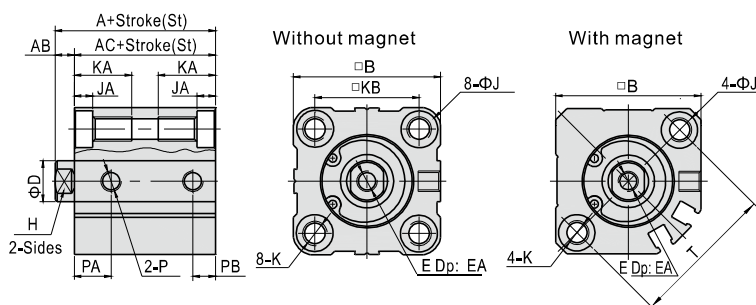
Dimensions

ACQ

Φ12, Φ16

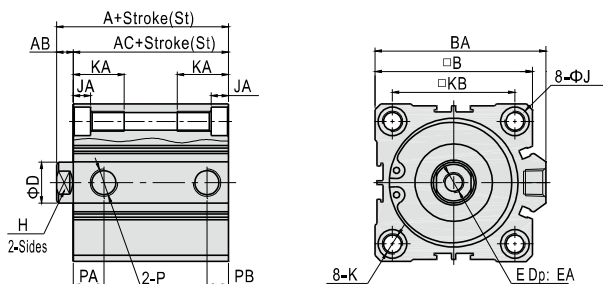


Φ20, Φ25



Type	Without magnet						With magnet						Without magnet						With magnet						
	A		AC		AC		A	AC	AB	B	D	E	EA	H	J	JA	K		KA	KB	P	PA	PB	PA	PB
Stroke	St≤50	St=55	St≥60	St≤50	St=55	St≥60	A	AC	AB	B	D	E	EA	H	J	JA	K	KA	KB	P	PA	PB	PA	PB	T
12	20.5	-	-	17	-	-	31.5	28	3.5	25	6	M3×0.5	6	5	6	3.5	M4×0.7 Thru.hole:Φ3.4	11	15.5	M5×0.8	7.5	5	9	7	22
16	22	22	22	18.5	18.5	18.5	34	30.5	3.5	29	8	M4×0.7	8	6	6	3.5	M4×0.7 Thru.hole:Φ3.4	11	20	M5×0.8	8	5.5	9.5	5.5	28
20	24	-	34	19.5	-	29.5	36	31.5	4.5	36	10	M5×0.8	7	8	9	5.5	M6×1.0 Thru.hole:Φ5.2	17	25.5	M5×0.8	9	5.5	9.5	5.5	36
25	27.5	-	37.5	22.5	-	32.5	37.5	32.5	5	40	12	M6×1.0	12	10	9	5.5	M6×1.0 Thru.hole:Φ5.2	17	28	M5×0.8	11	5.5	11	5.5	40

Φ32~Φ100 (Stroke≤100)



Note) The dimensions of non-std stroke cylinder has the same dimensions as the next longer stroke std. stroke cylinder, e.g. 55mm stroke cylinder has the same dimensions of 60 std. stroke cylinder.

Item	A(Without magnet)		A (With magnet)	AB	AC(Without magnet)		AC (With magnet)	B	BA	D	E
	St≤50	St≥60			St≤50	St≥60					
32	30	40	40	7	23	33	33	45	49.5	16	M8×1.25
40	36.5	46.5	46.5	7	29.5	39.5	39.5	53	57	16	M8×1.25
50	38.5	48.5	48.5	8	30.5	40.5	40.5	64	71	20	M10×1.5
63	44	54	54	8	36	46	46	77	84	20	M10×1.5
80	53.5	63.5	63.5	10	43.5	53.5	53.5	98	104	25	M16×2.0
100	65	75	75	12	53	63	63	117	123.5	32	M20×2.5

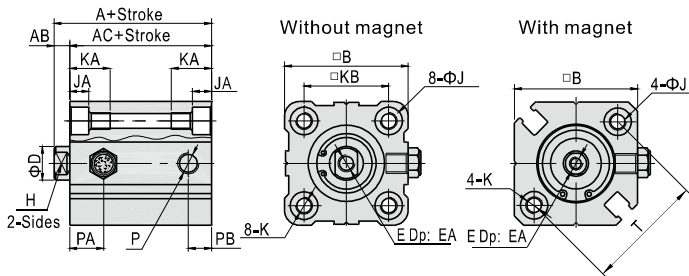
Item	Bore size	EA	H	J	JA	K	KA Note	KB	P	Without magnet		With magnet	
										PA	PB	PA	PB
32	St=5	13	14	9	5.5	M6×1.0 Thru.hole:Φ5.2	17	34	1/8"	7.5	6.5	10.5	7.5
	10.5									7.5			
40	St>5	13	14	9	5.5	M6×1.0 Thru.hole:Φ5.2	17	40	1/8"	11	8	11	8
	9									9			
50	St=5	15	17	10.5	6.5	M8×1.25 Thru.hole:Φ6.8	22	50	1/4"	10.5	10.5	10.5	10.5
	10.5									10.5			
63	St≥25	15	17	14	9	M10×1.5 Thru.hole:Φ8.5	28.5	60	1/4"	14	9.5	15	10.5
	27									(10.5)			
80	St=20	20	22	17	11	M12×1.75 Thru.hole:Φ10.3	35.5	77	3/8"	16	14	16	14
	16									14			
100	St≤15	26	27	17	11	M12×1.75 Thru.hole:Φ10.3	35.5	94	3/8"	20	17.5	20	17.5
	20									17.5			

Note: PA/PB in "()" is the value when stroke >5.

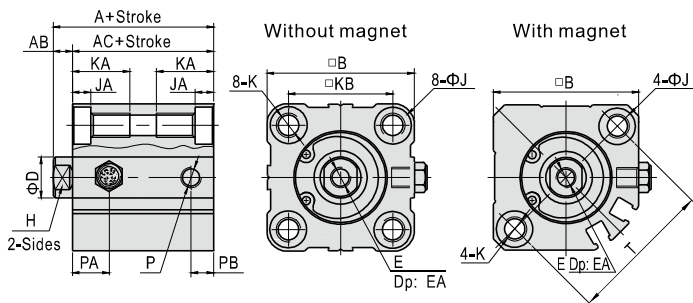
ACQ Series

ASQ

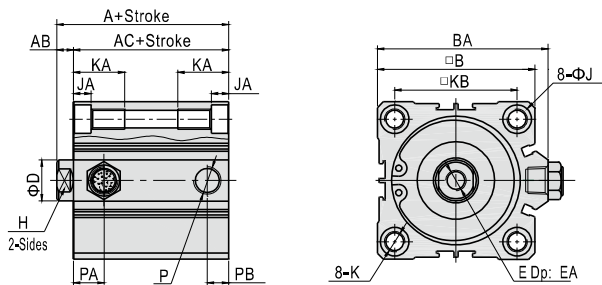
Φ12, Φ16



Φ20 Φ25

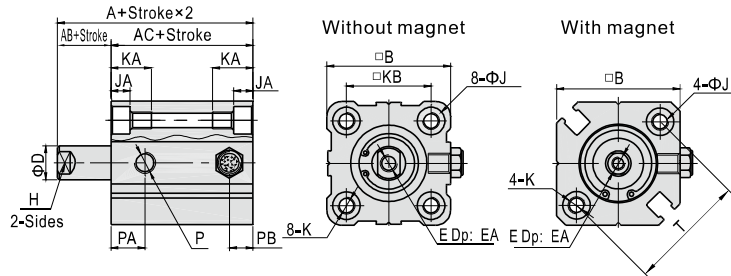


Φ32-Φ63

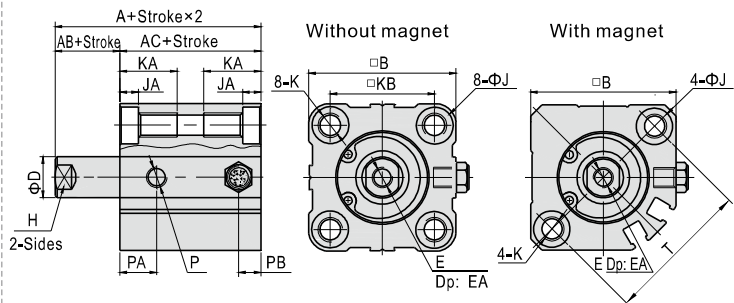


ATQ

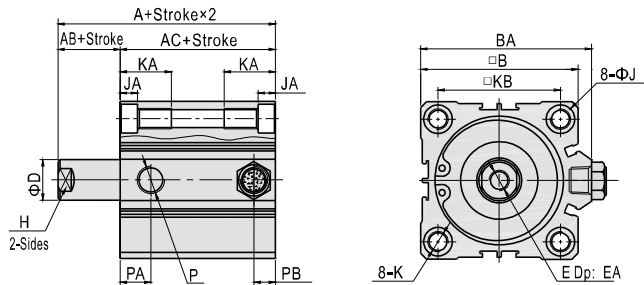
Φ12, Φ16



Φ20 Φ25



Φ32-Φ63



Bore size\Item	A(Without magnet)			A(With magnet)			AB	AC(Without magnet)			AC(With magnet)			B	BA	D	E	EA
	Stroke	5\10	15\20	25\30	5\10	15\20		25\30	5\10	15\20	25\30	5\10	15\20					
12	25,5	30,5	-	36,5	41,5	-	3,5	22	27	-	33	38	-	25	-	6	M3×0,5	6
16	27	32	-	39	44	-	3,5	23,5	28,5	-	35,5	40,5	-	29	-	8	M4×0,7	8
20	29	34	39	41	46	51	4,5	24,5	29,5	34,5	36,5	41,5	46,5	36	-	10	M5×0,8	7
25	32,5	37,5	42,5	42,5	47,5	52,5	5	27,5	32,5	37,5	37,5	42,5	47,5	40	-	12	M6×1,0	12
32	35	40	45	45	50	55	7	28	33	38	38	43	48	45	49,5	16	M8×1,25	13
40	41,5	46,5	51,5	51,5	56,5	61,5	7	34,5	39,5	44,5	44,5	49,5	54,5	53	57	16	M8×1,25	13
50	48,5	53,5	58,5	58,5	63,5	68,5	8	40,5	45,5	50,5	50,5	55,5	60,5	64	71	20	M10×1,5	15
63	54	59	64	64	69	74	8	46	51	56	56	61	66	77	84	20	M10×1,5	15

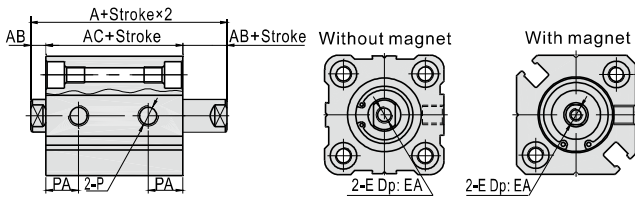
Bore size\Item	H	J	JA	K			KA	KB	P	PA(Without magnet)	PA(With magnet)	PB(Without magnet)	PB(With magnet)	T
				M4×0,7 Thru.hole:Φ3,4	M6×1,0 Thru.hole:Φ5,2	M8×1,25 Thru.hole:Φ6,8								
12	5	6	3,5	M4×0,7 Thru.hole:Φ3,4	11	15,5	M5×0,8	7,5	9	5	7	22		
16	6	6	3,5	M4×0,7 Thru.hole:Φ3,4	11	20	M5×0,8	8	9,5	5,5	5,5	28		
20	8	9	5,5	M6×1,0 Thru.hole:Φ5,2	17	25,5	M5×0,8	9	9,5	5,5	5,5	36		
25	10	9	5,5	M6×1,0 Thru.hole:Φ5,2	17	28	M5×0,8	11	11	5,5	5,5	40		
32	14	9	5,5	M6×1,0 Thru.hole:Φ5,2	17	34	1/8"	10,5	10,5	7,5	7,5	-		
40	14	9	5,5	M6×1,0 Thru.hole:Φ5,2	17	40	1/8"	11	11	8	8	-		
50	17	10,5	6,5	M8×1,25 Thru.hole:Φ6,8	22	50	1/4"	10,5	10,5	10,5	10,5	-		
63	17	14	9	M10×1,5 Thru.hole:Φ8,5	28,5	60	1/4"	15	15	10,5	10,5	-		

Compact cylinder

ACQ Series

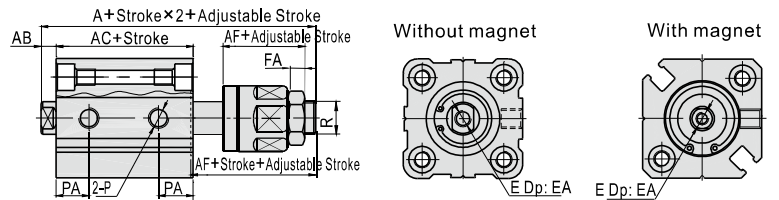
ACQD

φ12, φ16

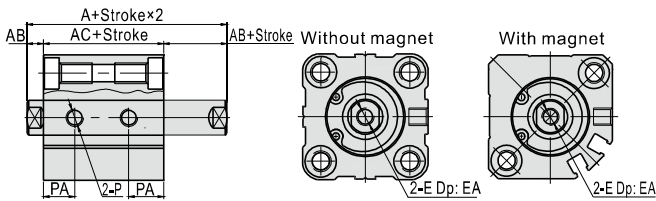


ACQJ

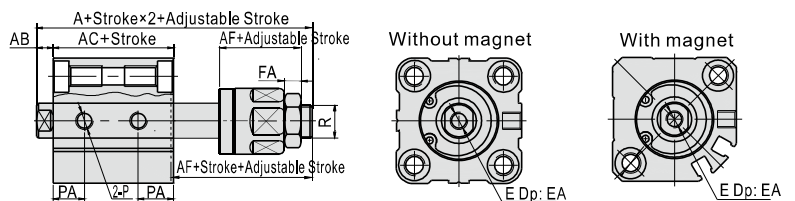
φ12, φ16



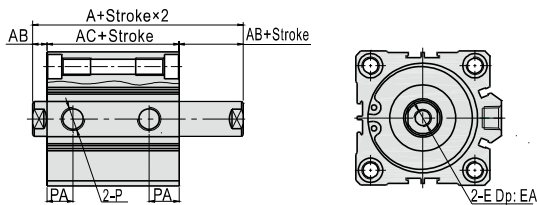
φ20 φ25



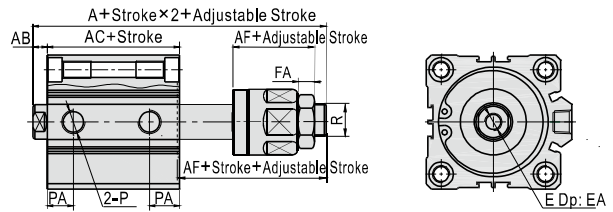
φ20 φ25



φ32~φ100



φ32~φ100

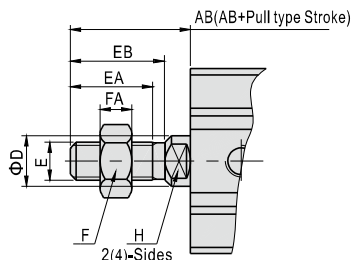


Item	A(ACQD)		A(ACQJ)		AC(ACQD)		AC(ACQJ)		AB	AF	E	EA	FA	PA	R
	Without magnet	With magnet	Without magnet	With magnet	Without magnet	With magnet	Without magnet	With magnet							
12	32.2	39.4	45.2	52.4	25.2	32.4	25.2	32.4	3.5	17	M3×0.5	6	4	9	M5×0.8
16	33	43	50	60	26	36	26	36	3.5	21	M4×0.7	8	5	9.5	M6×1.0
20	35	47	55	67	26	38	26	38	4.5	25	M5×0.8	7	6	9.5	M8×1.25
25	39	49	60.5	70.5	29	39	29	39	5	27	M6×1.0	9.5(St=5)/12(St>5)	6	11	M10×1.25
32	44.5	54.5	64.9	74.9	30.5	40.5	30.5	40.5	7	28	M8×1.25	9(St≤10)/13(St>10)	7	10	M12×1.25
40	54	64	74.5	84.5	40	50	40	50	7	28	M8×1.25	11(St≤10)/13(St>10)	7	13	M12×1.25
50	56.5	66.5	77	87	40.5	50.5	40.5	50.5	8	29	M10×1.5	12(St≤10)/15(St>10)	8	13.5	M16×1.5
63	58	68	78.4	88.4	42	52	42	52	8	29	M10×1.5	12(St≤10)/15(St>10)	8	14.5(St=5)/16(St>5)	M16×1.5
80	71	81	95.8	105.8	51	61	51	61	10	35.5	M16×2.0	14(St≤15)/20(St>15)	10	16	M20×1.5
100	84.5	94.5	114.3	124.3	60.5	70.5	60.5	70.5	12	42.5	M20×2.5	20(St≤25)/26(St>25)	13.5	21	M27×2.0

Remark) The unmarked dimension is the same as ACQ standard type. Please refer to this page for male thread dimensions.

Male thread

(Bore size: φ12~φ100, Stroke≤100)



Bore size/Item	AB	D	E	EA	EB	F	FA	H
12	14	6	M5×0.8	9	10	8	4	5
16	15.5	8	M6×1.0	10	11.5	10	5	6
20	18.5	10	M8×1.25	12	13.5	12	6	8
25	22.5	12	M10×1.25	15	17	17	6	10
32	28.5	16	M14×1.5	20.5	23.5	19	8	14
40	28.5	16	M14×1.5	20.5	23.5	19	8	14
50	34	20	M18×1.5	25.5	27.5	27	11	17
63	33.5	20	M18×1.5	26	28	27	11	17
80	43.5	25	M22×1.5	32.5	35.5	32	13	22
100	43.5	32	M26×1.5	32.5	35.5	36	13	27



Symbol



Product feature

1. JIS standard is implemented.
2. C clip is adopted to connect the cylinder body and back cover or front cover to make it compact and reliable.
3. The internal diameter of the body is treated with rolling followed by the treatment of hard anodizing, forming an excellent abrasion resistance and durability.
4. The seal of piston adopts heterogeneous two-way seal structure. It has compact dimension and the function of grease reservation.
5. Compact structure can effectively save installation space.
6. There are magnetic switch slots around the cylinder body, which is convenient to install inducting switch.

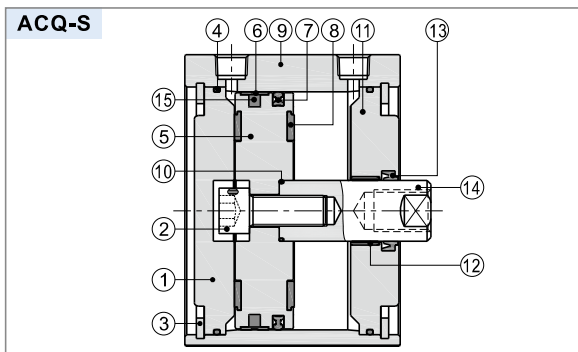
Ordering code

ACQ	125×30	S	B	□
ACQD	125×30	S	B	□
ACQJ	125×30-30	S	B	□



① Model	② Bore size	③ Stroke	④ Adjustable Stroke	⑤ Magnet	⑥ Rod type	⑦ Thread type
ACQ: Compact cylinder (Double acting)	125 140 160	Refer to stroke table for details	No this code	S: With magnet	Blank: Female thread B: Male thread	Blank: PT G: G T: NPT
ACQD: Compact cylinder (Double rod)						
ACQJ: Compact cylinder (Adjustable stroke)						

Inner structure and material of major parts



NO.	Item	Material	NO.	Item	Material
1	Back cover	Aluminum alloy	9	Body	Aluminum alloy
2	Screw	Carbon steel	10	O-ring	NBR
3	C clip	Spring steel	11	Front cover	Aluminum alloy
4	O-ring	NBR	12	Bushing	Wear resistant material
5	Piston	Aluminum alloy	13	Front cover packing	NBR
6	Wear ring	Wear resistant material	14	Piston rod	Carbon steel with 20μm chrome plated
7	Piston seal	NBR			
8	Bumper	NBR	15	Magnet	Rubber

Specification

Bore size (mm)	125	140	160
Acting type	Double acting		
Fluid	Air (to be filtered by 40μm filter element)		
Operating pressure	0.15~1.0MPa (22~145psi)		
Proof pressure	1.5MPa (215psi)		
Temperature °C	-20~70		
Speed range mm/s	30~500		
Stroke tolerance	Stroke ≤ 100 $+1.0_0$ Stroke > 100 $+1.5_0$		
Cushion type	Bumper		
Port size [Note1]	3/8"		

[Note1] PT thread, G thread and NPT thread are available.
Add) Refer to P362 for detail of sensor switch.

Stroke

Bore size (mm)	Standard stroke (mm)	Max. std stroke
125	10 20 30 40 50 75 100 125 150 175 200 250 300	300
140		
160		

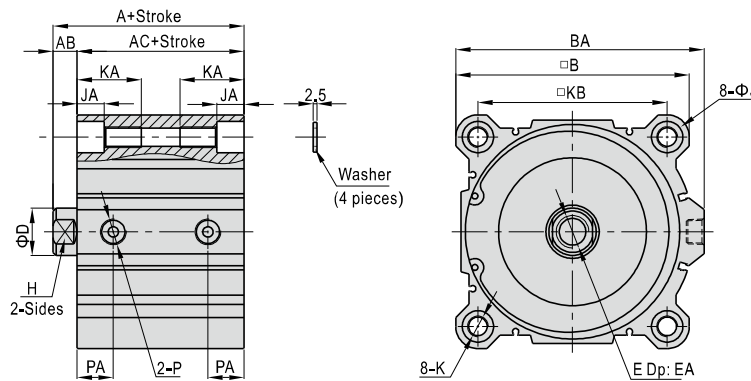
Note) Please contact the company for other special strokes.

Compact cylinder

ACQ Series—Big bore size

Dimensions

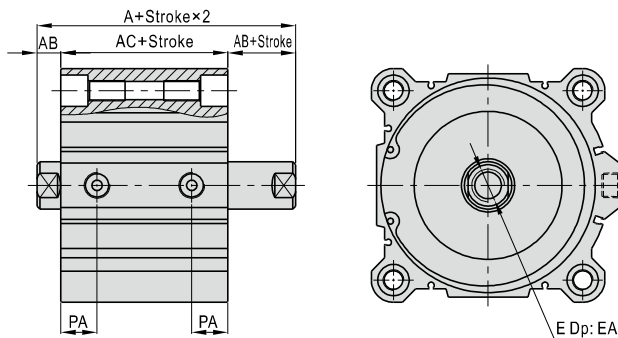
ACQ



Bore size/Item	A	AB	AC	B	BA	D	E	EA(St≤10)	EA(St>10)	H	J	JA	K	KA	KB	P	PA
125	99	16	83	142	153	32	M22×2.5	22.5	30	27	21.2	18.4	M14×2.0 Thru.hole:Φ12.4	43.5	114	3/8"	24.5
140	99	16	83	158	168	32	M22×2.5	22.5	30	27	21.2	18.4	M14×2.0 Thru.hole:Φ12.4	43.5	128	3/8"	24.5
160	108	17	91	178	188	40	M24×3.0	26.5	33	36	24.2	21.2	M16×2.0 Thru.hole:Φ14.4	49	144	3/8"	27.5

Remark) Washer must be used when the cylinder be mounted by through hole. Please refer to this page for male thread dimensions.

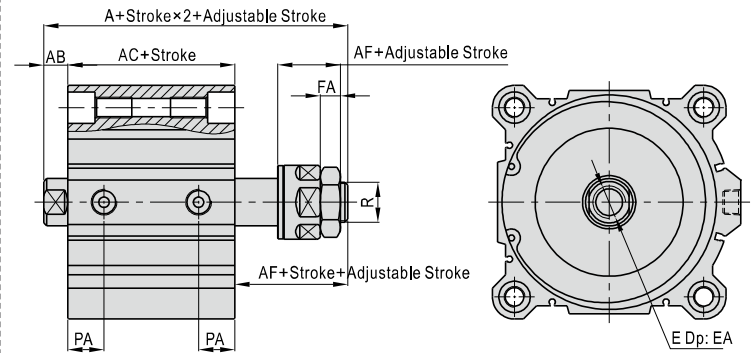
ACQD



Bore size/Item	A	AB	AC	E	EA		PA
					St≤10	St>10	
125	115	16	83	M22×2.5	22.5	30	24.5
140	115	16	83	M22×2.5	22.5	30	24.5
160	125	17	91	M24×3.0	26.5	33	27.5

Remark) The unmarked dimension is the same as ACQ standard type. Please refer to this page for male thread dimensions.

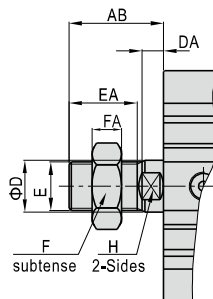
ACQJ



Bore size/Item	A	AB	AC	AF	E	EA		FA	PA	R
						St≤10	St>10			
125	140.8	16	83	42.5	M22×2.5	22.5	30	13.5	24.5	M27×2.0
140	140.8	16	83	42.5	M22×2.5	22.5	30	13.5	24.5	M27×2.0
160	175.3	17	91	68	M24×3.0	26.5	33	18	27.5	M36×2.0

Remark) The unmarked dimension is the same as ACQ standard type. Please refer to this page for male thread dimensions.

Male thread



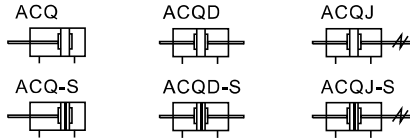
Bore size/Item	AB	D	E	EA	EB	F	FA	H
125	58	32	M30×1.5	42	45	46	18	27
140	58	32	M30×1.5	42	45	46	18	27
160	64	40	M36×1.5	47	50	55	21	36

Compact cylinder

ACQ Series—Longer stroke



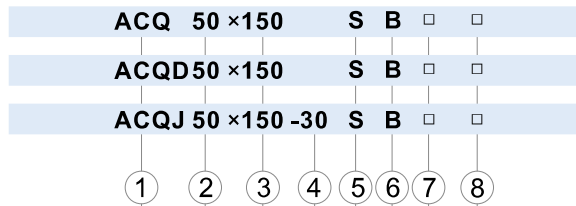
Symbol



Product feature

1. JIS standard is implemented.
2. C clip is adopted to connect the cylinder body and back cover or front cover, and riveted structure is adopted to connect piston and piston rod to make it compact and reliable.
3. The internal diameter of the body is treated with rolling followed by the treatment of hard anodizing, forming an excellent abrasion resistance and durability.
4. The seal of piston adopts heterogeneous two-way seal structure. It has compact dimension and the function of greasel reservation.
5. Compact structure can effectively save installation space.
6. There are magnetic switch slots around the cylinder body, which is convenient to install inducting switch.
7. Installing accessories with various specifications are optional.

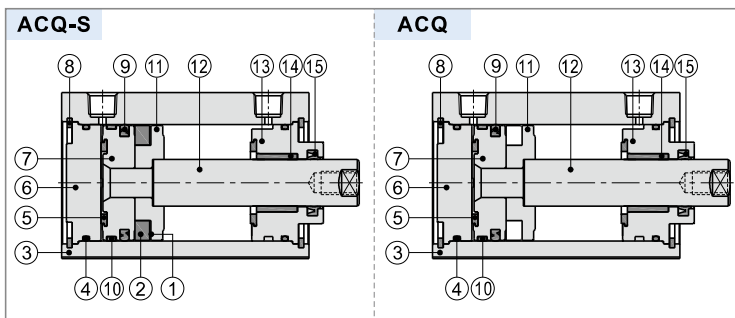
Ordering code



① Model	② Bore size	③ Stroke	④ Adjustable Stroke	⑤ Magnet	⑥ Rod type	⑦ Mounting type [Note 1]	⑧ Thread type
ACQ: Compact cylinder (Double acting)	32 40 50 63 80 100	Refer to stroke table for details	No this code	Blank: Without magnet S: With magnet	Blank: Female thread B: Male thread	Blank: No accessories FA: FA type FB: FB type CB: CB type LB: LB type	Blank: PT G: G T: NPT
ACQD: Compact cylinder (Double rod)							
ACQJ: Compact cylinder (Adjustable stroke)			10 20 30 40 50 75 100				

[Note 1] Please refer to page 120~121 for accessory parts.

Inner structure and material of major parts



NO.	Item	Material	NO.	Item	Material
1	Magnet washer	NBR	10	Wear ring	No(Φ32)Wear resistant material(Others)
2	Magnet	Plastic	11	Magnet holder	Aluminum alloy
3	Body	Aluminum alloy	12	Piston rod	Carbon steel with 20μm chrome plated
4	O-ring	NBR	13	Front cover	Aluminum alloy
5	Bumper	NBR	14	Bushing	No(Φ32)Wear resistant material(Others)
6	Back cover	Aluminum alloy	15	Front cover packing	NBR
7	Piston	Aluminum alloy			
8	C clip	Spring steel			
9	Piston seal	NBR			

Specification

Bore size(mm)	32	40	50	63	80	100
Acting type	Double acting					
Fluid	Air(to be filtered by 40μm filter element)					
Operating pressure	0.15~1.0MPa(22~145psi)					
Proof pressure	1.5MPa(215psi)					
Temperature °C	-20~70					
Speed range mm/s	30~500					
Stroke tolerance	$\begin{matrix} +1.5 \\ 0 \end{matrix}$					
Cushion type	Bumper					
Port size [Note 1]	1/8"		1/4"		3/8"	

[Note 1] PT thread, G thread and NPT thread are available.
Add) Refer to P362 for detail of sensor switch.

Stroke

Bore size(mm)	Standard stroke (mm)						Max.std stroke
32 40 50 63 80 100	125	150	175	200	250	300	300

Note) Within allowable stroke scope, when the stroke is larger than the maximum value, it shall be treated as non-standard one. Please contact the company for other special strokes.

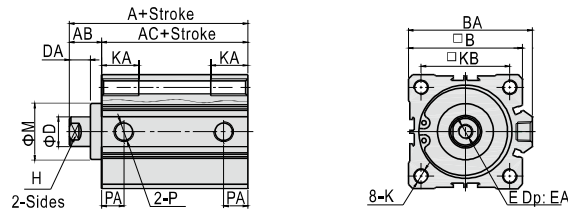
Compact cylinder

ACQ Series—Longer stroke

Dimensions

ACQ

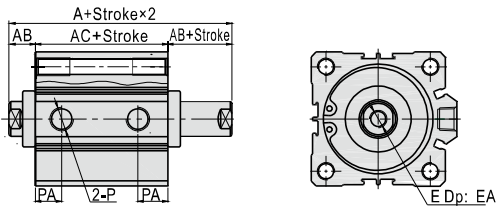
φ32~φ100(Stroke > 100)



Bore size\Item	A	AB	AC	B	BA	D	DA	E	EA	H	K	KA	KB	M	P	PA
32	62.5	17	45.5	45	49.5	16	12	M8×1.25	13	14	M6×1.0 Thru.hole:φ5.2	17	34	22	1/8"	12.5
40	72	17	55	53	57	16	12	M8×1.25	13	14	M6×1.0 Thru.hole:φ5.2	17	40	28	1/8"	14
50	73.5	18	55.5	64	71	20	13	M10×1.5	15	17	M8×1.25 Thru.hole:φ6.7	22	50	35	1/4"	14
63	75	18	57	77	84	20	13	M10×1.5	15	17	M10×1.5 Thru.hole:φ8.5	27	60	35	1/4"	16.5
80	86	20	66	98	104	25	15	M16×2.0	21	22	M12×1.75 Thru.hole:φ10.4	32	77	43	3/8"	19
100	97.5	22	75.5	117	123.5	32	17	M20×2.5	27	27	M12×1.75 Thru.hole:φ10.4	33	94	59	3/8"	23

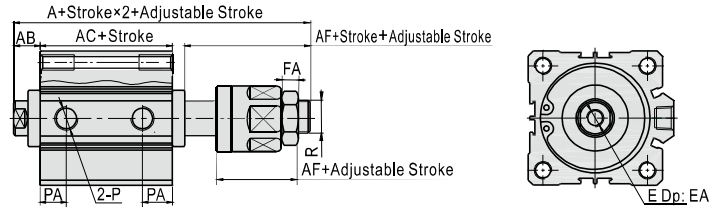
ACQD

φ32~φ100(Stroke > 100)



ACQJ

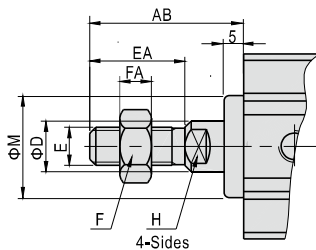
φ32~φ100(Stroke > 100)



Bore size\Item	A(ACQD)		A(ACQJ)		AB	AC		AF	EA	FA	PA	R
	Without magnet	With magnet	Without magnet	With magnet		Without magnet	With magnet					
32	79.5	89.5	95.5	105.5	17	45.5	55.5	28	13	7	12.5	M12×1.25
40	89	99	105	115	17	55	65	28	13	7	14	M12×1.25
50	91.5	101.5	107.5	117.5	18	55.5	65.5	29	15	8	14	M16×1.5
63	93	103	109	119	18	57	67	29	15	8	16.5	M16×1.5
80	106	116	126.5	136.5	20	66	76	35.5	21	10	19	M20×1.5
100	119.5	129.5	145	155	22	75.5	85.5	42.5	27	13.5	23	M27×2.0

Remark) The unmarked dimension is the same as ACQ standard type.

Male thread (Bore size: φ32~φ100 Stroke>100 Longer type)



Bore size\Item	AB	D	E	EA	FA	F	H	M
32	38.5	16	M14×1.5	23	8	19	14	22
40	38.5	16	M14×1.5	23	8	19	14	28
50	43.5	20	M18×1.5	28	11	27	17	35
63	43.5	20	M18×1.5	28	11	27	17	35
80	53.5	25	M22×1.5	35	13	32	22	43
100	53.5	32	M26×1.5	35	13	36	27	59

Compact cylinder

ACQ Series—With guider type



Symbol



Product feature

1. JIS standard is implemented and with guider.
2. C clip is adopted to connect the cylinder body and back cover or front cover to make it compact and reliable.
3. The internal diameter of the body is treated with rolling followed by the treatment of hard anodizing, forming an excellent abrasion resistance and durability.
4. The seal of piston adopts heterogeneous two-way seal structure. It has compact dimension and the function of grease reservation.
5. Compact structure can effectively save installation space.
6. There are magnetic switch slots around the cylinder body, which is convenient to install inducting switch.
7. Double rod non-rotating structure enables to bear large working load and lateral load.

Ordering code

TACQ 50 × 100 S □



① Model	② Bore size	③ Stroke	④ Magnet	⑤ Thread type
TACQ: Compact cylinder (Double acting with guider)	12 16 20 25 32 40 50 63 80 100	Refer to stroke table for details	Blank: Without magnet S: With magnet	Blank: PT G: G T: NPT

Specification

Bore size(mm)	12	16	20	25	32	40	50	63	80	100
Acting type	Double acting									
Fluid	Air(to be filtered by 40µm filter element)									
Operating pressure	0.15~1.0MPa(22~145psi)									
Proof pressure	1.5MPa(215psi)									
Temperature °C	-20~70									
Speed range mm/s	30~500									
Stroke tolerance	$+1.0$ 0									
Cushion type	Bumper									
Port size [Note1]	M5×0.8			1/8"		1/4"		3/8"		
Non-rotating tolerance [Note2]	±0.2°			±0.15°						

[Note1] PT thread, G thread and NPT thread are available.

[Note2] Retract position.

Add) Refer to P362 for detail of sensor switch.

Stroke

Bore size(mm)	Standard stroke (mm)										Max.std stroke (mm)	Middle stroke range(mm)			
	5	10	15	20	25	30	35	40	45	50			75	100	
12 16	●	●	●	●	●	●	●	×	×	×	×	×	×	30	1~29
20 25	●	●	●	●	●	●	●	●	●	●	×	×	×	50	1~49
32 40	●	●	●	●	●	●	●	●	●	●	●	●	●	100	1~99
50 63 80 100	×	●	●	●	●	●	●	●	●	●	●	●	●	100	5~99

[Note] The dimensions of non-std stroke cylinder has the same dimensions as the next longer stroke std. stroke cylinder. e.g. 23mm stroke cylinder has the same dimensions of 25 std. stroke cylinder.

Please contact the company for other special strokes.

Inner structure and material of major parts

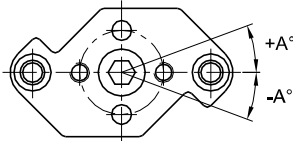
TACQ-S			TACQ			NO.	Item	Material	NO.	Item	Material
8	4	6	7	9	10	11	13	14	1	Back cover	Aluminum alloy
2	1	3	5	17	16	15	11	12	2	Bumper	NBR
3	5	17	16	15	11	12	12	13	3	Piston	Aluminum alloy
3	5	17	16	15	11	12	13	14	4	Piston seal	NBR
3	5	17	16	15	11	12	13	14	5	Piston rod	Carbon steel with 20µm chrome plated
3	5	17	16	15	11	12	13	14	6	Magnet	Sintered metal (Neodymium-iron-boron)
3	5	17	16	15	11	12	13	14	7	Magnet holder	Aluminum alloy
3	5	17	16	15	11	12	13	14	8	Body	Aluminum alloy
3	5	17	16	15	11	12	13	14	9	Wear ring	NBR
3	5	17	16	15	11	12	13	14	10	Front cover	Aluminum alloy
3	5	17	16	15	11	12	13	14	11	O-ring	NBR
3	5	17	16	15	11	12	13	14	12	Front cover packing	NBR
3	5	17	16	15	11	12	13	14	13	C clip	Spring steel
3	5	17	16	15	11	12	13	14	14	Fixing plate	Aluminum alloy
3	5	17	16	15	11	12	13	14	15	Screw	Carbon steel
3	5	17	16	15	11	12	13	14	16	Leader	Stainless steel(Φ12~Φ40)
3	5	17	16	15	11	12	13	14	17	Bushing	Carbon steel with 20µm chrome plated (Φ50~Φ100)
3	5	17	16	15	11	12	13	14	17	Bushing	Brass

Compact cylinder

ACQ Series—With guider type

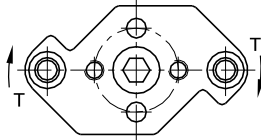
Installation and application

1. TACQ series cylinder is designed with double guide rod which is non-rotating. Make sure the non-rotating accuracy of the fixing plate is in the allowable range.



Bore size	12,16	20,25,32,40,50,63,80,100
Non-rotating tolerance	±0.2°	±0.15°

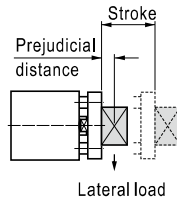
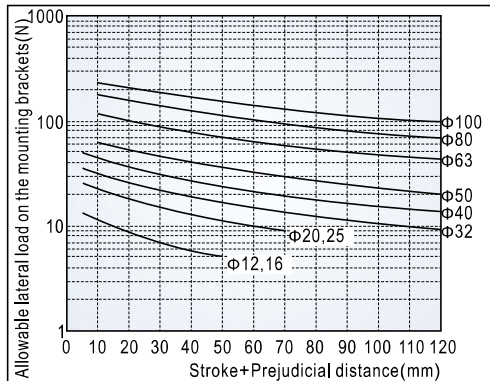
2. Do not apply reverse torque to the piston rods. The torque beyond the limits may cause malfunction or reduction of the service life.



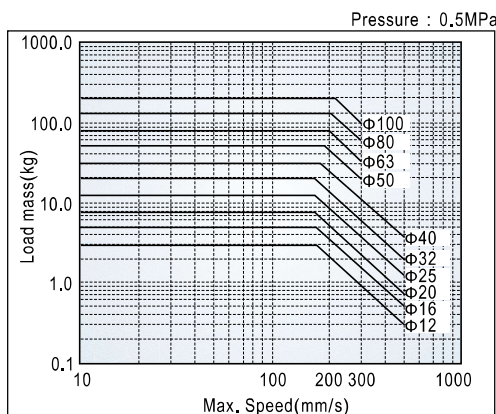
Unit : N·m

Bore size\Stroke	5	10	15	20	25	30	35	40	45	50	75	100
12	0.11	0.10	0.08	0.07	0.07	0.06	-	-	-	-	-	-
16	0.15	0.12	0.11	0.10	0.09	0.08	-	-	-	-	-	-
20	0.37	0.32	0.28	0.25	0.23	0.21	0.19	0.18	0.17	0.16	-	-
25	0.40	0.35	0.31	0.28	0.25	0.23	0.21	0.20	0.18	0.17	-	-
32	0.66	0.59	0.53	0.49	0.45	0.42	0.39	0.36	0.34	0.32	0.25	0.20
40	1.06	0.96	0.88	0.81	0.75	0.70	0.65	0.61	0.58	0.55	0.43	0.36
50	-	1.70	1.56	1.45	1.35	1.26	1.19	1.12	1.06	1.01	0.80	0.67
63	-	3.90	3.62	3.37	3.15	2.96	2.80	2.65	2.51	2.39	1.92	1.61
80	-	7.44	6.98	6.56	6.20	5.87	5.57	5.31	5.07	4.84	3.98	3.37
100	-	11.85	11.19	10.61	10.08	9.60	9.17	8.77	8.41	8.07	6.73	5.77

3. Make sure the lateral load on the mounting bracket is within the limits. Any exceeding may cause malfunction or reduction of the service life.

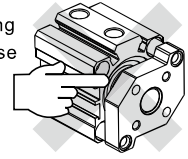


4. Make sure the load quality and the maximum speed are within the limits. Any exceeding may cause malfunction or reduction of the service life.

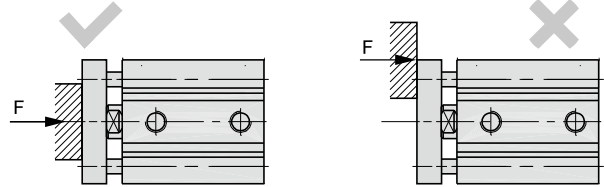


5. Caution before mounting:

- 5.1) Do not put hands between the mounting bracket and cylinder, which may cause damage to a human body when the piston rod retracts.



- 5.2) Make sure the external force against the mounting bracket is concentric with the piston rod. Any extra torque may cause damage to the cylinder.



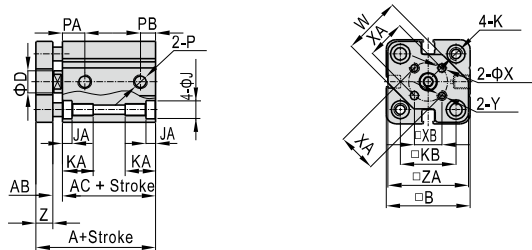
- 5.3) Install the fixture onto the mounting bracket only when the piston rod is in the retraction state. Do not apply the installation torque on the guide rod.
- 5.4) Avoid any damage on piston rod and guide rod, which may cause damage on seals and air leakage or malfunction.

Compact cylinder

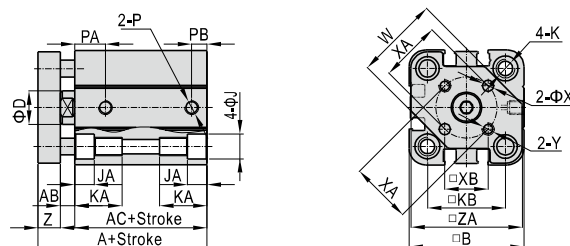
ACQ Series—With guider type

Dimensions

Φ12/Φ16



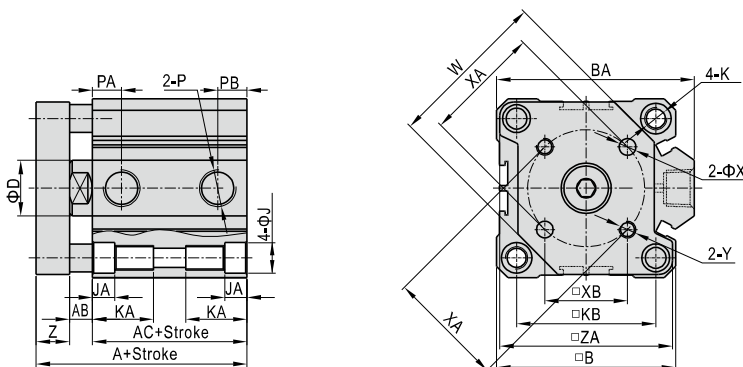
Φ20/Φ25



Bore size/Item	A		AC		AB	B	D	J	JA	K						
	Without magnet	With magnet	Without magnet	With magnet						Without magnet	With magnet	Without magnet	With magnet	W	X	XA
12	26.5	37.5	17.3	28.3	3	26	6	6	3.5	M4×0.7 Thru.hole:Φ3,4						
16	28	40	19	31	3	30	8	6	3.5	M4×0.7 Thru.hole:Φ3,4						
20	32	44	20.5	32.5	3.5	36	10	9	5.5	M6×1.0 Thru.hole:Φ5,2						
25	35.5	45.5	23	33	4.5	41	12	9	5.5	M6×1.0 Thru.hole:Φ5,2						

Bore size/Item	KA	KB	P	PA		PB		W	X	XA	XB	Y	Z	ZA
				Without magnet	With magnet	Without magnet	With magnet							
12	11.5	15.5	M5×0.8	7.5	9	5	7	15	3	10	7.1	M3×0.5	6	25
16	11.5	20	M5×0.8	8.5	10	5.5	5.5	21	3	14	9.9	M3×0.5	6	29
20	18	25.5	M5×0.8	10	10.5	5.5	5.5	26	4	17	12	M4×0.7	8	35
25	17.5	28	M5×0.8	11.5	11.5	5.5	5.5	30	5	22	15.6	M5×0.8	8	40

Φ32~Φ100



Bore size/Item	A(Without magnet)		A (With magnet)	AB	AC(Without magnet)		AC (With magnet)	B	BA	D	J	JA	K				
	St≤50	St≥75			St≤50	St≥75							Without magnet	With magnet	W	X	XA
32	40	50	50	6.5	23.5	33.5	33.5	45	49.5	16	9	5.5	M6×1.0 Thru.hole:Φ5.2				
40	46.5	56.5	56.5	6.6	30	40	40	53	57	16	9	5.5	M6×1.0 Thru.hole:Φ5.2				
50	50.5	60.5	60.5	7.5	31	41	41	64	71	20	10.5	6.5	M8×1.25 Thru.hole:Φ6.7				
63	56	66	66	8	36	46	46	77	84	20	14	9	M10×1.5 Thru.hole:Φ8.5				
80	67.5	77.5	77.5	10	43.5	53.5	53.5	98	104	25	17	11	M12×1.75 Thru.hole:Φ10.4				
100	81	91	91	12	53	63	63	117	123.5	32	17	11	M12×1.75 Thru.hole:Φ10.4				

Bore size/Item	KA	KB	P	PA	PA	PB	PB	W	X	XA	XB	Y	Z	ZA
				(Without magnet)	(With magnet)	(Without magnet)	(With magnet)							
32	17.5	34	1/8"	8	10.5	6.5	7.5	37	5	28	19.8	M5×0.8	10	43
				11		7.5								
40	17.5	40	1/8"	11	11	8	8	46	5	33	23.3	M5×0.8	10	51
50	22.5	50	1/4"	10.5	10.5	11	11	58	6	42	29.7	M6×1.0	12	62
63	28.5	60	1/4"	15	15	10.5	10.5	69	6	50	35.4	M6×1.0	12	75
80	35.5	77	3/8"	16	16	14	14	90	8	65	46	M8×1.25	14	95
100	35.5	94	3/8"	20	20	17.5	17.5	113.5	10	80	56.6	M10×1.5	16	114.5

List for ordering code of accessories

Accessories Bore size	Mounting accessories			Knuckle				Sensor switch
	LB	FA/FB	CB	I	Y	F	U	
12	F-ACQ12LB	F-ACQ12FA	F-ACQ12CB	F-ACQ12I	F-ACQ12Y	-	F-M5X080U	CMSG DMSG EMSG
16	F-ACQ16LB	F-ACQ16FA	F-ACQ16CB	F-ACQ16I	F-ACQ16Y	-	F-M6X100U	
20	F-ACQ20LB	F-ACQ20FA	F-ACQ20CB	F-ACQ20I	F-ACQ20Y	F-M8X125F	F-M8X125U	
25	F-ACQ25LB	F-ACQ25FA	F-ACQ25CB	F-ACQ25I	F-ACQ25Y	F-M10X125F	F-M10X125U	
32	F-ACQ32LB	F-ACQ32FA	F-ACQ32CB	F-ACQ32I	F-ACQ32Y	F-M14X150F	F-M14X150U	CMSJ DMSJ CMSG DMSG EMSG
40	F-ACQ40LB	F-ACQ40FA	F-ACQ40CB					
50	F-ACQ50LB	F-ACQ50FA	F-ACQ50CB	F-ACQ50I	F-ACQ50Y	F-M18X150F	F-M18X150U	
63	F-ACQ63LB	F-ACQ63FA	F-ACQ63CB					
80	F-ACQ80LB	F-ACQ80FA	F-ACQ80CB	F-ACQ80I	F-ACQ80Y	-	-	
100	F-ACQ100LB	F-ACQ100FA	F-ACQ100CB					
125	-	-	-					CMSH\DMSH EMSH CMSG\DMSG EMSG
140	-	-	-					
160	-	-	-					

Accessory selection

Cylinder model	Accessories	Mounting accessories				Knuckle[Note2]				Sensor switch[Note3]		
		LB	FA	FB	CB [1]	I	Y	U	F	CMSJ DMSJ	CMSG/DMSG EMSG	CMSH/DMSH EMSH
ACQ	Female thread	Without magnet								x	x	x
		With magnet				x	x	x	x	•	•	•
	Male thread	Without magnet	•	•	•					x	x	x
		With magnet	•	•	•	•	•	•	•	•	•	•
ASQ ATQ	Female thread	Without magnet				x	x	x	x	x	x	x
		With magnet	•	•	•					•	•	•
	Male thread	Without magnet	•	•	•					x	x	x
		With magnet	•	•	•	•	•	•	•	•	•	•
ACQD ACQJ	Female thread	Without magnet				x	x	x	x	x	x	x
		With magnet	•	•	x	x				•	•	•
	Male thread	Without magnet	•	•	x	x				x	x	x
		With magnet	•	•	•	•	•	•	•	•	•	•

Material of accessories

Accessories Bore size	Mounting accessories				Knuckle			
	LB	FA	FB	CB	I	Y	F	U
12, 15	△	•	•	•	▲	▲	▲	▲
20, 25	△	•	•	•	▲	▲	▲	▲
32~100	△	•	•	■	▲	■	▲	▲

•—Aluminum alloy ; ■—Cast Steel
 ▲—S45C ; △—SPCC

[Note1] CB is attached with relevant PIN.
 Mounting accessories and Knuckle unavailable for bore size 125,140,160 cylinder.

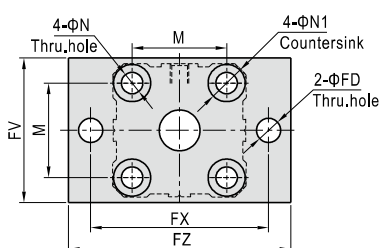
[Note2] Please refer to P358~361 for knuckle detail.

[Note3] CMSH/DMSH sensor switch only available for bore size 125,140,160 cylinder.

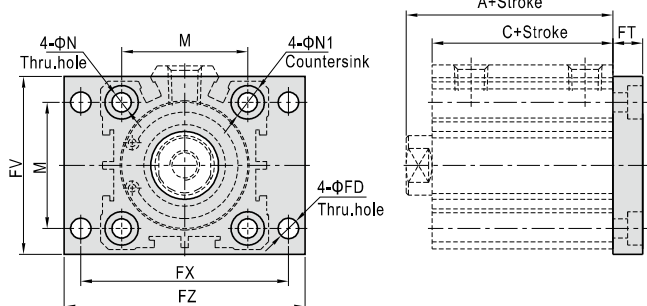
Dimensions

FA/FB

φ12~φ25



φ32~φ100



Bore size/Item	A [Note1]			C				M	N	N1	FD	FT	FV	FX	FZ	
	Without magnet	With magnet	Without magnet	With magnet	Without magnet	With magnet										
Stroke	≤50	55	≥60	≤50	55	≥60	With magnet									
12	20.5	-	-	31.5	17	-	-	28	15.5	4.5	7.5	4.5	5.5	25	45	55
16	22	22	-	34	18.5	18.5	-	30.5	20	4.5	7.5	4.5	5.5	30	45	55
20	24	-	34	36	19.5	-	29.5	31.5	25.5	6.5	10.5	6.5	8	39.5	48	60
25	27.5	-	37.5	37.5	22.5	-	32.5	32.5	28	6.5	10.5	6.5	8	42	52	64
32	30	-	40	40	23	-	33	33	34	6.5	10.5	5.5	8	48	56	65
40	36.5	-	46.5	46.5	29.5	-	39.5	39.5	40	6.5	10.5	5.5	8	54	62	72
50	38.5	-	48.5	48.5	30.5	-	40.5	40.5	50	8.5	13.5	6.5	9	67	76	89
63	44	-	54	54	36	-	46	46	60	10.5	16.5	9	10	80	92	108
80	53.5	-	63.5	63.5	43.5	-	53.5	53.5	77	12.5	18.5	11	12	99	116	134
100	65	-	75	75	53	-	63	63	94	12.5	18.5	11	12	117	136	154

[Note] Value A and C in the above table are only for ACQ series.

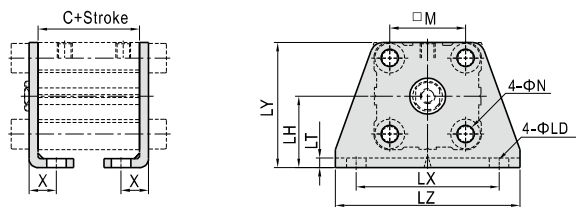
Please refer to relevant content for value A and C of other series.

Compact cylinder

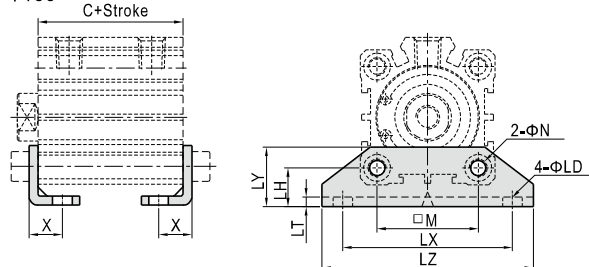
ACQ Series—Accessories

LB

Φ12~Φ25



Φ32~Φ100

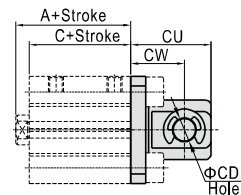
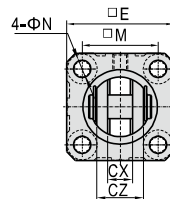


Bore size/Item	C [Note]			M	N	X	LD	LH	LT	LX	LY	LZ	
	Without magnet	With magnet	Stroke										
12	17	-	-	28	15.5	4.5	8	4.5	17	2	34	29.5	44
16	18.5	18.5	-	30.5	20	4.5	8	4.5	19	2	38	33.5	48
20	19.5	-	29.5	31.5	25.5	6.5	9.2	6.5	24	3	48	42	62
25	22.5	-	32.5	32.5	28	6.5	10.7	6.5	26	3	52	46	66
32	23	-	33	33	34	6.5	11.2	6.5	13	3	57	20	71
40	29.5	-	39.5	39.5	40	6.5	11.2	6.5	13	3	64	20	78
50	30.5	-	40.5	40.5	50	8.5	12.2	8.5	14	3	79	22	95
63	36	-	46	46	60	10.5	13.7	10.5	16	3	95	26	113
80	43.5	-	53.5	53.5	77	13	16.5	13	20.5	4.5	118	32	140
100	53	-	63	63	94	13	23	13	24	6	137	36	162

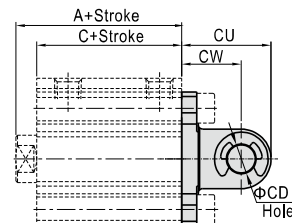
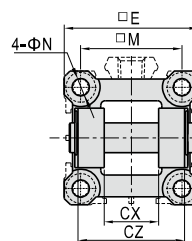
[Note] Value C in the above table is only for ACQ series.
Please refer to relevant content for value C of other series.

CB

Φ12~Φ25



Φ32~Φ100



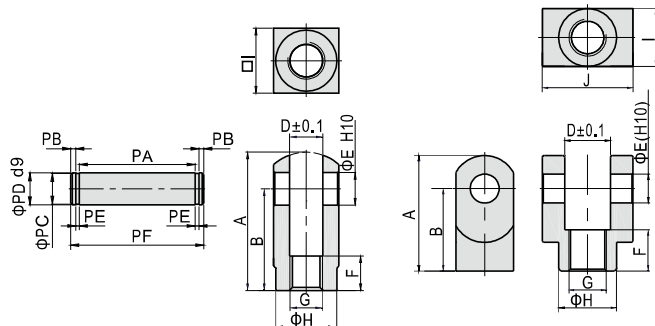
Item	A [Note]			C			E	M	N	CD	CU	CW	CX	CZ		
	Without magnet	With magnet	Stroke	Without magnet	With magnet	Stroke										
12	20.5	-	-	31.5	17	-	-	28	25	15.5	4.5	5	20	14	5.3	9.8
16	22	22	-	34	18.5	18.5	-	30.5	29	20	4.5	5	21	15	6.8	11.8
20	24	-	34	36	19.5	-	29.5	31.5	36	25.5	6.5	8	27	18	8.3	15.8
25	27.5	-	37.5	37.5	22.5	-	32.5	32.5	40	28	6.5	10	30	20	10.3	19.8
32	30	-	40	40	23	-	33	33	45.5	34	6.5	10	30	20	18.3	35.8
40	36.5	-	46.5	46.5	29.5	-	39.5	39.5	53.5	40	6.5	10	32	22	18.3	35.8
50	38.5	-	48.5	48.5	30.5	-	40.5	40.5	64.5	50	8.5	14	42	28	22.3	43.8
63	44	-	54	54	36	-	46	46	77.5	60	10.5	14	44	30	22.3	43.8
80	53.5	-	63.5	63.5	43.5	-	53.5	53.5	98.5	77	12.5	18	56	38	28.3	55.8
100	65	-	75	75	53	-	63	63	117.5	94	12.5	22	67	45	32.3	63.8

[Note] Value A and C in the above table are only for ACQ series.
Please refer to relevant content for value A and C of other series.

Y Knuckle

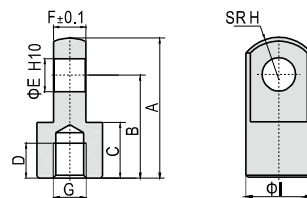
F-ACQ12Y
F-ACQ16Y
F-ACQ20Y
F-ACQ25Y

F-ACQ32Y
F-ACQ50Y
F-ACQ80Y
F-ACQ100Y



Type/Item	A	B	D	E	F	G	H	I	J	PA	PB	PC	PD	PE	PF
F-ACQ12Y	22	16	5.3	5	6	M5×0.8	9	10	-	10.2	1.5	4	5	0.7	14.6
F-ACQ16Y	28	21	6.6	5	11	M6×1.0	11	12	-	12.4	1.5	4	5	0.7	16.8
F-ACQ20Y	34	25	8.3	8	8.5	M8×1.25	15	16	-	16.2	1.5	7	8	0.9	21
F-ACQ25Y	41	30	10.3	10	10.5	M10×1.25	19	20	-	20.2	2	8	10	1.1	26.4
F-ACQ32Y	42	30	18.4	10	16	M14×1.5	22	22	36	36.2	2	8	10	1.1	42.4
F-ACQ50Y	56	40	22.4	14	20	M18×1.5	28	28	44	44.2	2	12	14	1.1	50.4
F-ACQ80Y	71	50	28.4	18	23	M22×1.5	38	38	56	56.2	2	15	18	1.7	63.6
F-ACQ100Y	79	55	32.4	22	24	M26×1.5	44	44	64	64.2	2.5	19	22	1.7	72.6

I Knuckle



Type/Item	A	B	C	D	E	F	G	H	I
F-ACQ12I	21.5	16	9	6	5	4.7	M5×0.8	6.3	10
F-ACQ16I	32	25	11	8	5	6.2	M6×1.0	8.1	12
F-ACQ20I	34	25	13.5	8.5	8	7.7	M8×1.25	10.3	16
F-ACQ25I	41	30	16	11	10	9.7	M10×1.25	12.8	20
F-ACQ32I	42	30	16	14	10	17.6	M14×1.5	12	22
F-ACQ50I	56	40	20	18	14	21.6	M18×1.5	16	28
F-ACQ80I	71	50	23	21	18	27.6	M22×1.5	21	38
F-ACQ100I	79	55	24	22	22	31.6	M26×1.5	24	44



Compact cylinder——SDA Series

Compendium of SDA Series

Manufactured by our enterprise

Magnetic switch slots around the cylinder body
There are magnetic switch slots around the cylinder body convenient to install inducting switch.

Two kinds of rod type

Female thread Male thread

Ten bore size are available
Bore size: 12, 16, 20, 25, 32, 40, 50, 63, 80, 100

Compact structure
Riveted structure is adopted to connect the cylinder body and back cover, and piston and piston rod to make it compact and reliable

Multi-type cylinder	
SDA: Compact cylinder (Double acting)	
SSA: Compact cylinder (Single acting-push)	
STA: Compact cylinder (Single acting-pull)	
SDAD: Compact cylinder (Double rod)	
SDAJ: Compact cylinder (Adjustable stroke)	
SDAT: Compact cylinder (Duplex type)	
SDAW: Compact cylinder (Duplex-end type)	

Criteria for selection: Cylinder thrust

Unit : Newton(N)

Bore size	Rod size	Acting type	Pressure area(mm ²)	Operating pressure(MPa)							Bore size	Rod size	Acting type	Pressure area(mm ²)	Operating pressure(MPa)							
				0.1	0.2	0.3	0.4	0.5	0.6	0.7					0.1	0.2	0.3	0.4	0.5	0.6	0.7	
12	6	Single acting Push side	113.1	-	12.6	23.9	35.2	46.5	57.9	69.2	40	16	Single acting Push side	1256.6	-	168.6	294.3	420.0	545.6	671.3	796.9	
		Single acting Pull side	84.8	-	7.0	15.4	23.9	32.4	40.9	49.4			Single acting Pull side	1055.6	-	128.4	234.0	339.5	445.1	550.6	656.2	
	Double acting Push side	113.1	-	22.6	33.9	45.2	56.5	67.9	79.2	Double acting Push side		1256.6	125.7	251.3	377.0	502.7	628.3	754.0	879.6			
	Double acting Pull side	84.8	-	17.0	25.4	33.9	42.4	50.9	59.4	Double acting Pull side		1055.6	105.6	211.1	316.7	422.2	527.8	633.3	738.9			
16	6	Single acting Push side	201.1	-	20.2	40.3	60.4	80.5	100.6	120.7	50	20	Single acting Push side	1963.5	-	89.3	285.7	482.0	678.4	874.7	1071.1	1267.4
		Single acting Pull side	172.8	-	14.6	31.8	49.1	66.4	83.7	101.0			Single acting Pull side	1649.3	57.9	222.9	387.8	552.7	717.7	882.6	1047.5	
	Double acting Push side	201.1	-	40.2	60.3	80.4	100.5	120.6	140.7	Double acting Push side		1963.5	196.3	392.7	589.0	785.4	981.7	1178.1	1374.4			
	Double acting Pull side	172.8	-	34.6	51.8	69.1	86.4	103.7	121.0	Double acting Pull side		1649.3	164.9	329.9	494.8	659.7	824.7	989.6	1154.5			
20	8	Single acting Push side	314.2	-	39.8	71.2	102.7	134.1	165.5	196.9	63	20	Single acting Push side	3117.2	-	135.7	447.4	759.2	1070.9	1382.6	1694.3	2006.1
		Single acting Pull side	263.9	-	29.8	56.2	82.6	108.9	135.3	161.7			Single acting Pull side	2803.1	104.3	384.6	664.9	945.2	1225.5	1505.9	1786.2	
	Double acting Push side	314.2	-	62.8	94.2	125.7	157.1	188.5	219.9	Double acting Push side		3117.2	311.7	623.4	935.2	1246.9	1558.6	1870.3	2182.1			
	Double acting Pull side	263.9	-	52.8	79.2	105.6	131.9	158.3	184.7	Double acting Pull side		2803.1	280.3	560.6	840.9	1121.2	1401.5	1681.9	1962.2			
25	10	Single acting Push side	490.9	-	69.7	118.8	167.8	216.9	266.0	315.1	80	25	Double acting Push side	5026.5	-	502.7	1005.3	1508.0	2010.6	2513.3	3015.9	3518.6
		Single acting Pull side	412.3	-	54.0	95.2	136.4	177.7	218.9	260.1			Single acting Pull side	4535.7	453.6	907.1	1360.7	1814.3	2267.8	2721.4	3175.0	
	Double acting Push side	490.9	-	98.2	147.3	196.3	245.4	294.5	343.6	Double acting Push side		7854.0	785.4	1570.8	2356.2	3141.6	3927.0	4712.4	5497.8			
	Double acting Pull side	412.3	-	82.5	123.7	164.9	206.2	247.4	288.6	Double acting Pull side		7049.7	705.0	1409.9	2114.9	2819.9	3524.9	4229.8	4934.8			
32	12	Single acting Push side	804.2	-	105.3	185.8	266.2	346.6	427.0	507.5	100	32	Double acting Push side	7854.0	-	785.4	1570.8	2356.2	3141.6	3927.0	4712.4	5497.8
		Single acting Pull side	691.2	-	82.7	151.8	221.0	290.1	359.2	428.3			Single acting Pull side	7049.7	705.0	1409.9	2114.9	2819.9	3524.9	4229.8	4934.8	
	Double acting Push side	804.2	-	160.8	241.3	321.7	402.1	482.5	563.0	Double acting Pull side		7049.7	705.0	1409.9	2114.9	2819.9	3524.9	4229.8	4934.8			
	Double acting Pull side	691.2	-	138.2	207.3	276.5	345.6	414.7	483.8													

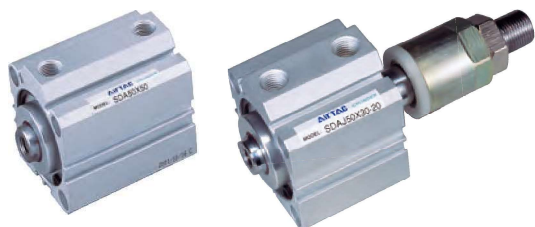
Installation and application



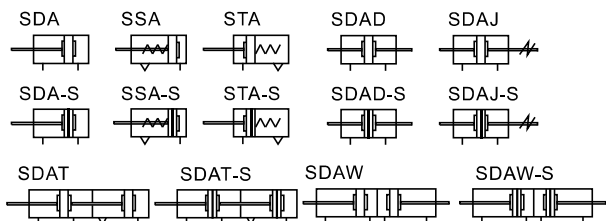
- When load changes in the work, the cylinder with abundant output capacity shall be selected.
- Relative cylinder with high temperature resistance or corrosion resistance shall be chosen under the condition of high temperature or corrosion.
- Necessary protection measure shall be taken in the environment with higher humidity, much dust or water drops, oil dust and welding dregs.
- Dirty substances in the pipe must be eliminated before cylinder is connected with pipeline to prevent the entrance of particles into the cylinder.
- The medium used by cylinder shall be filtered to 40μm or below.
- As both of the front cover and piston of the cylinder are short, typically too large stroke can not be selected.
- Anti-freezing measure shall be adopted under low temperature environment to prevent moisture freezing.
- The cylinder shall avoid the influence of side load in operation to maintain the normal work of cylinder and extend the service life.
- If the cylinder is dismantled and stored for a long time, please conduct anti-rust treatment to the surface. Anti-dust caps shall be added in air inlet and outlet ports. The front and back cover can not be dismantled, which shall be especially noticed.



SDA Series



Symbol



Product feature

1. Manufactured by our enterprise.
2. Riveted structure is adopted to connect the cylinder body and back cover, and piston and piston rod to make it compact and reliable;
3. The inner diameter of the body is treated with rolling followed by the treatment of hard anodizing, forming an excellent abrasion resistance and durability.
4. The seal of piston adopts heterogeneous two-way seal structure. It has compact dimension and the function of grease reservation.
5. Compact structure can effectively save installation space.
6. There are magnetic switch slots around the cylinder body, which is convenient to install sensor switch
7. Mounting accessories with various specifications are optional.

Specification

Bore size(mm)	12	16	20	25	32	40	50	63	80	100
Acting type	Double acting									
	Single acting_Push type、Single acting_Pull type									-
Fluid	Air(to be filtered by 40μm filter element)									
Operating pressure	Double acting 0.15~1.0MPa(22~145psi)(1.5~10.0bar)									
	Single acting 0.2~1.0MPa(28~145psi)(2.0~10.0bar)									
Proof pressure	1.5MPa(215psi)(15bar)									
Temperature °C	-20~70									
Speed range mm/s	Double acting : 30~500 Single acting : 50~500									
Stroke tolerance	Strokes≤100 ^{+1.0} ₀ Stroke>100 ^{+1.5} ₀									
Cushion type	Bumper									
Port size [Note1]	M5×0.8			1/8"			1/4"		3/8"	

[Note1] PT thread is available.
Add) Refer to P362 for detail of sensor switch.

Stroke

Bore size (mm)		Standard stroke (mm)										Max.std stroke													
12	Double acting	With magnet	5	10	15	20	25	30	35	40	45	50	50												
		Without magnet	5	10	15	20	25	30	35	40	45	50	55	60	60										
16	Single acting		5	10	15	20	25	30	30					30											
		With magnet	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75	80	85	90	90				
20	Double acting	Without magnet	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75	80	85	90	100	100			
		Single acting	5	10	15	20	25	30	30													30			
25	Double acting	With magnet	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75	80	85	90	100	110	120	120	
		Without magnet	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75	80	85	90	100	110	120	130	130
32	Single acting		5	10	15	20	25	30	30															30	
		With magnet	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75	80	85	90	100	110	120	120	
40	Double acting	Without magnet	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75	80	85	90	100	110	120	130	130
		Single acting	5	10	15	20	25	30	30																30
50	Double acting	With magnet	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75	80	85	90	100	110	120	120	
		Without magnet	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75	80	85	90	100	110	120	130	130

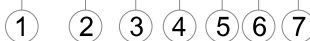
- Note) 1. Please contact the company for other special strokes.
2. The dimensions of non-std stroke cylinder has the same dimensions as the next longer stroke std. stroke cylinder, e.g. 23mm stroke cylinder has the same dimensions of 25 std. stroke cylinder.

Ordering code

SDA 20 × 30 S B □

SDAD 20 × 30 S B □

SDAJ 20 × 30-30 S B □



① Model	② Bore size	③ Stroke	④ Adjustable Stroke	⑤ Magnet	⑥ Rod type	⑦ Thread type [Note1]
SDA: Compact cylinder(Double acting)	12 16 20 25 32 40 50 63 80 100	Refer to stroke table for details	No this code	Blank: Without magnet S: With magnet	Blank: Female thread B: Male thread	Blank: PT
SSA: Compact cylinder(Single acting-push)	12 16 20 25					
STA: Compact cylinder(Single acting-pull)	32 40 50 63					
SDAD: Compact cylinder(Double rod)	12 16 20 25 32 40 50 63 80 100					
SDAJ: Compact cylinder(Adjustable stroke)	12 16 20 25 32 40 50 63 80 100					

SDAT 20 × 30 × 10 S B □



① Model	② Bore size	③ Stroke 1	④ Stroke 2 [Note2]	⑤ Magnet	⑥ Rod type	⑦ Thread type [Note1]
SDAT: Compact cylinder (Duplex type)	12 16 20 25 32 40 50 63 80 100	Refer to stroke table for details	Refer to stroke table for details	Blank: Without magnet S: With magnet	Blank: Female thread B: Male thread	Blank: PT
SDAW: Compact cylinder(Duplex-end type)						

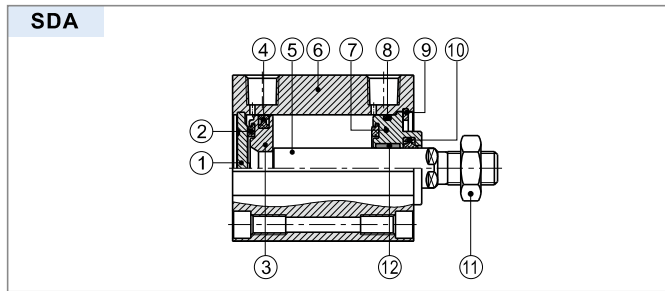
[Note1] Standard thread is blank here.

[Note2] Stroke1+Stroke2≤The value in the stroke table.



SDA Series

Inner structure and material of major parts

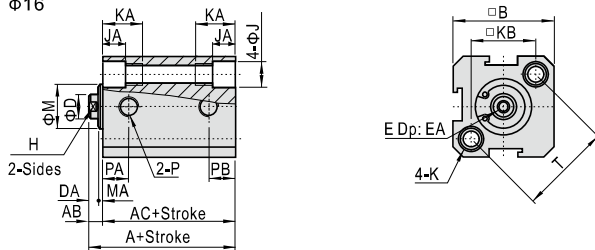


NO.	Item	Material
1	Back cover	No(Φ12, 16)/Aluminum alloy(Others)
2	Bumper	NBR
3	Piston	Brass(Φ12, 16)/Aluminum alloy(Others)
4	Piston seal	NBR
5	Piston rod	Carbon steel with 20μm chrome plated
6	Body	Aluminum alloy
7	Front cover	Aluminum alloy
8	O-ring	NBR
9	C clip	Spring steel
10	Front cover packing	NBR
11	Piston nut	Carbon steel
12	Bushing	No(Φ12~32)/Wear resistant material(Others)

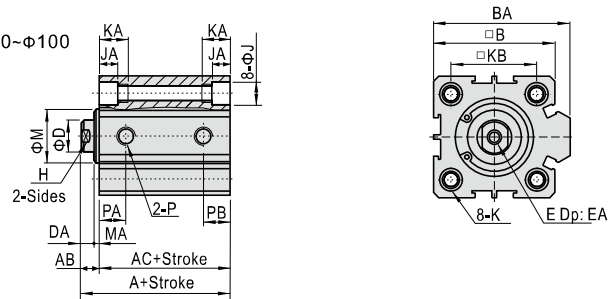
Dimensions

SDA

Φ12, Φ16



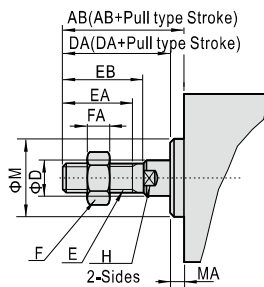
Φ20-Φ100



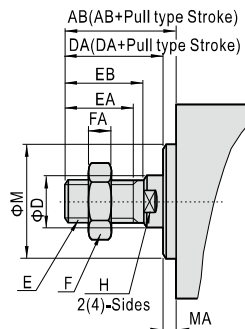
Item	A	AC	A		AB	B	BA	D	DA	E	EA	H	J	JA	K	KA	KB	M	MA	P	PA				PB				T
			Without magnet	With magnet																	St=5	St>5	St=5	St>5					
12	22	17	32	27	5	25	-	6	4	M3×0,5	6	5	6,5	4,5	M5×0,8Thru.hole:Φ4,2	12	16,3	10,2	1	M5×0,8	7,5	7,5	5	5	23				
16	24	18,5	34	28,5	5,5	29	-	6	4	M3×0,5	6	5	6,5	4,5	M5×0,8Thru.hole:Φ4,2	12	19,8	11	1,5	M5×0,8	8	8	5	5,5	28				
20	25	19,5	35	29,5	5,5	34	36	8	4	M4×0,7	8	6	6,5	4,5	M5×0,8Thru.hole:Φ4,2	14	24	13	1,5	M5×0,8	8	9	5	5,5	-				
25	27	21	37	31	6	40	42	10	4	M5×0,8	10	8	8,2	5,5	M6×1,0Thru.hole:Φ5,2	15	28	17	2	M5×0,8	9	9	5,5	5,5	-				
32	31,5	24,5	41,5	34,5	7	44	50	12	4,5	M6×1,0	12	10	8,2	5,5	M6×1,0Thru.hole:Φ5,2	16	34	22	2,5	1/8"	9	9	6,5	9	-				
40	33	26	43	36	7	52	58,5	16	4	M8×1,25	12	14	10,5	6,5	M8×1,25Thru.hole:Φ6,7	20	40	28	3	1/8"	9,5	9,5	7,5	7,5	-				
50	37	28	47	38	9	62	71,5	20	5	M10×1,5	15	17	10,5	6,5	M8×1,25Thru.hole:Φ6,7	25	48	38	4	1/4"	8	10,5	8	10,5	-				
63	41	32	51	42	9	75	84,5	20	5	M10×1,5	15	17	10,5	6,5	M8×1,25Thru.hole:Φ6,7	25	60	40	4	1/4"	9,5	12	9,5	11	-				
80	52	41	62	51	11	94	104	25	6	M14×1,5	20	22	17	11	M12×1,75Thru.hole:Φ10,4	25	74	45	5	3/8"	11,5	14,5	11,5	14,5	-				
100	63	51	73	61	12	114	124	32	7	M18×1,5	20	27	19	13	M14×2,0Thru.hole:Φ12,4	30	90	55	5	3/8"	16	20,5	16	20,5	-				

Male thread

Φ12, Φ16



Φ20-Φ100



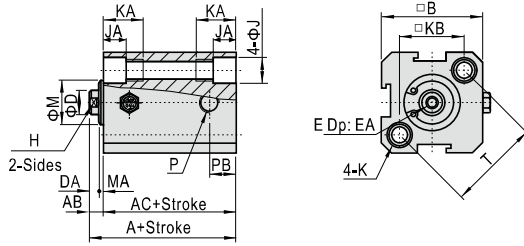
Bore size\Item	AB	D	DA	E	EA	EB	F	FA	H	M	MA		
											SDAD	SDAJ	Others
12	17	6	16	M5×0,8	10	12	8	4	5	10,2	1		1
16	17,5	6	16	M5×0,8	10	12	8	4	5	11	1,5		1,5
20	20,5	8	19	M6×1,0	13	15	10	5	6	13	1,5		1,5
25	23	10	21	M8×1,25	15	17	12	6	8	17	2		2
32	25	12	22	M10×1,25	15	18	17	6	10	22	3		2,5
40	35	16	32	M14×1,5	25	27,5	19	8	14	28	3		3
50	36,5	20	32,5	M18×1,5	25,5	27,5	27	11	17	38	4		4
63	37,5	20	33,5	M18×1,5	26	28	27	11	17	40	4		4
80	44	25	39	M22×1,5	30	33	32	13	22	45	5		5
100	50	32	45	M26×1,5	35	38	36	13	27	55	5		5

Compact cylinder

SDA Series

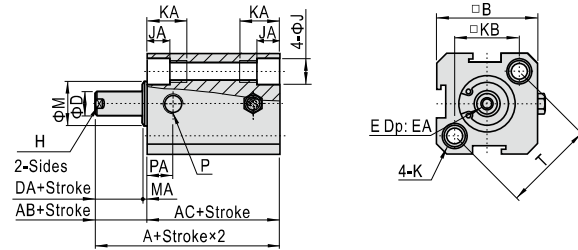
SSA

φ12、φ16

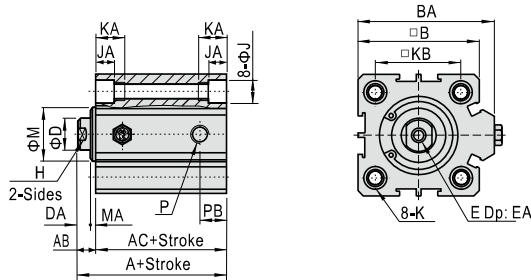


STA

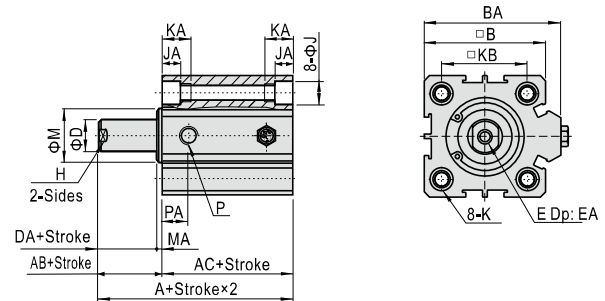
φ12、φ16



φ20~φ63



φ20~φ63



Bore size\Item	A(Without magnet)		A(With magnet)		AB	AC(Without magnet)		AC(With magnet)		B	BA
	St≤10	St>10	St≤10	St>10		St≤10	St>10	St≤10	St>10		
12	32	42	42	52	5	27	37	37	47	25	-
16	34	44	44	54	5.5	28.5	38.5	38.5	48.5	29	-
20	35	45	45	55	5.5	29.5	39.5	39.5	49.5	34	36
25	37	47	47	57	6	31	41	41	51	40	42
32	41.5	51.5	51.5	61.5	7	34.5	44.5	44.5	54.5	44	50
40	43	53	53	63	7	36	46	46	56	52	58.5
50	47	57	57	67	9	38	48	48	58	62	71.5
63	51	61	61	71	9	42	52	52	62	75	84.5

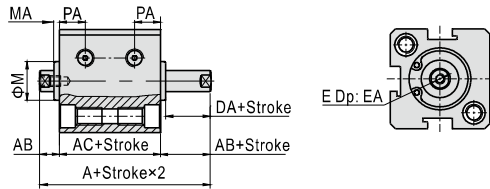
Bore size\Item	D	DA	E	EA	H	J	JA	K		KA	KB	M	MA	P	PA	PB	T
								M5×0.8 Thru.hole:φ4.2	M6×1.0 Thru.hole:φ5.2								
12	6	4	M3×0.5	6	5	6.5	4.5	M5×0.8 Thru.hole:φ4.2	12	16.3	10.2	1	M5×0.8	7.5	5	23	
16	6	4	M3×0.5	6	5	6.5	4.5	M5×0.8 Thru.hole:φ4.2	12	19.8	11	1.5	M5×0.8	8	5.5	28	
20	8	4	M4×0.7	8	6	6.5	4.5	M5×0.8 Thru.hole:φ4.2	14	24	13	1.5	M5×0.8	9	5.5	-	
25	10	4	M5×0.8	10	8	8.2	5.5	M6×1.0 Thru.hole:φ5.2	15	28	17	2	M5×0.8	9	5.5	-	
32	12	4	M6×1.0	12	10	8.2	5.5	M6×1.0 Thru.hole:φ5.2	16	34	22	2.4	1/8"	9	9	-	
40	16	4	M8×1.25	12	14	10.5	6.5	M8×1.25 Thru.hole:φ6.7	20	40	28	3	1/8"	9.5	7.5	-	
50	20	5	M10×1.5	15	17	10.5	6.5	M8×1.25 Thru.hole:φ6.7	25	48	38	4	1/4"	10.5	10.5	-	
63	20	5	M10×1.5	15	17	10.5	6.5	M8×1.25 Thru.hole:φ6.7	25	60	40	4	1/4"	12	11	-	

Note) Please refer to Page 124 for the dimension of male thread.

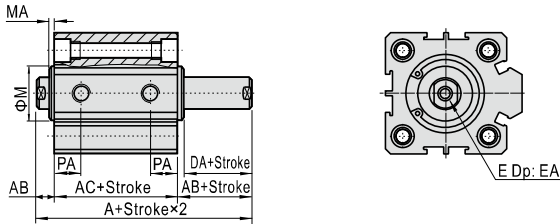
SDA Series

SDAD

φ12、φ16



φ20-φ100



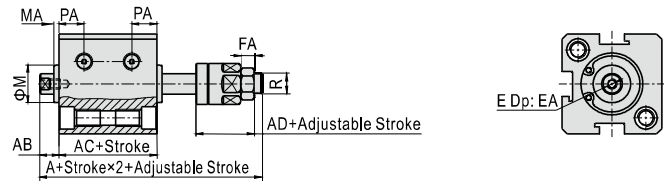
Bore size\Item	A		AC		AB	DA
	Without magnet	With magnet	Without magnet	With magnet		
12	27	17	37	27	5	4
16	29.5	18.5	39.5	28.5	5.5	4
20	30.5	19.5	40.5	29.5	5.5	4
25	33	21	43	31	6	4
32	38.5	24.5	48.5	34.5	7	4
40	40	26	50	36	7	4
50	46	28	56	38	9	5
63	50	32	60	42	9	5
80	63	41	73	51	11	6
100	75	51	85	61	12	7

Bore size\Item	E	EA		M	MA	PA	
		St≤10	St>10			St=5	St>5
12	M3×0.5	6	6	10.2	1	5.5	6.3
16	M3×0.5	6	6	11	1.5	6.5	7.3
20	M4×0.7	8(6.5 for St=5)	15	1.5	7.5	7.5	
25	M5×0.8	10(7 for St=5)	17	2	8	8	
32	M6×1.0	8	12	22	3	8	9
40	M8×1.25	8	12	28	3	8	10
50	M10×1.5	8	15	38	4	8	10.5
63	M10×1.5	10	15	40	4	9.5	11.8
80	M14×1.5	13	20	45	5	11.5	14.5
100	M18×1.5	18	20	55	5	16	20.5

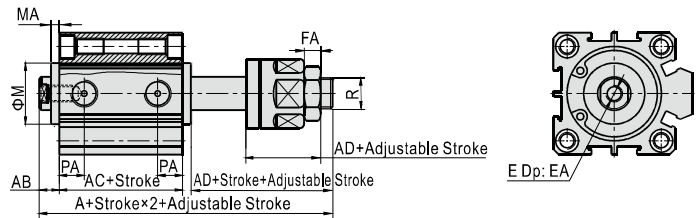
Note) The unmarked dimension is the same as SDA standard type. Please refer to Page 124 for the dimension of male thread.

SDAJ

φ12、φ16



φ20-φ100



Bore size\Item	A		AC		AB	AD	E
	Without magnet	With magnet	Without magnet	With magnet			
12	40	17	50	27	5	17	M3×0.5
16	42.5	18.5	52.5	28.5	5.5	17	M3×0.5
20	47.5	19.5	57.5	29.5	5.5	21	M4×0.7
25	54	21	64	31	6	25	M5×0.8
32	61.5	24.5	71.5	34.5	7	27	M6×1.0
40	64	26	74	36	7	28	M8×1.25
50	70	28	80	38	9	29	M10×1.5
63	74	32	84	42	9	29	M10×1.5
80	92.5	41	102.5	51	11	35.5	M14×1.5
100	110.5	51	120.5	61	12	42.5	M18×1.5

Bore size\Item	EA		FA	M	MA	PA		R
	St≤10	St>10				St=5	St>5	
12	6	6	4	10.2	1	5.5	6.3	M5×0.8
16	6	6	4	11	1.5	6.5	7.3	M5×0.8
20	8(6.5 for St=5)	15	5	15	1.5	7.5	7.5	M6×1.0
25	10(7 for St=5)	17	6	17	2	8	8	M8×1.25
32	8	12	6	22	3	8	9	M10×1.25
40	8	12	7	28	3	8	10	M12×1.25
50	8	15	8	38	4	8	10.5	M16×1.5
63	10	15	8	40	4	9.5	11.8	M16×1.5
80	13	20	10	45	5	11.5	14.5	M20×1.5
100	18	20	13.5	55	5	16	20.5	M27×2.0

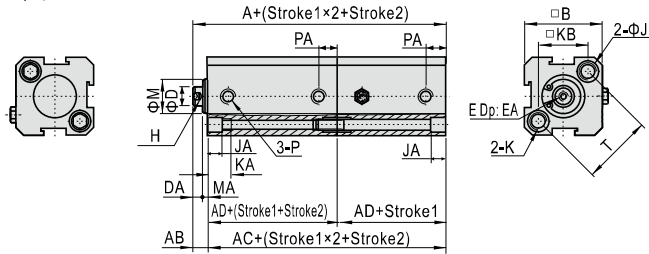
Note) The unmarked dimension is the same as SDA standard type. Please refer to Page 124 for the dimension of male thread.

Compact cylinder

SDA Series

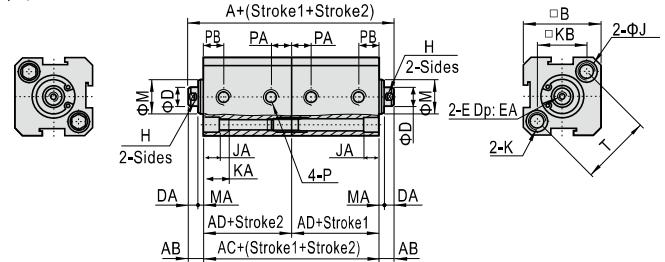
SDAT

φ12, φ16

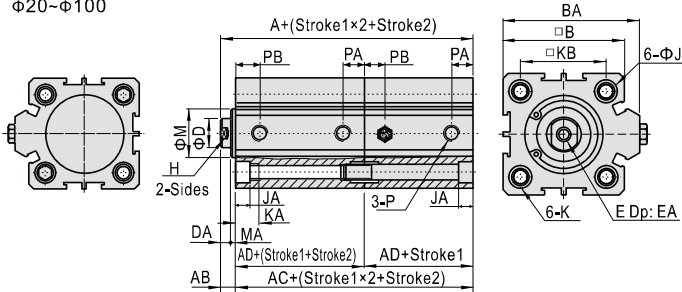


SDAW

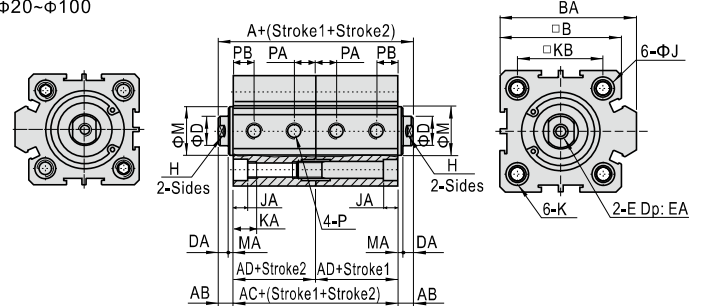
φ12, φ16



φ20-φ100



φ20-φ100



Note) Please refer to Page 124 for the dimension of male thread.

Bore size\Item	A			AC			AD			AB	B	BA	D	DA
	Without magnet	With magnet		Without magnet	With magnet		Without magnet	With magnet						
12	39	34	17	59	54	27	5	25	-	6	4			
16	42.5	37	18.5	62.5	57	28.5	5.5	29	-	6	4			
20	44.5	39	19.5	64.5	59	29.5	5.5	34	36	8	4			
25	48	42	21	68	62	31	6	40	42	10	4			
32	56	49	24.5	76	69	34.5	7	44	50	12	4			
40	59	52	26	79	72	36	7	52	58.5	16	4			
50	65	56	28	85	76	38	9	62	71.5	20	5			
63	73	64	32	93	84	42	9	75	84.5	20	5			
80	93	82	41	113	102	51	11	94	104	25	6			
100	114	102	51	134	122	61	12	114	124	32	7			

Bore size\Item	E	EA	H	J	JA	K				KA
						M5×0.8 Thru.hole:φ4.2	M5×0.8 Thru.hole:φ4.2	M5×0.8 Thru.hole:φ4.2	M5×0.8 Thru.hole:φ4.2	
12	M3×0.5	6	5	6.5	4.5	M5×0.8 Thru.hole:φ4.2	12	12	12	12
16	M3×0.5	6	5	6.5	4.5	M5×0.8 Thru.hole:φ4.2	12	12	12	12
20	M4×0.7	8	6	6.5	4.5	M5×0.8 Thru.hole:φ4.2	14	14	14	14
25	M5×0.8	10	8	8.2	5.5	M6×1.0 Thru.hole:φ5.2	15	15	15	15
32	M6×1.0	12	10	8.2	5.5	M6×1.0 Thru.hole:φ5.2	16	16	16	16
40	M8×1.25	12	14	10.5	6.5	M8×1.25 Thru.hole:φ6.7	20	20	20	20
50	M10×1.5	15	17	10.5	6.5	M8×1.25 Thru.hole:φ6.7	25	25	25	25
63	M10×1.5	15	17	10.5	6.5	M8×1.25 Thru.hole:φ6.7	25	25	25	25
80	M14×1.5	20	22	17	11	M12×1.75 Thru.hole:φ10.4	25	25	25	25
100	M18×1.5	20	27	19	13	M14×2.0 Thru.hole:φ12.4	30	30	30	30

Bore size\Item	KB	M	MA	P	PA		PB	
					St=5	St>5	St=5	St>5
					12	16.3	10.2	1
16	19.8	11	1.5	M5×0.8	5.5	5.5	8	8
20	24	13	1.5	M5×0.8	5	5.5	8	9
25	28	17	2	M5×0.8	5.5	5.5	9	9
32	34	22	2.5	1/8"	6.5	9	9	9
40	40	28	3	1/8"	7.5	7.5	9.5	9.5
50	48	38	4	1/4"	8	10.5	8	10.5
63	60	40	4	1/4"	9.5	11	9.5	12
80	74	45	5	3/8"	11.5	14.5	11.5	14.5
100	90	55	5	3/8"	16	20.5	16	20.5

Note) Please refer to Page 124 for the dimension of male thread.

Bore size\Item	A			AC			AD			AB	B	BA	D	DA
	Without magnet	With magnet		Without magnet	With magnet		Without magnet	With magnet						
12	44	34	17	64	54	27	5	25	-	6	4			
16	48	37	18.5	68	57	28.5	5.5	29	-	6	4			
20	50	39	19.5	70	59	29.5	5.5	34	36	8	4			
25	54	42	21	74	62	31	6	40	42	10	4			
32	63	49	24.5	83	69	34.5	7	44	50	12	4			
40	66	52	26	86	72	36	7	52	58.5	16	4			
50	74	56	28	94	76	38	9	62	71.5	20	5			
63	82	64	32	102	84	42	9	75	84.5	20	5			
80	104	82	41	124	102	51	11	94	104	25	6			
100	126	102	51	146	122	61	12	114	124	32	7			

Bore size\Item	E	EA	H	J	JA	K				KA
						M5×0.8 Thru.hole:φ4.2	M5×0.8 Thru.hole:φ4.2	M5×0.8 Thru.hole:φ4.2	M5×0.8 Thru.hole:φ4.2	
12	M3×0.5	6	5	6.5	4.5	M5×0.8 Thru.hole:φ4.2	12	12	12	12
16	M3×0.5	6	5	6.5	4.5	M5×0.8 Thru.hole:φ4.2	12	12	12	12
20	M4×0.7	8	6	6.5	4.5	M5×0.8 Thru.hole:φ4.2	14	14	14	14
25	M5×0.8	10	8	8.2	5.5	M6×1.0 Thru.hole:φ5.2	15	15	15	15
32	M6×1.0	12	10	8.2	5.5	M6×1.0 Thru.hole:φ5.2	16	16	16	16
40	M8×1.25	12	14	10.5	6.5	M8×1.25 Thru.hole:φ6.7	20	20	20	20
50	M10×1.5	15	17	10.5	6.5	M8×1.25 Thru.hole:φ6.7	25	25	25	25
63	M10×1.5	15	17	10.5	6.5	M8×1.25 Thru.hole:φ6.7	25	25	25	25
80	M14×1.5	20	22	17	11	M12×1.75 Thru.hole:φ10.4	25	25	25	25
100	M18×1.5	20	27	19	13	M14×2.0 Thru.hole:φ12.4	30	30	30	30

Bore size\Item	KB	M	MA	P	PA		PB	
					St=5	St>5	St=5	St>5
					12	16.3	10.2	1
16	19.8	11	1.5	M5×0.8	5	5.5	8	8
20	24	13	1.5	M5×0.8	5	5.5	8	9
25	28	17	2	M5×0.8	5.5	5.5	9	9
32	34	22	2.5	1/8"	6.5	9	9	9
40	40	28	3	1/8"	7.5	7.5	9.5	9.5
50	48	38	4	1/4"	8	10.5	8	10.5
63	60	40	4	1/4"	9.5	11	9.5	12
80	74	45	5	3/8"	11.5	14.5	11.5	14.5
100	90	55	5	3/8"	16	20.5	16	20.5



MU Series Mini Free Mount Cylinder

Compendium of MU Series

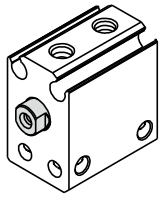
Seven bore size are available

Bore size: 4, 6, 8, 10, 12, 16, 20

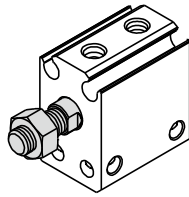
Magnetic switch slots around the cylinder body

There are magnetic switch slots around the cylinder body convenient to install inducting switch.

Two kinds of rod type



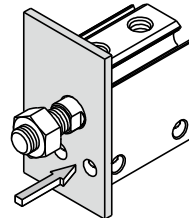
Female thread



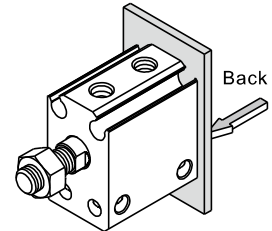
Male thread

Mounted from 4 directions

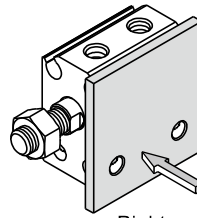
Cylinder can be mounted from 4 directions, and convenient to install and use.



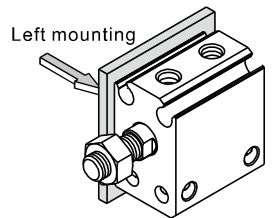
Front mounting



Back mounting



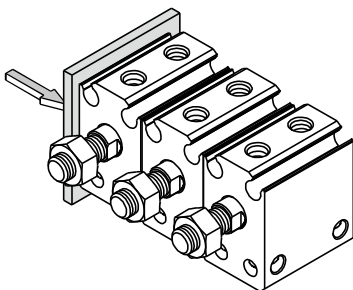
Right mounting



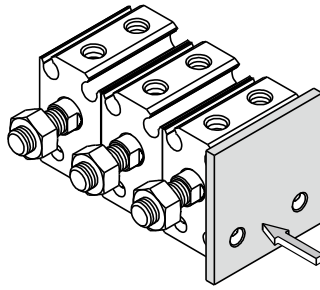
Left mounting

Mounted side by side

Multitudinous cylinder can be mounted side by side to save space.



Mounted side by side from left



Mounted side by side from right

Criteria for selection: Cylinder thrust

Unit : Newton(N)

Bore size	Rod size	Acting type	Pressure area(mm ²)	Operating pressure(MPa)							
				0.1	0.2	0.3	0.4	0.5	0.6	0.7	
4	2	Single acting_push	12,6	-	0,3	1,6	2,8	4,1	5,3	6,6	
		Double acting Push side	12,6	1,3	2,5	3,8	5,0	6,3	7,6	8,8	
		Double acting Pull side	9,4	0,9	1,9	2,8	3,8	4,7	5,6	6,6	
6	4	Single acting_push	28,3	-	-	5,1	7,9	10,7	13,5	16,4	
		Double acting Push side	28,3	-	5,7	8,5	11,3	14,2	17,0	19,8	
		Double acting Pull side	15,7	-	3,1	4,7	6,3	7,9	9,4	11,0	
8	5	Single acting_push	50,3	-	-	8,3	13,4	18,4	23,4	28,5	
		Double acting Push side	50,3	-	10,1	15,1	20,1	25,2	30,2	35,2	
		Double acting Pull side	30,6	-	6,1	9,2	12,2	15,3	18,4	21,4	
10	6	Single acting_push	78,5	-	-	16,5	24,4	32,2	40,1	47,9	
		Double acting Push side	78,5	1,3	15,7	23,6	31,4	39,3	47,1	55,0	
		Double acting Pull side	50,3	0,9	10,1	15,1	20,1	25,2	30,2	35,2	
12	6	Single acting_push	113,1	-	-	13,6	24,9	36,2	47,5	58,9	70,2
		Double acting Push side	113,1	11,3	22,6	33,9	45,2	56,5	67,9	79,2	
		Double acting Pull side	84,8	8,5	17,0	25,4	33,9	42,4	50,9	59,4	
16	8	Single acting_push	201,1	-	-	27,0	47,1	67,2	87,3	107,4	127,5
		Double acting Push side	201,1	20,1	40,2	60,3	80,4	100,5	120,6	140,7	
		Double acting Pull side	150,8	15,1	30,2	45,2	60,3	75,4	90,5	105,6	
20	10	Single acting_push	314,2	-	-	36,8	68,2	99,7	131,1	162,5	193,9
		Double acting Push side	314,2	31,4	62,8	94,2	125,7	157,1	188,5	219,9	
		Double acting Pull side	236,5	23,7	47,1	70,7	94,2	117,8	141,4	164,9	

Installation and application



- When load changes in the work, the cylinder with abundant output capacity shall be selected.
- Relative cylinder with high temperature resistance or corrosion resistance shall be chosen under the condition of high temperature or corrosion.
- Necessary protection measure shall be taken in the environment with higher humidity, much dust or water drops, oil dust and welding dregs.
- Dirty substances in the pipe must be eliminated before cylinder is connected with pipeline to prevent the entrance of particles into the cylinder.
- The medium used by cylinder shall be filtered to 40µm or below.
- As both of the front cover and piston of the cylinder are short, typically too large stroke can not be selected.
- Anti-freezing measure shall be adopted under low temperature environment to prevent moisture freezing.
- The cylinder shall avoid the influence of side load in operation to maintain the normal work of cylinder and extend the service life.
- If the cylinder is dismantled and stored for a long time, please conduct anti-rust treatment to the surface. Anti-dust caps shall be added in air inlet and outlet ports. The front and back cover can not be dismantled, which shall be especially noticed.



MU Series

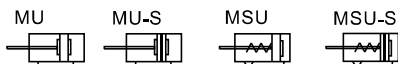


Specification

Bore size(mm)	4	6	8	10	12	16	20
Acting type	MU : Double acting MSU : Single acting_Pull type						
Fluid	Air(to be filtered by 40μm filter element)						
Operating pressure	Double acting 0.2~0.7MPa(29~100psi)		0.15~0.7MPa(22~100psi)				
	Single acting 0.3~0.7MPa(44~100psi)		0.2~0.7MPa(29~100psi)				
Proof pressure	1.2MPa(175psi)						
Temperature °C	-20~70						
Speed range mm/s	Double acting : 30~500			Single acting : 50~500			
Stroke tolerance	+1.0 0						
Cushion type	No					Bumper	
Port size	M3×0.5					M5×0.8	

Add) Refer to P362 for detail of sensor switch.

Symbol



Product feature

1. JIS standard is implemented.
2. Cylinder can be mounted from 4 directions, and convenient to install and use.
3. Multitudinous cylinder can be mounted side by side to save space.
4. The front end of the cylinder is designed with boss. Centering can be done easily.
5. The internal diameter of the body is treated with rolling followed by the treatment of hard anodizing, forming an excellent abrasion resistance and durability.
6. With magnet type is of the feature of position sensing.
7. There are magnetic switch slots around the cylinder body, which is convenient to install inducting switch.
8. The seal of piston adopts heterogeneous two-way seal structure. It has compact dimension and the function of grease reservation.

Stroke

Bore size (mm)		Standard stroke (mm)	Max.std stroke
4	Double acting	4 6 8 10 15 20	20
	Single acting	4 6	6
6	Double acting	4 6 8 10 15 20 25 30	30
	Single acting	4 6 8	8
8	Double acting	4 6 8 10 15 20 25 30	30
	Single acting	4 6 8 10	10
10	Double acting	4 6 8 10 15 20 25 30	30
	Single acting	4 6 8 10	10
12	Double acting	5 10 15 20 25 30 35 40 45 50	50
	Single acting	5 10	10
16	Double acting	5 10 15 20 25 30 35 40 45 50	50
	Single acting	5 10	10
20	Double acting	5 10 15 20 25 30 35 40 45 50	50
	Single acting	5 10	10

- Note) 1. Please contact the company for other special strokes.
 2. The dimensions of non-std stroke cylinder has the same dimensions as the next longer stroke std. stroke cylinder, e.g. 23mm stroke cylinder has the same dimensions of 25 std. stroke cylinder.

Ordering code

MU □ 12 × 10 S □

MSU □ 12 × 10 S □

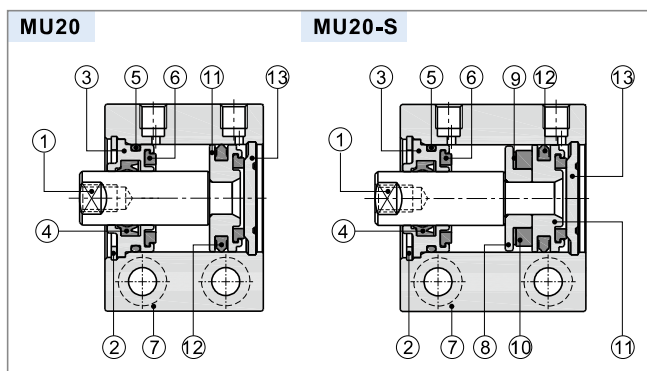
① ② ③ ④ ⑤ ⑥

① Model	② Body mounted type	③ Bore size	④ Stroke	⑤ Magnet	⑥ Rod type
MU: Mini free mount cylinder (double acting)	No this code	4	Refer to stroke table for details	No this code(Without magnet)	Blank: No thread; B: Male thread
		6			
		8			
		10			
MSU: Mini free mount cylinder (single acting-push)	Blank: Transverse mounting R: Axial mounting	12		Blank: Without magnet S: With magnet	Blank: Female thread B: Male thread
		16			
		20			

Mini free mount cylinder

MU Series

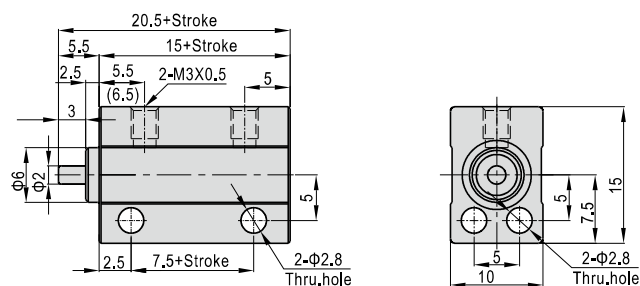
Inner structure and material of major parts



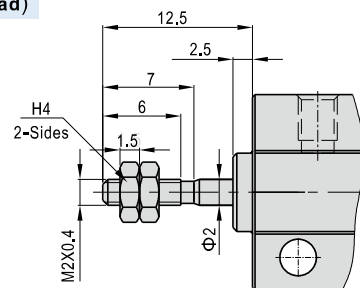
NO.	Item	Material
1	Piston rod	Stainless steel or Carbon steel with 20μm chrome plated
2	C clip	Spring steel
3	Front cover	Aluminum alloy
4	Front cover packing	NBR
5	O-ring	NBR
6	Bumper	TPU
7	Body	Aluminum alloy
8	Magnet holder	Brass(Φ12)/Aluminum alloy(Others)
9	Magnet washer	NBR
10	Magnet	Sintered metal (Neodymium-iron-boron)
11	Piston	Brass(Φ12,16)/Aluminum alloy(Others)
12	Piston seal	NBR
13	Back cover	No(Φ12,16)/Aluminum alloy(Others)

Dimensions

Φ4

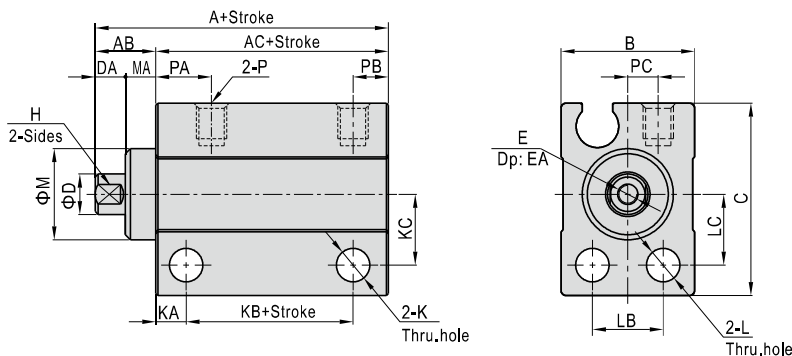


Φ4(Male thread)



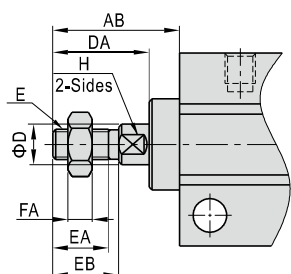
[Note] The value in the "()" is single-acting type's value.

Φ6~Φ10



Bore size\Item	With magnet			Without magnet			AB	B	C	D		DA	E	EA	H		K	KA	KC	L	LB	LC	M	MA	P			
	A	AC	KB	A	AC	KB				MU	MSU				MU	MSU									PA	PB	PC	
6	24	18	11.5	19	13	6.5	6	13	19	4	3.5	3	M2.5×0.45	5	3.5	3	3.3	3	7	3.3	7	7	9	3	M3×0.5	5.5	3.5	3
8	24	18	11.5	19	13	6.5	6	13	21		5	3	M3×0.5	6	4.5	3	3.3	3	8	3.3	7	8	11	3	M3×0.5	5.5	3.5	3
10	24	18	11.5	19	13	6.5	6	13.5	22		6	3	M3×0.5	6	5	3	3.3	3	8.5	3.3	7	8.5	12	3	M3×0.5	5.5	3.5	3.5

Φ6~Φ10(Male thread)



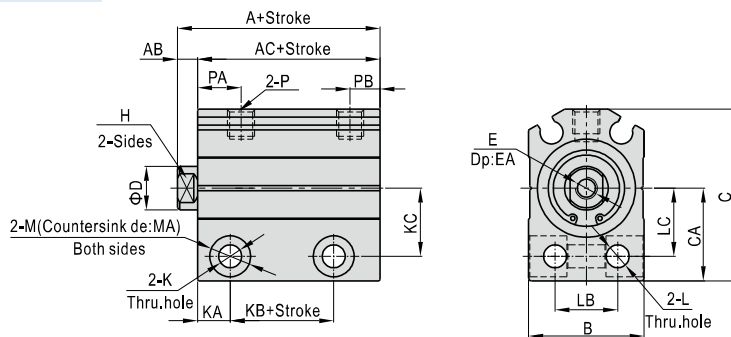
Bore size\Item	AB	D(MU)	D(MSU)	DA	E	EA	EB	FA	H
6	12.5	4	3.5	9.5	M3×0.5	5.5	6.5	2.4	3.5
8	14.5	5	5	11.5	M4×0.7	7	8.5	3	4
10	16.5	6	6	13.5	M5×0.8	9	10.5	4	5

[Note] The unmarked dimensions are the same as Female type.

Mini free mount cylinder

MU Series

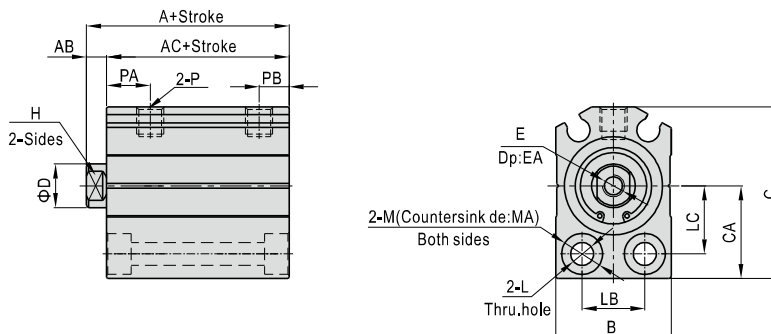
Φ12~Φ20(Transverse mounted)



Bore size\Item	A	AC	KB	A	AC	KB	AB	B	C	CA	D	E	EA	H	K	KA	KC	L	LB	LC	M	MA	P	PA	PB
	With magnet			Without magnet																					
12	25.5(30.5)	22(27)	8.5(13.5)	20.5(25.5)	17(22)	3.5(8.5)	3.5	17	28.5	15.5	6	M3×0.5	6	5	4.3	6	11	4.3	8	11	7.5	7	M5×0.8	7.5	5
16	27(32)	23.5(28.5)	9(14)	22(27)	18.5(23.5)	4(9)	3.5	21	31.5	17	8	M4×0.7	8	6	4.3	6	12.5	4.3	11.5	12.5	7.5	7	M5×0.8	8	5.5
20	29(34)	24.5(29.5)	10.5(15.5)	24(29)	19.5(24.5)	5.5(10.5)	4.5	25	38.5	21	10	M5×0.8	7	8	5.5	7	15.5	5.5	13.5	15.5	9	9	M5×0.8	9	5.5

[Note] The value in the "()" are single-acting type's value.

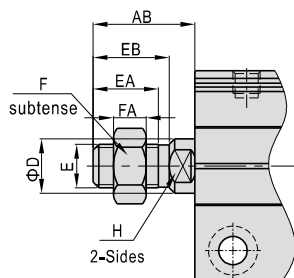
Φ12~Φ20(Axial mounted)



Bore size\Item	A	AC	A	AC	AB	B	C	D	CA	E	EA	H	L	LB	LC	M	MA	P	PA	PB
	With magnet		Without magnet																	
12	25.5(30.5)	22(27)	20.5(25.5)	17(22)	3.5	17	28.5	6	15.5	M3×0.5	6	5	4.3	8	11	7.5	4.5	M5×0.8	7.5	5
16	27(32)	23.5(28.5)	22(27)	18.5(23.5)	3.5	21	31.5	8	17	M4×0.7	8	6	4.3	11.5	12.5	7.5	4.5	M5×0.8	8	5.5
20	29(34)	24.5(29.5)	24(29)	19.5(24.5)	4.5	25	38.5	10	21	M5×0.8	7	8	5.5	13.5	15.5	9	5.5	M5×0.8	9	5.5

[Note] The value in the "()" are single-acting type's value.

Φ12~Φ20(Male thread)



Bore size\Item	AB	D	E	EA	EB	F	FA	H
12	14	6	M5×0.8	9	10.5	8	4	5
16	15.5	8	M6×1.0	10	12	10	5	6
20	18.5	10	M8×1.25	12	14	12	6	8

[Note] The unmarked dimensions are the same as Female type.



Multi-mount cylinder—MD, MK Series

Compendium of MD/MK Series

Six bore size are available
Bore size: 6, 10, 16, 20, 25, 32

Mounted from 6 directions
Cylinder can be mounted from 6 directions, and convenient to install and use.

Front mounting

Back mounting

Left mounting

Right mounting

Bottom mounting

Up mounting

Magnetic switch slots around the cylinder body
There are magnetic switch slots around the cylinder body convenient to install inducting switch.

Mounted side by side
Multitudinous cylinder can be mounted side by side to save space.

Mounted side by side from left

Mounted side by side from right

Multi-type cylinder

MD: Multi-mount cylinder (Double acting type)	
MSD: Multi-mount cylinder (Single acting-push type)	
MTD: Multi-mount cylinder (Single acting-pull type)	
MDD: Multi-mount cylinder (Double rod type)	
MDJ: Multi-mount cylinder (Adjustable stroke type)	
MK: Multi-mount cylinder (Double acting no-rotating type)	
MSK: Multi-mount cylinder (Single acting-push no-rotating type)	
MTK: Multi-mount cylinder (Single acting-pull no-rotating type)	
MKD: Multi-mount cylinder (Double rod no-rotating type)	
MKJ: Multi-mount cylinder (Adjustable stroke no-rotating type)	

Criteria for selection: Cylinder thrust

Unit : Newton(N)

Bore size	Rod size	Acting type		Pressure area(mm ²)	Operating pressure(MPa)						
					0.1	0.2	0.3	0.4	0.5	0.6	0.7
6	3	Single acting	Push side	28.3	-	1.5	2.9	4.3	5.7	7.2	8.6
			Pull side	21.2	-	0.8	1.5	2.2	2.9	3.6	
		Double acting	Push side	28.3	2.8	5.7	8.5	11.3	14.1	17.0	19.8
			Pull side	21.2	2.1	4.2	6.4	8.5	10.6	12.7	14.8
10	4	Single acting	Push side	78.5	-	3.9	7.9	11.8	15.8	19.7	23.7
			Pull side	66.0	-	1.4	4.1	6.8	9.5	12.2	14.9
		Double acting	Push side	78.5	7.9	15.7	23.6	31.4	39.3	47.1	55.0
			Pull side	66.0	6.6	13.2	19.8	26.4	33.0	39.6	46.2
16	6	Single acting	Push side	201.1	-	10.1	30.2	50.3	70.4	90.5	110.6
			Pull side	172.8	-	8.7	25.9	43.2	60.5	77.8	95.1
		Double acting	Push side	201.1	20.1	40.2	60.3	80.4	100.5	120.6	140.7
			Pull side	172.8	17.3	34.6	51.8	69.1	86.4	103.7	121.0
20	8	Single acting	Push side	314.2	-	15.7	47.1	78.6	110.0	141.4	172.8
			Pull side	263.9	-	13.2	39.6	66.0	92.3	118.7	145.1
		Double acting	Push side	314.2	31.4	62.8	94.2	125.7	157.1	188.5	219.9
			Pull side	263.9	26.4	52.8	79.2	105.6	131.9	158.3	184.7
25	10	Single acting	Push side	490.9	-	24.7	73.8	122.8	179.1	221.0	270.1
			Pull side	412.3	-	20.7	61.9	103.1	144.4	185.6	226.8
		Double acting	Push side	490.9	49.1	98.2	147.3	196.3	245.4	294.5	343.6
			Pull side	412.3	41.2	82.5	123.7	164.9	206.2	247.4	288.6
32	12	Single acting	Push side	804.2	-	40.2	120.7	201.1	281.5	361.9	442.4
			Pull side	691.2	-	34.7	103.8	173.0	242.1	311.2	380.3
		Double acting	Push side	804.2	80.4	160.8	241.3	321.7	402.1	482.5	563.0
			Pull side	691.2	69.1	138.2	207.3	276.5	345.6	414.7	483.8

Installation and application



1. When load changes in the work, the cylinder with abundant output capacity shall be selected.
2. Relative cylinder with high temperature resistance or corrosion resistance shall be chosen under the condition of high temperature or corrosion;
3. Necessary protection measure shall be taken in the environment with higher humidity, much dust or water drops, oil dust and welding dregs.
4. Dirty substances in the pipe must be cleared away before cylinder is connected with pipeline to prevent the entrance of particles into the cylinder.
5. The medium used by cylinder shall be filtered to 40µm or below.
6. As both of the front cover and piston of the cylinder are short, typically too large stroke can not be selected.
7. Anti-freezing measure shall be adopted under low temperature environment to prevent moisture freezing.
8. The cylinder shall avoid the influence of side load in operation maintain the normal work of cylinder and extend the service life.
9. If the cylinder is dismantled and stored for a long time, pay attention to conduct anti-rust treatment to the surface. Anti-dust caps shall be added in air inlet and outlet ports.



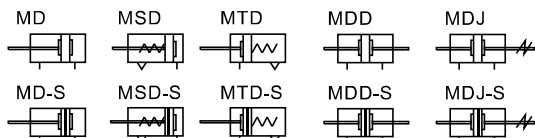


Specification

Bore size(mm)		6	10	16	20	25	32
Acting type	MD/MDD/MDJ	Double acting					
	MSD/MTD	Single acting					
Fluid		Air(to be filtered by 40µm filter element)					
Operating pressure	Double acting	0.15~1.0MPa(22~145psi)					
	Single acting	0.2~1.0MPa(28~145psi)					
Proof pressure		1.5MPa(215psi)					
Temperature °C		-20~70					
Speed range mm/s		Double acting : 30~500 Single acting : 50~500					
Stroke tolerance		+1,0 0					
Cushion type		Bumper					
Port size [Note]		M5×0.8					1/8"

[Note1] PT thread, G thread are available.
Add) Refer to P362 for detail of sensor switch.

Symbol



Product feature

1. Manufactured by our enterprise.
2. There are several ways to fix the cylinder and it is convenient to install and use.
3. Several cylinders can be assembled together to effectively save the installation space.
4. The guide precision of piston rod is high and no additional lubricant is needed.
5. Cylinders of various specifications are optional.
6. The seal material with high temperature resistance is adopted, operating temperature range is 0~150°C.(Option).

Stroke

Bore size (mm)		Standard stroke (mm)						Max.std stroke			
6	Double acting	5	10	15	20	25	30	35	35		
	Single acting	5	10	15	20				20		
10	Double acting	5	10	15	20	25	30	35	35		
	Single acting	5	10	15	20				20		
16	Double acting	5	10	15	20	25	30	40	50	50	
	Single acting	5	10	15	20				20		
20	Double acting	5	10	15	20	25	30	40	50	60	60
	Single acting	5	10	15	20				20		
25	Double acting	5	10	15	20	25	30	40	50	60	60
	Single acting	5	10	15	20				20		
32	Double acting	5	10	15	20	25	30	40	50	60	60
	Single acting	5	10	15	20				20		

Note) 1. Please contact the company for other special strokes.
2. The dimensions of non-std stroke cylinder has the same dimensions as the next longer stroke std. stroke cylinder. e.g. 23mm stroke cylinder has the same dimensions of 25 std. stroke cylinder.

Ordering code

MD 32 × 30 S □
MDD 32 × 30 S □
MDJ 32 × 30 -30 S □

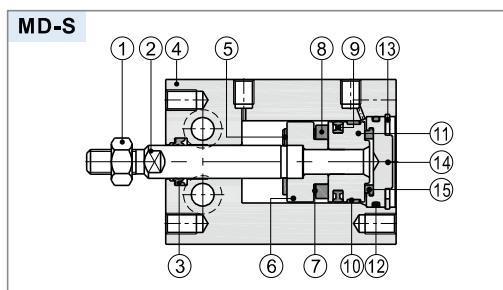
① ② ③ ④ ⑤ ⑥

① Model	② Bore size	③ Stroke	④ Adjustable stroke	⑤ Magnet	⑥ Thread type [Note1]
MD: Multi-mount cylinder(Double acting type)	6 10 16 20 25 32	Refer to stroke table for details	No this code 10 20 30	Blank: Without magnet S: With magnet	Blank: PT G : G
MSD: Multi-mount cylinder(Single acting-push type)					
MTD: Multi-mount cylinder(Single acting-pull type)					
MDD: Multi-mount cylinder(Double rod type)					
MDJ: Multi-mount cylinder(Adjustable stroke type)					

[Note1] Standard thread is blank here.

MD Series

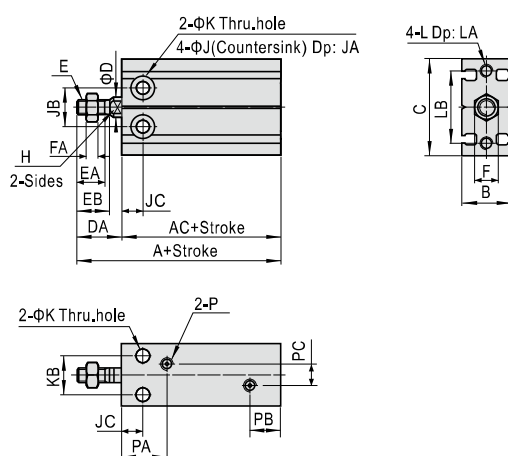
Inner structure and material of major parts



NO.	Item	Material	NO.	Item	Material
1	Rod nut	Carbon steel/Stainless steel	9	Piston seal	NBR
2	Piston rod	Stainless steel/S45C	10	Wear ring	Wear resistant material
3	Rod packing	NBR	11	Piston	Aluminum alloy
4	Body	Aluminum alloy	12	O-ring	NBR
5	Bumper	TPU	13	C-clip	Spring steel
6	Magnet holder	Aluminum alloy	14	Back cover	Aluminum alloy
7	Magnet washer	NBR	15	Bumper	TPU
8	Magnet	Sintered metal(Neodymium-iron-boron)			

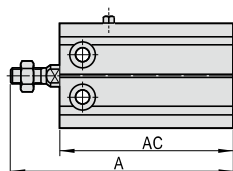
Dimensions

MD

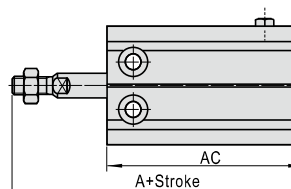


Bore size\Item	Without magnet		With magnet		B	C	D	DA	E	EA	EB	F	FA	H	J	JA	JB	JC	K	KB	L	LA	LB	P	PA	PB	PC
	A	AC	A	AC																							
6	46	33	46	33	16.5	22	3	13	M3×0.5	7	8	5.5	2.5	-	6	5	10	7	3.3	7	M3×0.5	5	17	M5×0.8	14	10	-
10	52	36	52	36	16.5	24	4	16	M4×0.7	10	11	7	2	-	6	5.5	11	7	3.3	9	M3×0.5	5	18	M5×0.8	15.5	10	-
16	46	30	56	40	20	32	6	16	M5×0.8	11	12.5	8	4	5	7.5	6.5	14	7	4.5	12	M4×0.7	5	25	M5×0.8	14.5	10	3
20	55	36	65	46	26	40	8	19	M6×1.0	12	14	10	5	6	9.5	8	16	9	5.5	16	M5×0.8	7.5	30	M5×0.8	19.3	9.5	9
25	63	40	73	50	32	50	10	23	M8×1.25	15.5	18	12	6	8	9.5	9	20	10	5.5	20	M5×0.8	8	38	M5×0.8	20.5	8.5	12
32	69	42	79	52	40	62	12	27	M10×1.25	19.5	22	17	6	10	11	11.5	24	11	6.5	24	M6×1.0	9	48	1/8"	22	12.5	13

MSD



MTD

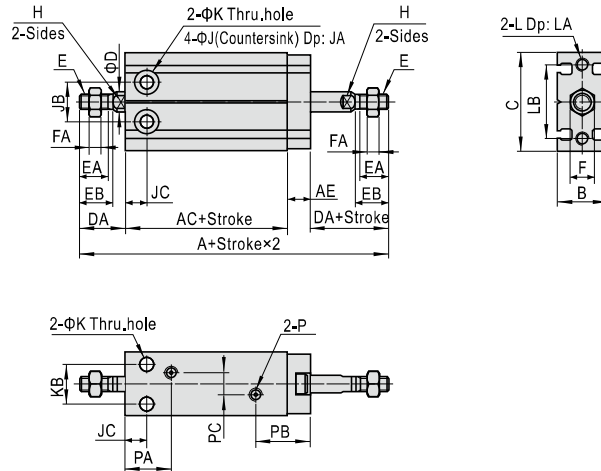


Item	A(Without magnet)				A(With magnet)				AC(Without magnet)				AC(With magnet)			
	5St	10St	15St	20St	5St	10St	15St	20St	5St	10St	15St	20St	5St	10St	15St	20St
6	56	61	71	76	56	61	71	76	43	48	58	63	43	48	58	63
10	62	67	77	82	62	67	77	82	46	51	61	66	46	51	61	66
16	61	66	81	86	71	76	91	96	45	50	65	70	55	60	75	80
20	70	75	90	95	80	85	100	105	51	56	71	76	61	66	81	86
25	78	83	98	103	88	93	108	113	55	60	75	80	65	70	85	90
32	84	89	104	109	94	99	114	119	57	62	77	82	67	72	87	92

Remark) The unmarked dimension is the same as MD standard type.

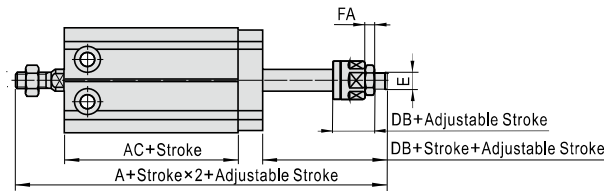
MD Series

MDD



Bore size\Item	Without magnet		With magnet		AE	B	C	D	DA	E	EA	EB	F	FA	H	J	JA	JB	JC	K	KB	L	LA	LB	P	PA	PB	PC
	A	AC	A	AC																								
6	70	38	70	38	6	16.5	22	3	13	M3×0.5	7	8	5.5	2.5	-	6	5	10	7	3.3	7	M3×0.5	5	17	M5×0.8	14	16	-
10	74	36	74	36	6	16.5	24	4	16	M4×0.7	10	11	7	2	-	6	5.5	11	7	3.3	9	M3×0.5	5	18	M5×0.8	15.5	16	-
16	69.5	30	79.5	40	7.5	20	32	6	16	M5×0.8	11	12.5	8	4	5	7.5	6.5	14	7	4.5	12	M4×0.7	5	25	M5×0.8	14.5	17.5	3
20	83	36	93	46	9	26	40	8	19	M6×1.0	12	14	10	5	6	9.5	8	16	9	5.5	16	M5×0.8	7.5	30	M5×0.8	19.3	18.5	9
25	95	40	105	50	9	32	50	10	23	M8×1.25	15.5	18	12	6	8	9.5	9	20	10	5.5	20	M5×0.8	8	38	M5×0.8	20.5	17.5	12
32	106	42	116	52	10	40	62	12	27	M10×1.25	19.5	22	17	6	10	11	11.5	24	11	6.5	24	M6×1.0	9	48	1/8"	22	22.5	13

MDJ



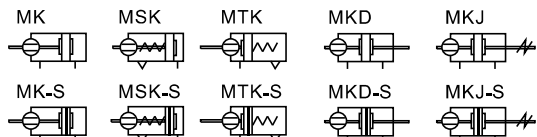
Bore size\Item	A(Without magnet)	A(With magnet)	AC(Without magnet)	AC(With magnet)	DB	E	FA
6	70	70	38	38	13	M3×0.5	2.5
10	73	73	36	36	15	M4×0.7	2
16	70.5	80.5	30	40	17	M5×0.8	4
20	85	95	36	46	21	M6×1.0	5
25	97	107	40	50	25	M8×1.25	6
32	106	116	42	52	27	M10×1.25	6

Remark) The unmarked dimension is the same as MD standard type.

MK Series



Symbol



Product feature

1. Manufactured by our enterprise.
2. There are several fixation ways for the cylinder, and also convenient to install and use.
3. Several cylinders can be assembled together to effectively save the installation space.
4. The guide precision of piston rod is high and no additional lubricant is needed.
5. Fixated block is attached to piston rod, which prevents it from rotating.
6. Various cylinders are available for your choice.
7. The seal material with high temperature resistance is adopted, operating temperature range is 0~150°C.(Option).

Ordering code

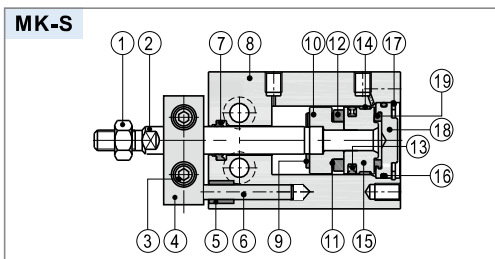
MK 32 × 30 S □
 MKD 32 × 30 S □
 MKJ 32 × 30 -30 S □

① ② ③ ④ ⑤ ⑥

① Model	② Bore size	③ Stroke	④ Adjustable stroke	⑤ Magnet	⑥ Thread type [Note 1]
MK: Multi-mount cylinder(Double acting no-rotating type)	6 10 16 20 25 32	Refer to stroke table for details	No this code 10 20 30	Blank: Without magnet S: With magnet	Blank: PT G : G
MSK: Multi-mount cylinder(Single acting-push no-rotating type)					
MTK: Multi-mount cylinder (Single acting-pull no-rotating type)					
MKD: Multi-mount cylinder(Double rod no-rotating type)					
MKJ: Multi-mount cylinder(Adjustable stroke no-rotating type)					

[Note 1] Standard thread is blank here.

Inner structure and material of major parts



NO.	Item	Material	NO.	Item	Material
1	Rod nut	Carbon steel/ Stainless steel	11	Magnet washer	NBR
2	Piston rod	Stainless steel/S45C	12	Magnet	Sintered metal(Neodymium-iron-boron)
3	Screw	Carbon steel	13	Piston seal	NBR
4	No-rotating plate	Aluminum alloy	14	Wear ring	Wear resistant material
5	Bushing	Brass	15	Piston	Aluminum alloy
6	Fixed rod	Stainless steel	16	O-ring	NBR
7	Rod packing	NBR	17	C-clip	Spring steel
8	Body	Aluminum alloy	18	Back cover	Aluminum alloy
9	Bumper	TPU	19	Bumper	TPU
10	Magnet holder	Aluminum alloy			

Specification

Bore size(mm)	6	10	16	20	25	32
Acting type	MK/MKD/MKJ MSK/MTK			Double acting Single acting		
Fluid	Air(to be filtered by 40μm filter element)					
Operating pressure	Double acting 0.2~1.0MPa(28~145psi)			Single acting 0.15~1.0MPa(22~145psi)		
Stroke tolerance	+1.0 0					
Proof pressure	1.5MPa(215psi)					
Temperature °C	-20~70					
Speed range mm/s	Double acting : 30~500 Single acting : 50~500					
Cushion type	Bumper					
Port size [Note]	M5×0.8					1/8"

[Note 1] PT thread, G thread are available.
 Add) Refer to P362 for detail of sensor switch.

Stroke

Bore size (mm)		Standard stroke (mm)										Max.std stroke			
6	Double acting	5	10	15	20	25	30	35					35		
	Single acting	5	10	15	20					20					
10	Double acting	5	10	15	20	25	30	35					35		
	Single acting	5	10	15	20					20					
16	Double acting	5	10	15	20	25	30	40	50					50	
	Single acting	5	10	15	20					20					
20	Double acting	5	10	15	20	25	30	40	50	60					60
	Single acting	5	10	15	20					20					
25	Double acting	5	10	15	20	25	30	40	50	60					60
	Single acting	5	10	15	20					20					
32	Double acting	5	10	15	20	25	30	40	50	60					60
	Single acting	5	10	15	20					20					

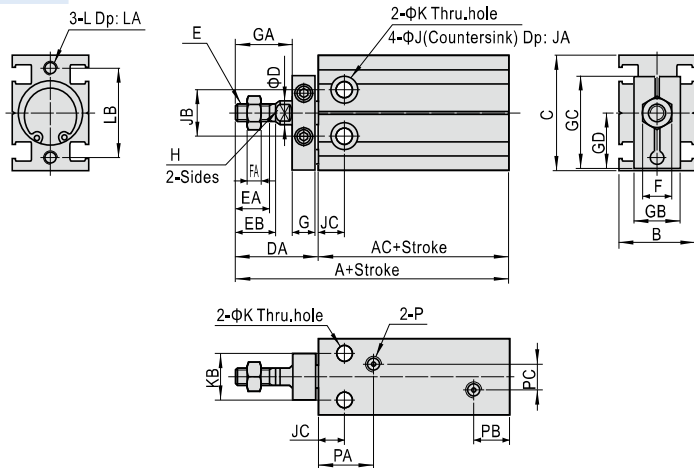
1. Please contact the company for other special strokes.
2. The dimensions of non-std stroke cylinder has the same dimensions as the next longer stroke std. stroke cylinder. e.g. 23mm stroke cylinder has the same dimensions of 25 std. stroke cylinder.

Multi-mount cylinder

MK Series

Dimensions

MK

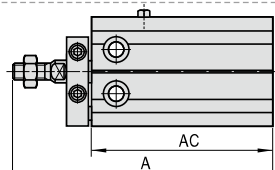


Bore size/Item	Without magnet		With magnet		B	C	D	DA	E
	A	AC	A	AC					
6	51	33	51	33	16,5	22	3	18	M3×0,5
10	57	36	57	36	16,5	24	4	21	M4×0,7
16	56	30	66	40	20	32	6	26	M5×0,8
20	65	36	75	46	26	40	8	29	M6×1,0
25	73	40	83	50	32	50	10	33	M8×1,25
32	84	42	94	52	40	62	12	42	M10×1,25

Bore size/Item	EA	EB	F	FA	G	GA	GB	GC	GD	H	J	JA
6	7	8	5,5	2,5	8	9	11	19	10,7	-	6	5
10	10	11	7	2	8	12	13	20,5	11,6	-	6	5,5
16	11	12,5	8	4	8	17	13	26,5	15,6	5	7,5	6,5
20	12	14	10	5	8	20	16	32	19,5	6	9,5	8
25	15,5	18	12	6	10	22	19	40	24,5	8	9,5	9
32	19,5	22	17	6	12	29	24	49	30,5	10	11	11,5

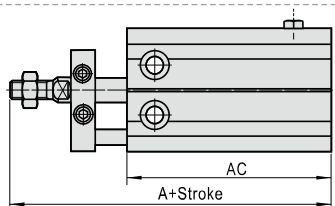
Bore size/Item	JB	JC	K	KB	L	LA	LB	P	PA	PB	PC
6	10	7	3,3	7	M3×0,5	5	17	M5×0,8	14	10	-
10	11	7	3,3	9	M3×0,5	5	18	M5×0,8	15,5	10	-
16	14	7	4,5	12	M4×0,7	5	25	M5×0,8	14,5	10	3
20	16	9	5,5	16	M5×0,8	7,5	30	M5×0,8	19,3	9,5	9
25	20	10	5,5	20	M5×0,8	8	38	M5×0,8	20,5	8,5	12
32	24	11	6,5	24	M6×1,0	9	48	1/8"	22	12,5	13

MSK



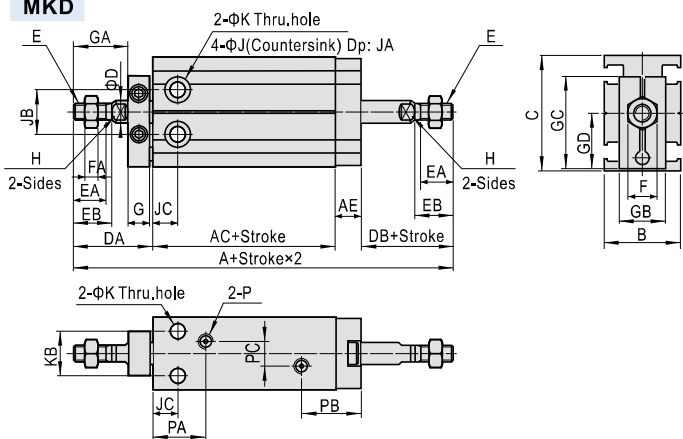
Item	A(Without magnet)				A(With magnet)				AC(Without magnet)				AC(With magnet)			
	5St	10St	15St	20St	5St	10St	15St	20St	5St	10St	15St	20St	5St	10St	15St	20St
6	61	66	76	81	61	66	76	81	43	48	58	63	43	48	58	63
10	67	72	82	87	67	72	82	87	46	51	61	66	46	51	61	66
16	71	76	91	96	81	86	101	106	45	50	65	70	55	60	75	80
20	80	85	100	105	90	95	110	115	51	56	71	76	61	66	81	86
25	88	93	108	113	98	103	118	123	55	60	75	80	65	70	85	90
32	99	104	119	124	109	114	129	134	57	62	77	82	67	72	87	92

MTK

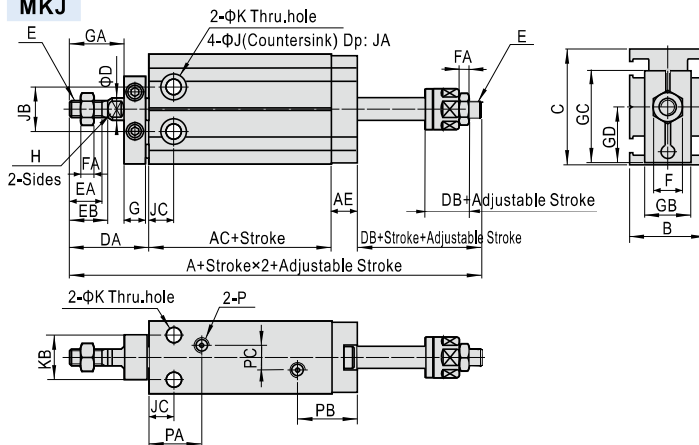


Remark) The unmarked dimension is the same as MK standard type.

MKD



MKJ



Bore size/Item	A(Without magnet)		A(With magnet)		AC (Without magnet)	AC (With magnet)	AE	B	C	D	DA	DB		E
	MKD	MKJ	MKD	MKJ								MKD	MKJ	
6	75	75	75	75	38	38	6	16,5	22	3	18	13	13	M3×0,5
10	79	78	79	78	36	36	6	16,5	24	4	21	16	14,7	M4×0,7
16	79,5	80,5	89,5	90,5	30	40	7,5	20	32	6	26	16	17	M5×0,8
20	93	95	103	105	36	46	9	26	40	8	29	19	21	M6×1,0
25	105	107	115	117	40	50	9	32	50	10	33	23	25	M8×1,25
32	121	121	131	131	42	52	10	40	62	12	42	27	27	M10×1,25

Bore size/Item	EA	EB	F	FA	G	GA	GB	GC	GD	H	J	JA	JB	JC	K	KB	P	PA	PB	PC
6	7	8	5,5	2,5	8	9	11	19	10,7	-	6	5	10	7	3,3	7	M5×0,8	14	16	-
10	10	11	7	2	8	12	13	20,5	11,6	-	6	5,5	11	7	3,3	9	M5×0,8	15,5	16	-
16	11	12,5	8	4	8	17	13	26,5	15,6	5	7,5	6,5	14	7	4,5	12	M5×0,8	14,5	17,5	3
20	12	14	10	5	8	20	16	32	19,5	6	9,5	8	16	9	5,5	16	M5×0,8	19,3	18,5	9
25	15,5	18	12	6	10	22	19	40	24,5	8	9,5	9	20	10	5,5	20	M5×0,8	20,5	17,5	12
32	19,5	22	17	6	12	29	24	49	30,5	10	11	11,5	24	11	6,5	24	1/8"	22	22,5	13



MPG Series Plate Cylinder

Compendium of MPG Series

Five bore size are available
Bore size: 6, 8, 10, 12, 16

Multi-type cylinder

MPG: Standard plate cylinder (double acting)	
MPGH: Hinge mounting type cylinder (double acting)	

Magnetic switch slots around the cylinder body
There are magnetic switch slots around the cylinder body convenient to install inducting switch.

Two kinds of rod type

Male thread	No thread

Three kinds of mounting type

LB Type	FA Type	SDB Type

Four kinds of cylinder joints

I Knuckle	Y Knuckle	FC Rubber bumper (flat head)	RC Rubber bumper (ball head)

Criteria for selection: Cylinder thrust

Unit : Newton(N)

Model	Bore size	Rod size	Acting type		Pressure area(mm ²)	Operating pressure(MPa)						
						0.1	0.2	0.3	0.4	0.5	0.6	0.7
MPG MPGH	6	3	Double acting	Push side	28.3	2.8	5.7	8.5	11.3	14.2	17.0	19.8
				Pull side	21.2	2.1	4.2	6.4	8.5	10.6	12.7	14.8
	8	4	Double acting	Push side	50.3	5.0	10.1	15.1	20.1	25.2	30.2	35.2
				Pull side	37.7	3.8	7.5	11.3	15.1	18.9	22.6	26.4
	10	4	Double acting	Push side	78.5	7.9	15.7	23.6	31.4	39.3	47.1	55.0
				Pull side	65.9	6.6	13.2	19.8	26.4	33.0	39.5	46.1
	12	6	Double acting	Push side	113.0	11.3	22.6	33.9	45.2	56.5	67.8	79.1
				Pull side	84.7	8.5	17.0	25.4	33.9	42.4	50.8	59.3
	16	6	Double acting	Push side	201.0	20.1	40.2	60.3	80.4	100.5	120.6	140.7
				Pull side	172.7	17.3	34.5	51.8	69.1	86.4	103.6	120.9

Installation and application



- When load changes in the work, the cylinder with abundant output capacity shall be selected.
- Relative cylinder with high temperature resistance or corrosion resistance shall be chosen under the condition of high temperature or corrosion.
- Necessary protection measure shall be taken in the environment with higher humidity, much dust or water drops, oil dust and welding dregs.
- Dirty substances in the pipe must be eliminated before cylinder is connected with pipeline to prevent the entrance of particles into the cylinder.
- The medium used by cylinder shall be filtered to 40µm or below.
- As both of the front cover and piston of the cylinder are short, typically too large stroke can not be selected.
- Anti-freezing measure shall be adopted under low temperature environment to prevent moisture freezing.
- The cylinder shall avoid the influence of side load in operation to maintain the normal work of cylinder and extend the service life.
- If the cylinder is dismantled and stored for a long time, please conduct anti-rust treatment to the surface. Anti-dust caps shall be added in air inlet and outlet ports. The front and back cover can not be dismantled, which shall be especially noticed.





Specification

Bore size(mm)	6	8	10	12	16
Acting type	Double acting				
Fluid	Air(to be filtered by 40μm filter element)				
Operating pressure	0.15~0.7MPa(22~100psi)				
Proof pressure	1.2MPa(175psi)				
Mounting type	Basic, FA, LB, SDB				
Temperature °C	-20~70				
Speed range mm/s	30~500				
Stroke tolerance	+1.0 0				
Cushion type	Bumper				
Port size	M3×0.5			M5×0.8	

Add) Refer to P362 for detail of sensor switch.

Symbol



Product feature

1. It is compact, small size and light weight. It is easy to install and dismantle.
2. The guide precision of piston rod is high and no additional lubricant is needed.
3. Advanced rubber coating process is applied to the back cover.
4. Mounting accessories with various specifications are optional.
5. With magnet type is of the feature of position sensing.
6. There are magnetic switch slots around the cylinder body, which is convenient to install inducting switch.
7. Cylinders of various specifications are optional.

Stroke

Bore size (mm)	Standard stroke (mm)	Max.std stroke
6	5 10 15 20 25	25
8	5 10 15 20 25 30 35 40	40
10	5 10 15 20 25 30 35 40	40
12	5 10 15 20 25 30 35 40	40
16	5 10 15 20 25 30 35 40	40

[Note] Please contact the company for other special strokes.

Ordering code

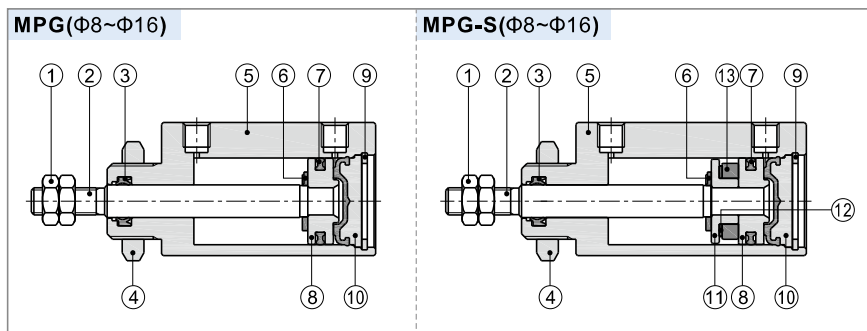
MPG 10 × 30 S N □

MPGH 10 × 30 S N □

① ② ③ ④ ⑤ ⑥

① Model	② Bore size	③ Stroke	④ Magnet	⑤ Rod type	⑥ Mounting type
MPG: Standard plate cylinder (double acting)	6 8 10 12 16	Refer to stroke table for details	Blank: Without magnet S: With magnet	Blank: Male thread N: No thread	Blank: No accessories
MPGH: Hinge mounting type cylinder (double acting)					LB: LB type
					FA: FA type
					Blank: No accessories
					SDB: SDB type

Inner structure and material of major parts

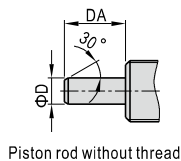


NO.	Item	Material
1	Rod nut	Stainless steel
2	Piston rod	Stainless steel
3	Front cover packing	NBR
4	Front cover nut	Carbon steel
5	Body	Aluminum alloy
6	Bumper	TPU
7	Piston	Aluminum alloy(Φ16) Brass(Others)
8	Piston seal	NBR
9	clip	Spring steel
10	Back cover	Aluminum alloy & Rubber
11	Magnet holder	Stainless steel(Φ6)/Brass(Φ8~Φ12) Aluminum alloy(Φ16)
12	Magnet washer	NBR
13	Magnet	Sintered metal (Neodymium-iron-boron)

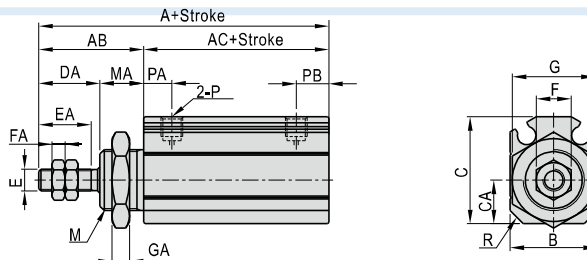
MPG Series

Dimensions

MPG/MPG-S

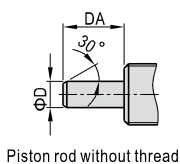


Piston rod without thread

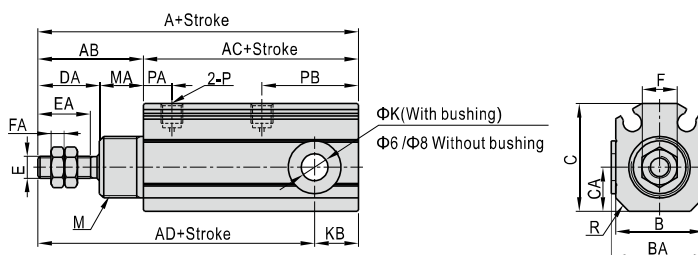


Bore size\Item	A	AC	A	AC	AB	B	C	CA	D	DA	E	EA	F	FA	G	GA	M	MA	P	PA	PB	R
	Without magnet	With magnet	Without magnet	With magnet																		
6	33	16	38	21	17	14	16.5	6	3	9	M3×0.5	7	5.5	2.4	13	4	M10×1.0	8	M3×0.5	5.5	6.5	2
8	38	18	43	23	20	14.5	17.5	7	4	12	M4×0.7	10	7	3	17	4	M12×1.0	8	M3×0.5	6	7	2
10	39.5	19.5	44.5	24.5	20	15	19	7	4	12	M4×0.7	10	7	3	17	4	M12×1.0	8	M3×0.5	6	7	2.5
12	43.5	19.5	48.5	24.5	24	17	21.5	8.5	6	14	M5×0.8	12	8	3	19	4	M14×1.0	10	M5×0.8	6.5	7.5	2.5
16	43.5	19.5	48.5	24.5	24	20	24.5	10	6	14	M5×0.8	12	8	3	19	4	M14×1.0	10	M5×0.8	6.5	7.5	3

MPGH/MPGH-S



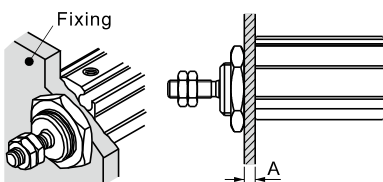
Piston rod without thread



Bore size\Item	A	AC	AD	A	AC	AD	AB	B	BA	C	CA	D	DA	E	EA	F	FA	K	KB	M	MA	P	PA	PB	R
	Without magnet	With magnet	Without magnet	With magnet																					
6	38	21	34	43	26	39	17	14	-	16.5	6	3	9	M3×0.5	7	5.5	2.4	$3^{+0.05}_0$	4	M10×1.0	8	M3×0.5	5.5	11.5	2
8	46	26	41	51	31	46	20	14.5	-	17.5	7	4	12	M4×0.7	10	7	3	$4^{+0.05}_0$	5	M12×1.0	8	M3×0.5	6	15	2
10	50.5	30.5	44	55.5	35.5	49	20	15	17	19	7	4	12	M4×0.7	10	7	3	$5^{+0.065}_0$	6.5	M12×1.0	8	M3×0.5	6	18	2.5
12	58	34	48	63	39	53	24	17	19	21.5	8.5	6	14	M5×0.8	12	8	3	$6^{+0.065}_0$	10	M14×1.0	10	M5×0.8	6.5	22	2.5
16	58	34	48	63	39	53	24	20	22	24.5	10	6	14	M5×0.8	12	8	3	$6^{+0.065}_0$	10	M14×1.0	10	M5×0.8	6.5	22	3

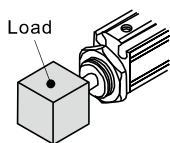
Installation and application

1. Select the plate thickness and tightening torque of the front cover thread according to the table below:



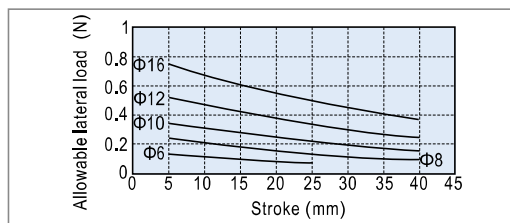
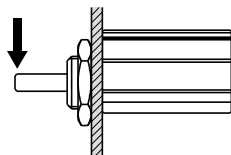
Bore size	Front cover thread	Maximum allowable torque(N.m)	Maximum thickness(A)
6	M10×1.0	12.5	4
8	M12×1.0	21.0	4
10	M12×1.0	21.0	4
12	M14×1.0	34.0	5
16	M14×1.0	34.0	5

2. The extra torque produced by the load at the piston rod end cannot exceed the allowable value specified in the table below, Otherwise may cause damage to the cylinder or reduce the service life.



Bore size	Piston rod thread	Maximum allowable torque(N.m)
6	M3×0.5	0.3
8	M4×0.7	0.8
10	M4×0.7	0.8
12	M5×0.8	1.6
16	M5×0.8	1.6

3. Allowable Rod End Lateral Load



MPG Series

List for ordering code of accessories

Accessories Bore size	Mounting accessories			Knuckle				Sensor switch		
	LB	FA	SDB	FC	RC	I	Y	CMSH	DMSH	EMSH
6	F-MPG6LB	F-MPG6FA	F-MPG6SDB	F-MPG6FC	F-MPG6RC	F-M3×050I	F-M3×050Y	CMSH	DMSH	EMSH
8	F-MPG10LB	F-MPG10FA	F-MPG8SDB F-MPG10SDB	F-MPG10FC	F-MPG10RC	F-M4×070I	F-M4×070Y			
10										
12	F-MPG16LB	F-MPG16FA	F-MPG12SDB F-MPG16SDB	F-MPG16FC	F-MPG16RC	F-M5×080I	F-M5×080Y			
16										

Accessory selection

Accessories Cylinder model	Mounting accessories [Note1]			Knuckle [Note2]				Sensor switch		
	LB	FA	SDB	I	Y	FC	RC	CMSH	DMSH	EMSH
MPG	No magnet	●	●	×	●	●	●	●	×	×
	With magnet	●	●	×	●	●	●	●	●	●
MPGH	No magnet	×	×	●	●	●	●	×	×	×
	With magnet	×	×	●	●	●	●	●	●	●

Material of accessories

Accessories Bore size	Mounting accessories			Knuckle			
	LB	FA	SDB	I	Y	FC	RC
6~16	△	△	△	◇	◇	□	□

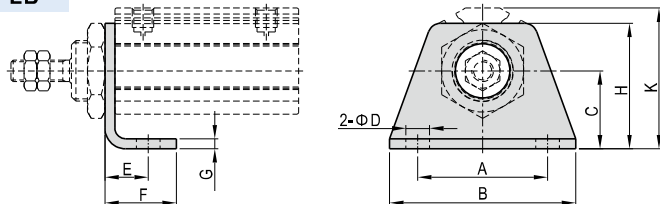
△—SPCC ; □—POM ; ◇—Carbon steel

[Note1] SDB is attached with relevant PIN.

[Note2] Please refer to P358~361 for knuckle detail.

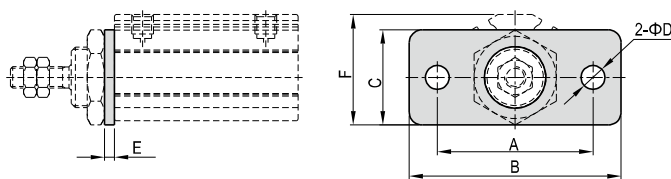
Dimensions

LB



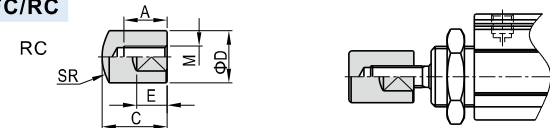
Bore size\Item	A	B	C	D	E	F	G	H	K
6	20	28	11	3.4	6.5	10.5	1.5	19	21.5
8	24	33	13	4.5	7	12	1.5	22	23.5
10	24	33	13	4.5	7	12	1.5	22	25
12	30	43	18	5.5	10	16.5	2.5	29	31
16	30	43	18	5.5	10	16.5	2.5	29	32.5

FA



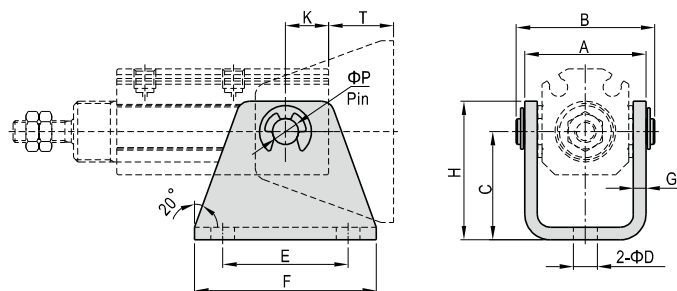
Bore size\Item	A	B	C	D	E	F
6	24	32	16	3.4	1.5	18.5
8	28	37	18	4.5	1.5	19.5
10	28	37	18	4.5	1.5	21
12	36	49	22	5.5	2.5	24
16	36	49	22	5.5	2.5	25.5

FC/RC



Bore size\Item	A	B	C	D	E	M	SR
6	6	6	11	8	5	M3×0.5	8
8	8	8	13	10	6	M4×0.7	10
10	8	8	13	10	6	M4×0.7	10
12	10	10	15	12	7	M5×0.8	12
16	10	10	15	12	7	M5×0.8	12

SDB



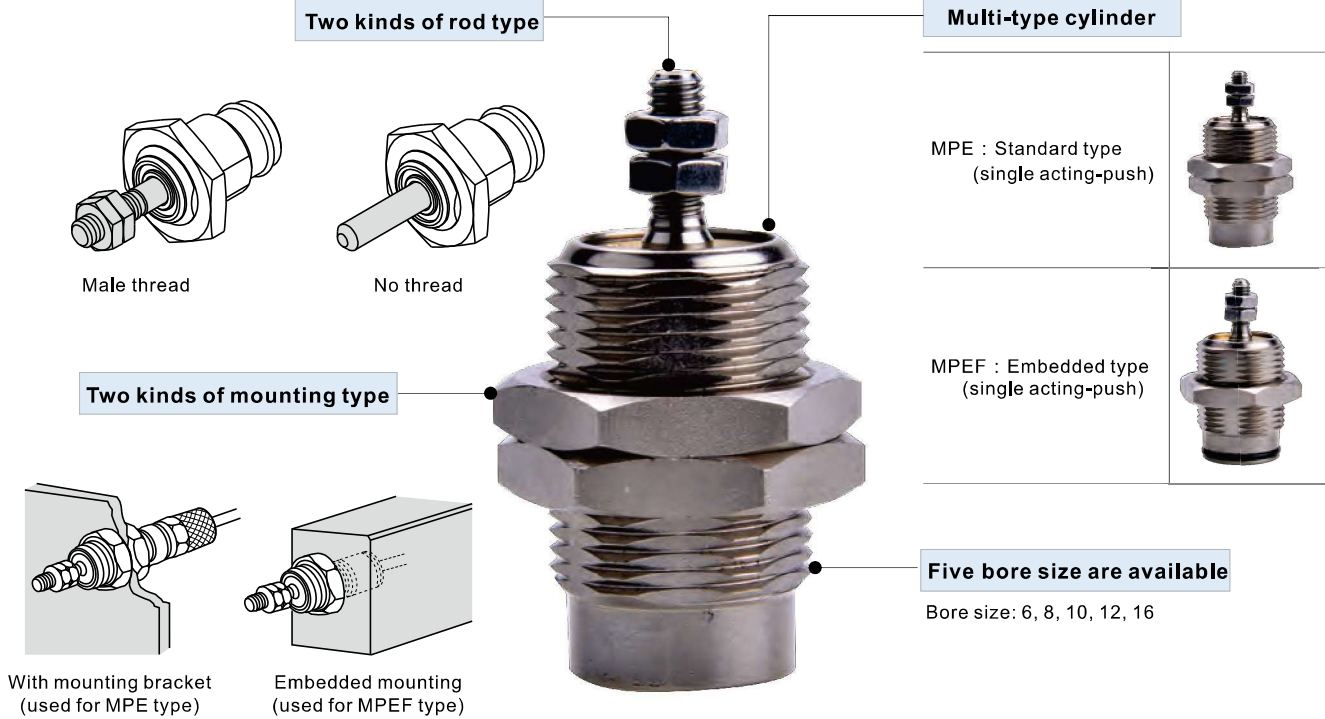
Bore size\Item	A	AA*	B	BB*	C	D	E	F	G	H	K	T	P
6	18.5	55°	21.5	110°	16	3.4	18	26	1.5	20	4	12	3
8	19	55°	23	110°	18	4.5	21	30	1.5	23	5	13	4
10	20.5	65°	24.1	110°	20	4.5	24	33	1.5	25.5	6.5	13.5	5
12	25	55°	29	110°	25	5.5	26	39	3	32	10	15	6
16	28	55°	32	110°	25	5.5	29	42	3	32	10	15	6

*Note: AA and BB are for reference only.
Specific value depends on the actual situation.



MPE Series Threaded Cylinder

Compendium of MPE Series



Criteria for selection: Cylinder thrust

Unit : Newton(N)

Model	Bore size	Rod size	Acting type	Pressure area(mm ²)	Operating pressure(MPa)							
					0.1	0.2	0.3	0.4	0.5	0.6	0.7	
MPE MPEF	6	3	Single acting	Push side	28.3	-	1.8	4.6	7.4	10.3	13.1	15.9
			Pull side	21.2			1.6					
	8	4	Single acting	Push side	50.3	-	4.8	9.8	14.8	19.9	24.9	29.9
			Pull side	37.7			2.7					
	10	5	Single acting	Push side	78.5	-	9.4	17.3	25.1	33.0	40.8	48.7
			Pull side	58.9			2.8					
	12	6	Single acting	Push side	113.0	-	13.3	24.6	35.9	47.2	58.5	69.8
			Pull side	84.7			3.45					
	16	6	Single acting	Push side	201.0	-	29.4	49.5	69.6	89.7	109.8	129.9
			Pull side	172.7			4.8					

Installation and application



1. When load changes in the work, the cylinder with abundant output capacity shall be selected.
2. Relative cylinder with high temperature resistance or corrosion resistance shall be chosen under the condition of high temperature or corrosion.
3. Necessary protection measure shall be taken in the environment with higher humidity, much dust or water drops, oil dust and welding dregs.
4. Dirty substances in the pipe must be eliminated before cylinder is connected with pipeline to prevent the entrance of particles into the cylinder.
5. The medium used by cylinder shall be filtered to 40μm or below.
6. As both of the front cover and piston of the cylinder are short, typically too large stroke can not be selected.
7. Anti-freezing measure shall be adopted under low temperature environment to prevent moisture freezing.
8. The cylinder shall avoid the influence of side load in operation to maintain the normal work of cylinder and extend the service life.
9. If the cylinder is dismantled and stored for a long time, please conduct anti-rust treatment to the surface. Anti-dust caps shall be added in air inlet and outlet ports. The front and back cover can not be dismantled, which shall be especially noticed.



MPE Series



Specification

Bore size(mm)	6	8	10	12	16
Acting type	Single acting				
Fluid	Air(to be filtered by 40μm filter element)				
Operating pressure	0.2~0.7MPa(28~100psi)		0.15~0.7MPa(22~100psi)		
Proof pressure	1.2MPa(175psi)				
Mounting type	Embedded type, End inlet type				
Temperature °C	-20~70				
Speed range mm/s	50~500				
Stroke tolerance	+1.0 0				
Cushion type	No cushion				
Port size	M5×0.8				

Symbol



Product feature

1. It is compact, small and light.
2. Multi cylinders can be integrated to save space.
3. Mounting accessories are not necessary.
4. Cylinders of various specifications are optional.

Stroke

Bore size (mm)	Standard stroke (mm)	Max.std stroke
6	5 10 15	15
8	5 10 15	15
10	5 10 15	15
12	5 10 15	15
16	5 10 15	15

[Note] Please contact the company for other special strokes.

Ordering code

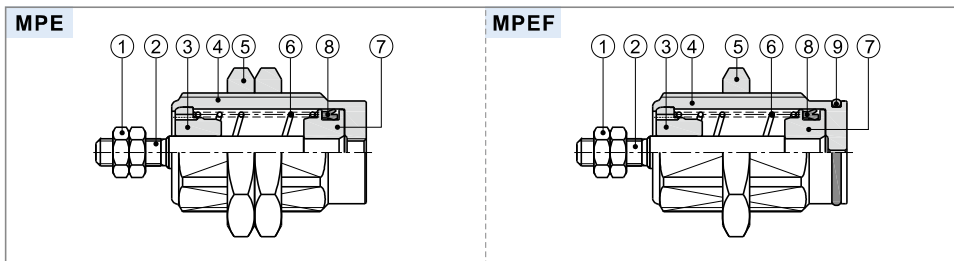
MPE 16 ×15 N

MPEF 16 ×15 N

① ② ③ ④

① Model	② Bore size	③ Stroke	④ Rod type
MPE : Standard type (single acting-push)	6 8 10 12 16	Refer to stroke table for details	Blank: Male thread N: No thread
MPEF : Embedded type (single acting-push)			

Inner structure and material of major parts



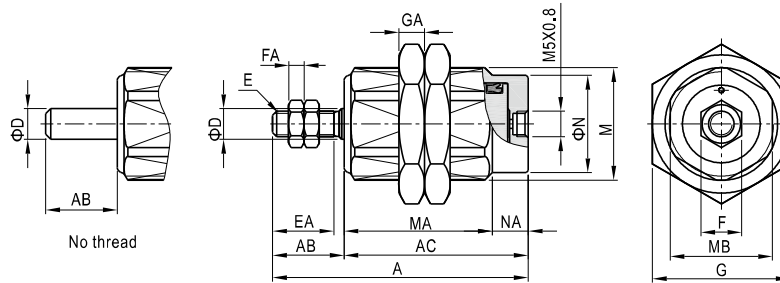
NO.	Item	Material
1	Rod nut	Stainless steel
2	Piston rod	Stainless steel
3	Front cover	Brass
4	Body	Brass (nickel-plated)
5	Body nut	Carbon steel
6	Spring	Spring steel
7	Piston	Stainless steel
8	Piston seal	NBR
9	O-ring	NBR

Threaded cylinder

MPE Series

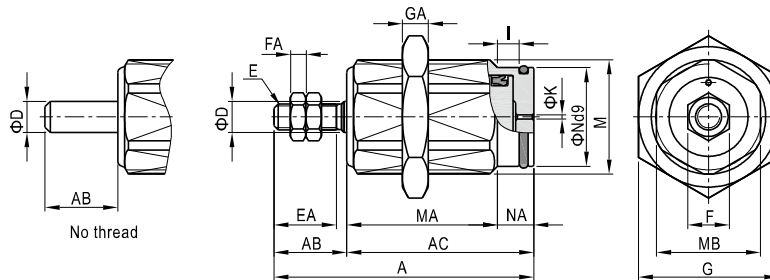
Dimensions

MPE

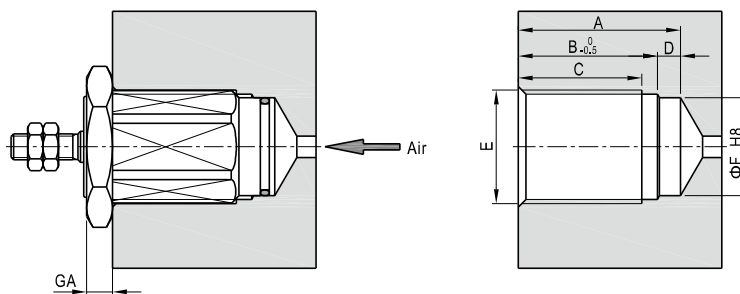


Bore size\Item Stroke	A			AB	AC			MA			D	E	EA	F	FA	G	GA	M	MB	N	NA
	5St	10St	15St		5St	10St	15St	5St	10St	15St											
6	30.5	37.5	44.5	9	21.5	28.5	35.5	15.5	22.5	29.5	3	M3×0.5	7	5.5	2.4	14	4	M10×1.0	9	8.5	6
8	34.5	41.5	48.5	12	22.5	29.5	36.5	16.5	23.5	30.5	4	M4×0.7	10	7	3	17	4	M12×1.0	11	10	6
10	35	42	49	12	23	30	37	17	24	31	5	M4×0.7	10	7	3	19	4	M16×1.5	14	12	6
12	37.5	43.5	49.5	12	25.5	31.5	37.5	19.5	25.5	31.5	6	M5×0.8	10	8	3	24	5	M18×1.5	16	15	6
16	40.5	46.5	52.5	14	26.5	32.5	38.5	19.5	25.5	31.5	6	M5×0.8	12	8	3	27	5	M22×1.5	20	19	7

MPEF



Bore size\Item Stroke	A			AB	AC			MA			D	E	EA	F	FA	G	GA	I	M	MB	N	NA	K
	5St	10St	15St		5St	10St	15St	5St	10St	15St													
6	28	35	42	9	19	26	33	13	20	27	3	M3×0.5	7	5.5	2.4	14	4	2.5	M10×1.0	9	8.5	6	0.6
8	32	39	46	12	20	27	34	14	21	28	4	M4×0.7	10	7	3	17	4	2.5	M12×1.0	11	10	6	0.8
10	32.5	39.5	46.5	12	20.5	27.5	34.5	14	21	28	5	M4×0.7	10	7	3	19	4	2.5	M16×1.5	14	12	6.5	1
12	35	41	47	12	23	29	35	16.5	22.5	28.5	6	M5×0.8	10	8	3	24	5	2.7	M18×1.5	16	15	6.5	1.3
16	38	44	50	14	24	30	36	17	23	29	6	M5×0.8	12	8	3	27	5	2.7	M22×1.5	20	19	7	1.7



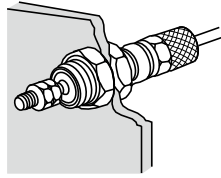
Bore size\Item Stroke	A			B			C			D	E	F	GA
	5St	10St	15St	5St	10St	15St	5St	10St	15St				
6	14.5	21.5	28.5	11	18	25	8.5	15.5	22.5	3.5	M10×1.0	8.5	4
8	15	22	29	11.5	18.5	25.5	9	16	23	3.5	M12×1.0	10	4
10	15.5	22.5	29.5	12	19	26	9	16	23	3.5	M16×1.5	12	4
12	17	23	29	13.5	19.5	25.5	10.5	16.5	22.5	3.5	M18×1.5	15	5
16	18	24	30	14	20	26	11	17	23	4	M22×1.5	19	5

[Note] Size E and F must be concentric.

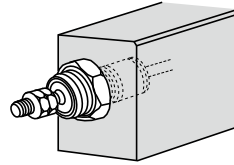
MPE Series

Mounting and use

1. Select applicable cylinder model and mounting method based on actual situation :



With mounting bracket (used for MPE type)

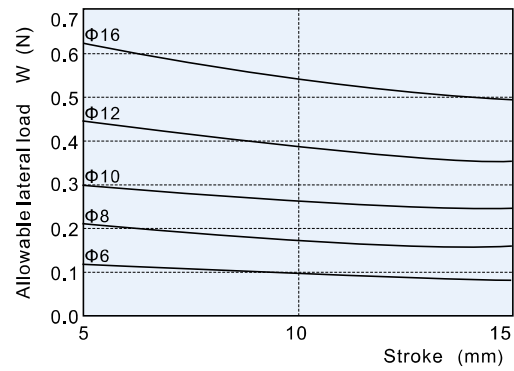


Embedded mounting (used for MPEF type)

2. MPE series are single acting cylinders. No load is allowed at the piston rod when it is on the retraction state.

3. The force of the spring of the cylinder is for retraction of the piston rod only. The piston rod may not retract to the bottom end if there's any load.

4. Make sure the rod end lateral load is allowable. Otherwise may cause damage to the cylinder or reduce the service life.





Twin-rod cylinder——TN, TR Series

Compendium of TN/TR Series

TN series is enterprises standard, TR series is JIS standard

Multi-type cylinder

TN: Twin-rod cylinder (Double acting type)



TR: Twin-rod cylinder (Double acting type)



Bumper in front of the barrel

Bumper in front of the barrel can adjust the stroke of cylinder and relieve impact.

Twin-rod cylinder

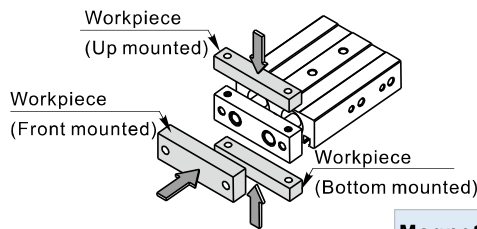
It is good resistance to bending and twisting moments.

Five or six bore size are available

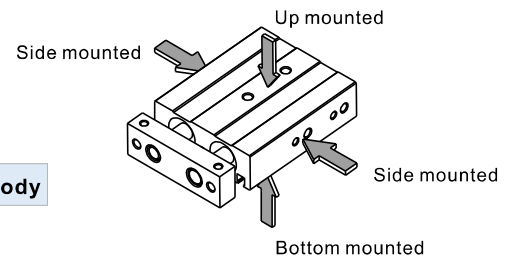
TN series bore size: 10, 16, 20, 25, 32

TR series bore size: 6, 10, 16, 20, 25, 32

Be mounted the workpiece from three directions



Mounted from four directions



Magnetic switch slots around the cylinder body

There are magnetic switch slots around the cylinder body convenient to install inducting switch.

Criteria for selection: Cylinder thrust

Unit : Newton(N)

Bore size	Rod size	Acting type	Pressure area(mm ²)	Operating pressure(MPa)							
				0.1	0.2	0.3	0.4	0.5	0.6	0.7	
6	4	Double acting	Push side	56.5	5.7	11.3	17.0	22.6	28.3	33.9	39.6
			Pull side	31.4	3.1	6.3	9.4	12.6	15.7	18.8	22.0
10	6	Double acting	Push side	157.1	15.7	31.4	47.1	62.8	78.6	94.3	110.0
			Pull side	100.5	10.1	20.1	30.2	40.2	50.3	60.3	70.4
16	8	Double acting	Push side	402.1	40.2	80.4	120.6	160.8	201.1	241.3	281.5
			Pull side	301.6	30.2	60.3	90.5	120.6	150.8	181.0	211.1
20	10	Double acting	Push side	628.3	62.8	125.7	188.5	251.3	314.2	377.0	439.8
			Pull side	471.2	47.1	94.2	141.4	188.5	235.6	282.7	329.8
25	12	Double acting	Push side	981.7	98.2	196.4	294.5	392.7	490.9	589.0	687.2
			Pull side	755.6	75.6	151.1	226.7	302.2	377.8	453.4	528.9
32	16	Double acting	Push side	1608.5	160.9	321.7	482.6	643.4	804.3	965.1	1126.0
			Pull side	1206.4	120.6	241.3	361.9	482.6	603.2	723.8	844.5

Installation and application



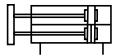
1. When load changes in the work, the cylinder with abundant output capacity shall be selected.
2. Relative cylinder with high temperature resistance or corrosion resistance shall be chosen under the condition of high temperature or corrosion;
3. Necessary protection measure shall be taken in the environment with higher humidity, much dust or water drops, oil dust and welding dregs.
4. Dirty substances in the pipe must be eliminated before cylinder is connected with pipeline to prevent the entrance of particles into the cylinder;
5. The medium used by cylinder shall be filtered to 40µm or below.
6. As both the front cover and piston are short, too large stroke can not be selected.
7. Anti-freezing measure shall be adopted under low temperature environment to prevent moisture freezing.
8. The cylinder shall avoid radial load in operation to maintain the normal and extend service life.
9. If the cylinder is dismantled and stored for a long time, please conduct anti-rust treatment to the surface. Anti-dust cap shall be inserted into the inlet and outlet ports. As the precision of the manufacture and guide is high, Please do not dismantle the fixed block or cylinder cover .



TN Series



Symbol



Product feature

1. Enterprises standard is implemented.
2. Embedded installation and fixation mode saves the installation space.
3. It is good resistance to bending and twisting moments.
4. Mounting holes on three sides facilitates multi-position mounting.
5. Bumper in front of the barrel can adjust the stroke of cylinder and relieve impact.
6. Standard configuration of this series has magnet and the type without magnet is not available.

Specification

Bore size(mm)	10	16	20	25	32
Acting type	Double acting				
Fluid	Air(to be filtered by 40μm filter element)				
Operating pressure	0.2~1.0MPa(29~145psi)		0.15~1.0MPa(22~145psi)		
Proof pressure	1.5MPa(215psi)				
Temperature °C	-20~70				
Speed range mm/s	30~500				
Adjustable stroke mm	-5~0				
Stroke tolerance	≤100 ^{+1.0} ₀		> 100 ^{+1.5} ₀		
Cushion type	Bumper				
Non-rotating tolerance [Note1]	±0.4°		±0.3°		
Port size [Note2]	M5×0.8				1/8"

[Note1] Retract position.

[Note2]PT thread is available.

Add) Refer to P362 for detail of sensor switch.

Stroke

Bore size (mm)	Standard stroke (mm)														Max.std stroke
10	10	20	30	40	50	60	70	80	90	100					100
16	10	20	30	40	50	60	70	80	90	100	125	150	175	200	200
20	10	20	30	40	50	60	70	80	90	100	125	150	175	200	200
25	10	20	30	40	50	60	70	80	90	100	125	150	175	200	200
32	10	20	30	40	50	60	70	80	90	100	125	150	175	200	200

[Note] When the stroke less then or equal to 100mm, The dimensions of non-std stroke cylinder has the same dimensions as the next longer stroke std. stroke cylinder. e.g. 35mm stroke cylinder has the same dimensions of 40 std. stroke cylinder.

Ordering code

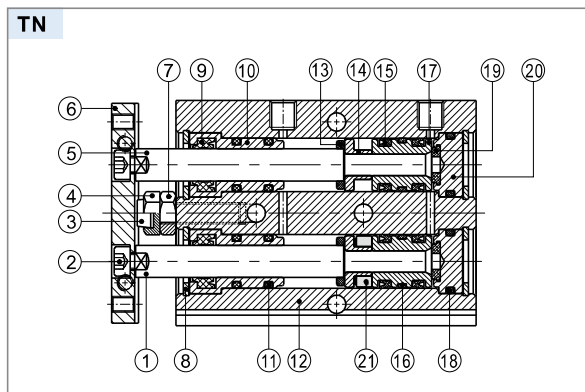
TN 20 ×50 S □



① Model	② Bore size	③ Stroke	④ Magnet [Note1]	⑤ Thread type [Note 2]
TN: Twin-rod cylinder (Double acting type)	10 16 20 25 32	Refer to stroke table for details	S: With magnet	Blank: PT

[Note1] TN Series are all with magnet. [Note2] When the thread is standard, the code is blank.

Inner structure and material of major parts

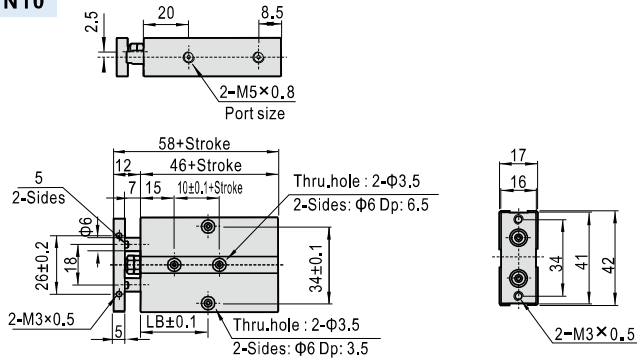


NO.	Item	Material	NO.	Item	Material
1	Piston rod B	Φ32 S45C	12	Body	Aluminum alloy
		Other SUS304	13	Bumper	TPU
2	Screw	Carbon steel	14	Magnet holder	Φ10 SUS303
3	Bumper	POM			Other Aluminum alloy
4	Adjustable nut	Carbon steel	15	Piston seal	NBR
5	Piston rod A	S45C	16	Wear ring	Wear resistant material
6	Fixing plate	Free cutting steel	17	Piston	Φ10 SUS303
7	Screw	Carbon steel			Other Aluminum alloy
8	C clip	Spring steel	18	Seal ring	NBR
9	Wiper seal	NBR	19	Bumper	TPU
10	Front cover	Aluminum alloy	20	Back cover	Aluminum alloy
11	O-ring	NBR	21	Magnet	Sintered metal(Neodymium-iron-boron)

TN Series

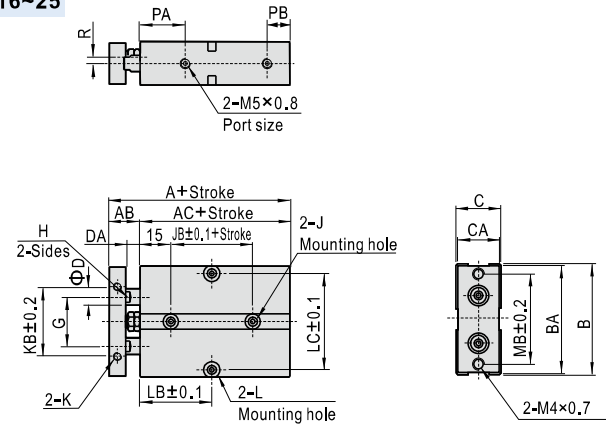
Dimensions

TN10



Item\Stroke	10	20	30	40	50	60	70	80	90	100
LB	30	30	35	40	45	50	55	60	65	70

TN16~25

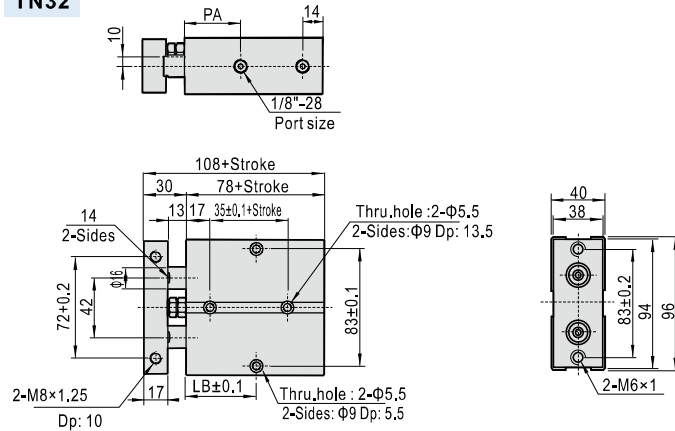


Bore size\Item	A	AB	AC	B	BA	C	CAD	DA	G	H	J
16	68	15	53	54	53	21	20	8	8.2	24	6
20	78	20	58	62	61	25	24	10	10.2	28	8
25	81	19	62	73	72	30	29	12	10.2	34	10

Bore size\Item	JB	K	KB	PA	PB	L	LC	MB	R
16	20	M4x0.7Dp:5	34	22	11	Both sides:Φ8Dp:4.5Thru.hole:Φ4.5	47	47	3
20	20	M4x0.7Dp:5	44	25	12	Both sides:Φ8Dp:4.5Thru.hole:Φ4.5	55	55	3.5
25	30	M4x0.7Dp:6	56	27	12	Both sides:Φ8Dp:4.5Thru.hole:Φ4.5	66	66	6

Bore size\Item	LB													
Stroke≤	10	20	30	40	50	60	70	80	90	100	125	150	175	200
16	30	35	40	45	50	55	60	65	70	75	87.5	100	112.5	125
20	35	35	40	45	50	55	60	65	70	75	87.5	100	112.5	125
25	40	40	45	50	55	60	65	70	75	80	92.5	105	117.5	130

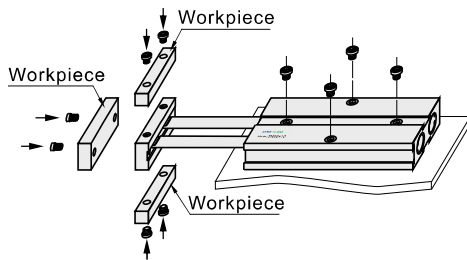
TN32



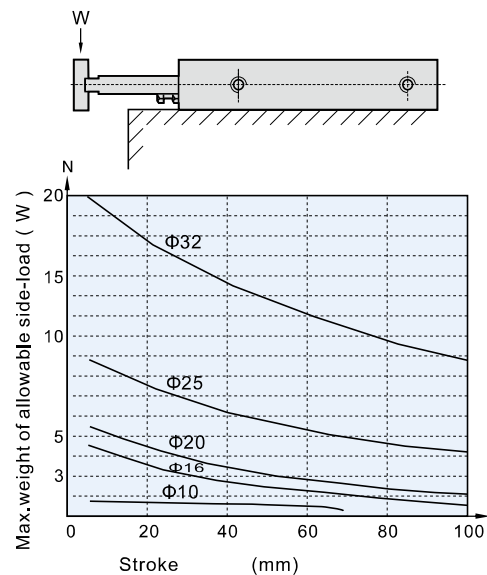
Item\Stroke	10	20	30	40	50	60	70	80	90	100	125	150	175	200
LB	45	50	55	60	65	70	75	80	85	90	102.5	115	127.5	140
PA	35									40				

Installation and application

1. How to mount workpiece :



2. Max. weight of allowable side-load





Symbol



Product feature

1. JIS standard is implemented.
2. The non-rotating precision is high and deflection of the end of piston rod is low, which is suitable for precise guide.
3. It adopts lengthening type sliding supporting guide. No additional lubricant is needed and it has good performance of guide.
4. Mounting holes on three sides facilitates multi-position mounting.
5. It is good resistance to bending and twisting moments.
6. Except for the axial, each side of the cylinder has installation orifices to provide several installation and fixation ways for the customers.
7. There are two groups of air intake and outlet at two sides of the cylinder for the actual selection.
8. Bumper in front of the barrel can adjust the stroke of cylinder and relieve impact.
9. Standard configuration of this series has magnet and the type without magnet is not available.

Specification

Bore size(mm)	6	10	16	20	25	32
Acting type	Double acting					
Fluid	Air(to be filtered by 40µm filter element)					
Operating pressure	0.2~1.0MPa(29~145psi)			0.15~1.0MPa(22~145psi)		
Proof pressure	1.5MPa(215psi)					
Temperature °C	-20~70					
Speed range mm/s	30~500					
Adjustable stroke mm	-5~0					
Stroke tolerance				≤100 ^{+1.0} ₀		>100 ^{+1.5} ₀
Cushion type	Bumper					
Non-rotating tolerance [Note1]	±0.2°		±0.15°		±0.1°	
Port size [Note2]	M5×0.8				1/8"	

[Note1] Retract position.

[Note2]PT thread, G thread and NPT thread are available.

Add) Refer to P362 for detail of sensor switch.

Stroke

Bore size (mm)	Standard stroke (mm)	Max.std stroke
6	10 20 30 40 50	50
10	10 20 30 40 50 60 70 80 90 100	100
16	10 20 30 40 50 60 70 80 90 100 125 150 175 200	200
20	10 20 30 40 50 60 70 80 90 100 125 150 175 200	200
25	10 20 30 40 50 60 70 80 90 100 125 150 175 200	200
32	10 20 30 40 50 60 70 80 90 100 125 150 175 200	200

[Note] When the stroke less then or equal to 100mm, The dimensions of non-std stroke cylinder has the same dimensions as the next longer stroke std. stroke cylinder, e.g. 35mm stroke cylinder has the same dimensions of 40 std. stroke cylinder.

Ordering code

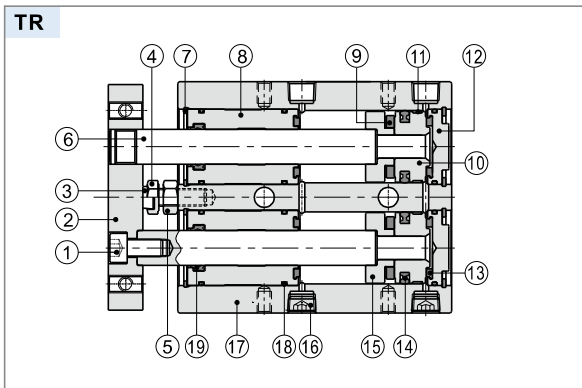
TR 20 ×50 S □



① Model	② Bore size	③ Stroke	④ Magnet [Note1]	⑤ Thread type [Note 2]
TR: Twin-rod cylinder (Double acting type)	6 10 16 20 25 32	Refer to stroke table for details	S: With magnet	Blank: PT G : G T : NPT

[Note1] TR Series are all with magnet. [Note2] When the thread is standard, the code is blank.

Inner structure and material of major parts



NO.	Item	Material	NO.	Item	Material
1	Screw	Carbon steel	10	Piston	Φ6,10 SUS304
2	Fixing plate	Aluminum alloy			Other
3	Bumper	POM	11	Wear ring	Nylon 6
4	Screw	Free cutting steel	12	Back cover	Aluminum alloy
5	Nut	Carbon steel	13	Bumper	TPU
6	Piston rod	Φ20~32 Carbon steel	14	Piston seal	NBR
		Other SUS304	15	Magnet holder	Φ6,10 SUS304
7	C clip	Spring steel			Other
8	Front cover	Aluminum alloy	16	Screw	Carbon steel
		Φ32 Plastic	17	Body	Aluminum alloy
9	Magnet	Sintered metal	18	Back cover O-ring	NBR
		Other (Neodymium-iron-boron)	19	Spool O-ring	NBR

TR Series

Dimensions

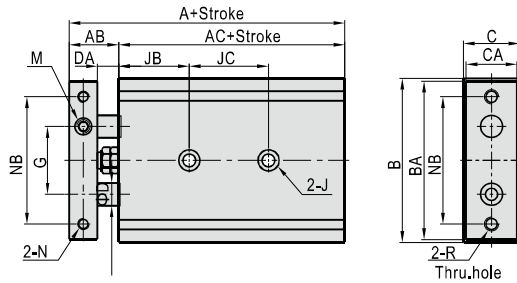
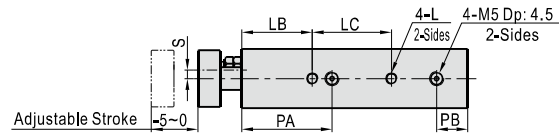
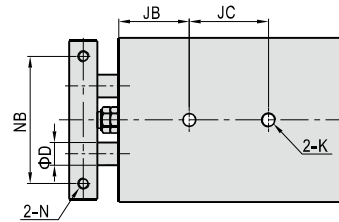
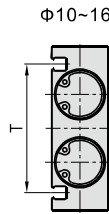
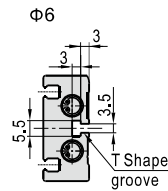
TR6~16

Bore size\Item	A	AB	AC	B	BA	C	CA	D	DA	G	T	NB	PA	PB	R	S
6	58.5	13.5	45	37	35	16	14	4	8	16	23	28	24.5	6.5	M3×0.5	4.5
10	72	17	55	46	44	17	15	6	9	20	36.5	35	30	8	M4×0.7	3.5
16	79	19	60	58	56	20	18	8	9	25	46.5	45	38	8	M5×0.8	5

Bore size\Item	JC LC								
	Stroke	10~25	30~50	60~80	90~100	125	150	175	200
6	JC=10+Stroke/2	-	-	-	-	-	-	-	-
	LC=13+Stroke	-	-	-	-	-	-	-	-
10	30	40	50	60	-	-	-	-	-
16	25	35	45	55	65	75	145	145	-

Bore size\Item	J	JB	K
6	One side:Φ6.5Dp:3.5Thru.hole:Φ3.5	13	-
10	One side:Φ6.5Dp:3.5Thru.hole:Φ3.5	20	M4×0.7Thru.thread
16	One side:Φ8.0Dp:4.5Thru.hole:Φ4.5	30	M5×0.8Thru.thread

Bore size\Item	L	LB	M
6	M3×0.5Dp:4.5	10	M3×0.5
10	M3×0.5Dp:5	20	M5×0.8
16	M4×0.7Dp:5	30	M6×1.0



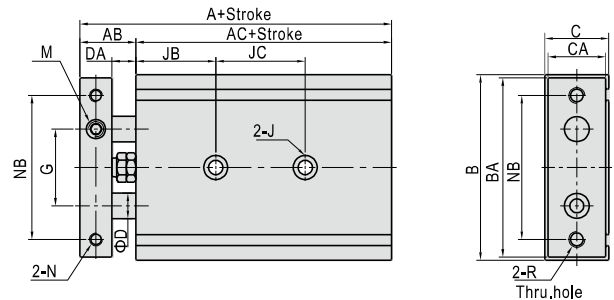
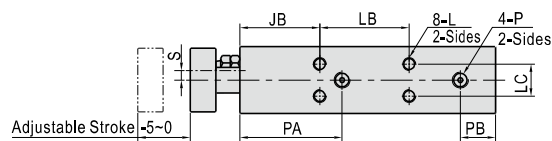
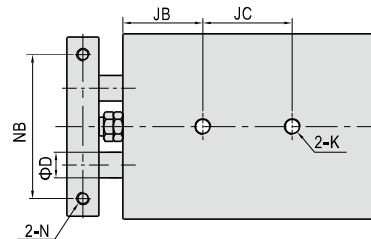
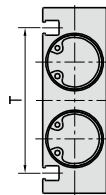
TR20~32

Bore size\Item	A	AB	AC	B	BA	C	CA	D	DA	G	JB	P	PA	PB
20	94	24	70	64	62	25	23	10	12	28	30	M5×0.8	46	9
25	96	24	72	80	78	30	28	12	12	35	30	1/8"	43	9
32	112	30	82	98	96	38	36	16	14	44	30	1/8"	53	10

Bore size\Item	JC LB							
	Stroke	10~25	30~50	60~100	125	150	175	200
20	30	40	60	80	80	100	100	-
25	30	40	60	80	80	100	100	-
32	40	50	70	90	90	110	110	-

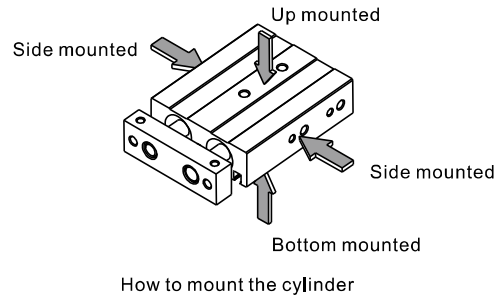
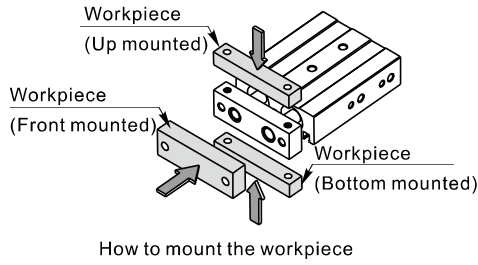
Bore size\Item	K	J	L
20	M6×1.0	One side:Φ9.5Dp:5.5Thru.hole:Φ5.5	M4×0.7Dp:5.5
25	M8×1.25	One side:Φ11Dp:6.5Thru.hole:Φ7	M5×0.8Dp:7
32	M8×1.25	One side:Φ11Dp:6.5Thru.hole:Φ7	M5×0.8Dp:7

Bore size\Item	LC	M	N	NB	R	S	T
20	9.5	M8×1.25	M4×0.7Dp:6	50	M5×0.8	6.5	52
25	13	M8×1.25	M5×0.8Dp:7.5	60	M6×1.0	9	61
32	20	M10×1.5	M5×0.8Dp:8	75	M6×1.0	11.5	73



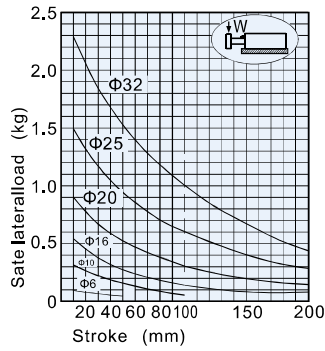
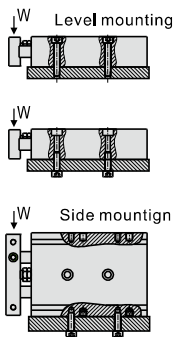
Installation and application

1. How to mount workpiece :

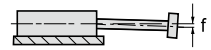
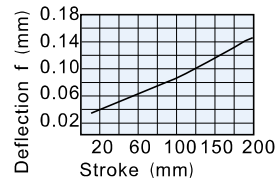


2. Max. weight of allowable side-load

Mounting type



3. Safe deflection



The average value of deflection of rod end of the whole series basically stays in the line showed in the chart on the right.



Tri-rod cylinder—TCL, TCM Series

Compendium of TCL/TCM Series

JIS standard

Two guides of special bearing steel
Steel ball linear bearing(TCL) or Brass sliding bearing(TCM)

Double-rod guide unit
Two guides of special bearing steel and linear bearing or brass bearing guide are used to prevent rotating. They can bear high torque and radial load.

Magnetic switch slots around the cylinder body
There are magnetic switch slots around the cylinder body convenient to install inducting switch.

Two groups of inlet and outlet air ports

Mounted from three directions

Multi-type cylinder

TCL: Linear bearing

TCM: Brass bearing

Twelve bore size are available
Bore size: 6, 10, 12, 16, 20, 25, 32, 40, 50, 63, 80, 100

Up inlet or outlet air port

Side inlet or outlet air port

Up mounted

Back mounted

Bottom mounted

Criteria for selection: Cylinder thrust

Unit : Newton(N)

Bore size	Rod size	Acting type	Pressure area(mm ²)	Operating pressure(MPa)							
				0.1	0.2	0.3	0.4	0.5	0.6	0.7	
6	3	Double acting	Push side	28.3	2.8	5.7	8.5	11.3	14.1	17.0	19.8
			Pull side	21.2	2.1	4.2	6.4	8.5	10.6	12.7	14.8
10	5	Double acting	Push side	78.5	7.9	15.7	23.6	31.4	39.3	47.1	55.0
			Pull side	58.9	5.9	11.8	17.7	23.6	29.5	35.3	41.2
12	6	Double acting	Push side	113.1	11.3	22.6	33.9	45.2	56.5	67.9	79.2
			Pull side	84.8	8.5	17.0	25.4	33.9	42.4	50.9	59.4
16	8	Double acting	Push side	201.1	20.1	40.2	60.3	80.4	100.5	120.6	140.7
			Pull side	150.8	15.1	30.2	45.2	60.3	75.4	90.5	105.6
20	10	Double acting	Push side	314.2	31.4	62.8	94.2	125.7	157.1	188.5	219.9
			Pull side	235.6	23.6	47.1	70.7	94.2	117.8	141.4	164.9
25	12	Double acting	Push side	490.9	49.1	98.2	147.3	196.3	245.4	294.5	343.6
			Pull side	377.8	37.8	75.6	113.3	151.1	188.9	226.7	264.4
32	16	Double acting	Push side	804.2	80.4	160.8	241.3	321.7	402.1	482.5	563.0
			Pull side	603.2	60.3	120.6	181.0	241.3	301.6	361.9	422.2
40	16	Double acting	Push side	1256.6	125.7	251.3	377.0	502.7	628.3	754.0	879.6
			Pull side	1055.6	105.6	211.1	316.7	422.2	527.8	633.3	738.9
50	20	Double acting	Push side	1963.5	196.3	392.7	589.0	785.4	981.7	1178.1	1374.4
			Pull side	1649.3	164.9	329.9	494.8	659.7	824.7	989.6	1154.5
63	20	Double acting	Push side	3117.2	311.7	623.4	935.2	1246.9	1558.6	1870.3	2182.1
			Pull side	2803.1	280.3	560.6	840.9	1121.2	1401.5	1681.9	1962.2
80	25	Double acting	Push side	5026.5	502.7	1005.3	1508.0	2010.6	2513.3	3015.9	3518.6
			Pull side	4535.7	453.6	907.1	1360.7	1814.3	2267.8	2721.4	3175.0
100	25	Double acting	Push side	7854.0	785.4	1570.8	2356.2	3141.6	3927.0	4712.4	5497.8
			Pull side	7363.1	736.3	1472.6	2208.9	2945.2	3681.6	4417.9	5154.2

Installation and application



- When load changes in the work, the cylinder with abundant output capacity shall be selected.
- Relative cylinder with high temperature resistance or corrosion resistance shall be chosen under the condition of high temperature or corrosion.
- Necessary protection measure shall be taken in the environment with higher humidity, much dust or water drops, oil dust and welding dregs.
- Dirty substances in the pipe must be cleared away before cylinder is connected with pipeline to prevent the entrance of particles into the cylinder.
- The medium used by cylinder shall be filtered to 40μm or below.
- The cylinder shall avoid the influence of side load in operation to maintain the normal work of cylinder and extend the service life.
- Anti-freezing measure shall be adopted under low temperature environment to prevent moisture freezing.
- If the cylinder is dismantled and stored for a long time, please conduct anti-rust treatment to the surface. Anti-dust cap shall be inserted into the inlet and outlet ports. As the precision of the manufacture and guide is high, never dismantle the fixed block or cylinder cover without permission.

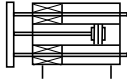


Tri-rod cylinder

TCL,TCM Series



Symbol

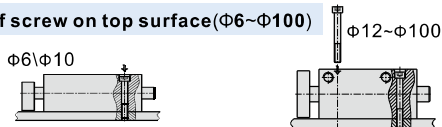


Product feature

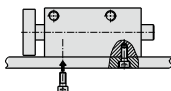
- JIS standard is implemented.
- Two guides of special bearing steel and linear bearing or brass bearing guide are used to prevent rotating. They can bear high torque and radial load.
 - ★Note: Steel ball linear bearing: It is suitable for elevation action of cylinder or the situation requiring high precision and high bearing ability, especially for the situation requiring low friction action process.
 - Brass sliding bearing: it is suitable for the action that has radial load resistance. Compared with normal cylinder of same use, the horizontal impact resistance is doubled and it has stronger torsion rigidity.
- Drive unit and guide unit are in the same barrel that no additional accessories are needed with minimal space required. The air intake is optional and it is convenient to install.
- The bottom, back side and fixing plate of main body respectively has two exact orientation orifices (See ΦPA orifice and the orifice in XX point), which can provide orientation installation with high precision for the special situation.
- Options of switch mounting with provision 4 mounting slots.
- Special design of main body provides multi-mount;

How to mount

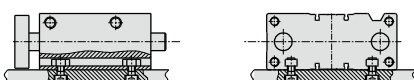
Fixation of screw on top surface($\Phi 6\sim\Phi 100$)



Fixation of screw at bottom surface($\Phi 12\sim\Phi 100$)



Fixation of T slot at bottom($\Phi 12\sim\Phi 100$)



Specification

Bore size(mm)	6	10	12	16	20	25	32	40	50	63	80	100
Acting type	Double acting											
Fluid	Air(to be filtered by 40 μ m filter element)											
Operating pressure	0.2~0.7MPa(29~100psi)						0.15~1.0MPa(22~145psi)					
Proof pressure	1.2MPa(175psi)						1.5MPa(215psi)					
Temperature $^{\circ}C$	-20~70											
Speed range mm/s	50~500						30~500			50~400		
Stroke tolerance	≤ 100 $^{+1.0}_0$						> 100 $^{+1.5}_0$					
Cushion type	Bumper											
Non-rotating tolerance [Note1]	TCL	-		$\pm 0.08^{\circ}$	$\pm 0.07^{\circ}$	$\pm 0.06^{\circ}$	$\pm 0.05^{\circ}$	$\pm 0.04^{\circ}$				
	TCM	$\pm 0.1^{\circ}$		$\pm 0.10^{\circ}$	$\pm 0.09^{\circ}$	$\pm 0.08^{\circ}$	$\pm 0.06^{\circ}$	$\pm 0.05^{\circ}$				
Port size [Note2]	M3 \times 0.5			M5 \times 0.8			1/8"		1/4"		3/8"	

[Note1] Retract position.

[Note2]PT thread, G thread and NPT thread are available.

Add) Refer to P362 for detail of sensor switch.

Stroke

Bore size (mm)	Standard stroke (mm)											Max.std stroke						
6	5	10	15	20									20					
10	5	10	15	20	25	30						30						
12	10	20	25	30	40	50	60	70	75	80	90	100	125	150	150			
16	10	20	25	30	40	50	60	70	75	80	90	100	125	150	175	200	200	
20 25	20	25	30	40	50	60	70	75	80	90	100	125	150	175	200	225	250	250
32 40 50 63	25	30	40	50	60	70	75	80	90	100	125	150	175	200	225	250	250	
80 100	25	30	40	50	60	70	75	80	90	100	125	150	175	200	225	250	250	

[Note] When the discrepancy between non-standard stroke and standard stroke is 1~5mm,

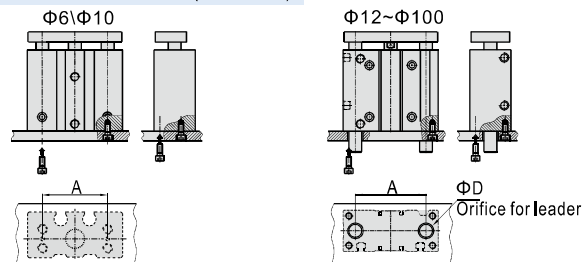
The dimensions of non-std stroke cylinder has the same dimensions as the next longer stroke std. stroke cylinder, e.g. 86mm stroke cylinder has the same dimensions of 90 std. stroke cylinder. But 84mm stroke cylinder should be ordered by non-standard stroke.

Ordering code

TC M 50 \times 50 S □					
① ② ③ ④ ⑤ ⑥					
① Model	② Bearing type	③ Bore size	④ Stroke	⑤ Magnet	⑥ Thread type [Note 2]
TC: Tri-rod cylinder (Double acting type)	M: Brass bearing	6	Refer to stroke table for details	S: With magnet [Note1]	Blank: PT G: G T: NPT
		10			
		12			
		16			
	L: Linear bearing	20			
		25			
		32			
		40			
	M: Brass bearing	50			
		63			
	80				
	100				

[Note1] TC Series are all with magnet. [Note2] When the thread is standard, the code is blank.

Fixation of screw at back side($\Phi 6\sim\Phi 100$)



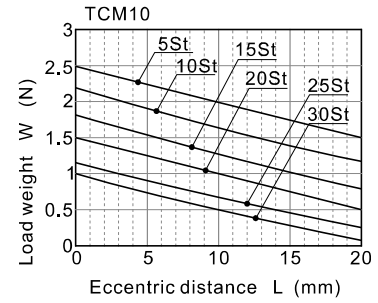
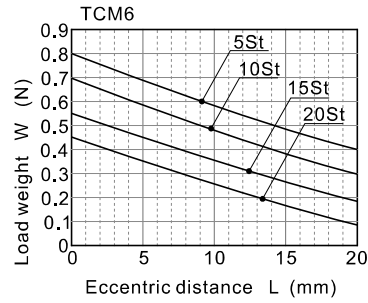
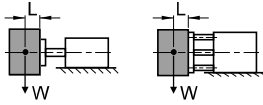
Bore size\Item	6	10	12	16	20	25	32	40	50	63	80	100
A	20.5	23	41	46	54	64	78	86	110	124	156	188
D	TCM	X	X	10	12	13	20				30	-
(Min)	TCL	-	-	8	10	10	13	20	20	20	-	30

TCL,TCM Series

Safe load and torque

1. Max. safe load

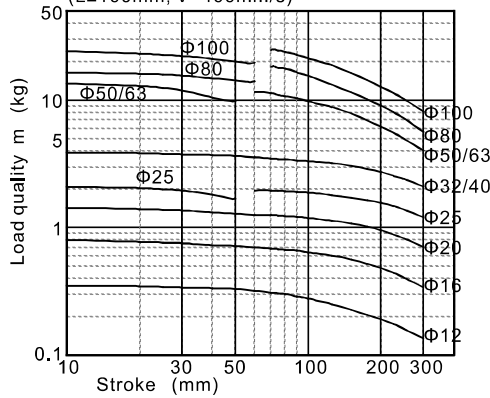
TCM6,10 Max. safe load



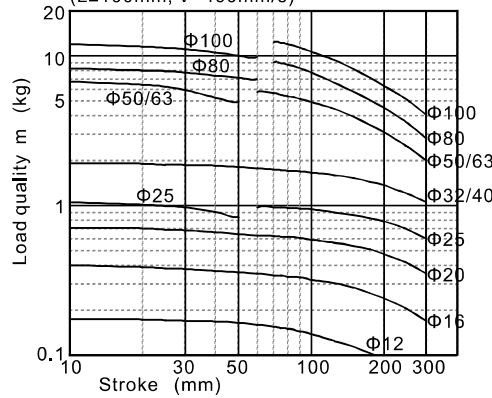
TC12~100 Max. safe load



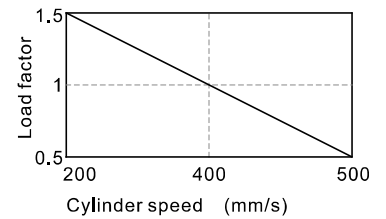
TCM(Brass bearing)Horizontal action
(L≤100mm, V=400mm/s)



TCL(Linear bearing)Horizontal action
(L≤100mm, V=400mm/s)



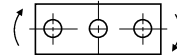
For other operating speeds of the cylinder, multiply the value of the graph when V=400mm/s by the coefficient in the following table, and the obtained value is the approximate value of the allowable load mass.



2. Max. safe torque

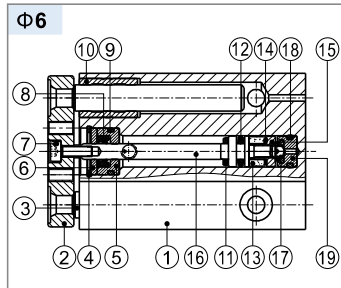
Max. safe torque

Unit: Newton-Meter(N·m)

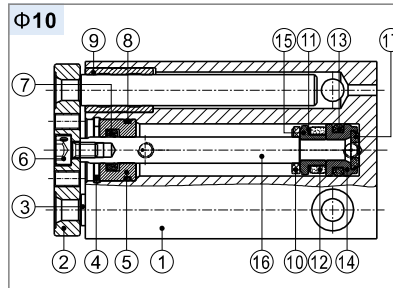


Bore size	Type	Stroke(mm)																			
		5	10	15	20	25	30	40	50	60	70	75	80	90	100	125	150	175	200	225	250
6	TCM	0.008	0.007	0.006	0.005	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
10	TCM	0.045	0.039	0.033	0.028	0.024	0.021	-	-	-	-	-	-	-	-	-	-	-	-	-	-
12	TCM	-	0.39	-	0.32	0.29	0.27	0.24	0.21	0.49	0.46	0.43	0.42	0.39	0.36	0.31	0.27	-	-	-	-
	TCL	-	0.35	-	0.29	0.26	0.24	0.22	0.19	0.44	0.39	0.37	0.35	0.32	0.29	0.24	0.20	-	-	-	-
16	TCM	-	0.69	-	0.58	0.54	0.49	0.43	0.38	0.75	0.72	0.69	0.65	0.61	0.58	0.50	0.44	0.40	0.36	-	-
	TCL	-	0.62	-	0.52	0.49	0.44	0.39	0.34	0.68	0.65	0.62	0.59	0.55	0.52	0.43	0.37	0.32	0.28	-	-
20	TCM	-	-	-	1.05	0.99	0.93	0.83	0.75	1.97	1.90	1.88	1.86	1.72	1.63	1.44	1.28	1.16	1.06	1.01	0.90
	TCL	-	-	-	0.95	0.89	0.84	0.75	0.68	1.77	1.59	1.52	1.46	1.33	1.25	1.30	1.15	1.03	0.93	0.88	0.76
25	TCM	-	-	-	1.76	1.65	1.55	1.38	1.25	3.17	3.06	2.96	2.91	2.77	2.57	2.26	2.02	1.83	1.67	1.57	1.42
	TCL	-	-	-	1.58	1.49	1.40	1.24	1.13	2.71	2.42	2.38	2.33	2.19	1.97	2.03	1.78	1.58	1.41	1.22	1.16
32	TCM	-	-	-	-	6.35	6.00	5.73	5.13	5.98	5.74	5.69	5.62	5.11	4.97	4.42	3.98	3.61	3.31	2.97	2.84
	TCL	-	-	-	-	5.72	5.40	5.16	4.62	5.38	5.15	5.11	5.02	4.60	4.47	3.98	3.58	3.25	2.98	2.67	2.56
40	TCM	-	-	-	-	7.00	6.60	6.11	5.66	6.66	6.31	6.27	6.23	5.86	5.48	4.78	4.38	3.98	3.65	3.34	3.13
	TCL	-	-	-	-	6.30	5.94	5.50	5.09	5.99	5.67	5.62	5.58	5.27	4.93	4.30	3.94	3.58	3.29	3.01	2.82
50	TCM	-	-	-	-	13.00	12.60	11.00	10.80	13.70	12.70	12.00	11.80	11.10	10.60	9.50	8.60	7.86	7.24	6.80	6.24
	TCL	-	-	-	-	9.17	8.75	8.30	7.62	10.30	9.94	9.83	9.77	8.82	8.74	8.55	7.74	7.07	6.52	6.12	5.62
63	TCM	-	-	-	-	14.70	13.60	12.90	12.10	19.40	16.20	13.50	12.70	12.10	11.90	10.70	9.69	8.86	8.16	7.52	7.04
	TCL	-	-	-	-	10.20	9.74	9.20	8.48	17.46	14.00	11.00	10.60	10.20	9.74	9.63	8.72	7.97	7.34	6.77	6.34
80	TCM	-	-	-	-	21.90	20.80	19.70	18.60	15.80	24.00	22.90	21.70	21.00	20.50	18.60	17.00	15.60	14.50	13.50	12.60
	TCL	-	-	-	-	15.10	14.30	13.60	12.90	12.20	21.60	20.61	19.53	18.90	18.45	16.74	15.30	14.04	13.05	12.15	11.34
100	TCM	-	-	-	-	38.80	36.80	35.00	33.50	28.50	39.40	37.50	35.60	34.50	33.80	30.90	28.40	26.20	24.40	22.50	21.40
	TCL	-	-	-	-	27.10	25.70	24.40	23.05	25.65	35.46	33.75	32.04	31.05	30.42	27.81	25.56	23.58	21.96	20.25	19.26

Inner structure and material of major parts

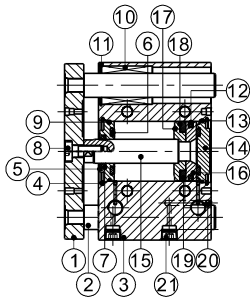


NO.	Item	Material
1	Body	Aluminum alloy
2	Fixing plate	Carbon steel
3	Guide rod	Stainless steel
4	C clip	Spring steel
5	Front cover	Aluminum alloy
6	O-ring stop block	Aluminum alloy
7	Screw	Alloy steel
8	Piston rod O-ring	NBR
9	O-ring	NBR
10	Bearing	Brass
11	Bumper	TPU
12	Piston seal	NBR
13	Magnet	Rare Earth
14	Magnet washer	NBR
15	Piston	Stainless steel
16	Piston rod	Stainless steel
17	Bumper	TPU
18	O-ring	NBR
19	Washer	Aluminum alloy



NO.	Item	Material
1	Body	Aluminum alloy
2	Fixing plate	Carbon steel
3	Guide rod	Stainless steel
4	C clip	Spring steel
5	Front cover	Aluminum alloy
6	Screw	Alloy steel
7	Piston rod O-ring	NBR
8	O-ring	NBR
9	Bearing	Brass
10	Bumper	TPU
11	Magnet washer	NBR
12	Magnet	Rare Earth
13	Piston seal	NBR
14	Piston	Brass
15	Magnet holder	Brass
16	Piston rod	Stainless steel
17	Bumper	TPU

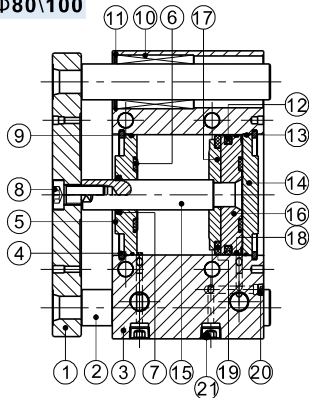
Φ12-63



NO.	Item	Material
1	Fixing plate	Carbon steel
2	Leader	Carbon steel
3	Body	Aluminum alloy
4	C clip	Spring steel
5	Front cover	Aluminum alloy
6	Bumper	TPU
7	Piston rod O-ring	NBR
8	Screw	Alloy steel
9	O-ring	NBR
10	Bearing	Bearing steel/brass
11	C clip	Spring steel
12	Piston seal	NBR
13	O-ring	NBR
14	Back cover	Brass/aluminum alloy
15	Piston rod	Carbon steel
16	Piston	Brass/aluminum alloy
17	Magnet holder	Brass/aluminum alloy
18	Magnet washer	NBR
19	Magnet	Rare Earth/Plastic
20	Screw	Alloy steel
21	Screw	Alloy steel
22	Spacer	Aluminum alloy

NO.	Item	Material
1	Fixing plate	Carbon steel
2	Leader	Carbon steel
3	Body	Aluminum alloy
4	C clip	Spring steel
5	Front cover	Aluminum alloy
6	Bumper	TPU
7	Piston rod O-ring	NBR
8	Screw	Alloy steel
9	O-ring	NBR
10	Bearing	Bearing steel/brass
11	C clip	Spring steel
12	Piston seal	NBR
13	O-ring	NBR
14	Back cover	Brass/aluminum alloy
15	Piston rod	Carbon steel
16	Piston	Brass/aluminum alloy
17	Magnet holder	Brass/aluminum alloy
18	Magnet washer	NBR
19	Magnet	Rare Earth/Plastic
20	Screw	Alloy steel
21	Screw	Alloy steel
22	Spacer	Aluminum alloy

Φ80\100



NO.	Item	Material
1	Fixing plate	Carbon steel
2	Leader	Carbon steel
3	Body	Aluminum alloy
4	C clip	Spring steel
5	Front cover	Aluminum alloy
6	Bumper	TPU
7	Piston rod O-ring	NBR
8	Screw	Alloy steel
9	O-ring	NBR
10	Bearing	Bearing steel/brass
11	C clip	Spring steel
12	Piston seal	NBR
13	O-ring	NBR
14	Back cover	Brass/aluminum alloy
15	Piston rod	Carbon steel
16	Piston	Brass/aluminum alloy
17	Magnet holder	Brass/aluminum alloy
18	Magnet washer	NBR
19	Magnet	Rare Earth/Plastic
20	Screw	Alloy steel
21	Screw	Alloy steel
22	Spacer	Aluminum alloy

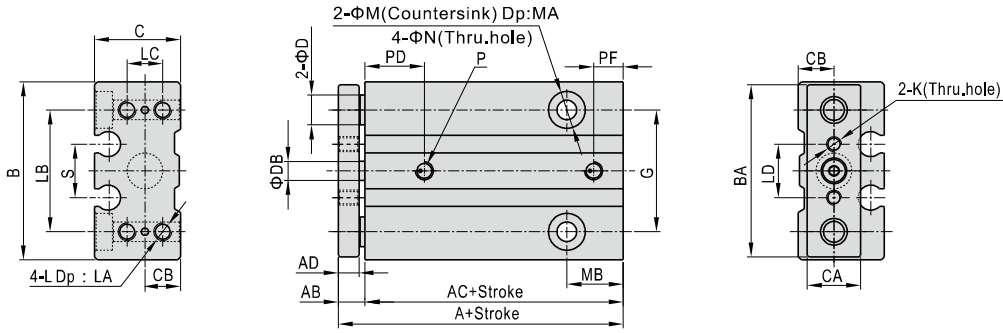
NO.	Item	Material
1	Fixing plate	Carbon steel
2	Leader	Carbon steel
3	Body	Aluminum alloy
4	C clip	Spring steel
5	Front cover	Aluminum alloy
6	Bumper	TPU
7	Piston rod O-ring	NBR
8	Screw	Alloy steel
9	O-ring	NBR
10	Bearing	Bearing steel/brass
11	C clip	Spring steel
12	Piston seal	NBR
13	O-ring	NBR
14	Back cover	Brass/aluminum alloy
15	Piston rod	Carbon steel
16	Piston	Brass/aluminum alloy
17	Magnet holder	Brass/aluminum alloy
18	Magnet washer	NBR
19	Magnet	Rare Earth/Plastic
20	Screw	Alloy steel
21	Screw	Alloy steel
22	Spacer	Aluminum alloy

Tri-rod cylinder

TCL,TCM Series

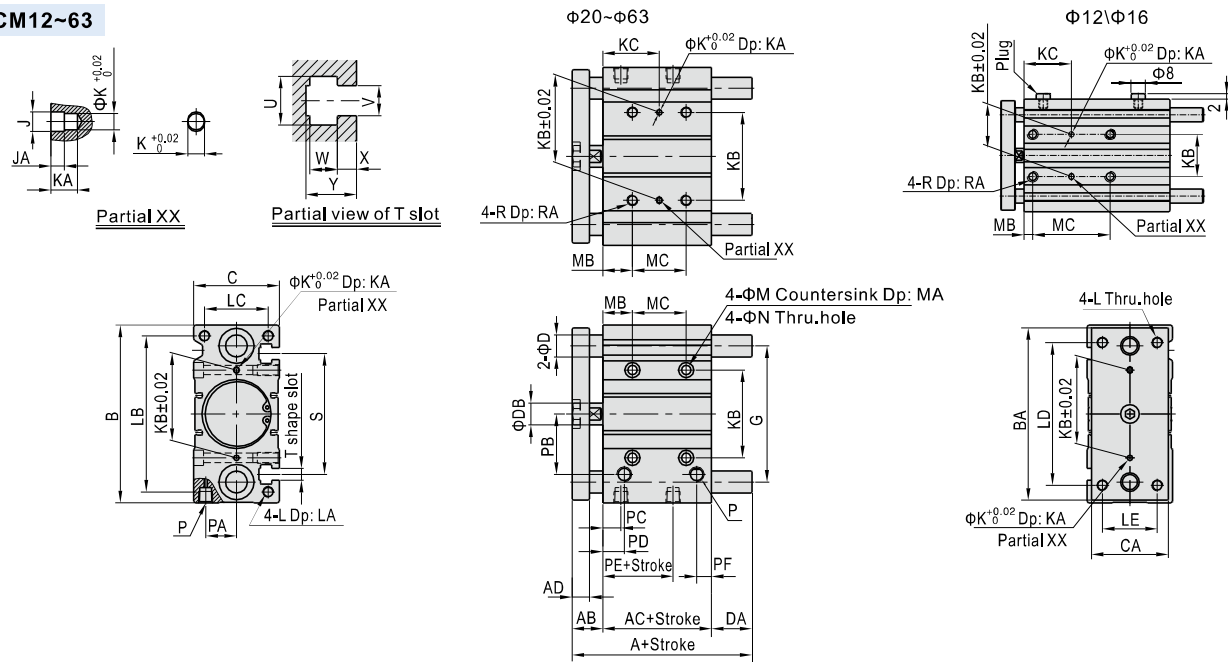
Dimensions

TCM6\TCM10



Bore size\Item	A	AB	AC	AD	B	BA	C	CA	CB	D	DB	G	K	L	LA	LB	LC	LD	M	MA	MB	N	P	PD	PF
6	29.5	6	23.5	5	30	29	14.5	9	6	5	3	20.5	M2.5X0.45	M3X0.5	5	20.5	6	9	6	3	9.5	3.5	M3X0.5	9.5	5.5
10	32	6	26	5	34	33	18	10	7.5	6	5	23	M3X0.5	M4X0.7	5	23	8	11	8	4	8.5	4.5	M3X0.5	11.5	5

TCL/TCM12~63



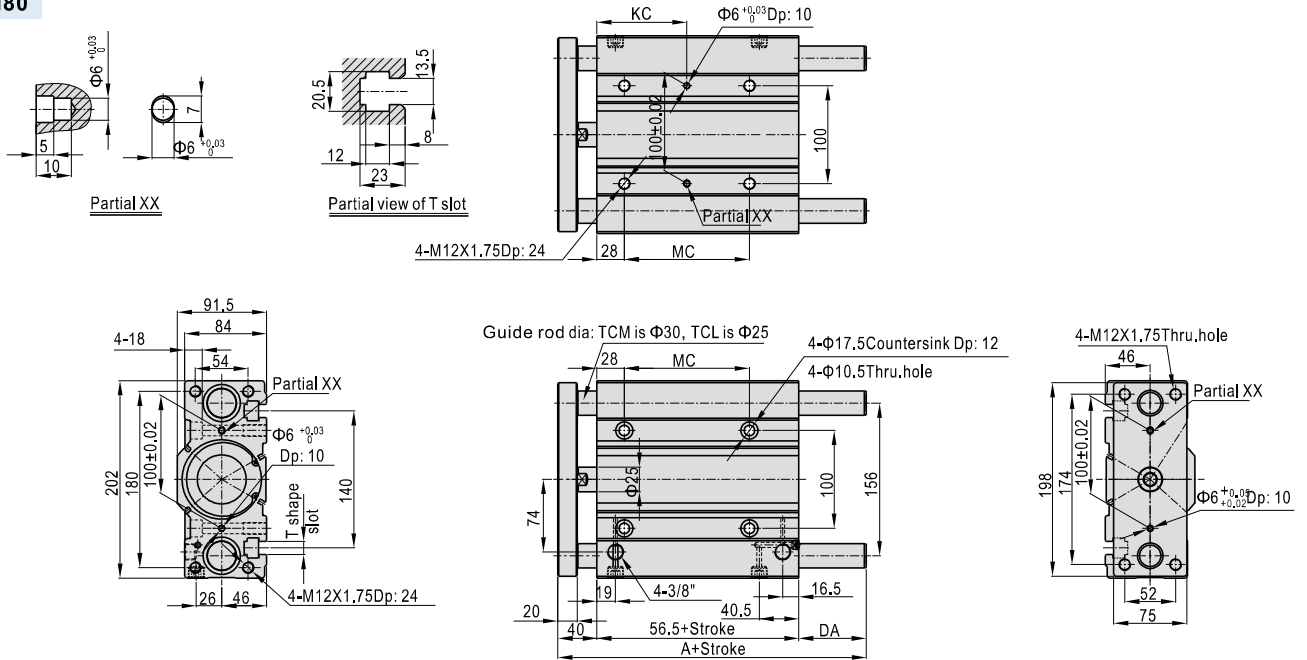
Bore size\Item	A					DA					MC				KC						
	TCL	TCM	TCL\TCM	TCL	TCM	TCL	DA	TCM	TCL	TCM	MC	MC	MC	MC	KC	KC	KC	KC			
Stroke	≤30	≤50	31(51)~100	101~200	>200	≤30	31~100	101~200	>200	≤50	51~100	101~200	>200	≤30	31~100	101~200	>200	≤30	31~100	101~200	>200
12	42	55	85	-	0	13	43	-	0	13	43	-	20	40	110	-	15	25	60	-	
16	46	65	95	-	0	19	49	-	0	19	49	-	24	44	110	-	17	27	60	-	
20	53	80	104	122	0	27	51	69	0	27	51	69	24	44	120	200	29	39	77	117	
25	53.5	82	104.5	122	0	28.5	51	68.5	0	28.5	51	68.5	24	44	120	200	29	39	77	117	
Stroke	≤50	≤50	51~100	101~200	>200	≤50	51~100	101~200	>200	≤50	51~100	101~200	>200	≤40	41~100	101~200	>200	≤40	41~100	101~200	>200
32	65	78	102	118	140	5.5	42.5	58.5	80.5	18.5	42.5	58.5	80.5	24	48	124	200	33	45	83	121
40	66	78	102	118	140	0	36	52	74	12	36	52	74	24	48	124	200	34	46	84	122
50	76	89	118	134	161	4	46	62	89	17	46	62	89	24	48	124	200	36	48	86	124
63	77	89	118	134	161	0	41	57	84	12	41	57	84	28	52	128	200	38	50	88	124
Bore size\Item	AB	AC	AD	B	BA	C	CA	D(TCL)	D(TCM)	DB	G	J	JA	K	KA	KB	L	LA	LB	LC	LD
12	13	29	8	58	56	26	22	6	8	6	41	3.5	3	3	6	23	M4×0.7	10	50	18	48
16	13	33	8	64	62	30	25	8	10	6	46	3.5	3	3	6	24	M5×0.8	12	56	22	54
20	16	37	10	83	81	36	30	10	12	10	54	3.5	3	3	6	28	M5×0.8	13	72	24	70
25	16	37.5	10	93	91	42	38	12	16	12	64	4.5	3	4	6	34	M6×1.0	15	82	30	78
32	22	37.5	12	112	110	48	44	16	20	16	78	4.5	3	4	6	42	M8×1.25	20	98	34	96
40	22	44	12	120	118	54	44	16	20	16	86	4.5	3	4	6	50	M8×1.25	20	106	40	104
50	28	44	16	148	146	64	60	20	20	20	110	6	4	5	8	66	M10×1.5	22	130	46	130
63	28	49	16	162	158	78	70	20	20	20	124	6	4	5	8	80	M10×1.5	22	142	58	130
Bore size\Item	LE	M	MA	MB	N	P	PA	PB	PC	PD	PE	PF	R	RA	S	U	V	W	X	Y	
12	14	8	4.5	5	4.5	M5×0.8	8	18	11	11	13	7.5	M5×0.8	12	37	7.5	4.5	4	2	6.5	
16	16	8	4.5	5	4.5	M5×0.8	10	19	11	11	15	8	M5×0.8	10	38	7.5	4.5	4	2.5	7	
20	18	9.5	5.5	17	5.5	1/8"	11	25	10.5	10.5	12.5	9	M6×1.0	12	44	8.5	5.5	4.5	3	8	
25	26	9.5	5.5	17	5.5	1/8"	13.5	28.5	11.5	11.5	12.5	9	M6×1.0	12	50	8.5	5.5	4.5	3	8.5	
32	30	11	7.5	21	6.5	1/8"	16	34	12.5	12.5	7	9	M8×1.25	16	63	10.5	6.5	5.5	3.5	9.5	
40	30	11	7.5	22	6.5	1/8"	18	38	14	14	13	10	M8×1.25	16	72	10.5	6.5	5.5	4	11	
50	40	14	9	24	8.5	1/4"	21.5	47	12	14	9	11	M10×1.5	20	92	13.5	8.5	7.5	4.5	13.5	
63	50	14	9	24	8.5	1/4"	28	55	16.5	16.5	14	13.5	M10×1.5	20	110	18	11	10	7	18.5	



Tri-rod cylinder

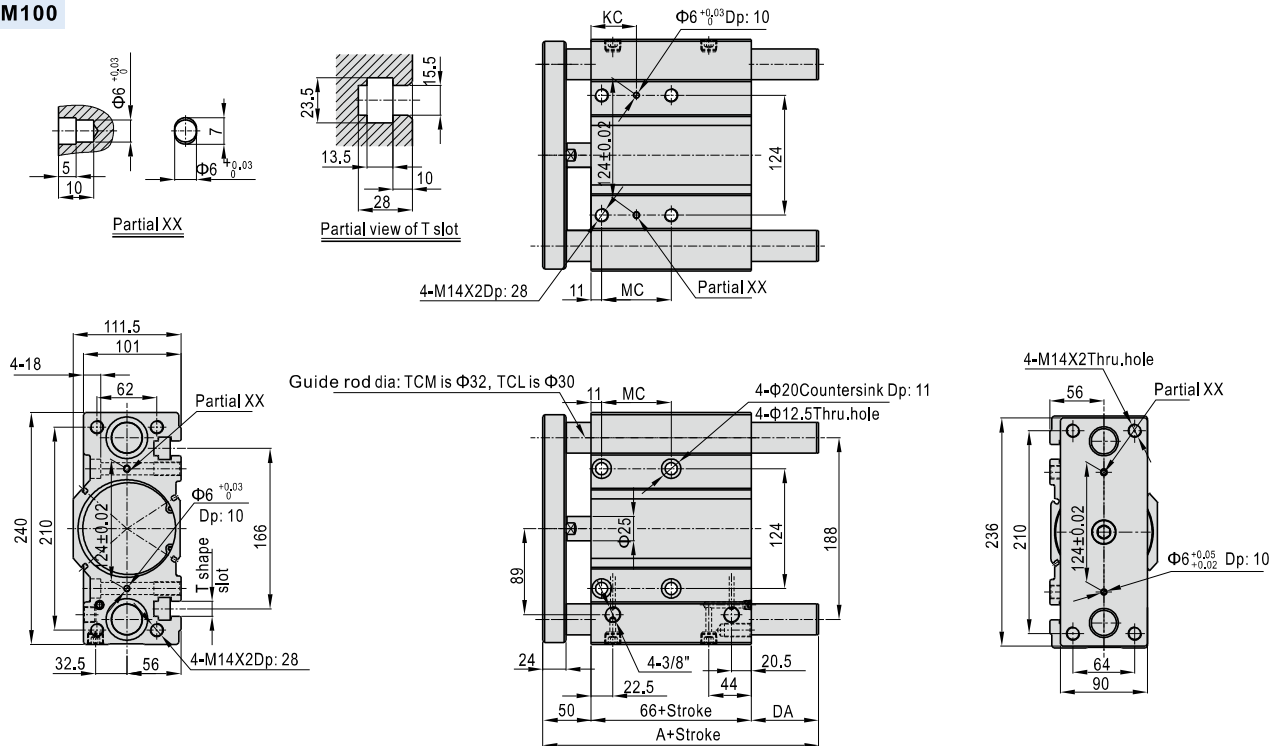
TCL, TCM Series

TCL/TCM80



Item\Stroke	25	30	40	50	60	70	75	80	100	125	150	175	200	225	250
A	TCM=112.5/TCL=106.5					165.5					187.5				
DA	TCM=16/TCL=10					69					91				
KC	42					54					92				
MC	28					52					128				

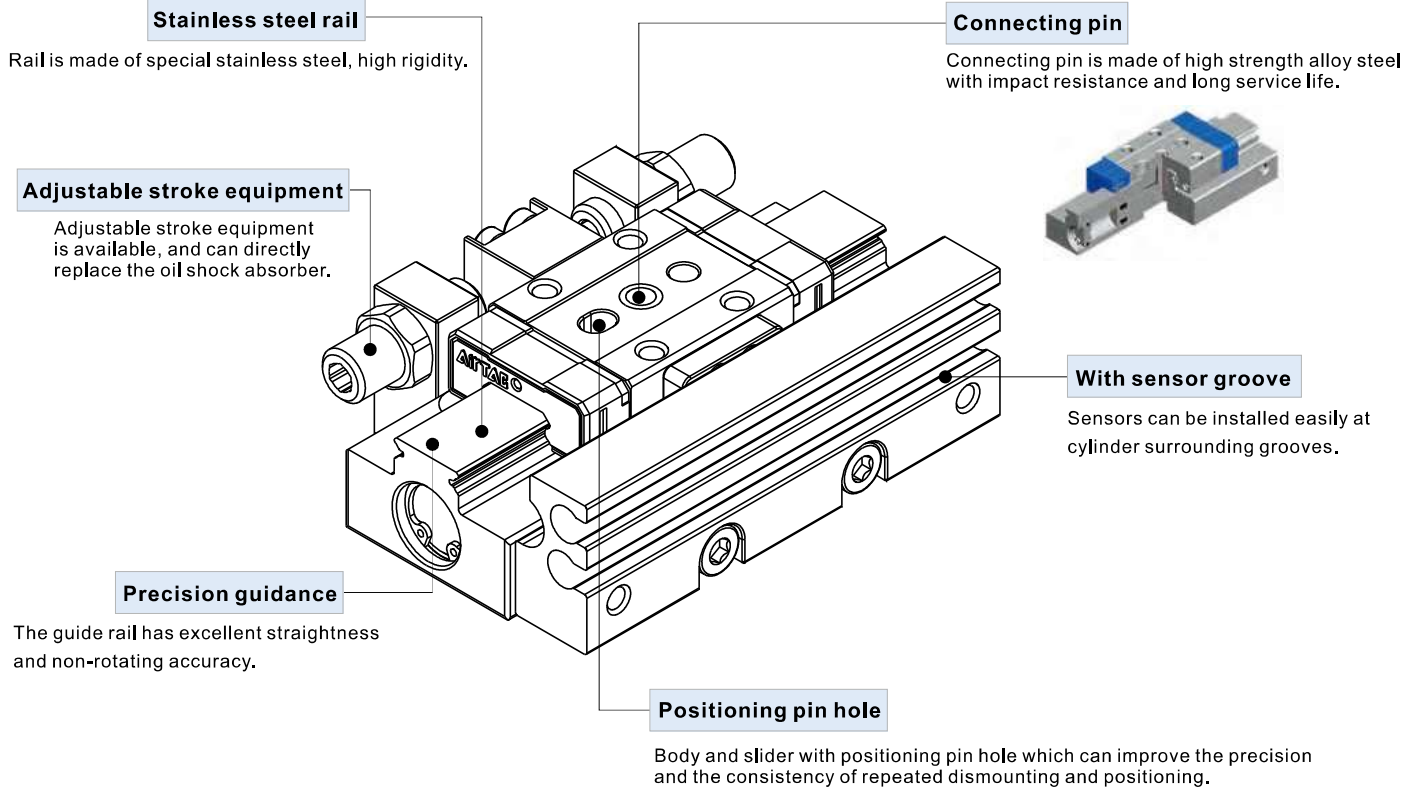
TCL/TCM100



Item\Stroke	25	30	40	50	60	70	75	80	100	125	150	175	200	225	250
A	TCM=128/TCL=122					186					208				
DA	TCM=12/TCL=6					70					92				
KC	35					47					85				
MC	48					72					148				



Compendium of HGS Series



Installation and application



1. Dirty substances in the pipe must be eliminated before cylinder is connected with pipeline to prevent the entrance of impurities into the cylinder.
2. The medium used by cylinder should be filtered to 40 μ m or below.
3. Anti-freezing measure shall be adopted under low temperature environment to prevent moisture freezing.
4. If the cylinder is dismantled and stored for a long time, pay attention to conduct anti-rust treatment to the surface.
Anti-dust caps shall be added in air inlet and outlet ports.

Slide table cylinder

HGS Series



Symbol



Product feature

1. Rail is made of special stainless steel, with high rigidity, corrosion resistance.
2. Connecting pin is made of high strength alloy steel with impact resistance and long service life.
3. Adjustable stroke equipment is available, and can directly replace the oil shock absorber.
4. The guide rail has excellent straightness and no turning accuracy.
5. Sensors can be installed easily at cylinder surrounding grooves.
6. Body and slider with positioning pin hole which can improve the precision and the consistency of repeated dismounting and positioning.

Ordering code

HGS 10 × 15 S J

① ② ③ ④ ⑤

① Model	② Bore size	③ Stroke	④ Magnet	⑤ Stroke adjustment device
HGS: Slide table cylinder	6	5 10	Blank: Without magnet	Blank: Without stroke adjustment device
	8	5 10 15 20	S: With magnet	J: With stroke adjustment device
	10	5 10 15 20		[Note]
	12	5 10 15 20 25		

[Note] Stroke adjustment device of $\Phi 10 \setminus \Phi 12$ can be replaced by shock absorber.

Ordering code of accessories

F - HGS 10 × 15 H

① ② ③ ④

① Model	② Bore size	③ Stroke	④ Accessories type
HGS: Slide table cylinder	6	5 10	H: Sensor fixed seat package
	8	5 10 15 20	J: Stroke adjusting screw package
	10	5 10 15 20	
	12	5 10 15 20 25	

Matching table

		Sensor				
Ordering code		Stroke (mm)				
		5	10	15	20	25
Bore size	6	F-HGS6X5H	F-HGS6X10H			
	8	F-HGS8X5H	F-HGS8X10H	F-HGS8X15H	F-HGS8X20H	
	10	F-HGS10X5H	F-HGS10X10H	F-HGS10X15H	F-HGS10X20H	
	12	F-HGS12X5H		F-HGS12X15H	F-HGS12X20H	F-HGS12X25H

		Stroke adjusting screw				
Ordering code		Stroke (mm)				
		5	10	15	20	25
Bore size	6	F-HGS6X5J	F-HGS6X10J			
	8	F-HGS8X5J	F-HGS8X10J	F-HGS8X15J		
	10	F-HGS10X5J	F-HGS10X10J	F-HGS10X15J		
	12	F-HGS10X10J				F-HGS10X15J

Specification

Bore size (mm)	6	8	10	12
Acting type	Double acting			
Fluid	Air (to be filtered by 40 μ m filter element)			
Operating pressure	$\Phi 6/8/10$	36~100psi(0.25~0.7MPa)		
	$\Phi 12$	29~100psi(0.2~0.7MPa)		
Proof pressure	175psi(1.2MPa)			
Cushion type	Bumper		Bumper or shock absorber	
Temperature	-20~70°C			
Lubrication	Not required			
Speed range	50~500mm/s			
Stroke tolerance	$\begin{matrix} +0.5 \\ 0 \end{matrix}$			
Sensor switches	DMSH\EMSH [Note1]			
Port size	M3×0.5		M5×0.8	

Note) Refer to P362 for detail of sensor switch.

Stroke

Bore size (mm)	Standard stroke (mm)	Max.std stroke
6	5 10	10
8	5 10 15 20	20
10	5 10 15 20	20
12	5 10 15 20 25	25

[Note] Consult us for non-standard stroke.

Slide table cylinder

HGS Series

Production weight table

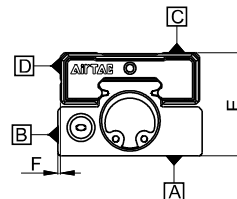
Unit : g

Model	Body weight	Sensor fixed seat package weight	Stroke adjusting screw package weight		
			Single adjusting screw	Single shock absorber	Other accessories
HGS6X5	116.1	14.25	2.4	-	11.61
HGS10X5	152.3	19.05	2.4	-	11.61
HGS8X5	133.01	14.05	2.4	-	10.34
HGS8X10	167.46	18.54	2.4	-	10.34
HGS8X15	207.07	23.35	2.4	-	10.34
HGS8X20	239.37	28.16	2.4	-	10.34
HGS10X5	194.26	15.91	6.8	16	27.36
HGS10X10	248.98	19.12	6.8	16	26.2
HGS10X15	303.39	24	6.8	16	21.8
HGS10X20	352.05	28.93	6.8	16	21.8
HGS12X5	291.01	21.64	6.8	16	27.36
HGS12X10	318.12	21.64	6.8	16	26.2
HGS12X15	356.79	27.63	6.8	16	21.8
HGS12X20	445.92	33.25	6.8	16	21.8
HGS12X25	491.34	38.87	6.8	16	21.8

Example :

HGS10X15SJ=Body weight+Sensor fixed seat package weight+Single adjusting screw weightX2+Other accessories weight =303.39+24+6.8X2+21.8=362.79(g)

Table precision



[Unit: mm]

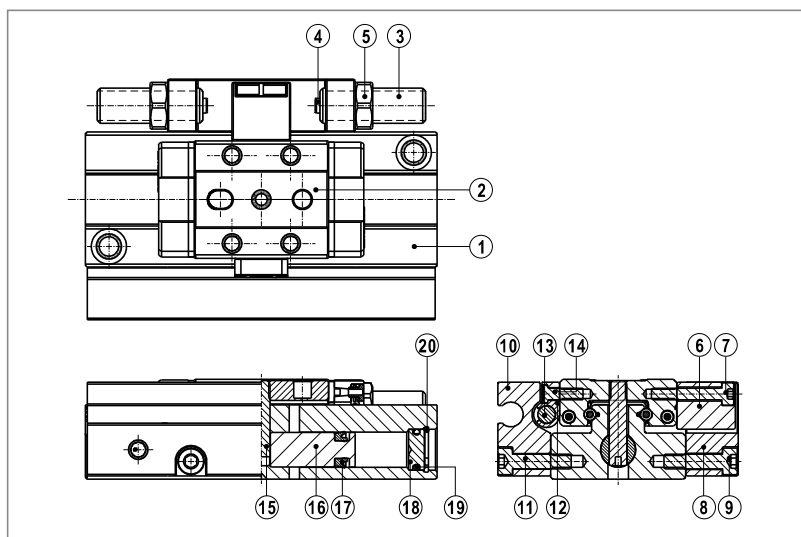
Model	HGS6	HGS8	HGS10	HGS12
Parallelism	C surface to A surface			
	D surface to B surface			
Parallelism of walking	C surface to A surface			
	D surface to B surface			
Dimensional tolerance of E		±0.05		
Dimensional tolerance of F		±0.05		

Max. allowable load

[Unit : kg]

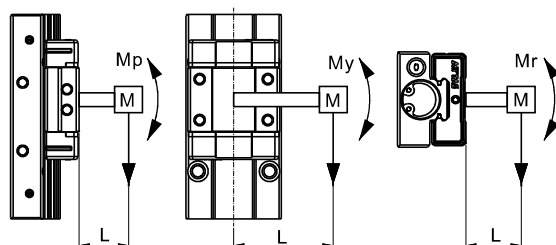
Model	HGS6	HGS8	HGS10	HGS12
No stroke adjustment device	0.3	0.3	0.8	1.2
With stroke adjustment device	0.2	0.5	0.8	1.2
With shock absorber	-	-	1.6	2.0

Inner structure and material of major parts



NO.	Item	Material	NO.	Item	Material
1	Body	Stainless steel	11	Hexagon socket head screws	Alloy steel
2	Slide table	Stainless steel	12	Magnet holder	Plastic
3	Adjustable screw	Stainless steel	13	Magnet	Rare earths
4	Bumper	NBR	14	Screw	Alloy steel
5	Hex nut	Stainless steel	15	Pin	Stainless steel
6	Middle stopping block	Cutting steel	16	Piston	Stainless steel
7	Hexagon socket head screws	Alloy steel	17	Piston packing	NBR
8	End stopping block	Aluminum alloy	18	End cover	Stainless steel
9	Hexagon socket head screws	Alloy steel	19	O ring	NBR
10	Sensor fixed rail	Aluminum alloy	20	C clip	Spring steel

Max. allowable torque

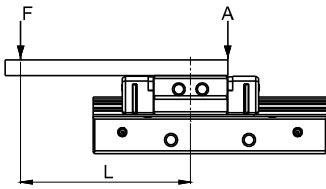


Model	Max. Allowable torque (N.m)		
	Pitch moment Mp	Yaw moment My	Roll moment Mr
HGS6X5	0.42	0.42	0.87
HGS6X10			
HGS8X5	0.42	0.42	0.87
HGS8X10			
HGS8X15	1.7	1.7	1.8
HGS8X20			
HGS10X5	1.2	1.4	2.3
HGS10X10			
HGS10X15	2.8	3.1	3.3
HGS10X20			
HGS12X5	2.4	2.9	4.7
HGS12X10			
HGS12X15	6.5	7.7	7.3
HGS12X20			
HGS12X25			

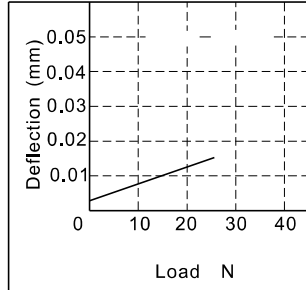
HGS Series

Table deflection

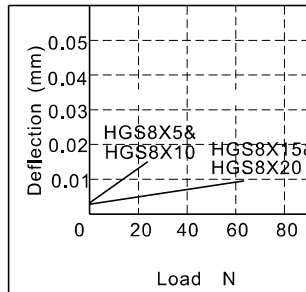
Table deflection due to pitch moment



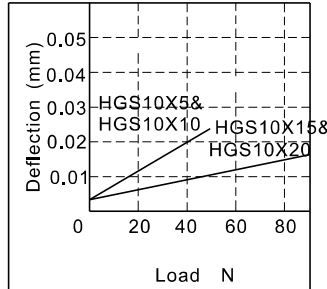
HGS6 L=80mm



HGS8 L=80mm



HGS10 L=100mm



HGS12 L=100mm

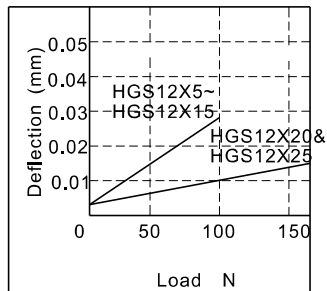
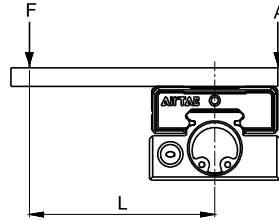
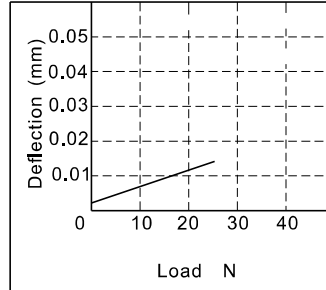


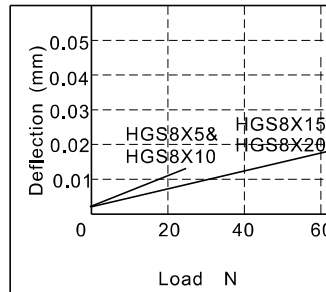
Table deflection due to yaw moment



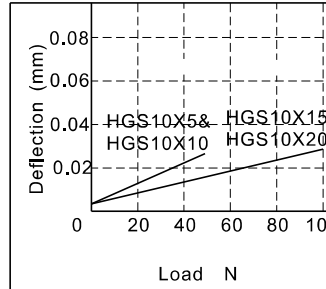
HGS6 L=80mm



HGS8 L=80mm



HGS10 L=100mm



HGS12 L=100mm

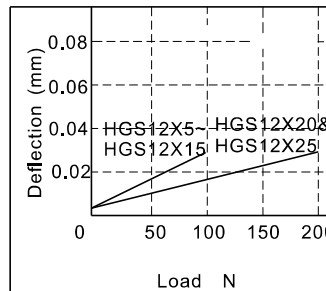
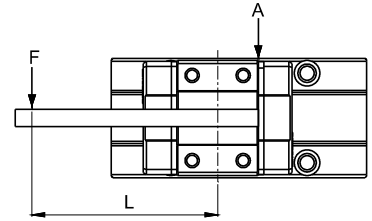
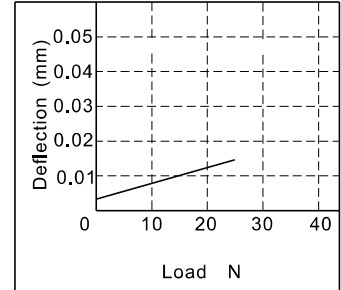


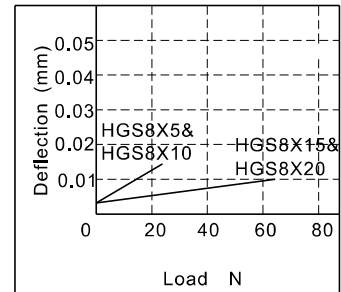
Table deflection due to roll moment



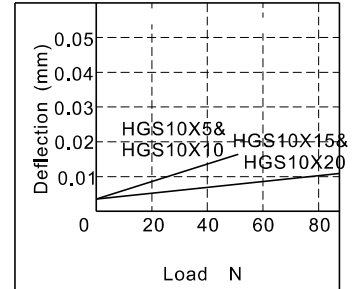
HGS6 L=80mm



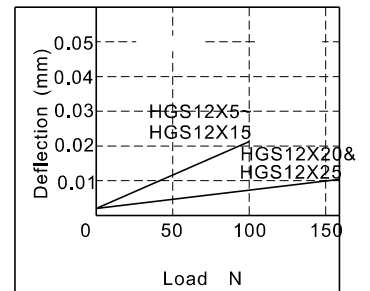
HGS8 L=80mm



HGS10 L=100mm



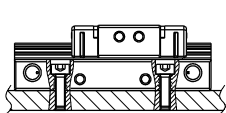
HGS12 L=100mm



HGS Series

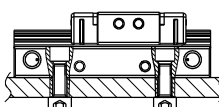
Installation and application

1. Cylinder can be mounted from 4 directions
2. When mounting an compact slide cylinder, screws of appropriate length should be used and tightened properly within the maximum tightening torque.
If screws are tightened beyond designed limits, malfunction may occur. If they are tightened insufficiently, it may result in sliding or falling off from its position.



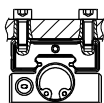
Model	Bolt used	Max. tightening torque (Nm)	Max. screw-in depth (mm)
HGS6	M3×0.5	1.1	4.3
HGS8	M3×0.5	1.1	6.3
HGS10	M3×0.5	1.1	6
HGS12	M3×0.5	1.1	4.8
HGS12	M4×0.7	2.5	4.8

Note: M3X0.5 bolt is used for HGS12X5/10.

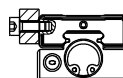


Model	Bolt used	Max. tightening torque (Nm)	Max. screw-in depth (mm)
HGS6	M4×0.7	2.5	4.3
HGS8	M4×0.7	2.5	6.3
HGS10	M4×0.7	2.5	6
HGS12	M4×0.7	2.5	4.8
HGS12	M5×0.8	5.1	4.8

Note: M4X0.7 bolt is used for HGS12X5/10.



Model	Bolt used	Max. tightening torque (Nm)	Max. screw-in depth (mm)
HGS6	M3×0.5	1.1	3
HGS8	M3×0.5	1.1	3
HGS10	M3×0.5	1.1	3
HGS12	M3×0.5	1.1	4

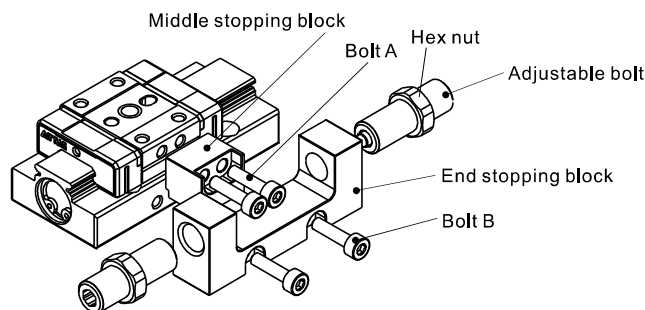


Model	Bolt used	Max. tightening torque (Nm)	Max. screw-in depth (mm)
HGS6	M2×0.4	0.26	4
HGS8	M2×0.4	0.26	4
HGS10	M3×0.5	1.1	3
HGS12	M3×0.5	1.1	4

Installation of Accessories

Locking torque shown in the following table is recommended to tighten the bolts, if bolts are tightened beyond designed limits, malfunction may occur; If they are tightened insufficiently, it may result in sliding or falling off from its position.

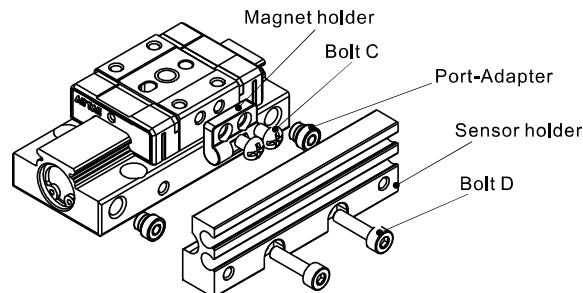
Stroke adjustable device



Model	Bolt A used	Max locking torque(N.m)	Bolt B used	Max locking torque(N.m)
HGS6	M2X0.4X10L	0.26	M2.5X0.45X10L	0.36
HGS8	M2X0.4X10L	0.26	M3X0.5X10L	1.1
HGS10	M3X0.5X12L	1.1	M3X0.5X12L	1.1
HGS12	M3X0.5X12L	1.1	M3X0.5X12L	1.1

Sensor Seat

Port-adapter must be assembled correctly, leaks may happen if it is missing.

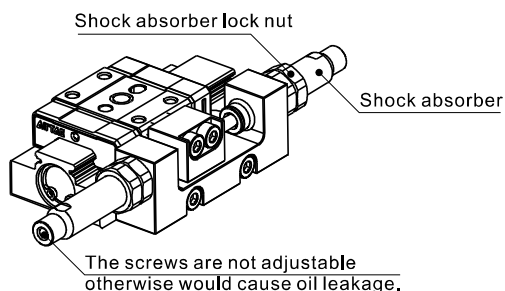


Model	Bolt C used	Max locking torque(N.m)	Bolt D used	Max locking torque(N.m)
HGS6	M2X0.4X6L	0.26	M2.5X0.45X10L	0.36
HGS8	M2X0.4X6L	0.26	M3X0.5X10L	1.1
HGS10	M3X0.5X4L	1.1	M3X0.5X10L	1.1
HGS12	M3X0.5X4L	1.1	M3X0.5X10L	1.1

Sensor seat can be installed on both sides of cylinder while stroke adjustment device can only be installed on the side with no ports.

About shock absorber

1. Shock absorbers are expendable. Promptly replace them when energy absorbing capacity decreases.
2. Never turn or adjust the screws on bottom of the shock absorber body. The screws are not for adjusting. Otherwise would cause oil leakage.
3. Follow the table for tightening torque of shock absorber to lock nuts.



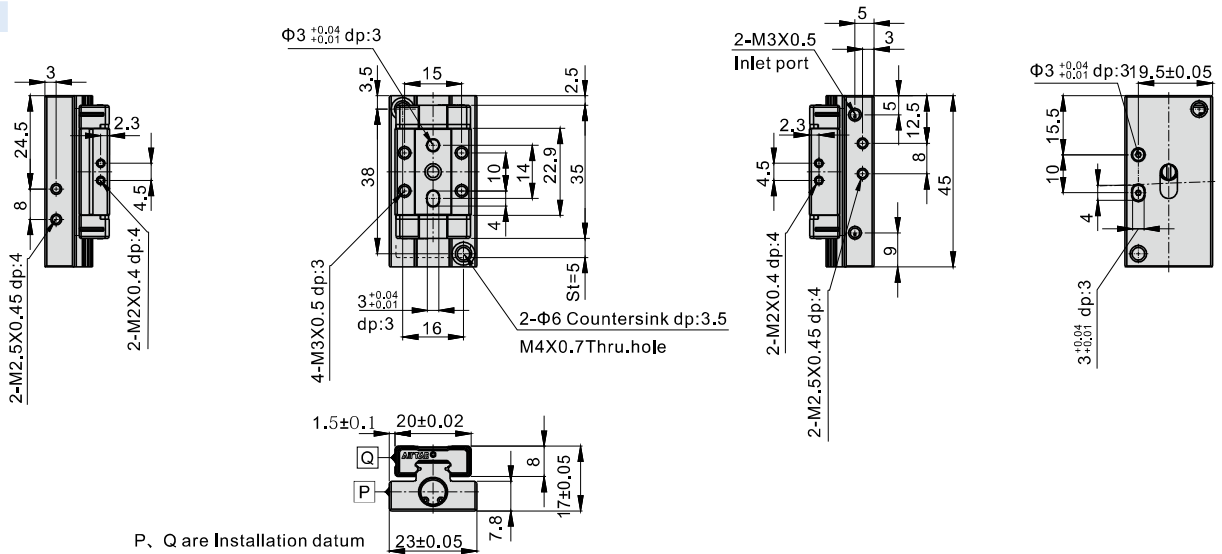
Model	Shock absorber	Tightening torque
HGS6	Without shock absorber	
HGS8		
HGS10	ACA0806-1N	1.67(N.m)
HGS12	ACA0806-1N	1.67(N.m)

Slide table cylinder

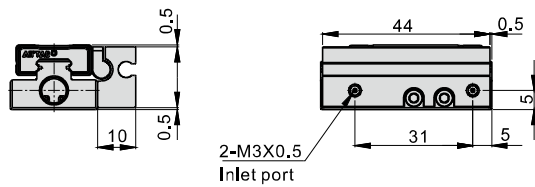
HGS Series

Dimensions(HGS6)

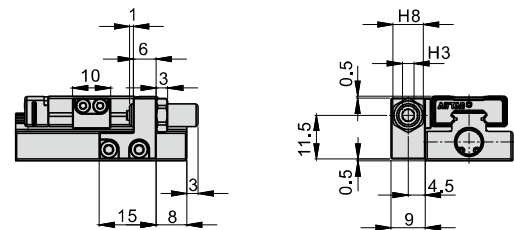
HGS6X5



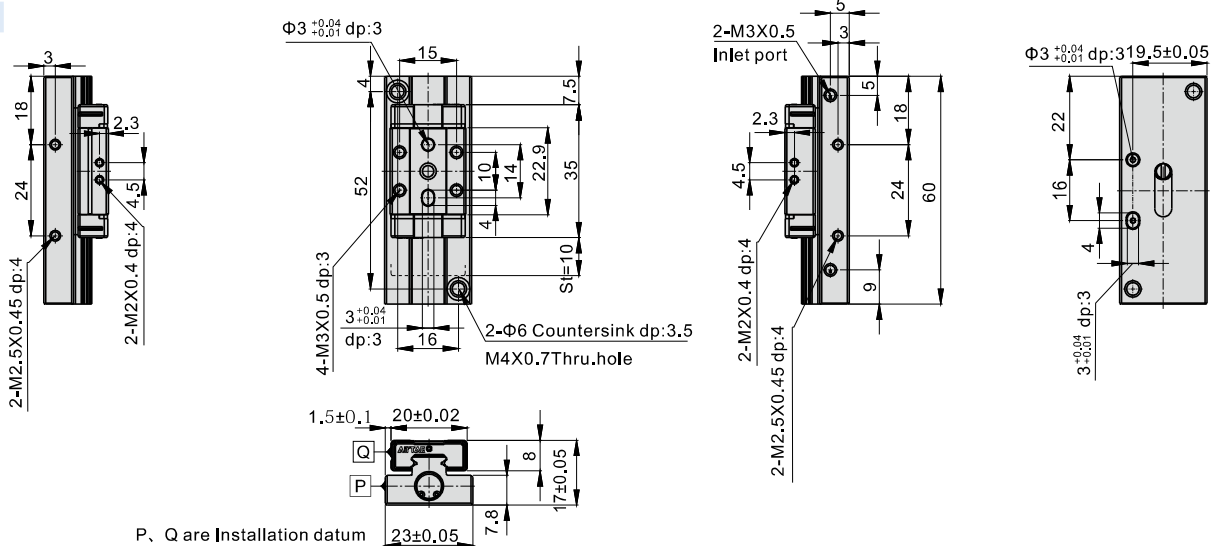
HGS6X5S



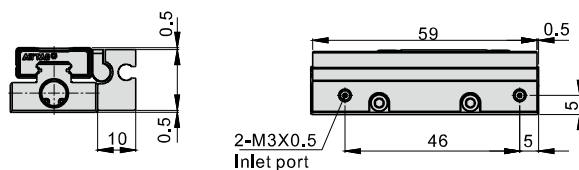
HGS6X5J Adjustable range : 5mm



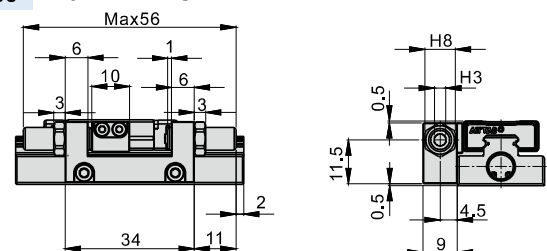
HGS6X10



HGS6X10S



HGS6X10J Adjustable range : 5mm of each sides.

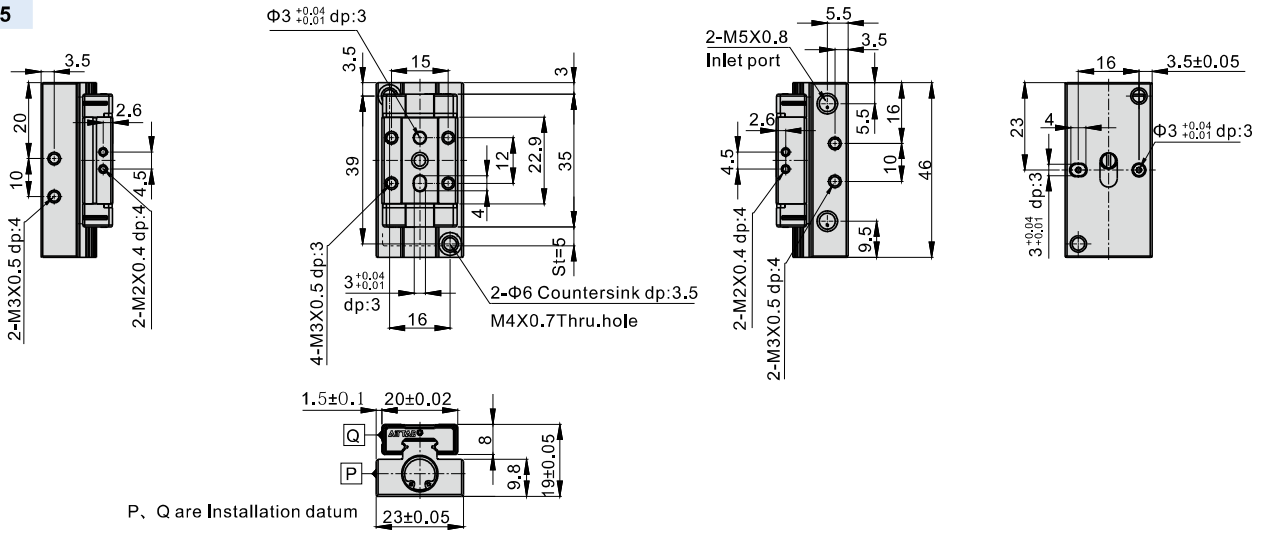


Slide table cylinder

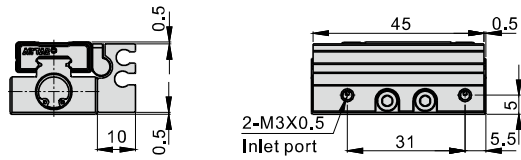
HGS Series

Dimensions(HGS8)

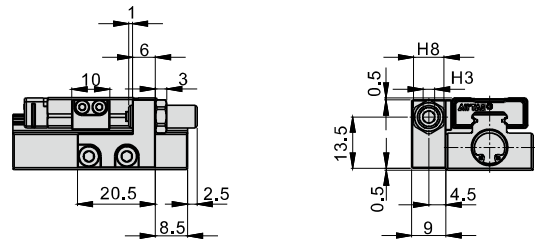
HGS8X5



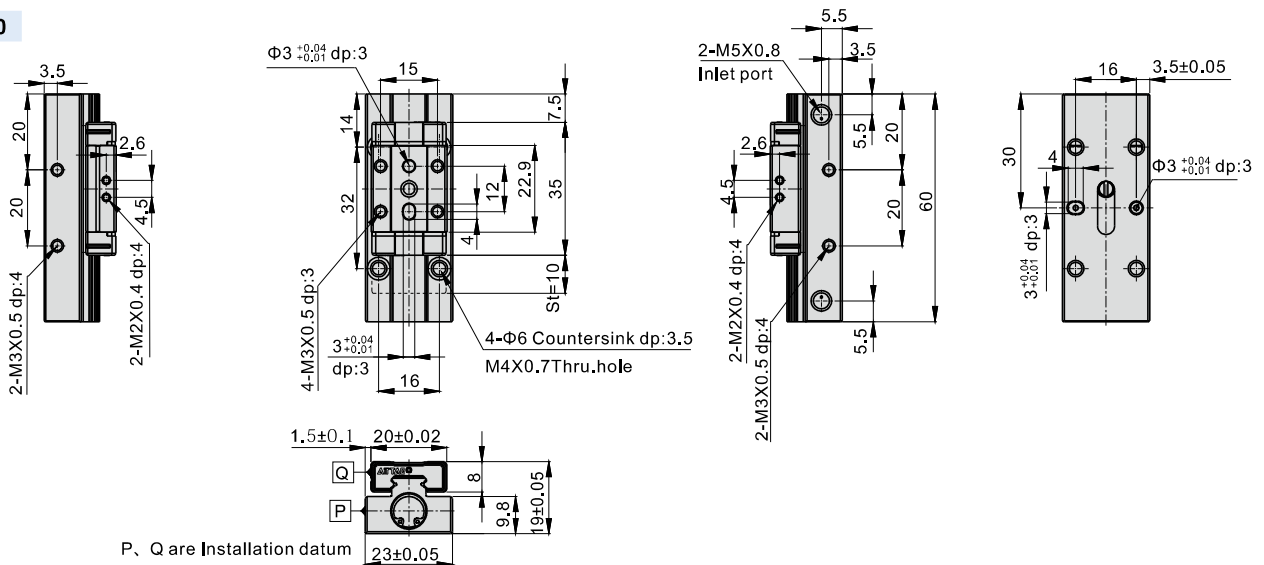
HGS8X5S



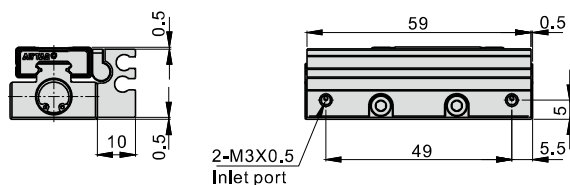
HGS8X5J Adjustable range : 5mm



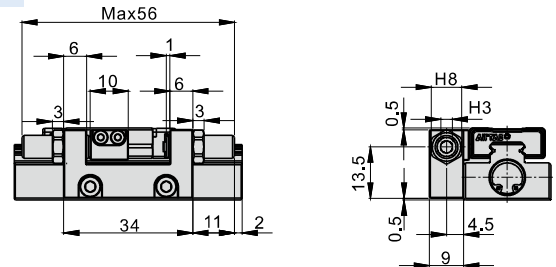
HGS8X10



HGS8X10S



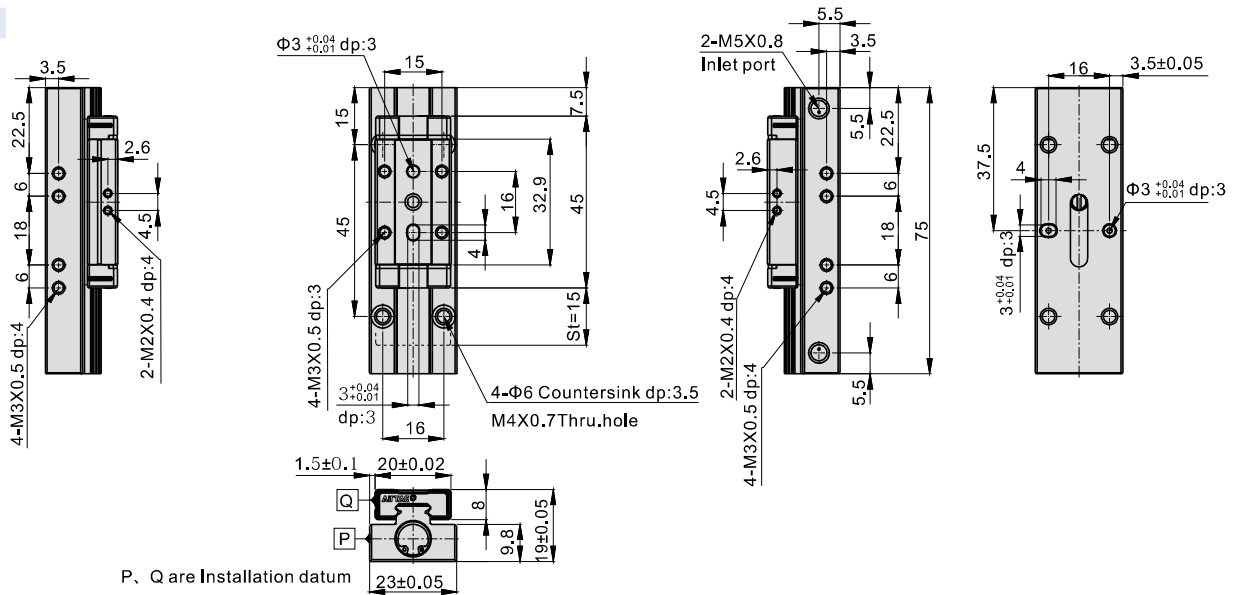
HGS8X10J Adjustable range : 5mm of each sides.



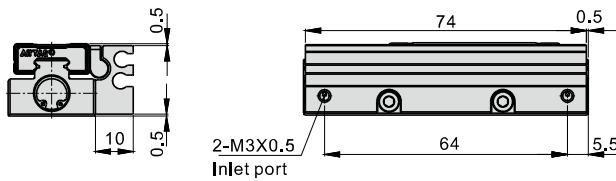
Slide table cylinder

HGS Series

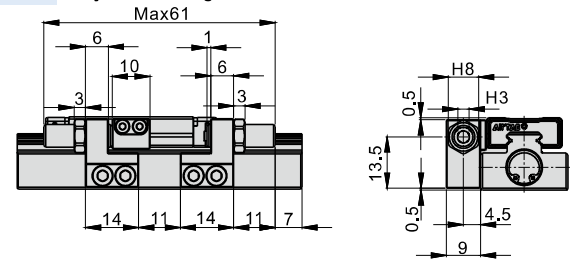
HGS8X15



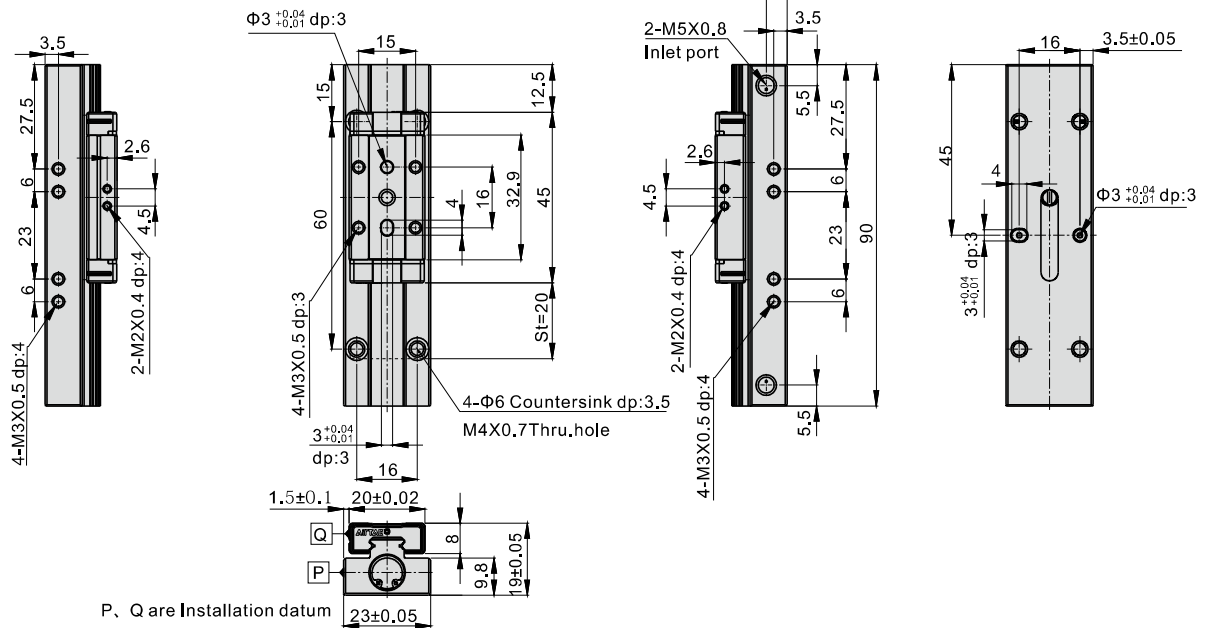
HGS8X15S



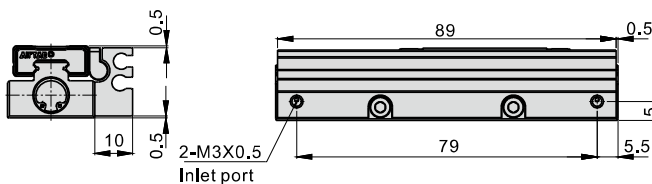
HGS8X15J Adjustable range : 5mm of each sides.



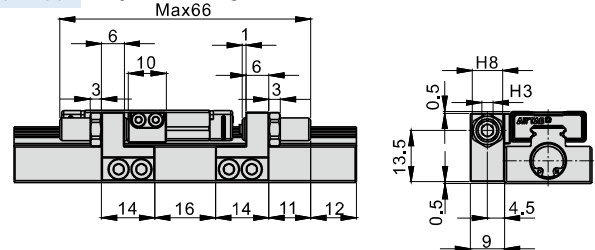
HGS8X20



HGS8X20S



HGS8X20J Adjustable range : 5mm of each sides.

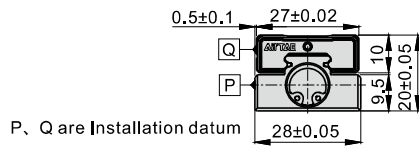
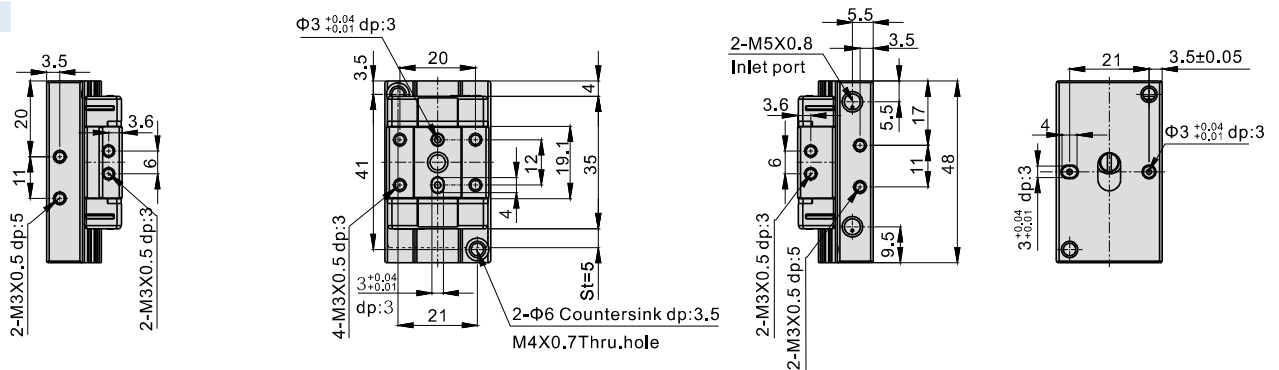


Slide table cylinder

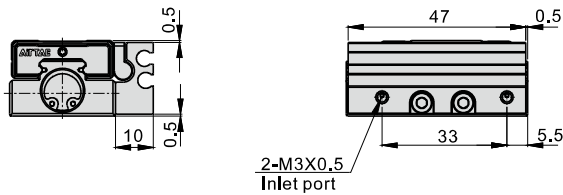
HGS Series

Dimensions(HGS10)

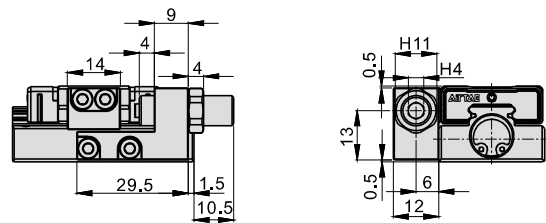
HGS10X5



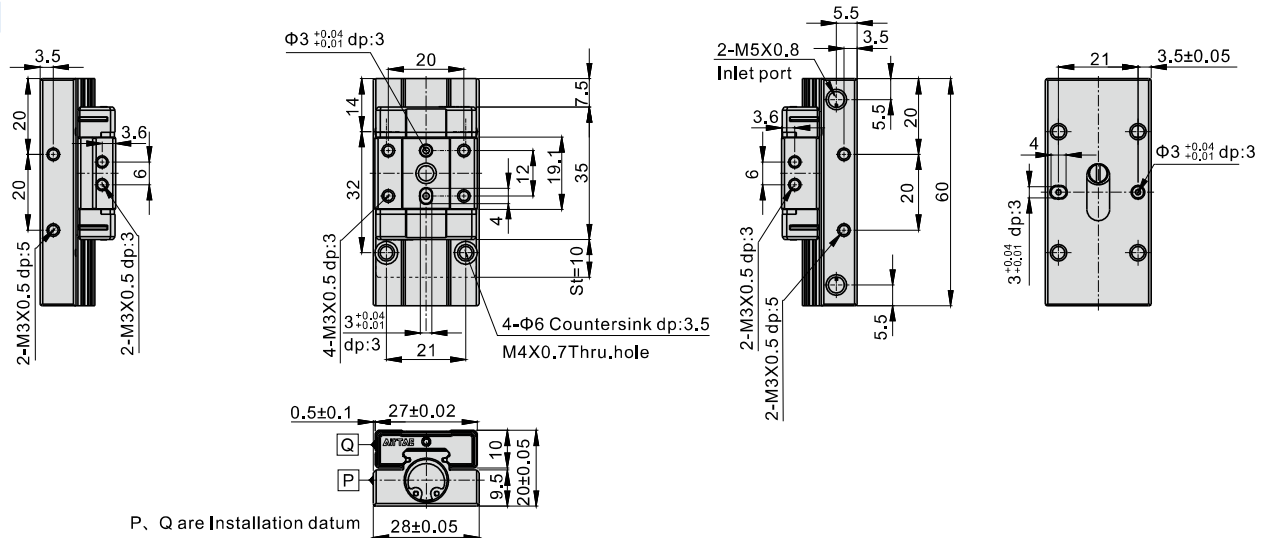
HGS10X5S



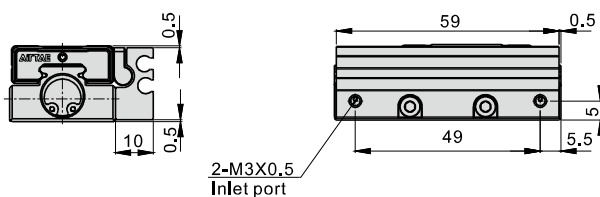
HGS10X5J Adjustable range : 5mm



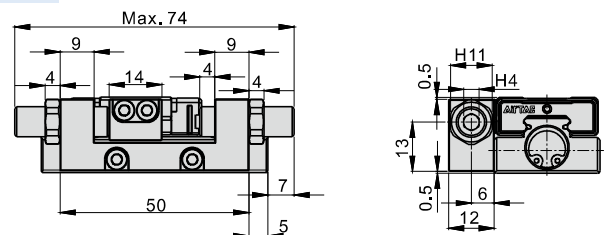
HGS10X10



HGS10X10S



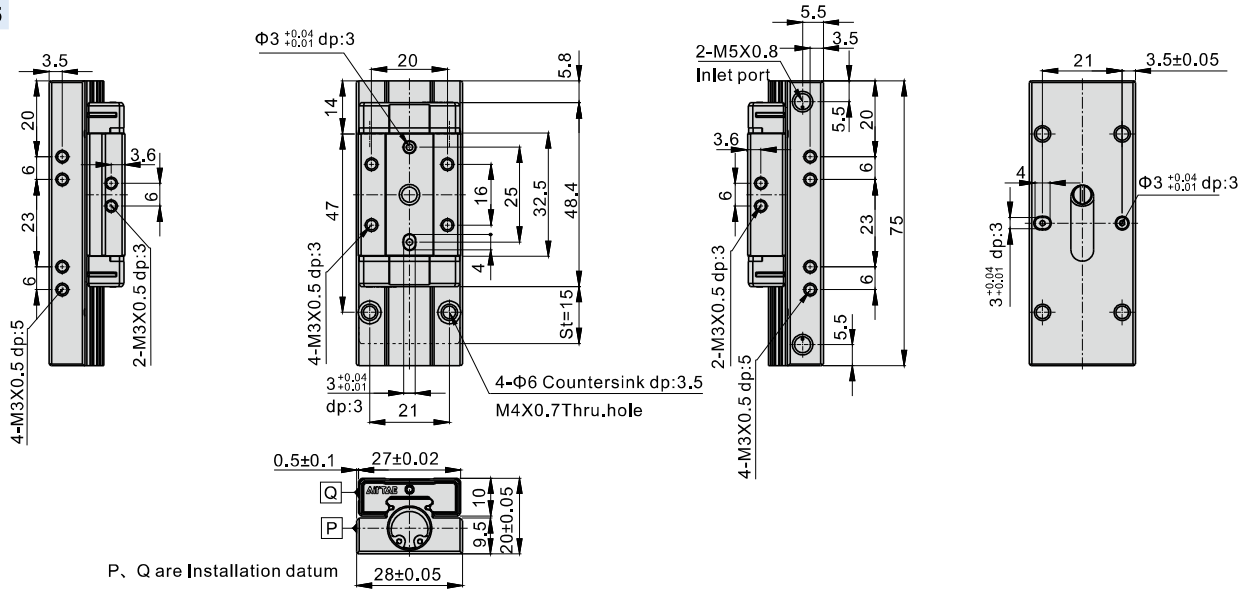
HGS10X10J Adjustable range : 5mm of each sides.



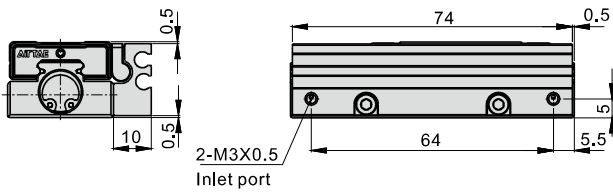
Slide table cylinder

HGS Series

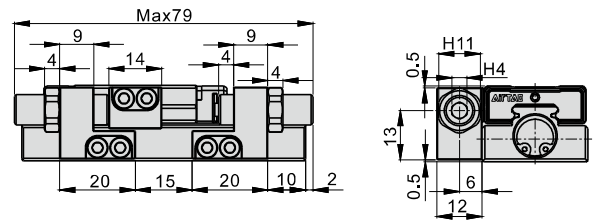
HGS10X15



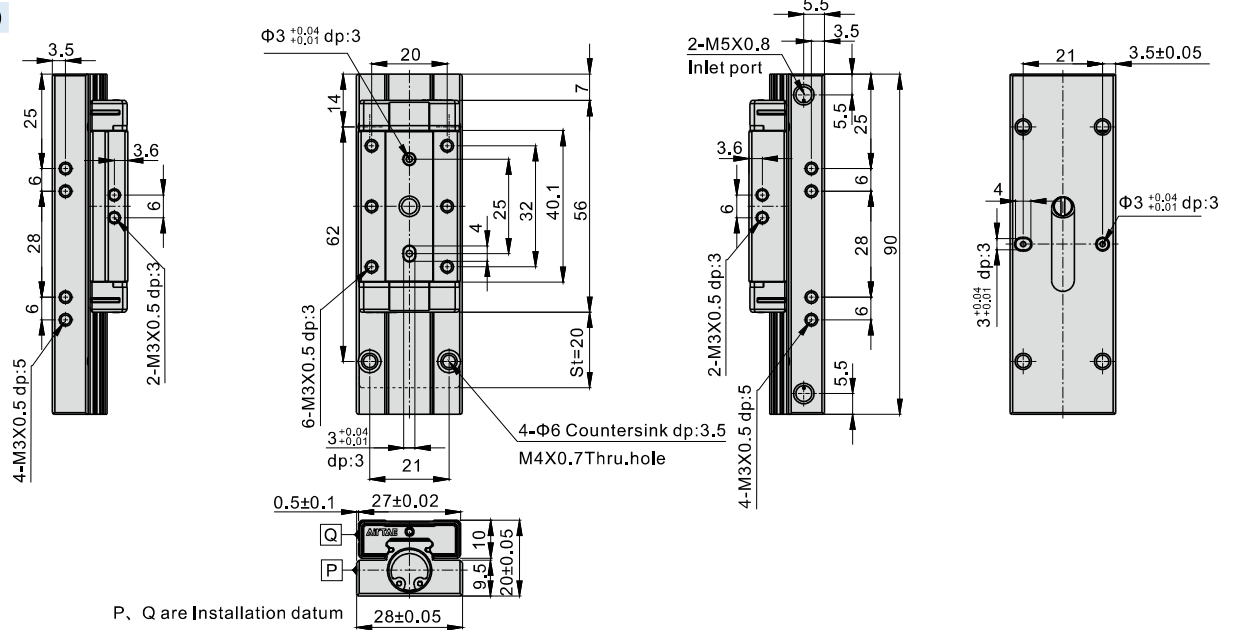
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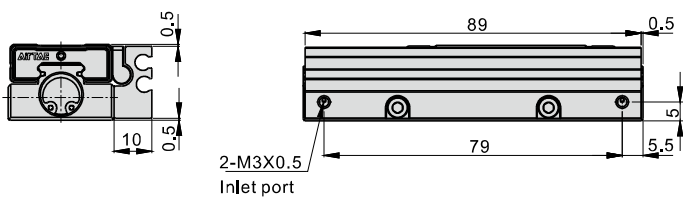
HGS10X15J Adjustable range : 5mm of each sides.



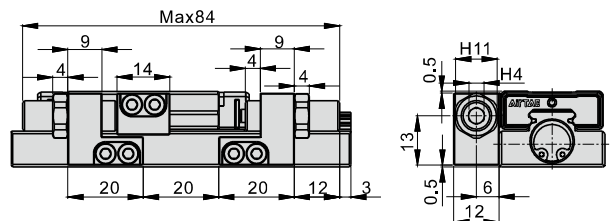
HGS10X20



HGS10X20S



HGS10X20J Adjustable range : 5mm of each sides.

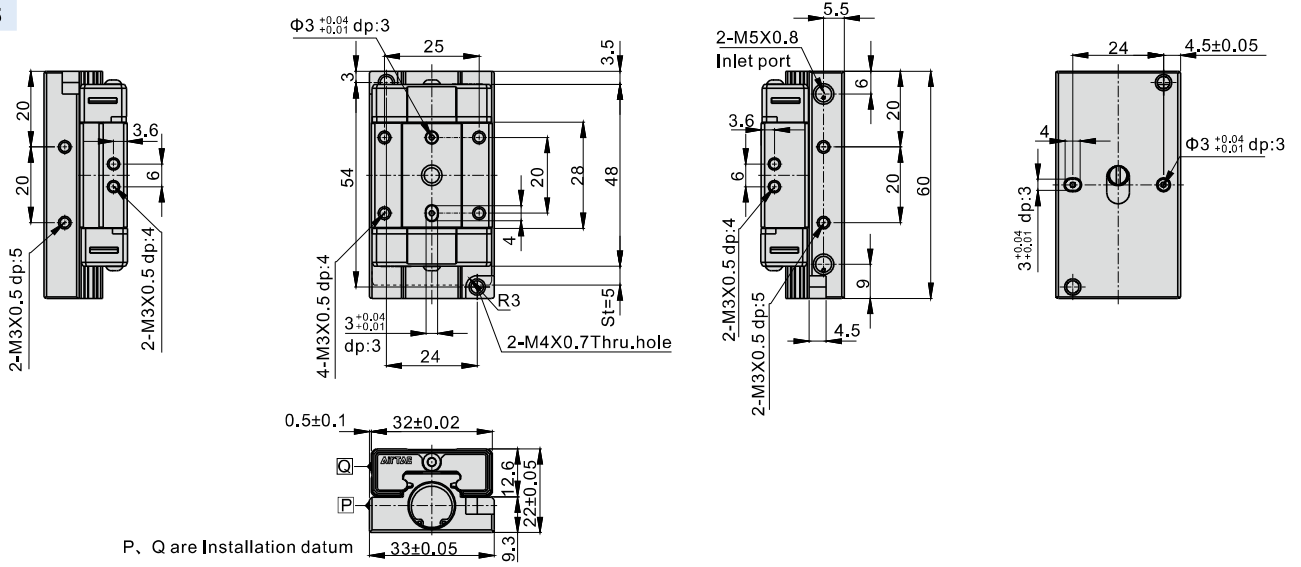


Slide table cylinder

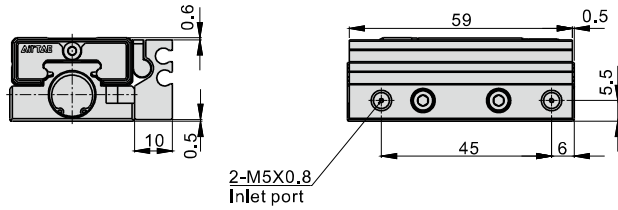
HGS Series

Dimensions(HGS12)

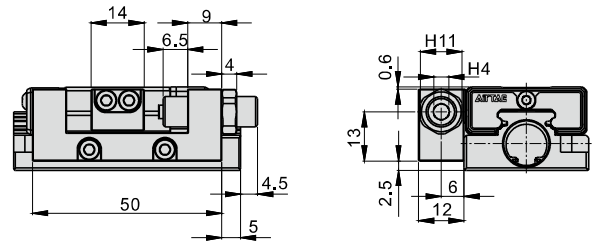
HGS12X5



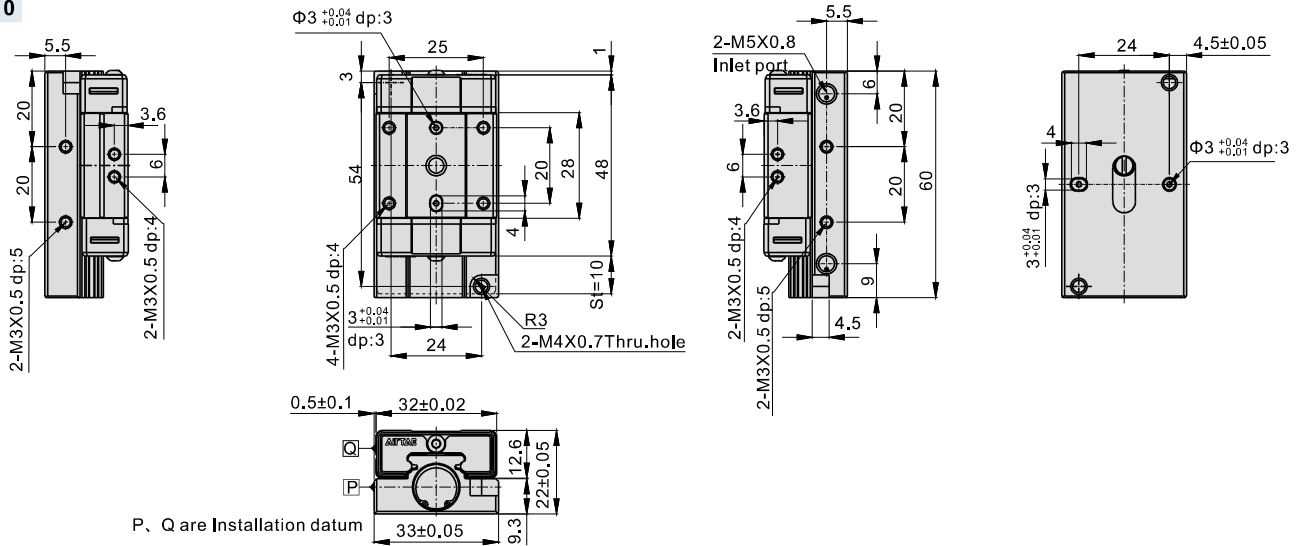
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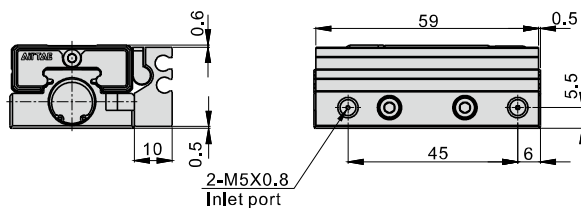
HGS12X5J Adjustable range : 5mm



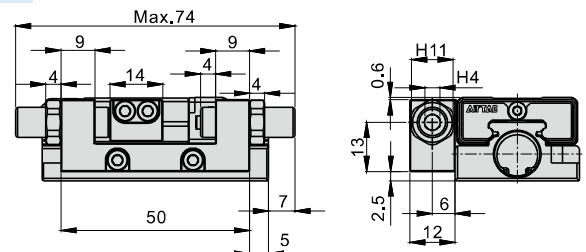
HGS12X10



HGS12X10S



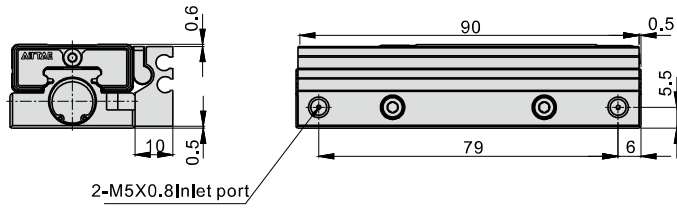
HGS12X10J Adjustable range : 5mm of each sides.



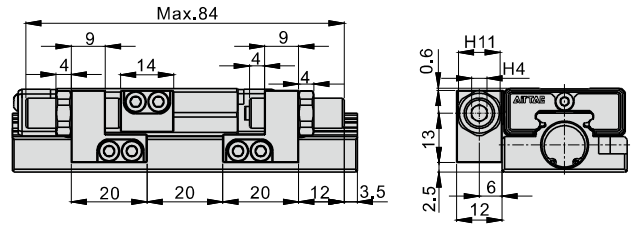
Slide table cylinder

HGS Series

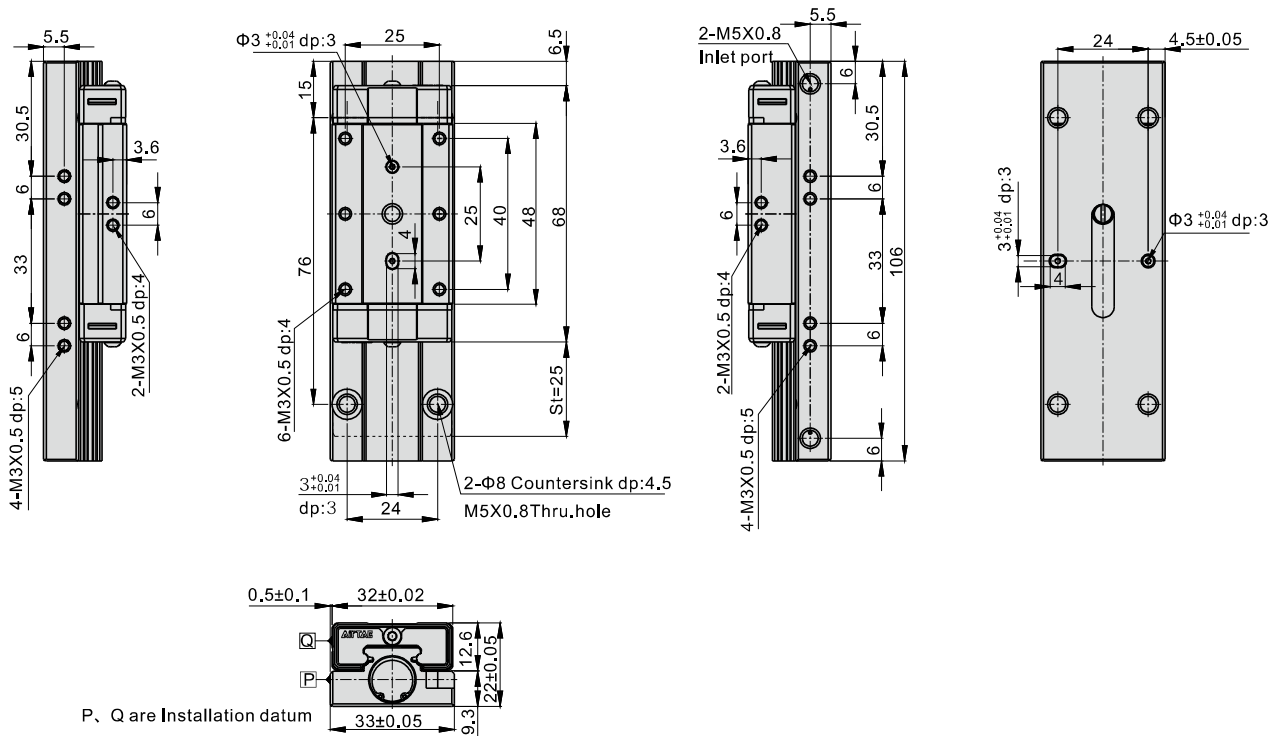
HGS12X20S



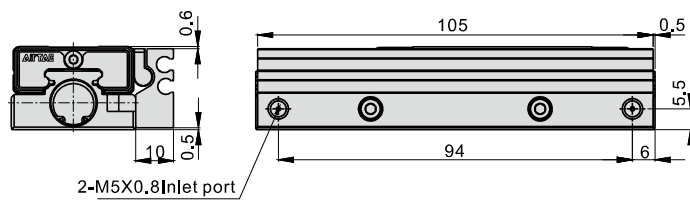
HGS12X20J Adjustable range : 5mm of each sides.



HGS12X25

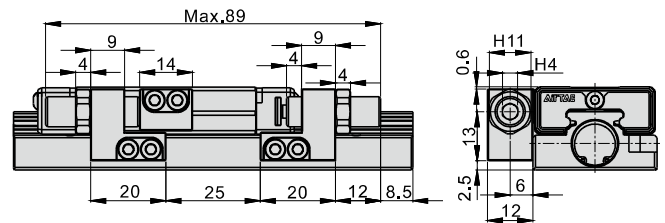


HGS12X25S



HGS12X25J

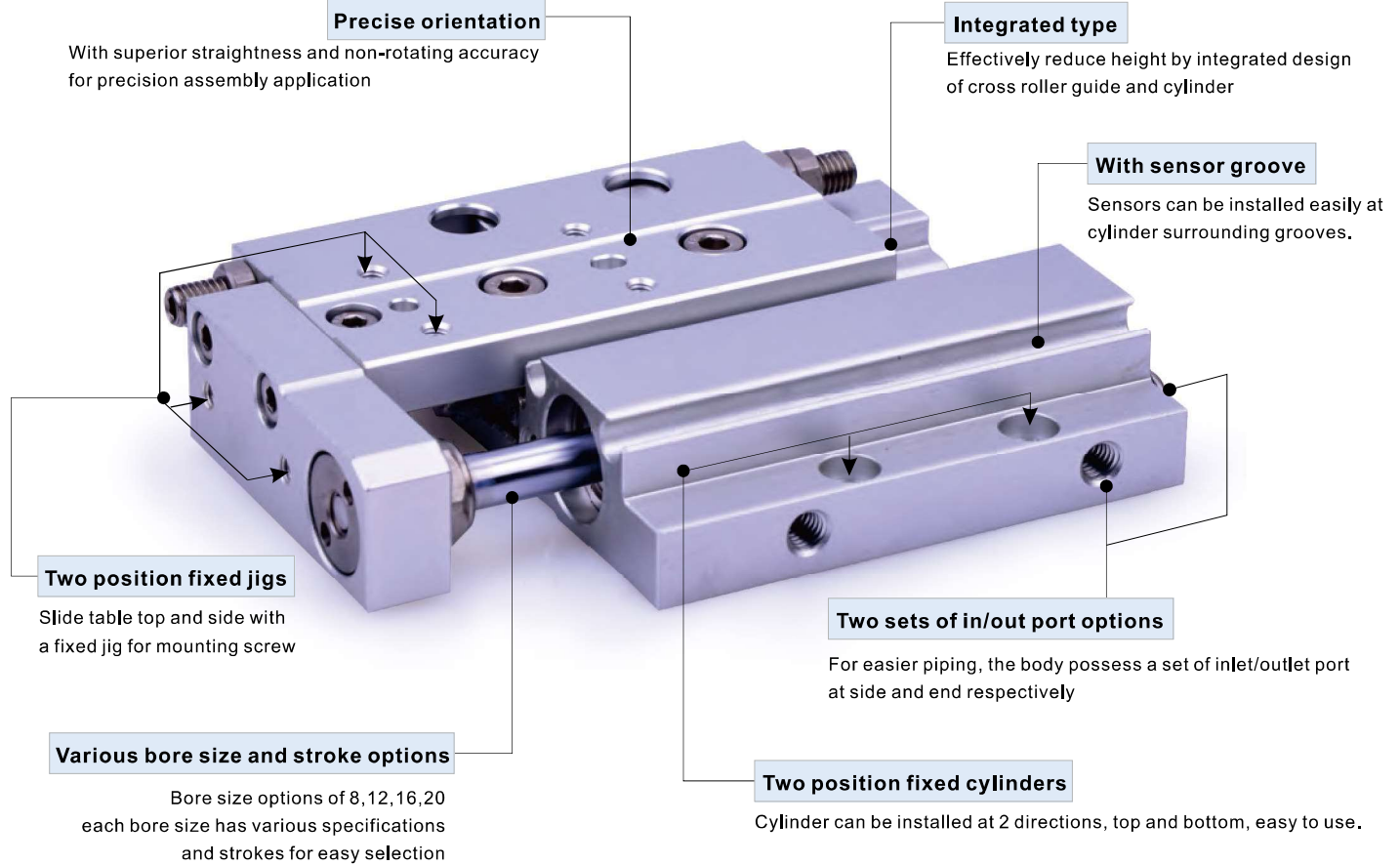
Adjustable range : 5mm of each sides.





Slide table cylinder—HLF Series

Compendium of HLF Series



Criteria for selection: Cylinder thrust

Unit : Newton(N)

Bore size	Rod size	Acting type	Pressure area(mm ²)	Operating pressure(MPa)							
				0.1	0.2	0.3	0.4	0.5	0.6	0.7	
8	3	Double acting	Push-side	50.3	5.0	10.1	15.1	20.1	25.1	30.2	35.2
			Pull-side	43.2	4.3	8.6	13.0	17.3	21.6	25.9	30.2
12	4	Double acting	Push-side	113.1	11.3	22.6	33.9	45.2	56.5	67.9	79.2
			Pull-side	100.5	10.1	20.1	30.2	40.2	50.3	60.3	70.4
16	6	Double acting	Push-side	201.0	20.1	40.2	60.3	80.4	100.5	120.6	140.7
			Pull-side	172.7	17.3	34.5	51.8	69.1	86.4	103.6	120.9
20	8	Double acting	Push-side	314.0	31.4	62.8	94.2	125.6	157.0	188.4	219.8
			Pull-side	263.8	26.4	52.8	79.1	105.5	131.9	158.3	184.7

Installation and application



1. Dirty substances in the pipe must be eliminated before cylinder is connected with pipeline to prevent the entrance of impurities into the cylinder.
2. The medium used by cylinder should be filtered to 40μm or below.
3. Anti-freezing measure shall be adopted under low temperature environment to prevent moisture freezing.
4. If the cylinder is dismantled and stored for a long time, pay attention to conduct anti-rust treatment to the surface. Anti-dust caps shall be added in air inlet and outlet ports.





Symbol



Product feature

1. cross roller linear guide and cylinder integrated type design, effectively reducing cylinder thickness.
2. With superior straightness and non-rotating accuracy for precision assembly application.
3. cylinder can be installed from 2 directions.
4. Piping is possible from 2 directions.

Ordering code

HLF 20 × 30 S



① Model	② Bore size	③ Stroke	④ Magnet
HLF: Slide table cylinder (Roller type)	8 12 16 20	Refer to stroke table for details	S: With magnet

Specification

Bore size (mm)	8	12	16	20
Acting type	Double acting			
Fluid	Air (to be filtered by 40µm filter element)			
Operating pressure	0.2~0.7MPa(29~100psi)(2.0~7.0bar)		0.15~0.7MPa(22~100psi)(1.5~7.0bar)	
Proof pressure	1.2MPa(175psi)(12.0bar)			
Temperature °C	-20~70			
Speed range mm/s	50~500			
Stroke tolerance	+1.0 0			
Cushion type	Bumper			
Sensor switches [Note1]	DMSH, CMSH, EMSH			
Port size	M3×0.5		M5×0.8	

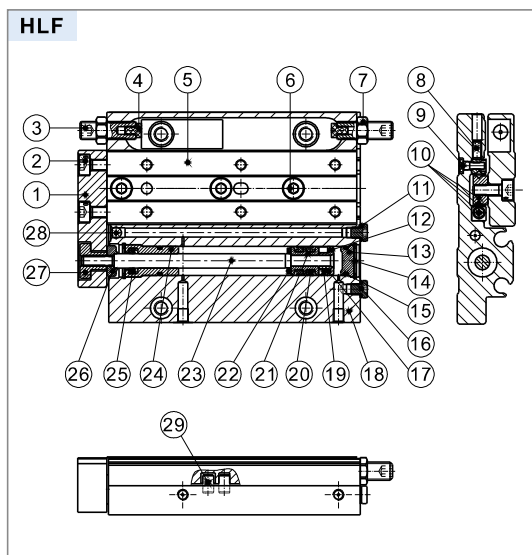
[Note1] Refer to P362 for detail of sensor switch.

Stroke

Bore size (mm)	Standard stroke (mm)	Max.std stroke
8	10 20 30	30
12	10 20 30 40 50	50
16	10 20 30 40 50 75 100	100
20	10 20 30 40 50 75 100	100

[Note] Consult us for non-standard stroke.

Inner structure and material of major parts

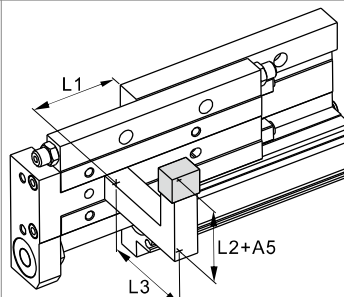


NO.	Item	Material	NO.	Item	Material
1	Fixed plate	Aluminum alloy	16	Plug screw	carbon steel
2	Hexagon socket head screws	Alloy steel	17	Magnet pad	NBR
3	Adjustable screw	Alloy steel	18	Body	Aluminum alloy
4	Bumper	TPU	19	Magnet	Sintered NdFeB
5	Slide table	Aluminum alloy	20	Piston packing	NBR
6	Hexagon socket head screws	Alloy steel	21	Piston	brass
7	Hex nut	Carbon steel	22	Bumper	TPU
8	Socket set screws	Alloy steel	23	Rod	Stainless steel
9	Hexagon socket head screws	Alloy steel	24	Front cover	Aluminum alloy
10	Roller assembly		25	Spool O ring	NBR
11	Gasket	Wear resistant material	26	Floating joint 2	Cutting steel
12	Magnet holder	brass	27	Floating joint 1	Cutting steel
13	Back cover	Aluminum alloy	28	Φ3 steel ball	Stainless steel
14	C clip	Spring steel	29	Pin	Stainless steel
15	O ring	NBR			

HLF Series

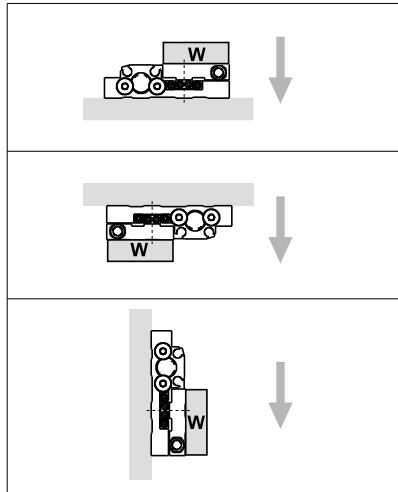
Model Selection Method

Please select compact cylinder's type according to following procedure, and cross reference with data sheets.

Steps	Calculation formula, data	Example	
1. Conditions of Use:			
<p>Consider installation, the shape of the workpiece, the conditions of use.</p>	<ol style="list-style-type: none"> 1. Model used(Bore size, Stroke) 2. Type of cushion(Bumper, Shock absorber) 3. Mounting position of work(Top, front) 4. Mounting direction(Axial, Vertical) 5. Average speed Va(mm/s) 6. Applied load W(kg) Fig. 1 7. Overhang Ln(mm) Fig. 2 	 <ol style="list-style-type: none"> 1. Model used: HLF20X50 2. Type of cushion: Bumper 3. Mounting position of work: Table top mounting 4. Mounting direction: Horizontal arm installation 5. Average speed Va=300(mm/s) 6. Applied load W=0,5(kg) 7. Overhang L1=10mm, L2=30mm, L3=30mm 	
2. Kinetic energy check			
<ol style="list-style-type: none"> 1. Calculate kinetic energy of load E(J) 2. Calculate allowable kinetic energy Ea(J) 3. Check that kinetic energy of load doesn't exceed allowable kinetic energy: E≤Ea 	$E=W \times (V/1000)^2 / 2$ Impact speed V=1.4(Correction factor (reference value))×Va $E_a=K \times E_{max}$ Mounting work coefficient K: Fig 3 Maximum allowable kinetic energy : Table 1 Kinetic energy of load(E)≤ Allowable kinetic energy(Ea)	$E=0.5 \times (420/1000)^2 / 2 = 0.044$ $V=1.4 \times 300 = 420$ $E_a=1 \times 0.16 = 0.16$ $E=0.044 \leq E_a=0.16$ Can be used	
3. Load rate check			
<p>3-1. Concentrated load rate</p> <ol style="list-style-type: none"> 1. Calculate allowable applied load Wa (kg) <p>Note) In the case of vertical use, there is no need to discuss this load rate. (α1=0)</p> <ol style="list-style-type: none"> 2. Calculate load rate α1. 	$W_a=K \times \beta \times W_{max}$ Mounting work coefficient K : Fig 3 Applied load coefficient β: Map 1 Maximum allowable applied load Wmax : Table 2 $\alpha_1=W/W_a$	$W_a=1 \times 1 \times 4 = 4$ K=1 β=1 Wmax=4 $\alpha_1=0.5/4=0.125$	
<p>3-2. Static moment rate</p> <ol style="list-style-type: none"> 1. Calculate static moment M(N.m) 2. Calculate allowable static moment Ma(N.m) 3. Calculate static moment rate α2 	$M=W \times 9.8(L_n+A_n)/1000$ Correction value for center position distance of moment An : Table 3 $M_a=K \times \gamma \times M_{max}$ Mounting work coefficient K: Fig 3 Allowable moment coefficient γ : Map 2 Maximum allowable moment Mmax : Table 4 $\alpha_2=M/M_a$	<p>Yaw moment My</p> $M_y=0.5 \times 9.8(10+11)/1000=0.11$ A3=11 $M_{ay}=1 \times 1 \times 9.14=9.14$ Mymax=9.14 K=1 γ=1 $\alpha_2=0.11/9.14=0.012$	<p>Roll moment Mr</p> $M_r=0.5 \times 9.8(30+17)/1000=0.23$ A6=17 Mar=9.14(Same as May) $\alpha_2=0.23/9.14=0.025$
<p>3-3. Dynamic moment rate</p> <ol style="list-style-type: none"> 1. Calculate dynamic moment Me(N.m) 2. Calculate allowable dynamic moment Mea(N.m) 3. Calculate dynamic moment rate α3. 	$M_e=(W_e \times 9.8(L_n+A_n)/1000)/3$ Impact equivalent mass We=δ×W×V δ : Cushion factor With polyurethane bumper (standard)=4/100 Correction value for center position distance of moment An : Table 3 $M_{ea}=K \times \gamma \times M_{max}$ Mounting work coefficient K: Fig 3 Allowable moment coefficient γ : Map 2 Maximum allowable moment Mmax : Table 4 $\alpha_3=M_e/M_{ea}$	<p>Pitch moment Mep</p> $M_{ep}=(8.4 \times 9.8(30+17)/1000)/3 = 1.3$ $W_e=4/100 \times 0.5 \times 420 = 8.4$ A2=17 $M_{eap}=1 \times 0.7 \times 9.14 = 6.40$ K=1 γ=0.7 Mpxmax=9.14 $\alpha_3=1.3/6.40=0.20$	<p>Yaw moment Mey</p> $M_{ey}=(8.4 \times 9.8(30+34)/1000)/3 = 1.8$ We=8.4 A4=34 Mey=6.4(Same as Meap) K=1 $\alpha_3=1.8/6.4=0.28$
<p>3-4. Sum of load ratio</p> The total load rate does not exceed 1, can be used.	$\Sigma \alpha = \alpha_1 + \alpha_2 + \alpha_3 \leq 1$	Depent on: $\Sigma \alpha = \alpha_1 + \alpha_2 + \alpha_3 = 0.125 + 0.012 + 0.025 + 0.20 + 0.28 = 0.642 \leq 1$ Can be used.	

HLF Series

Fig.1 Applied load : W(kg)



Note: The state of vertical use does not need to consider this load rate.

Fig 3 Mounting work coefficient: K

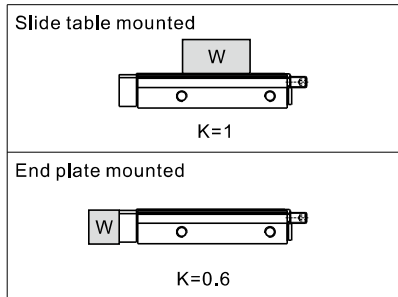


Table2 Maximum allowable applied load : Wmax(kg)

Model	Wmax
HLF8	0.6
HLF12	1
HLF16	2
HLF20	4

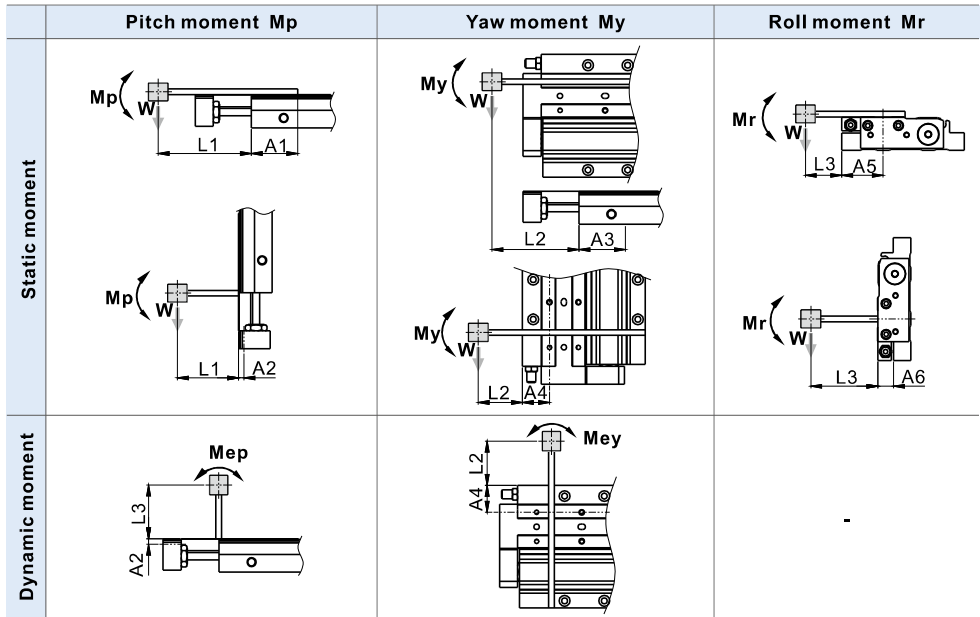
Table4 Maximum allowable moment : Mmax(N.m)

Type	Stroke (mm)					
	10	20	30	50	70	100
HLF8	0.56	0.78	0.98	-	-	-
HLF12	-	1.65	2.22	3.34	-	-
HLF16	-	-	3.41	5.69	7.96	-
HLF20	-	-	6.66	9.14	13.70	18.27

Symbol and Unit

Symbol	Item	Unit	Symbol	Item	Unit
An(n=1~6)	Correction value for center position distance of moment	mm	Va	Average speed	mm/s
E	Kinetic energy	J	W	Applied load	kg
Ea	Allowable kinetic energy	J	Wa	Allowable applied load	kg
Emax	Maximum allowable kinetic energy	J	We	Impact equivalent load	kg
Ln(n=1~3)	Overhang	mm	Wmax	Maximum allowable applied load	kg
M(Mp, My, Mr)	Static moment(Pitch, Yaw, Roll)	N.m	α	Load rate	-
Ma(Map, May, Mar)	Allowable static moment(Pitch, Yaw, Roll)	N.m	β	Applied load coefficient	-
Me(Mep, Mey)	Dynamic moment(Pitch, Yaw)	N.m	γ	Allowable moment coefficient	-
Mea(Meap, Meay)	Allowable dynamic moment(Pitch, Yaw)	N.m	δ	Bumper	-
Mmax(Mpmax, Mymax, Mrmax)	Maximum allowable static moment(Pitch, Yaw, Roll)	N.m	K	Mounting work coefficient	-
V	Impact speed	mm/s			

Fig.2 Overhang : Ln(mm), Correction value for center position distance of moment: An(mm)



Note: Static moment: Generated by gravity.
Dynamic moment: Generated by the impact when the limiter is impacted.

Table 1 Maximum allowable kinetic energy : Emax(J)

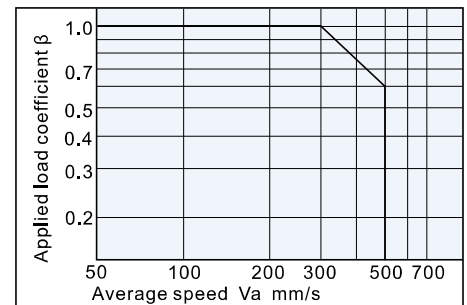
Type	Emax(Bumper)
HLF8	0.027
HLF12	0.055
HLF16	0.11
HLF20	0.16

Table3 Correction value for center position distance of moment: An(mm)

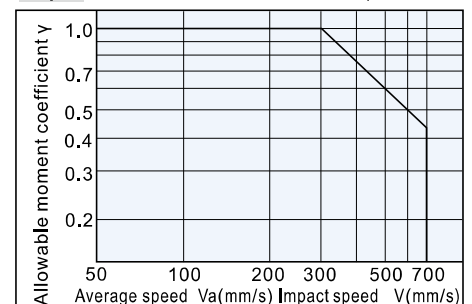
Model	An					
	A ₁	A ₂	A ₃	A ₄	A ₅	A ₆
HLF8	6 Note1	10	6 Note1	21	21	10
HLF12	10	11	10	23	23	11
HLF16	10	12	10	28	28	12
HLF20	11	17	11	34	34	17

Note1 : Only HLF8X10 is 16mm.

Map 1 Applied load coefficient : β



Map 2 Allowable moment coefficient: γ



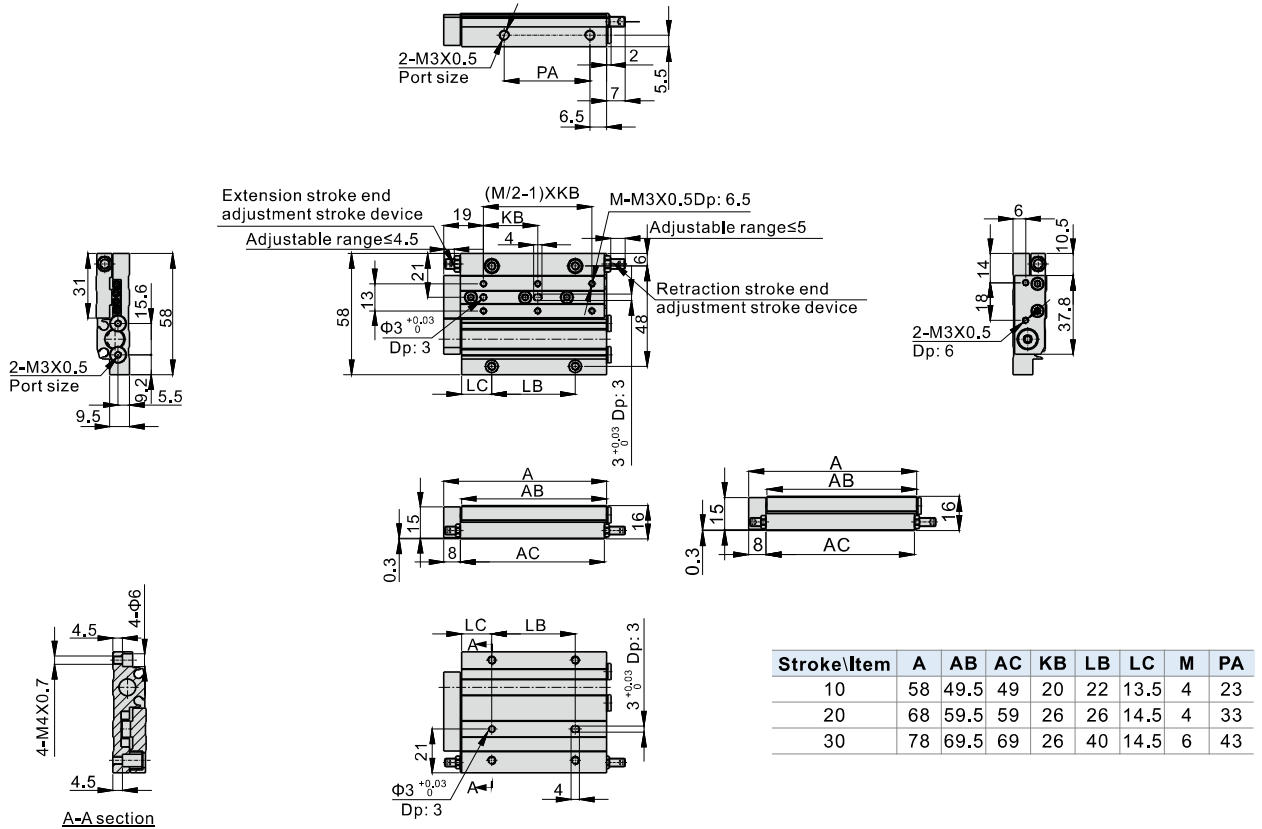
Note: Calculate static moment using average speed
Calculate dynamic moment using impact speed

Slide table cylinder

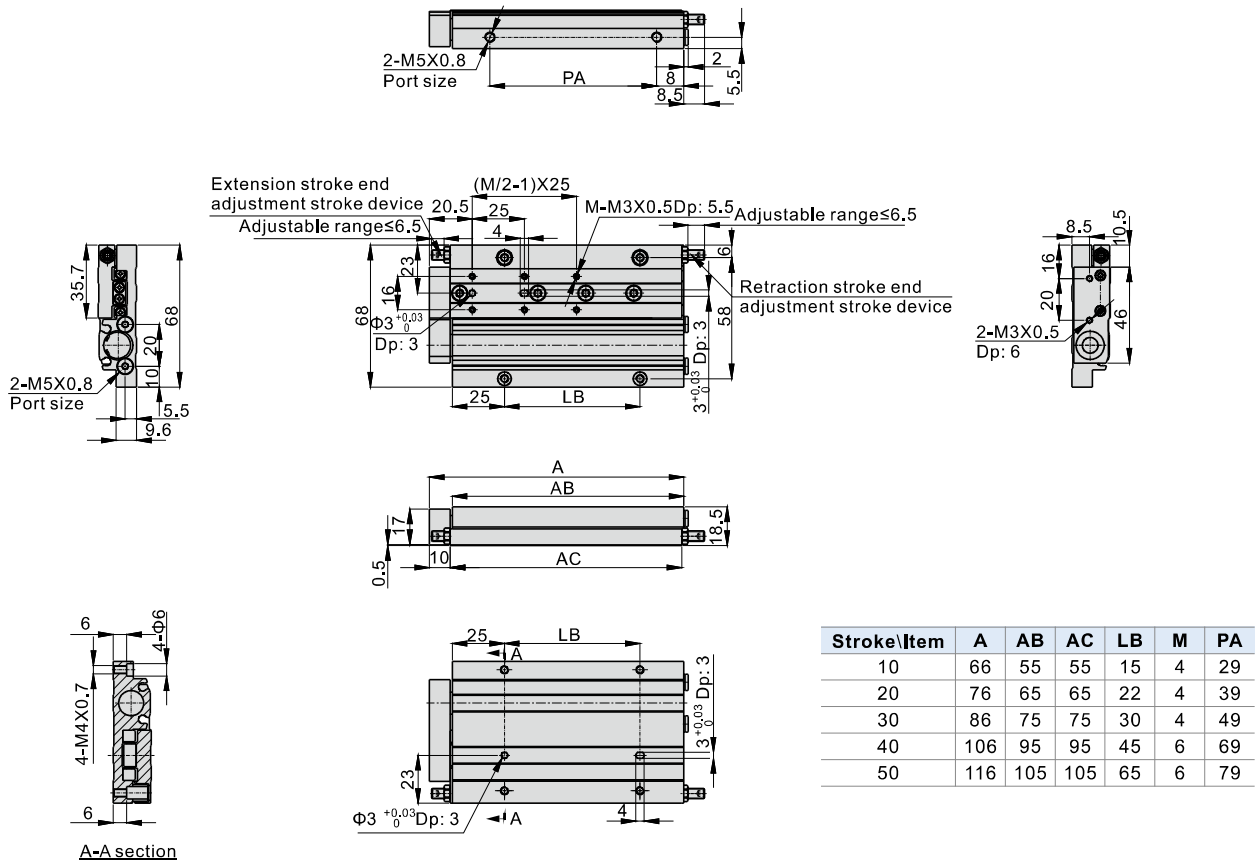
HLF Series

Dimensions

HLF8



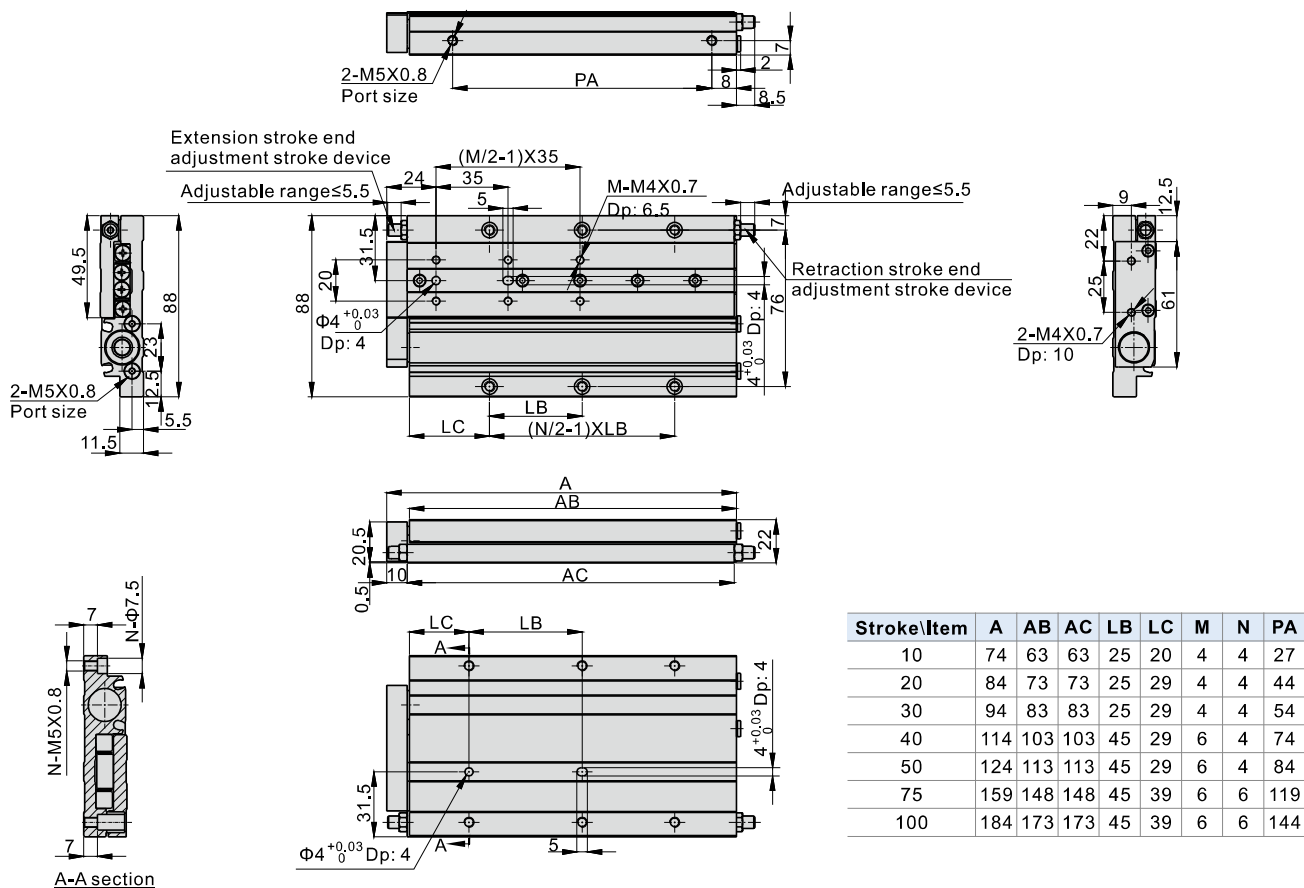
HLF12



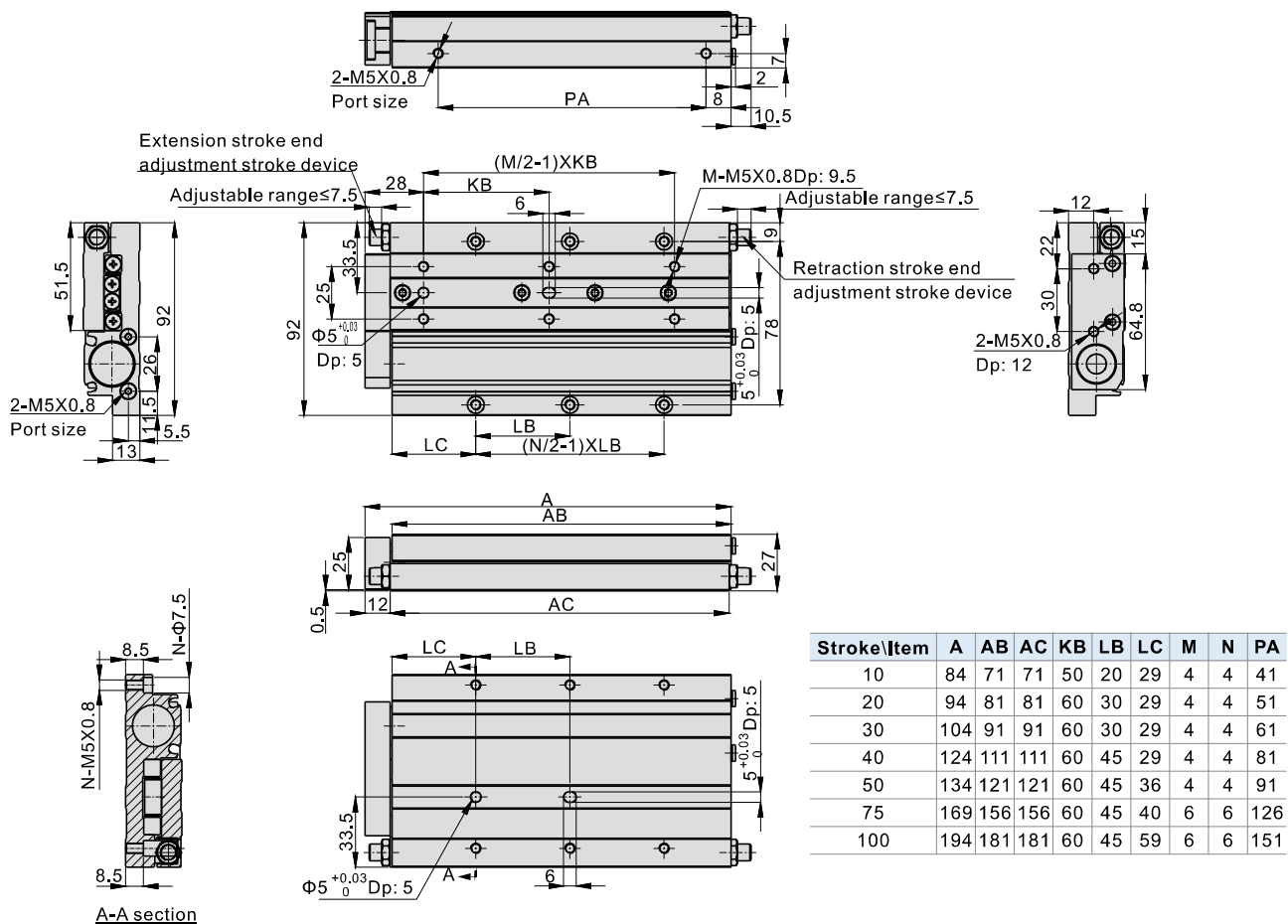
Slide table cylinder

HLF Series

HLF16



HLF20





Slide table cylinder—HLH Series

Compendium of HLH Series

Exactitude pilot
With the excellent straightness and non-rotation precision, it is more suitable for precision assembly.

Integrative design
Miniature linear roller ball bearing integrated wise cylinder.

With magnetic switch slots
There are magnetic switch slots both sides of the cylinder body convenient to install inducting switch.

Three groups of inlet and outlet air ports

Mounting workpiece from 2 directions

Mounting cylinder from 4 directions

Be mounted from side
Be mounted from side
Be mounted from back
Be mounted from bottom

Four bore size are available
Bore size: 6, 10, 16, 20

Criteria for selection: Cylinder thrust

Unit : Newton(N)

Bore size	Rod size	Acting type		Pressure area(mm ²)	Operating pressure(MPa)						
					0.1	0.2	0.3	0.4	0.5	0.6	0.7
6	3	Double acting	Push-side	28.3	-	5.7	8.5	11.3	14.2	17.0	19.8
			Pull-side	21.2	-	4.2	6.4	8.5	10.6	12.7	14.8
10	4	Double acting	Push-side	78.5	7.9	15.7	23.6	31.4	39.3	47.1	55.0
			Pull-side	66.0	6.6	13.2	19.8	26.4	33.0	39.6	46.2
16	6	Double acting	Push-side	201.0	20.1	40.2	60.3	80.4	100.5	120.6	140.7
			Pull-side	172.7	17.3	34.5	51.8	69.1	86.4	103.6	120.9
20	8	Double acting	Push-side	314.0	31.4	62.8	94.2	125.6	157.0	188.4	219.8
			Pull-side	263.8	26.4	52.8	79.1	105.5	131.9	158.3	184.7

Installation and application



1. Dirty substances in the pipe must be eliminated before cylinder is connected with pipeline to prevent the entrance of impurities into the cylinder.
2. The medium used by cylinder should be filtered to 40μm or below.
3. Anti-freezing measure shall be adopted under low temperature environment to prevent moisture freezing.
4. If the cylinder is dismantled and stored for a long time, pay attention to conduct anti-rust treatment to the surface. Anti-dust caps shall be added in air inlet and outlet ports.



HLH Series

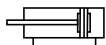


Specification

Bore size(mm)	6	10	16	20
Acting type	Double acting			
Fluid	Air(to be filtered by 40μm filter element)			
Operating pressure	0.2~0.7MPa(29~100psi)(2.0~7.0bar)		0.15~0.7MPa(22~100psi)(1.5~7.0bar)	
Proof pressure	1.2MPa(175psi)(12.0bar)			
Temperature °C	-20~70			
Speed range mm/s	50~500			
Allowable kinetic energy(J)	0.008	0.025	0.05	0.1
Stroke tolerance	+1.0 0			
Cushion type	Bumper			
Sensor switches [Note1]	CMSH, DMSH, EMSH			
Port size	M5×0.8			

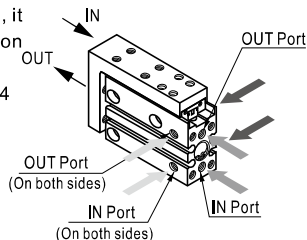
[Note1] Refer to P362 for detail of sensor switch.

Symbol



Product feature

1. Miniature linear roller ball bearing integrated with cylinder.
2. With the excellent straightness and non-rotation precision, it is more suitable for precision assembly.
3. Mounting is possible from 4 directions.
4. Piping is possible from 3 directions.



Stroke

Bore size (mm)	Standard stroke (mm)	Max.std stroke
6	5 10 15 20 25 30	30
10	5 10 15 20 25 30 40 50	50
16	5 10 15 20 25 30 40 50 60	60
20	5 10 15 20 25 30 40 50 60	60

[Note] Consult us for non-standard stroke.

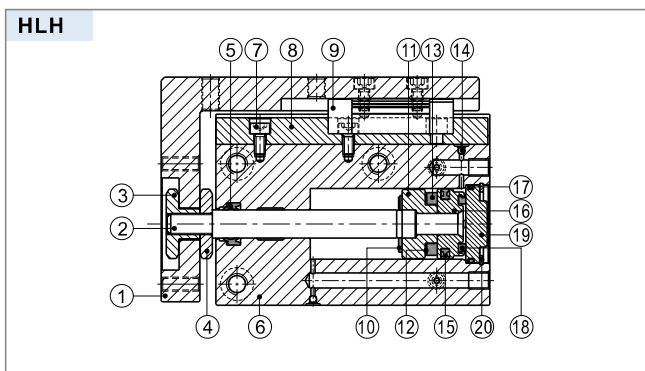
Ordering code

HLH 20 × 30 S



① Model	② Bore size	③ Stroke	④ Magnet
HLH: Slide table cylinder(Double acting type)	6 10 16 20	Refer to stroke table for details	S: With magnet

Inner structure and material of major parts



NO.	Item	Material	NO.	Item	Material
1	Slide table	Aluminum alloy	12	Magnet washer	NBR
2	Piston rod	Stainless steel	13	Magnet	Sintered metal (Neodymium-iron-boron)
3	Hexagon nut	Carbon steel	14	Steel ball	SUS304
4	Hexagon nut	Carbon steel	15	Piston seal	NBR
5	Rod seal	NBR	16	Piston	Aluminum alloy
6	Body	Aluminum alloy	17	O-ring	NBR
7	Screw	Carbon steel	18	Bumper	TPU
8	Linear guide	Stainless steel	19	Back cover	Aluminum alloy
9	Slide block		20	C clip	Spring steel
10	Bumper	TPU			
11	Magnet holder	Aluminum alloy			

HLH Series

Model Selection Method

1. Select the bore size according to the thrust and practicality. Refer to the table on page 187.
2. Determine the selection conditions in order, starting from the upper row in the table below, and choose one of the selection graphs to be used.

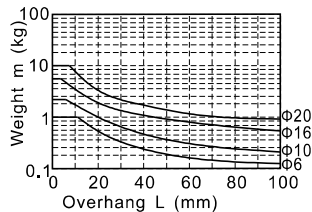
Mounting position	Vertical			Horizontal								
Maximum speed(mm/s)	≤100	≤300	≤500	≤100	≤300	≤500	≤100	≤300	≤500			
Load offset l(mm)	-	-	-	50	100	200	50	100	200			
Selection graph	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)

L: Overhang
(the distance from the cylinder shaft centre to the load centre of gravity)

2.1) The relation between loading and overhang(Selection graphs)

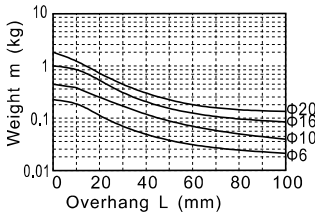
Selection Graphs(1)

Maximum speed 100(mm/s) or less



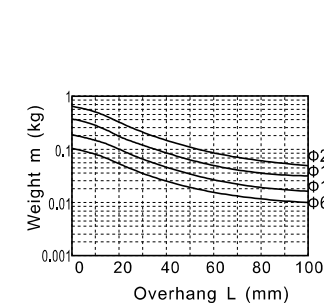
Selection Graphs(2)

Maximum speed 300(mm/s) or less



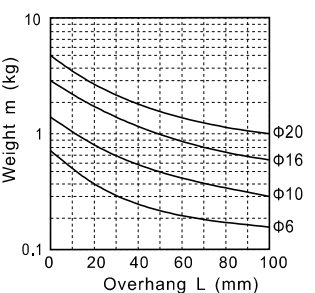
Selection Graphs(3)

Maximum speed 500(mm/s) or less



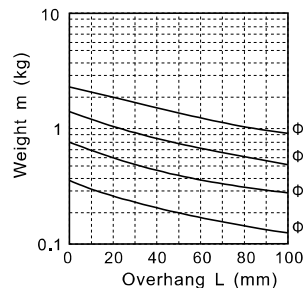
Selection Graphs(4)

Maximum speed 100(mm/s) or less
Load eccentricity 50mm



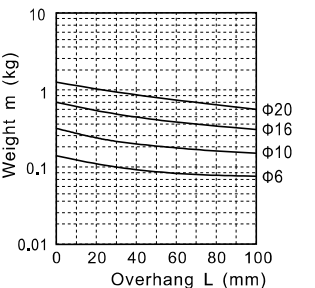
Selection Graphs(5)

Maximum speed 100(mm/s) or less
Load eccentricity 100mm



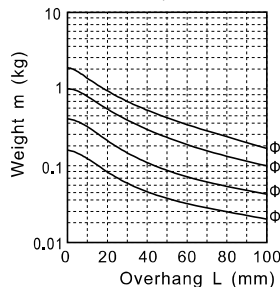
Selection Graphs(6)

Maximum speed 100(mm/s) or less
Load eccentricity 200mm



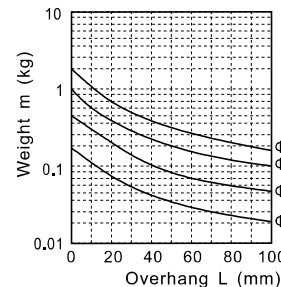
Selection Graphs(7)

Maximum speed 300(mm/s) or less
Load eccentricity 50mm



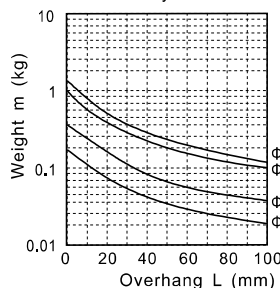
Selection Graphs(8)

Maximum speed 300(mm/s) or less
Load eccentricity 100mm



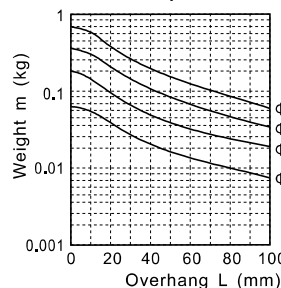
Selection Graphs(9)

Maximum speed 300(mm/s) or less
Load eccentricity 200mm



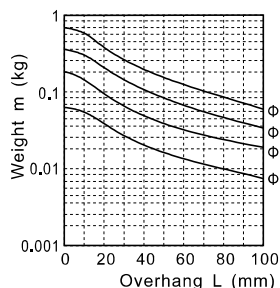
Selection Graphs(10)

Maximum speed 500(mm/s) or less
Load eccentricity 50mm



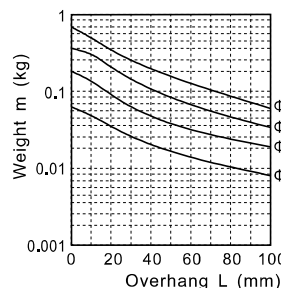
Selection Graphs(11)

Maximum speed 500(mm/s) or less
Load eccentricity 100mm



Selection Graphs(12)

Maximum speed 500(mm/s) or less
Load eccentricity 200mm



2.2) Selection Examples

Example ①: Mounting: Vertical
Maximum speed: 500mm/s
Overhang: 40mm
Load weight: 0.1Kg

Refer to Graph based on vertical mounting and a speed of 500mm/s. In Graph, find the intersection of a 40mm overhang and load weight of 0.1Kg, which results in a selection of φ20.

Example ②: Mounting: Horizontal
Maximum speed: 500mm/s
Load eccentricity: 50mm
Overhang: 30mm
Load weight: 0.1Kg

Refer to Graph based on horizontal mounting, a speed of 500mm/s and load eccentricity of 50mm. In Graph, find the intersection of a 30mm overhang and load weight of 0.1Kg, which results in a selection of φ16.

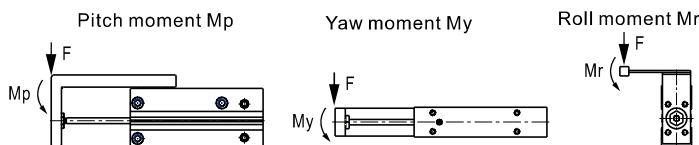
Slide table cylinder

HLH Series

Installation and application

1. The actual loading and moment of cylinder must be less than its allowable loading and moment:

1.1) The allowable moment of cylinder



Model/Allowable torque (Nm)	Pitch moment Mp	Yaw moment My	Roll moment Mr
HLH6	0.25	0.25	0.41
HLH10	0.95	0.95	1.49
HLH16	3.28	3.28	3.45
HLH20	6.29	6.29	6.61

1.2) When the cylinder is subjected to different type of moment, there will be different degree of shift in performance, please refer to the following table for details.

Table deflection due to pitch moment

Table deflection (arrow) when a load acts upon the section marked with the arrow at the full stroke of the compact slide.

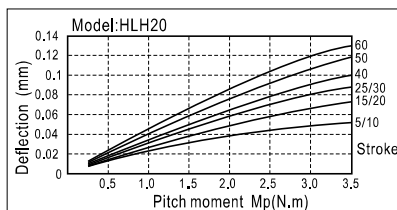
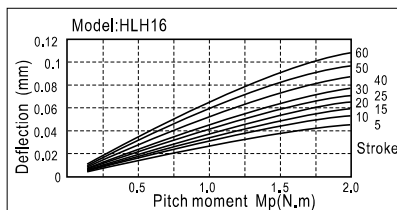
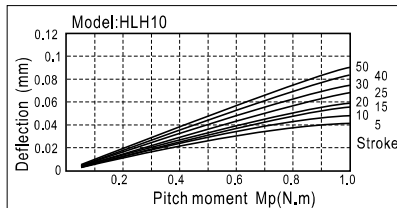
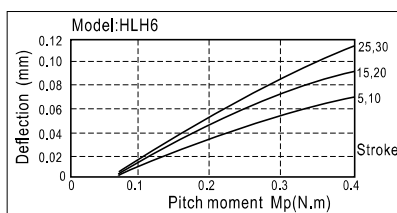
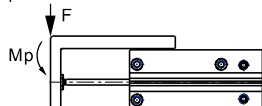


Table deflection due to yaw moment

Table deflection (arrow) when a load acts upon the section marked with the arrow at the full stroke of the compact slide.

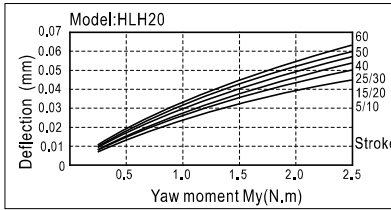
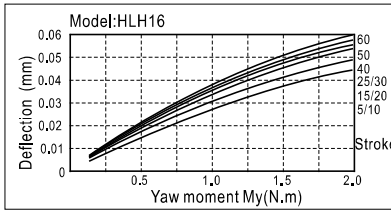
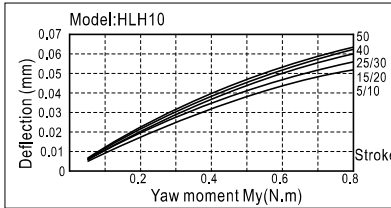
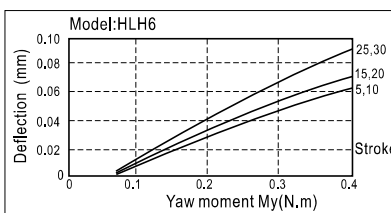
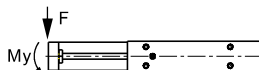
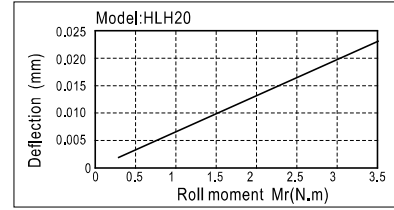
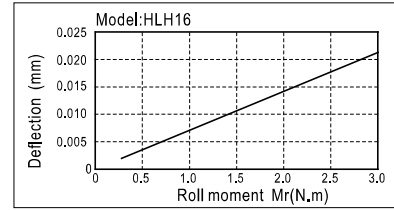
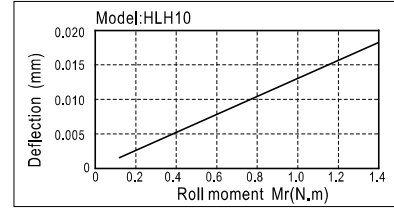
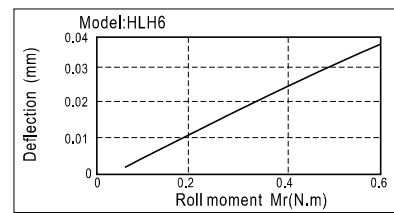
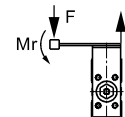


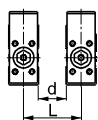
Table deflection due to roll moment

Table deflection (at A) when a load acts upon section F at the full stroke of the compact slide.

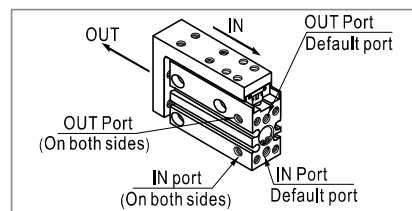


2. The compact slide can be piped from 3 directions. Confirm the pressure ports and operating direction. (See drawing right)

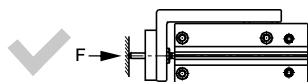
3. In compact slides with sensor switch, there is a danger of sensor switch malfunction if the mounting pitch is less than the dimensions shown in Table right. Be sure to allow at least the indicated interval.



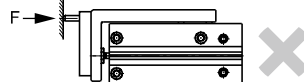
At least indicated interval (mm)/Model	HLH6	HLH10	HLH16	HLH20
d	5	5	10	15
L	21	25	35	47



4. When the output of the compact slide will be directly applied to the table, it should be applied along the rod axis. (See drawing below.)



The loading and piston rod are coaxial



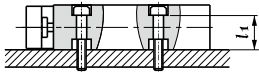
The loading and piston rod are offset

Slide table cylinder

HLH Series

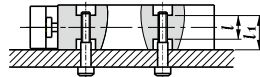
5. Be sure to use a flow control valve, and adjust the speed to 500mm/s or less.
6. A compact slide can be mounted from 4 directions. Don't exceed the max. fastening torque then frightening the mounting bolts.

Lateral Mounting(Through Holes)



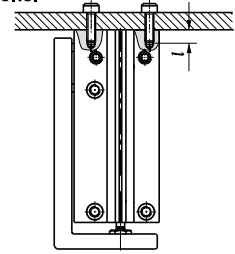
Model	Bolts	Max.fastening torque	L1
HLH6	M3×0,5	1.1(Nm)	12.7
HLH10	M4×0,7	2.5(Nm)	15.6
HLH16	M4×0,7	2.5(Nm)	20.6
HLH20	M5×0,8	5.1(Nm)	24.0

Lateral Mounting(Tapped Holes)

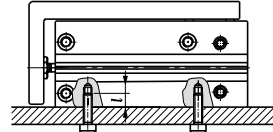


Model	Bolts	Max.fastening torque	L1	L
HLH6	M4×0,7	2.5(Nm)	12,7	9,4
HLH10	M5×0,8	5.1(Nm)	15,6	11,2
HLH16	M5×0,8	5.1(Nm)	20,6	16,2
HLH20	M6×1,0	8.1(Nm)	24,0	16,0

Axial Mounting(Tapped Holes)



Vertical Mounting(Tapped Holes)

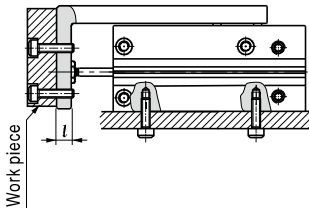


Model	Bolts	Max.fastening torque	L
HLH6	M3×0,5	1.1(Nm)	5
HLH10	M4×0,7	2.5(Nm)	6
HLH16	M4×0,7	2.5(Nm)	6
HLH20	M5×0,8	5.1(Nm)	8

7. Work Piece Mounting

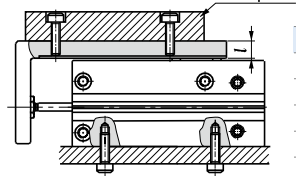
7.1) Work pieces can be mounted on 2 surfaces of the compact slide. When mounting a work piece, tighten the bolts properly at a torque value within the limiting range.

Front Mounting



Model	Bolts	Max.fastening torque	L
HLH6	M3×0,5	1.1(Nm)	5,5
HLH10	M4×0,7	2.5(Nm)	7,5
HLH16	M4×0,7	2.5(Nm)	10
HLH20	M5×0,8	5.1(Nm)	11

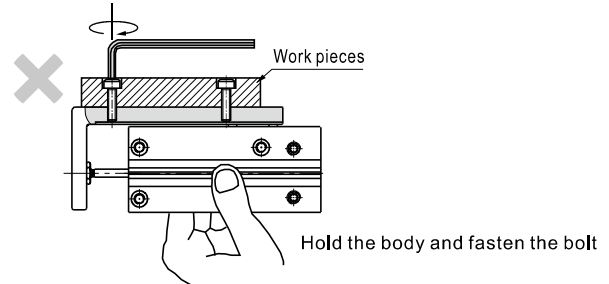
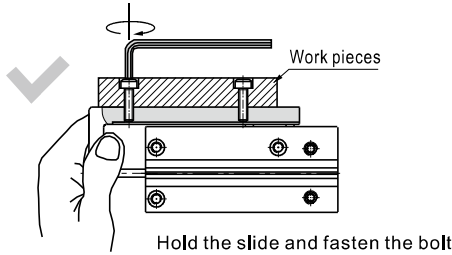
Top Mounting



Model	Bolts	Max.fastening torque	L
HLH6	M3×0,5	1.1(Nm)	6,5
HLH10	M4×0,7	2.5(Nm)	8
HLH16	M4×0,7	2.5(Nm)	9
HLH20	M5×0,8	5.1(Nm)	9,5

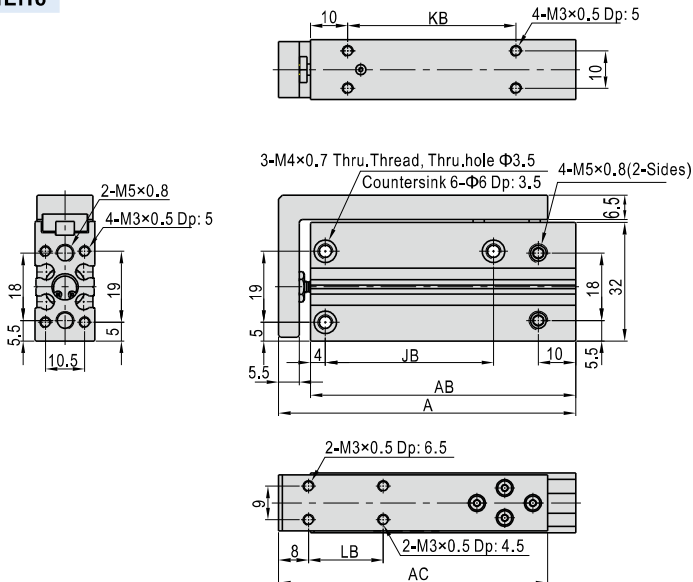
7.2) Since the table is supported by the linear guide, take care not to apply strong impact or large moment to the guide section.

7.3) Hold the slide when fastening work pieces with bolts, If the body is held while tightening bolts, excessive moment may damage guide section.



Dimensions

HLH6

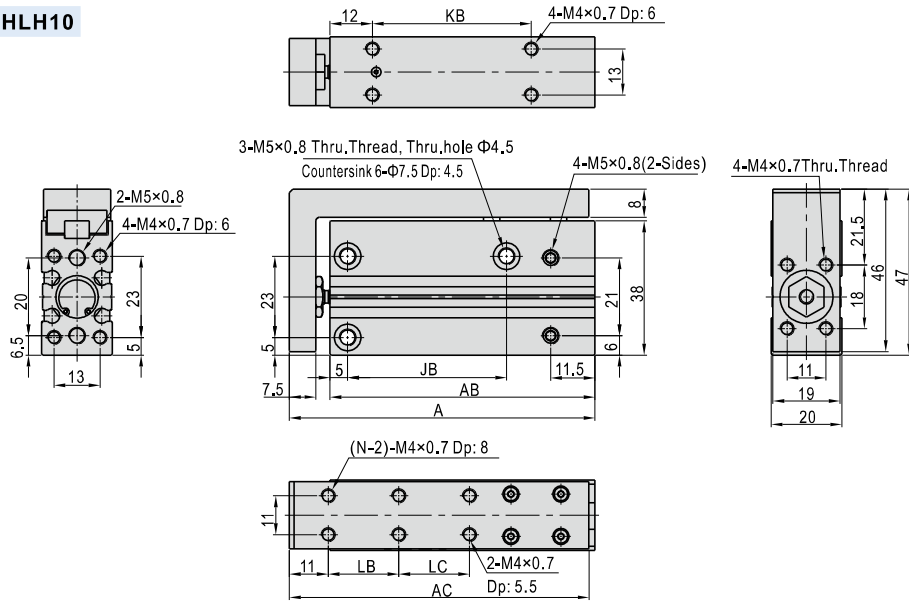


Stroke\Item	A	AB	AC	JB	KB	LB
5	44,5	36	42	14	10	10
10	49,5	41	42	14	15	10
15	54,5	46	52	24	20	20
20	59,5	51	52	24	25	20
25	64,5	56	62	30	30	30
30	69,5	61	62	30	35	30

Slide table cylinder

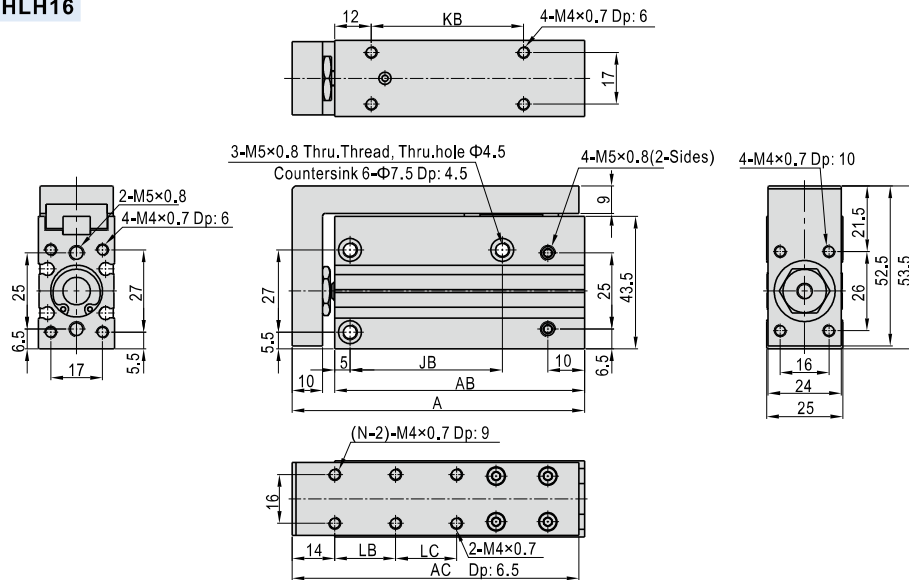
HLH Series

HLH10



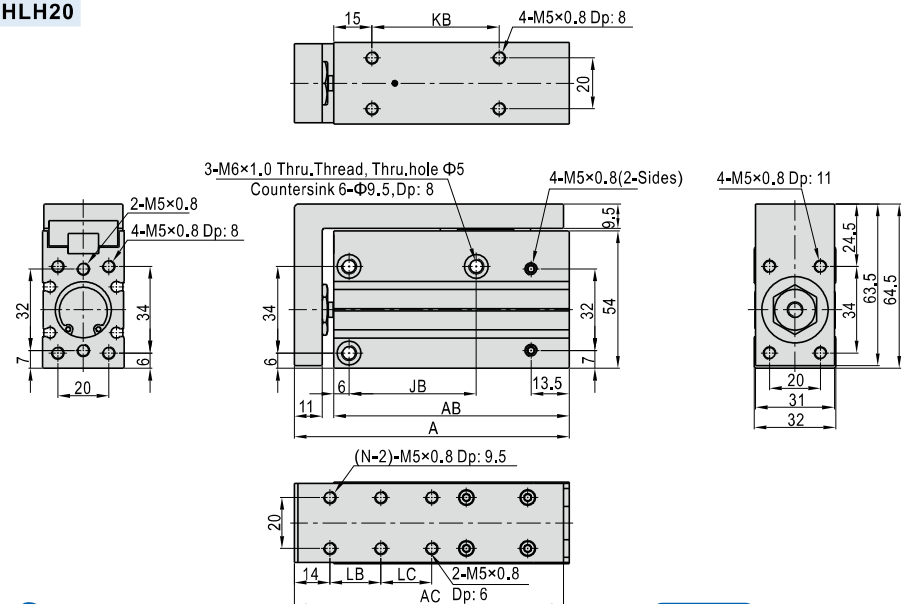
Stroke\Item	A	AB	AC	JB	KB	LB	LC	N
5	51.5	40	50	14	10	10	-	6
10	56.5	45	55	14	15	10	-	6
15	61.5	50	60.5	24	20	20	-	6
20	66.5	55	63	24	25	20	-	6
25	71.5	60	70.5	30	30	30	-	6
30	76.5	65	75.5	30	35	30	-	6
40	86.5	75	85.5	45	45	20	20	8
50	96.5	85	93	55	55	25	25	8

HLH16



Stroke\Item	A	AB	AC	JB	KB	LB	LC	N
5	61	47	60	20	15	10	-	6
10	66	52	64.5	20	20	10	-	6
15	71	57	69.5	30	25	20	-	6
20	76	62	75	30	30	20	-	6
25	81	67	80	40	35	30	-	6
30	86	72	84.5	40	40	30	-	6
40	96	82	95	50	50	20	20	8
50	106	92	104.5	60	60	25	25	8
60	116	102	114.5	60	70	30	30	8

HLH20



Stroke\Item	A	AB	AC	JB	KB	LB	LC	N
5	73	57.5	72	20	15	10	-	6
10	78	62.5	72	20	20	10	-	6
15	83	67.5	82	25	25	20	-	6
20	88	72.5	82	25	30	20	-	6
25	93	77.5	92	40	35	30	-	6
30	98	82.5	92	40	40	30	-	6
40	108	92.5	101.5	50	50	20	20	8
50	118	102.5	113.5	70	60	25	25	8
60	128	112.5	122.5	70	70	30	30	8



Slide table cylinder(ball bearing type)——HLQ Series

Compendium of HLQ\HLQL Series

Multi-adjuster option

Ball bearing type
Ball bearing type, it achieves high precision, high rigidity, with antirust and dustproof function.

Mounting cylinder from 3 directions
Through hole for body mounting. Body mounting holes provide 3 mounting positions. Pin holes for positioning.

Slide table

Body

Dual rod structure
Dual rod doubles the output thrust

Floating joint design
Piston rod needn't endure additional torque

Mounting workpiece from 2 directions

Workpiece

Slide table

With magnetic switch slots
There are magnetic switch slots side of the cylinder body convenient to install inducting switch.

Two models (HLQ/HLQL) are available

Standard : HLQ

Symmetrical : HLQL

Six bore size are available
Bore size: 6, 8, 12, 16, 20, 25

Criteria for selection: Cylinder thrust

Unit : Newton(N)

Bore size	Rod size	Acting type		Pressure area(mm ²)	Operating pressure(MPa)					
					0.2	0.3	0.4	0.5	0.6	0.7
6	3	Double acting	Push-side	42	8	13	17	21	25	29
			Pull-side	57	11	17	23	29	34	40
8	4	Double acting	Push-side	75	15	23	30	38	45	53
			Pull-side	101	20	30	40	51	61	71
12	6	Double acting	Push-side	170	34	51	68	85	102	119
			Pull-side	226	45	68	90	113	136	158
16	8	Double acting	Push-side	302	60	91	121	151	181	211
			Pull-side	402	80	121	161	201	241	281
20	10	Double acting	Push-side	471	94	141	188	236	283	330
			Pull-side	628	126	188	251	314	377	440
25	12	Double acting	Push-side	756	151	227	302	378	454	529
			Pull-side	982	186	295	393	491	589	687

Installation and application



1. Dirty substances in the pipe must be eliminated before cylinder is connected with pipeline to prevent the entrance of impurities into the cylinder.
2. The medium used by cylinder should be filtered to 40μm or below.
3. Anti-freezing measure shall be adopted under low temperature environment to prevent moisture freezing.
4. If the cylinder is dismantled and stored for a long time, pay attention to conduct anti-rust treatment to the surface. Anti-dust caps shall be added in air inlet and outlet ports.



Slide table cylinder(ball bearing type)

HLQ、HLQL Series



Specification

Bore size(mm)	6	8	12	16	20	25
Number of guide rail	Single guide rail			Double guide rail		
Acting type	Double acting					
Fluid	Air(to be filtered by 40μm filter element)					
Operating pressure	0.2~0.7MPa(29~100psi)(2.0~7.0bar)		0.15~0.7MPa(22~100psi)(1.5~7.0bar)			
Proof pressure	1.2MPa(175psi)(12.0bar)					
Temperature °C	-20~70					
Speed range mm/s	50~500					
Stroke tolerance	Strokes≤100 ^{+1.0} ₀			Stroke>100 ^{+1.5} ₀		
Cushion type	Bumper(Both ends)、Shock absorber					
Sensor switches	CMSH、DMSH、EMSH					
Port size [Note1]	M5×0.8				1/8"	

[Note1] PT thread, G thread, NPT thread are available.

Refer to P362 for detail of sensor switch.

Symbol



Stroke

Bore size (mm)	Standard stroke (mm)	Max.std stroke
6	10 20 30 40 50	50
8	10 20 30 40 50 75	75
12	10 20 30 40 50 75 100	100
16	10 20 30 40 50 75 100 125	125
20	10 20 30 40 50 75 100 125 150	150
25	10 20 30 40 50 75 100 125 150	150

[Note] Consult us for non-standard stroke.

Ordering code

HLQ 20 × 30 S AS □

① ② ③ ④ ⑤ ⑥

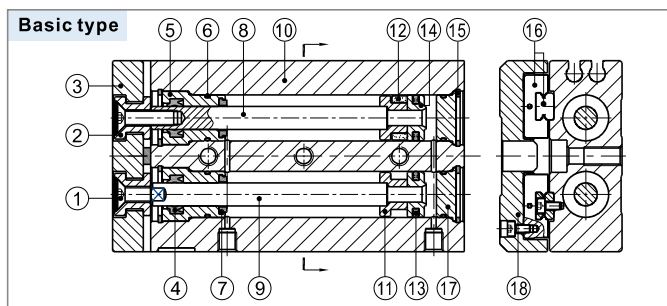
① Model	② Bore Size	③ Stroke	④ Magnet	⑤ Adjuster option [Note1]	⑥ Thread type [Note2]	
HLQ: Slide table cylinder (Double acting type) (ball bearing type) HLQL: Symmetrical Slide table cylinder (Double acting type) (ball bearing type)	6 8 12 16 20 25	Refer to stroke table for details	S: With magnet	Blank: Without adjuster(Basic type) 	Blank: PT G : G T : NPT	
				A: Adjustable rubber stopper(Both ends) 		B: Shock absorber(Both ends)
				AS: Adjustable rubber stopper(Extension) 		BS: Shock absorber(Extension)
				AF: Adjustable rubber stopper(Retraction) 		BF: Shock absorber(Retraction)

[Note1] B type, BS type, BF type are unavailable for bore size of Φ6. [Note2]When the thread is standard, the code is blank.

Slide table cylinder(ball bearing type)

HLQ、HLQL Series

Inner structure and material of major parts



NO.	Item	Material	NO.	Item	Material
1	Screw	Carbon steel	11	Magnet holder	Brass
2	Floating joint	Carbon steel	12	Magnet	Sintered metal (Neodymium-iron-boron)
3	Fixing plate	Aluminum alloy	13	Piston seal	NBR
4	Rod seal	NBR	14	Piston	Brass
5	Front cover	Aluminum alloy	15	C clip	Spring steel
6	O-ring	NBR	16	Linear guide combination	
7	Bumper	TPU	17	Back cover	Brass
8	Piston rod A	Stainless steel	18	Slide table	Aluminum alloy
9	Piston rod B	Carbon steel			
10	Body	Aluminum alloy			

Model Selection Method

Please select compact cylinder's type according to following procedure, and cross reference with data sheets.

A) Operating conditions(According to mounting position and work form)

1. Model used(Bore size, Stroke)
2. Type of cushion(Bumper, Shock absorber)
3. Mounting position of work(Top, front)
4. Mounting direction(Axial, Vertical)
5. Average speed V_a (mm/s)
6. Applied load W (N)
7. Overhang L_1, L_2, L_3 (mm)

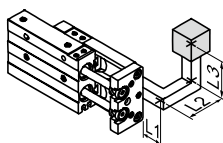
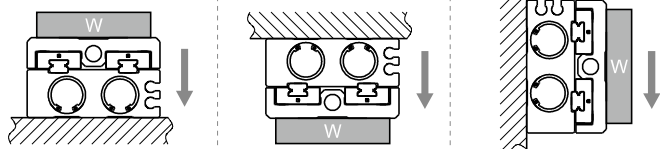


Fig. 1

Explain : L_1 is the distance of load's center beyond the end plank's plane.
If load's center is not beyond the end plank's plane, L_1 is negative.

Fig. 1 : Applied load



B) Kinetic energy check

1. Calculate kinetic energy of load E (J)

$$E = \frac{1}{2} \times \frac{W}{g} \times \left(\frac{1.4 \times V_a}{1000} \right)^2$$
2. Calculate allowable kinetic energy E_a (J)

$$E_a = K \times E_{max}$$

K : Mounting work coefficient (Fig 2)
 E_{max} : Maximum allowable kinetic energy (Table 1)
3. Check that kinetic energy of load doesn't exceed allowable kinetic energy: $E \leq E_a$

C) Load check

1. Calculate allowable applied load W_a (N)

$$W_a = K \times \beta \times W_{max}$$

K : Mounting work coefficient (Fig 2)
 W_{max} : Maximum allowable applied load (Table 1)
 β : Applied load coefficient (Fig 3)
2. Check that load(W) doesn't exceed allowable applied load(W_a): $W \leq W_a$

Fig 2 : Mounting work coefficient (K)

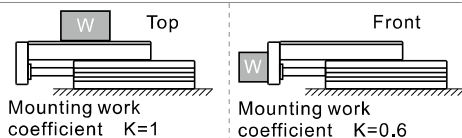
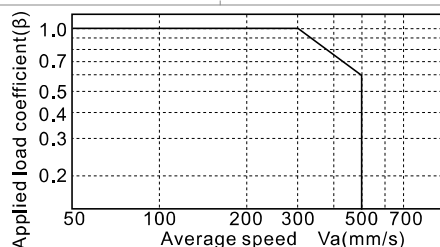


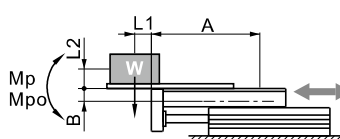
Fig 3 : Applied load coefficient (β)



D) Moment check

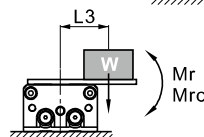
Horizontal

1. Calculate actual moment: $M_p, M_{p0}, M_y, M_{y0}, M_r, M_{r0}$ (Nm)



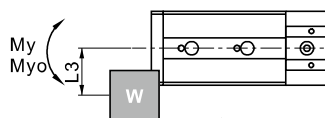
Dynamic moment : $M_p = W \times (L_1 + A) / 1000$

Static moment : $M_{p0} = \frac{W \times (L_1 + A)}{1000} + \frac{W \times a \times (L_2 + B)}{1000 \times g}$



Dynamic moment : $M_r = W \times L_3 / 1000$

Static moment : $M_{r0} = (W \times a \times L_3) / 1000g$



Dynamic moment : $M_y = 0$

Static moment : $M_{y0} = (W \times a \times L_3) / 1000g$

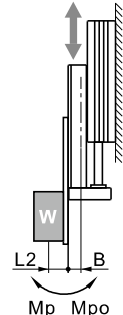
2. Check

Dynamic moment : $\frac{M_p}{M_{p_{max}}} + \frac{M_y}{M_{y_{max}}} + \frac{M_r}{M_{r_{max}}} \leq 1$

Static moment : $\frac{M_{p0}}{M_{p0_{max}}} + \frac{M_{y0}}{M_{y0_{max}}} + \frac{M_{r0}}{M_{r0_{max}}} \leq 1$

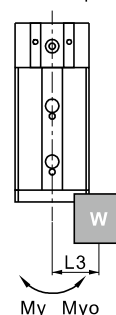
Vertical

1. Calculate actual moment: M_p, M_{p0}, M_y, M_{y0} (Nm)



Dynamic moment : $M_p = W \times (L_2 + B) / 1000$

Static moment : $M_{p0} = \frac{W \times (L_2 + B)}{1000} + \frac{W \times a \times (L_2 + B)}{1000 \times g}$



Dynamic moment : $M_y = W \times L_3 / 1000$

Static moment : $M_{y0} = \frac{W \times a \times L_3}{1000g} + \frac{W \times L_3}{1000}$

2. Check

Dynamic moment : $\frac{M_p}{M_{p_{max}}} + \frac{M_y}{M_{y_{max}}} \leq 1$

Static moment : $\frac{M_{p0}}{M_{p0_{max}}} + \frac{M_{y0}}{M_{y0_{max}}} \leq 1$

Explain:

$L_1/L_2/L_3$: The distance of load center to mount plane(Determined by actuality).
 A/B : Correction value for center position distance of moment(Refer to table 2).
 $M_{p_{max}}/M_{y_{max}}/M_{r_{max}}/M_{p0_{max}}/M_{y0_{max}}/M_{r0_{max}}$: Maximum allowable moment(Refer to table 2).
 g : Acceleration of gravity($g=9.81m/s^2$).
 a : Acceleration of inertia
(Bumper: $a=1600 \times (V_a/1000)^2$, Shock absorber: $a=400 \times (V_a/1000)^2$)
 W : Load weight(Determined by actuality).

Slide table cylinder(ball bearing type)

HLQ、HLQL Series

Table 1 : Maximum allowable kinetic energy(Emax)
Maximum allowable applied load(Wmax)

Model	Max. allowable kinetic energy Emax(J)			Max. allowable applied load Wmax(N)
	Basic type	Rubber stopper type	Shock absorber type	
HLQ6	0.01	0.01	-	4
HLQ8	0.024	0.024	0.048	8
HLQ12	0.05	0.05	0.1	15
HLQ16	0.1	0.1	0.2	30
HLQ20	0.13	0.13	0.26	40
HLQ25	0.22	0.22	0.44	70

Note: Symbol and unit

Symbol	Item	Unit
A, B	Correction value for center position distance of moment	mm
a	Acceleration of inertia	-
E	Kinetic energy	J
Ea	Allowable kinetic energy	J
Emax	Maximum allowable kinetic energy	J
g	Acceleration of gravity g=9.81	m/s ²
K	Mounting work coefficient	-
L1, L2, L3	Overhang	mm
Mp, My, Mr	Dynamic moment(Pitch, Yaw, Roll)	Nm
Mp _{max} , My _{max} , Mr _{max}	Maximum allowable dynamic moment (Pitch, Yaw, Roll)	Nm
Mpo, Myo, Mro	Static moment(Pitch, Yaw, Roll)	Nm
Mpo _{max} , Myo _{max} , Mro _{max}	Maximum allowable static moment (Pitch, Yaw, Roll)	Nm
Va	Average speed	mm/s
W	Applied load	N
Wmax	Maximum allowable applied load	N
β	Applied load coefficient	-

Table 2 : Maximum allowable moment(Nm),
Correction value for center position distance of moment(mm)

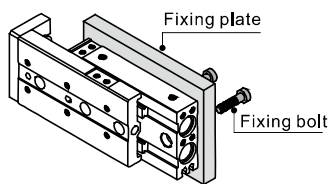
Bore size	Stroke	Static moment			Dynamic moment			Correction value	
		Mpo _{max}	Myo _{max}	Mro _{max}	Mp _{max}	My _{max}	Mr _{max}	A	B
6	10	3.3	3.8	2.6	0.7	0.7	0.6	30	7
	20	3.3	3.8	2.6	0.7	0.8	0.6	40	
	30	3.3	3.8	2.6	0.7	0.8	0.6	50	
	40	7.2	7.9	3.6	1.3	1.3	0.6	60	
	50	12.4	12.7	4.7	1.8	1.8	0.6	70	
8	10	10.1	9.1	8.8	2.5	2.5	2.0	30	7
	20	10.1	9.1	8.8	2.6	2.6	2.0	40	
	30	10.1	9.1	8.8	2.8	2.8	2.0	50	
	40	12.4	10.8	10.1	3.4	3.4	2.3	60	
	50	23.6	24.8	13.9	4.4	4.4	2.1	70	
12	75	32.8	35.3	16.4	4.6	4.6	1.8	95	11
	10	8.5	8.5	13.6	2.5	2.5	4	32	
	20	8.5	8.5	13.6	2.5	2.5	4	44	
	30	8.5	8.5	13.6	2.5	2.5	4	54	
	40	8.5	8.5	13.6	2.5	2.5	4	62	
16	50	8.5	8.5	13.6	2.5	2.5	4	72	12
	75	52.3	52.3	85.6	18.9	18.9	13	115	
	100	53.9	53.9	86.9	19.5	19.5	13	142	
	10	33.6	33.6	35.2	8.4	8.4	8.8	49	
	20	33.6	33.6	35.2	8.4	8.4	8.8	49	
20	30	33.6	33.6	35.2	8.4	8.4	8.8	59	14
	40	33.6	33.6	35.2	8.4	8.4	8.8	69	
	50	33.6	33.6	35.2	8.4	8.4	8.8	79	
	75	70.2	70.2	62.5	28.1	28.1	25	120	
	100	76.6	76.6	62.5	38.3	38.3	25	150	
25	125	78	78	62.5	39	39	25	175	17
	10	34.8	34.8	36.8	8.7	8.7	9.2	53	
	20	34.8	34.8	36.8	8.7	8.7	9.2	53	
	30	34.8	34.8	36.8	8.7	8.7	9.2	63	
	40	34.8	34.8	36.8	8.7	8.7	9.2	73	
30	50	34.8	34.8	36.8	8.7	8.7	9.2	83	14
	75	70.2	70.2	74.5	28.1	28.1	29.7	123	
	100	76.6	76.6	74.5	38.3	38.3	29.7	157	
	125	78	78	74.5	39	39	29.7	178	
	150	98.4	98.4	74.5	49.2	49.2	29.7	210	
40	10	56.7	56.7	51	16.2	16.2	17	60	17
	20	56.7	56.7	51	16.2	16.2	17	60	
	30	56.7	56.7	51	16.2	16.2	17	70	
	40	56.7	56.7	51	16.2	16.2	17	80	
	50	56.7	56.7	51	16.2	16.2	17	90	
50	75	122.5	122.5	138.5	49	49	55.4	130	17
	100	173.8	173.8	138.5	79	79	55.4	168	
	125	217	217	138.5	108.6	108.6	55.4	205	
	150	221.8	221.8	138.5	110.9	110.9	55.4	230	

Installation and application

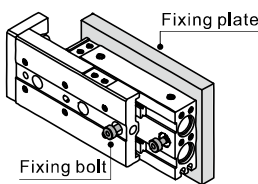
1. How to mount cylinder :

1.1) Cylinder can be mounted from 3 directions

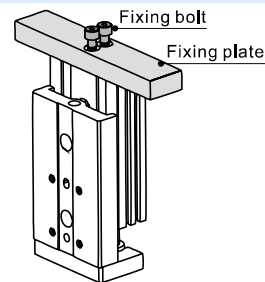
Vertical Mounting(Body thread holes)



Vertical Mounting(Body through holes)



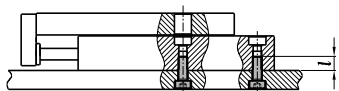
Axial Mounting (Body thread holes)



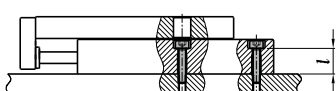
1.2) When mounting an compact slide cylinder, screws of appropriate length should be used and tightened properly within the maximum tightening torque.

If screws are tightened beyond designed limits, malfunction may occur. If they are tightened insufficiently, it may result in sliding or falling off from its position.

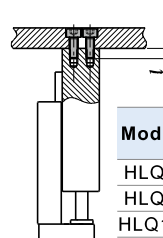
Vertical Mounting(Body thread holes)



Vertical Mounting(Body through holes)



Axial Mounting(Body thread holes)



Model	Bolt used	Max. tightening torque (Nm)	Max. screw-in depth(mm)
HLQ6	M4×0.7	2.1	8
HLQ8	M4×0.7	2.1	8
HLQ12	M5×0.8	4.4	10
HLQ16	M6×1.0	4.4	10
HLQ20	M6×1.0	7.4	12
HLQ25	M8×1.25	18.0	16

Model	Bolt used	Max. tightening torque (Nm)	Max. screw-in depth(mm)
HLQ6	M3×0.5	1.2	8.0
HLQ8	M3×0.5	1.2	9.6
HLQ12	M4×0.7	2.8	13.4
HLQ16	M5×0.8	5.7	16.7
HLQ20	M5×0.8	5.7	22.0
HLQ25	M6×1.0	10.0	27.0

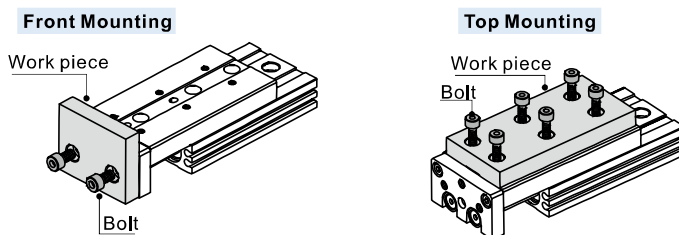
Model	Bolt used	Max. tightening torque (Nm)	Max. screw-in depth(mm)
HLQ6	M2.5×0.45	0.5	3.5
HLQ8	M3×0.5	0.9	4.0
HLQ12	M4×0.7	2.1	6.0
HLQ16	M5×0.8	4.4	7.0
HLQ20	M5×0.8	4.4	8.0
HLQ25	M6×1.0	7.4	10.0

Slide table cylinder(ball bearing type)

HLQ、HLQL Series

2. Work Piece Mounting :

2.1) Work pieces can be mounted on 2 surfaces of the compact slide.

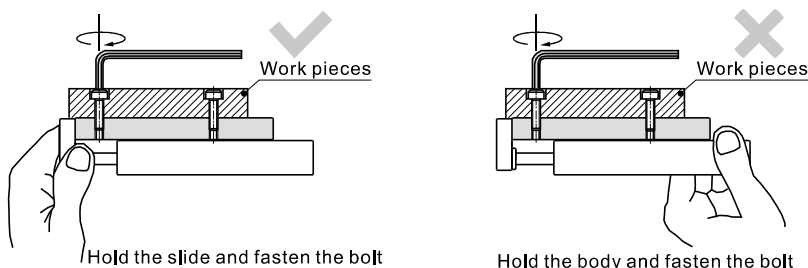


2.2) When mounting a work piece, tighten the bolts properly at a torque value within the limiting range. Use bolts at least 0.5mm shorter than maximum thread depth to prevent bolts from contacting the guide block. If the bolts are too long, they hit the guide block and cause damage.

Front Mounting				Top Mounting			
Model	Bolt used	Max. tightening torque (Nm)	Max. screw-in depth(mm)	Model	Bolt used	Max. tightening torque (Nm)	Max. screw-in depth(mm)
HLQ6	M3×0,4	0,9	5	HLQ6	M3×0,5	0,9	4,7
HLQ8	M4×0,7	2,1	6	HLQ8	M3×0,5	0,9	4,7
HLQ12	M5×0,8	4,4	8	HLQ12	M4×0,7	2,1	5,0
HLQ16	M6×1,0	7,4	10	HLQ16	M5×0,8	4,4	5,0
HLQ20	M6×1,0	7,4	13	HLQ20	M5×0,8	4,4	8,0
HLQ25	M8×1,25	18,0	15	HLQ25	M6×1,0	7,4	9,0

2.3) Since the table is supported by the linear guide, take care not to apply strong impact or large moment to the guide section.

2.4) Hold the slide when fastening work pieces to it with bolts, If the body is held while tightening bolts, excessive moment may damage guide section.

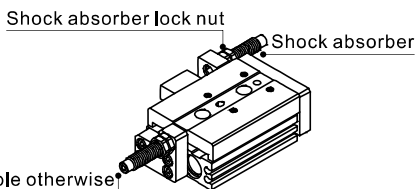


3. About shock absorber :

3.1) Shock absorbers are expendable. Promptly replace them when energy absorbing capacity decreases.

3.2) Never turn or adjust the screws on bottom of the shock absorber body. The screws are not for adjusting. Otherwise would cause oil leakage.

3.3) Follow the table for tightening torque of shock absorber to lock nuts.



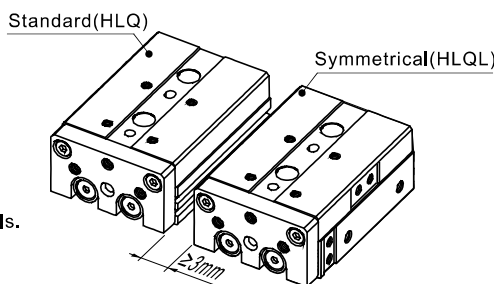
The screws are not adjustable otherwise would cause oil leakage.

Model	Shock absorber	Tightening torque
HLQ6	Without shock absorber	
HLQ8	ACA0806-1N	1.67(Nm)
HLQ12	ACA0806-1N	1.67(Nm)
HLQ16	ACA1007-1N	3.14(Nm)
HLQ20	ACA1210-1N	3.14(Nm)
HLQ25	ACA1412-1N	10.8(Nm)

4. How to mount sensor switch :

4.1) HLQ Series are all with magnet. The matching sensor switches are CMSH, DMSH, EMSH series.

4.2) Maintain a minimum spacing of at least 3mm if two compact cylinders are used side by side in order to avoid malfunction.



5. Make sure to connect the compact cylinder to speed controller at the meter-out side, and the speed of compact cylinder must below 500mm/s.

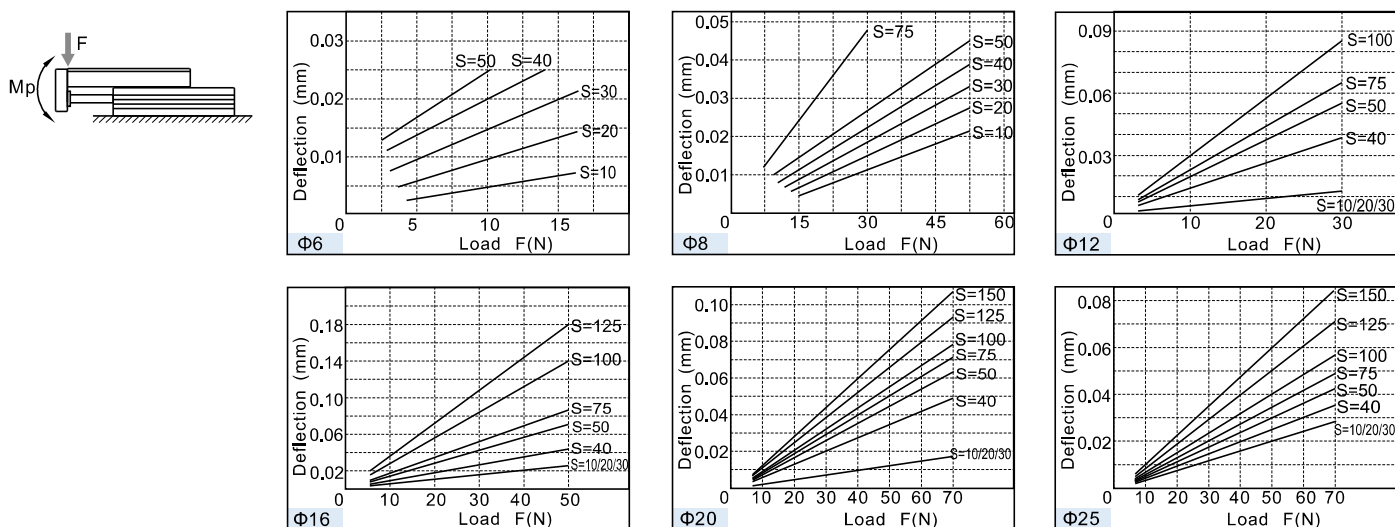
6. Don't apply a load beyond the range of the operation limits. Different load or torque will cause different deflection to table, please see below for details.

Slide table cylinder(ball bearing type)

HLQ、HLQL Series

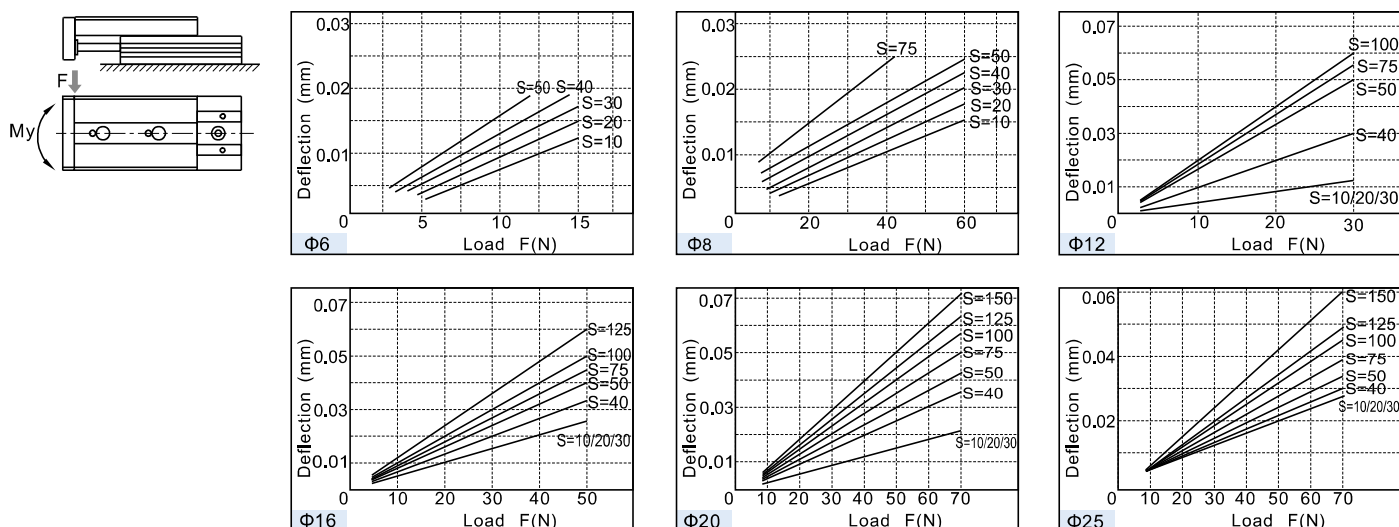
6.1) Table deflection due to pitch moment:

Table deflection (arrow) when a load acts upon the section marked with the arrow at the full stroke of the compact slide.



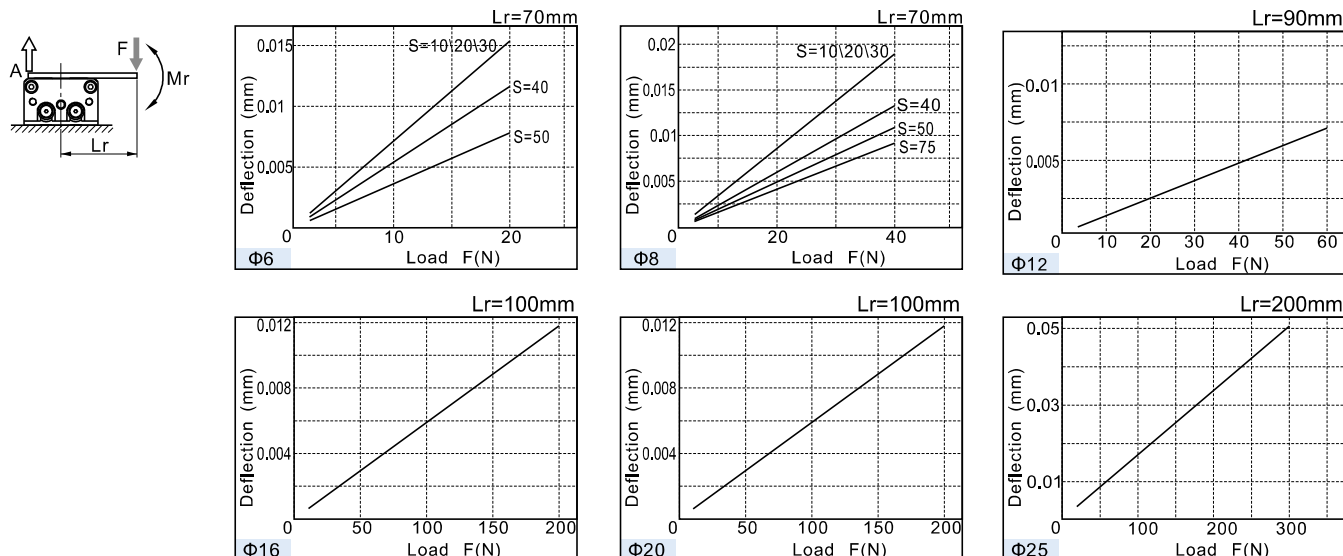
6.2) Table deflection due to yaw moment:

Table deflection (arrow) when a load acts upon the section marked with the arrow at the full stroke of the compact slide.



6.3) Table deflection due to roll moment:

Table deflects (A) when a load acts upon section F at the full stroke of the compact slide.

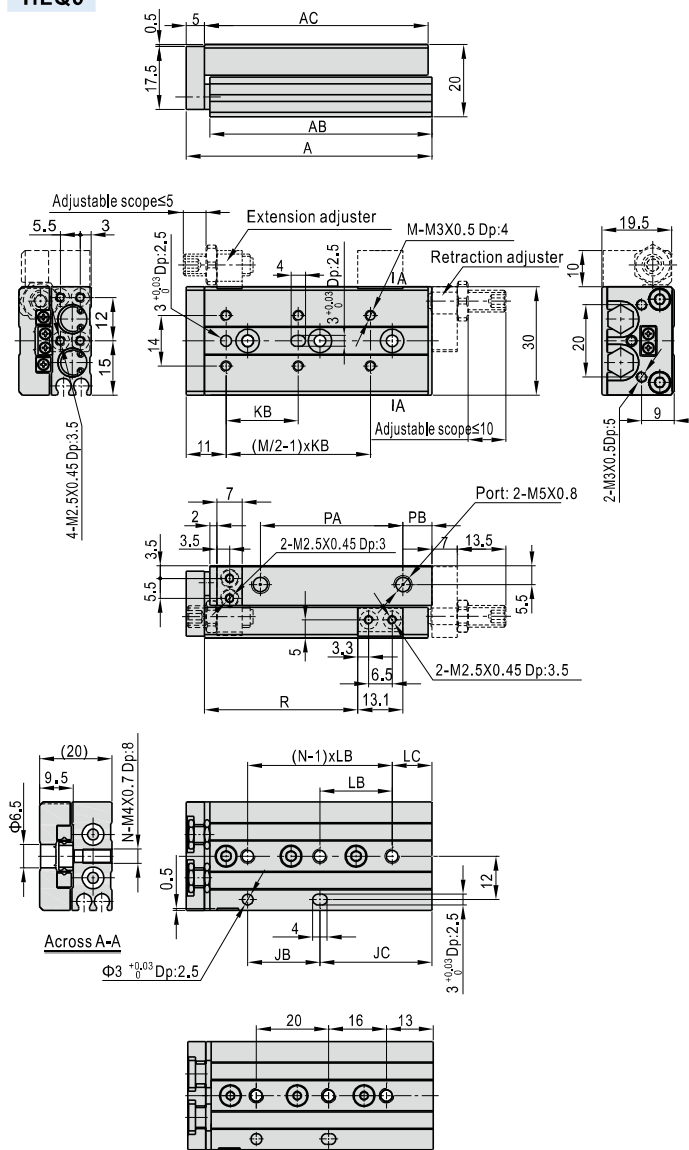


Slide table cylinder(ball bearing type)

HLQ、HLQL Series

Dimensions

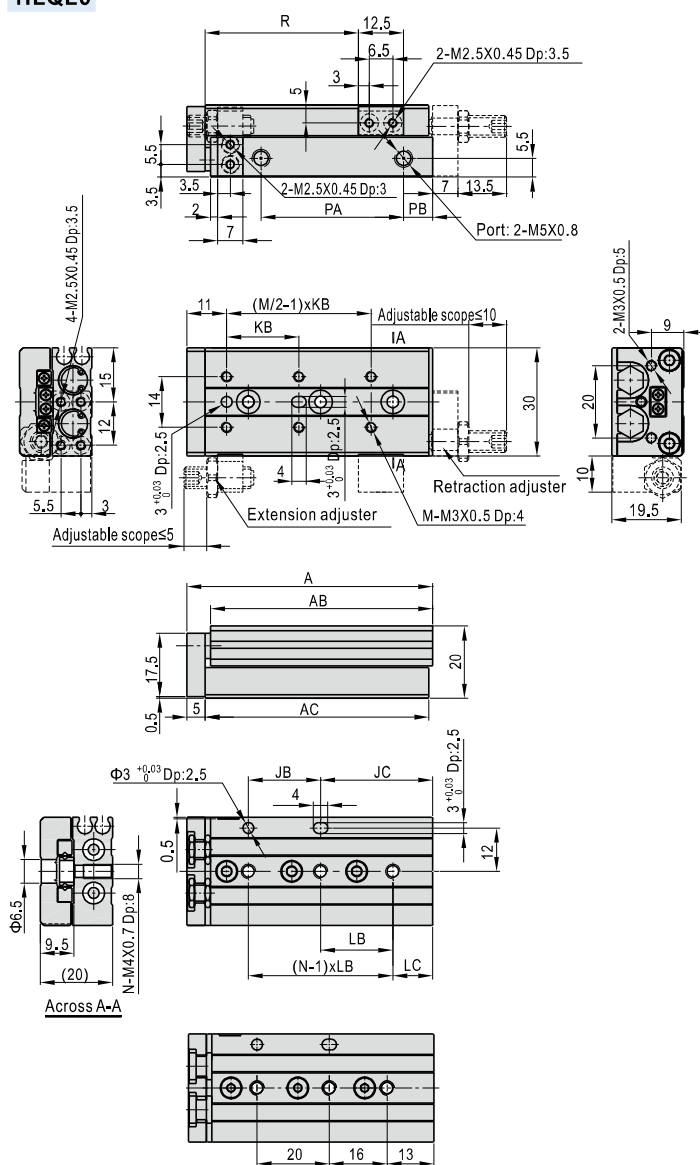
HLQ6



HLQ6×30

Stroke\Item	A	AB	AC	JB	JC	KB	LB	LC	M	N	PA	PB	R
10	48	41.5	42	16	13	22	23	6	4	2	16	9	21.5
20	58	51.5	52	26	13	25	26	13	4	2	26	9	31.5
30	68	61.5	62	20	29	21	-	-	6	3	36	9	41.5
40	86	79.5	80	28	39	26	28	11	6	3	47	16	51.5
50	96	89.5	90	28	49	27	28	21	6	3	64	9	61.5

HLQL6



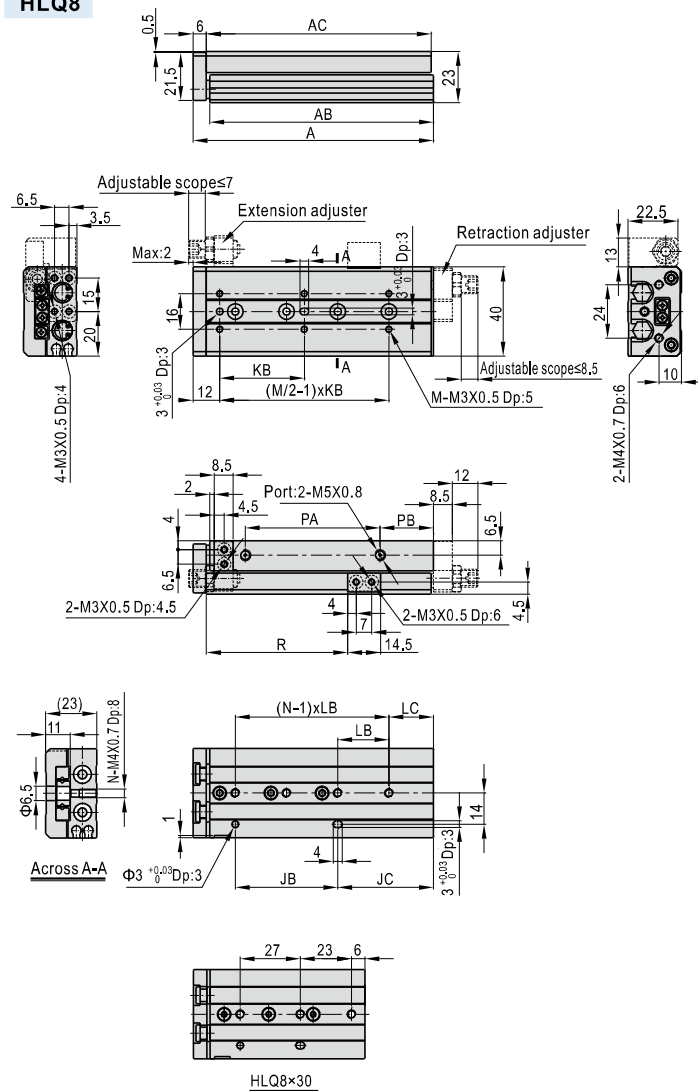
HLQL6×30

Stroke\Item	A	AB	AC	JB	JC	KB	LB	LC	M	N	PA	PB	R
10	48	41.5	42	16	13	22	23	6	4	2	16	9	21.5
20	58	51.5	52	26	13	25	26	13	4	2	26	9	31.5
30	68	61.5	62	20	29	21	-	-	6	3	36	9	41.5
40	86	79.5	80	28	39	26	28	11	6	3	47	16	51.5
50	96	89.5	90	28	49	27	28	21	6	3	64	9	61.5

Slide table cylinder(ball bearing type)

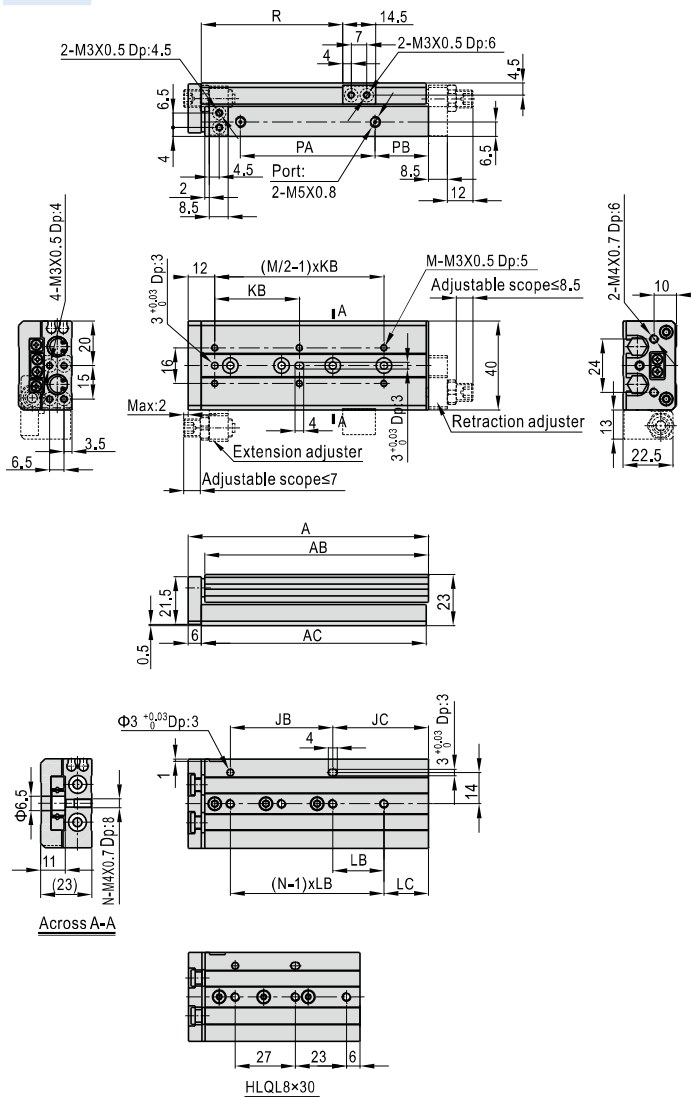
HLQ、HLQL Series

HLQ8



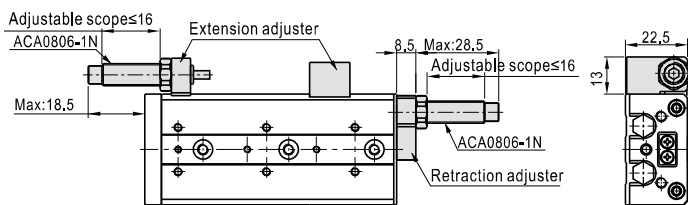
Stroke\Item	A	AB	AC	JB	JC	KB	LB	LC	M	N	PA	PB	R
10	53	45.5	46	19	13	25	25	7	4	2	17.5	10.5	23.5
20	63	55.5	56	28	14	25	28	14	4	2	28	10	33.5
30	77	69.5	70	27	29	26	-	-	6	3	42	10	43.5
40	91	83.5	84	31	39	32	31	8	6	3	54	12	53.5
50	116	108.5	109	58	37	46	29	8	6	4	79	12	63.5
75	144	136.5	137	60	63	50	30	33	6	4	109	10	88.5

HLQL8

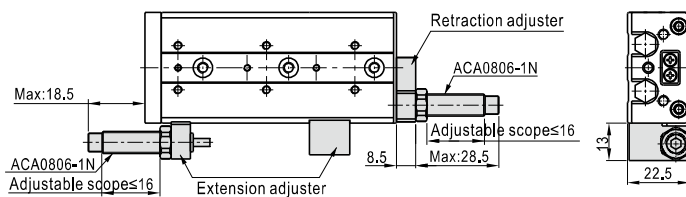


Stroke\Item	A	AB	AC	JB	JC	KB	LB	LC	M	N	PA	PB	R
10	53	45.5	46	19	13	25	25	7	4	2	17.5	10.5	23.5
20	63	55.5	56	28	14	25	28	14	4	2	28	10	33.5
30	77	69.5	70	27	29	26	-	-	6	3	42	10	43.5
40	91	83.5	84	31	39	32	31	8	6	3	54	12	53.5
50	116	108.5	109	58	37	46	29	8	6	4	79	12	63.5
75	144	136.5	137	60	63	50	30	33	6	4	109	10	88.5

HLQ8(With shock absorber)



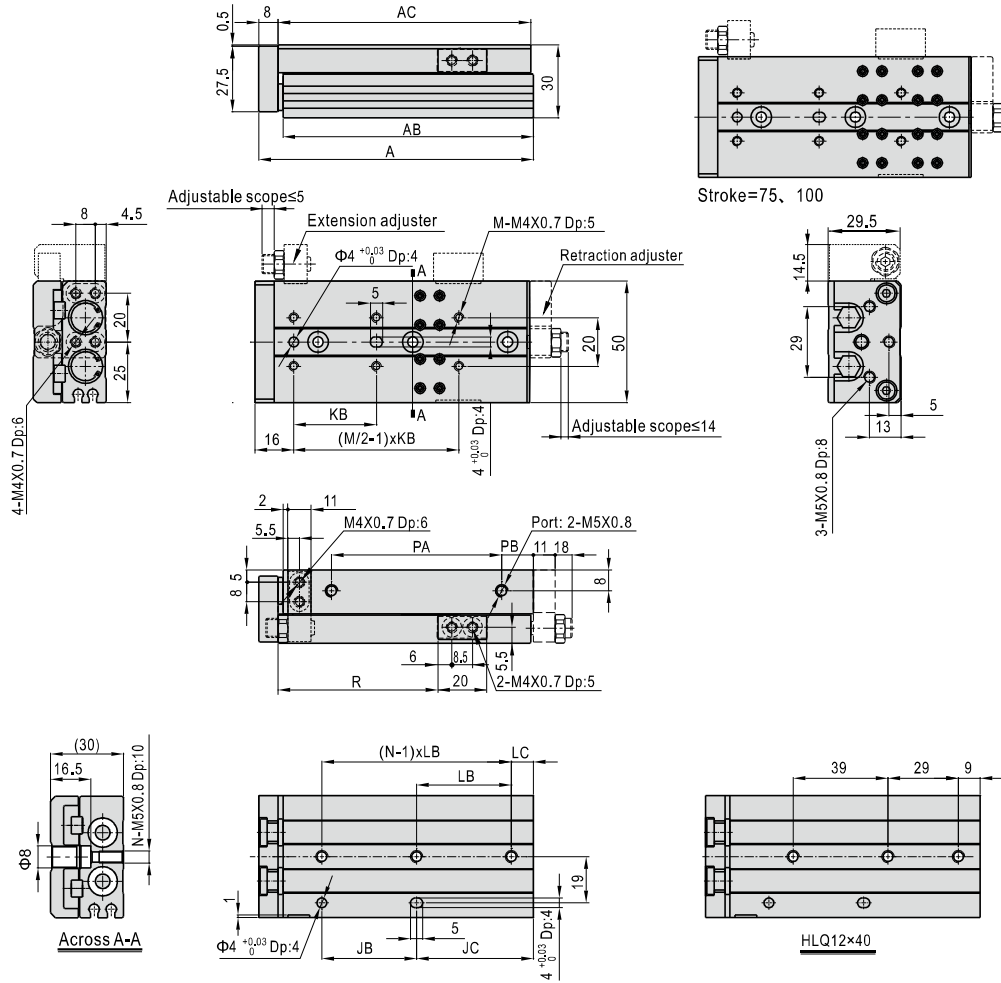
HLQL8(With shock absorber)



Slide table cylinder(ball bearing type)

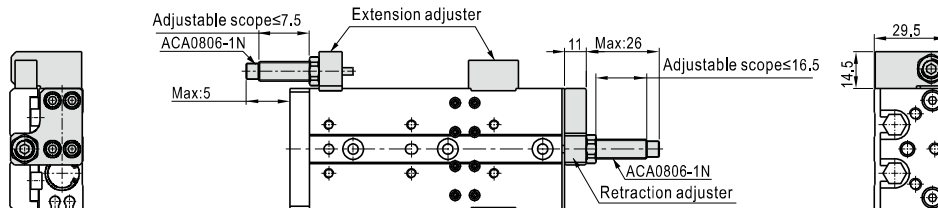
HLQ、HLQL Series

HLQ12



Stroke\Item	A	AB	AC	JB	JC	KB	LB	LC	M	N	PA	PB	R
10	76	66	67	32	18	28	32	18	4	2	32.5	13	35
20	76	66	67	32	18	28	32	18	4	2	32.5	13	45
30	86	76	77	40	20	38	40	20	4	2	42.5	13	55
40	103	93	94	39	38	34	-	-	6	3	59.5	13	65
50	113	103	104	39	48	34	39	9	6	3	69.5	13	75
75	157	147	148	72	59	36	36	23	8	4	113.5	13	99
100	182	172	173	72	84	36	36	12	10	5	134.5	17	124

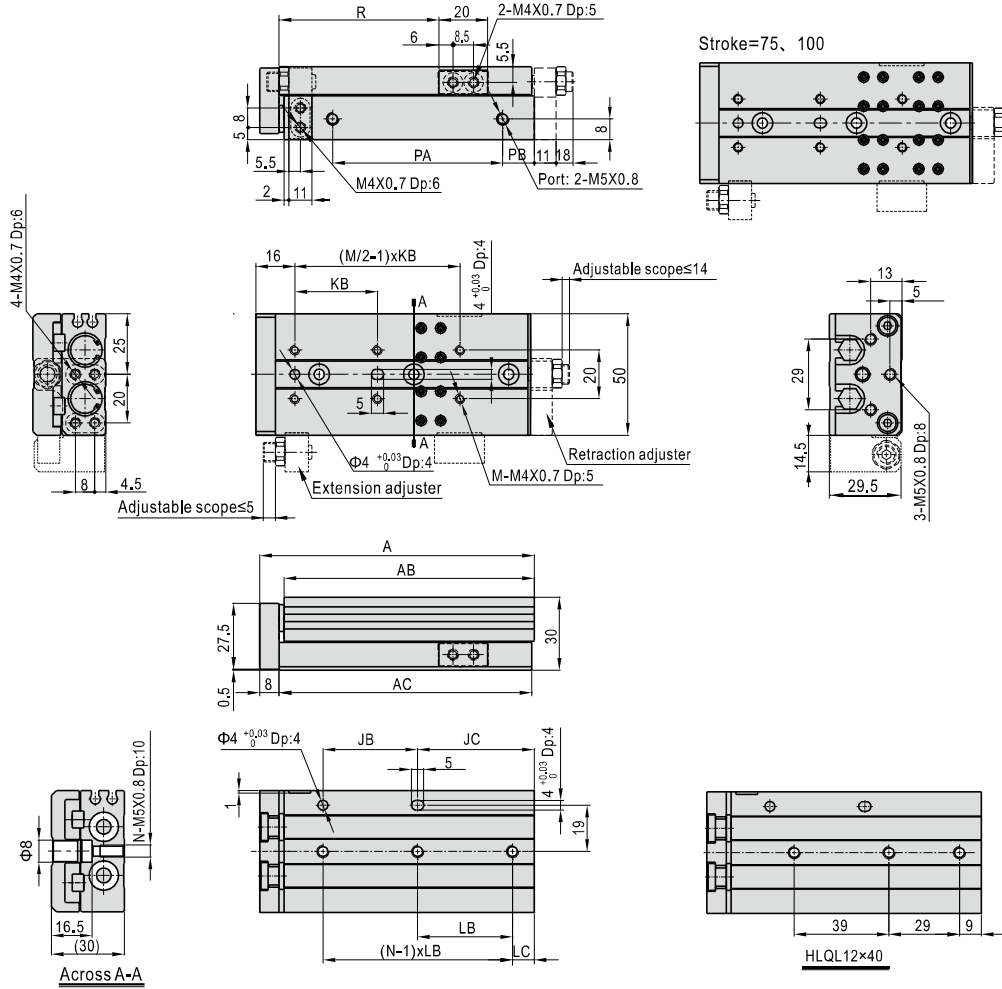
HLQ12(With shock absorber)



Slide table cylinder(ball bearing type)

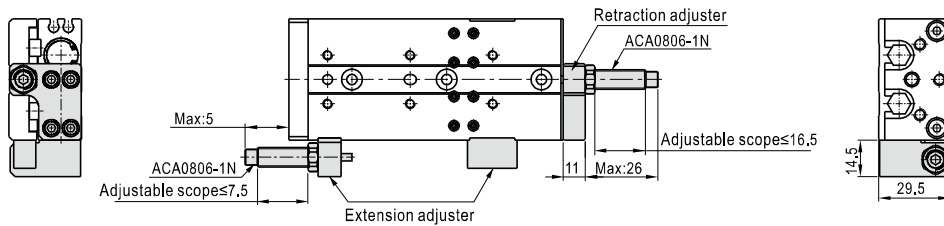
HLQ、HLQL Series

HLQL12



Stroke\Item	A	AB	AC	JB	JC	KB	LB	LC	M	N	PA	PB	R
10	76	66	67	32	18	28	32	18	4	2	32.5	13	35
20	76	66	67	32	18	28	32	18	4	2	32.5	13	45
30	86	76	77	40	20	38	40	20	4	2	42.5	13	55
40	103	93	94	39	38	34	-	-	6	3	59.5	13	65
50	113	103	104	39	48	34	39	9	6	3	69.5	13	75
75	157	147	148	72	59	36	36	23	8	4	113.5	13	99
100	182	172	173	72	84	36	36	12	10	5	134.5	17	124

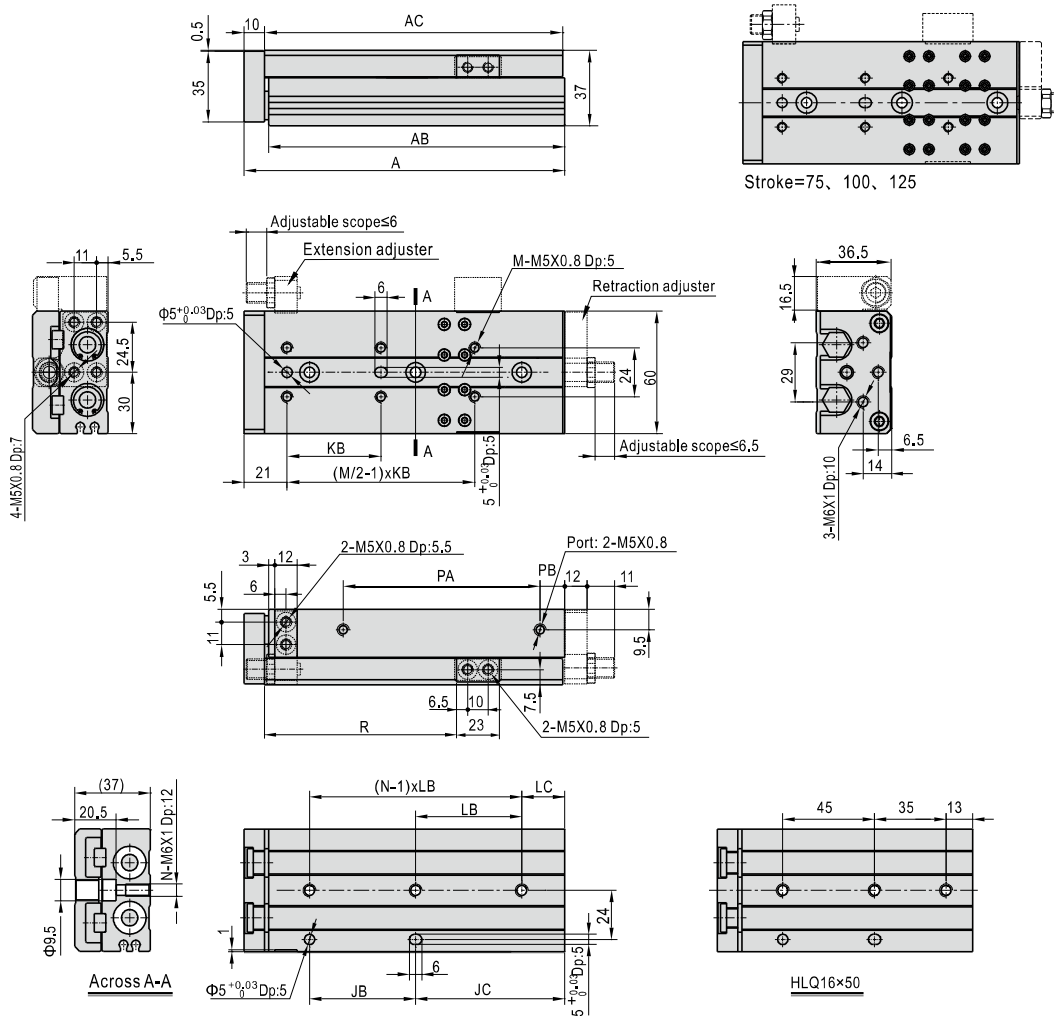
HLQL12(With shock absorber)



Slide table cylinder(ball bearing type)

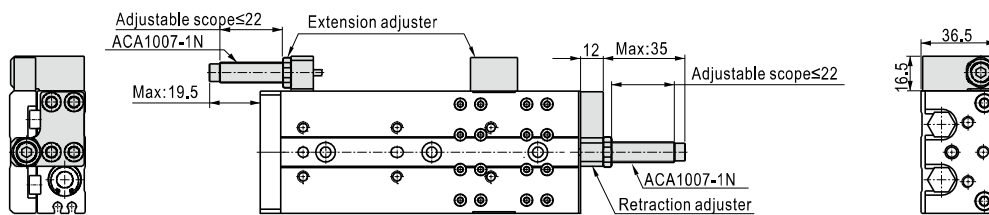
HLQ、HLQL Series

HLQ16



Stroke\Item	A	AB	AC	JB	JC	KB	LB	LC	M	N	PA	PB	R
10	89	77	78	39	18	38	39	18	4	2	40,5	12	28,5
20	89	77	78	39	18	38	39	18	4	2	40,5	12	38,5
30	99	87	88	48	19	48	48	19	4	2	50,5	12	48,5
40	109	97	98	58	19	58	58	19	4	2	60,5	12	58,5
50	125	113	114	45	48	40	-	-	6	3	70,5	18	68,5
75	157	145	146	52	73	46	52	21	6	3	108,5	12	93,5
100	200	188	189	88	80	44	44	36	8	4	151,5	12	118,5
125	225	213	214	88	105	44	44	17	10	5	176,5	12	143,5

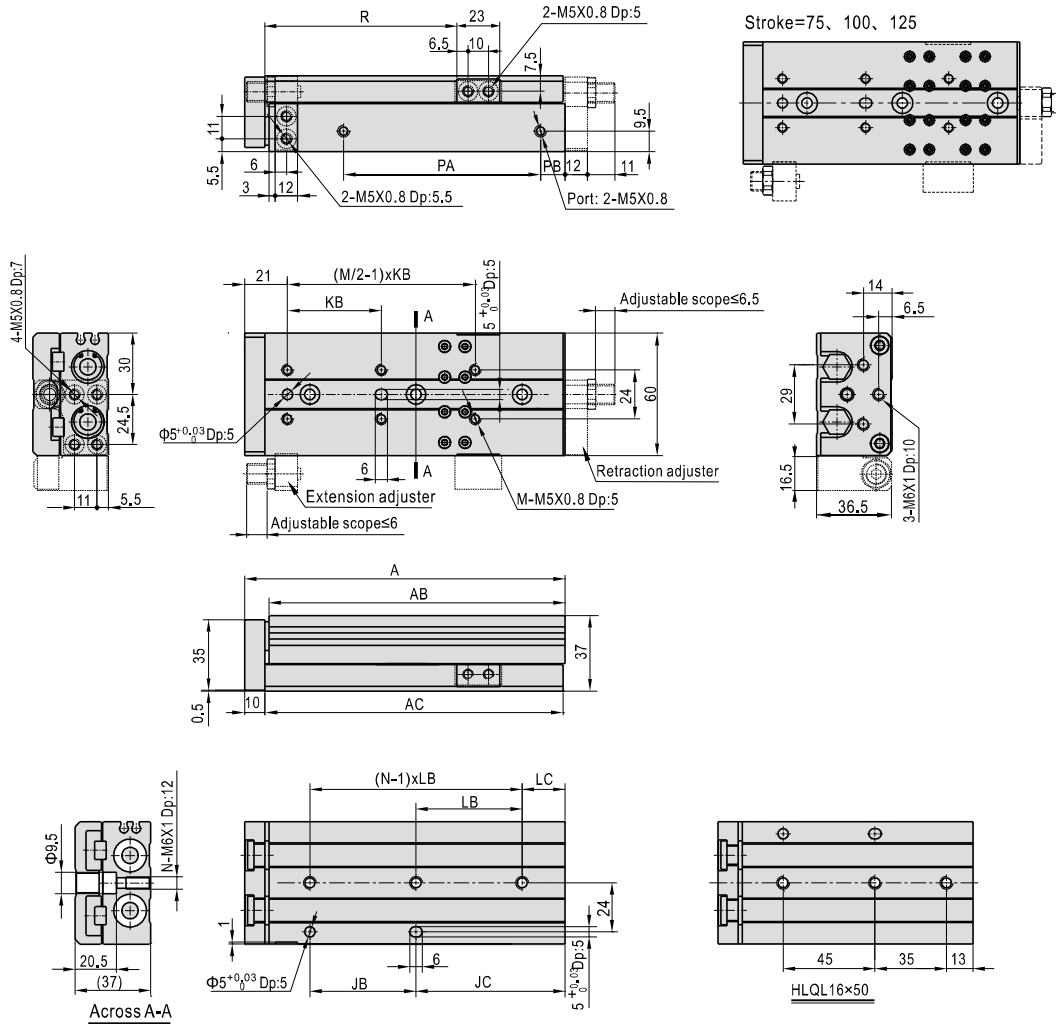
HLQ16(With shock absorber)



Slide table cylinder(ball bearing type)

HLQ、HLQL Series

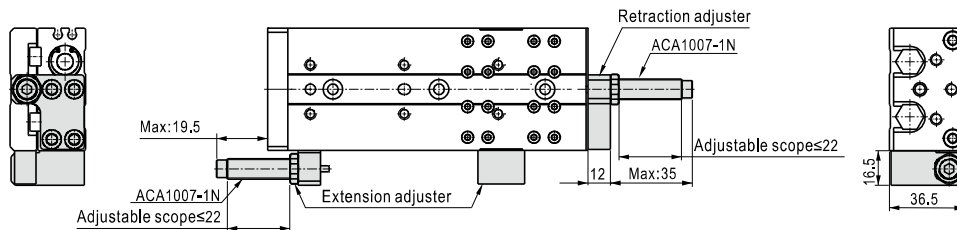
HLQL16



Stroke=75、100、125

Stroke\Item	A	AB	AC	JB	JC	KB	LB	LC	M	N	PA	PB	R
10	89	77	78	39	18	38	39	18	4	2	40.5	12	28.5
20	89	77	78	39	18	38	39	18	4	2	40.5	12	38.5
30	99	87	88	48	19	48	48	19	4	2	50.5	12	48.5
40	109	97	98	58	19	58	58	19	4	2	60.5	12	58.5
50	125	113	114	45	48	40	-	-	6	3	70.5	18	68.5
75	157	145	146	52	73	46	52	21	6	3	108.5	12	93.5
100	200	188	189	88	80	44	44	36	8	4	151.5	12	118.5
125	225	213	214	88	105	44	44	17	10	5	176.5	12	143.5

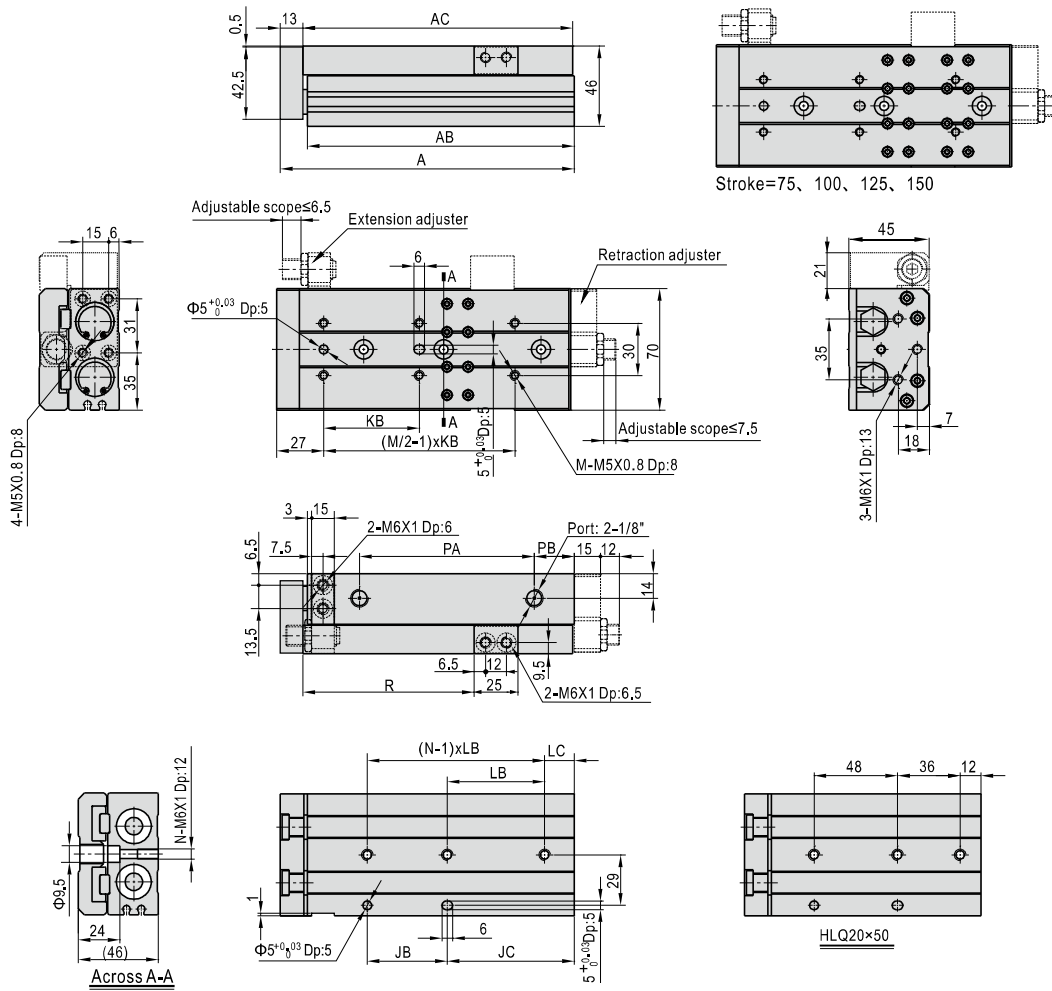
HLQL16(With shock absorber)



Slide table cylinder(ball bearing type)

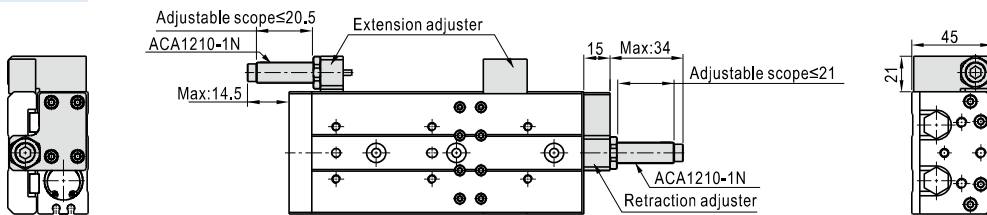
HLQ、HLQL Series

HLQ20



Stroke\Item	A	AB	AC	JB	JC	KB	LB	LC	M	N	PA	PB	R
10	108	92.5	94	50	18	45	46	22	4	2	46.5	16	32.5
20	108	92.5	94	50	18	40	46	22	4	2	46.5	16	42.5
30	108	92.5	94	50	18	48	46	22	4	2	46.5	16	52.5
40	118	102.5	104	56	22	58	56	22	4	2	56.5	16	62.5
50	136	120.5	122	48	48	42	-	-	6	3	72.5	18	72.5
75	169	153.5	155	56	73	55	56	17	6	3	98.5	25	97.5
100	226	210.5	212	112	74	50	56	18	8	4	155.5	25	122.5
125	254	238.5	240	118	96	55	59	37	8	4	183.5	25	147.5
150	282	266.5	268	124	118	62	62	56	8	4	211.5	25	172.5

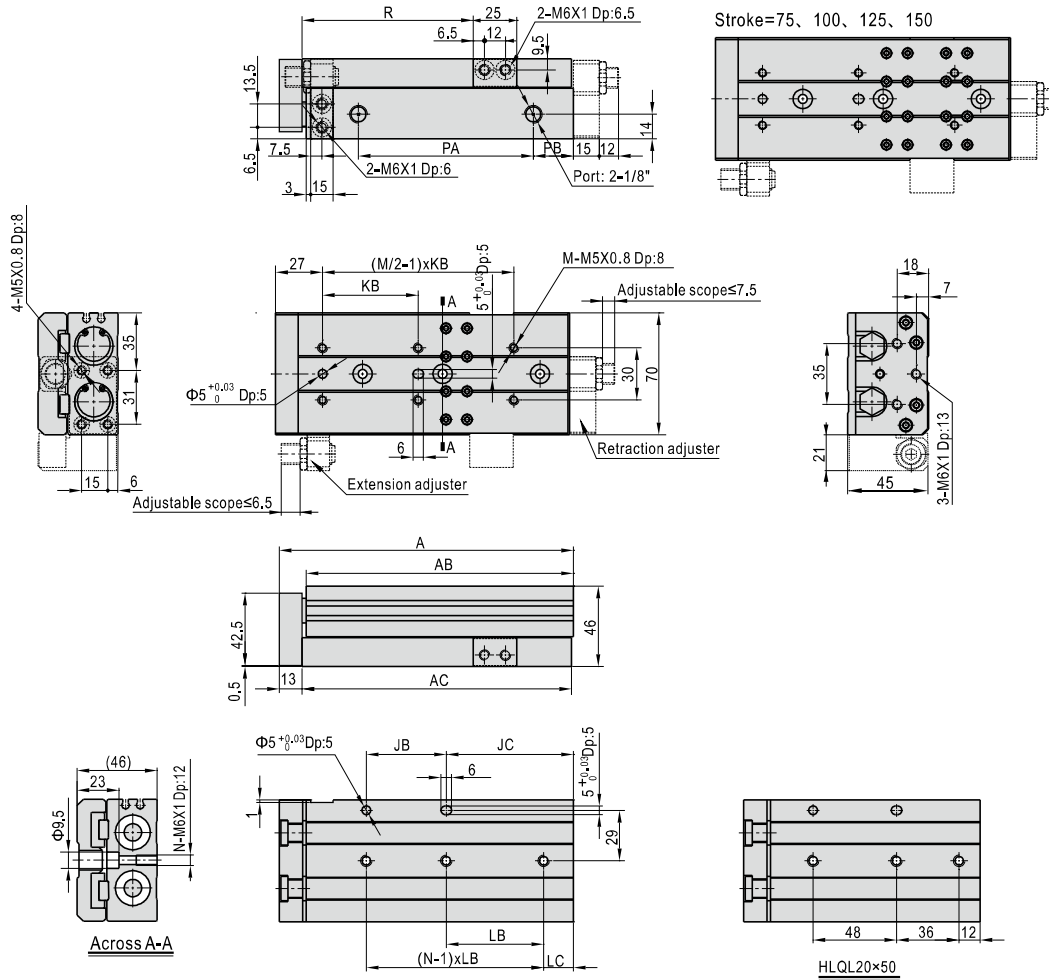
HLQ20(With shock absorber)



Slide table cylinder(ball bearing type)

HLQ、HLQL Series

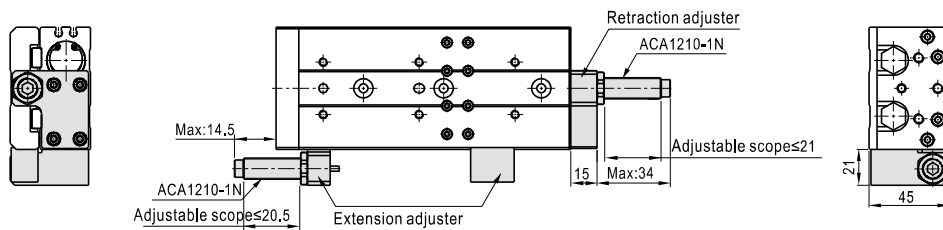
HLQL20



Stroke=75、100、125、150

Stroke\Item	A	AB	AC	JB	JC	KB	LB	LC	M	N	PA	PB	R
10	108	92.5	94	50	18	45	46	22	4	2	46.5	16	32.5
20	108	92.5	94	50	18	40	46	22	4	2	46.5	16	42.5
30	108	92.5	94	50	18	48	46	22	4	2	46.5	16	52.5
40	118	102.5	104	56	22	58	56	22	4	2	56.5	16	62.5
50	136	120.5	122	48	48	42	-	-	6	3	72.5	18	72.5
75	169	153.5	155	56	73	55	56	17	6	3	98.5	25	97.5
100	226	210.5	212	112	74	50	56	18	8	4	155.5	25	122.5
125	254	238.5	240	118	96	55	59	37	8	4	183.5	25	147.5
150	282	266.5	268	124	118	62	62	56	8	4	211.5	25	172.5

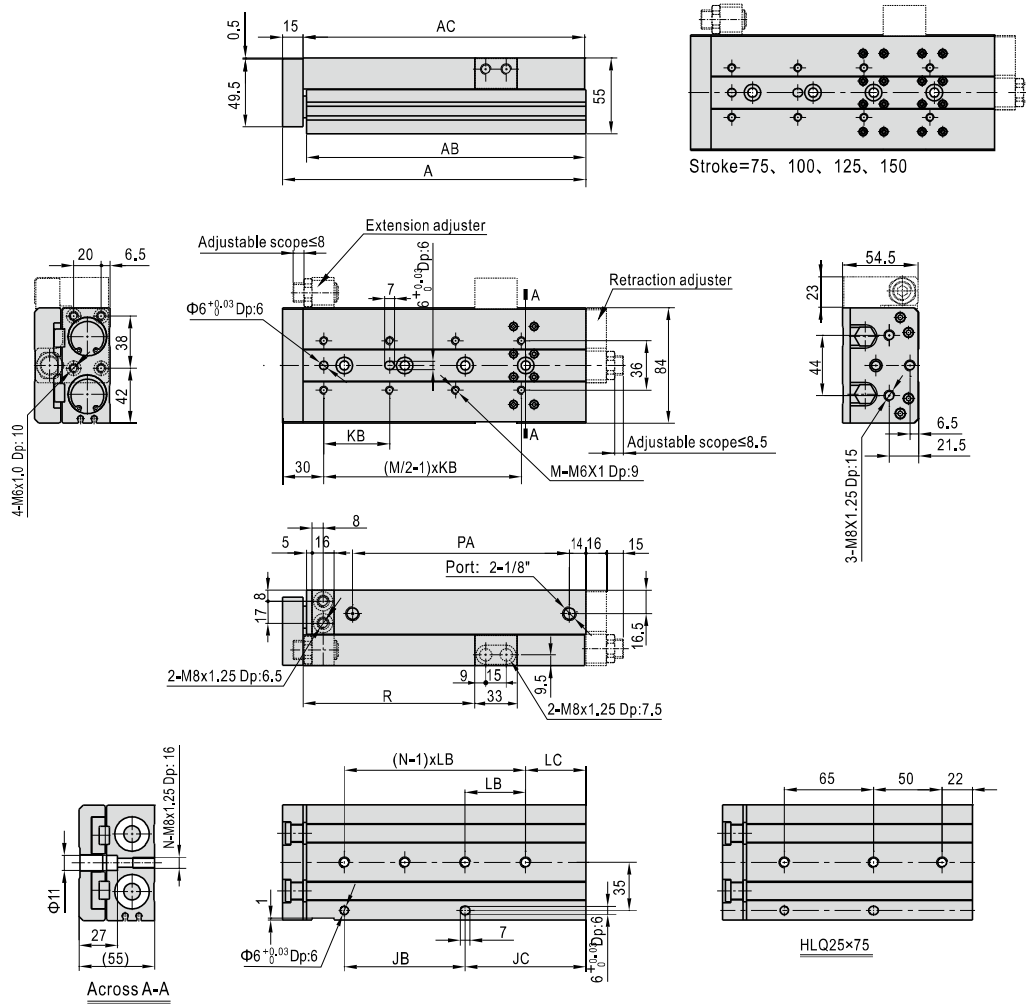
HLQL20(With shock absorber)



Slide table cylinder(ball bearing type)

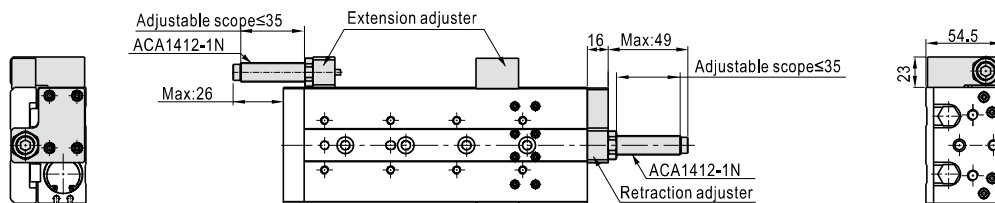
HLQ、HLQL Series

HLQ25



Stroke\Item	A	AB	AC	JB	JC	KB	LB	LC	M	N	PA	R
10	123	105.5	107	55	23	55	55	23	4	2	58	35
20	123	105.5	107	55	23	46	55	23	4	2	58	45
30	123	105.5	107	55	23	55	55	23	4	2	58	55
40	133	115.5	117	65	23	65	65	23	4	2	68	65
50	157	139.5	141	80	32	75	80	32	4	2	92	75
75	182	164.5	166	65	72	60	-	-	6	3	117	100
100	221	203.5	205	88	88	48	44	44	8	4	156	125
125	274	256.5	258	132	97	60	66	31	8	4	209	150
150	299	281.5	283	132	122	65	66	56	8	4	234	175

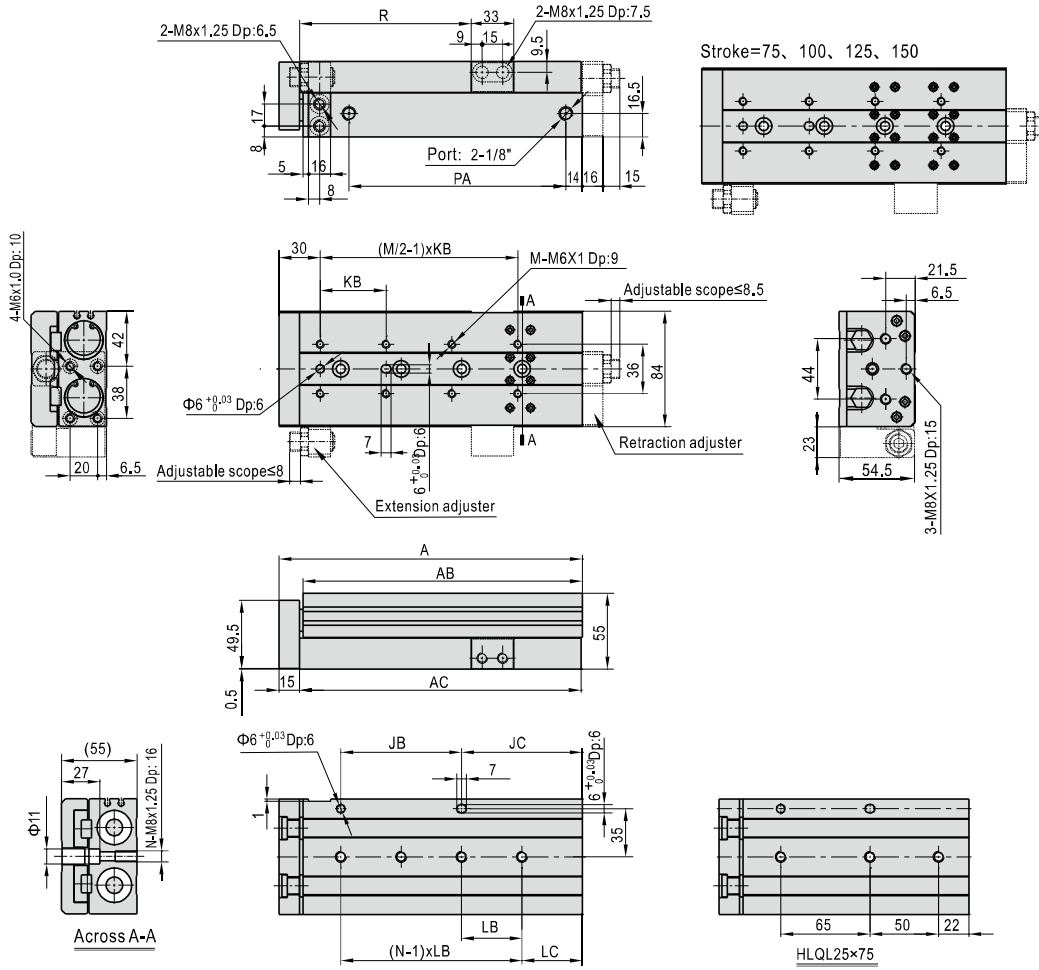
HLQ25(With shock absorber)



Slide table cylinder(ball bearing type)

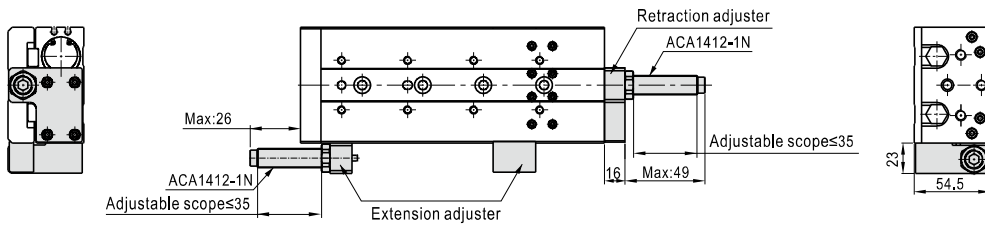
HLQ、HLQL Series

HLQL25



Stroke\Item	A	AB	AC	JB	JC	KB	LB	LC	M	N	PA	R
10	123	105.5	107	55	23	55	55	23	4	2	58	35
20	123	105.5	107	55	23	46	55	23	4	2	58	45
30	123	105.5	107	55	23	55	55	23	4	2	58	55
40	133	115.5	117	65	23	65	65	23	4	2	68	65
50	157	139.5	141	80	32	75	80	32	4	2	92	75
75	182	164.5	166	65	72	60	-	-	6	3	117	100
100	221	203.5	205	88	88	48	44	44	8	4	156	125
125	274	256.5	258	132	97	60	66	31	8	4	209	150
150	299	281.5	283	132	122	65	66	56	8	4	234	175

HLQL25(With shock absorber)



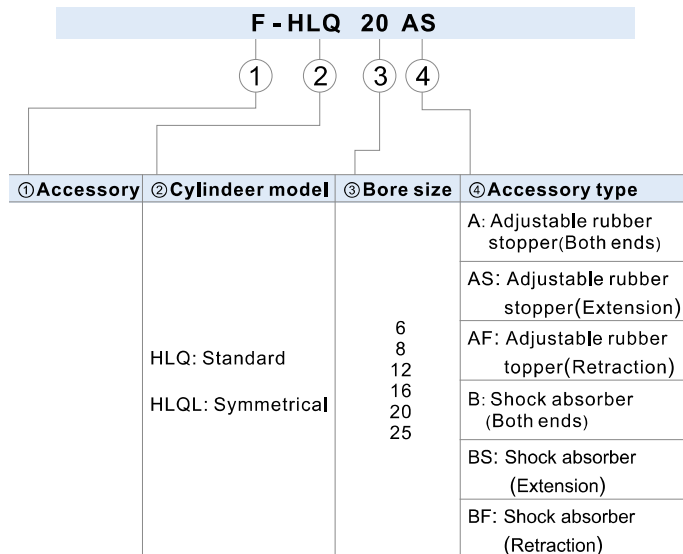
Slide table cylinder(ball bearing type)

HLQ、HLQL Series—Accessories

Accessory selection

Accessories\Bore size		6	8	12	
Standard (HLQ)	Both ends	A(Adjustable rubber stopper)	F-HLQ6A	F-HLQ8A	F-HLQ12A
		B(Shock absorber)	×	F-HLQ8B	F-HLQ12B
	Extension	AS(Adjustable rubber stopper)	F-HLQ6AS	F-HLQ8AS	F-HLQ12AS
		BS(Shock absorber)	×	F-HLQ8BS	F-HLQ12BS
	Retraction	AF(Adjustable rubber stopper)	F-HLQ6AF	F-HLQ8AF	F-HLQ12AF
		BF(Shock absorber)	×	F-HLQ8BF	F-HLQ12BF
Accessories\Bore size		16	20	25	
Standard (HLQ)	Both ends	A(Adjustable rubber stopper)	F-HLQ16A	F-HLQ20A	F-HLQ25A
		B(Shock absorber)	F-HLQ16B	F-HLQ20B	F-HLQ25B
	Extension	AS(Adjustable rubber stopper)	F-HLQ16AS	F-HLQ20AS	F-HLQ25AS
		BS(Shock absorber)	F-HLQ16BS	F-HLQ20BS	F-HLQ25BS
	Retraction	AF(Adjustable rubber stopper)	F-HLQ16AF	F-HLQ20AF	F-HLQ25AF
		BF(Shock absorber)	F-HLQ16BF	F-HLQ20BF	F-HLQ25BF
Accessories\Bore size		6	8	12	
Symmetrical (HLQL)	Both ends	A(Adjustable rubber stopper)	F-HLQL6A	F-HLQL8A	F-HLQL12A
		B(Shock absorber)	×	F-HLQL8B	F-HLQL12B
	Extension	AS(Adjustable rubber stopper)	F-HLQL6AS	F-HLQL8AS	F-HLQL12AS
		BS(Shock absorber)	×	F-HLQL8BS	F-HLQL12BS
	Retraction	AF(Adjustable rubber stopper)	F-HLQL6AF	F-HLQL8AF	F-HLQL12AF
		BF(Shock absorber)	×	F-HLQL8BF	F-HLQL12BF
Accessories\Bore size		16	20	25	
Symmetrical (HLQL)	Both ends	A(Adjustable rubber stopper)	F-HLQL16A	F-HLQL20A	F-HLQL25A
		B(Shock absorber)	F-HLQL16B	F-HLQL20B	F-HLQL25B
	Extension	AS(Adjustable rubber stopper)	F-HLQL16AS	F-HLQL20AS	F-HLQL25AS
		BS(Shock absorber)	F-HLQL16BS	F-HLQL20BS	F-HLQL25BS
	Retraction	AF(Adjustable rubber stopper)	F-HLQL16AF	F-HLQL20AF	F-HLQL25AF
		BF(Shock absorber)	F-HLQL16BF	F-HLQL20BF	F-HLQL25BF

Note): A=AS+AF; B=BS+BF.



Dimensions

AS: Adjustable rubber stopper(Extension)

Body Mounting

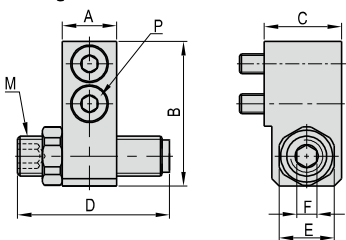
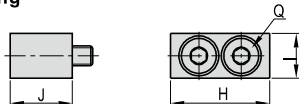


Table Mounting



Bore size\Item	Adjusting stroke range	A	B	C	D	E	F
6	5	7	19	10.5	16.5	8	3
8	5	8.5	21.5	14	21.5	11	4
12	5	11	29	15.5	31.5	11	4
16	5	12	36	17.5	24	14	5
20	5	15	44.5	22	28	17	6
25	5	16	53.5	24	32	19	6

Bore size\Item	M	P	H	I	J	Q
6	M6×1.0	M2.5Length:10	12.5	6.5	10.5	M2.5Length:10
8	M8×1.0	M3Length:14	14.5	8	12	M3Length:14
12	M8×1.0	M4Length:16	20	9	13.5	M4Length:12
16	M10×1.0	M5Length:16	23	10.5	17	M5Length:16
20	M12×1.0	M6Length:20	25	12.5	21	M6Length:20
25	M14×1.5	M8Length:20	33	16.5	23	M8Length:20

BS: Shock absorber(Extension)

Body Mounting

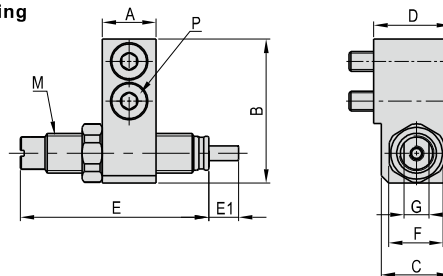
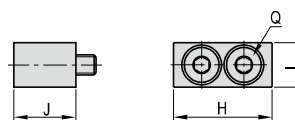


Table Mounting

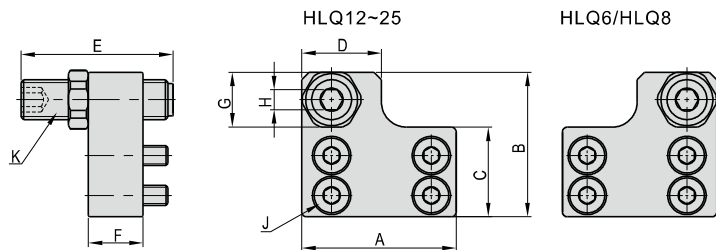


Bore size\Item	A	B	C	D	E	E1	F	G	M	P	H	I	J	Q
8	8.5	21.5	12.5	14	40	6	11	7	M8×1.0	M3Length:14	14.5	8	12	M3Length:14
12	11	29	14	15.5	40	6	11	7	M8×1.0	M4Length:16	20	9	13.5	M4Length:12
16	12	36	16	17.5	49	7	14	9	M10×1.0	M5Length:16	23	10.5	17	M5Length:16
20	15	44.5	20	22	53.5	10	17	11	M12×1.0	M6Length:20	25	12.5	21	M6Length:20
25	16	53.5	22	24	68.5	12	19	12	M14×1.5	M8Length:20	33	16.5	23	M8Length:20

Slide table cylinder(ball bearing type)

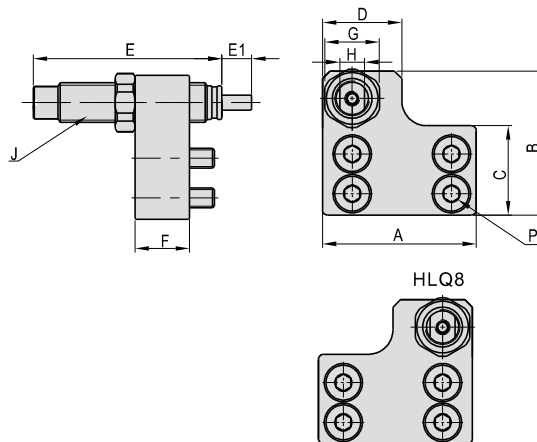
HLQ、HLQL Series—Accessories

AF: Adjustable rubber stopper(Retraction, for standard)



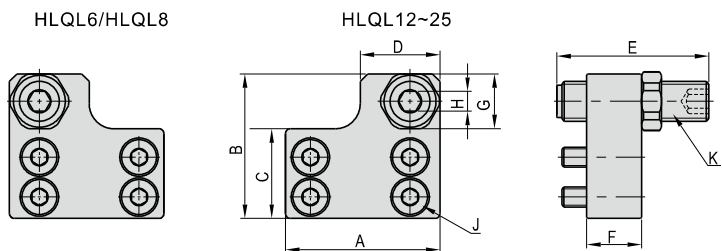
Bore size\Item	Adjusting stroke range	A	B	C	D	E	F	G	H	J	K
6	5	18	19	11	8	21.5	7	8	3	M2.5Length:6	M6×1.0
8	5	24	22	13	14	21.5	8.5	11	4	M3Length:8	M8×1.0
12	5	31	29	18	16	31.5	11	11	4	M4Length:12	M8×1.0
16	5	37	36	21.5	18	24	12	14	5	M5Length:12	M10×1.0
20	5	45.5	44	25.5	23	28	15	17	6	M5Length:16	M12×1.0
25	5	54	53.5	31.6	28	32	16	19	6	M6Length:18	M14×1.5

BF: Shock absorber(Retraction, for standard)



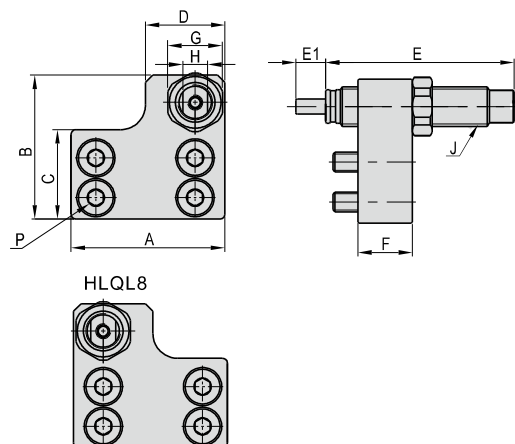
Bore size\Item	A	B	C	D	E	E1	F	G	H	J	P
8	24	22	13	14	40	6	8.5	11	7	M8×1.0	M3Length:8
12	31	29	18	16	40	6	11	11	7	M8×1.0	M4Length:12
16	37	36	21.5	18	49	7	12	14	9	M10×1.0	M5Length:12
20	45.5	44	25.5	23	53.5	10	15	17	11	M12×1.0	M5Length:16
25	54	53.5	31.6	28	68.5	12	16	19	12	M14×1.5	M6Length:18

AF: Adjustable rubber stopper(Retraction, for symmetrical)



Bore size\Item	Adjusting stroke range	A	B	C	D	E	F	G	H	J	K
6	5	18	19	11	8	21.5	7	8	3	M2.5Length:6	M6×1.0
8	5	24	22	13	14	21.5	8.5	11	4	M3Length:8	M8×1.0
12	5	31	29	18	16	31.5	11	11	4	M4Length:12	M8×1.0
16	5	37	36	21.5	18	24	12	14	5	M5Length:12	M10×1.0
20	5	45.5	44	25.5	23	28	15	17	6	M5Length:16	M12×1.0
25	5	54	53.5	31.6	28	32	16	19	6	M6Length:18	M14×1.5

BF: Shock absorber(Retraction, for symmetrical)



Bore size\Item	A	B	C	D	E	E1	F	G	H	J	P
8	24	22	13	14	40	6	8.5	11	7	M8×1.0	M3Length:8
12	31	29	18	16	40	6	11	11	7	M8×1.0	M4Length:12
16	37	36	21.5	18	49	7	12	14	9	M10×1.0	M5Length:12
20	45.5	44	25.5	23	53.5	10	15	17	11	M12×1.0	M5Length:16
25	54	53.5	31.6	28	68.5	12	16	19	12	M14×1.5	M6Length:18



Slide table cylinder(Cross roller type)—HLS Series

Compendium of HLS\HLSL Series

Multi-adjuster option

Floating joint design
Piston rod needn't endure additional torque

Mounting workpiece from 2 directions

Cross roller type
Cross roller type incorporating the cylinder, it achieves high precision, high rigidity, high load, excellent linearity and non-rotate tolerance.

Mounting cylinder from 3 directions
Through hole for body mounting. Body mounting holes provide 3 mounting positions. Pin holes for positioning.

With magnetic switch slots
There are magnetic switch slots side of the cylinder body convenient to install inducting switch.

Two models (HLS/HLSL) are available

Dual rod structure
Dual rod doubles the output thrust

Standard : HLS

Symmetrical : HLSL

Six bore size are available
Bore size: 6, 8, 12, 16, 20, 25

Criteria for selection: Cylinder thrust

Unit : Newton(N)

Bore size	Rod size	Acting type	Pressure area(mm ²)	Operating pressure(MPa)						
				0.2	0.3	0.4	0.5	0.6	0.7	
6	3	Double acting	Push-side	42	8	13	17	21	25	29
			Pull-side	57	11	17	23	29	34	40
8	4	Double acting	Push-side	75	15	23	30	38	45	53
			Pull-side	101	20	30	40	51	61	71
12	6	Double acting	Push-side	170	34	51	68	85	102	119
			Pull-side	226	45	68	90	113	136	158
16	8	Double acting	Push-side	302	60	91	121	151	181	211
			Pull-side	402	80	121	161	201	241	281
20	10	Double acting	Push-side	471	94	141	188	236	283	330
			Pull-side	628	126	188	251	314	377	440
25	12	Double acting	Push-side	756	151	227	302	378	454	529
			Pull-side	982	186	295	393	491	589	687

Installation and application



1. Dirty substances in the pipe must be eliminated before cylinder is connected with pipeline to prevent the entrance of impurities into the cylinder.
2. The medium used by cylinder should be filtered to 40μm or below .
3. Anti-freezing measure shall be adopted under low temperature environment to prevent moisture freezing.
4. If the cylinder is dismantled and stored for a long time, pay attention to conduct anti-rust treatment to the surface. Anti-dust caps shall be added in air inlet and outlet ports.



Slide table cylinder(Cross roller type)

HLS、HLSL Series



Specification

Bore size(mm)	6	8	12	16	20	25
Acting type	Double acting					
Fluid	Air(to be filtered by 40μm filter element)					
Operating pressure	0.2~0.7MPa(29~100psi)(2.0~7.0bar)			0.15~0.7MPa(22~100psi)(1.5~7.0bar)		
Proof pressure	1.2MPa(175psi)(12.0bar)					
Temperature °C	-20~70					
Speed range mm/s	50~500					
Stroke tolerance	Stroke≤100 $+1.0$ ₀			Stroke>100 $+1.5$ ₀		
Cushion type	Bumper(Both ends)、Shock absorber					
Sensor switches	CMSH、DMSH、EMSH					
Port size [Note1]	M5×0.8				1/8"	

[Note1] PT thread, G thread, NPT thread are available.
Refer to P362 for detail of sensor switch.

Symbol



Stroke

Bore size (mm)	Standard stroke (mm)										Max.std stroke	
6	10	20	30	40	50						50	
8	10	20	30	40	50	75					75	
12	10	20	30	40	50	75	100				100	
16	10	20	30	40	50	75	100	125			125	
20	10	20	30	40	50	75	100	125	150			150
25	10	20	30	40	50	75	100	125	150			150

[Note1] Consult us for non-standard stroke.

Ordering code

HLS 20 × 30 S AS □

① ② ③ ④ ⑤ ⑥

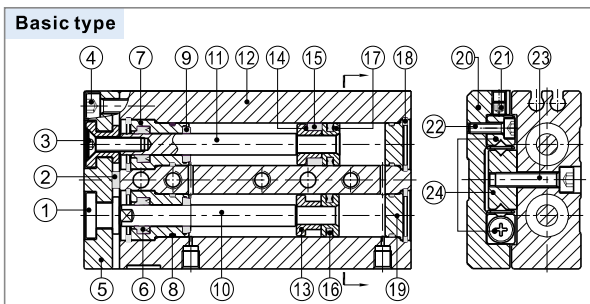
① Model	② Bore Size	③ Stroke	④ Magnet	⑤ Adjuster option [Note1]		⑥ Thread type [Note2]
HLS: Slide table cylinder (Double acting type) (Cross roller type) HLSL: Symmetrical slide table cylinder (Double acting type) (Cross roller type)	6 8 12 16 20 25	Refer to stroke table for details	S: With magnet	Blank: Without adjuster(Basic type) Extension Retraction 		Blank: PT G : G T : NPT
				A: Adjustable rubber stopper(Both ends) Rubber stopper Extension Retraction 	B: Shock absorber(Both ends) Shock absorber Extension Retraction 	
				AS: Adjustable rubber stopper(Extension) Rubber stopper Extension Retraction 	BS: Shock absorber(Extension) Shock absorber Extension Retraction 	
				AF: Adjustable rubber stopper(Retrac-tion) Rubber stopper Extension Retraction 	BF: Shock absorber(Retrac-tion) Shock absorber Extension Retraction 	

[Note1] B type, BS type, BF type are unavailable for bore size of Φ6. [Note2]When the thread is standard, the code is blank.

Slide table cylinder(Cross roller type)

HLS、HLSL Series

Inner structure and material of major parts



Item	Material	Item	Material
1 Floating joint	Carbon steel	13 Magnet holder	Brass
2 Bumper	TPU	14 Magnet washer	NBR
3 Screw	Carbon steel	15 Magnet	Sintered metal (Neodymium-iron-boron)
4 Screw	Carbon steel		
5 Fixing plate	Aluminum alloy	16 Piston seal	NBR
6 Rod seal	NBR	17 Piston	Brass
7 Front cover	Aluminum alloy	18 C clip	Spring steel
8 Bumper	TPU	19 Back cover	Aluminum alloy
9 Bumper	TPU	20 Slide table	Aluminum alloy
10 Piston rod A	Carbon steel	21 Nut	Carbon steel
11 Piston rod B	Stainless steel	22 Screw	Carbon steel
12 Body	Aluminum alloy	23 Screw	Carbon steel
		24 Slide guidecombination	subassembly

Model Selection Method

Please select compact cylinder's type according to following procedure, and cross reference with data sheets.

A) Operating conditions(According to mounting position and work form)

1. Model used(Bore size, Stroke)
2. Type of cushion(Bumper, Shock absorber)
3. Mounting position of work(Top, front)
4. Mounting direction(Axial, Vertical)
5. Average speed Va(mm/s)
6. Applied load W(N)
7. Overhang L1, L2, L3(mm)

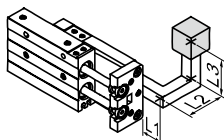
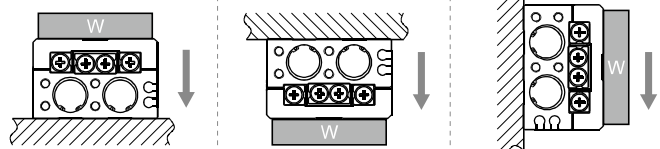


Fig. 1

Explain : L1 is the distance of load's center beyond the end plank's plane.
If load's center is not beyond the end plank's plane, L1 is negative.

Fig. 1 : Applied load



B) Kinetic energy check

1. Calculate kinetic energy of load E(J)

$$E = \frac{1}{2} \times \frac{W}{g} \times \left(\frac{1.4 \times Va}{1000} \right)^2$$
2. Calculate allowable kinetic energy Ea(J)

$$Ea = K \times E_{max}$$

K: Mounting work coefficient (Fig 2)
E_{max}: Maximum allowable kinetic energy (Table 1)
3. Check that kinetic energy of load doesn't exceed allowable kinetic energy: E ≤ Ea

C) Load check

1. Calculate allowable applied load Wa (N)

$$Wa = K \times \beta \times W_{max}$$

K: Mounting work coefficient (Fig 2)
W_{max}: Maximum allowable applied load (Table 1)
β: Applied load coefficient (Fig 3)
2. Check that load(W) doesn't exceed allowable applied load(Wa): W ≤ Wa

Fig 2 : Mounting work coefficient (K)

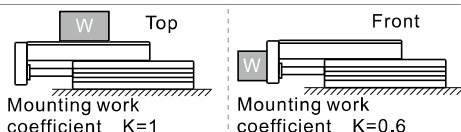
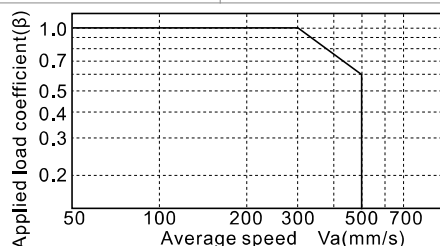


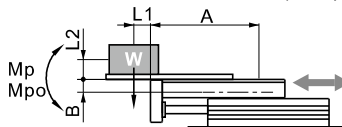
Fig 3 : Applied load coefficient (β)



D) Moment check

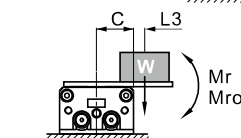
Horizontal

1. Calculate actual moment: Mp, Mpo, My, Myo, Mr, Mro (Nm)



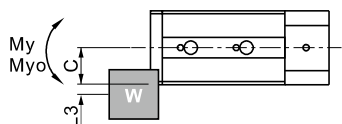
Dynamic moment : $Mp = W \times (L1 + A) / 1000$

Static moment : $Mpo = \frac{W \times (L1 + A)}{1000} + \frac{W \times a \times (L2 + B)}{1000 \times g}$



Dynamic moment : $Mr = W \times (C + L3) / 1000$

Static moment : $Mro = (W \times a \times (C + L3)) / 1000g$



Dynamic moment : $My = 0$

Static moment : $Myo = (W \times a \times (C + L3)) / 1000g$

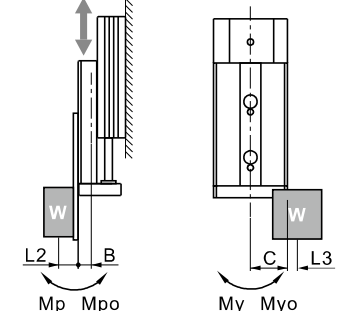
2. Check

Dynamic moment : $\frac{Mp}{Mp_{max}} + \frac{My}{My_{max}} + \frac{Mr}{Mr_{max}} \leq 1$

Static moment : $\frac{Mpo}{Mpo_{max}} + \frac{Myo}{Myo_{max}} + \frac{Mro}{Mro_{max}} \leq 1$

Vertical

1. Calculate actual moment: Mp, Mpo, My, Myo(Nm)



Dynamic moment : $Mp = W \times (L2 + B) / 1000$

Static moment : $Mpo = \frac{W \times (L2 + B)}{1000} + \frac{W \times a \times (L2 + B)}{1000 \times g}$

Dynamic moment : $My = W \times (C + L3) / 1000$

Static moment : $Myo = \frac{W \times a \times (C + L3)}{1000g} + \frac{W \times (C + L3)}{1000}$

2. Check

Dynamic moment : $\frac{Mp}{Mp_{max}} + \frac{My}{My_{max}} \leq 1$

Static moment : $\frac{Mpo}{Mpo_{max}} + \frac{Myo}{Myo_{max}} \leq 1$

Explain:

L1/L2/L3: The distance of load center to mount plane(Determined by actuality).
A/B/C: Correction value for center position distance of moment(Refer to table 2).
Mp_{max}/My_{max}/Mr_{max}/Mpo_{max}/Myo_{max}/Mro_{max}: Maximum allowable moment(Refer to table 2).
g: Acceleration of gravity(g=9.81m/s²).
a: Acceleration of inertia
(Bumper: a=1600×(Va/1000)², Shock absorber: a=400×(Va/1000)²)
W: Load weight(Determined by actuality).

Slide table cylinder(Cross roller type)

HLS、HLSL Series

Table 1 : Maximum allowable kinetic energy(Emax)
Maximum allowable applied load(Wmax)

Model	Max. allowable kinetic energy Emax(J)			Max. allowable applied load Wmax(N)
	Basic type	Rubber stopper type	Shock absorber type	
HLS6	0.01	0.01	-	4
HLS8	0.024	0.024	0.048	8
HLS12	0.05	0.05	0.1	15
HLS16	0.1	0.1	0.2	30
HLS20	0.13	0.13	0.26	40
HLS25	0.22	0.22	0.44	70

Note: Symbol and unit

Symbol	Item	Unit
A, B, C	Correction value for center position distance of moment	mm
a	Acceleration of inertia	-
E	Kinetic energy	J
Ea	Allowable kinetic energy	J
Emax	Maximum allowable kinetic energy	J
g	Acceleration of gravity g=9.81	m/s ²
K	Mounting work coefficient	-
L1, L2, L3	Overhang	mm
Mp, My, Mr	Dynamic moment(Pitch, Yaw, Roll)	Nm
Mp _{max} , My _{max} , Mr _{max}	Maximum allowable dynamic moment (Pitch, Yaw, Roll)	Nm
Mpo, Myo, Mro	Static moment(Pitch, Yaw, Roll)	Nm
Mpo _{max} , Myo _{max} , Mro _{max}	Maximum allowable static moment (Pitch, Yaw, Roll)	Nm
Va	Average speed	mm/s
W	Applied load	N
Wmax	Maximum allowable applied load	N
β	Applied load coefficient	-

Table 2 : Maximum allowable moment(Nm),
Correction value for center position distance of moment(mm)

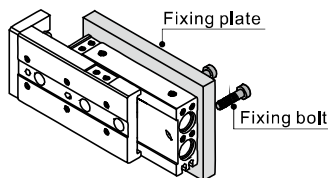
Bore size	Stroke	Static moment			Dynamic moment			Correction value		
		Mpo _{max}	Myo _{max}	Mro _{max}	Mp _{max}	My _{max}	Mr _{max}	A	B	C
6	10	3.3	3.8	2.6	0.7	0.7	0.6	27	7.3	16
	20	3.3	3.8	2.6	0.7	0.8	0.6	42		
	30	3.3	3.8	2.6	0.7	0.8	0.6	52		
	40	7.2	7.9	3.6	1.3	1.3	0.6	72		
	50	12.4	12.7	4.7	1.8	1.8	0.6	87		
8	10	10.1	9.1	8.8	2.5	2.5	2.0	32	8.5	20
	20	10.1	9.1	8.8	2.6	2.6	2.0	42		
	30	10.1	9.1	8.8	2.8	2.8	2.0	57		
	40	12.4	10.8	10.1	3.4	3.4	2.3	72		
	50	23.6	24.8	13.9	4.4	4.4	2.1	92		
12	75	32.8	35.3	16.4	4.6	4.6	1.8	132	10	25
	10	33.0	34.3	30.9	7.3	7.3	5.8	48		
	20	33.0	34.3	30.9	7.6	7.6	5.8	58		
	30	33.0	34.3	30.9	7.8	7.8	5.8	68		
	40	33.0	34.3	30.9	8.0	8.0	5.8	78		
16	50	53.4	49.6	39.7	9.8	9.8	5.8	88	11	30
	75	78.8	71.9	48.6	14.2	14.2	6.8	125		
	100	78.8	71.9	48.6	14.7	14.7	6.8	160		
	10	33.0	34.3	30.9	8.8	8.8	7.6	43		
	20	33.0	34.3	30.9	9.2	9.2	7.6	53		
20	30	33.0	34.3	30.9	9.5	9.5	7.6	63	16.5	35
	40	33.0	34.3	30.9	10.0	10.0	7.6	78		
	50	53.4	49.6	39.7	12.2	12.2	7.6	93		
	75	78.8	71.9	48.6	17.6	17.6	8.9	130		
	100	78.8	71.9	48.6	18.2	18.2	8.9	165		
25	125	143.7	144.5	53.3	24.8	24.8	7.8	204	20.3	42
	10	60.1	50.5	72.8	14.5	14.5	15.2	47		
	20	60.1	50.5	72.8	15.2	15.2	15.2	57		
	30	60.1	50.5	72.8	15.7	15.7	15.2	67		
	40	60.1	50.5	72.8	16.3	16.3	15.2	82		
30	50	60.1	50.5	72.8	16.6	16.6	15.2	92	25.3	48
	75	169.3	154.3	114.4	41.2	41.2	22.0	136		
	100	169.3	154.3	114.4	42.8	42.8	22.0	176		
	125	169.3	154.3	114.4	43.6	43.6	22.0	205		
	150	267.5	286.6	145.6	49.0	49.0	20.5	249		
40	10	60.1	50.5	72.8	16.3	16.3	17.6	52	30.3	54
	20	60.1	50.5	72.8	17.0	17.0	17.6	62		
	30	60.1	50.5	72.8	17.4	17.4	17.6	72		
	40	60.1	50.5	72.8	17.8	17.8	17.6	82		
	50	60.1	50.5	72.8	18.2	18.2	17.6	96		
50	75	169.3	154.3	114.4	45.2	45.2	25.3	141	35.3	60
	100	169.3	154.3	114.4	46.2	46.2	25.3	165		
	125	169.3	154.3	114.4	48.0	48.0	25.3	210		
	150	267.5	286.6	145.6	65.0	65.0	28.3	254		

Installation and application

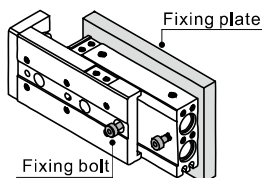
1. How to mount cylinder :

1.1) Cylinder can to be mounted from 3 directions

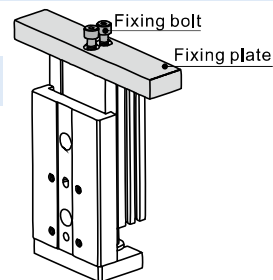
Vertical Mounting(Body thread holes)



Vertical Mounting(Body through holes)



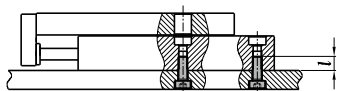
Axial Mounting (Body thread holes)



1.2) When mounting an compact slide cylinder, screws of appropriate length should be used and tightened properly within the maximum tightening torque.

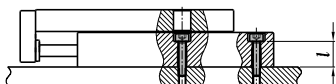
If screws are tightened beyond designed limits, malfunction may occur. If they are tightened insufficiently, it may result in sliding or falling off from its position.

Vertical Mounting(Body thread holes)



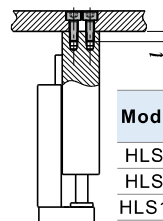
Model	Bolt used	Max. tightening torque (Nm)	Max. screw-in depth(mm)
HLS6	M4×0.7	2.1	8
HLS8	M4×0.7	2.1	8
HLS12	M5×0.8	4.4	10
HLS16	M6×1.0	4.4	10
HLS20	M6×1.0	7.4	12
HLS25	M8×1.25	18.0	16

Vertical Mounting(Body through holes)



Model	Bolt used	Max. tightening torque (Nm)	Body depth(mm)
HLS6	M3×0.5	1.2	11.0
HLS8	M3×0.5	1.2	12.5
HLS12	M4×0.7	2.8	18.0
HLS16	M5×0.8	5.7	25.0
HLS20	M5×0.8	5.7	28.0
HLS25	M6×1.0	10.0	36.2

Axial Mounting(Body thread holes)



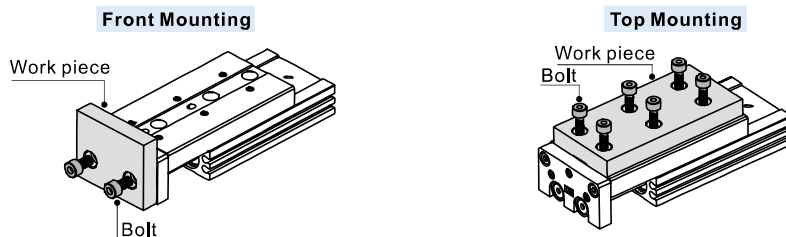
Model	Bolt used	Max. tightening torque (Nm)	Max. screw-in depth(mm)
HLS6	M2.5×0.45	0.5	3.5
HLS8	M3×0.5	0.9	4.0
HLS12	M4×0.7	2.1	6.0
HLS16	M5×0.8	4.4	7.0
HLS20	M5×0.8	4.4	8.0
HLS25	M6×1.0	7.4	10.0

Slide table cylinder(Cross roller type)

HLS、HLSL Series

2. Work Piece Mounting :

2.1) Work pieces can be mounted on 2 surfaces of the compact slide.

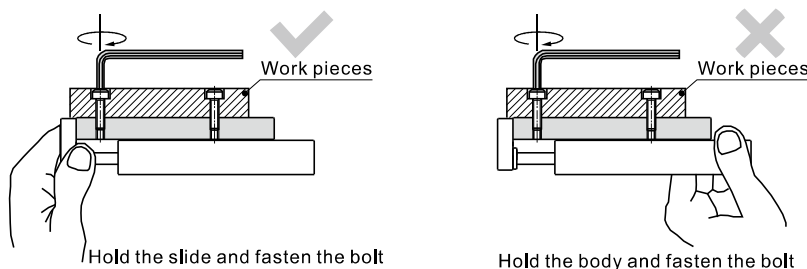


2.2) When mounting a work piece, tighten the bolts properly at a torque value within the limiting range. Use bolts at least 0.5mm shorter than maximum thread depth to prevent bolts from contacting the guide block. If the bolts are too long, they hit the guide block and cause damage.

Front Mounting				Top Mounting			
Model	Bolt used	Max. tightening torque (Nm)	Max. screw-in depth(mm)	Model	Bolt used	Max. tightening torque (Nm)	Max. screw-in depth(mm)
HLS6	M3×0.4	0.9	5	HLS6	M3×0.5	0.9	4.0
HLS8	M4×0.7	2.1	6	HLS8	M3×0.5	0.9	5.0
HLS12	M5×0.8	4.4	8	HLS12	M4×0.7	2.1	5.5
HLS16	M6×1.0	7.4	10	HLS16	M5×0.8	4.4	6.0
HLS20	M6×1.0	7.4	13	HLS20	M5×0.8	4.4	10.0
HLS25	M8×1.25	18.0	15	HLS25	M6×1.0	7.4	13.0

2.3) Since the table is supported by the linear guide, take care not to apply strong impact or large moment to the guide section.

2.4) Hold the slide when fastening work pieces to it with bolts, If the body is held while tightening bolts, excessive moment may damage guide section.

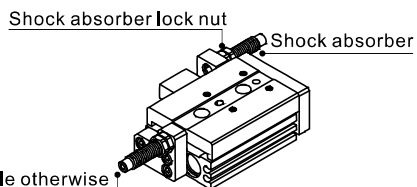


3. About shock absorber :

3.1) Shock absorbers are expendable. Promptly replace them when energy absorbing capacity decreases.

3.2) Never turn or adjust the screws on bottom of the shock absorber body. The screws are not for adjusting. Otherwise would cause oil leakage.

3.3) Follow the table for tightening torque of shock absorber to lock nuts.



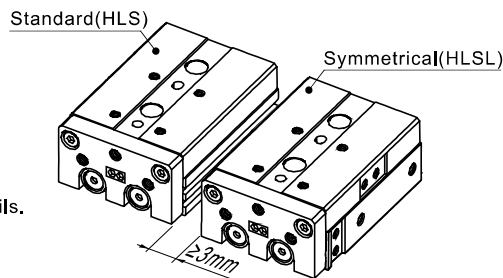
The screws are not adjustable otherwise would cause oil leakage.

Model	Shock absorber	Tightening torque
HLS6	Without shock absorber	
HLS8	ACA0806-1N	1.67(Nm)
HLS12	ACA0806-1N	1.67(Nm)
HLS16	ACA1007-1N	3.14(Nm)
HLS20	ACA1210-1N	3.14(Nm)
HLS25	ACA1412-1N	10.8(Nm)

4. How to mount sensor switch :

4.1) HLS Series are all with magnet. The matching sensor switches are CSMH, DMSH, EMSH series.

4.2) Maintain a minimum spacing of at least 3mm if two compact cylinders are used side by side in order to avoid malfunction.



5. Make sure to connect the compact cylinder to speed controller at the meter-out side, and the speed of compact cylinder must below 500mm/s.

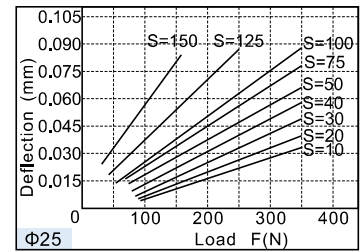
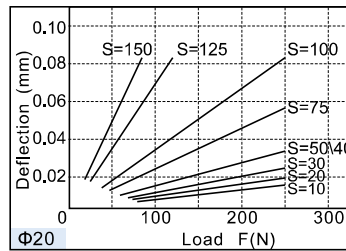
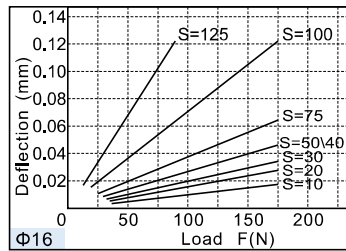
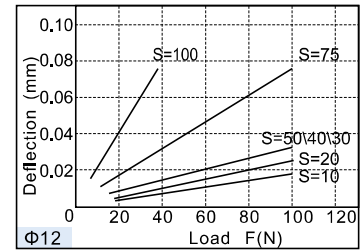
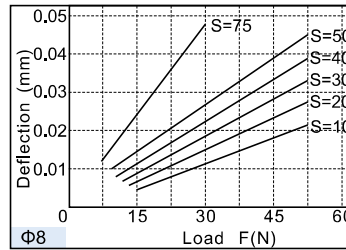
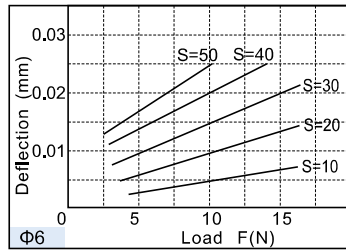
6. Don't apply a load beyond the range of the operation limits. Different load or torque will cause different deflection to table, please see below for details.

Slide table cylinder(Cross roller type)

HLS、HLSL Series

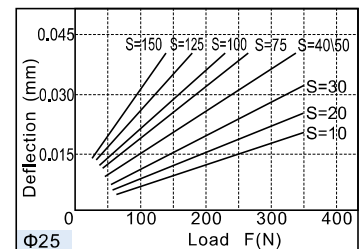
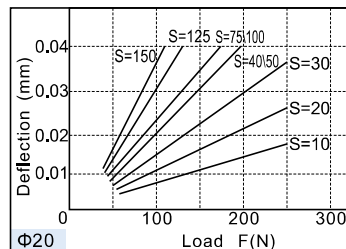
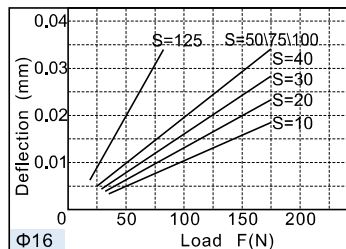
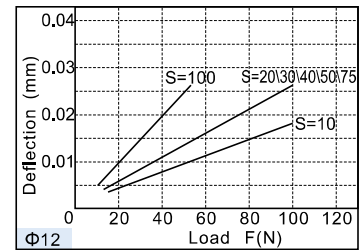
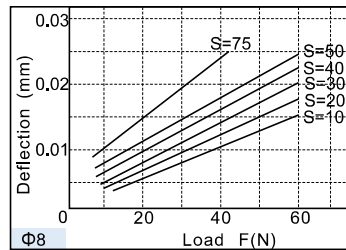
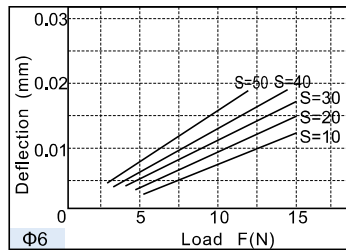
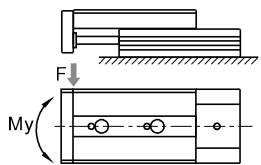
6.1) Table deflection due to pitch moment:

Table deflection (arrow) when a load acts upon the section marked with the arrow at the full stroke of the compact slide.



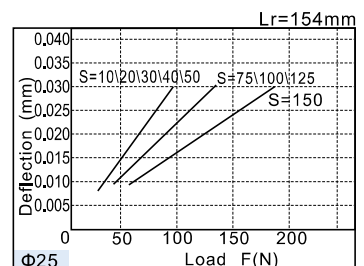
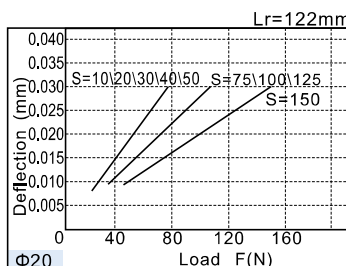
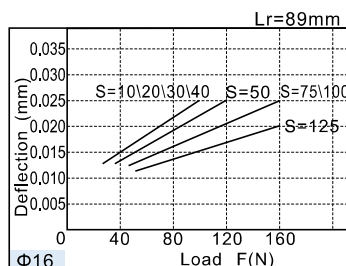
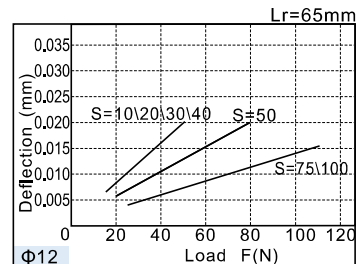
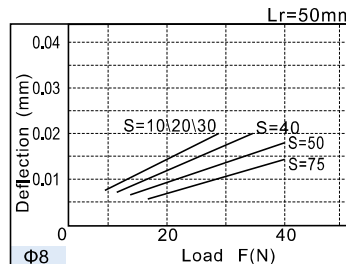
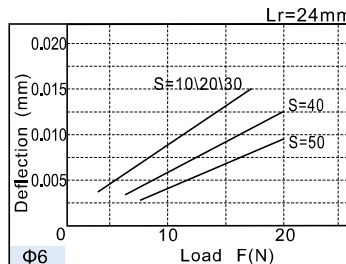
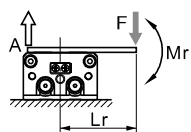
6.2) Table deflection due to yaw moment:

Table deflection (arrow) when a load acts upon the section marked with the arrow at the full stroke of the compact slide.



6.3) Table deflection due to roll moment:

Table deflection (A) when a load acts upon section F at the full stroke of the compact slide.

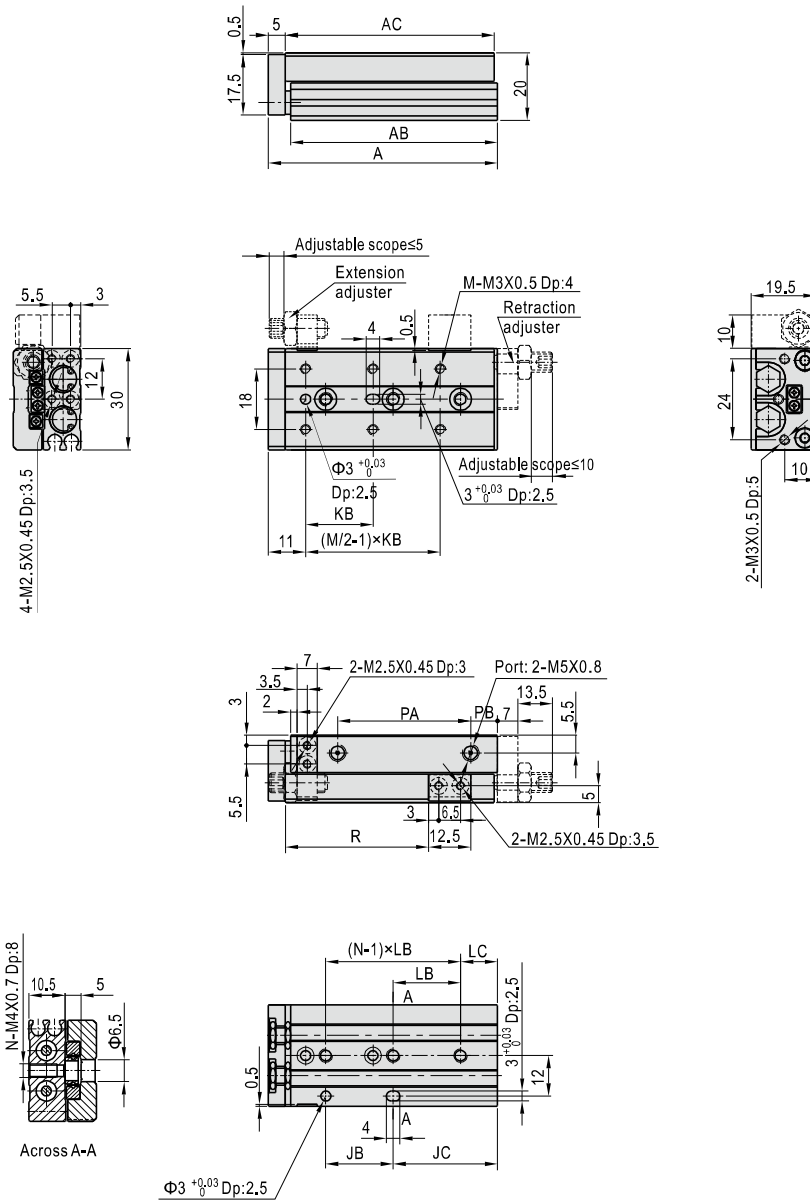


Slide table cylinder(Cross roller type)

HLS、HLSL Series

Dimensions

HLS6

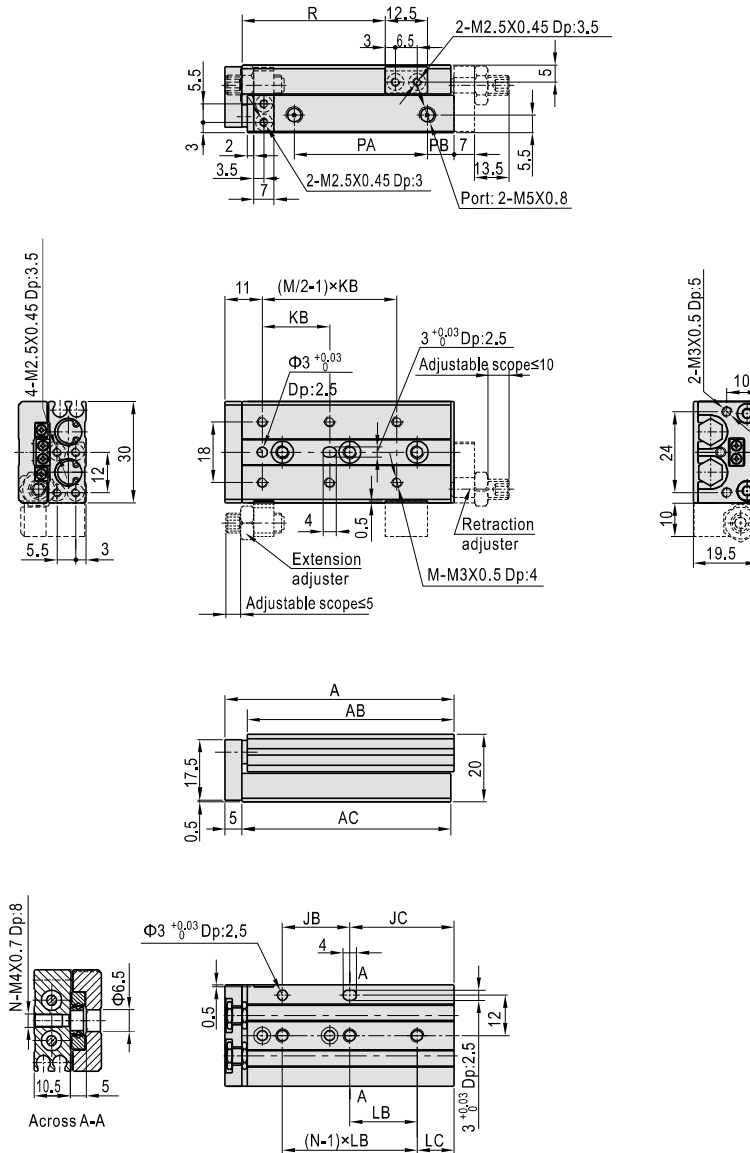


Stroke\Item	A	AB	AC	JB	JC	KB	LB	LC	M	N	PA	PB	R
10	48	41.5	42	20	11	20	25	6	4	2	19	8	21.5
20	58	51.5	52	20	21	30	35	6	4	2	28	9	31.5
30	68	61.5	62	20	31	20	20	11	6	3	39	8	41.5
40	90	83.5	84	30	43	28	30	13	6	3	51	18	51.5
50	106	99.5	100	48	41	38	24	17	6	4	61	24	61.5

Slide table cylinder(Cross roller type)

HLS、HLSL Series

HLSL6

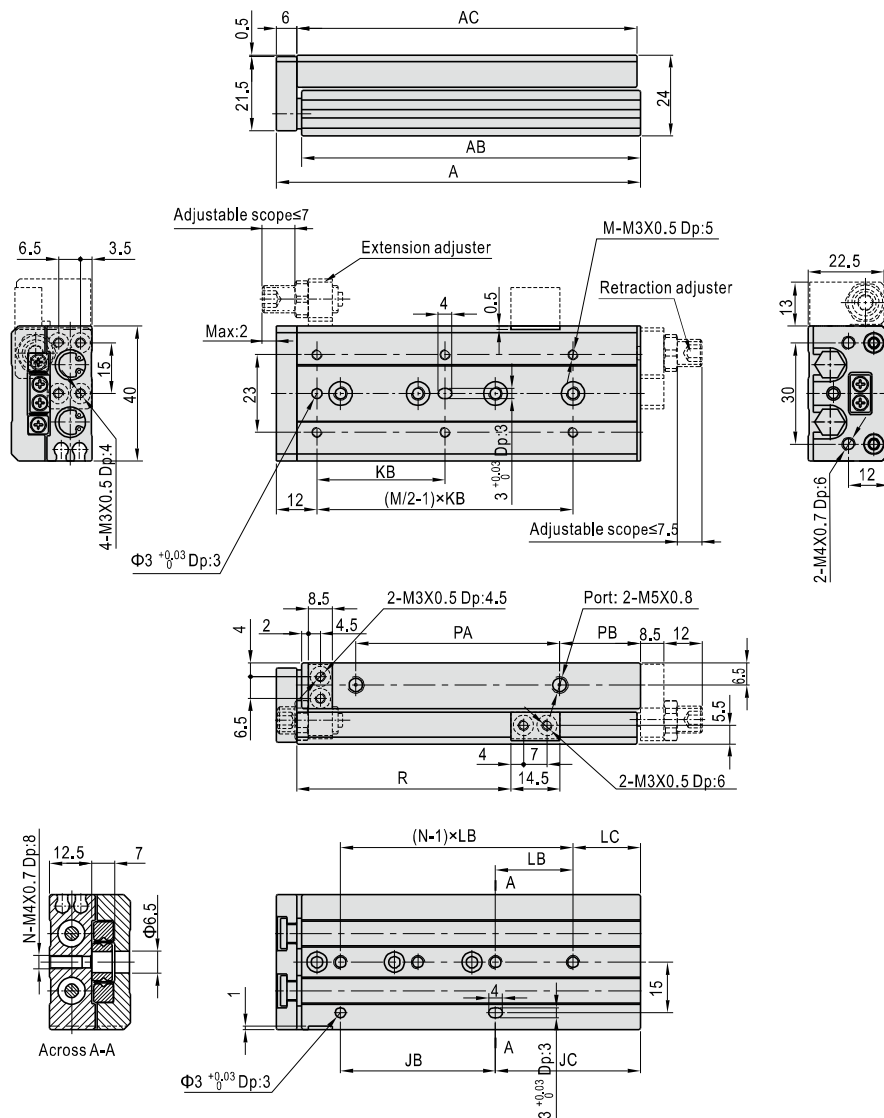


Stroke\Item	A	AB	AC	JB	JC	KB	LB	LC	M	N	PA	PB	R
10	48	41.5	42	20	11	20	25	6	4	2	19	8	21.5
20	58	51.5	52	20	21	30	35	6	4	2	28	9	31.5
30	68	61.5	62	20	31	20	20	11	6	3	39	8	41.5
40	90	83.5	84	30	43	28	30	13	6	3	51	18	51.5
50	106	99.5	100	48	41	38	24	17	6	4	61	24	61.5

Slide table cylinder(Cross roller type)

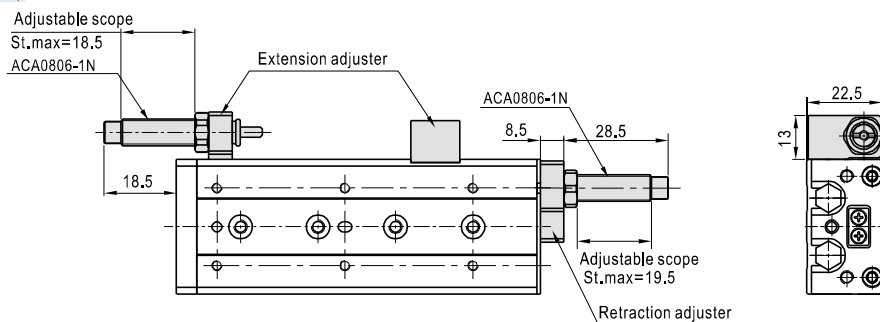
HLS、HLSL Series

HLS8



Stroke\Item	A	AB	AC	JB	JC	KB	LB	LC	M	N	PA	PB	R
10	56	48.5	49	20	17	25	28	9	4	2	19.5	12.5	23.5
20	61	53.5	54	30	12	25	30	12	4	2	30	7	33.5
30	72	64.5	65	20	33	40	20	13	4	3	41	7	43.5
40	90	82.5	83	28	43	50	28	15	4	3	56	10	53.5
50	108	100.5	101	46	43	38	23	20	6	4	68	16	63.5
75	158	150.5	151	56	83	50	28	27	6	5	94	40	88.5

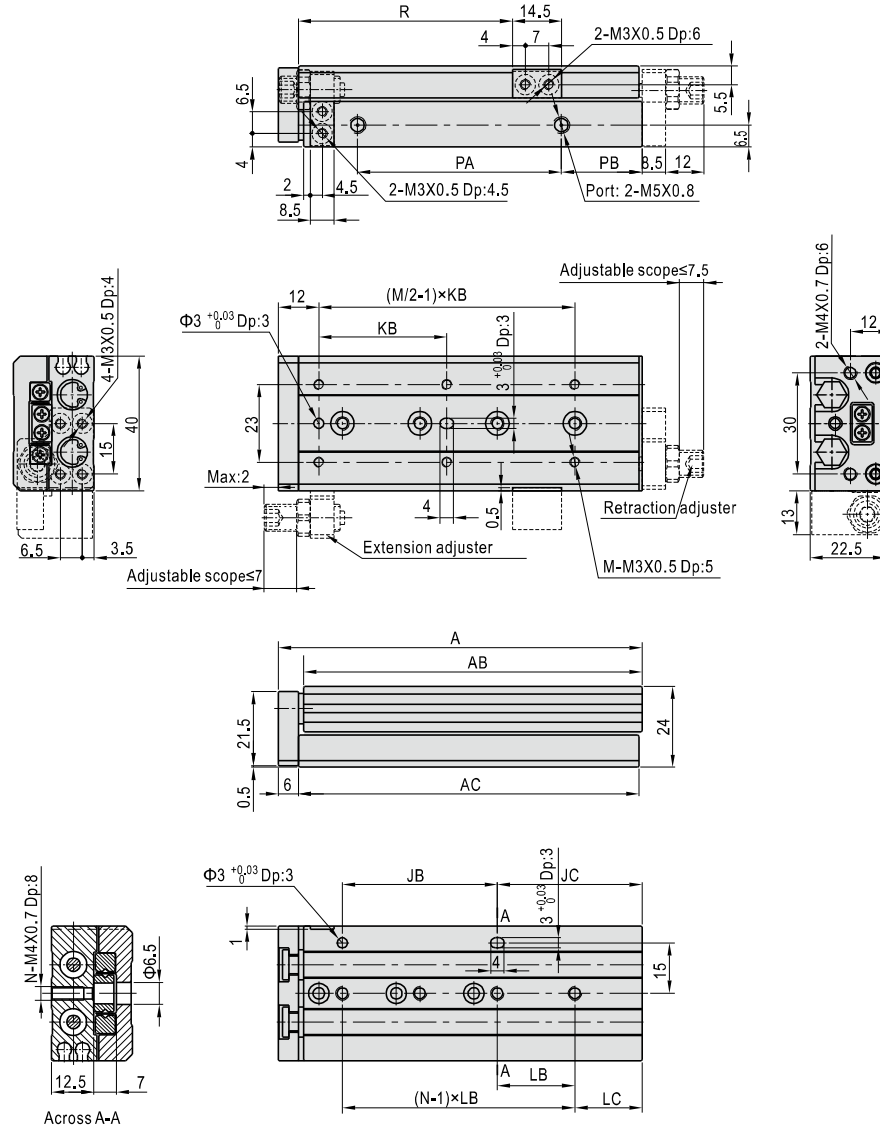
HLS8(With shock absorber)



Slide table cylinder(Cross roller type)

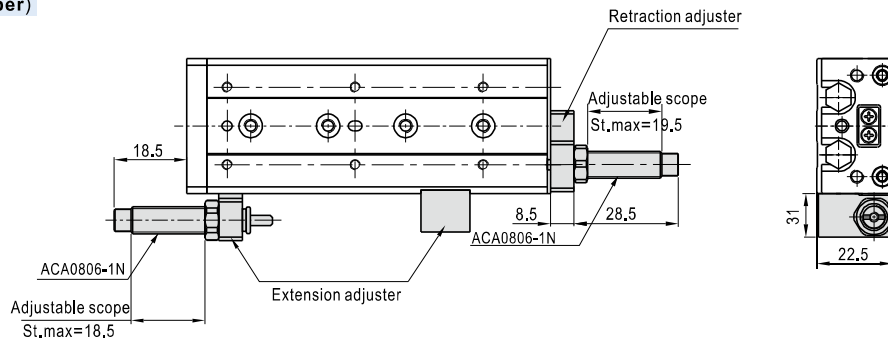
HLS、HLSL Series

HLSL8



Stroke\Item	A	AB	AC	JB	JC	KB	LB	LC	M	N	PA	PB	R
10	56	48.5	49	20	17	25	28	9	4	2	19.5	12.5	23.5
20	61	53.5	54	30	12	25	30	12	4	2	30	7	33.5
30	72	64.5	65	20	33	40	20	13	4	3	41	7	43.5
40	90	82.5	83	28	43	50	28	15	4	3	56	10	53.5
50	108	100.5	101	46	43	38	23	20	6	4	68	16	63.5
75	158	150.5	151	56	83	50	28	27	6	5	94	40	88.5

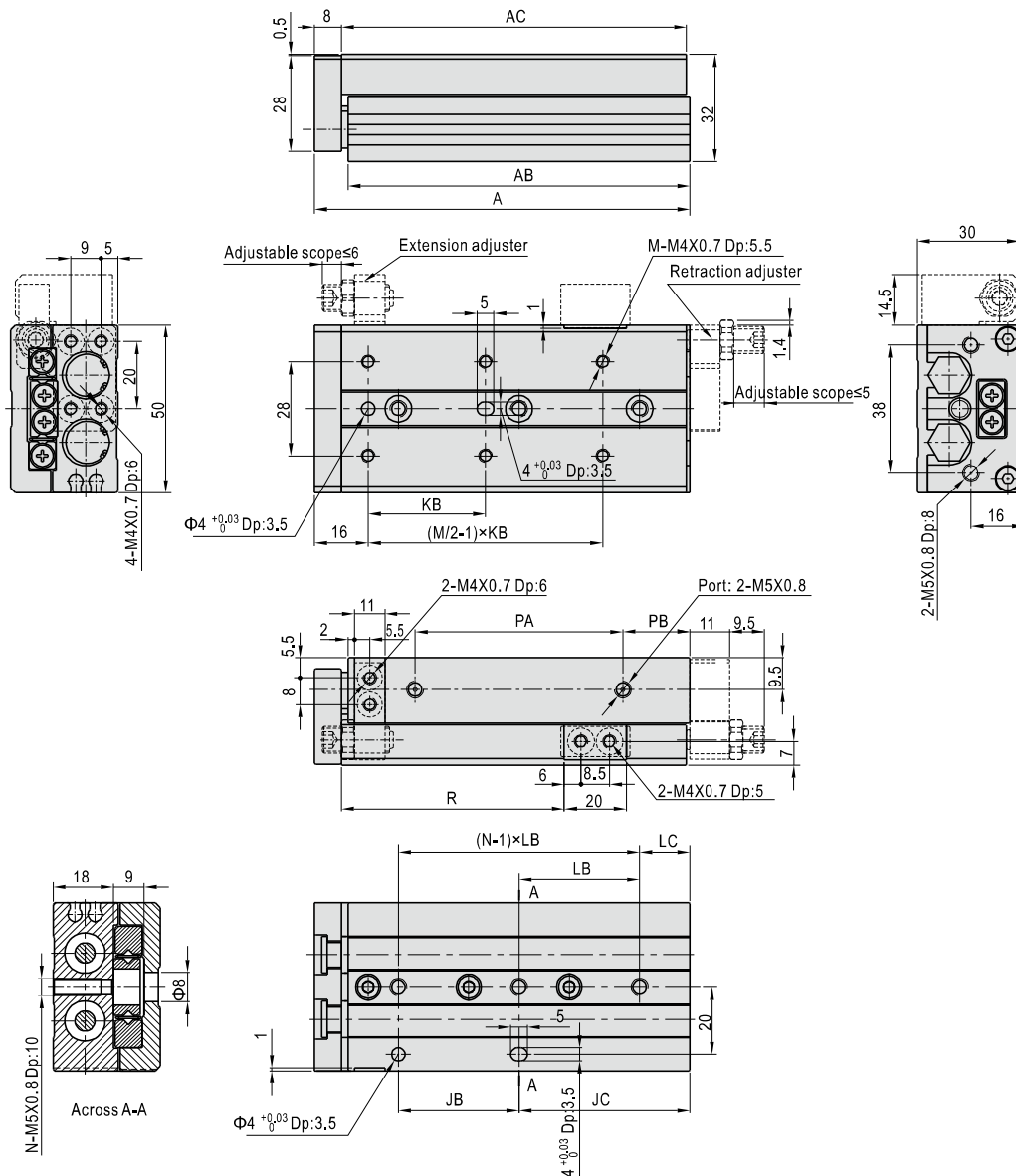
HLSL8(With shock absorber)



Slide table cylinder(Cross roller type)

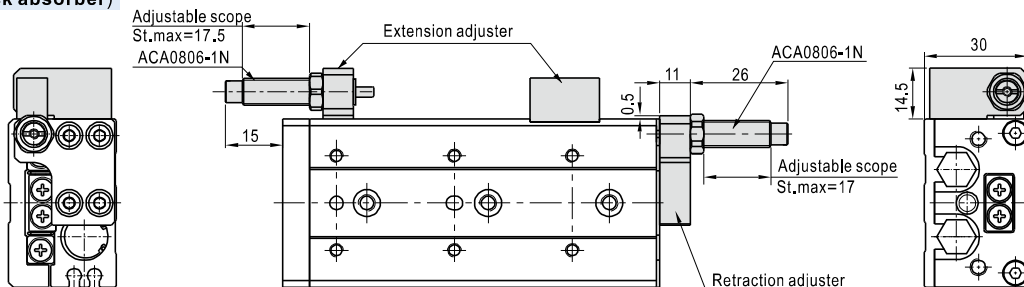
HLS、HLSL Series

HLS12



Stroke\Item	A	AB	AC	JB	JC	KB	LB	LC	M	N	PA	PB	R
10	80	70	71	40	15	35	40	15	4	2	39.5	10	25
20	80	70	71	40	15	35	40	15	4	2	39.5	10	35
30	80	70	71	40	15	35	40	15	4	2	39.5	10	45
40	92	82	83	25	42	50	25	17	4	3	51.5	10	55
50	112	102	103	36	51	35	36	15	6	3	61.5	20	65
75	158	148	149	72	61	55	36	25	6	4	87.5	40	90
100	212	202	203	76	111	65	38	35	6	5	131.5	50	115

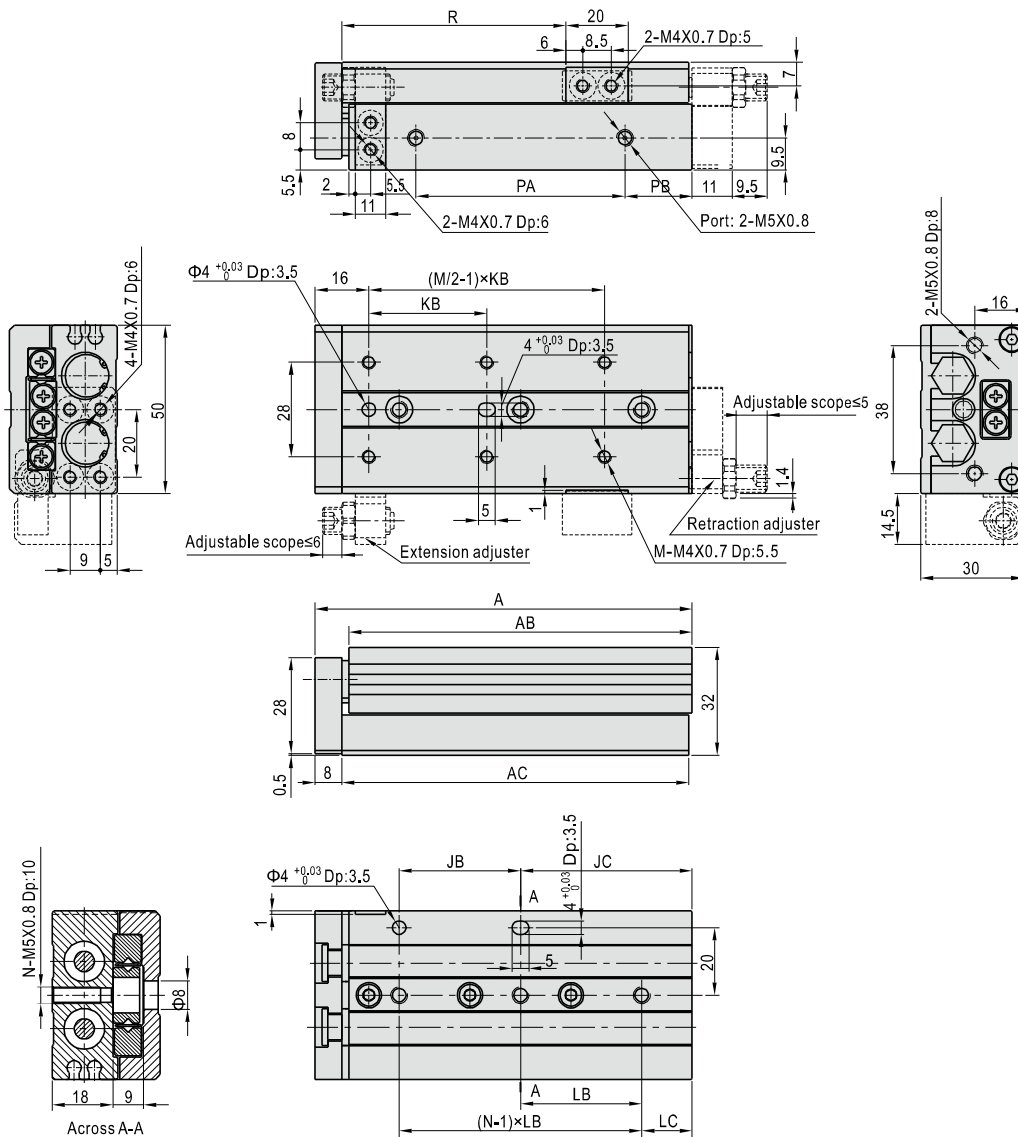
HLS12(With shock absorber)



Slide table cylinder(Cross roller type)

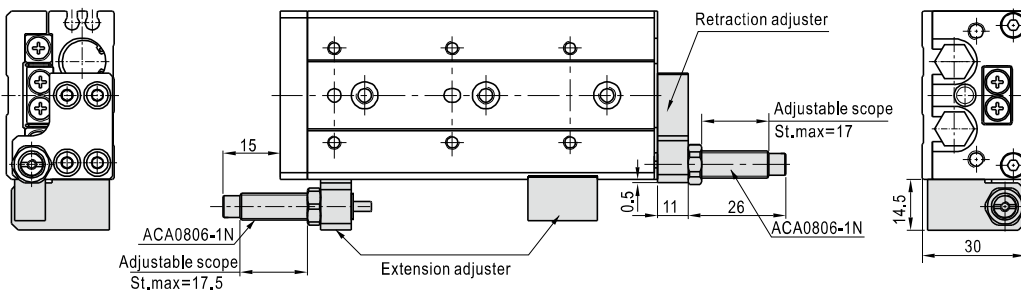
HLS, HLSL Series

HLSL12



Stroke\Item	A	AB	AC	JB	JC	KB	LB	LC	M	N	PA	PB	R
10	80	70	71	40	15	35	40	15	4	2	39.5	10	25
20	80	70	71	40	15	35	40	15	4	2	39.5	10	35
30	80	70	71	40	15	35	40	15	4	2	39.5	10	45
40	92	82	83	25	42	50	25	17	4	3	51.5	10	55
50	112	102	103	36	51	35	36	15	6	3	61.5	20	65
75	158	148	149	72	61	55	36	25	6	4	87.5	40	90
100	212	202	203	76	111	65	38	35	6	5	131.5	50	115

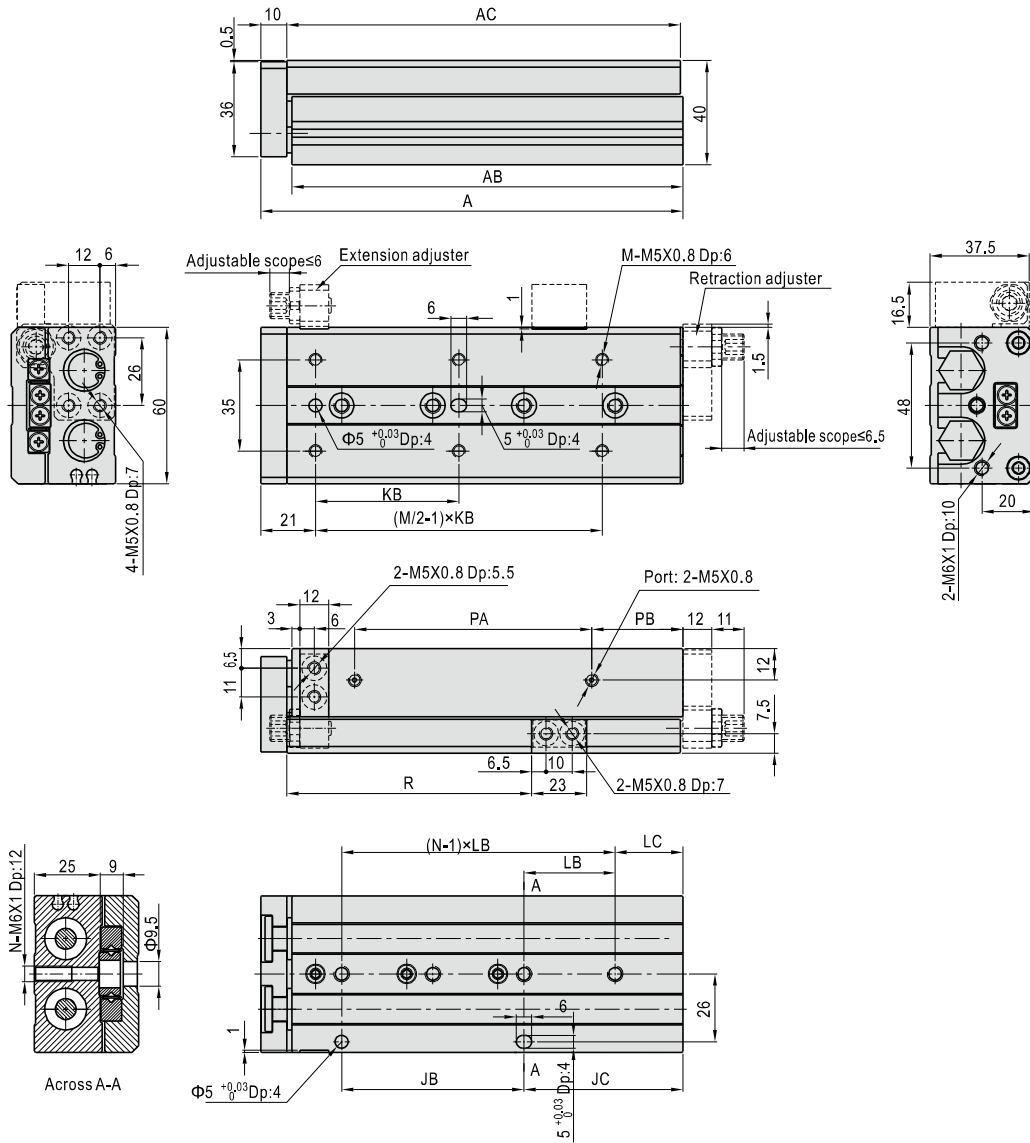
HLSL12(With shock absorber)



Slide table cylinder(Cross roller type)

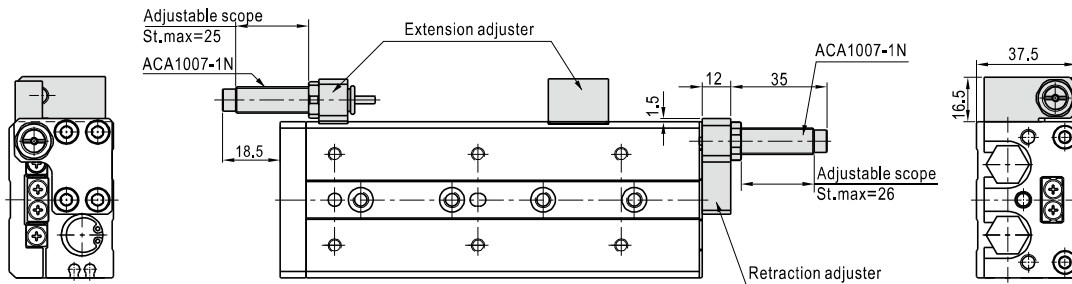
HLS、HLSL Series

HLS16



Stroke\Item	A	AB	AC	JB	JC	KB	LB	LC	M	N	PA	PB	R
10	87	75	76	40	16	35	40	16	4	2	42.5	8	28.5
20	87	75	76	40	16	35	40	16	4	2	42.5	8	38.5
30	87	75	76	40	16	35	40	16	4	2	42.5	8	48.5
40	97	85	86	50	16	40	50	16	4	2	52.5	8	58.5
50	112	100	101	30	51	30	30	21	6	3	63.5	12	68.5
75	162	150	151	70	61	55	35	26	6	4	90.5	35	93.5
100	210	198	199	70	109	65	35	39	6	5	118.5	55	118.8
125	260	248	249	70	159	70	35	19	8	7	153.5	70	143.5

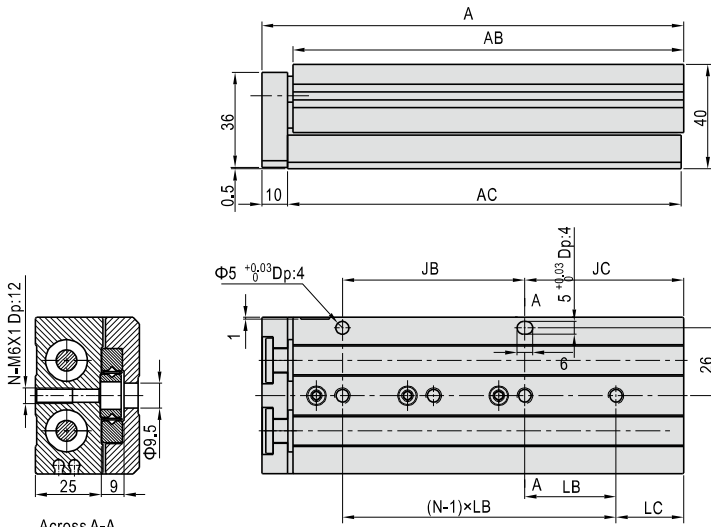
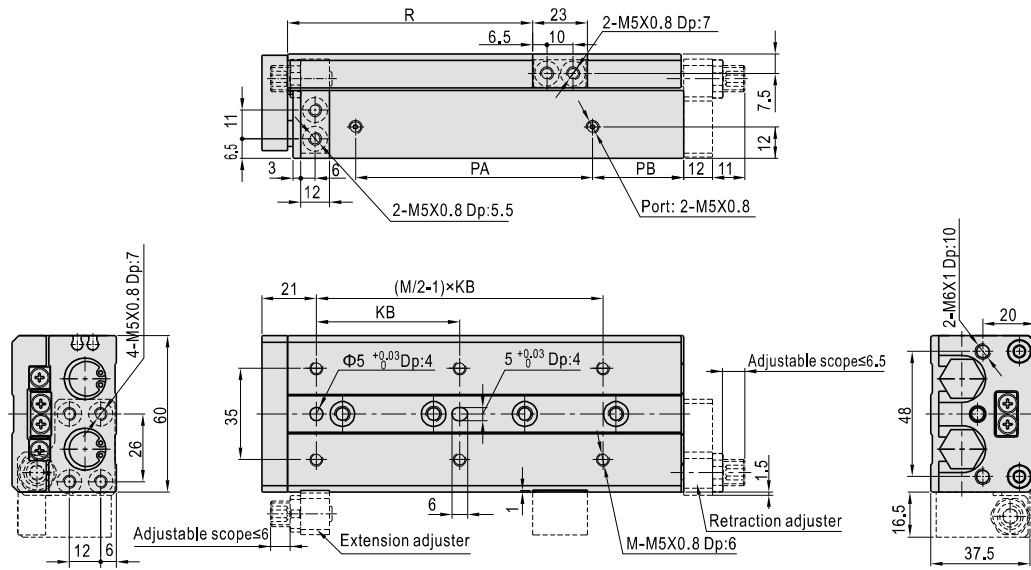
HLS16(With shock absorber)



Slide table cylinder(Cross roller type)

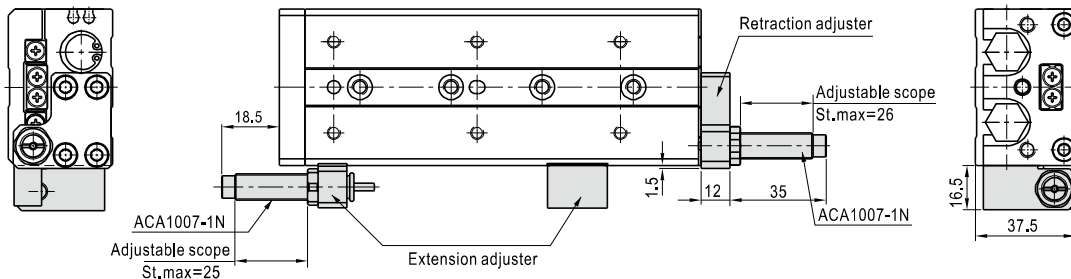
HLS、HLSL Series

HLSL16



Stroke\Item	A	AB	AC	JB	JC	KB	LB	LC	M	N	PA	PB	R
10	87	75	76	40	16	35	40	16	4	2	42.5	8	28.5
20	87	75	76	40	16	35	40	16	4	2	42.5	8	38.5
30	87	75	76	40	16	35	40	16	4	2	42.5	8	48.5
40	97	85	86	50	16	40	50	16	4	2	52.5	8	58.5
50	112	100	101	30	51	30	30	21	6	3	63.5	12	68.5
75	162	150	151	70	61	55	35	26	6	4	90.5	35	93.5
100	210	198	199	70	109	65	35	39	6	5	118.5	55	118.8
125	260	248	249	70	159	70	35	19	8	7	153.5	70	143.5

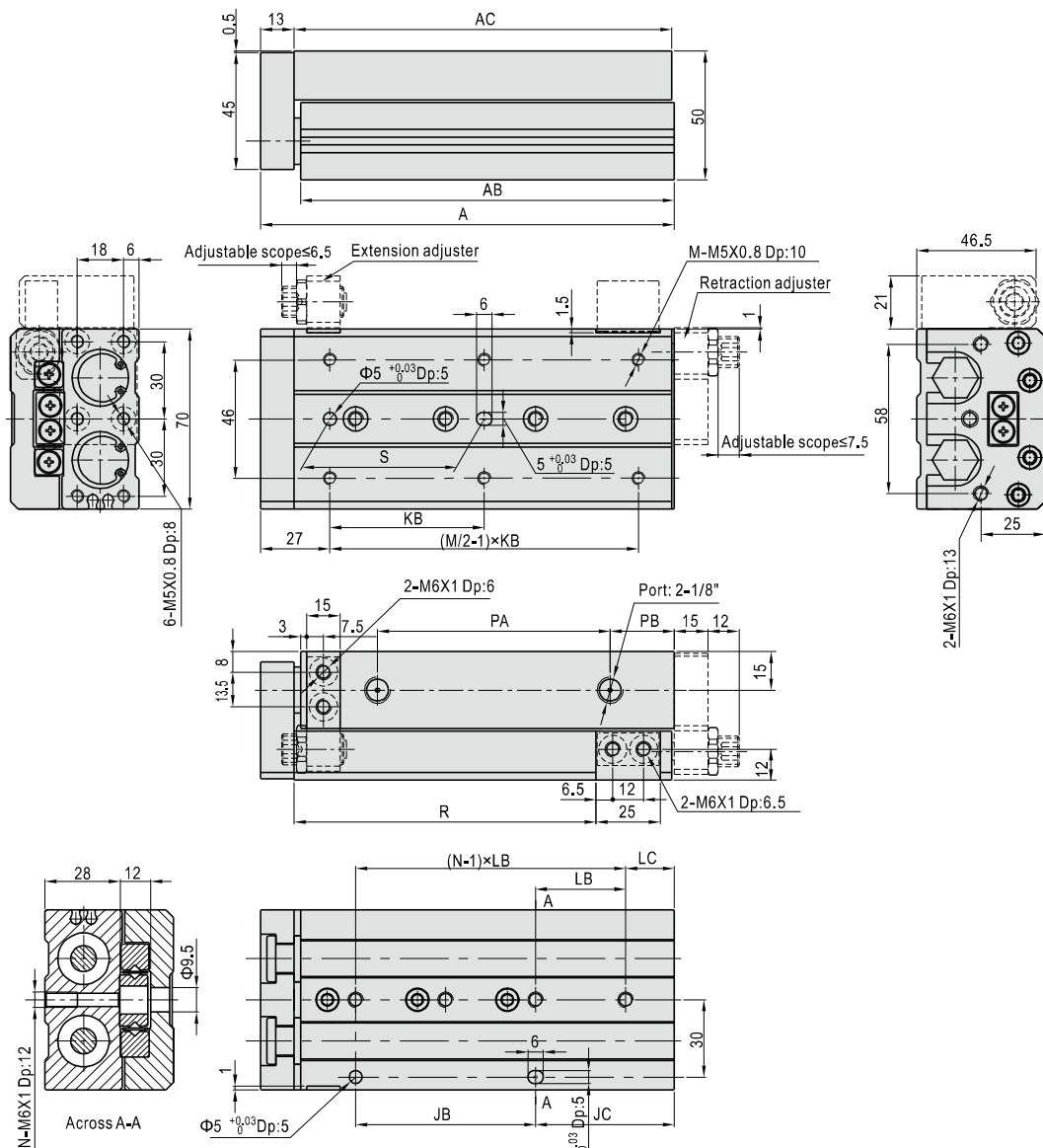
HLSL16(With shock absorber)



Slide table cylinder(Cross roller type)

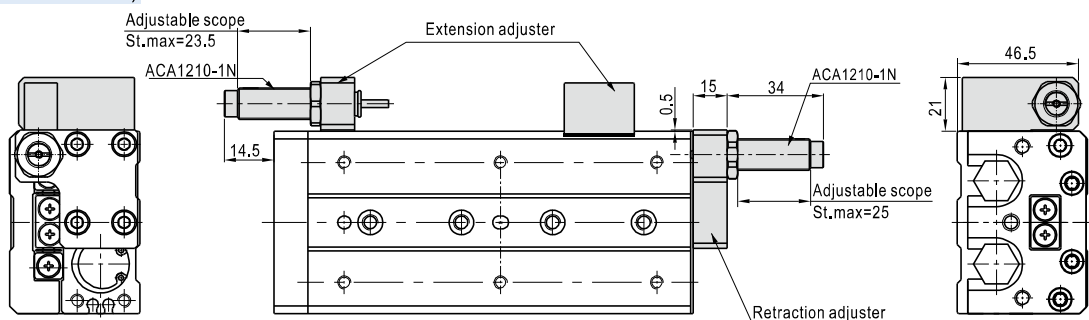
HLS、HLSL Series

HLS20



Stroke\Item	A	AB	AC	JB	JC	KB	LB	LC	M	N	S	PA	PB	R
10	97	81.5	83	35	25	50	45	15	4	2	40	43.5	10	32.5
20	97	81.5	83	35	25	50	45	15	4	2	40	43.5	10	42.5
30	97	81.5	83	35	25	50	45	15	4	2	40	43.5	10	52.5
40	107	91.5	93	35	35	60	55	15	4	2	50	53.5	10	62.5
50	122	106.5	108	35	50	35	35	15	6	3	35	68.5	10	72.5
75	161	145.5	147	70	54	60	35	19	6	4	60	107.5	10	97.5
100	214	198.5	200	70	107	70	35	37	6	5	70	115.5	55	122.5
125	268	252.5	254	76	155	70	38	41	8	6	70	154.5	70	147.5
150	320	304.5	306	88	195	80	44	19	8	7	80	186.5	90	172.5

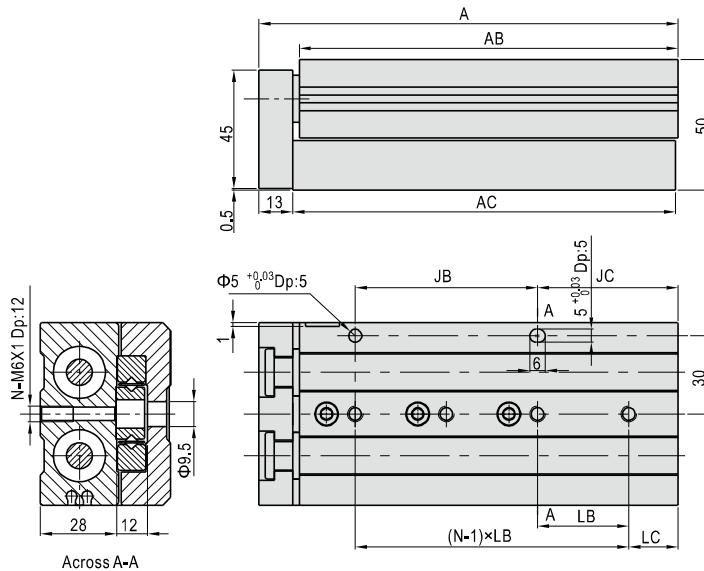
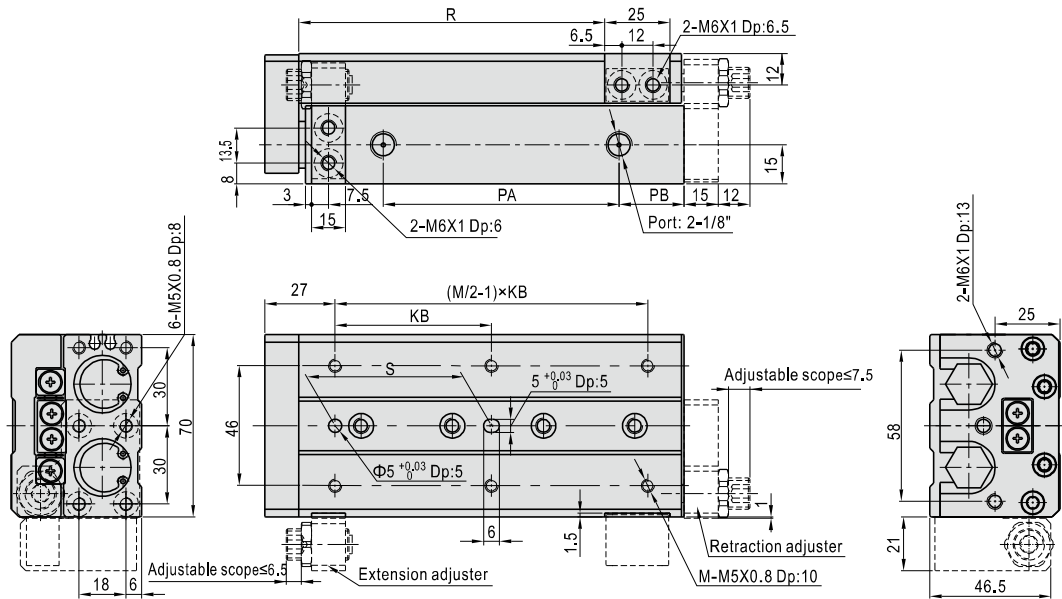
HLS20(With shock absorber)



Slide table cylinder(Cross roller type)

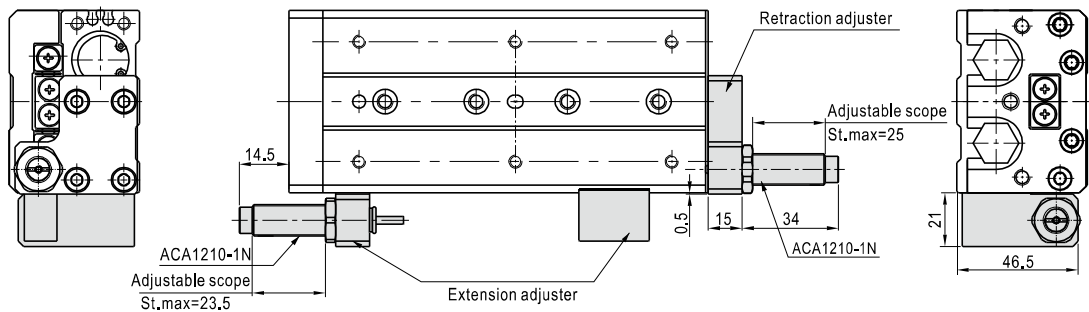
HLS, HLSL Series

HLSL20



Stroke\Item	A	AB	AC	JB	JC	KB	LB	LC	M	N	S	PA	PB	R
10	97	81.5	83	35	25	50	45	15	4	2	40	43.5	10	32.5
20	97	81.5	83	35	25	50	45	15	4	2	40	43.5	10	42.5
30	97	81.5	83	35	25	50	45	15	4	2	40	43.5	10	52.5
40	107	91.5	93	35	35	60	55	15	4	2	50	53.5	10	62.5
50	122	106.5	108	35	50	35	35	15	6	3	35	68.5	10	72.5
75	161	145.5	147	70	54	60	35	19	6	4	60	107.5	10	97.5
100	214	198.5	200	70	107	70	35	37	6	5	70	115.5	55	122.5
125	268	252.5	254	76	155	70	38	41	8	6	70	154.5	70	147.5
150	320	304.5	306	88	195	80	44	19	8	7	80	186.5	90	172.5

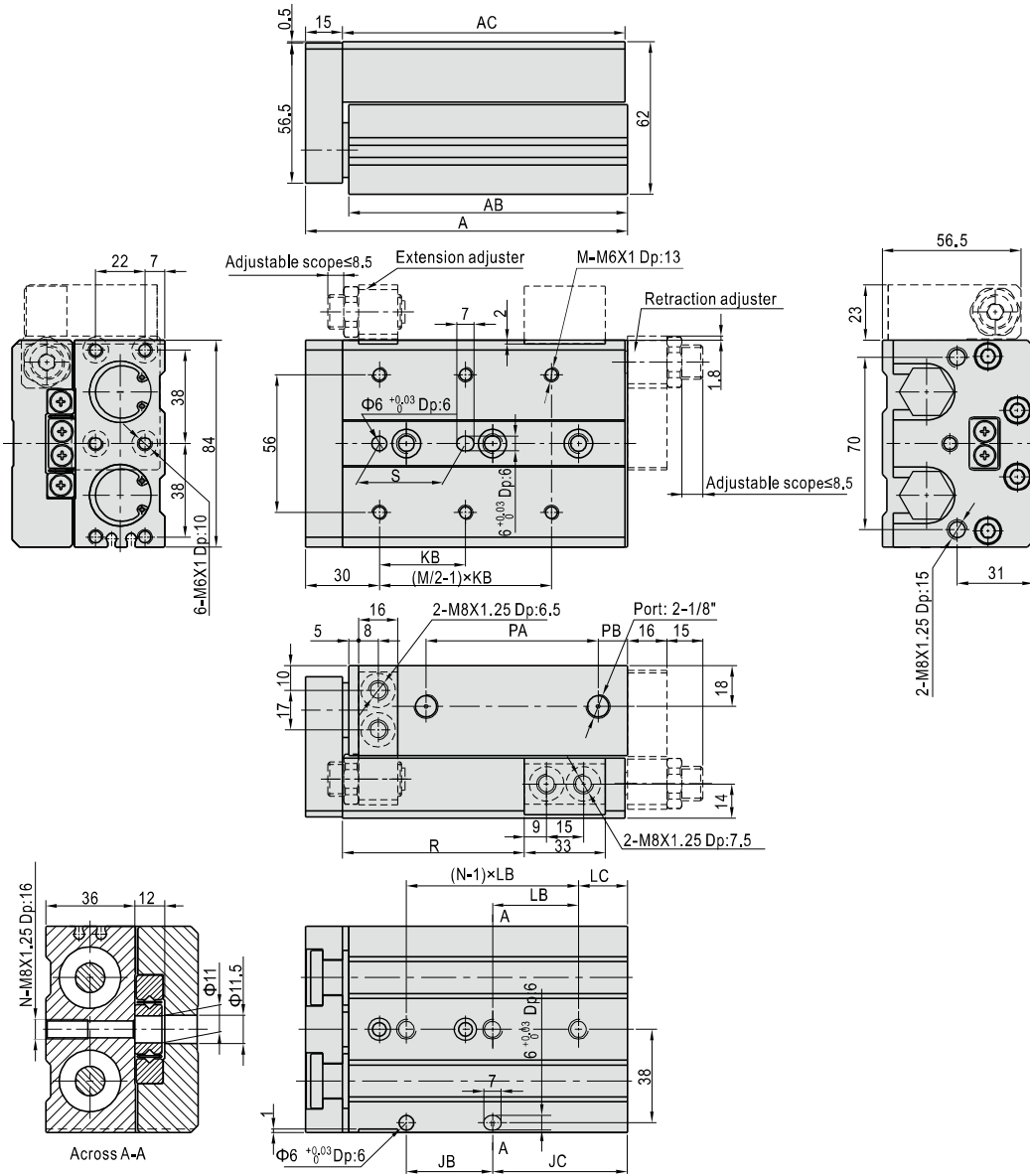
HLSL20(With shock absorber)



Slide table cylinder(Cross roller type)

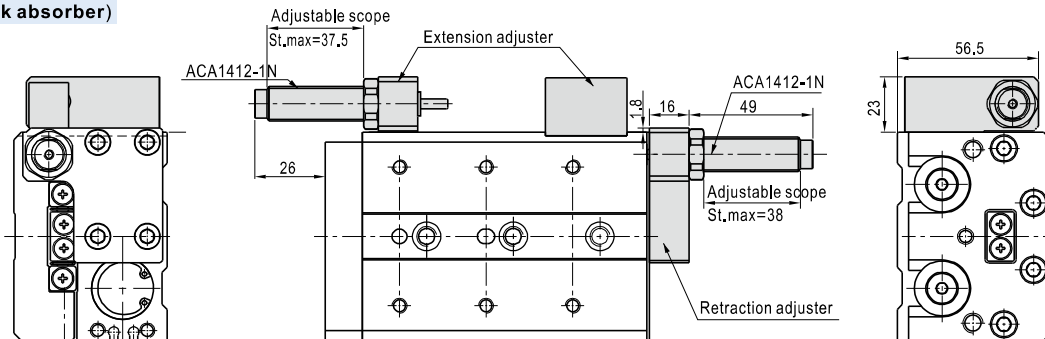
HLS、HLSL Series

HLS25



Stroke\Item	A	AB	AC	JB	JC	KB	LB	LC	M	N	S	PA	PB	R
10	108	90.5	92	45	22	50	45	22	4	2	40	47	12	35
20	108	90.5	92	45	22	50	45	22	4	2	40	47	12	45
30	108	90.5	92	45	22	50	45	22	4	2	40	47	12	55
40	118	100.5	102	55	22	60	55	22	4	2	50	57	12	65
50	131	113.5	115	35	55	35	35	20	6	3	35	70	12	75
75	172	154.5	156	70	61	60	35	26	6	4	60	90	33	100
100	213	195.5	197	70	102	70	35	32	6	5	70	119	45	125
125	271	253.5	255	76	154	75	38	40	8	6	75	155	67	150
150	311	293.5	295	80	190	80	40	30	8	7	80	180	82	175

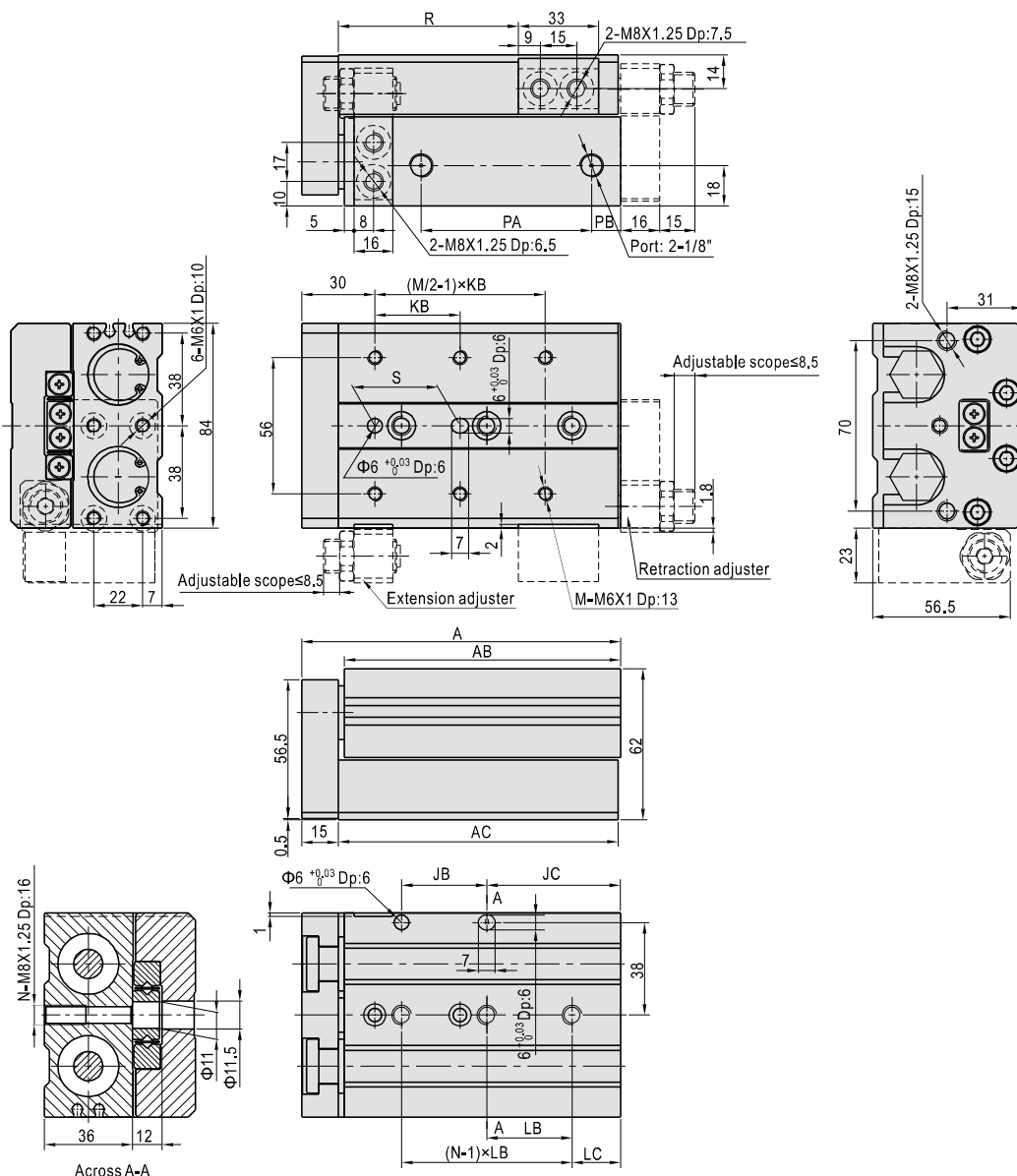
HLS25(With shock absorber)



Slide table cylinder(Cross roller type)

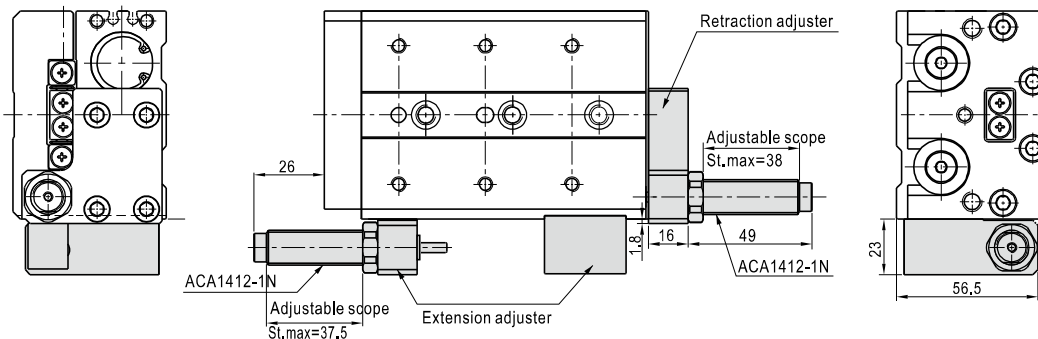
HLS、HLSL Series

HLSL25



Stroke/Item	A	AB	AC	JB	JC	KB	LB	LC	M	N	S	PA	PB	R
10	108	90.5	92	45	22	50	45	22	4	2	40	47	12	35
20	108	90.5	92	45	22	50	45	22	4	2	40	47	12	45
30	108	90.5	92	45	22	50	45	22	4	2	40	47	12	55
40	118	100.5	102	55	22	60	55	22	4	2	50	57	12	65
50	131	113.5	115	35	55	35	35	20	6	3	35	70	12	75
75	172	154.5	156	70	61	60	35	26	6	4	60	90	33	100
100	213	195.5	197	70	102	70	35	32	6	5	70	119	45	125
125	271	253.5	255	76	154	75	38	40	8	6	75	155	67	150
150	311	293.5	295	80	190	80	40	30	8	7	80	180	82	175

HLSL25(With shock absorber)



Slide table cylinder(Cross roller type)

HLS、HLSL Series—Accessories

Accessory selection

		Accessories\Bore size	6	8	12
Standard (HLS)	Both ends	A(Adjustable rubber stopper)	F-HLQ6A	F-HLS8A	F-HLS12A
		B(Shock absorber)	×	F-HLS8B	F-HLS12B
	Extension	AS(Adjustable rubber stopper)	F-HLS6AS	F-HLS8AS	F-HLS12AS
		BS(Shock absorber)	×	F-HLQ8BS	F-HLQ12BS
	Retraction	AF(Adjustable rubber stopper)	F-HLQ6AF	F-HLS8AF	F-HLS12AF
		BF(Shock absorber)	×	F-HLS8BF	F-HLS12BF
		Accessories\Bore size	16	20	25
Standard (HLS)	Both ends	A(Adjustable rubber stopper)	F-HLS16A	F-HLS20A	F-HLS25A
		B(Shock absorber)	F-HLS16B	F-HLS20B	F-HLS25B
	Extension	AS(Adjustable rubber stopper)	F-HLS16AS	F-HLS20AS	F-HLS25AS
		BS(Shock absorber)	F-HLQ16BS	F-HLQ20BS	F-HLQ25BS
	Retraction	AF(Adjustable rubber stopper)	F-HLS16AF	F-HLS20AF	F-HLS25AF
		BF(Shock absorber)	F-HLS16BF	F-HLS20BF	F-HLS25BF
		Accessories\Bore size	6	8	12
Symmetrical (HLSL)	Both ends	A(Adjustable rubber stopper)	F-HLQL6A	F-HLSL8A	F-HLSL12A
		B(Shock absorber)	×	F-HLSL8B	F-HLSL12B
	Extension	AS(Adjustable rubber stopper)	F-HLS6AS	F-HLS8AS	F-HLS12AS
		BS(Shock absorber)	×	F-HLQ8BS	F-HLQ12BS
	Retraction	AF(Adjustable rubber stopper)	F-HLQL6AF	F-HLSL8AF	F-HLSL12AF
		BF(Shock absorber)	×	F-HLSL8BF	F-HLSL12BF
		Accessories\Bore size	16	20	25
Symmetrical (HLSL)	Both ends	A(Adjustable rubber stopper)	F-HLSL16A	F-HLSL20A	F-HLSL25A
		B(Shock absorber)	F-HLSL16B	F-HLSL20B	F-HLSL25B
	Extension	AS(Adjustable rubber stopper)	F-HLS16AS	F-HLS20AS	F-HLS25AS
		BS(Shock absorber)	F-HLQ16BS	F-HLQ20BS	F-HLQ25BS
	Retraction	AF(Adjustable rubber stopper)	F-HLSL16AF	F-HLSL20AF	F-HLSL25AF
		BF(Shock absorber)	F-HLSL16BF	F-HLSL20BF	F-HLSL25BF

Note): A=AS+AF; B=BS+BF.

F - HLS 20 AF			
① Accessory	② Cylinder model	③ Bore size	④ Accessory type[Note]
	HLS: Standard	6	A: Adjustable rubber stopper(Both ends)
	HLSL: Symmetrical	8	AS: Adjustable rubber stopper(Extension)
		12	AF: Adjustable rubber stopper(Retraction)
		16	B: Shock absorber (Both ends)
		20	BF: Shock absorber (Retraction)
		25	

[Note]The list accessories are for HLS cylinder. Accessories that are adaptable to other cylinder are not shown. Please refer to accessory list for selection and ordering information.

Dimensions

AS: Adjustable rubber stopper(Extension)

Body Mounting

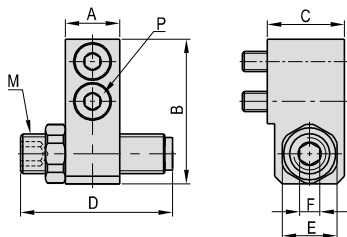
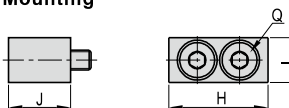


Table Mounting



Bore size\Item	Adjusting stroke range	A	B	C	D	E	F	M	P	H	I	J	Q
6	5	7	19	10.5	16.5	8	3	M6×1.0	M2.5 Length:10	12.5	6.5	10.5	M2.5 Length:10
8	5	8.5	21.5	14	21.5	11	4	M8×1.0	M3 Length:14	14.5	8	12	M3 Length:14
12	5	11	29	15.5	21.5	11	4	M8×1.0	M4 Length:16	20	9	13.5	M4 Length:12
16	5	12	36	17.5	24	14	5	M10×1.0	M5 Length:16	23	10.5	17	M5 Length:16
20	5	15	44.5	22	28	17	6	M12×1.0	M6 Length:20	25	12.5	21	M6 Length:20
25	5	16	53.5	24	32	19	6	M14×1.5	M8 Length:20	33	16.5	23	M8 Length:20

BS: Shock absorber(Extension)

Body Mounting

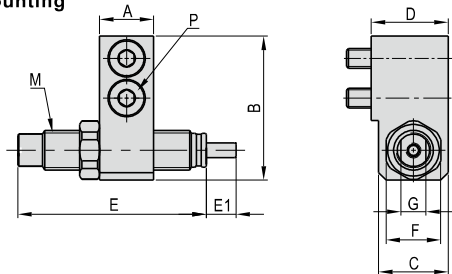
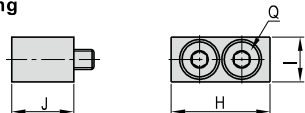


Table Mounting



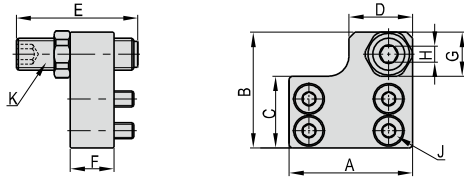
Bore size\Item	A	B	C	D	E	E1	F	G	M	P	H	I	J	Q
8	8.5	21.5	12.5	14	40	6	11	7	M8×1.0	M3 Length:14	14.5	8	12	M3 Length:14
12	11	29	14	15.5	40	6	11	7	M8×1.0	M4 Length:16	20	9	13.5	M4 Length:12
16	12	36	16	17.5	49	7	14	9	M10×1.0	M5 Length:16	23	10.5	17	M5 Length:16
20	15	44.5	20	22	53.5	10	17	11	M12×1.0	M6 Length:20	25	12.5	21	M6 Length:20
25	16	53.5	22	24	68.5	12	19	12	M14×1.5	M8 Length:20	33	16.5	23	M8 Length:20

Slide table cylinder(Cross roller type)

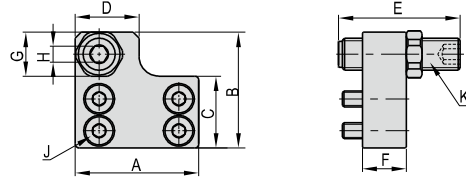
HLS、HLSL Series—Accessories

AF: Adjustable rubber stopper(Retraction)

For standard type



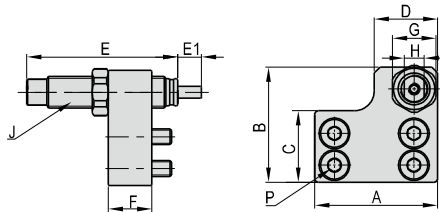
For symmetrical type



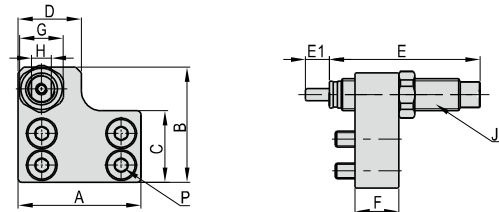
Bore size\Item	Adjusting stroke range	A	B	C	D	E	F	G	H	J	K
6	5	18	19	11	8	21,5	7	8	3	M2,5 Length:6	M6×1,0
8	5	24	22,5	13	14	21,5	8,5	11	4	M3 Length:8	M8×1,0
12	5	31	29	18	16	21,5	11	11	4	M4 Length:12	M8×1,0
16	5	37	37,5	23	18	24	12	14	5	M5 Length:12	M10×1,0
20	5	45,5	47	28,5	23	28	15	17	6	M5 Length:16	M12×1,0
25	5	54	56	34	28	32	16	19	6	M6 Length:18	M14×1,5

BF: Shock absorber(Retraction)

For standard type



For symmetrical type

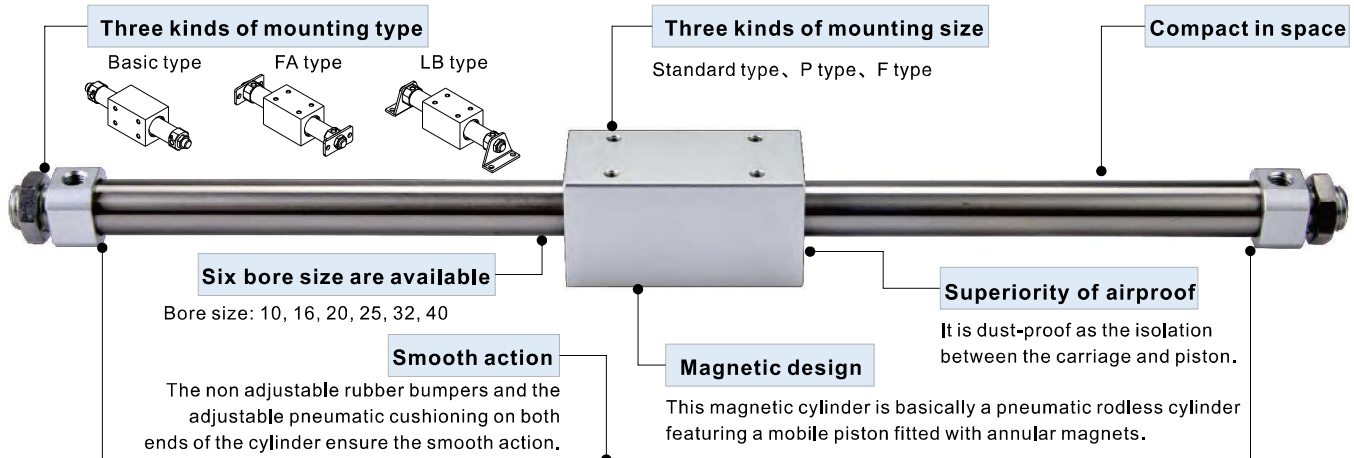


Bore size\Item	A	B	C	D	E	E1	F	G	H	J	P
8	24	22,5	13	14	40	6	8,5	11	7	M8×1,0	M3 Length:8
12	31	29	18	16	40	6	11	11	7	M8×1,0	M4 Length:12
16	37	37,5	23	18	49	7	12	14	9	M10×1,0	M5 Length:12
20	45,5	47	28,5	23	53,5	10	15	17	11	M12×1,0	M5 Length:16
25	54	56	34	28	68,5	12	16	19	12	M14×1,5	M6 Length:18



Rodless magnetic cylinder—RMS Series

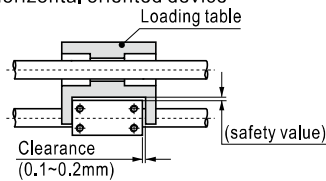
Compendium of RMS Series



Installation and application

- The maxi load to move must be less than the theoretical holding force.
- How to mount load:
 - Horizontal mounting: the permissible radial load must be lower than the figures in the chart below.

Horizontal oriented device

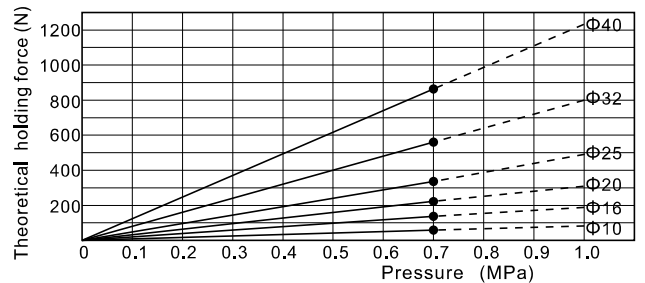


Bore size	10	16	20	25	32	40
Max. Loading table weight(kg)	0.4	1.0	1.1	1.2	1.5	2.0

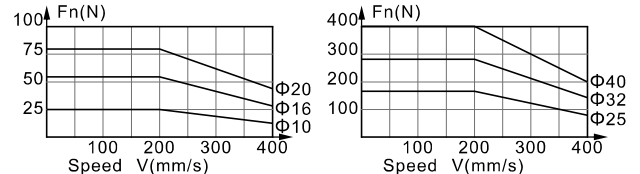
[Note] If Max. load be larger than the value of above table, please conform with our company.

In horizontal movement, please choose proper bore size based on Force-Velocity chart

- Find required pushing force
- Find moving velocity
- Choose proper spec based on force-Velocity chart

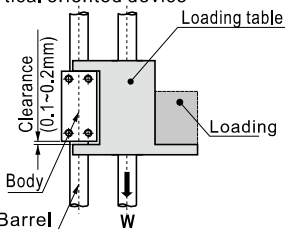


Force-Velocity chart (Pushing force in horizontal movement and moving velocity)



- Vertical mounting: The load guiding method should adopt rolling support (linear guide rail, etc.); if the sliding support is used, the sliding resistance will increase due to the load mass and the torque generated by the load, resulting in poor operation.

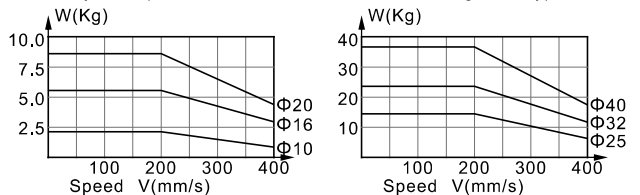
Vertical oriented device



Bore size	Max. Load weight(Loading table+Load)(kg)
10	2.2
16	5.6
20	8.8
25	15
32	24
40	37

[Note] If pressure be larger than the max. pressure, magnetic core might disengage.

Load-Velocity chart (Load in vertical movement and moving velocity)

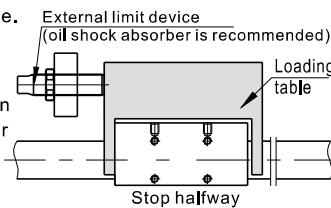


3. Middle-stop:

- When using stopper mechanism to fulfill middle-stop application, working pressure of cylinder cannot exceeds figures stated in the table on the right. Once working pressure exceeds these figures, energy cannot be absorbed when hitting happens on external stopper and it may cause discouple. Shock absorber is recommended in stopper design. When adjusting the mechanism, observe that if hitting process is done smoothly and there is no bounce happened.
- In designing middle-stop application for pneumatic system, allowable kinetic energy must be within figures shown in the table on the right. (Moving speed needs to be smaller than max velocity)

Note : When kinetic energy exceeds allowable figures, discouple will happen, which means body and piston inside the barrel will separate from each other, please be careful when design.

- Dirty substances in the pipe must be eliminated before cylinder is connected with pipeline to prevent the entrance of impurities into the cylinder.
- The medium used by cylinder shall be filtered to 40μm or below.
- If the cylinder is dismantled and stored for a long time, pay attention to conduct anti-rust treatment to the surface. Anti-dust jam cap shall be added in air inlet and outlet ports.;
- Non-magnetically conductive materials are recommended for workpieces fitted to the cylinder, otherwise the lifetime may be halved if magnetically conductive materials are used.



Bore size	Maximum allowable working pressure for middle-stop
10	0.55MPa
16	0.55MPa
20	0.55MPa
25	0.55MPa
32	0.55MPa
40	0.55MPa

Bore size	Allowable kinetic energy for middle-stop application in pneumatic system(ES)(J)
10	0.03
16	0.13
20	0.24
25	0.45
32	0.88
40	1.53

RMS Series



Specification

Series name	RMS Series		RMS, RMSF Series				RMSF Series			
Bore size(mm)	10		16	20	25	32	40	16	20	32
Acting type	Double acting									
Fluid	Air(to be filtered by 40µm filter element)									
Operating pressure	0.2~0.7MPa (29~100psi)(2.0~7bar)		0.15~0.7MPa(22~100psi)(1.5~7bar) [Note2]							
Proof pressure	1.2MPa(175psi)(12.0bar)									
Temperature °C	-20~70									
Speed range mm/s	50~400									
Stroke tolerance mm	0~250 ^{+1.0} ₀ 251~1000 ^{+1.5} ₀ 1001~ ^{+2.0} ₀									
Cushion type	Bumper		Variable cushion+Fixed cushion							
Port size [Note1]	M5×0.8		1/8"		1/4"		M5×0.8		1/8"	
Safe holding force N	55	140	220	345	560	880	140	220	560	

[Note1] PT thread, G thread and NPT thread are available.

[Note 2] when stopping in the middle, Operating pressure shall not exceed 0,55MPa, and buffer shall be provided when stopping at both ends.

Stroke

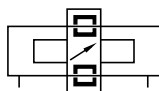
Bore size (mm)	Standard stroke (mm)	Max.std stroke
10	50 100 150 200 250 300	1000
16	50 100 150 200 250 300 350 400 450 500	1500
20	50 100 150 200 250 300 350 400 450 500 600 700 750 800 900 1000	2000
25	50 100 150 200 250 300 350 400 450 500 600 700 750 800 900 1000	2500
32	50 100 150 200 250 300 350 400 450 500 600 700 750 800 900 1000	3000
40	50 100 150 200 250 300 350 400 450 500 600 700 750 800 900 1000	3000

[Note] Consult us for non-standard stroke.

Product feature

1. This magnetic cylinder is basically a pneumatic rodless cylinder featuring a mobile piston fitted with annular magnets. The mobile carriage is also equipped with magnets to provide magnetic coupling (carriage/piston). The carriage slide freely along the main tube.
2. It is dust-proof as the isolation between the carriage and piston.
3. It is compact in space.
4. The non adjustable rubber bumpers and the adjustable pneumatic cushioning on both ends of the cylinder ensure the smooth action.

Symbol



Ordering code

RMS □ 20 ×200 □ □

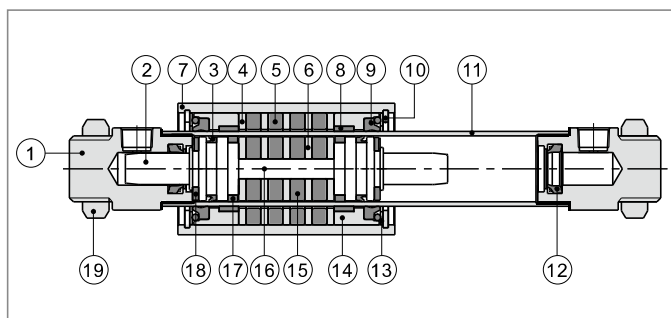
① ② ③ ④ ⑤ ⑥

① Model	② Version	③ Bore size	④ Stroke	⑤ Mounting type [Note1]	⑥ Thread type [Note2]
RMS: Rodless magnetic cylinder	Blank: basic version	10 16 20 25 32 40	Refer to stroke table for details	Blank: non bracket	Blank: PT
	P: P size version	16 20 32		LB: LB type	G: G
	F: F size version	16 20 25 32 40		FA: FA type	T: NPT

[Note1] RMSF40 series do not have FA mounting accessories.

[Note2] Blank on thread code means metric M thread. There is only metric thread for Φ10/Φ16, if G or NPT thread is needed, please consult

Inner structure and material of major parts

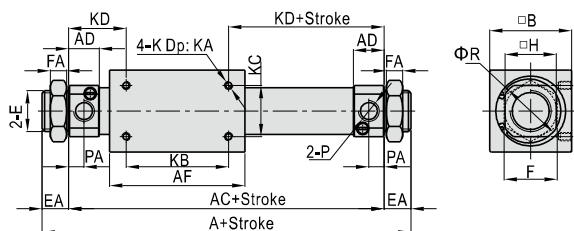


NO.	Item	Material	NO.	Item	Material
1	End cap	Aluminum alloy	11	Barrel	Stainless steel
2	Piston	Aluminum alloy	12	Cushion O-ring	TPU
3	Piston seal	TPU	13	Washer	Stainless steel
4	Magnet washer	Carbon steel	14	Cover	Aluminum alloy
5	Magnet	Rare-earth material	15	Magnet	Rare-earth material
6	Magnet washer	Carbon steel	16	Connecting rod	Stainless steel
7	Body	Aluminum alloy	17	Wear ring	Wear resistant material
8	Wear ring	Wear resistant material	18	Bumper	NBR
9	Scraping dust ring	Plastics	19	Nut	Stainless steel
10	C Clip	Spring steel			

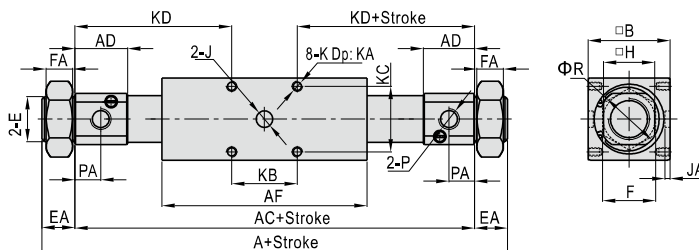
RMS Series

Dimensions

RMS RMS-P



RMS-F



Model/Item	A	AC	AD	AF	B	E	EA	F	FA	H	J	JA	K	KA	KB	KC	KD	P	PA	R
RMS10	91	73	9,5	48	25	M10×1,0	9	14	4	15	-	-	M3×0,5	4	30	16	21,5	M5×0,8	5	17
RMS16	103	83	10	57	35	M10×1,0	10	14	4	20	-	-	M4×0,7	5	35	19	24	M5×0,8	5,5	22
RMSP16	112	92	14,5	57		M10×1,0	10	14	4		-	-	M4×0,7	7	34	25	29		7,5	
RMSF16	205	181	34	80	40	M16×1,5	12	23	8	25	8	3	M5×0,8	7,5	26	26	77,5	1/8"	20	29
RMS20	132	106	15	66		M20×1,5	13	26	8		-	-	M4×0,7	5,5	50	25	28		1/8"	
RMSP20	143	115	19,5	66	46	M20×1,5	14	26	8	30	-	-	M5×0,8	7	40	30	37,5	1/8"	10	33,5
RMSF20	217	185	29,5	90		M22×1,5	16	29	7		8	2,5	M5×0,8	8,5	32	32	76,5		1/8"	
RMS25	137	111	15	70	60	M26×1,5	13	32	8	36	-	-	M5×0,8	7,5	50	30	30,5	1/8"	7,5	39,5
RMSP25	238	206	37,5	90		M22×1,5	16	29	7		10	3	M6×1,0	10	36	36	85		1/8"	
RMS32	156	124	16	80	70	M26×1,5	16	32	8	46	-	-	M6×1,0	8	50	40	41,5	1/8"	10	39,5
RMSP32	165	133	20,5	80		M26×1,5		32	8		-	-		8						
RMSF32	270	238	48	110	70	M30×1,5	16	36	7	46	10	3,5	M6×1,0	12,5	48	48	95	1/4"	28	49,5
RMS40	182	150	22	92		M32×2,0		41	10		-	-		9						
RMSF40	327	295	44,5	130	M38×1,5	46	8	12	4,5	M8×1,25	16	50	56	122,5	1/4"	25				

List for ordering code of accessories

Accessories\Bore size	10		16			20			25		32			40	
	RMS	RMS	RMSP	RMSF	RMS	RMSP	RMSF	RMS	RMSF	RMS	RMSP	RMSF	RMS	RMSF	
Mounting accessories	LB	F-PB12LB	F-RMS16LB	F-RMSF16LB	F-RMS20LB	F-RMSF20LB	F-RMS25LB	F-RMSF25LB	F-RMS32LB	F-RMSF32LB	F-RMS40LB	F-RMSF40LB			
	FA	F-PB12FA	F-PB12FA	F-M112FA	F-MF20FA	F-MA20FA	F-MF32FA	F-MA20FA	F-MF32FA	F-MA40FA	F-MF40FA	-			

Accessory selection

Accessories\Cylinder model	RMS	RMSP	RMSF	
Mounting accessories	LB	•	•	•
	FA	•	•	•

Material of accessories

Accessories\Bore size	10		16			20			25		32			40	
	RMS	RMS	RMSP	RMSF	RMS	RMSP	RMSF	RMS	RMSF	RMS	RMSP	RMSF	RMS	RMSF	
Mounting accessories	LB	△	△	△	△	△	△	△	△	△	△	△	△	△	
	FA	△	△	△	△	△	○	△	○	△	○	△	△	-	

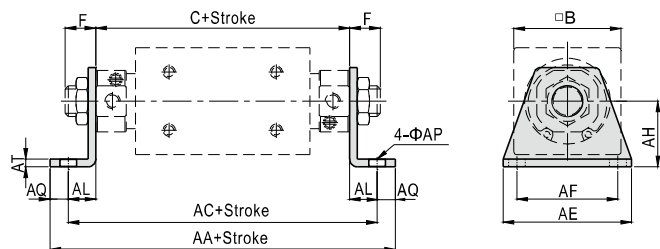
○—Lower carbon steel ; △—SPCC

Rodless magnetic cylinder

RMS Series

Dimensions

RMS-LB RMSP-LB

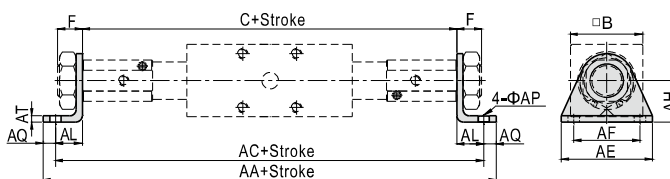


Bore size\Item	AA		AC		C		F	
	RMS	RMSP	RMS	RMSP	RMS	RMSP	RMS	RMSP
10	103	-	91	-	73	-	9	-
16	113	122	101	110	83	92	10	10
20	158	167	142	151	106	115	13	14
25	167	-	151	-	111	-	13	-
32	184	193	170	179	124	133	16	16
40	216	-	196	-	150	-	16	-

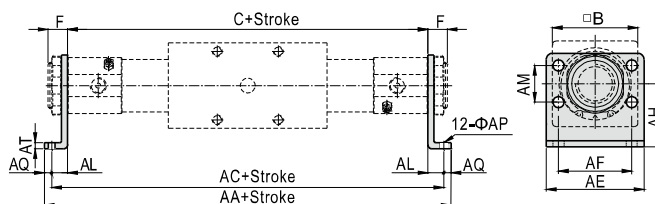
Bore size\Item	AE	AF	AH	AL	AP	AQ	AT	B
10	42	33	14	9	5.5	6	2.5	25
16	42	33	20	9	5.5	6	2.5	35
20	43	30	23	18	6.5	8	3	40
25	54	40	26	20	6.5	8	4	46
32	62	46	33	23	7	7	4	60
40	75	55	38	23	9	10	5	70

RMSF-LB

Φ16~Φ25



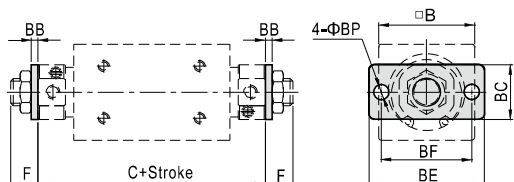
Φ32, Φ40



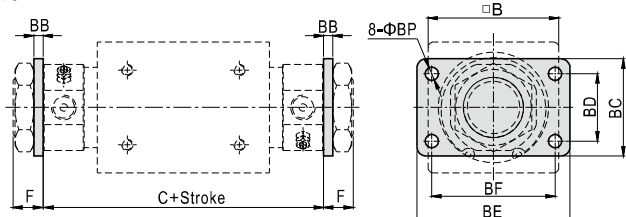
Bore size\Item	AA	AC	AE	AF	AH	AL	AM	AP	AQ	AT	B	C	F
16	221	209	44	32	20	14	-	5.5	6	2.5	35	181	12
20	235	219	54	40	23	17	-	6.5	8	3	40	185	16
25	256	240	54	40	26	17	-	6.5	8	4	46	206	16
32	280	266	66	52	33	14	28	7	7	4	60	238	16
40	353	333	80	60	38	19	30	9	10	5	70	295	16

RMS-FA RMSP-FA

Φ16~Φ32



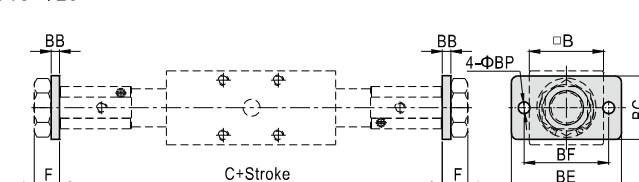
Φ40



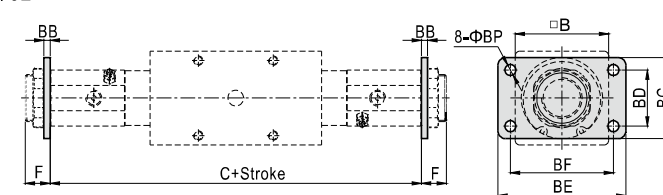
Bore size\Item	B	BB	BC	BD	BE	BF	BP	C		F	
								RMS	RMSP	RMS	RMSP
10	25	3	20	-	42	33	5.5	73	-	9	-
16	35	3	20	-	42	33	5.5	83	92	10	10
20	40	4	34	-	75	60	7	106	115	13	14
25	46	4	40	-	75	60	7	111	-	13	-
32	60	4	40	-	75	60	7	124	133	16	16
40	70	5	52	36	82	66	7	150	-	16	-

RMSF-FA

Φ16~Φ25



Φ32



Bore size\Item	B	BB	BC	BD	BE	BF	BP	C	F
16	35	4	30	-	52	40	5.5	181	12
20	40	4	38	-	64	50	6.5	185	16
25	46	4	38	-	64	50	6.5	206	16
32	60	4	50	36	84	70	6.5	238	16

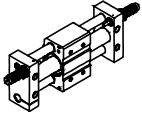


Guided rodless cylinder(Magnetic Coupled)——RMT Series

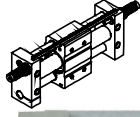
Compendium of RMT Series

With magnet and without magnet are available

Without magnet



With magnet

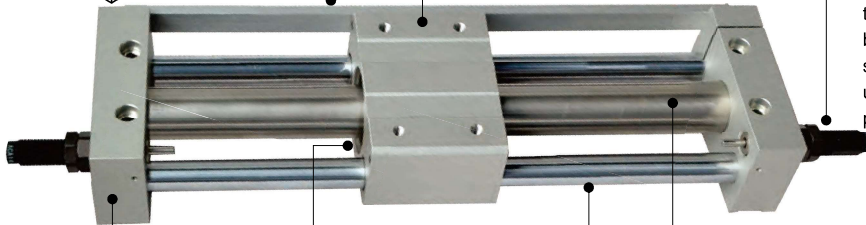


Magnetic design

This magnetic cylinder is basically a pneumatic rodless cylinder featuring a mobile piston fitted with annular magnets.

Two kinds of cushion type

The non adjustable rubber bumpers and the adjustable pneumatic cushioning on both ends of the cylinder ensure the smooth action. If shock absorber be used, the cushioning effect is more perfection.



Double guides

Double guides ensure high precision and can endure proper side load or offset load.

Five bore size are available

Bore size: 16, 20, 25, 32, 40

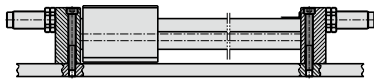
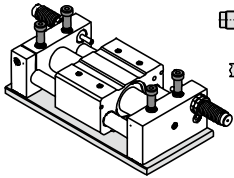
It is compact in space

Can be mounted from top and bottom.

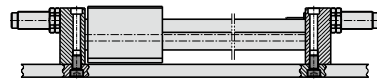
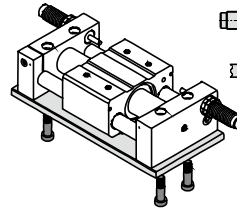
Superiority of airproof

It is dust-proof as the isolation between the carriage and piston.

Top bolt mounting



Bottom bolt mounting



Installation and application



1. Dirty substances in the pipe must be eliminated before cylinder is connected with pipeline to prevent the entrance of impurities into the cylinder.
2. The medium used by cylinder shall be filtered to 40μm or below.
3. Anti-freezing measure shall be adopted under low temperature environment to prevent moisture freezing.
4. If the cylinder is dismantled and stored for a long time, pay attention to conduct anti-rust treatment to the surface.
Anti-dust caps shall be added in air inlet and outlet ports.
5. Non-magnetically conductive materials are recommended for workpieces fitted to the cylinder, otherwise the lifetime may be halved if magnetically conductive materials are used.

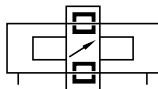


Guided rodless cylinder(Magnetic Coupled)

RMT Series



Symbol



Specification

Bore size(mm)	16	20	25	32	40
Acting type	Double acting				
Fluid	Air(to be filtered by 40µm filter element)				
Operating pressure	0.2~0.7MPa(30~100psi)(2.0~7bar)		0.25~0.7MPa(36~100psi)(2.5~7bar)		
Proof pressure	1.2MPa(175psi)(12.0bar)				
Temperature °C	-20~70				
Speed range mm/s	50~400				
Stroke tolerance mm	0~250 ^{+1,0} ₀	251~1000 ^{+1,5} ₀	1001~ ^{+2,0} ₀		
Cushion type	Fixed cushion		Shock absorber(Available)		
Safe holding force N	140	220	345	560	880
Port size [Note1]	M5×0.8		1/8"		1/4"

[Note1] PT thread, G thread and NPT thread are available.
Add) Refer to P362 for detail of sensor switch.

Product feature

1. This magnetic cylinder is basically a pneumatic rodless cylinder featuring a mobile piston fitted with annular magnets. The mobile carriage is also equipped with magnets to provide magnetic coupling (carriage/piston). The carriage slide freely along the main tube.
2. It is dust-proof as the isolation between the carriage and piston.
3. It is compact in space.
4. The non adjustable rubber bumpers and the adjustable pneumatic cushioning on both ends of the cylinder ensure the smooth action. If shock absorber be used, the cushioning effect is more perfection.
5. Double guides ensure high precision and can endure proper side load or offset load.

Stroke

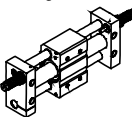
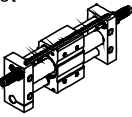
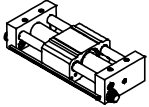
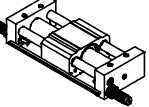
Bore size (mm)	Standard stroke (mm)														Max,std stroke		
16	50	100	150	200	250	300	350	400	450	500					750		
20	50	100	150	200	250	300	350	400	450	500	600	700	750	800			1000
25	50	100	150	200	250	300	350	400	450	500	600	700	750	800			1500
32	50	100	150	200	250	300	350	400	450	500	600	700	750	800			1500
40	50	100	150	200	250	300	350	400	450	500	600	700	750	800	900	1000	1500

[Note] Consult us for non-standard stroke.

Ordering code

RMT 20 ×100 S □ □

① ② ③ ④ ⑤ ⑥

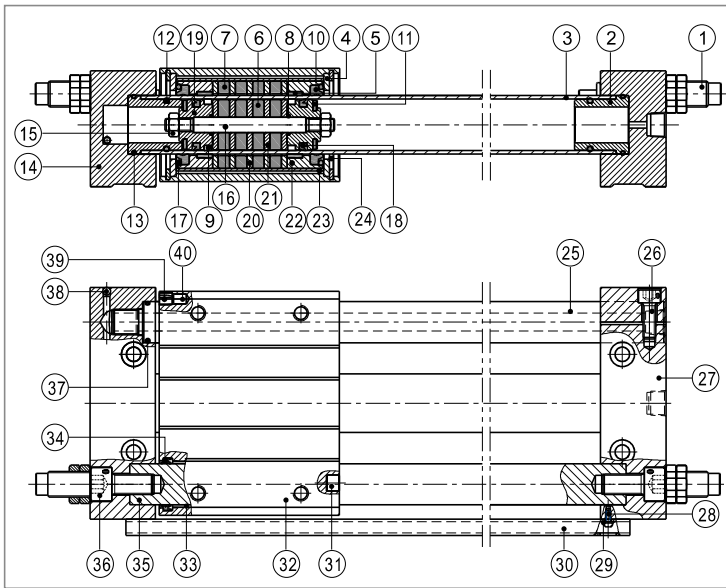
① Model	② Bore size	③ Stroke	④ Magnet	⑤ Cushion type	⑥ Thread type [Note1]
RMT: Guided rodless cylinder(Magnetic Coupled)	16 20 25 32 40	Refer to stroke table for details	Blank: Without magnet  S: With magnet 	Blank: With two adjustable nuts  A: With two shock absorbers 	Blank: PT G: G T: NPT

[Note1] Blank on thread code means metric M thread. There is only metric thread for Φ16. if G or NPT thread is needed, please consult.

Guided rodless cylinder(Magnetic Coupled)

RMT Series

Inner structure and material of major parts

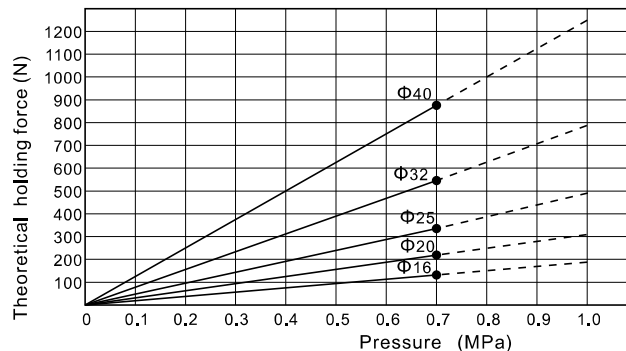


NO.	Item	Material	NO.	Item	Material
1	Shock absorber	Combination	21	Magnet washer	Carbon steel
2	Washer cover	Aluminum alloy	22	End cover	Aluminum alloy
3	Stainless steel barrel	Stainless steel	23	Moveable core	Aluminum alloy
4	Washer	Carbon steel	24	C clip	Spring steel
5	Wearing ring	Wear resistant material	25	Guide I	Carbon steel
6	Magnet	Rare-earth material	26	Countersink screw	Carbon steel
7	Magnet	Rare-earth material	27	Fixing plate	Aluminum alloy
8	O-ring	NBR	28	Screw	Carbon steel
9	Wear ring	Wear resistant material	29	Spring washer	Spring steel
10	Scraping dust ring	Plastics	30	Rail	Aluminum alloy
11	Bumper	NBR	31	Bumper block	Stainless steel
12	O-ring	NBR	32	Barrel	Aluminum alloy
13	O-ring	NBR	33	Bushing	Bronze+Fill lubricant
14	Fixing plate	Aluminum alloy	34	Gasket	TPU
15	Nut	SS41	35	Guide II	Carbon steel
16	Joint pole	Stainless steel	36	Countersink screw	Carbon steel
17	O-ring	NBR	37	O-ring	NBR
18	Piston seal	TPU	38	Steel ball	Stainless steel
19	Magnet	Aluminum alloy	39	Location washer	NBR
20	Magnet washer	Carbon steel	40	Magnet	Rare-earth material

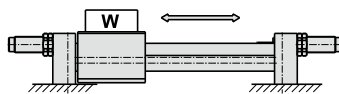
Installation and application

1. How to determine load:

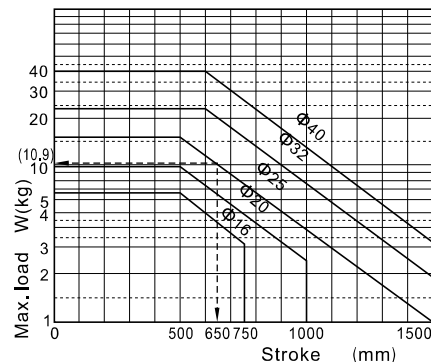
1.1) The maxi load to move must be less than the theoretical holding force.



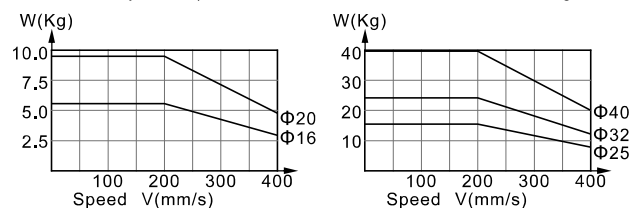
1.2) The relation between loading and stroke as below (Loading center and slide table center must be superposition)



Bore size	Max.Load W(kg)	Stroke scope
16	5.6	~300mm
20	9.6	~500mm
25	16	~500mm
32	24	~600mm
40	40	~600mm



Load-Velocity chart (Load in horizontal movement and moving velocity)



In horizontal movement, please choose proper bore size based on

Load-Velocity chart

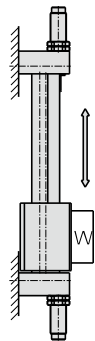
A. Find required load

B. Find moving velocity

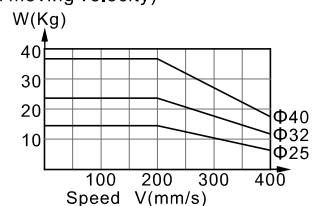
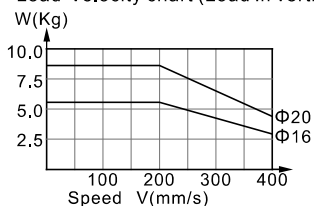
C. Choose proper spec based on Load-Velocity chart

RMT Series

1.3. Load-Velocity chart (Load in vertical movement and moving velocity)

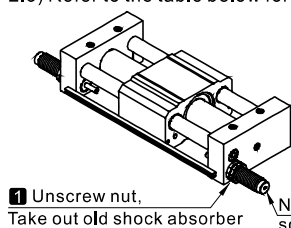


Load-Velocity chart (Load in vertical movement and moving velocity)



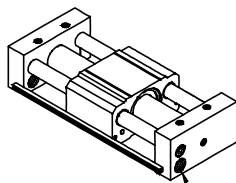
2. About shock absorber

- 2.1) Shock absorbers are consumable parts. When a decrease in energy absorption capacity is noticed, it must be replaced. Refer to the table below for shock absorber type.
- 2.2) Never loosen the bottom screw of the shock absorber. (It is not an adjustment screw.) That may cause oil leakage.
- 2.3) Refer to the table below for tightening torques of the shock absorber setting nut.

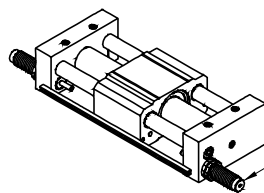


1 Unscrew nut,
Take out old shock absorber

Never loosen the bottom
screw of the shock absorber
That may cause oil leakage.



2 Mounting new
shock absorber

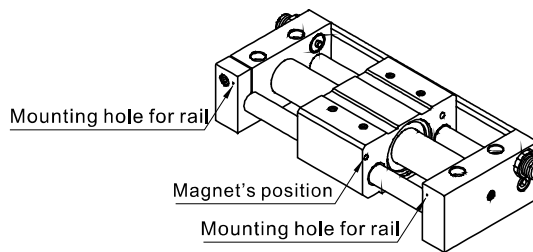
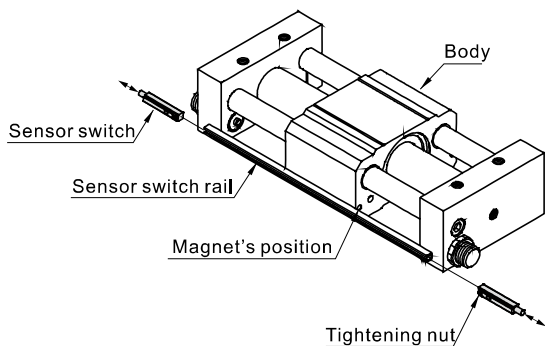


3 Adjust the shock absorber to proper position
and tightening it with proper torque.

Cylinder model	RMT16	RMT20	RMT25	RMT32	RMT40
Shock absorber type	ACA1006-A	ACA1007-1N	ACA1412-1N	ACA2020-1N	ACA2020-1N
Tightening torque(Nm)	1.67	1.67	3.14	10.80	10.80

3. About sensor switch

- 3.1) Sensor switch only can be used for the cylinder with magnet. The magnet located the four corner of body's (refer below). The cylinder with magnet have both group mounting hole for mounting rail. please refer to below for ordering sensor switch, mounting it into the rail's groove, adjusting it to proper position, tightening it with proper torque.



Cylinder model	RMT16	RMT20	RMT25	RMT32	RMT40
Sensor switch	CMSG、DMSG、EMSG				

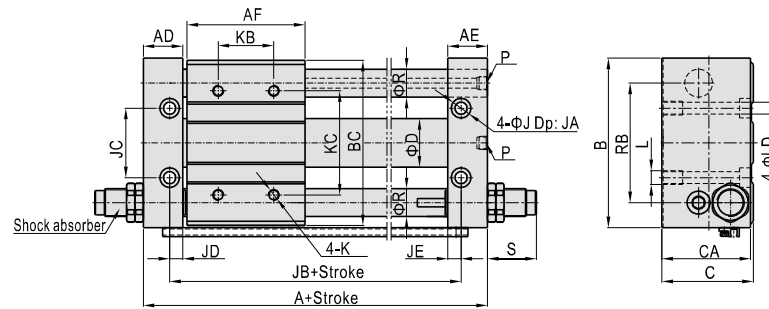
4. Use an external limit device to stop the load midway: Please refer to RMS series for details.

Guided rodless cylinder(Magnetic Coupled)

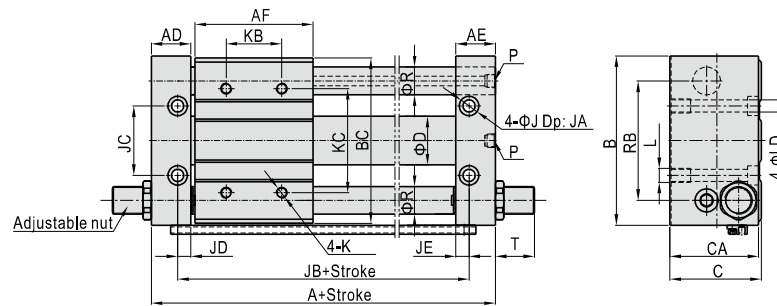
RMT Series

Dimensions

RMT-A



RMT



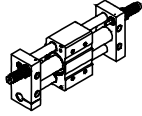
Bore size\Item	A	AD	AE	AF	B	BC	C	CA	D	J	JA	JB	JC	JD	JE	K	KB	KC	L	LD	P	R	RB	S	T
16	107	22,5	22,5	60	75	72	40	39	18	9,5	5	75	30	6,5	6,5	M5×0,8Dp:10	30	50	M6×1,0Dp:9,5	5,5	M5×0,8	12	52	18,5	13,5
20	124	25,5	25,5	70	90	87	46	45	22,8	9,5	5	90	38	8,5	8,5	M6×1,0Dp:10	40	70	M6×1,0Dp:9,5	5,5	1/8"	16	63	22,5	10
25	124	25,5	25,5	70	100	97	54	53	27,8	11	6,5	90	42	8,5	8,5	M6×1,0Dp:10	40	70	M8×1,25Dp:10	7	1/8"	16	70	40,5	15
32	148	28,5	28,5	85	122	119	66	64	35	14	8	110	50	9,5	9,5	M8×1,25Dp:12	40	75	M10×1,5Dp:15	8,5	1/8"	20	86	57,5	16
40	170	35,5	35,5	95	145	142	76	74	43	14	8	120	64	10,5	10,5	M8×1,25Dp:12	65	105	M10×1,5Dp:15	8,5	1/4"	25	105	50,5	10



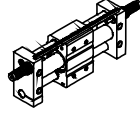
Compendium of RMTL Series

With magnet and without magnet are available

Without magnet



With magnet



Magnetic design

This magnetic cylinder is basically a pneumatic rodless cylinder featuring a mobile piston fitted with annular magnets.

Two kinds of cushion type

The non adjustable rubber bumpers and the adjustable pneumatic cushioning on both ends of the cylinder ensure the smooth action. If shock absorber be used, the cushioning effect is more perfection.

Six bore size are available

Bore size: 10, 16, 20, 25, 32, 40

Double guides

Double guides ensure high precision and can endure proper side load or offset load.

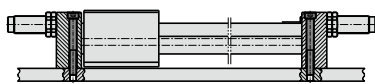
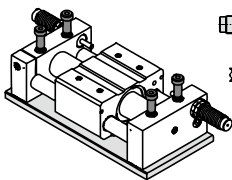
Superiority of airproof

It is dust-proof as the isolation between the carriage and piston.

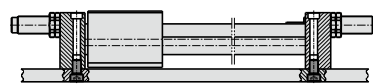
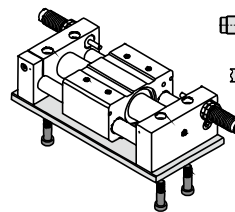
It is compact in space

Can be mounted from top and bottom.

Top bolt mounting



Bottom bolt mounting



Installation and application



1. Dirty substances in the pipe must be eliminated before cylinder is connected with pipeline to prevent the entrance of impurities into the cylinder.
2. The medium used by cylinder shall be filtered to 40μm or below.
3. Anti-freezing measure shall be adopted under low temperature environment to prevent moisture freezing.
4. If the cylinder is dismantled and stored for a long time, pay attention to conduct anti-rust treatment to the surface.
Anti-dust caps shall be added in air inlet and outlet ports.
5. Non-magnetically conductive materials are recommended for workpieces fitted to the cylinder, otherwise the lifetime may be halved if magnetically conductive materials are used.

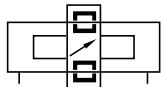


Guided rodless cylinder(Magnetic Coupled/Ball bearing) **AIRTAC**

RMTL Series



Symbol



Product feature

1. This magnetic cylinder is basically a pneumatic rodless cylinder featuring a mobile piston fitted with annular magnets. The mobile carriage is also equipped with magnets to provide magnetic coupling (carriage/piston). The carriage slide freely along the main tube.
2. It is dust-proof as the isolation between the carriage and piston.
3. It is compact in space.
4. The non adjustable rubber bumpers and the adjustable pneumatic cushioning on both ends of the cylinder ensure the smooth action. If shock absorber be used, the cushioning effect is more perfection.
5. Double guides ensure high precision and can endure proper side load or offset load.

Specification

Bore size(mm)	10	16	20	25	32	40
Acting type	Double acting					
Fluid	Air(to be filtered by 40μm filter element)					
Operating pressure	0.2~0.7MPa(30~100psi)(2.0~7bar)					
Proof pressure	1.2MPa(175psi)(12.0bar)					
Temperature °C	-20~70					
Speed range mm/s	50~500					
Stroke tolerance mm	0~250 ^{+1.0} ₀		251~1000 ^{+1.5} ₀		1001~ ^{+2.0} ₀	
Cushion type	Fixed cushion			Shock absorber(Available)		
Safe holding force N	55	140	220	345	560	880
Port size [Note1]	M5×0.8			1/8"		1/4"

[Note1] PT thread, G thread and NPT thread are available.
Add) Refer to P362 for detail of sensor switch.

Stroke

Bore size (mm)	Standard stroke (mm)											Max, std stroke					
10	50	100	150	200	250	300						500					
16	50	100	150	200	250	300	350	400	450	500			750				
20	50	100	150	200	250	300	350	400	450	500	600	700	750	800	1000		
25	50	100	150	200	250	300	350	400	450	500	600	700	750	800	1500		
32	50	100	150	200	250	300	350	400	450	500	600	700	750	800	1500		
40	50	100	150	200	250	300	350	400	450	500	600	700	750	800	900	1000	1500

[Note] Consult us for non-standard stroke.

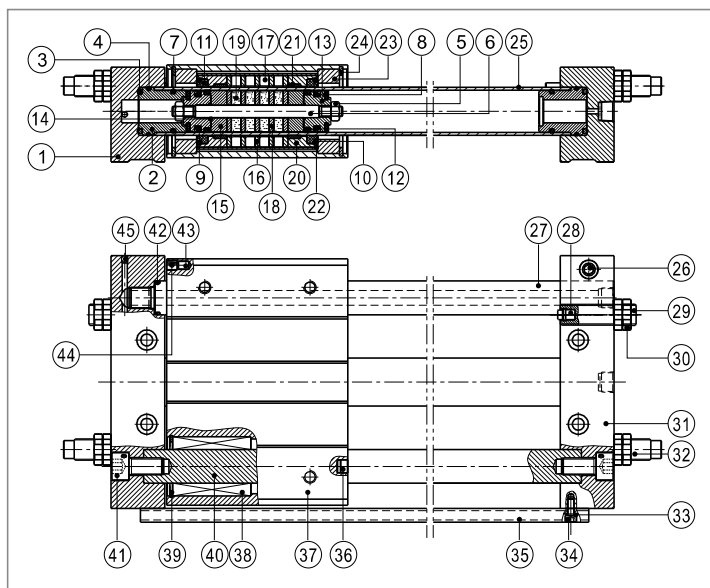
Ordering code

RMTL 20 × 100 S □ □					
① Model	② Bore size	③ Stroke	④ Magnet	⑤ Cushion type [Note1]	⑥ Thread type
RMTL: Guided rodless cylinder(Magnetic Coupled/Ball bearing)	10 16	Refer to stroke table for details	Blank: Without magnet 	Blank: With two adjustable nuts 	Blank: M5 Blank: PT G: G T: NPT
	20 25 32 40		S: With magnet 	A: With two shock absorbers 	

[Note1] When A type is selected, the two adjustable nuts are added too.

RMTL Series

Inner structure and material of major parts

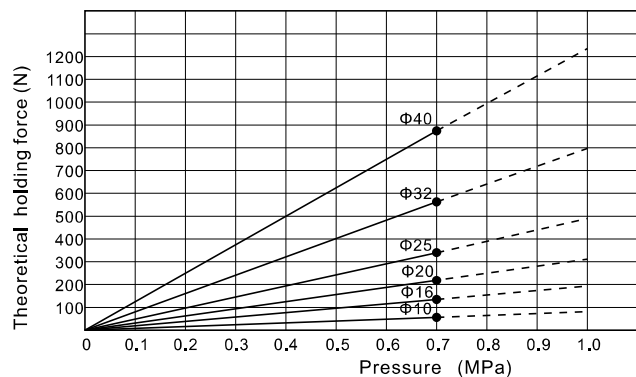


NO.	Item	Material	NO.	Item	Material
1	Fixing plate	Aluminum alloy	24	C clip	Spring steel
2	Washer cover	Aluminum alloy	25	Barrel	Stainless steel
3	O-ring	NBR	26	Countersink screw	Carbon steel
4	O-ring	NBR	27	Guide I	Carbon steel
5	Nut	Carbon steel	28	Bumper	TPU
6	Joint pole	Stainless steel	29	Adjustable screw	Carbon steel
7	O-ring	NBR	30	Nut	Ss41
8	Bumper	NBR	31	Fixing plate	Aluminum alloy
9	Piston seal	TPU	32	Shock absorber	Combination
10	O-ring	NBR	33	Spring washer	Spring steel
11	Scraping dust ring	Plastics	34	Countersink screw	Carbon steel
12	Wearing ring	Wear resistant material	35	Rail	Aluminum alloy
13	Piston	Aluminum alloy	36	Bumper block	Stainless steel
14	O-ring	NBR	37	Body	Aluminum alloy
15	Piston washer	Aluminum alloy	38	Bushing	
16	Magnet washer	Carbon steel	39	C clip	Spring steel
17	Magnet	Rare-earth material	40	Guide II	Carbon steel
18	Magnet washer	Carbon steel	41	Countersink screw	Carbon steel
19	Magnet	Rare-earth material	42	O-ring	NBR
20	Body cover	Aluminum alloy	43	Magnet	Rare-earth material
21	Wearing ring	Wear resistant material	44	Location washer	NBR
22	Mobility iron	Aluminum alloy	45	Steel ball	Stainless steel
23	Washer	Aluminum alloy			

Installation and application

1. How to determine load

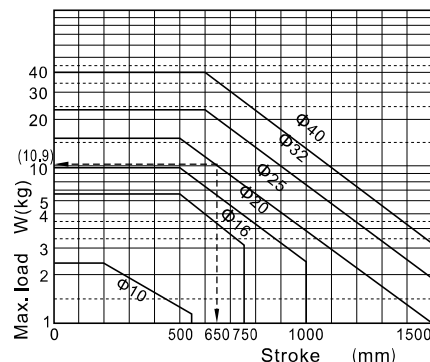
The maxi load to move must be less than the theoretical holding force.



The relation between loading and stroke as below

(Loading center and slide table center must be superposition)

Bore size	Max.Load W(kg)	Stroke scope
10	2.4	~200mm
16	5.6	~300mm
20	9.6	~500mm
25	16	~500mm
32	24	~600mm
40	40	~600mm



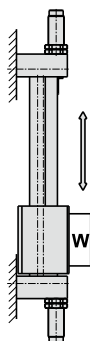
In horizontal movement, please choose proper bore size based on Load-Velocity chart

A. Find required load

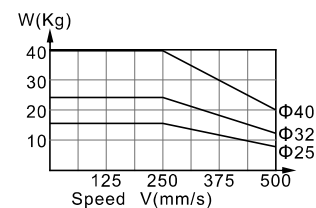
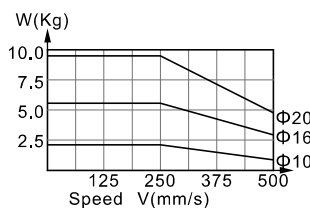
B. Find moving velocity

C. Choose proper spec based on Load-Velocity chart

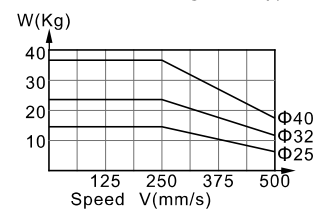
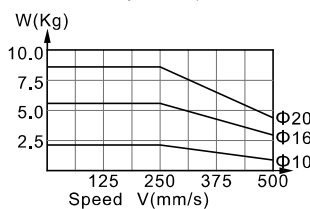
1.3. Load-Velocity chart (Load in vertical movement and moving velocity)



Load-Velocity chart (Load in horizontal movement and moving velocity)



Load-Velocity chart (Load in vertical movement and moving velocity)

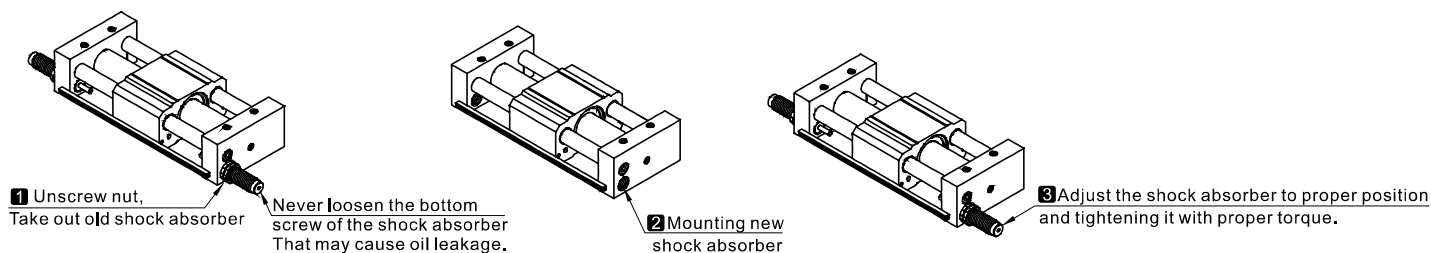


Guided rodless cylinder(Magnetic Coupled/Ball bearing) **AIRTAC**

RMTL Series

2. About shock absorber

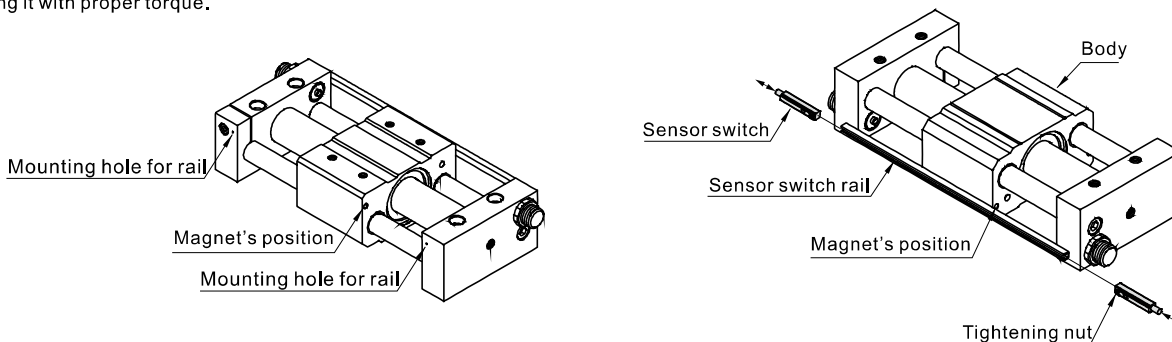
- 2.1) Shock absorbers are consumable parts. When a decrease in energy absorption capacity is noticed, it must be replaced. Refer to the table below for shock absorber type.
- 2.2) Never loosen the bottom screw of the shock absorber. (It is not an adjustment screw.) That may cause oil leakage.
- 2.3) Refer to the table below for tightening torques of the shock absorber setting nut.



Bore size	10	16	20	25	32	40
Shock absorber type	ACA0806-1N	ACA1006-A	ACA1007-1N	ACA1412-1N	ACA2020-1N	ACA2020-1N
Tightening torque(Nm)	1.67	1.67	1.67	3.14	10.80	10.80

3. About sensor switch

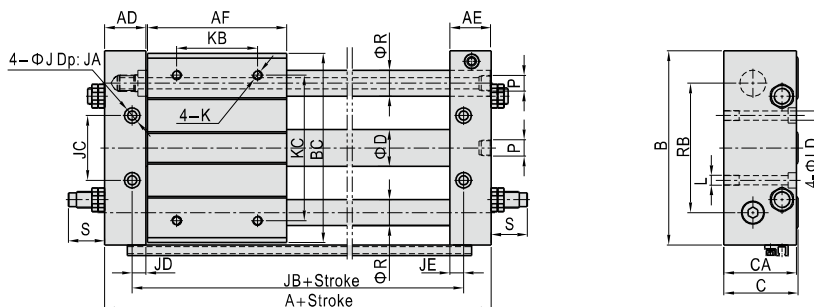
- 3.1) Sensor switch only can be used for the cylinder with magnet. The magnet is located at the four corners of the body's (refer below). The cylinder with magnet has both groups of mounting holes for the rail. Please refer to below for ordering sensor switches, mounting them into the rail's groove, adjusting them to the proper position, and tightening them with the proper torque.



Cylinder model	RMTL10	RMTL16	RMTL20	RMTL25	RMTL32	RMTL40
Sensor switch	CM5G, DMSG, EMSG					

- 4. Use an external limit device to stop the load midway: Please refer to RMS series for details.

Dimensions



Model	A	AD	AE	AF	B	BC	C	CA	D	J	JA	JB	JC	JD	JE	K	KB	KC	L	LD	P	R	RB	S
RMTL10	111	20.5	20.5	68	80	77	34	33	12	8	4	85	26	7.5	7.5	M4X0.7Dp:8	30	60	M5X0.8Dp:9.5	4.5	M5X0.8	10	52	17.5
RMTL16	122	22.5	22.5	75	95	92	40	39	18	9.5	5	90	30	6.5	6.5	M5X0.8Dp:10	45	70	M6X1.0Dp:9.5	5.5	M5X0.8	12	65	18.5
RMTL20	139	25.5	25.5	86	120	117	46	45	22.8	9.5	5	105	40	8.5	8.5	M6X1.0Dp:10	50	90	M6X1.0Dp:10	5.5	1/8"	16	80	22.5
RMTL25	139	25.5	25.5	86	130	127	54	53	27.8	11	6.5	105	50	8.5	8.5	M6X1.0Dp:10	60	100	M8X1.25Dp:10	7	1/8"	16	90	40.5
RMTL32	159	28.5	28.5	100	160	157	66	64	35	14	8	121	60	9.5	9.5	M8X1.25Dp:12	70	120	M10X1.5Dp:15	8.5	1/8"	20	110	57.5
RMTL40	209	35.5	35.5	136	190	187	78	74	43	14	8	159	84	10.5	10.5	M8X1.25Dp:12	90	140	M10X1.5Dp:15	8.5	1/4"	25	130	50.5





Rodless magnetic cylinder(With Linear guide)—RMH Series

Compendium of RMH Series

Magnetic design
This magnetic cylinder is basically a pneumatic rodless cylinder featuring a mobile piston fitted with annular magnets.

Inlet and outlet ports are on the same side

Sensor switch rail
Matching sensor model : CMSH, DMSH, EMSH

With the slide rail
The operation accuracy of the body is high, the body does not rotate accurately, and the load capacity is strong.

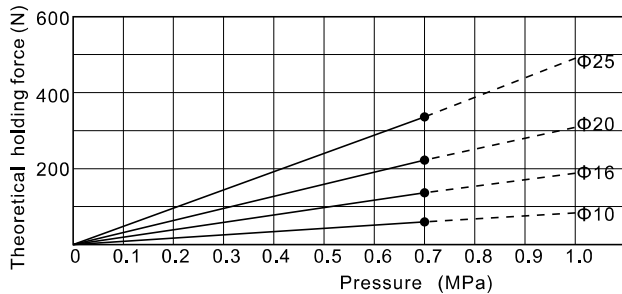
Four bore size are available
Bore size: 10, 16, 20, 25

Cylinder can be mounted from two directions

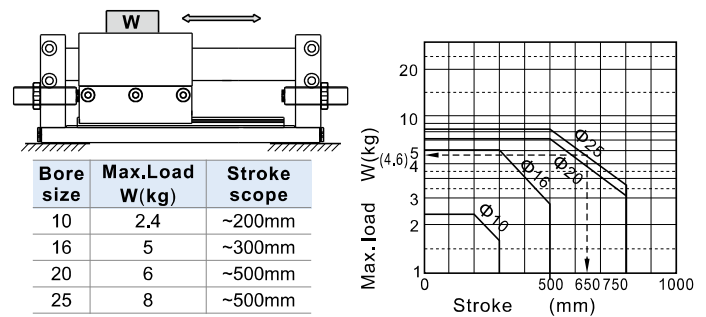
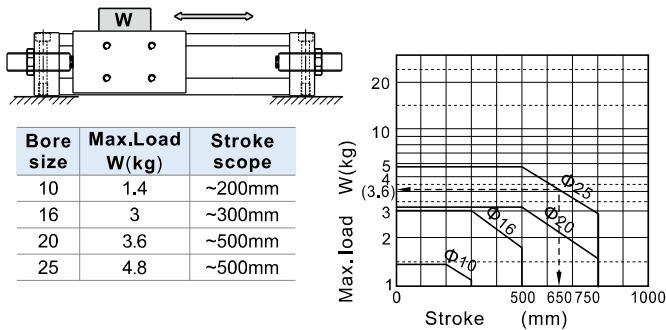
Can be loaded from two directions

Installation and application

1. The maxi load to move must be less than the theoretical holding force.



2. The relation between loading and stroke as below (Loading center and slide table center must be superposition)



3. About adjusting screw:

RMH series is compacted with two adjusting screws, but you can replace them with oil shock absorber by conditions.

Bore size	Shock absorber type
10	ACA0806-1
16	ACA1007-1
20	ACA1007-1
25	ACA1412-1

4. When use external limiter to stop load middle way: please refer to RMS series.

5. Dirty substances in the pipe must be eliminated before cylinder is connected with pipeline to prevent the entrance of impurities into the cylinder.

6. The medium used by cylinder shall be filtered to 40μm or below.

7. If the cylinder is dismantled and stored for a long time, pay attention to conduct anti-rust treatment to the surface. Anti-dust jam cap shall be added in air inlet and outlet ports.

8. Non-magnetically conductive materials are recommended for workpieces fitted to the cylinder, otherwise the lifetime may be halved if magnetically conductive materials are used.



RMH Series

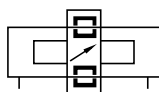


Specification

Bore size(mm)	10	16	20	25
Acting type	Double acting			
Fluid	Air(to be filtered by 40μm filter element)			
Operating pressure	0.2~0.7MPa(28~100psi)(2~7bar)			
Proof pressure	1.2MPa(175psi)(12.0bar)			
Temperature °C	-20~70			
Speed range mm/s	50~400			
Stroke tolerance mm	0~250 ^{+1.0} ₀ 251~800 ^{+1.5} ₀			
Cushion type	Bumper			
Port size [Note1]	M5×0.8			1/8"
Safe holding force N	55	140	220	345

[Note1] PT thread, G thread and NPT thread are available.

Symbol



Stroke

Bore size (mm)	Standard stroke (mm)													
10	50	100	150	200	250	300								
16	50	100	150	200	250	300	350	400	450	500				
20	50	100	150	200	250	300	350	400	450	500	600	700	750	800
25	50	100	150	200	250	300	350	400	450	500	600	700	750	800

[Note] Consult us for non-standard stroke.

Product feature

1. This magnetic cylinder is basically a pneumatic rodless cylinder featuring a mobile piston fitted with annular magnets.
The mobile carriage is also equipped with magnets to provide magnetic coupling (carriage/piston). The carriage slide freely along the main tube.
2. It is dust-proof as the isolation between the carriage and piston.
3. It is compact in space.
4. The non adjustable rubber bumpers and the adjustable pneumatic cushioning on both ends of the cylinder ensure the smooth action.
5. With the slide rail, the operation accuracy of the body is high, the body does not rotate accurately, and the load capacity is strong.

Ordering code

RMH 20 ×200 S □

① ② ③ ④ ⑤

① Model	② Bore Size	③ Stroke [Note1]	④ Magnet	⑤ Thread type [Note2]
RMH: Rodless magnetic cylinder (With linear guide)	10 16 20 25	Refer to stroke table for details	S: With magnet	Blank : PT thread G : G thread T : NPT thread

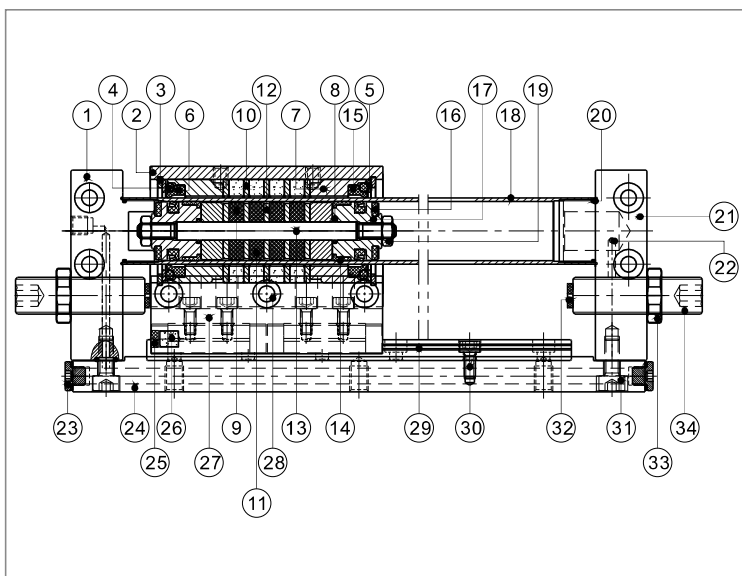
[Note1] Consult us for non-standard stroke.

[Note2] Blank on thread code means metric M thread. There is only metric thread for Φ10/Φ16, if NPT or G thread is needed, please consult.

Rodless magnetic cylinder (With Linear guide)

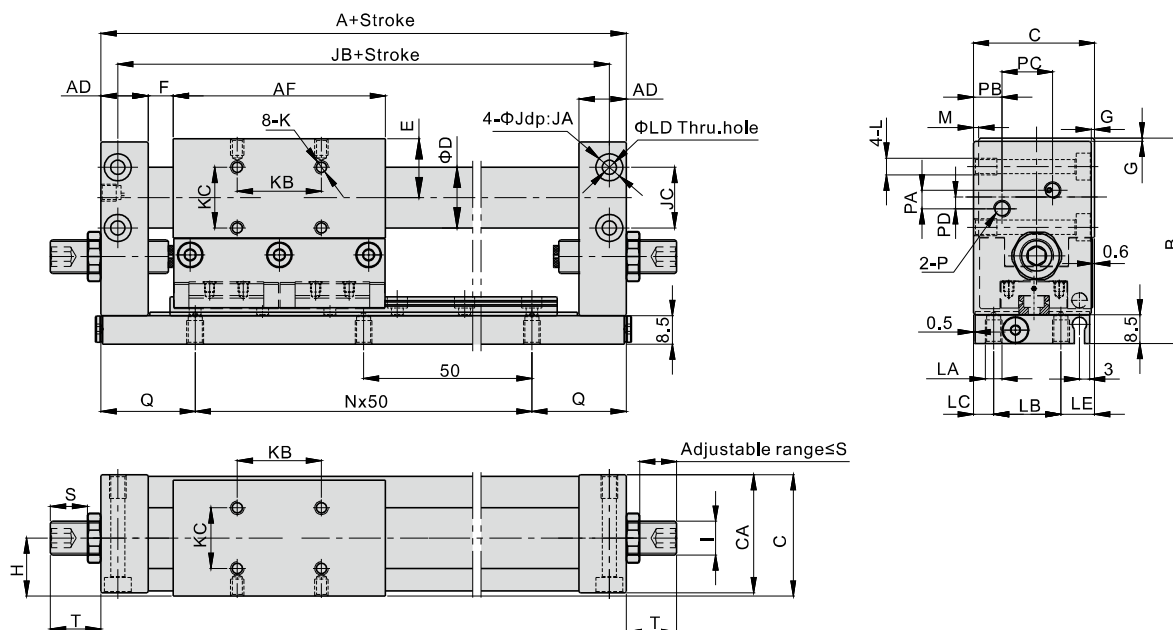
RMH Series

Inner structure and material of major parts



NO.	Item	Material	NO.	Item	Material
1	End cover	Aluminum alloy	18	Barrel	Stainless steel
2	Body	Aluminum alloy	19	Nut	Stainless steel
3	C Clip	TPU	20	O-ring	NBR
4	O-ring	NBR	21	End cover	Aluminum alloy
5	Washer	Stainless steel	22	Steel ball	Stainless steel
6	Scraping dust ring	Plastics	23	Pluger screw	Carbon steel
7	Cover	Aluminum alloy	24	Fixed block	Aluminum alloy
8	O-ring	NBR	25	Push block	Plastics
9	Magnet	Rare-earth material	26	Magnet	Rare-earth material
10	Magnet washer	Carbon steel	27	Joining block	Aluminum alloy
11	Magnet	Rare-earth material	28	Bolt	Alloy steel
12	Magnet washer	Carbon steel	29	Linear rail	-
13	Connecting rod	Stainless steel	30	Bolt	Alloy steel
14	Wear ring	Wear resistant material	31	Bolt	Alloy steel
15	Piston seal	TPU	32	Bumper	TPU
16	Bumper	NBR	33	Nut	Alloy steel
17	Piston	Aluminum alloy	34	Bolt	Alloy steel

Dimensions



Type\Item	A	AD	AF	B	C	CA	D	E	F	G	H	I	J	JA	JB	JC	K	KB	KC	L	LA	LB	LC
RMH10	86	10.5	52	52	30	29	12	14	6.5	1	14	M8X1.0	6	3.5	78	14	M3X0.5dp:4	20	15	M4X0.7dp:6	M4X0.7dp:6	16	4
RMH16	106	14	63	61	36	35	18	17.5	7.5	1	17	M10X1.0	8	4.5	96	18	M4X0.7dp:5	25	18	M5X0.8dp:7	M5X0.8dp:7	20	6
RMH20	124	14	76	71	39	38	22.8	20	10	1	18.5	M10X1.0	9.5	5.5	112	17	M4X0.7dp:5	40	22	M6X1.0dp:8	M6X1.0dp:8	22	5
RMH25	137	17.5	77	76	45	43	27.8	22.5	12.5	2	21.5	M14X1.5	9.5	5.5	124	20	M5X0.8dp:6	40	28	M6X1.0dp:8	M6X1.0dp:8	26	7

Type\Item Stroke	P	LD	LE	M	PA	PB	PC	PD	Q	S	T	N															
												50	100	150	200	250	300	350	400	450	500	600	700	750	800		
RMH10	M5X0.8	3.5	10	1.5	4	7.5	11	2	18	10.5	14.5	2	3	4	5	6	7	-	-	-	-	-	-	-	-	-	
RMH16	M5X0.8	4.5	10	1.5	5.5	8.5	15	3.5	28	11	15	2	3	4	5	6	7	8	9	10	11	-	-	-	-	-	
RMH20	1/8"	5.5	12	1.5	0	10	18.5	0	37	8.5	12.5	2	3	4	5	6	7	8	9	10	11	13	15	16	17	-	
RMH25	1/8"	5.5	12	1.5	0	11	22	0	43.5	16	22	2	3	4	5	6	7	8	9	10	11	13	15	16	17	-	



Rotary table cylinder—HRQ Series

Compendium of HRQ Series

Higher manufacturing precision of working platform

The manufacturing precision of working platform is high, and is easy for installation, and is of precise orientation. The center of working platform has a through hole, and pipe can be located and passed through this hole;

Rack and pinion design

Rack and pinion design, stable functioning.

Double cylinder structure

Double cylinder structure, double output could be achieved.

With magnetic switch slots

Three kinds of type could be chosen

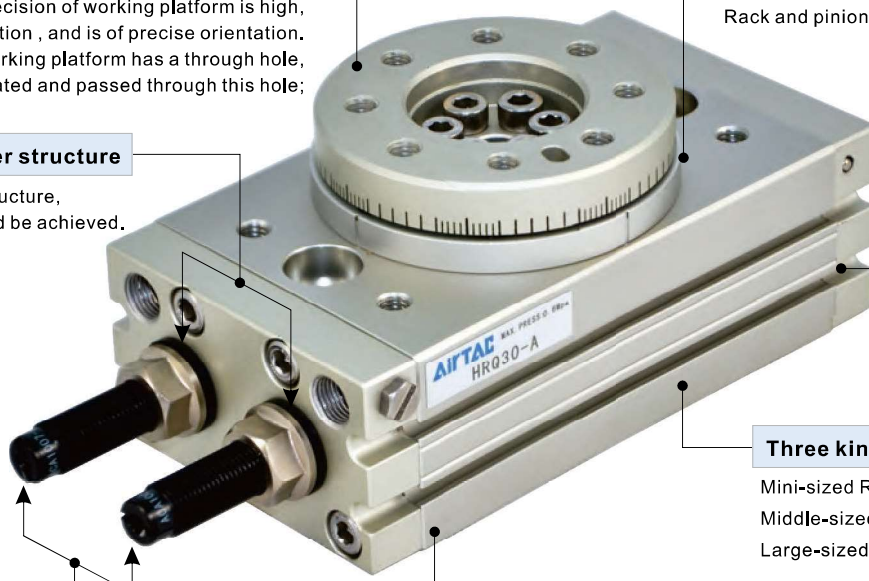
Mini-sized Rotary Cylinder: 2, 3, 7
 Middle-sized Rotary Cylinder: 10, 20, 30, 50
 Large-sized Rotary Cylinder: 70, 100, 200

Simple to install

Guide hole is designed on the both side of the cylinder body (10~200) or undersurface (2~7), which is simply to install.

Two modes of buffer could be chosen

Adjustment bolt buffer and internal shock absorber could be chosen



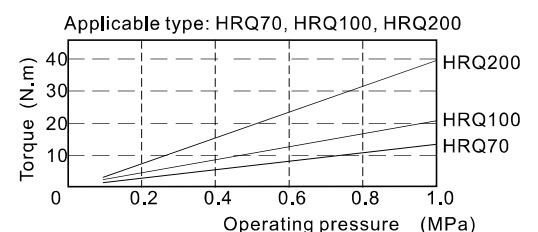
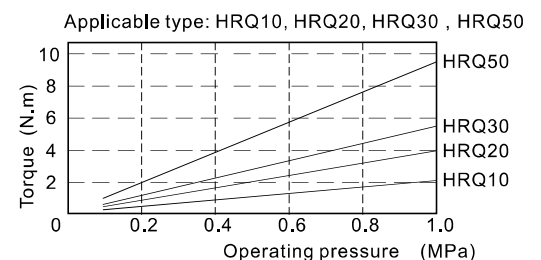
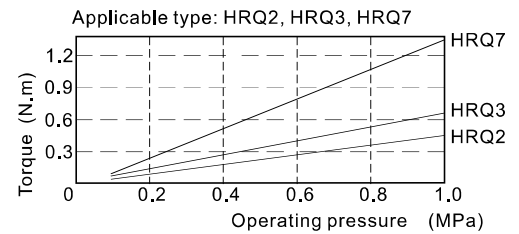
Installation and application

1. Dirty substances in the pipe must be eliminated before cylinder is connected with pipeline to prevent the entrance of impurities into the cylinder.
2. The medium used by cylinder shall be filtered to 40 μ m or below.
3. Anti-freezing measure shall be adopted under low temperature environment to prevent moisture freezing.
4. If the cylinder is dismantled and stored for a long time, pay attention to conduct anti-rust treatment to the surface. Anti-dust caps shall be added in air inlet and outlet ports.

Maximum allowed loading

Loading type	Model									
	HRQ2	HRQ3	HRQ7	HRQ10	HRQ20	HRQ30	HRQ50	HRQ70	HRQ100	HRQ200
Maximum allowed radial loading (N) 	18	30	50	80	150	200	300	330	390	540
Maximum allowed axial loading (N) 	35	50	70	80	150	200	300	300	500	740
Maximum allowed bending moment (Nm) 	0.8	1.1	1.5	2.5	4.0	5.5	10.0	12.0	18.0	25.0

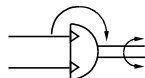
Actual torque output



HRQ Series



Symbol



Product feature

1. Rack and pinion design, stable functioning.
2. Double cylinder structure, double output could be achieved.
3. The manufacturing precision of working platform is high, and is easy for installation, and is of precise orientation.
4. The center of working platform has a through hole, and pipe can be located and passed through this hole;
5. Guide hole is designed on the both side of the cylinder body (10~200) or undersurface (2~7), which is simply to install.
6. Two modes of buffer could be chosen, adjustment bolt buffer and internal shock absorber, the maximum buffer energy of internal shock absorber is 3-5 times that of adjustment bolt buffer.

Specification

Specification	2	3	7	10	20	30	50	70	100	200	
Acting type	Double rack and pinion(Double acting)										
Fluid	Air(to be filtered by 40µm filter element)										
Operating pressure	With adjustment bolt	0.25~0.7MPa (37~100psi) (2.5~7bar)		0.2~0.7MPa (29~100psi) (2~7bar)		0.15~0.7MPa (22~100psi)(1.5~7.0bar)					
	With internal shock absorber	-		-		0.15~0.7MPa (22~100psi)(1.5~7.0bar)					
Proof pressure	1.2MPa(175psi)(12.0bar)										
Temperature °C	-20~70										
Angle adjustment range	0~190°								0~190°		
Repeatable precision	With adjustment bolt	0.2°									
	With internal shock absorber	-		0.05°							
Theoretic moment (Nm)(0.5MPa)	0.2	0.33	0.63	1.1	2.2	2.8	5.0	7.5	11.0	22.0	
Cushion type	With adjustment bolt	Rubber bumper									
	With internal shock absorber	-		Shock absorber							
Port size	End ports	M5×0.8					1/8" [Note 1]				
	Side ports	M5×0.8					M5×0.8				
Weight g	120	175	270	535	940	1260	2060	2890	4100	7650	

[Note1] PT thread, G thread and NPT thread are available.

Add) Refer to P362 for detail of sensor switch.

Maximum allowed movement energy and rotation times

Model	Maximal allowed energy (J)		Rotation times (s/90°)	
	With adjustment bolt	With internal shock absorber	With adjustment bolt	With internal shock absorber
HRQ2	0.0015	-	0.2~0.7	-
HRQ3	0.002	-	0.2~0.7	-
HRQ7	0.006	-	0.2~1.0	-
HRQ10	0.01	0.04	0.2~1.0	0.2~0.7
HRQ20	0.025	0.12	0.2~1.0	0.2~0.7
HRQ30	0.05	0.12	0.2~1.0	0.2~0.7
HRQ50	0.08	0.30	0.2~1.0	0.2~0.7
HRQ70	0.24	1.1	0.2~1.5	0.2~1.0
HRQ100	0.32	1.6	0.2~2.0	0.2~1.0
HRQ200	0.56	2.9	0.2~2.5	0.2~1.0

[Note]

1: The movement energy should not exceed the allowed maximum energy, or the inner accessories of product would be damaged;

2: When the rotation times of with shock absorber is larger than the allowed tolerance, the bigger effect will be lost.

Ordering code

HRQ 20 A □

① ② ③ ④

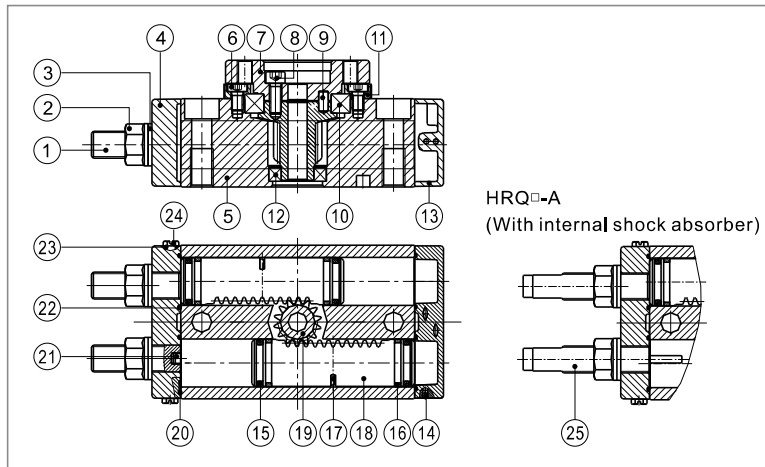
① Model	② Specification	③ Cushion type	④ Thread type
HRQ: Rotary Table/Rack & Pinion Style	2	Blank: With adjustment bolt	No this code
	3		
	7		
	10		
	20	Blank: With adjustment bolt A: With internal shock absorber	Blank: PT G: G T: NPT
	30		
	50		
	70		
100			
200			

[Note] HRQ series are all attached with magnet.

Rotary table cylinder

HRQ Series

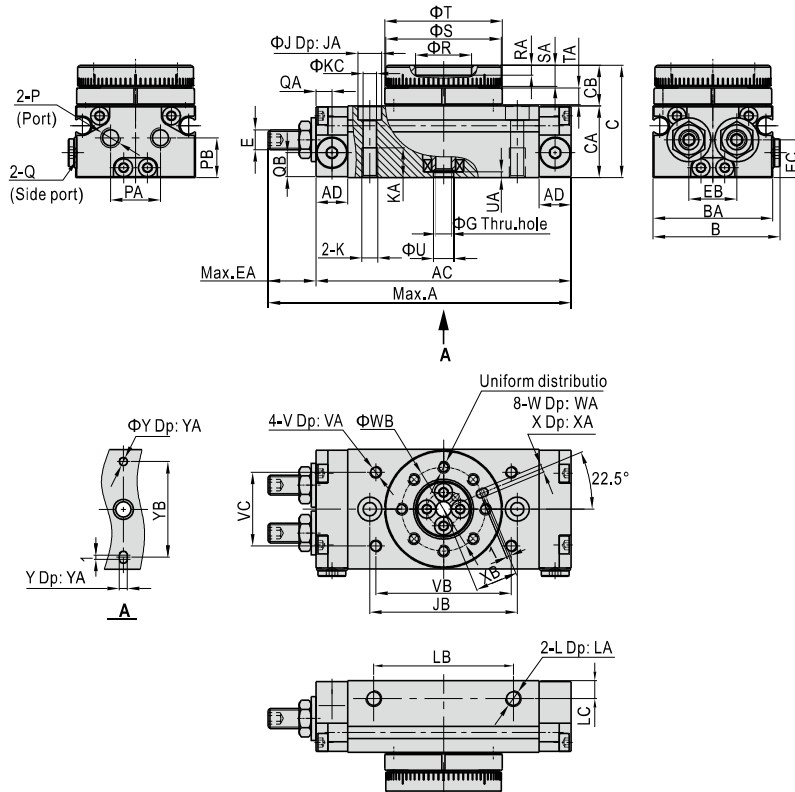
Inner structure and material of major parts



NO.	Item	Material
1	Adjustment bolt	Carbon steel
2	Hexagon nut	Carbon steel
3	Seal washer	Carbon steel & Rubber
4	Front cover	Aluminum alloy
5	Body	Aluminum alloy
6	Hexagon socket head cap bolt	Carbon steel
7	Table	Aluminum alloy
8	Hexagon socket head cap bolt	Carbon steel
9	Guide pin/flat key	Carbon steel
10	Deep-groove bearing	Subassembly
11	Bearing retainer	Aluminum alloy
12	Deep-groove bearing/Needle bearing	Subassembly
13	Back cover	Aluminum alloy
14	Steel ball	Stainless steel
15	Piston seal	NBR
16	Wear ring	Wear resistant material
17	Magnet	Rare earths
18	Rack	Stainless steel/Carbon steel
19	Pinion	Chrome molybdenum steel
20	O-ring	NBR
21	Bumper	NBR
22	O-ring	NBR
23	O-ring	NBR
24	Hexagon screw	Stainless steel
25	Shock absorber	Subassembly

Dimensions

HRQ2/3/7

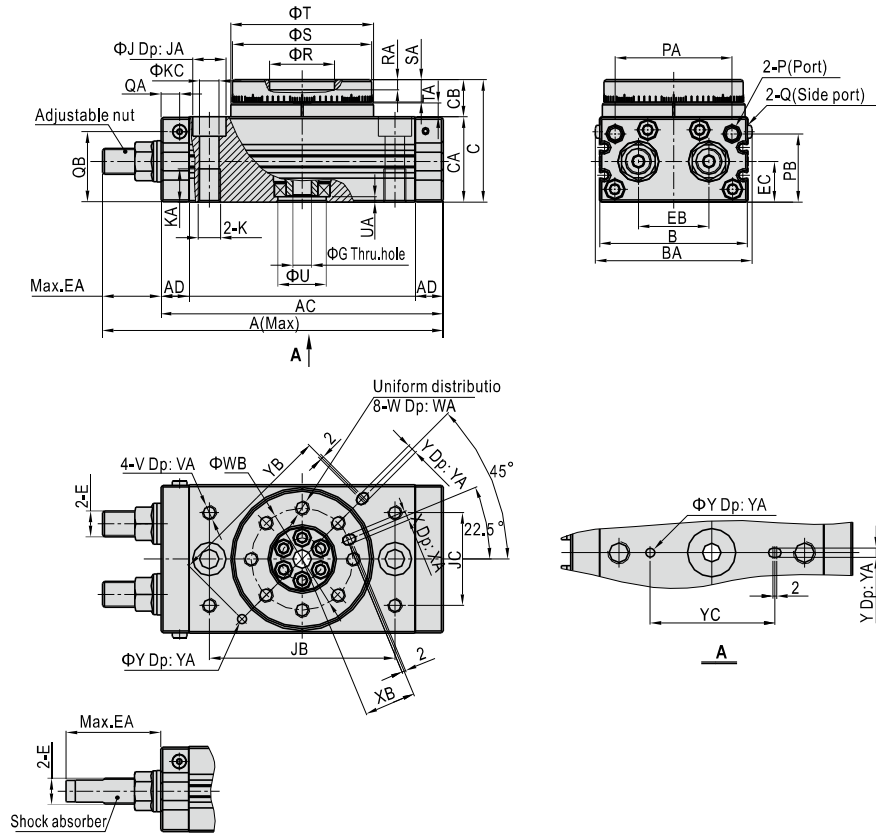


Type\Item	A	AC	AD	B	BA	C	CA	CB	E	EA	EB	EC	G	J	JA	JB	K	KA	KC	L	LA	LB	LC	P	PA
2	76	64	8	32	30	28	18	10	M5×0,8	12	12	9,5	4	6	3,5	37	M4×0,7	7,5	3,5	M4×0,7	4	35	4,5	M5×0,8	12,5
3	82	70	8	36,5	34,5	30,5	20,5	10	M5×0,8	12	15,5	10,5	5	7,5	4,5	43	M5×0,8	8,5	4,5	M4×0,7	4	40	4,5	M5×0,8	15,5
7	94,5	79,5	8	43	41	34,5	23	11,5	M6×1,0	15	18,5	12	6	7,5	4,5	50	M5×0,8	8,5	4,5	M5×0,8	5	50	5	M5×0,8	18,5
Type\Item	PB	Q	QA	QB	R	RA	S	SA	T	TA	U	UA	V	VA	VB	VC	W	WA	WB	X	XA	XB	Y	YA	YB
2	10	M5×0,8	4	6	14(H9)	2,5	29(h9)	5,5	29,5(h9)	4	5(H9)	1,5	M3×0,5	3,5	34	18,5	M3×0,5	5,5	21	2(H9)	2	10,5	2(H9)	2	24
3	12	M5×0,8	4	7,5	17(H9)	2,5	33(h9)	5,5	34(h9)	4	6(H9)	1,5	M3×0,5	3,5	38	23	M3×0,5	5,5	25	2(H9)	2	12,5	2(H9)	2	28
7	14	M5×0,8	4	9	20(H9)	3	39(h9)	6,5	40(h9)	4,5	7(H9)	1,5	M4×0,7	4,5	45	30	M4×0,7	6,5	29	3(H9)	3	14,5	3(H9)	3	32

Rotary table cylinder

HRQ Series

HRQ10~50



HRQ□-A (With internal shock absorber)

Type\Item	A(With internal shock absorber)	A(With adjustment bolt)	AC	AD	B	BA	C	CA	CB	E	EA(With internal shock absorber)	EA(With adjustment bolt)
10	123	112	92	9.5	50	54	47	34	13	M10×1.0	31	20
20	169	145.3	117	11	65	69	54	37	17	M12×1.0	52	28.3
30	178.5	154.5	127	11.5	70	74	57	40	17	M12×1.0	51.5	27.5
50	212	185.9	152	15	80	84	66	46	20	M14×1.5	60	33.9

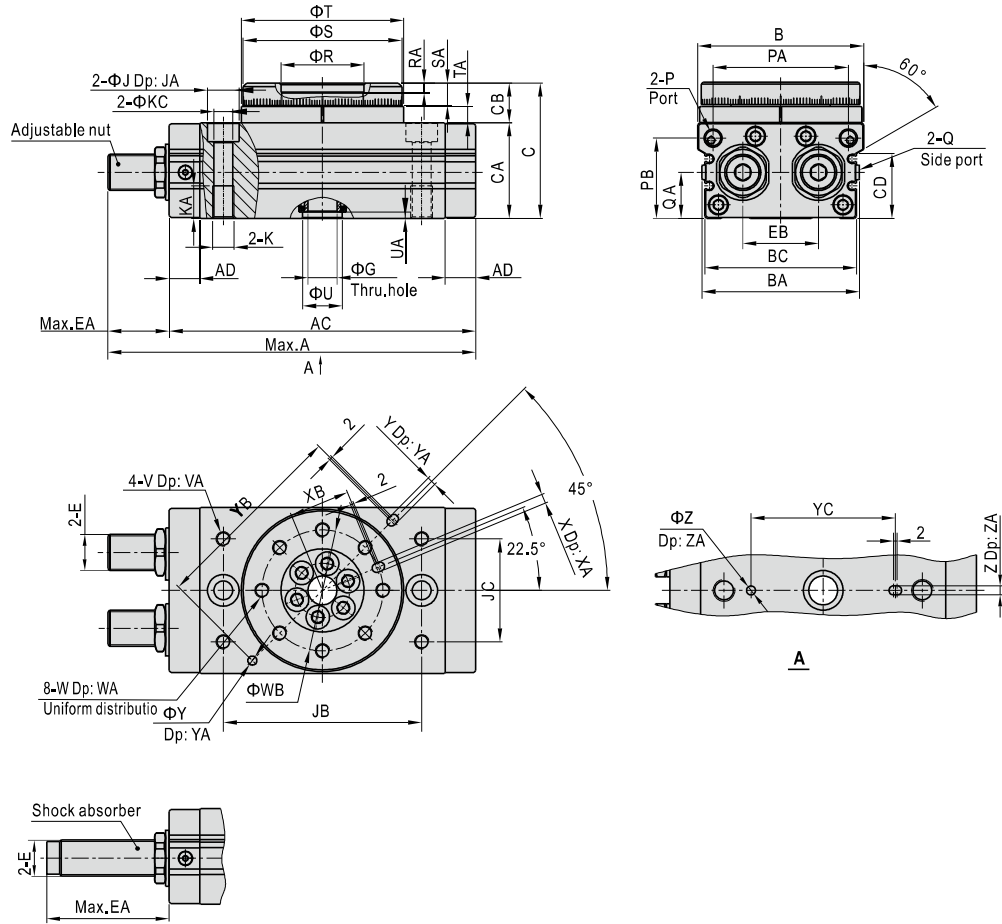
Type\Item	EB	EC	G	J	JA	JB	JC	K	KA	KC	P	PA	PB	Q	QA	QB	R	RA	S	SA
10	20.5	14	5	11	6.5	60	27	M8×1.25	12	6.5	M5×0.8	34.5	28	M5×0.8	4.5	29	20(H9)	4.5	45(h9)	8
20	27.5	16	9	14	8.5	76	34	M10×1.5	15	8.5	M5×0.8	47	30	M5×0.8	6	30	28(H9)	6.5	60(h9)	10
30	29	18.5	9	14	8.5	84	37	M10×1.5	15	8.5	1/8"	50	32	M5×0.8	6.5	34	32(H9)	5	65(h9)	10
50	38	22	10	17.5	12	100	50	M12×1.75	18	10.5	1/8"	63	38	M5×0.8	10	38	35(H9)	5.5	75(h9)	12

Type\Item	T	TA	U	UA	V	VA	W	WA	WB	X	XA	XB	Y	YA	YB	YC
10	46(h9)	4.5	15(H9)	3	M5×0.8	8	M5×0.8	8	32	3(H9)	3.5	16	3(H9)	3.5	56	40
20	61(h9)	6.5	17(H9)	2.5	M6×1.0	8	M6×1.0	10	43	4(H9)	4.5	21.5	4(H9)	4.5	74	50
30	67(h9)	6.5	22(H9)	3	M6×1.0	8	M6×1.0	10	48	4(H9)	5	24	4(H9)	4.5	80	58
50	77(h9)	7.5	26(H9)	3	M8×1.25	8	M8×1.25	12	55	5(H9)	6	27.5	5(H9)	5.5	92	68

Rotary table cylinder

HRQ Series

HRQ70~200



HRQ□-A(With internal shock absorber)

Type\Item	A(With adjustment bolt)	A(With internal shock absorber)	AC	AD	B	BA	BC	C	CA	CB	CD	E	EA(With adjustment bolt)
70	206.8	244	170	17	92	88	84	75	53	22	36	M20×1.5	36.8
100	225.7	263	189	17	102	99	95	86	59	27	42	M20×1.5	36.7
200	279.5	316.5	240	24	120	117	113	106	74	32	57	M27×1.5	39.5

Type\Item	EA(With internal shock absorber)	EB	G	J	JA	JB	JC	K	KA	KC	P	PA	PB	Q	QA	R	RA	S	SA
70	74	42	16	17.5	12	110	57	M12×1.75	18	10.5	1/8"	75	44.5	M5×0.8	25.5	46(H9)	5	88(h9)	12.5
100	74	50	19	17.5	12	130	66	M12×1.75	18	10.5	1/8"	85	50.5	M5×0.8	29.5	56(H9)	6	98(h9)	14.5
200	76.5	60	24	20	12.5	150	80	M16×2.0	25	14	1/8"	103	63	M5×0.8	36.5	64(H9)	9	116(h9)	16.5

Type\Item	T	TA	U	UA	V	VA	W	WA	WB	X	XA	XB	Y	YA	YB	YC	Z	ZA
70	90(h9)	9	22(H9)	3.5	M8×1.25	10	M8×1.25	12.5	67	5(H9)	5.5	33.5	5(H9)	3.5	110	80	5(H9)	3.5
100	100(h9)	12	24(H9)	3.5	M8×1.25	10	M10×1.5	14.5	77	6(H9)	6.5	38.5	6(H9)	4.5	120	100	6(H9)	4.5
200	118(h9)	15	32(H9)	5.5	M12×1.75	13	M12×1.75	16.5	90	8(H9)	8.5	45	8(H9)	4.5	140	110	8(H9)	6.5

HRQ Series

How to select product

1. Determine the following working conditions according to the actual situation:

1.1) Rotation angle θ : The actual rotation angle must be within the maximum allowed range of rotation angle of cylinder.

1.2) Rotation time t : The rotation time must be within the maximum allowed range of rotation time of cylinder.

1.3) Installation position of cylinder: Allow enough installation space, so as to ensure leaving adequate space for rotation of cylinder and workpieces.

1.4) Determination of loading mass and loading shape.

2. Calculation of necessary torque needed when loading rotation (T(N.m)):

Calculate the necessary moment required for loading rotation according to the formula below, and combine with the torque diagram of actual effect, to choose pneumatic cylinder with suitable torque output.

2.1) Calculation method of moment of inertia in different conditions

$$T = K \times I \times \dot{\omega}$$

$$\dot{\omega} = \frac{2\theta}{t^2}$$

T: Necessary torque required for loading rotation (N.m)
 K: Coefficient of allowance, K is defined as 5
 I: Moment of inertia (kg.m²)
 $\dot{\omega}$: Angular acceleration (rad/s²)
 θ : Rotation Angle (rad)
 t: Rotation time (s)

Diagram	Description	Calculation formula of moment of inertia	Rotation radius	Diagram	Description	Calculation formula of moment of inertia	Rotation radius
	d: Diameter (m) m: Mass (kg)	$I = \frac{md^2}{8}$	$\frac{d^2}{8}$		a: Sheet length (m) b: Length of side (m) m: Mass (kg)	$I = \frac{m(a^2+b^2)}{12}$	$\frac{a^2+b^2}{12}$
		Note: no special installation direction				Note: no special installation direction	
	d ₁ : Diameter (m) d ₂ : Diameter (m) m ₁ : d ₁ Mass (kg) m ₂ : d ₂ Mass (kg)	$I = \frac{m_1 d_1^2 + m_2 d_2^2}{8}$	$\frac{d_1^2 + d_2^2}{8}$		a: Sheet length (m) m: Mass (kg)	$I = \frac{ma^2}{12}$	$\frac{a^2}{12}$
		Note: compare d ₁ with d ₂ , disregard d ₁ if d ₁ is extremely tiny				Note: no special installation direction	
	d: Diameter (m) m: Mass (kg)	$I = \frac{md^2}{16}$	$\frac{d^2}{16}$		a: Sheet length (m) m: Mass (kg)	$I = \frac{ma^2}{3}$	$\frac{a^2}{3}$
		Note: no special installation direction				Note: 1. horizontal installation. 2. pay attention to the change of movement time when vertical installation.	
	r: Radius (m) m: Mass (kg)	$I = \frac{2mr^2}{5}$	$\frac{2r^2}{5}$		a: Sheet length (m) b: Distance between the rotation axis and the gravity center of loading (m) m: Mass (kg)	$I = \frac{ma^2}{12} + mb^2$	$\frac{a^2}{12} + b^2$
		Note: no special installation direction				Note: the cuboids are same too.	
	a ₁ : Length of stick (m) a ₂ : Length of stick (m) m ₁ : a ₁ Mass (kg) m ₂ : a ₂ Mass (kg)	$I = \frac{m_1 a_1^2 + m_2 a_2^2}{3}$	$\frac{a_1^2 + a_2^2}{3}$		a: Tooth number of gear b: Tooth number of loading gear	$I_a = \left(\frac{a}{b}\right)^2 I_b$	
		Note: 1. horizontal installation. 2. pay attention to the change of movement time when vertical installation.					
	a ₁ : Sheet length (m) a ₂ : Sheet length (m) b: Length of side (m) m ₁ : a ₁ Mass (kg) m ₂ : a ₂ Mass (kg)	$I = \frac{m_1(4a_1^2+b^2) + m_2(4a_2^2+b^2)}{12}$	$\frac{2a_1^2 + 2a_2^2 + b^2}{6}$		a ₁ : Vertical distance between the rotation axis and the concentrated loading (m) a ₂ : Length of arm (m) m ₁ : Mass of concentrated loading (kg) m ₂ : Mass of arm (kg)	$I = m_1 a_1^2 + \frac{m_2 a_2^2}{3} + m_1 K$	
		Note: 1. horizontal installation. 2. pay attention to the change of movement time when vertical installation.				Note: 1. horizontal installation. 2. compared with m, disregard if m is extremely tiny. 3. calculate K according to the shape of concentrated loading row by row. For example, when the loading is spheroid, K=2r ² /5	

3. Calculation of maximum movement energy E_{max}(J):

Calculate the maximum movement energy E_{max} according to the formula below, and make sure that the maximum movement energy is within allowed energy range of the chosen pneumatic cylinder, excessive large movement energy would lead to damage of inner parts, please choose rotation cylinder attached with shock absorber when the movement energy is fairly large.

$$E_{\max} = \frac{1}{2} I \omega_{\max}^2 \quad \omega_{\max} = \frac{2\theta}{t} \quad \omega_{\max} : \text{Maximal angular velocity (rad/s)}$$

4. Calculation of loading rate

Calculate the loading rate according to the formula below, and the loading rate must not be more than 1.

$$\text{Loading rate} = \frac{W_s}{\text{Maximal allowed axial loading}} + \frac{W_r}{\text{Maximal allowed radial loading}} + \frac{M}{\text{Maximal allowed bending moment of working platform}} \leq 1$$

W_s : Actual axial loading W_r : Actual radial loading M : Actual loaded bending moment of working platform

5. Determination method

It could be used only when the chosen pneumatic cylinder must meet the requirements of article 2, 3 and 4 simultaneously.



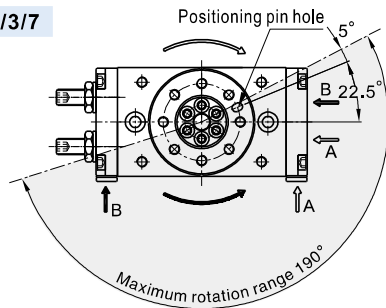
HRQ Series

Installation and application

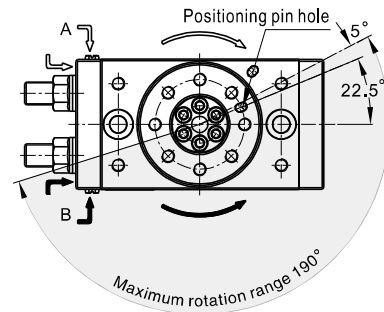
1. Rotation Direction and Rotation Angle

1.1) Rotation Direction

HRQ2/3/7



HRQ10~200



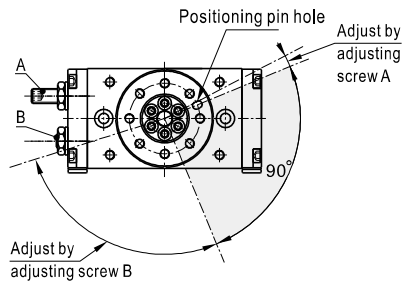
A) By adjusting the adjustment bolt, the rotation end can be set within the range shown in the up drawing: Maximum rotation is 190°;

B) The rotary table turns in the clockwise direction when the A port is pressurized, and in the counter-clockwise direction when the B port is pressurized.

1.2) Rotation Range Example(90° Rotation)

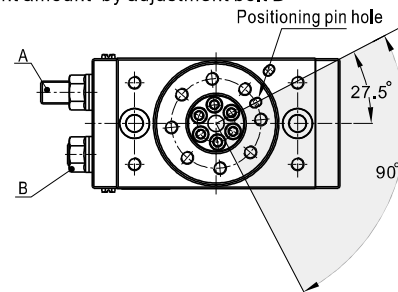
HRQ2/3/7

Adjustment amount by adjustment bolt B

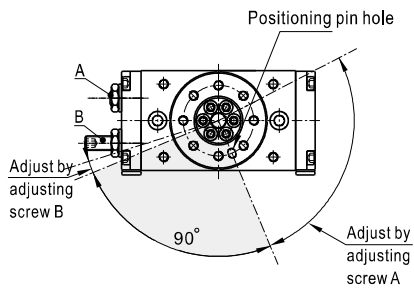


HRQ10~200

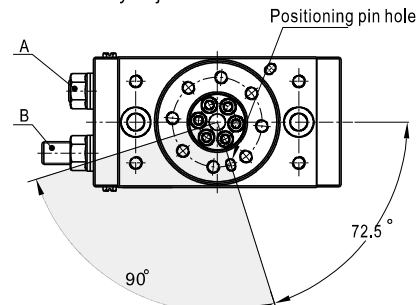
Adjustment amount by adjustment bolt B



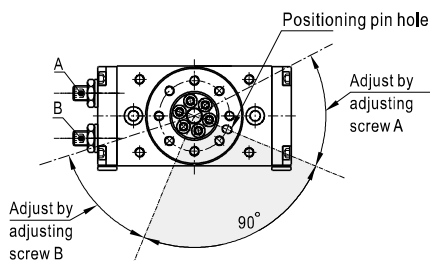
Adjustment amount by adjustment bolt A



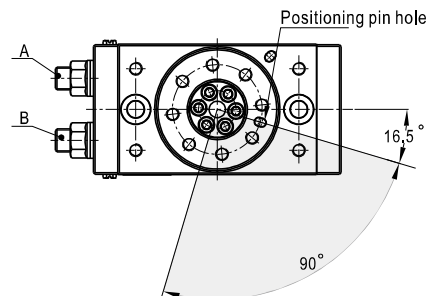
Adjustment amount by adjustment bolt A



Adjustment amount by adjustment bolt A, B



Adjustment amount by adjustment bolt A, B



1.3) The rotation angle can also be set on a type with internal absorber.

Model	Adjustment angle per rotation of angle (adjustment screw)	Model	Adjustment angle per rotation of angle (adjustment screw or shock absorber)
HRQ2	11.5°	HRQ10	10.2°
HRQ3	10.9°	HRQ20	6.5°
HRQ7	10.2°	HRQ30	6.5°
		HRQ50	8.2°
		HRQ70	7.0°
		HRQ100	6.1°
		HRQ200	4.9°

HRQ Series

2. The range of rotation angle has been adjusted to the maximum in the factory, please do not enlarge the rotation angle any more.
3. The movement energy should not exceed the allowed maximum energy, or the inner parts will be damaged.
4. The rotary parts need no lubrication.
5. Series HRQ is equipped with a rubber bumper or shock absorber. Therefore, perform rotation adjustment in the pressurized condition (minimum operation pressure: 0.1 Mpa or more for adjustment bolt and internal shock absorber types, and 0.2 MPa or more for external shock absorber type.)
6. Refer to the table below for tightening torques of the shock absorber setting nut.

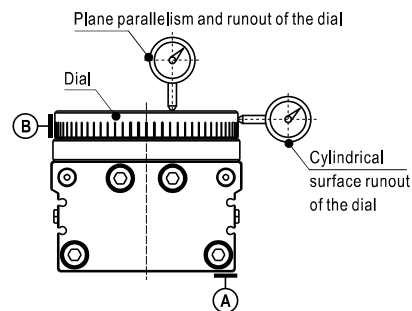
Shock absorber size	Max. tightening torque(Nm)
M10	3.5
M12	8.0
M14	11.0
M20	24.0
M27	63.0

7. Never loosen the bottom screw of the shock absorber. (It is not an adjustment screw.) That may cause oil leakage.
8. Shock absorbers are consumable parts.

When a decrease in energy absorption capacity is noticed, it must be replaced.

Rotary table cylinder	Shock absorber
HRQ10	ACA1006-A
HRQ20\HRQ30	ACA1215-A
HRQ50	ACA1416-A
HRQ70\HRQ100	ACA2020-A
HRQ200	ACA2725-A

9. Strictly control run out and parallelism of the dial according to the requirements of the following table.



Items	Specific requirements	Relative datum
Plane parallelism of the dial	0.1	A
Plane runout of the dial	0.1	A
Cylindrical surface runout of the dial	0.1	B



Rotary table cylinder—HRS Series

Compendium of HRS Series

Double cylinder structure

Reinforced cylinder structure allows for double output to be achieved.

Rack and pinion design

Rack and pinion design, provides stable operation.

With magnetic switch slots

Switch slots are designed on the both side of the cylinder body.

Five specifications are available

Specification: 10、15、20、30、40

Two modes of buffer could be chosen

Bumpers and air cushion provided as standard options, providing excellent cushion performance.

Simple to install

With guide holes on both sides of the cylinder body, installation is simple.



Installation and application

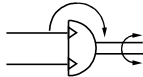


1. Dirty substances in the pipe must be eliminated before cylinder is connected with pipeline to prevent the entrance of impurities into the cylinder.
2. The medium used by cylinder requires 40 micron or lower filtration.
3. Anti-freezing measure shall be adopted under low temperature environment to prevent moisture freezing.
4. If unit or components to be stored for an extended period of time, it is recommended to apply an anti corrosive treatment to exterior. Dust caps shall be added in air inlet and outlet ports.





Symbol



Product feature

1. Rack and pinion design, stable functioning.
2. Double cylinder structure, double force could be achieved.
3. Guide hole is designed on the both side of the cylinder body, which is simple to install.
4. Standard come with both bumper and air cushion, providing excellent cushion performance.

Note : HRS10/15 only has bumpers (do not have air cushion).

Specification

Specification	10	15	20	30	40
Acting type	Double rack and pinion(Double acting)				
Fluid	Air(to be filtered by 40µm filter element)				
Operating pressure	0.25~0.7MPa (37~100psi)(2.5~7.0bar)		0.15~0.7MPa (22~100psi)(1.5~7.0bar)		
Proof pressure	1.2MPa(175psi)(12.0bar)				
Temperature	-20~70℃				
Angle adjustment range	0~190°				
Repeatable precision	0.2°				
Theoretic moment(N.m)(0.5MPa)	0.33	1.1	2.2	2.8	5
Cushion type	Rubber bumper			Bumper and air cushion	
Port size	M5×0.8			1/8" [Note1]	
Weight g	145	359	822	1120	1806

[Note1] PT thread, G thread and NPT thread are available.
Add) Refer to P362 for detail of sensor switch.

Ordering code

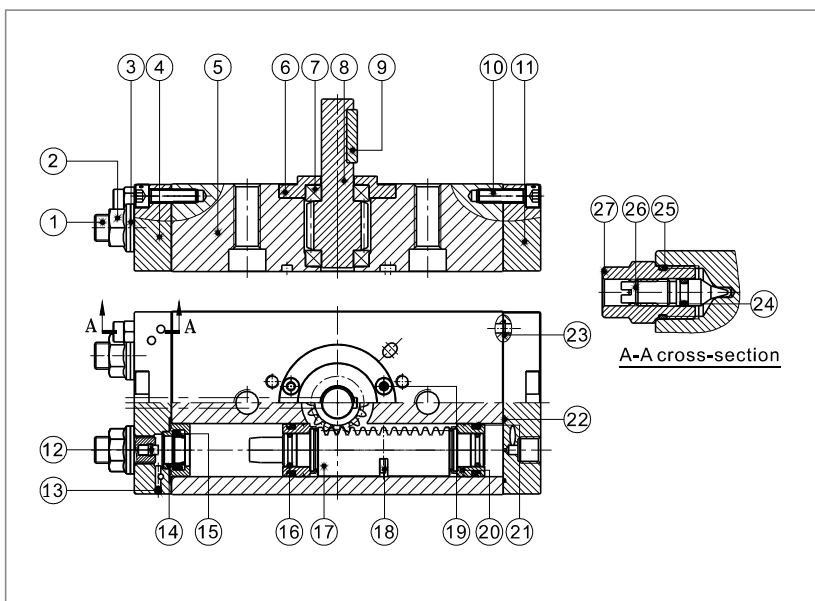
HRS 20 X 90° □

①
②
③
④

① Model	② Specification	③ Rotating angle	④ Thread type
HRS: Rotary Table/Rack & Pinion Style	10	90° 180°	No this code Blank: PT G: G T: NPT
	15		
	20		
	30		
	40		

[Note] HRS series are all come with magnet.

Inner structure and material of major parts



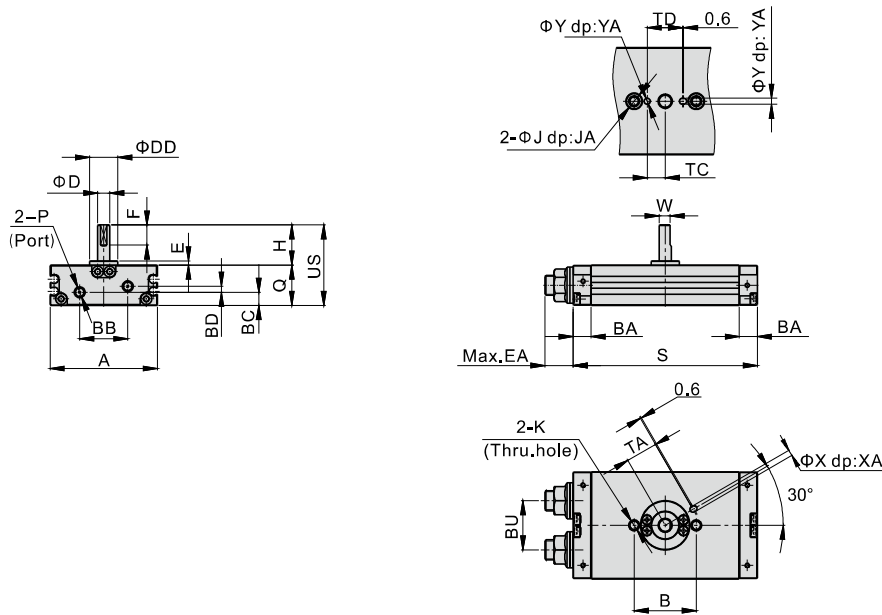
NO.	Item	Material
1	Adjustment bolt	Carbon steel
2	Hexagon nut	Carbon steel
3	Seal washer	Carbon steel & Rubber
4	Front cover	Aluminum alloy
5	Body	Aluminum alloy
6	Top cap	Carbon steel
7	Deep-groove bearing	Subassembly
8	Gear shaft	Carbon steel
9	Flat key	Carbon steel
10	Hexagon socket head cap bolt	Carbon steel
11	Back cover	Aluminum alloy
12	Bumper	NBR
13	Steel ball	Stainless steel
14	Buffering Cap	Aluminum alloy
15	O-ring	NBR
16	O-ring	NBR
17	Rack	Stainless steel
18	Magnet	Rare earths
19	Hexagon socket head cap bolt	Carbon steel
20	Piston	Brass
21	Piston seal	NBR
22	O-ring	NBR
23	O-ring	NBR
24	O-ring	NBR
25	O-ring	NBR
26	Air cushion screw	Brass
27	Screw	Brass/Carbon steel

Rotary table cylinder

HRS Series

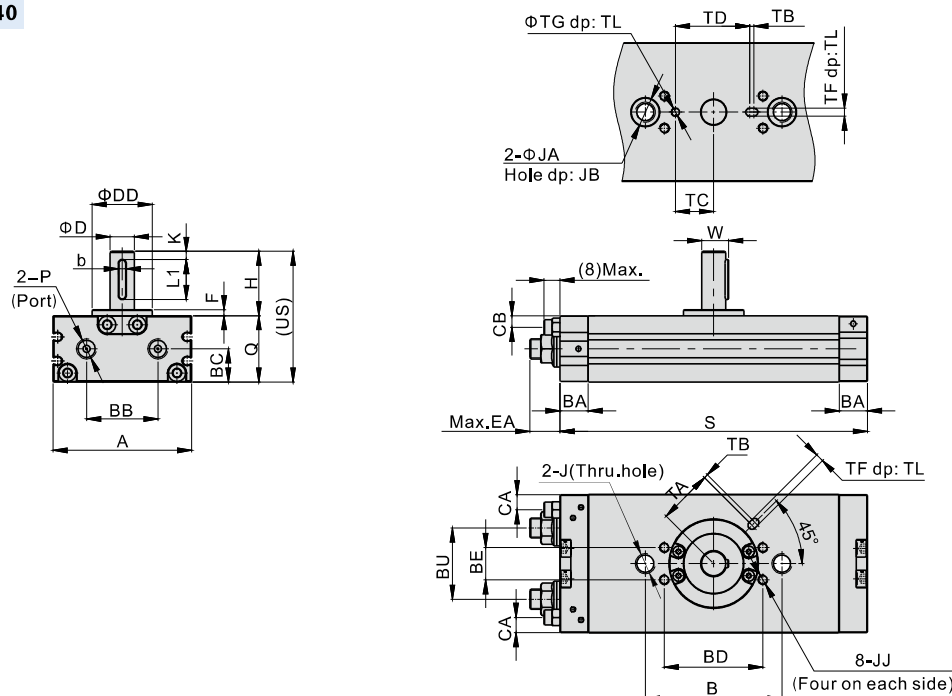
Dimensions

HRS10/15



Type	Item	Rotating angle	A	EA	B	BA	BB	BC	BD	BU	D	DD	E	F	H	K	W	Q	S	US	TA	TC	TD	J	JA	X	XA	Y	YA	P
10		90°	42.5	11.4	29	8.5	16.7	5.5	6	16.7	5	12	2	10	18	M5×0.8	4.5	17	62	35	15.5	8	15.4	7.5	4.5	3 (H9)	2	3 (H9)	2	M5×0.8
		180°																	69											
15		90°	53.5	14	31	9	24.5	6.5	0	24.5	6	14	2	10	20	M5×0.8	5.5	20	75	40	16	9	17.6	7.5	4.5	3 (H9)	2	3 (H9)	2	M5×0.8
		180°																	92											

HRS20/30/40



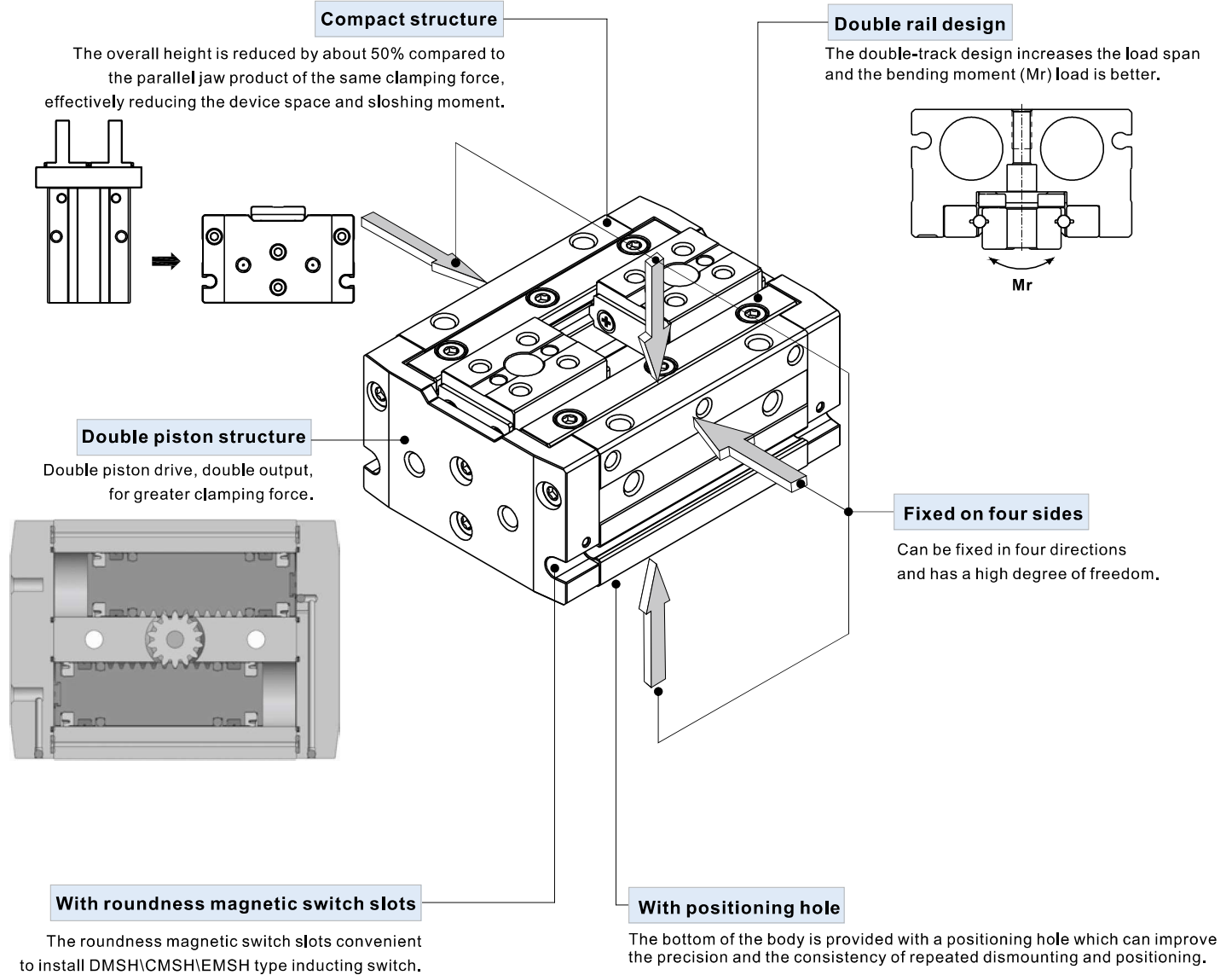
Type/Item	Rotating angle	A	B	EA	BA	BB	BC	BD	BE	BU	CA	CB	D	DD	F	H	J	JA
20	90° 180°	63	50	14.5	14	32.5	14.5	/	/	32.5	6	4.8	10	25	2.5	30	M8X1.25	11
30	90° 180°	69	68	14.5	14	35.5	16.5	49	16	35.5	7.5	5.8	12	30	3	32	M10X1.5	14
40	90° 180°	81	76	19.5	16	44	18.5	55	16	44	7	6.5	15	32	3	36	M10X1.5	14

Type/Item	Rotating angle	JB	K	JJ	P	Q	S	W	key		US	TA	TB	TC	TD	TF	TG	TL
									b	L1								
20	90°																	
	180°	6.5	3	/	1/8"	29	110	11.5	4	20	59	24.5	1	13.5	27	4(H9)	4(H9)	2.5
30	90°																	
	180°	8.5	4	M5X0.8 dp:6	1/8"	33	122	13.5	4	20	65	27	2	19	37	4(H9)	4(H9)	2.5
40	90°																	
	180°	8.5	5	M6X1 dp:7	1/8"	37	141	17	5	25	73	32.5	2	20	39.5	5(H9)	5(H9)	3.5



Compact air gripper—HFD Series

Compendium of HFD Series



Gripping force and stroke

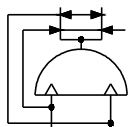
Bore size	8			12			16			20			25	
Stroke (mm)	8	15	30	10	25	50	15	30	60	20	40	80	40	80
Gripping force per finger Effective value(N)	19			48			90			141			210	
Weight (g)	88.8	105.7	153.4	226.7	303.7	441.9	505.3	642.3	946.7	1019.6	1319.1	1983.3	1693.7	2558.9

[Note] The gripping force in the above table is in the working pressure of 0.5MPa, and with a gripping point of L=20mm.





Symbol



Ordering code

HFD 16 X 15



① Model	② Bore size	③ Stroke	
HFD: Compact air finger (Double acting)	8	8	15 30
	12	10	25 50
	16	15	30 60
	20	20	40 80
	25	40	80

Specification

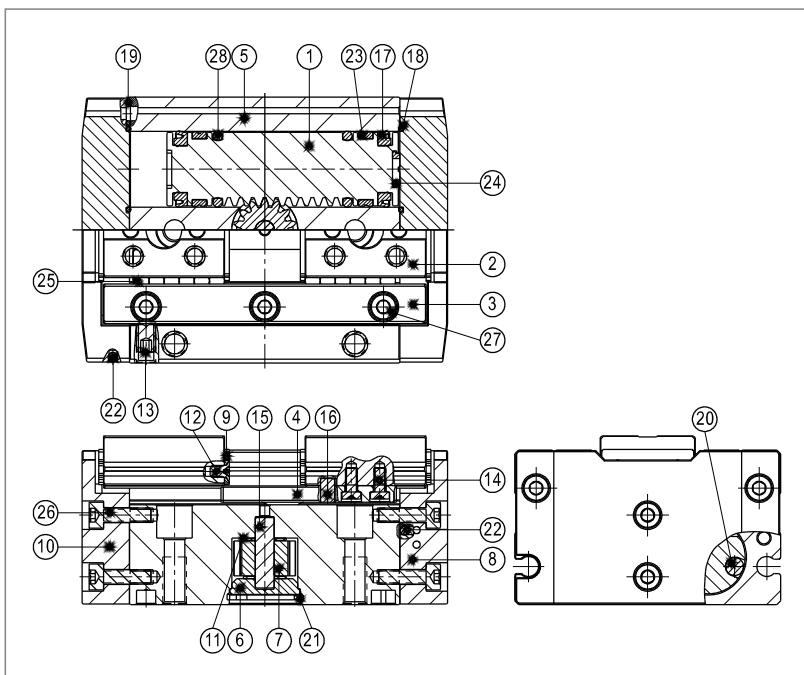
Bore size (mm)	8	12	16	20	25
Acting type	Double acting				
Fluid	Air(to be filtered by 40μm filter element)				
Operating pressure	Φ8	0.25~0.7MPa(36~100psi)(2.5~7bar)			
	Φ12	0.2~0.7MPa(29~100psi)(2~7bar)			
	Φ16/20/25	0.15~0.7MPa(22~100psi)(1.5~7bar)			
Proof pressure	1.2MPa(175psi)(12bar)				
Temperature	-20~70°C				
Lubrication	Not required				
Repeatability mm	±0.05				
Max. frequency	Longer stroke:60(c.p.m)				
	Middle and short stroke:120(c.p.m)				
Sensor switches	CMSH, DMSH, EMSH				
Port size	M3×0.5				M5×0.8

Note) Refer to P362 for detail of sensor switch.

Product feature

1. The double-track design increases the load span and the bending moment (M_r) load is better.
2. Double piston drive, double output, for greater clamping force.
3. The bottom of the body is provided with a positioning hole which can improve the precision and the consistency of repeated dismounting and positioning.
4. The jaw rails are made of stainless steel for high rigidity and corrosion resistance.
5. Can be fixed in four directions and has a high degree of freedom.
6. The overall height is reduced by about 50% compared to the parallel jaw product of the same clamping force, effectively reducing the device space and sloshing moment.

Inner structure and material of major parts

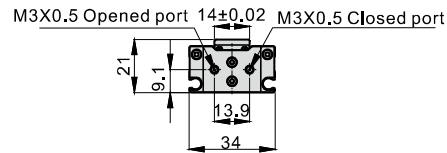
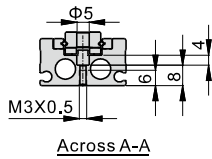
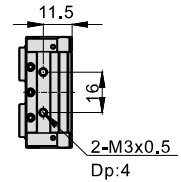
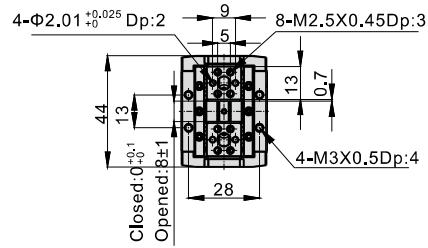
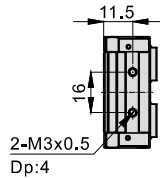
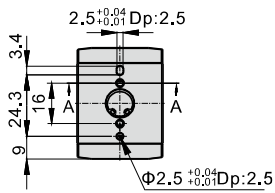


NO.	Item	Material
1	Rack	Stainless steel
2	Jaws	Stainless steel
3	Guide	Stainless steel
4	Joint arm	Cr-Mo steel
5	Body	Aluminum alloy
6	Rack end cap	Aluminum alloy
7	Gear	Cr-Mo steel
8	Back cover	Aluminum alloy
9	Baffle	Stainless steel
10	Front cover	Aluminum alloy
11	Plastic bearing	Wear resistant material
12	Screw	Stainless steel/Alloy steel
13	Screw	Alloy steel
14	Screw	Alloy steel
15	Pin	Bearing steel
16	Pin	Bearing steel
17	Piston seal	NBR
18	O-ring	NBR
19	O-ring	NBR
20	Magnet	Rare earth material
21	C clip	Spring steel
22	Steel ball	Stainless steel
23	Wear ring	Wear resistant material
24	Bumper	TPU
25	Steel ball	Bearing steel
26	Bolt	Alloy steel/Stainless steel
27	Bolt	Alloy steel/Stainless steel
28	O-ring	NBR

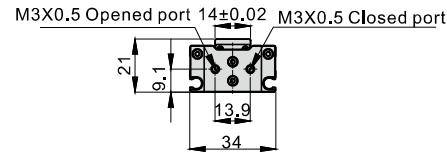
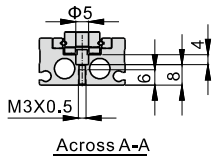
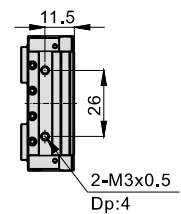
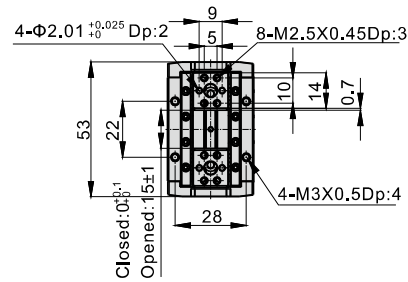
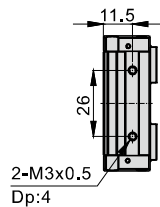
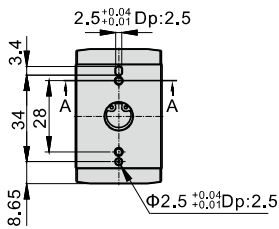
Note: HFD8 No. 12 and No. 27 are made of alloy steel.

Dimensions

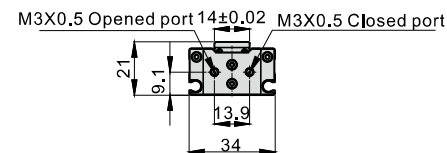
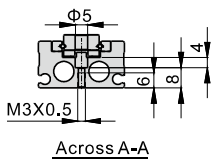
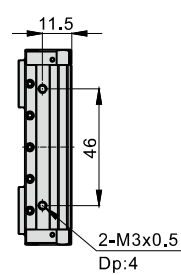
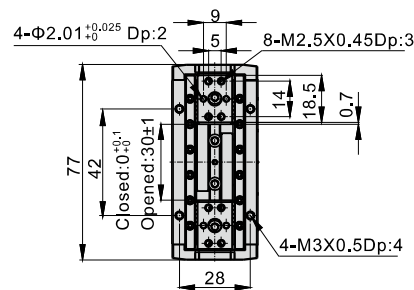
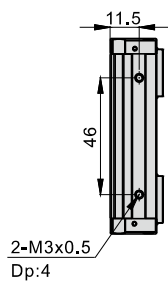
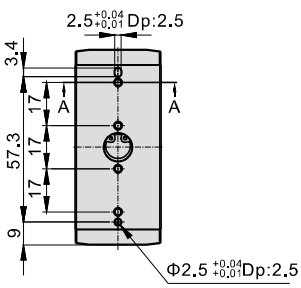
HFD8X8



HFD8X15



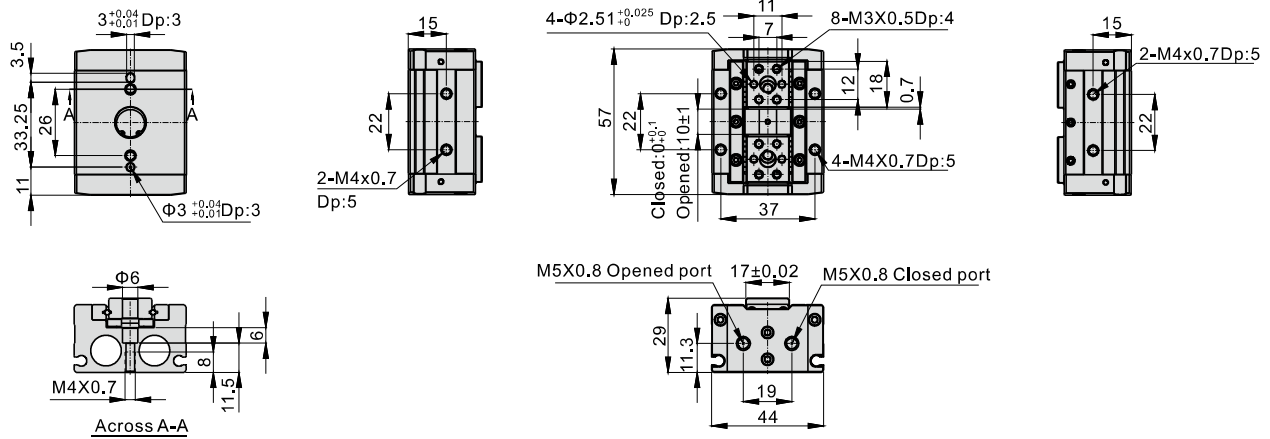
HFD8X30



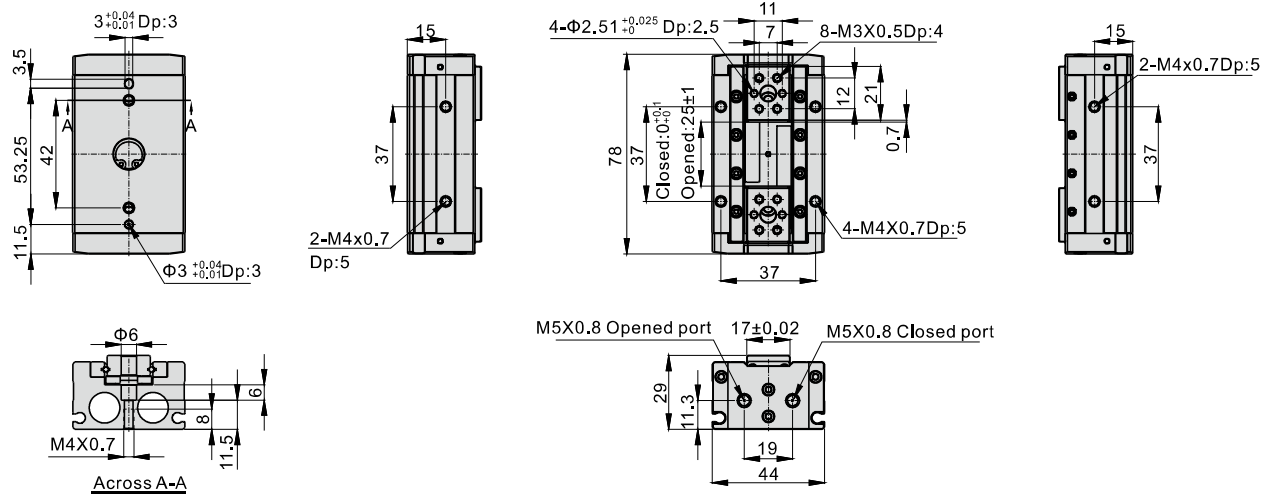
Compact air gripper

HFD Series

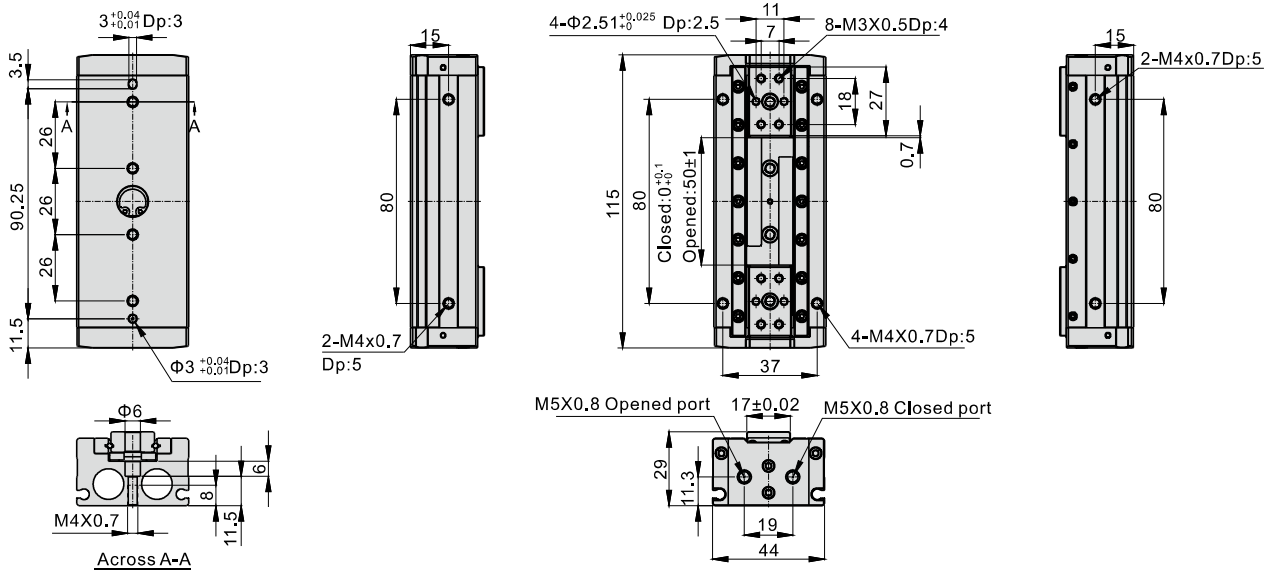
HFD12X10



HFD12X25

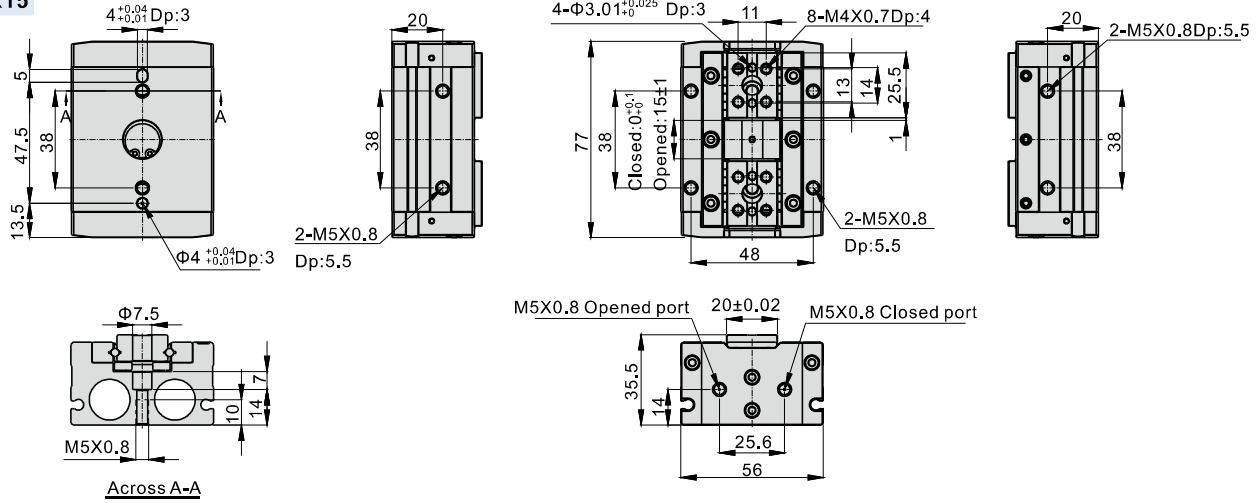


HFD12X50

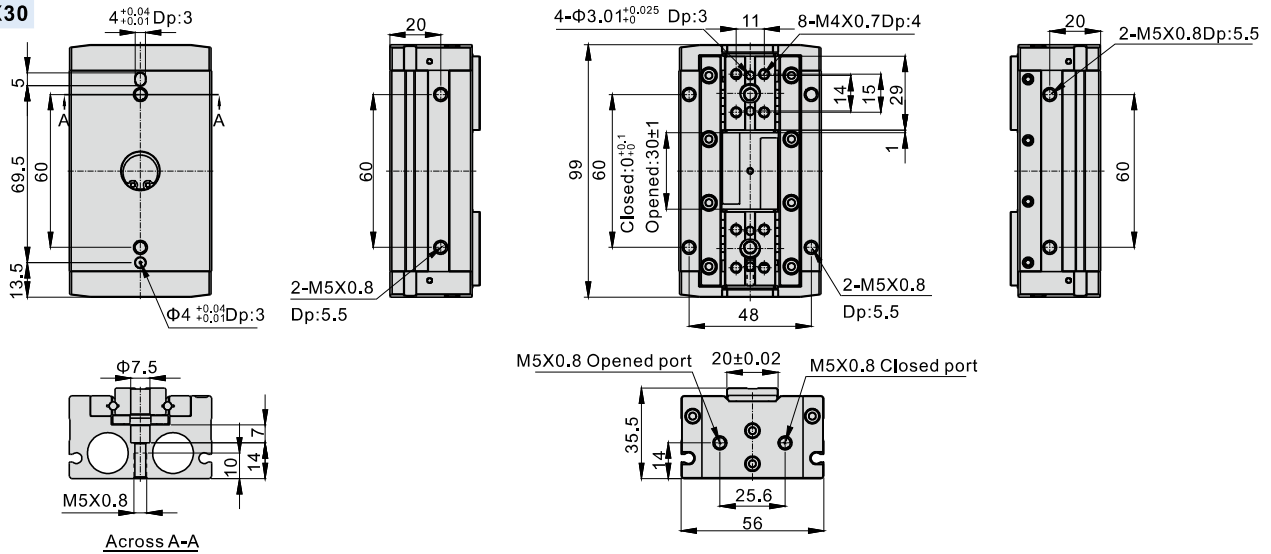


HFD Series

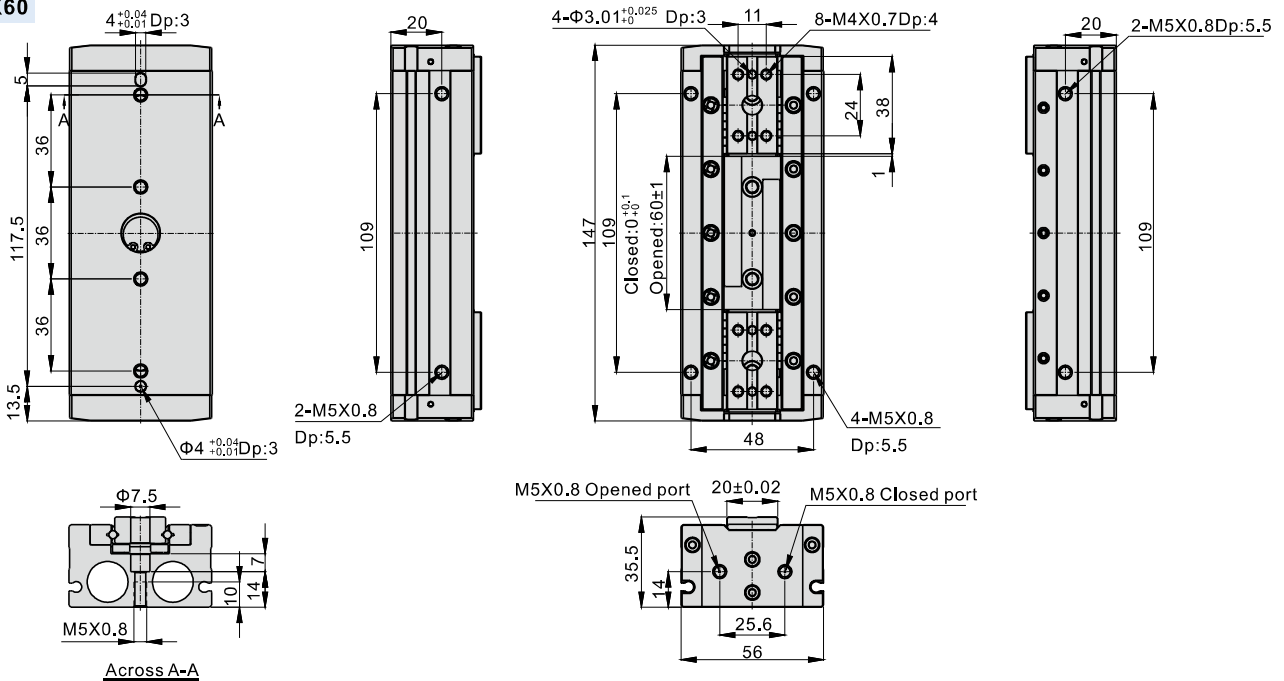
HFD16X15



HFD16X30



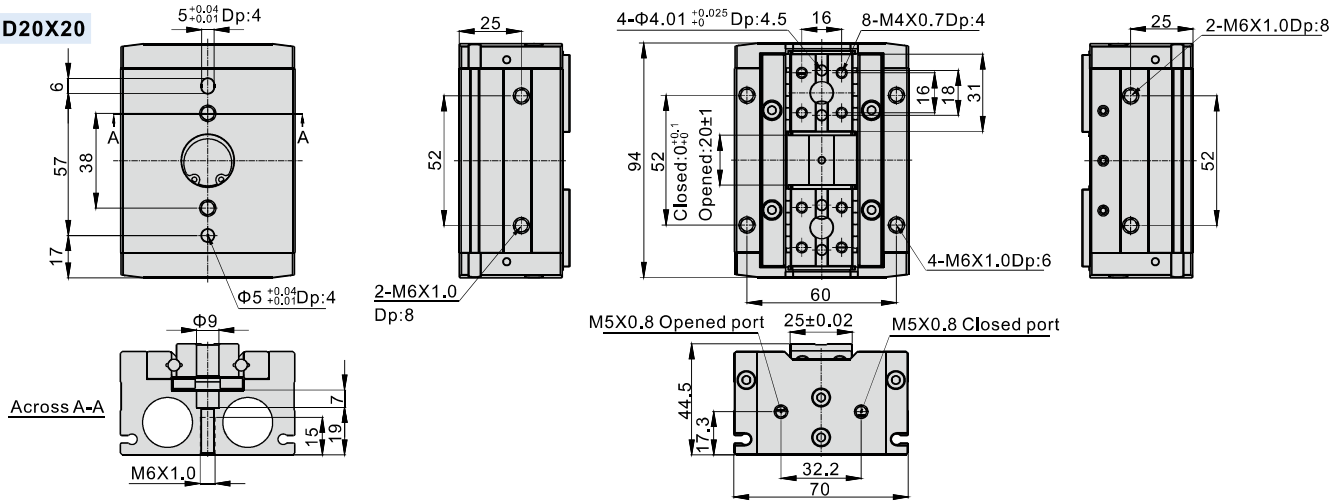
HFD16X60



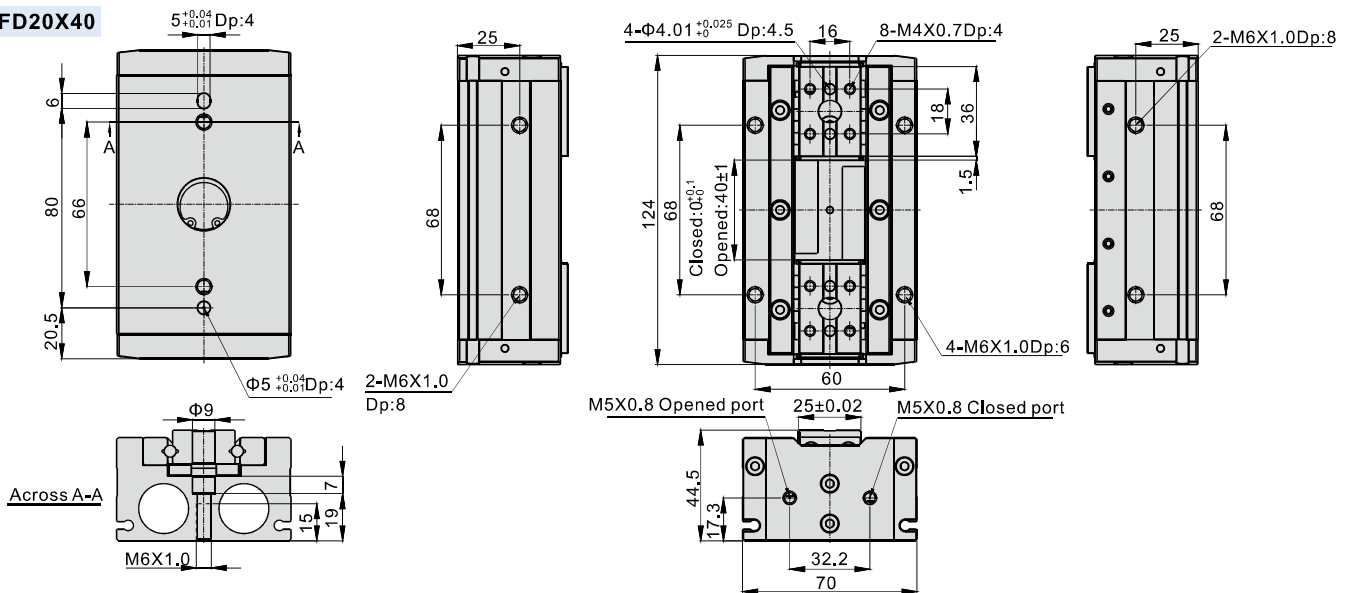
Compact air gripper

HFD Series

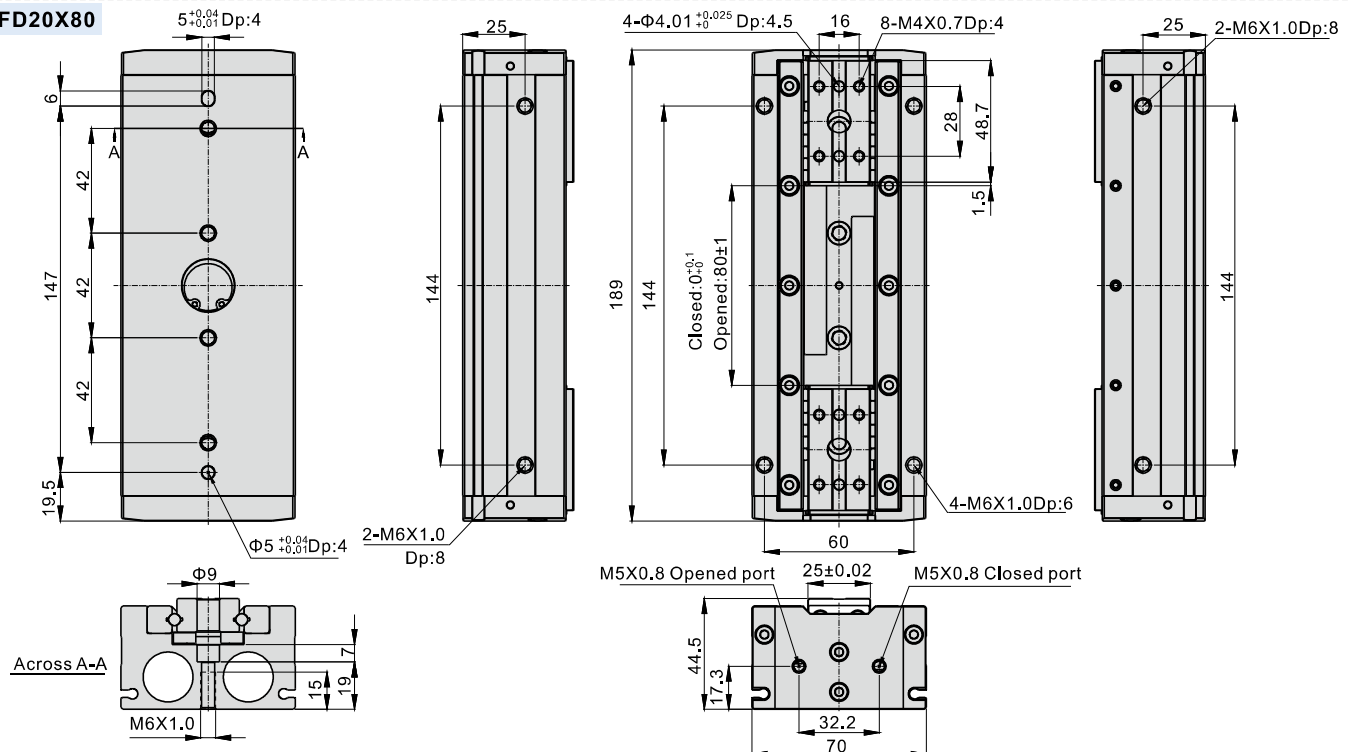
HFD20X20



HFD20X40



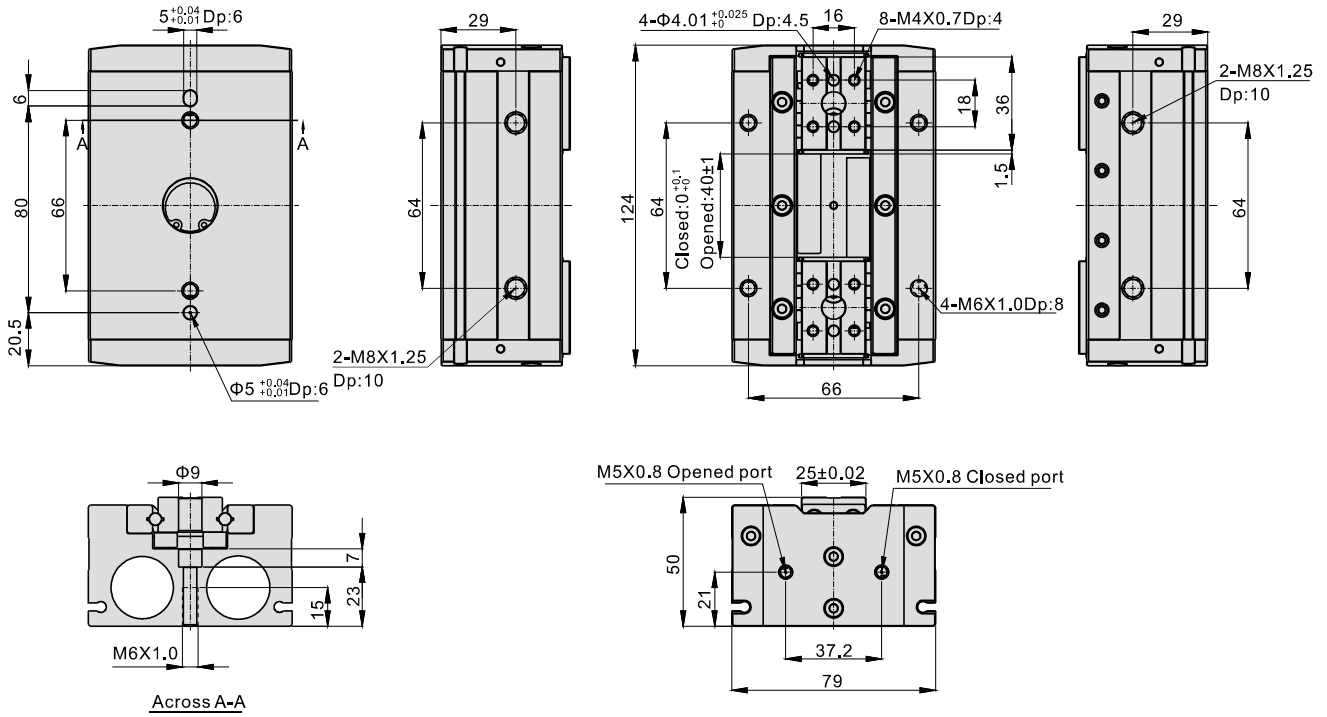
HFD20X80



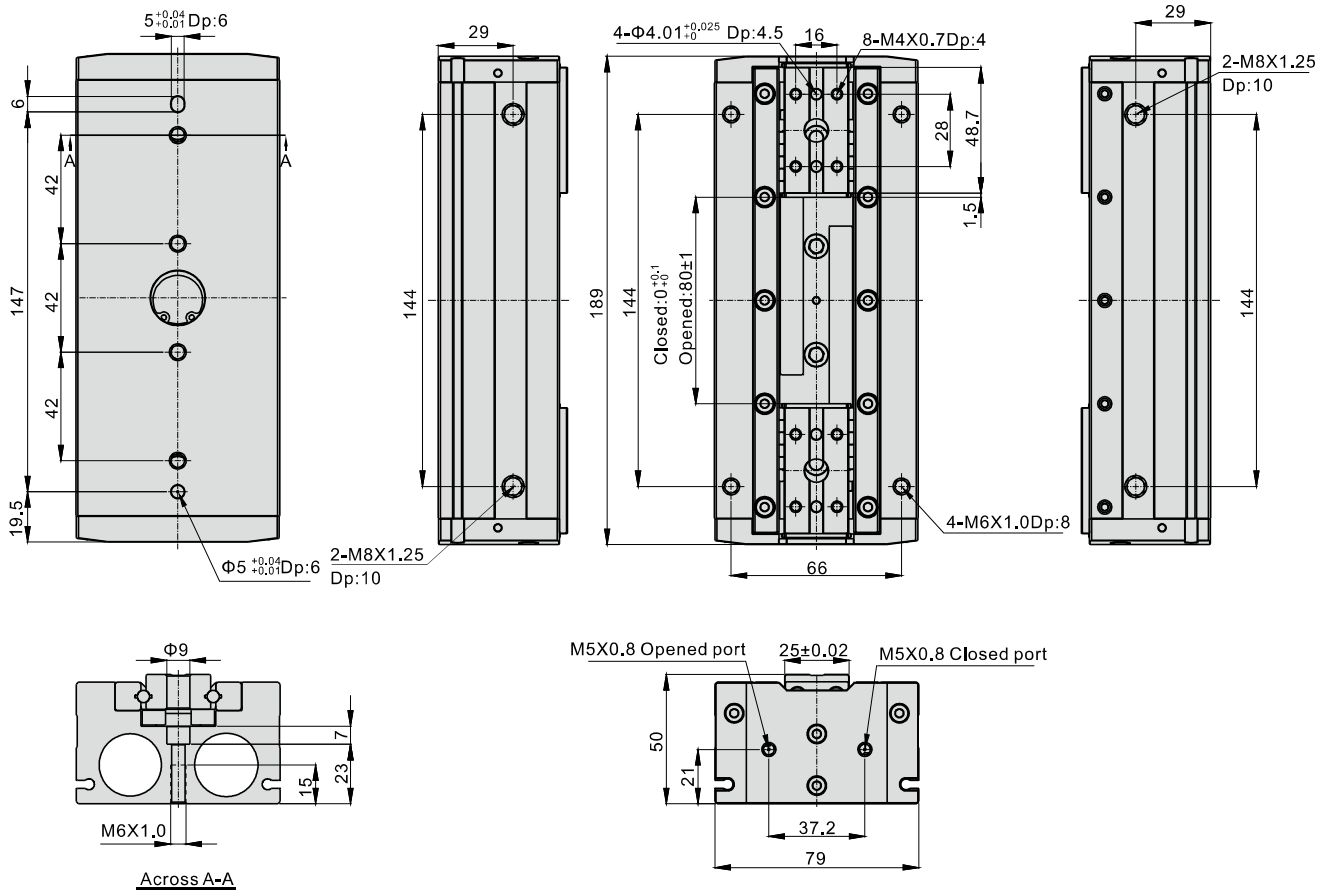
Compact air gripper

HFD Series

HFD25X40



HFD25X80



How to select product

Please select pneumatic finger according to the following steps:

① The selection of the effective gripping force



② The confirmation of the gripping point



③ The confirmation of the external force put on the gripping jaw

1. The selection of the gripping force

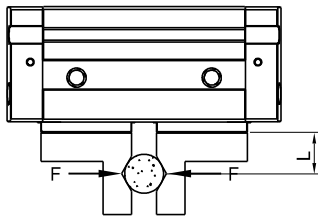
The gripping work-pieces shown below, on the impact condition of ordinary handling state, taking safety coefficient $a=4$, have a gripping force that is more than 10-20 times of the mass of the gripped objects.

	The work-pieces as shown in the left: n : Number of gripping F : Gripping force (N) μ : friction coefficient between fittings and work-pieces. m : mass of work-pieces g : acceleration of gravity ($=9.8m/s^2$)	The condition that the work-pieces won't drop is: $n \times \mu F > mg$ so: $F > \frac{mg}{n \times \mu}$ Safety coefficient is a , so F is: $F = \frac{mg}{n \times \mu} \times a$	$\mu=0.2$	$\mu=0.1$
			$F = \frac{mg}{2 \times 0.2} \times 4 = 10 \times mg$	$F = \frac{mg}{2 \times 0.1} \times 4 = 20 \times mg$
			10 times of the mass of the gripped objects	20 times of the mass of the gripped objects

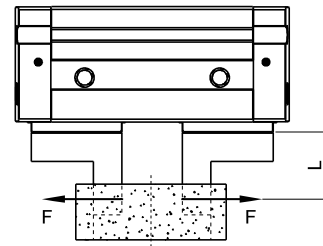
Note) If the friction coefficient $\mu > 0.2$, for safety, please also select clamping force according to the principle of 10~20 times of the mass of the clamped objects. As for large acceleration and shock, it requires for greater safety coefficient.

1.1) The actual gripping force must be within the effective gripping forces of different pneumatic fingers specifications shown in the below chart.

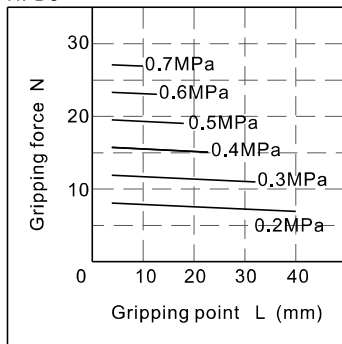
Closed gripping force



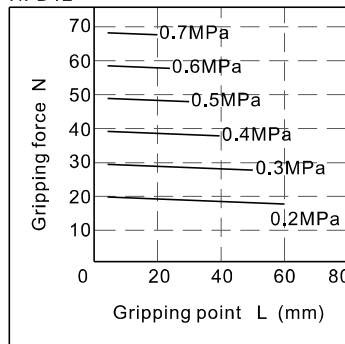
Opened gripping force



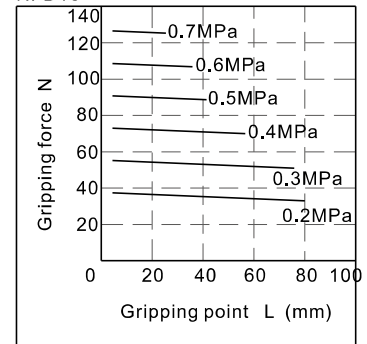
HFD8



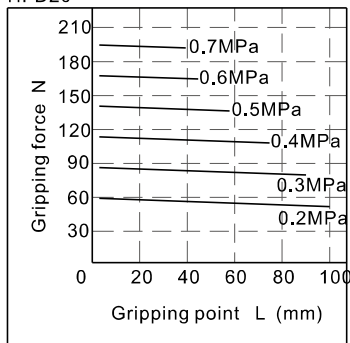
HFD12



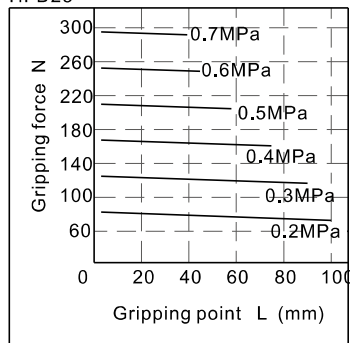
HFD16



HFD20



HFD25



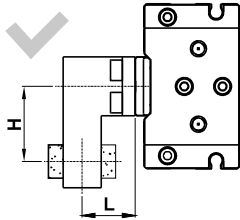
HFD Series

2. The selection of the gripping point

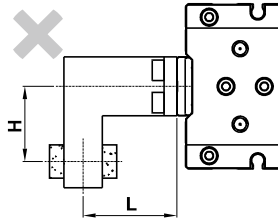
2.1) Please select the gripping point within the limited field shown below.

Over the limits, gripping jaws would be subjected to excessive torque loads, and lead to short life of the air gripper.

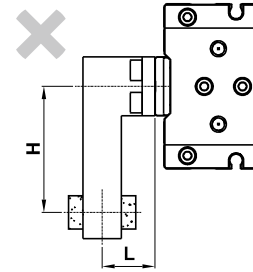
L and H have proper sizes



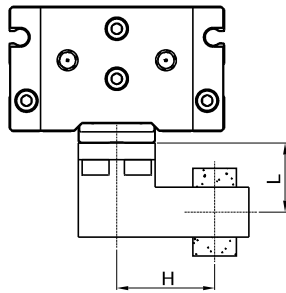
L is too long



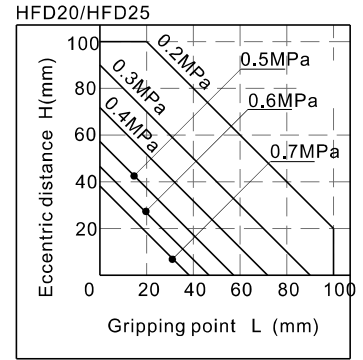
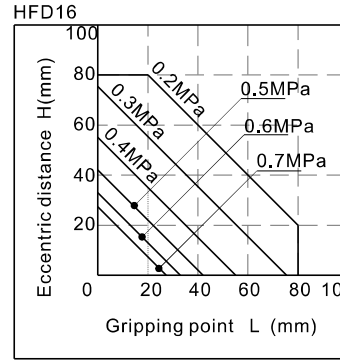
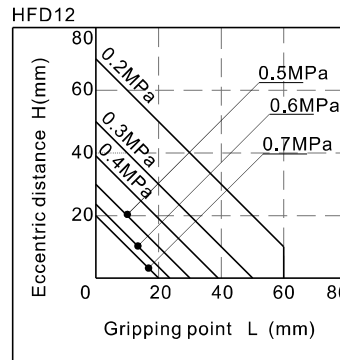
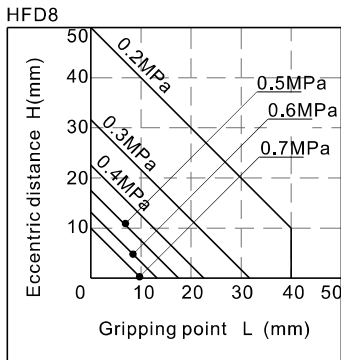
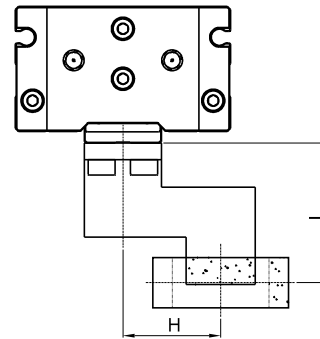
H is too long



The range of the closed gripping points

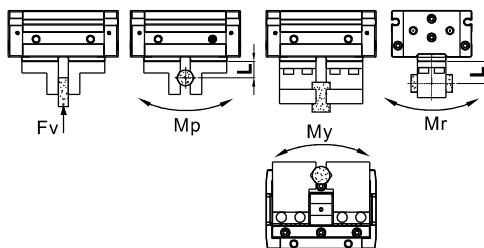


The range of the Opened gripping points



2.2) In the allowable range of gripping point, it is better to design for short and light fittings. If the fittings are long and heavy, the inertia force when the finger is open and close will become larger, and the performance of gripping jaw will be degraded, at the same time it will affect the life.

3. The confirmation of the external force put on the gripping jaw.



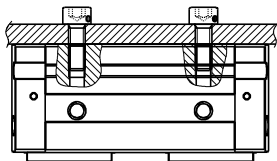
[Note]
The loads and torque values of said are all static values.
L=Distance to load point(mm).

Bore size	The allowed vertical loads Fv(N)	Max. permissible torque(Nm)			The calculation of allowable forces when moment loads work	Examples of calculation
		Mp	My	Mr		
8	58	0,26	0,26	0,64	$\text{Allowable load(N)} = \frac{M(\text{Maximum permissible moment})(\text{N.m})}{L \times 10^{-3}}$ Unit conversion constant	In the guide rail of HFD12, the external force of the pitching moment static loads put on the point of L=30mm is f=10 N, $\frac{0,68}{30 \times 10^{-3}} = 22.7(\text{N})$ Actual load f=10(N) < 22.7(N) To meet the using requirements
12	98	0,68	0,68	1,68		
16	176	1,4	1,4	3,36		
20	294	2	2	4,8		
25	294	2	2	4,8		

Installation and application

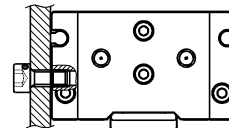
1. Due to the abrupt changes, the circuit pressure is low, which will lead to the decrease of the gripping force and falling of the work-pieces.
In order to avoid the harm to the human body and damage to the equipment, anti-dropping device must be equipped.
2. Don't use the air gripper under strong external force and impact force.
3. When install and fix the air gripper, avoid falling down, collision and damage.
4. When fixing the gripping jaw parts, don't twist the gripping jaw.
5. There are several kinds of installation method, and the locking torque of fastening screw must be within the prescribed torque range shown in the below chart.
If the locking torque is too large, it will cause the dysfunctional. If the locking torque is too small, it will cause the position deviation and fall.

Tail installation type



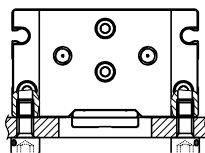
Bore size	The bolts type	Max. locking moment(N.m)	Max. screwed depth(mm)
8	M3×0.5	0.95	6
12	M4×0.7	2.2	8
16	M5×0.8	4.5	10
20	M6×1.0	7.8	15
25	M6×1.0	7.8	15

Side installation type



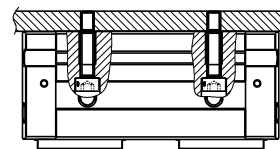
Bore size	The bolts type	Max. locking moment(N.m)	Max. screwed depth(mm)
8	M3×0.5	0.63	4
12	M4×0.7	1.5	5
16	M5×0.8	3	5.5
20	M6×1.0	5.2	8
25	M8×1.25	12	10

Bottom installation type



Bore size	The bolts type	Max. locking moment(N.m)	Max. screwed depth(mm)
8	M3×0.5	0.63	4
12	M4×0.7	1.5	5
16	M5×0.8	3	5.5
20	M6×1.0	5.2	6
25	M6×1.0	5.2	8

Front installation type

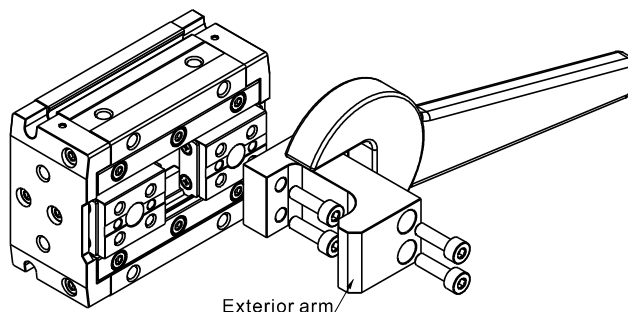


Bore size	The bolts type	Max. locking moment(N.m)
8	M2.5×0.45	0.36
12	M3×0.5	0.63
16	M4×0.7	1.5
20	M5×0.8	5
25	M5×0.8	5

7. The installation method of the gripping jaw fittings

When install the gripping jaw fittings, you have to pay particular attention that you can only hold the gripping jaw by using spanner, and then lock the screws with allen wrench. Never clamp the body directly and then lock the screws, otherwise the parts will be easily damaged.

Bore size	The bolts type	Max. locking moment(N.m)
8	M2.5×0.45	0.36
12	M3×0.5	0.63
16	M4×0.7	1.5
20	M4×0.7	1.5
25	M4×0.7	1.5





Air gripper—HFCQ Series

Parallel open/close hollow style

Compendium of HFCQ Series

Hollow structure

The hollow tube can be matched with the mechanism to achieve the blowing effect.

Stainless steel jaw

The jaws and piston rods are made of high-grade stainless steel, which has high strength, corrosion resistance and small assembly clearance, low shaking and high durability.

Dustproof design

All series are equipped with a dust jacket, which can also be used in special occasions.

Bumper design

The bumper is adopted in the front of piston, which can reduce the noise of metal bump.

With positioning hole

A positioning hole is attached to the bottom of the body, which can improve the precision and the consistency of repeated dismantling and positioning.

Push function

The tail end is equipped with a push rod mechanism for the push function.

With roundness magnetic switch slots

The roundness magnetic switch slots convenient to install CMSH\DMSH\EMSH type inducting switch.



Cylinder pusher module Spring pusher module

Gripping force and stroke

Model	Gripping force per finger Effective valve(N)		Opening/Closing stroke (Both sides)(mm)	Weight (g)
	Internal	External		
HFCQ16	15	9	4	100
HFCQ20	26	21	4	140
HFCQ25	45	36	6	220
HFCQ32	77	62	8	430
HFCQ40	118	97	8	560
HFCQ50	187	155	12	950
HFCQ63	329	280	16	1600

Note) The gripping force in the above table is in the working pressure of 0.5MPa, and with a gripping point of L=20mm(Φ16~Φ25) or L=30mm(Φ32~Φ63).

Add) Please refer to page 263 for the definition of "L".

Installation and application



1. Dirty substances in the pipe must be eliminated before air gripper is connected with pipeline to prevent the entrance of impurities into the cylinder.
2. The medium used by cylinder shall be filtered to 40μm or below.
3. Anti-freezing measure shall be adopted under low temperature environment to prevent moisture freezing.
4. If the air gripper is dismantled and stored for a long time, pay attention to conduct anti-rust treatment to the surface. Anti-dust caps shall be added in air inlet and outlet ports.



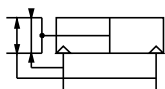


Specification

Bore size (mm)	16	20	25	32	40	50	63
Acting type	Double acting						
Fluid	Air(to be filtered by 40μm filter element)						
Operating pressure	0.2~0.7MPa(28~100psi)		(2.0~7.0bar)		0.15~0.7MPa(22~100psi)		(1.5~7.0bar)
Temperature °C	-20~70						
Lubrication	Not required						
Repeatability mm	±0.01						
Max. frequency	120(c.p.m)			60(c.p.m)			
Sensor switches	CMSH, DMSH, EMSH						
Port size	M3×0.5			M5×0.8			
Hollow diameter	Φ3 ^{+0.05} ₊₀	Φ3 ^{+0.05} ₊₀	Φ4 ^{+0.05} ₊₀	Φ6 ^{+0.05} ₊₀	Φ10 ^{+0.05} ₊₀	Φ12 ^{+0.05} ₊₀	Φ16 ^{+0.05} ₊₀
Push rod mechanism	-			Cylinder or Spring push rod mechanism			
Port size of push rod mechanism	-			M5×0.8			

[Note] Sensor switch should be ordered additionally. Refer to P362 for detail.

Symbol



Product feature

1. The hollow tube can be matched with the mechanism to achieve the blowing effect.
2. The jaws and piston rods are made of high-grade stainless steel, which has high strength, corrosion resistance and small assembly clearance, low shaking and high durability.
3. All series are equipped with a dust jacket, which can also be used in special occasions.
4. A positioning hole is attached to the bottom of the body, which can improve the precision and the consistency of repeated dismounting and positioning.
5. The tail end is equipped with a push rod mechanism for the push function.
6. The sensor grooves of each specification are shared.

Ordering code

HFCQ 20 E

① ② ③

① Model	② Bore size	③ Push rod mechanism		
HFCQ: Air finger (Double acting, parallel hollow type)	16	Blank: Without push rod mehanism	E: Cylinder push rod mechanism	V: Spring push rod mechanism
	20			
	25			
	32			
	40			
	50			
63				



Push rod mechanism ordering code

F-HFCQ 32 E

① ② ③

① Model	② Bore size	③ Push rod mechanism type	
HFCQ: Air finger (Double acting, parallel hollow type)	32	E: Cylinder push rod mechanism	V: Spring push rod mechanism
	40		
	50		
	63		
	63		



[Note]

1. The push rod mechanism can only be used with Φ32/Φ40/Φ50/Φ63.
2. HFCQ series are all attached with magnet.

Specification of Cylinder push rod mechanism

Model	HFCQ32E	HFCQ40E	HFCQ50E	HFCQ63E
Acting type	Double acting			
Fluid	Air(to be filtered by 40μm filter element)			
Operating pressure	0.2~0.7MPa(28~100psi)		0.15~0.7MPa(22~100psi)	
Temperature	-20~70 °C			
Lubrication	Not required			
Push stroke mm	7	8	14	15
Max. frequency	60(c.p.m)			
Sensor switches	DMSH, CMSH, EMSH			
Push force N(0.5MPa)	45	130	204	335
Weight g	560	790	1350	2280

Specification of Spring push rod mechanism

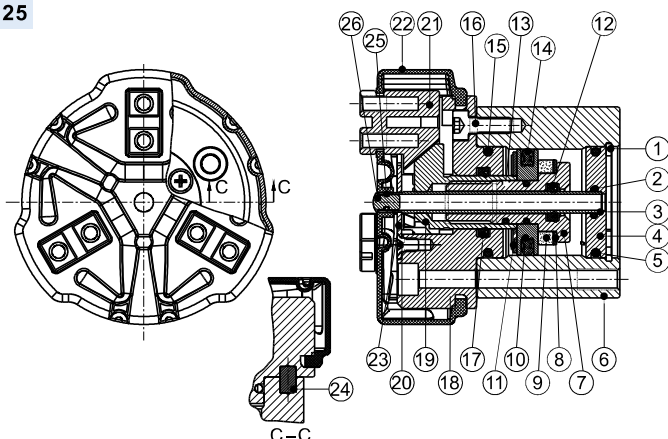
Model	HFCQ32V	HFCQ40V	HFCQ50V	HFCQ63V
Push stroke mm	7	8	14	15
Push spring force N	5~12	9~18	16~31	24~40
Weight g	530	730	1270	2190

Air gripper (parallel open/close hollow style)

HFCQ Series

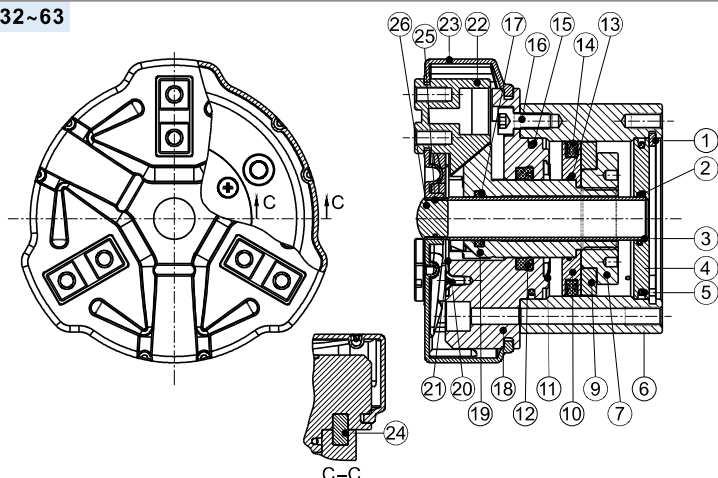
Inner structure and material of major parts

HFCQ16~25



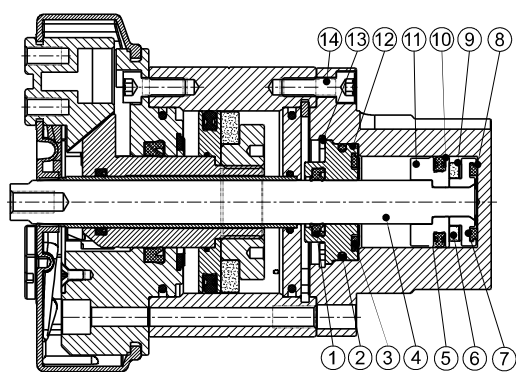
NO.	Item	Material
1	C clip	Spring steel
2	O-ring	NBR
3	Hollow tube	Stainless steel
4	Back cover	Aluminum alloy
5	O-ring	NBR
6	Body	Aluminum alloy
7	Magnet holder	Stainless steel
8	Magnet washer	NBR
9	Magnet	Rare earths
10	Piston	Aluminum alloy
11	Bumper	TPU
12	Rod packing	NBR
13	O-ring	NBR
14	Piston seal	NBR
15	O-ring	NBR
16	Countersink screw	Alloy steel
17	Rod packing	NBR(16~25) TPU(32~63)
18	Front cover	Aluminum alloy
19	Piston rod	Stainless steel
20	Screw	Stainless steel
21	Jaw	Stainless steel
22	Dustproof cover	NBR
23	Cover blank	Stainless steel
24	Pin	Stainless steel
25	O-ring	NBR
26	Dustproof pluger	NBR

HFCQ32~63



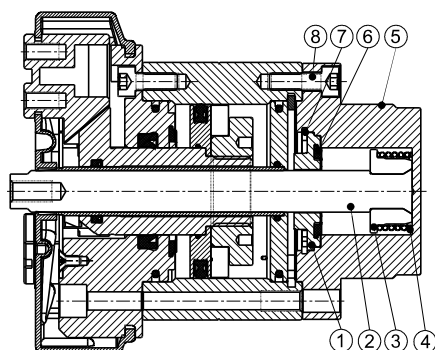
NO.	Item	Material
1	Rod packing	NBR
2	O-ring	NBR
3	Bumper	TPU/NBR
4	Push rod	Stainless steel
5	Piston seal	NBR
6	Magnet washer	NBR
7	Bumper	TPU/NBR
8	Body	Aluminum alloy
9	Magnet holder	Brass/Aluminum alloy
10	Magnet	Rare earths
11	Piston	Brass/Aluminum alloy
12	Front cover	Aluminum alloy
13	C clip	Spring steel
14	Countersink screw	Alloy steel

HFCQ32E~63E



NO.	Item	Material
1	Front cover	Aluminum alloy
2	Push rod	Stainless steel
3	Piston	Aluminum alloy
4	Spring	SWPB
5	Body	Aluminum alloy
6	Bumper	TPU/NBR
7	C clip	Spring steel
8	Countersink screw	Alloy steel

HFCQ32V~63V

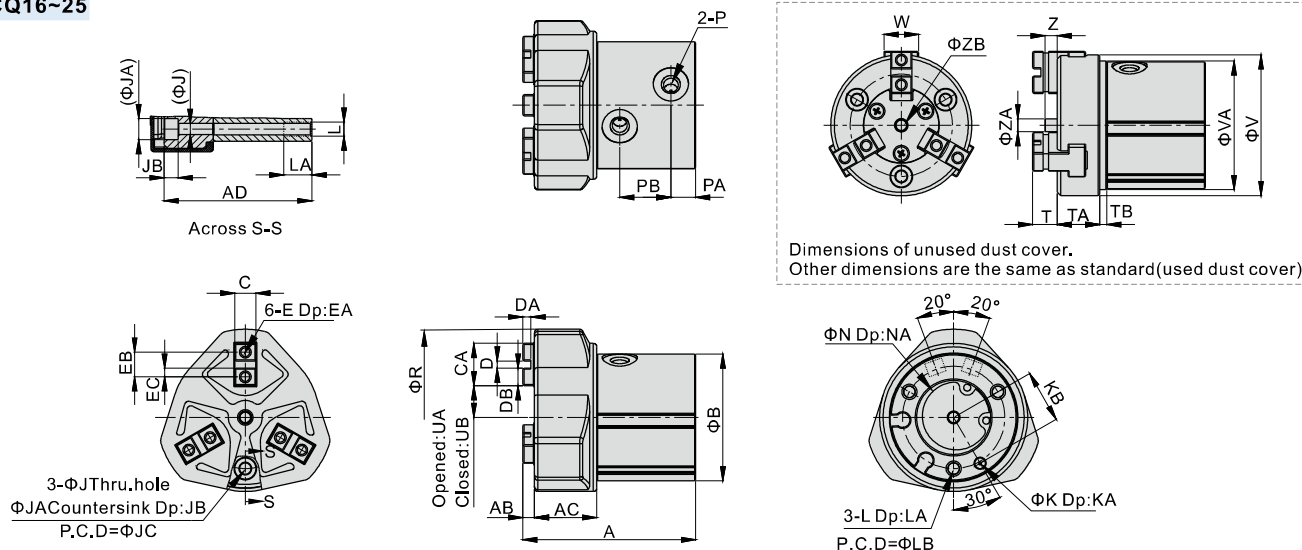


Air gripper(parallel open/close hollow style)

HFCQ Series

Dimensions

HFCQ16~25

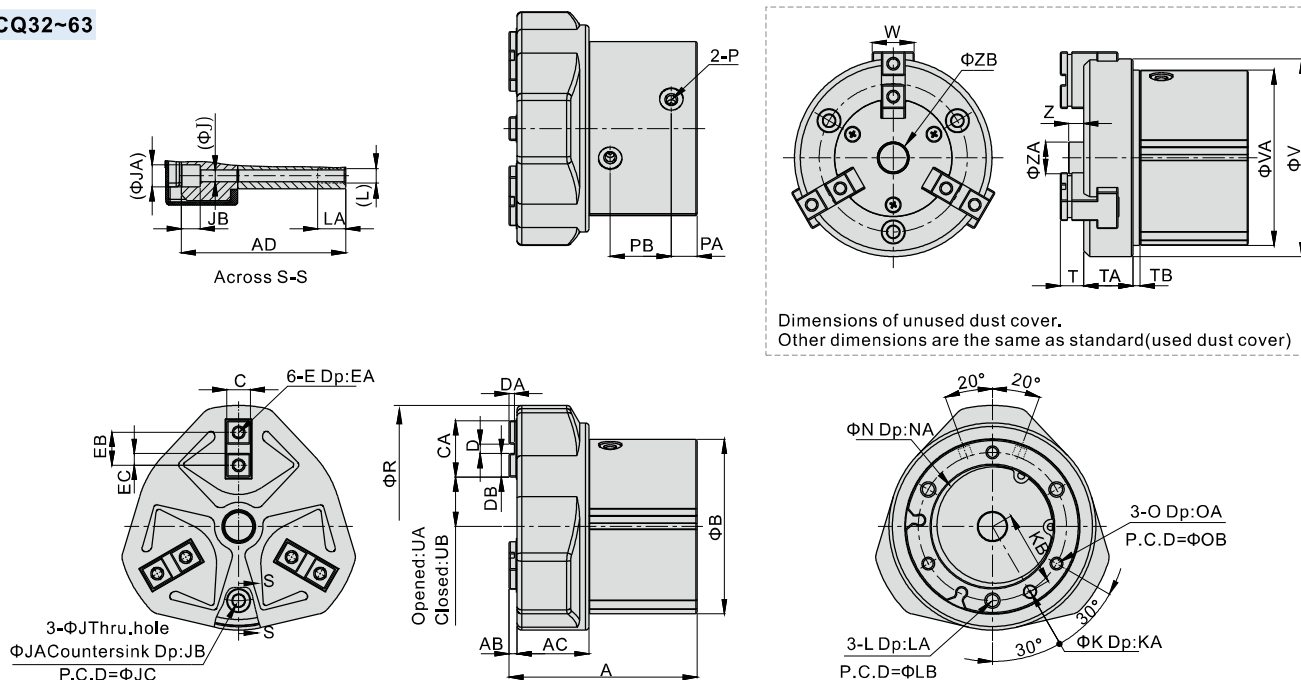


Dimensions of unused dust cover.
Other dimensions are the same as standard(used dust cover)

Bore size\Item	A	AB	AC	AD	B	C	CA	D	DA	DB	E	EA	EB	EC	J	JA	JB	JC	K	KA	KB	L	LA	LB
16	46	3	16	39	31	5 ^{+0.01} _{-0.03}	11	2 ^{+0.04} _{-0.01}	2 ^{+0.2} _{-0.01}	4.5	M3×0.5	5	6	2	3.2	6	4	24	3 ^{+0.04} _{-0.01}	3	12	M4×0.7	8	24
20	49	3	18	42	36	6 ^{+0.01} _{-0.03}	12	2 ^{+0.04} _{-0.01}	2 ^{+0.2} _{-0.01}	5	M3×0.5	5	7	2.5	3.2	6	4	29	3 ^{+0.04} _{-0.01}	3	15	M4×0.7	8	29
25	55	3	20	47	42	6 ^{+0.01} _{-0.03}	14	2 ^{+0.04} _{-0.01}	2 ^{+0.2} _{-0.01}	6	M3×0.5	5	8	3	3.2	6	4	34	3 ^{+0.04} _{-0.01}	3	18	M4×0.7	8	34

Bore size\Item	N	NA	P	PA	PB	R	T	TA	TB	UA	UB	V	VA	W	Z	ZA	ZB
16	17 ^{+0.05} _{-0.01}	1.5	M3×0.5	7	14	44	7	10.5	3	9	7	34	31.5	8	3.5	3.7	3 ^{+0.05} _{-0.01}
20	21 ^{+0.05} _{-0.01}	1.5	M5×0.8	7	14	50	7	12	3	10	8	40	36.5	10	3.5	3.7	3 ^{+0.05} _{-0.01}
25	26 ^{+0.05} _{-0.01}	1.5	M5×0.8	8	17	59	8	13	3	12.5	9.5	47	42.5	12	4.5	4.7	4 ^{+0.05} _{-0.01}

HFCQ32~63



Dimensions of unused dust cover.
Other dimensions are the same as standard(used dust cover)

Bore size\Item	A	AB	AC	AD	B	CA	C	D	DA	DB	E	EA	EB	EC	J	JA	JB	JC	K	KA	KB	L	LA	LB	N	NA
32	63	3	24	54	55	20	8 ^{+0.01} _{-0.03}	2 ^{+0.04} _{-0.01}	2 ^{+0.2} _{-0.01}	9	M4×0.7	8	11	4.5	4.2	8	7	44	4 ^{+0.04} _{-0.01}	4	22	M5×0.8	10	44	34 ^{+0.05} _{-0.01}	2
40	66	3	26	57	62	21	8 ^{+0.01} _{-0.03}	3 ^{+0.04} _{-0.01}	2 ^{+0.2} _{-0.01}	9	M4×0.7	8	12	4.5	4.2	8	7	52	4 ^{+0.04} _{-0.01}	4	26	M5×0.8	10	52	42 ^{+0.05} _{-0.01}	2
50	80	3	31	70	74	24	10 ^{+0.01} _{-0.03}	4 ^{+0.04} _{-0.01}	2 ^{+0.2} _{-0.01}	10	M5×0.8	10	14	5	5.1	9.5	8	63	5 ^{+0.04} _{-0.01}	5	32	M6×1.0	12	63	52 ^{+0.05} _{-0.01}	2
63	91	4	37	79	92	28	12 ^{+0.01} _{-0.03}	6 ^{+0.04} _{-0.01}	3 ^{+0.2} _{-0.01}	11	M5×0.8	10	17	5.5	6.6	11	8	78	6 ^{+0.04} _{-0.01}	6	40	M8×1.25	16	78	65 ^{+0.05} _{-0.01}	2.5

Bore size\Item	O	OA	OB	P	PA	PB	R	UA	UB	T	TA	TB	V	VA	W	Z	ZA	ZB
32	M4×0.7	8	44	M5×0.8	10	19	76	15.5	11.5	9	15.5	2.5	62	55.5	14	5	7.4	6 ^{+0.05} _{-0.01}
40	M4×0.7	8	52	M5×0.8	11	19	86	19	15	9	17.5	2.5	72	62.5	16	5	11.4	10 ^{+0.05} _{-0.01}
50	M5×0.8	10	63	M5×0.8	11	26	103	24	18	10	21	3	84	74.5	18	6	13.4	12 ^{+0.05} _{-0.01}
63	M6×1.0	12	78	M5×0.8	13	29	125	31	23	12	26	3	102	92.5	24	7	17.4	16 ^{+0.05} _{-0.01}

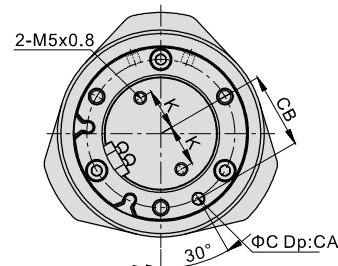
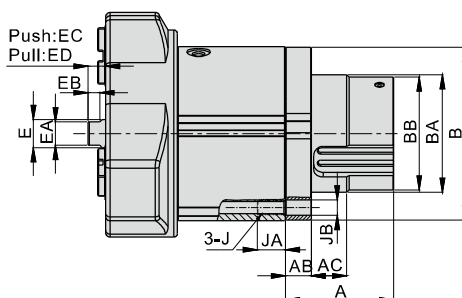
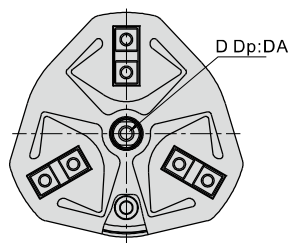
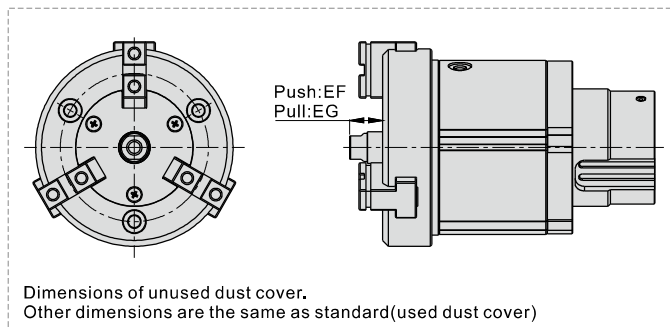


Air gripper(parallel open/close hollow style)

HFCQ Series

HFCQ32E~63E

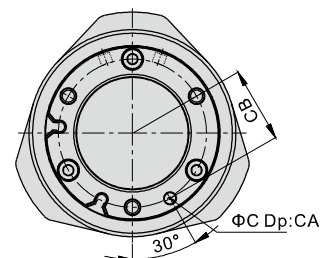
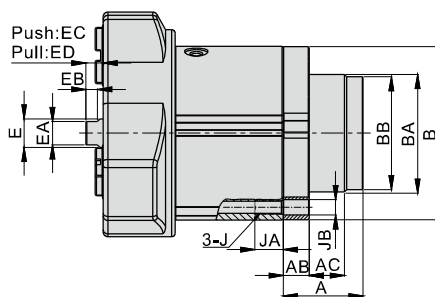
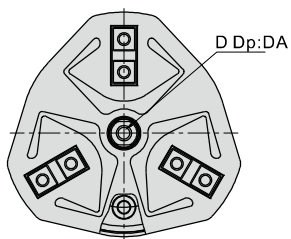
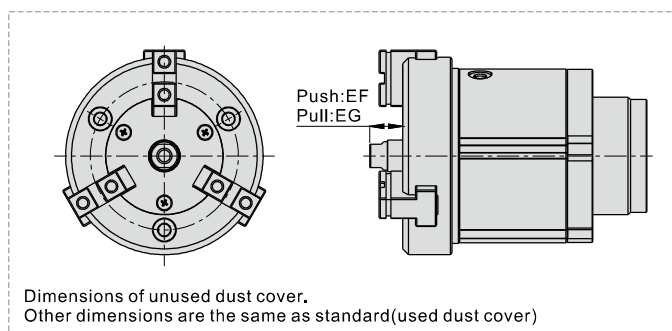
(With Cylinder push rod mechanism)



Bore size\Item	A	AB	AC	B	BA	BB	C	CA	CB	D	DA	E	EA	EB	EC	ED	EF	EG	J	JA	JB	K
32	36	9	9	54.5	32 ⁰ _{-0.05}	30	4 ^{+0.04} _{+0.01}	4	22	M3×0.5	6	6	5	3.5	14	7	20	13	M5×0.8	10	5.5	9.5
40	38	9	12	61.5	40 ⁰ _{-0.05}	38	4 ^{+0.04} _{+0.01}	4	26	M5×0.8	10	10	8	4.5	15	7	21	13	M5×0.8	10	5.5	13.5
50	48	11	15	73.5	50 ⁰ _{-0.05}	48	5 ^{+0.04} _{+0.01}	5	32	M6×1.0	12	12	10	5	21	7	28	14	M6×1.0	12	6.6	17.5
63	53	13	18	91.5	60 ⁰ _{-0.05}	58	6 ^{+0.04} _{+0.01}	6	40	M8×1.25	16	16	14	7	24	9	32	17	M8×1.25	16	8.6	20

HFCQ32C~63V

(With Spring push rod mechanism)



Bore size\Item	A	AB	AC	B	BA	BB	C	CA	CB	D	DA	E	EA	EB	EC	ED	EF	EG	J	JA	JB
32	20	9	11	54.5	32 ⁰ _{-0.05}	-	4 ^{+0.04} _{+0.01}	4	22	M3×0.5	6	6	5	3.5	14	7	20	13	M5×0.8	10	5.5
40	24	9	15	61.5	40 ⁰ _{-0.05}	-	4 ^{+0.04} _{+0.01}	4	26	M5×0.8	10	10	8	4.5	15	7	21	13	M5×0.8	10	5.5
50	34	11	15	73.5	50 ⁰ _{-0.05}	48	5 ^{+0.04} _{+0.01}	5	32	M6×1.0	12	12	10	5	21	7	28	14	M6×1.0	12	6.6
63	40	13	18	91.5	60 ⁰ _{-0.05}	58	6 ^{+0.04} _{+0.01}	6	40	M8×1.25	16	16	14	7	24	9	32	17	M8×1.25	16	8.6

HFCQ Series

How to select product

Please select pneumatic finger according to the following steps:

① The selection of the effective gripping force



② the confirmation of the gripping point

1. The selection of the gripping force

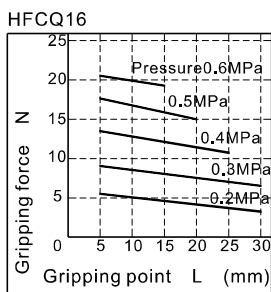
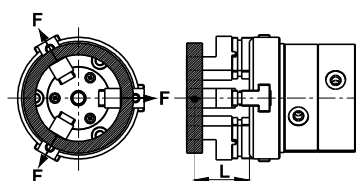
The gripping work-pieces shown below, on the impact condition of ordinary handling state, taking safety coefficient $a=4$, have a gripping force that is more than 10-20 times of the mass of the gripped objects.

	The work-pieces as shown in the left : n : number of gripper F : Gripping force (N) μ : friction coefficient between fittings and work-pieces. m : mass of work-pieces g : acceleration of gravity ($=9.8m/s^2$)	The condition that the work-pieces won't drop is: $n \times \mu F > mg$ so: $F > \frac{mg}{n \times \mu}$ Safety coefficient is a , so F is: $F = \frac{mg}{n \times \mu} \times a$	$\mu=0.2$ $F = \frac{mg}{2 \times 0.2} \times 4 = 10 \times mg$	$\mu=0.1$ $F = \frac{mg}{2 \times 0.1} \times 4 = 20 \times mg$
			10 times of the mass of the gripped objects	20 times of the mass of the gripped objects

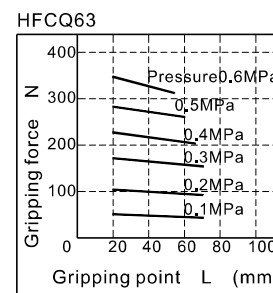
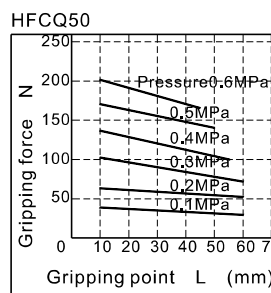
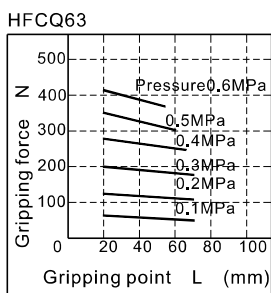
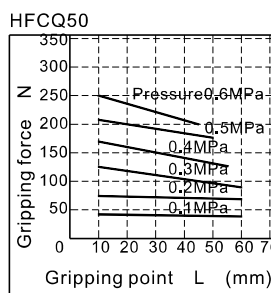
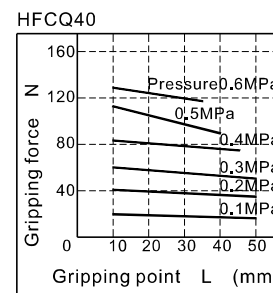
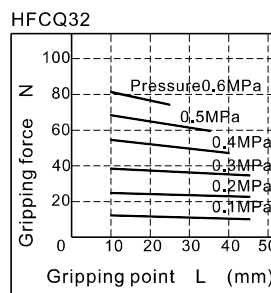
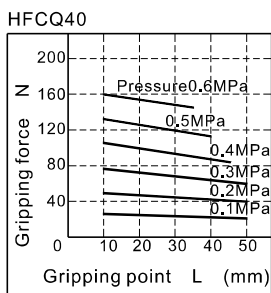
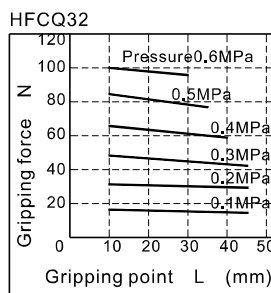
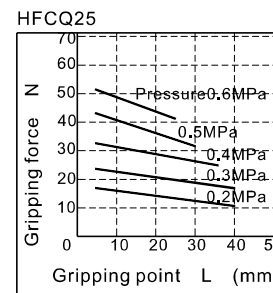
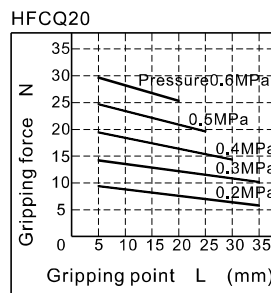
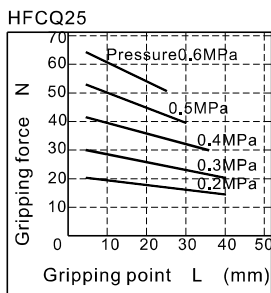
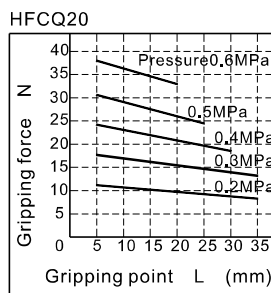
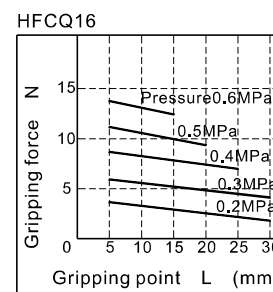
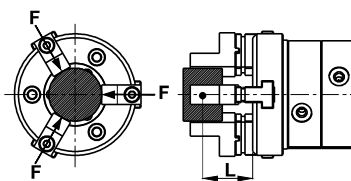
Note) If the friction coefficient $\mu > 0.2$, for safety, please also select clamping force according to the principle of 10~20 times of the mass of the clamped objects. As for large acceleration and shock, it requires for greater safety coefficient.

1.1) The actual gripping force must be within the effective gripping forces of different pneumatic fingers specifications shown in the below chart.

Opened gripping force

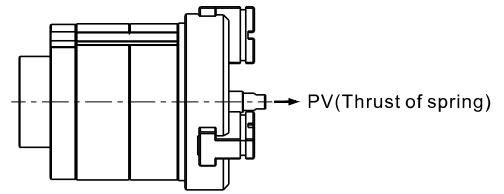
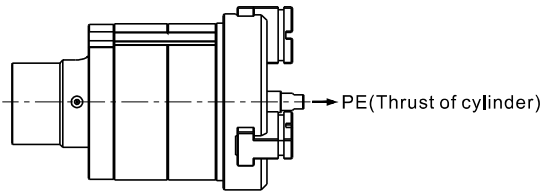


Closed gripping force

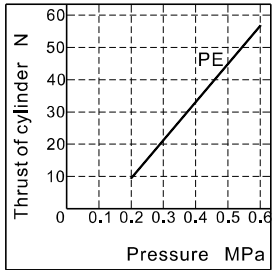


HFCQ Series

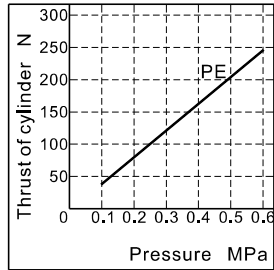
Effective thrust of Push rod mechanism



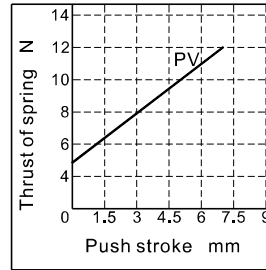
HFCQ32E



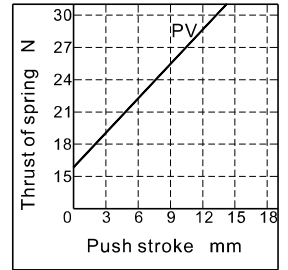
HFCQ50E



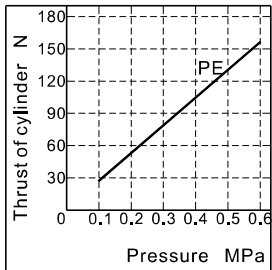
HFCQ32V



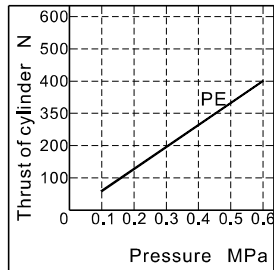
HFCQ50V



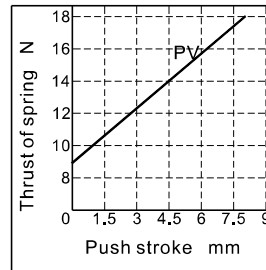
HFCQ40E



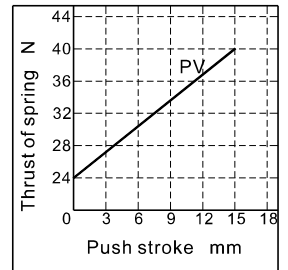
HFCQ63E



HFCQ40V



HFCQ63V

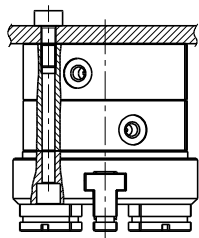


HFCQ Series

Installation and application

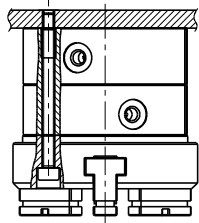
1. Due to the abrupt changes, the circuit pressure is low, which will lead to the decrease of the gripping force and falling of the work-pieces.
In order to avoid the harm to the human body and damage to the equipment, anti-dropping device must be equipped.
2. Don't use the air gripper under strong external force and impact force.
3. When install and fix the air gripper, avoid falling down, collision and damage.
4. When fixing the gripping jaw parts, don't twist the gripping jaw.
5. There are several kinds of installation method, and the locking torque of fastening screw must be within the prescribed torque range shown in the below chart.
If the locking torque is too large, it will cause the dysfunctional. If the locking torque is too small, it will cause the position deviation and fall.

Tail installation type



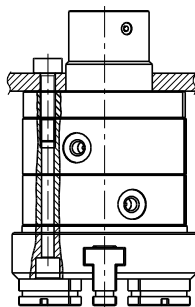
Bore size	The bolts type	Max. locking moment(N.m)	Max. screwed depth(mm)	The aperture of the positioning bore(mm)	The depth of the positioning bore(mm)
16	M4×0.7	2.1	8	Φ17 ^{+0.05} ₀	1.5
20	M4×0.7	2.1	8	Φ21 ^{+0.05} ₀	1.5
25	M4×0.7	2.1	8	Φ26 ^{+0.05} ₀	1.5
32	M4×0.7	2.1	8	Φ34 ^{+0.05} ₀	2
	M5×0.8	4.3	10	Φ34 ^{+0.05} ₀	2
40	M4×0.7	2.1	8	Φ42 ^{+0.05} ₀	2
	M5×0.8	4.3	10	Φ42 ^{+0.05} ₀	2
50	M5×0.8	4.3	10	Φ52 ^{+0.05} ₀	2
	M6×1.0	7.3	12	Φ52 ^{+0.05} ₀	2
63	M6×1.0	7.3	12	Φ65 ^{+0.05} ₀	2.5
	M8×1.25	18	16	Φ65 ^{+0.05} ₀	2.5

The installation of the front through hole



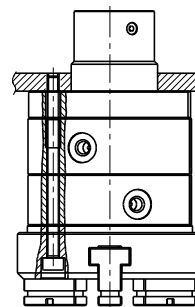
Bore size	The bolts type	Max. locking mement(N.m)
16	M3×0.5	0.88
20	M3×0.5	0.88
25	M3×0.5	0.88
32	M4×0.7	2.1
40	M4×0.7	2.1
50	M5×0.8	4.3
63	M6×1.0	7.3

Tail installation type(with push rod)



Bore size	The bolts type	Max. locking moment(N.m)	Max. screwed depth(mm)	The aperture of the positioning bore(mm)
32	M5×0.8	4.3	10	Φ32 ⁰ _{-0.05}
40	M5×0.8	4.3	10	Φ40 ⁰ _{-0.05}
50	M6×1.0	7.3	12	Φ50 ⁰ _{-0.05}
63	M8×1.25	18	16	Φ60 ⁰ _{-0.05}

The installation of the front through hole(with push rod)



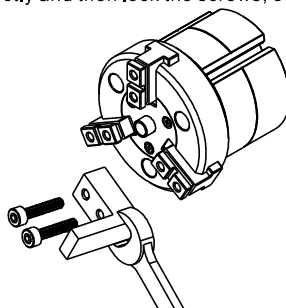
Bore size	The bolts type	Max. locking mement(N.m)
32	M4×0.7	2.1
40	M4×0.7	2.1
50	M5×0.8	4.3
63	M6×1.0	7.3

6. The installation method of the gripping jaw fittings

When install the gripping jaw fittings, you have to pay particular attention that you can only hold the gripping jaw by using spanner, and then lock the screws with allen wrench. Never clamp the body directly and then lock the screws, otherwise the parts will be easily damaged.

Install the gripping jaw fittings

Bore size	The bolts type	Max. locking mement(N.m)
16	M3×0.5	0.59
20	M3×0.5	0.59
25	M3×0.5	0.59
32	M4×0.7	1.4
40	M4×0.7	1.4
50	M5×0.8	2.8
63	M5×0.8	2.8





Air gripper—HFKL Series

Parallel with guide/longer stroke/roller bearing style

Compendium of HFKL Series

Four kinds of bore size and three kinds of type

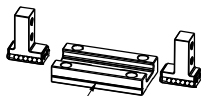
Bore size: 10, 16, 20, 25. HFKL: Double acting
HFSKL: Single acting and normally closed
HFTKL: Single acting and normally opened

Long clamping stroke

The gripping stroke is long and the size of the gripping object is different.

Integrated design of linear guide roller

Integrated design of linear guide roller, high rigidity and high precision.

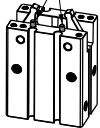


Integration of a linear guide roller

With positioning pin

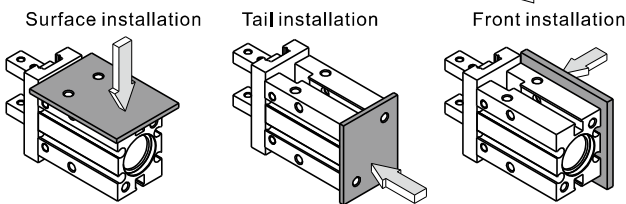
A positioning pin is attached to the bottom of the linear guide rail, which can prevent the deviation of the positioning rail and body.

The positioning pin prevents the deviation of the rail and body



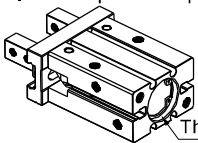
Can be mounted from three directions

With mounting holes on the side and tail.



With positioning hole

The positioning hole can improve the precision and the consistency of repeated dismounting and positioning.

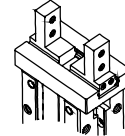


The positioning hole

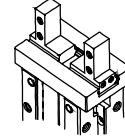
Multiple kinds of finger type

According to the actual using requirements of customers, the initial position of clamping jaw can be customized to meet the different needs under different working conditions.

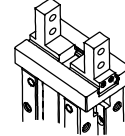
Standard type



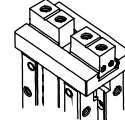
Side mounting type(B)



Thru.hole mounting type(N)



Bottom mounting type(F)



Closed port

Opened port

With squareness magnetic switch slots

The squareness magnetic switch slots convenient to install DMSG\CMSG\EMSG type inducting switch.

With roundness magnetic switch slots

The roundness magnetic switch slots convenient to install DMSH\CMSH\EMSH type inducting switch.

Bore size (mm)		10	16	20	25
Acting type		Double acting		Single acting	
Fluid		Air(to be filtered by 40μm filter element)			
Operating pressure	Double acting	Φ10	0.2~0.7MPa(28~100psi)(2.0~7.0bar)		
		Others	0.15~0.7MPa(22~100psi)(1.5~7.0bar)		
	Single acting	Φ10	0.35~0.7MPa(50~100psi)(3.5~7.0bar)		
		Others	0.25~0.7MPa(36~100psi)(2.5~7.0bar)		
Temperature °C		-20~70			
Lubrication		Not required			
Repeatability mm		±0.01			
Max. frequency		120(c.p.m)			
Sensor switches		CMSH\DMSH EMSH		CMSG\DMSG\EMSG CMSH\DMSH\EMSH	
Port size		M3×0.5		M5×0.8	

Note) Refer to P362 for detail of sensor switch.



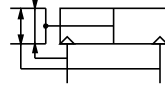
Air gripper(Parallel with guide/longer stroke/roller bearing style) **AIRTAC**

HFKL Series

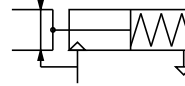


Symbol

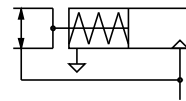
HFKL: Double acting



HFTKL: Single acting and normally opened



HFSKL: Single acting and normally closed



Gripping force and stroke

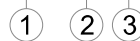
Acting type		Double acting(HFKL)				Single acting_NO (HFTKL)				Single acting_NC (HFSKL)			
Bore size		10	16	20	25	10	16	20	25	10	16	20	25
Gripping force per finger Effective value(N)	External	11	34	45	69	7	27	35	55	-	-	-	-
	Internal	17	45	68	102	-	-	-	-	13	38	59	87
Opening/Closing stroke(Both sides)(mm)		8	12	18	22	8	12	18	22	8	12	18	22
Weight (g)	F Type	64	146	275	484	74	154	294	530	73	154	294	528
	Others	64	146	273	489	73	155	292	525	72	155	292	523

[Note] The gripping force in the above table is in the working pressure of 0.5MPa, and with a gripping point of L=20mm.

Add) Please refer to page 270 for the definition of "L".

Ordering code

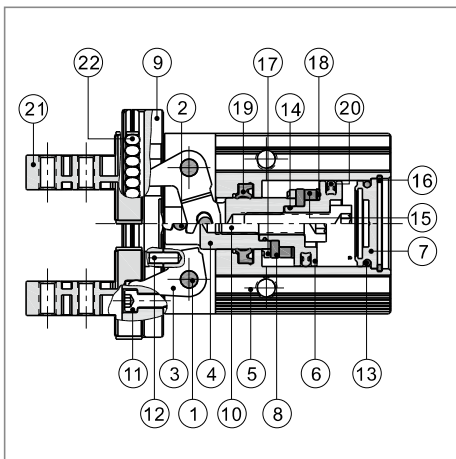
HFKL 20 □



①Model	②Bore size	③Finger type			
HFKL: Air finger(Double acting)	10 16 20 25	Blank: Standard	B: Side mounting type	N: Thru.hole mounting type	F: Bottom mounting type
HFSKL: Air finger (Single acting and normally closed)					
HFTKL: Air finger (Single acting and normally opened)					

[Note] HFKL series are all attached with magnet, and sensor switch should be ordered additionally.

Inner structure and material of major parts

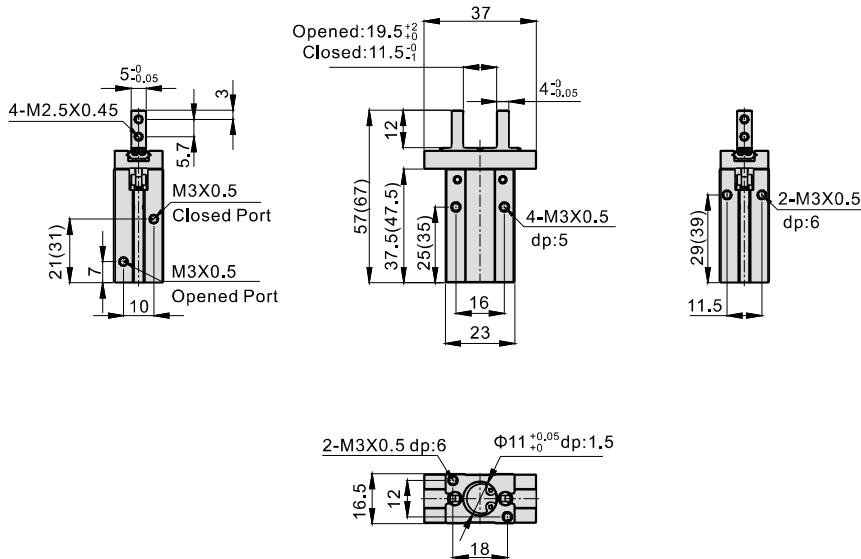


NO.	Item	Material	NO.	Item	Material
1	Pin	Stainless steel	12	Pin	Bearing steel
2	Pin	Stainless steel	13	O-ring	NBR
3	Curved bar	Stainless steel	14	O-ring	NBR
4	Piston rod	Aluminum alloy/Stainless steel	15	Magnet	Sintered metal(Neodymium-iron-boron)
5	Body	Aluminum alloy	16	C clip	Spring steel
6	Piston	Aluminum alloy/Stainless steel	17	Bumper	TPU
7	Back cover	Brass/Aluminum alloy	18	Magnet washer	NBR
8	Magnet fixed plate	Aluminum alloy/Stainless steel	19	Rod packing	NBR
9	Rail	Alloy steel	20	Piston seal	NBR
10	Countersink screw	Alloy steel	21	Clamping jaw	Bearing steel
11	Countersink screw	Alloy steel	22	Guide roller	Bearing steel

HFKL Series

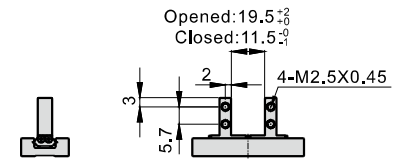
Dimensions

HFKL10

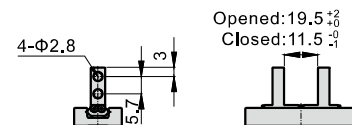


[Note]The values in "(" in the above table are single acting type sizes.

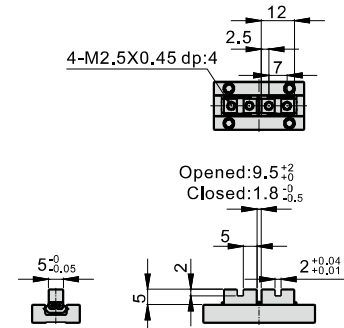
Side mounting type(B type)



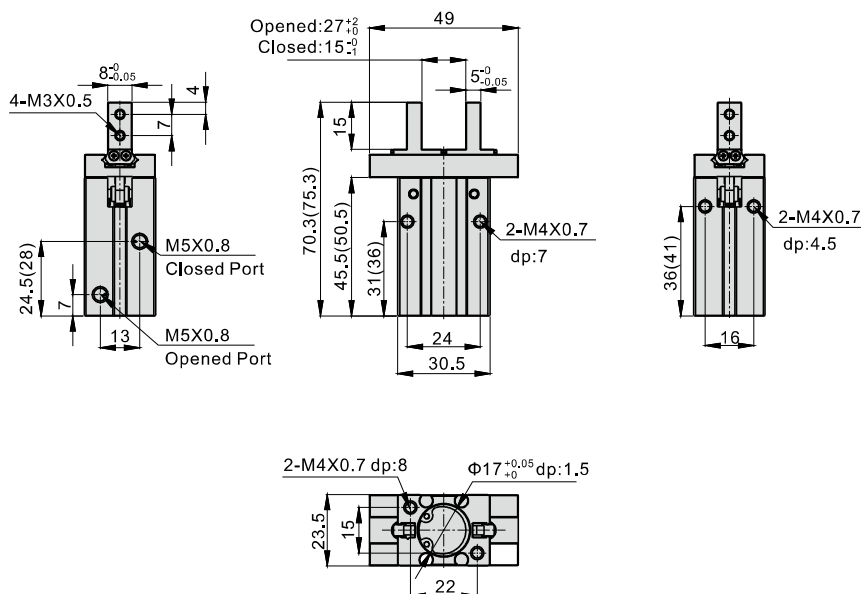
Thru.hole mounting type(N type)



Bottom mounting type(F type)

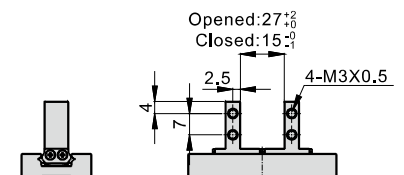


HFKL16

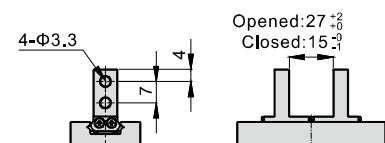


[Note]The values in "(" in the above table are single acting type sizes.

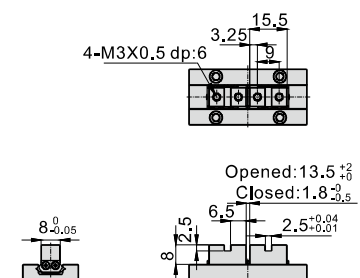
Side mounting type(B type)



Thru.hole mounting type(N type)



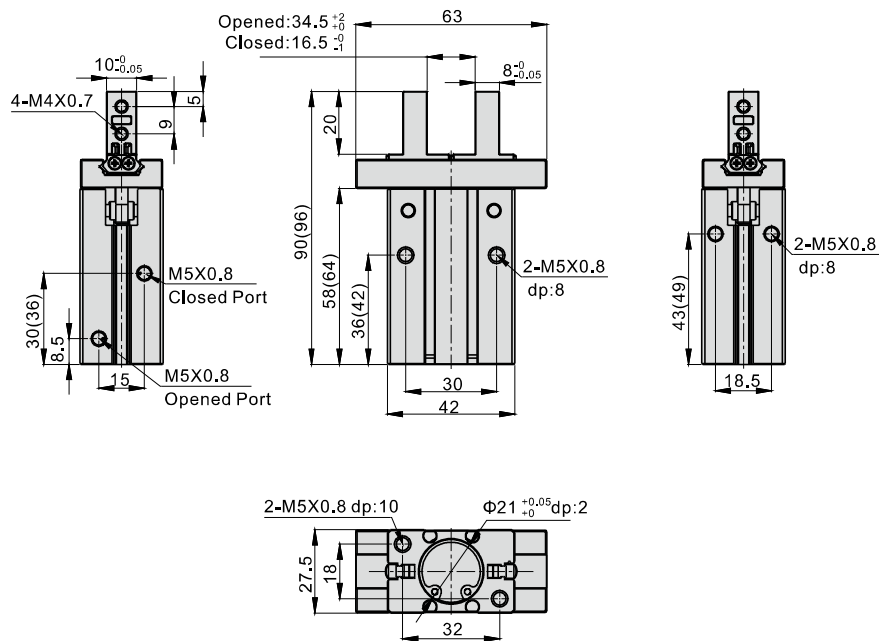
Bottom mounting type(F type)



Air gripper (Parallel with guide/longer stroke/roller bearing style) **AIRTAC**

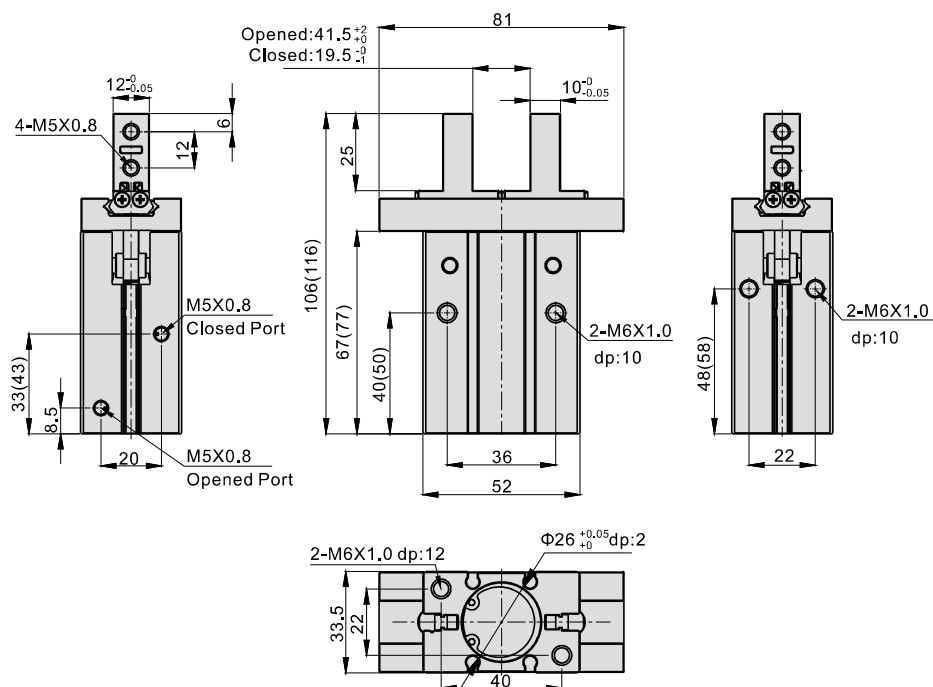
HFKL Series

HFKL20



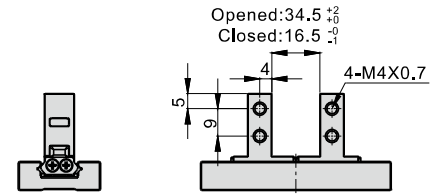
[Note]The values in "()" in the above table are single acting type sizes.

HFKL25

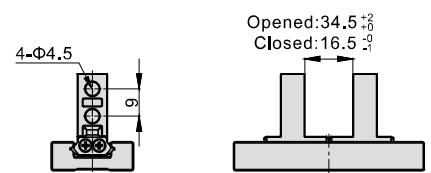


[Note]The values in "()" in the above table are single acting type sizes.

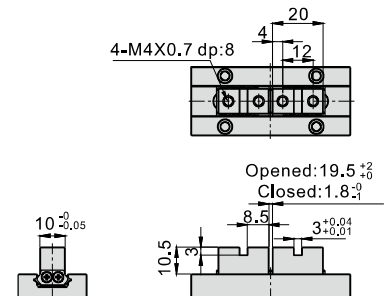
Side mounting type(B type)



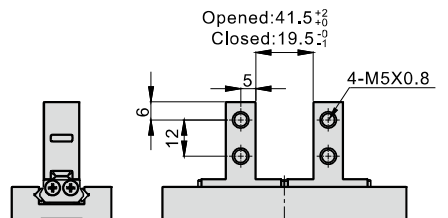
Thru.hole mounting type(N type)



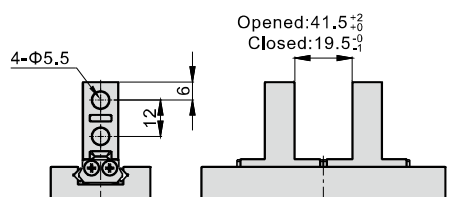
Bottom mounting type(F type)



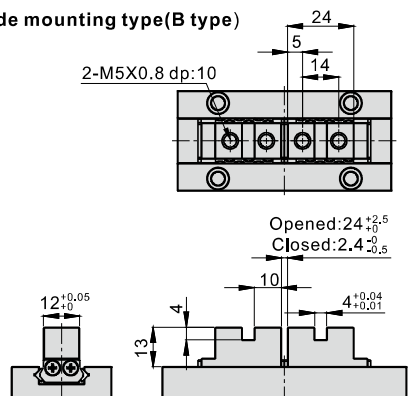
Side mounting type(B type)



Thru.hole mounting type(N type)



Side mounting type(B type)



HFKL Series

How to select product

Please select pneumatic finger according to the following steps:

① The selection of the effective gripping force



② the confirmation of the gripping point



③ the confirmation of the external force put on the gripping jaw

1. The selection of the gripping force

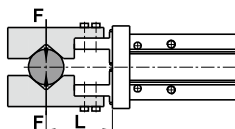
The gripping work-pieces shown below, on the impact condition of ordinary handling state, taking safety coefficient a=4, have a gripping force that is more than 10-20 times of the mass of the gripped objects.

	The work-pieces as shown in the left :		μ=0.2	μ=0.1
	F: Gripping force (N) μ: friction coefficient between fittings and work-pieces. m: mass of work-pieces g: acceleration of gravity (=9.8m/s ²)	The condition that the work-pieces won't drop is: $2 \times \mu F > mg$ so: $F > \frac{mg}{2 \times \mu}$ Safety coefficient is a, so F is: $F = \frac{mg}{2 \times \mu} \times a$	$F = \frac{mg}{2 \times 0.2} \times 4 = 10 \times mg$ 10 times of the mass of the gripped objects	$F = \frac{mg}{2 \times 0.1} \times 4 = 20 \times mg$ 20 times of the mass of the gripped objects

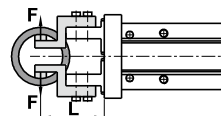
Note) If the friction coefficient μ > 0.2, for safety, please also select clamping force according to the principle of 10~20 times of the mass of the clamped objects. As for large acceleration and shock, it requires for greater safety coefficient.

1.1) The actual gripping force must be within the effective gripping forces of different pneumatic fingers specifications shown in the below chart.

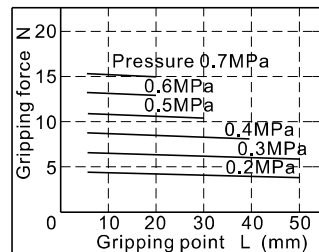
Double acting type closed gripping force



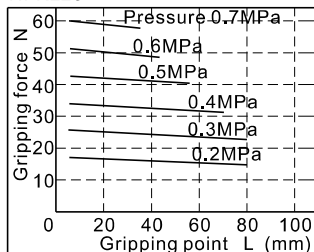
Double acting type opened gripping force



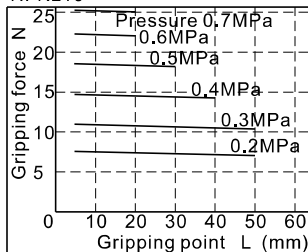
HFKL10



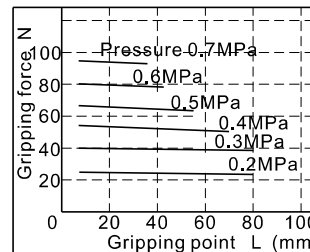
HFKL20



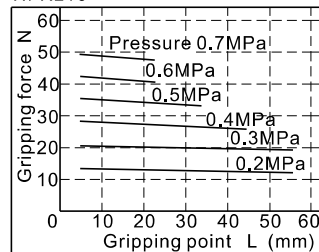
HFKL10



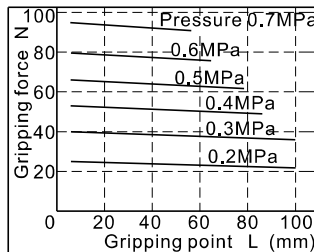
HFKL20



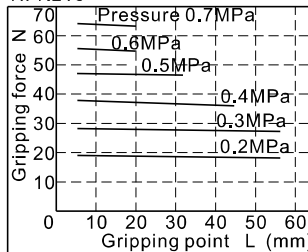
HFKL16



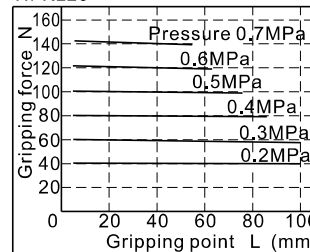
HFKL25



HFKL16

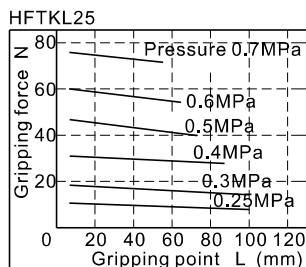
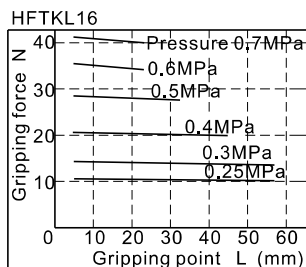
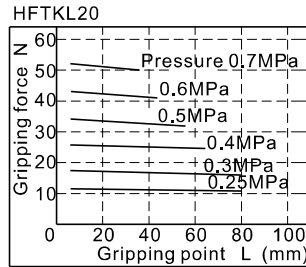
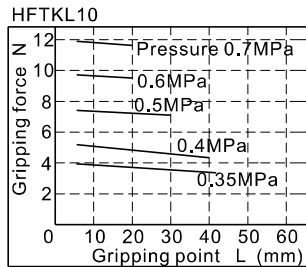
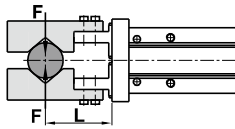


HFKL25

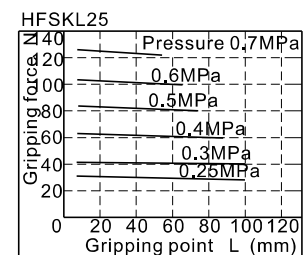
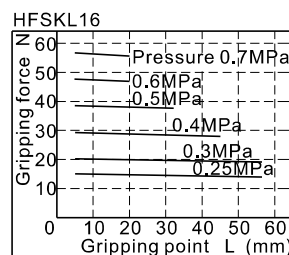
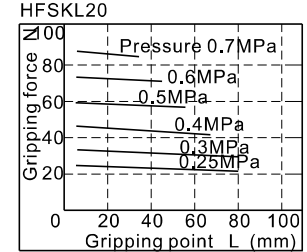
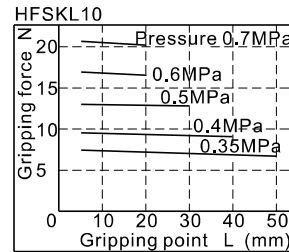
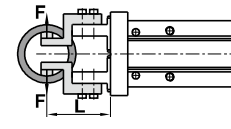


HFKL Series

Single acting normally opened gripping force



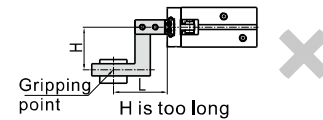
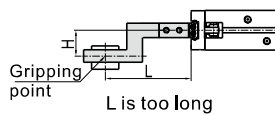
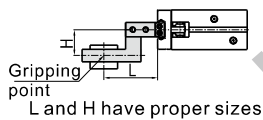
Single acting normally closed clamping force



2. The selection of the gripping point

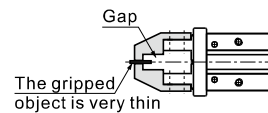
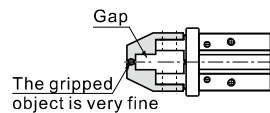
2.1) Please select the gripping point within the limited field shown below.

Over the limits, gripping jaws would be subjected to excessive torque loads, and lead to short life of the air gripper.



2.2) In the allowable range of gripping point, it is better to design for short and light fittings. If the fittings are long and heavy, the inertia force when the finger is open and close will become larger, and the performance of gripping jaw will be degraded, at the same time it will affect the life.

2.3) When the gripped object is very fine and thin, you have to equip with gap between fittings. If not, there will be unstable clamp, resulting in a position offset and adverse clamping and so on.



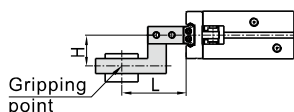
3. The confirmation of the external force put on the gripping jaw.

Bore size	The allowed vertical loads Fv(N)	Max. permissible torque(Nm)			The calculation of allowable forces when moment loads work	Examples of calculation
		Mp	My	Mr		
10	87	0.26	0.26	0.53	$\frac{M(\text{Maximum permissible moment})(\text{N}\cdot\text{m})}{L \times 10^{-3}}$ Unit conversion constant	In the guide rail of HFKL16, the external force of the pitching moment static loads put on the point of L=30mm is f=10 N, Allowable load F = 0.68/(30×10 ⁻³) = 22.7(N) Actual load f=10(N)<22.7(N) To meet the using requirements
16	147	0.68	0.68	1.36		
20	221	1.32	1.32	2.65		
25	382	1.94	1.94	3.88		

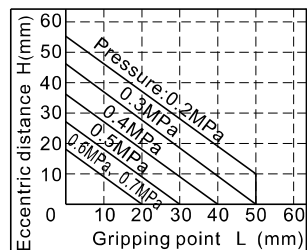
[Note] The loads and torque values of said are all static values.

HFKL Series

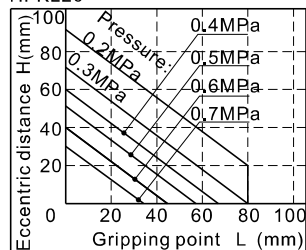
The range of the closed gripping points



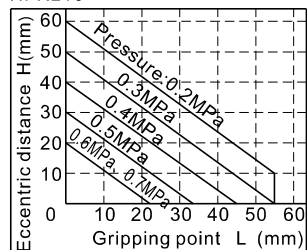
HFKL10



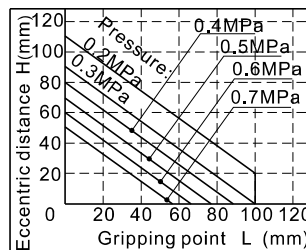
HFKL20



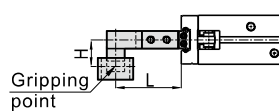
HFKL16



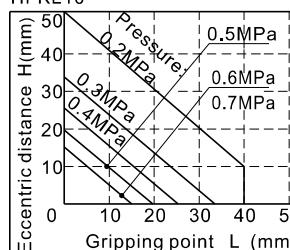
HFKL25



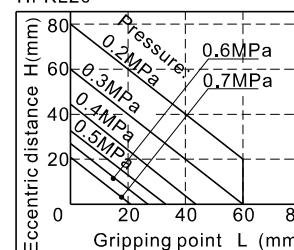
The range of the opened clamping point



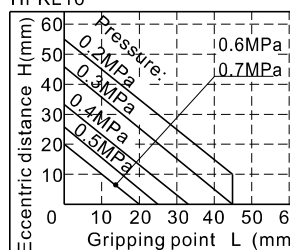
HFKL10



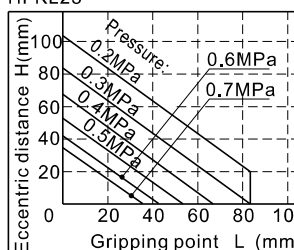
HFKL20



HFKL16



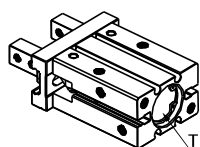
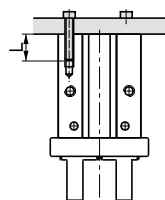
HFKL25



Installation and application

1. Due to the abrupt changes, the circuit pressure is low, which will lead to the decrease of the gripping force and falling of the work-pieces. In order to avoid the harm to the human body and damage to the equipment, anti-dropping device must be equipped.
2. Don't use the air gripper under strong external force and impact force.
3. Please contact with us when the single acting type clamps only with the spring force.
4. When install and fix the air gripper, avoid falling down, collision and damage.
5. When fixing the gripping jaw parts, don't twist the gripping jaw.
6. There are several kinds of installation method, and the locking torque of fastening screw must be within the prescribed torque range shown in the below chart. If the locking torque is too large, it will cause the dysfunctional. If the locking torque is too small, it will cause the position deviation and fall.

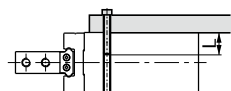
Tail installation type



The bore of the tail is used for mounting and positioning

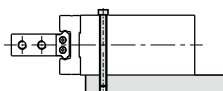
Bore size	The bolts type	Max. locking moment	Max. screwed depth	The aperture of the positioning bore	The depth of the positioning bore
10	M3×0.5	0.88N.m	6mm	Φ11mm ^{+0.05} ₀	1.5mm
16	M4×0.7	2.1N.m	8mm	Φ17mm ^{+0.05} ₀	1.5mm
20	M5×0.8	4.3N.m	10mm	Φ21mm ^{+0.05} ₀	2mm
25	M6×1.0	7.3N.m	12mm	Φ26mm ^{+0.05} ₀	2mm

The installation of the front threaded hole

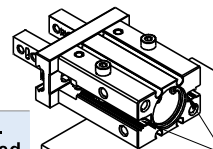


Bore size	The bolts type	Max. locking moment(Nm)	Max. screwed depth(mm)
10	M3×0.5	0.69	5
16	M4×0.7	2.1	7
20	M5×0.8	4.3	8
25	M6×1.0	7.3	10

The installation of the front through hole

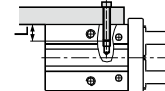


Bore size	The bolts type	Max. locking moment(Nm)	Max. screwed depth(mm)
10	M2.5×0.45	0.49	5
16	M3×0.5	0.88	8
20	M4×0.7	2.1	10
25	M5×0.8	4.3	12



When installed from front through holes, sensors can not be installed in the sensor grooves that are interfered by screws.

Surface installation type



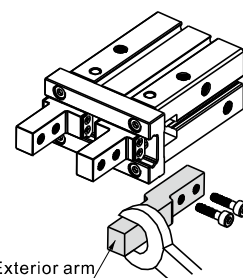
Bore size	The bolts type	Max. locking moment(Nm)	Max. screwed depth(mm)
10	M3×0.5	0.9	6
16	M4×0.7	1.6	4.5
20	M5×0.8	3.3	8
25	M6×1.0	5.9	10

Air gripper(Parallel with guide/longer stroke/roller bearing style) **AIRTAC**

HFKL Series

7. The installation method of the gripping jaw fittings
When install the gripping jaw fittings, you have to pay particular attention that you can only hold the gripping jaw by using spanner, and then lock the screws with allen wrench. Never clamp the body directly and then lock the screws, otherwise the parts will be easily damaged.

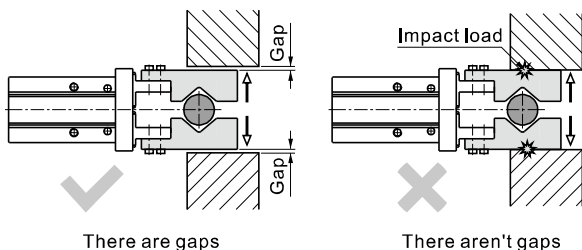
Bore size	The bolts type	Max. locking moment(Nm)
10	M2.5×0.45	0.31
16	M3×0.5	0.59
20	M4×0.7	1.4
25	M5×0.8	2.8



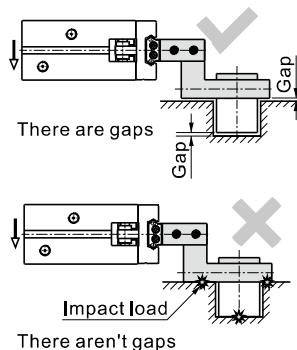
8. Confirm that there is no external forces exerted on the gripping jaw.

Transverse load acts on the gripping jaw, which will cause impact load and leads to the shaking and damage of gripping jaw. Equip with gaps so that the air gripper will not crash into work-pieces and accessories at the end of its trip.

8.1) The end of stroke under the open state of air gripper

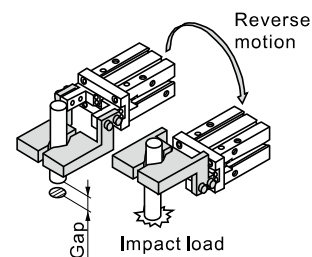


8.2) The end of stroke under the move state of air gripper



8.3) Reverse motion state

When reverse motion state, the gripping point must be precision, otherwise in the reverse motion state the air gripper maybe impact with ambience and will cause impact load .



9. When the work-pieces are inserted, the center line should be coaxial, no offset, in case there are external force generated on gripping jaw. When testing, it is specially required that the manual operation should be reduced, the pressure should be used to run it at a low speed, and guarantee the safety and no impact.



10. Please use the flow control valve to adjust the opening and closing speed of gripping jaw if too fast.

11. People can not enter the movement path of air gripper and articles can not be placed on the path too.

12. Before removing the air gripper, please confirm that it is out of working state, and then discharge of compressed air.



Air gripper—HFZ Series

Parallel style with guide track—ball bearing

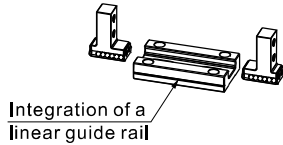
Compendium of HFZ Series

Seven kinds of bore size and three kinds of type

Bore size: 6, 10, 16, 20, 25, 32, 40,
 HFZ: Double acting
 HFSZ: Single acting and normally closed
 HFTZ: Single acting and normally opened

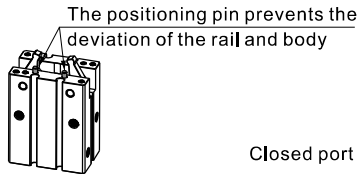
Integrated design of linear guide rail

Integrated design of linear guide rail,
 high rigidity and high precision.



With positioning pin

A positioning pin is attached to the bottom
 of the linear guide rail, which can prevent
 the deviation of the positioning rail and body.



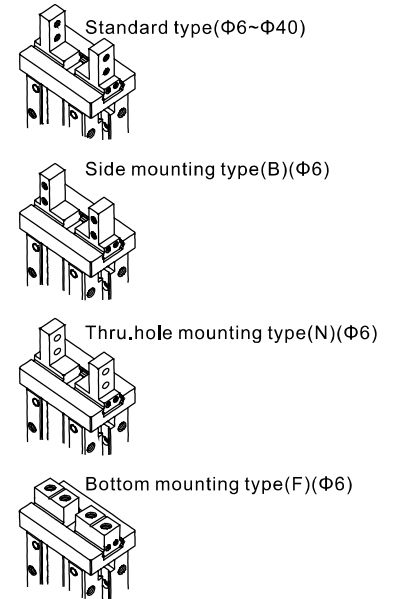
With squareness magnetic switch slots

The squareness magnetic switch slots convenient
 to install DMSG\CMSG\EMSG type inducting switch.

With roundness magnetic switch slots

The roundness magnetic switch slots convenient
 to install DMSH\CMSH\EMSH type inducting switch.

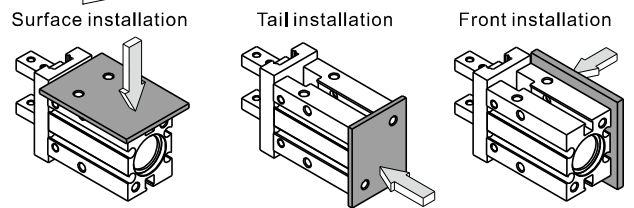
Four kinds of finger type



According to the actual using requirements of
 customers, the initial position of clamping jaw
 can be customized to meet the different needs
 under different working conditions.

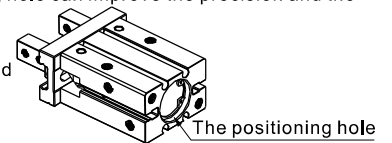
Can be mounted from three directions

With mounting holes on the side and tail.



With positioning hole

The positioning hole can improve the precision and the
 consistency of repeated
 dismounting and
 positioning.



Bore size (mm)		6	10	16	20	25	32	40	
Acting type		Double acting		Single acting					
Fluid		Air(to be filtered by 40μm filter element)							
Operating pressure	Double acting	Φ6, Φ10	0.2~0.7MPa(28~100psi)(2.0~7.0bar)						
		Others	0.15~0.7MPa(22~100psi)(1.5~7.0bar)						
	Single acting	Φ6, Φ10	0.35~0.7MPa(50~100psi)(3.5~7.0bar)						
		Others	0.25~0.7MPa(36~100psi)(2.5~7.0bar)						
Temperature °C		-20~70							
Lubrication		Not required							
Repeatability mm		±0.01				±0.02			
Max. frequency		180(c.p.m)				60(c.p.m)			
Sensor switches		CMSG\DMSG\EMSG EMSH		CMSG\DMSG\EMSG CMSG\DMSG\EMSH					
Port size		M3×0.5			M5×0.8				

Note) Refer to P362 for detail of sensor switch.

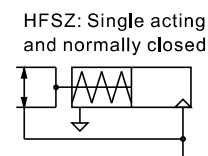
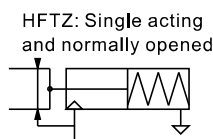
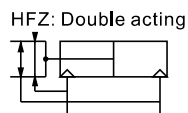


Air gripper(parallel style——ball bearing)

HFZ Series



Symbol



Gripping force and stroke

Acting type		Double acting(HFZ)							Single acting_NO (HFTZ)							Single acting_NC (HFSZ)						
Bore size		6	10	16	20	25	32	40	6	10	16	20	25	32	40	6	10	16	20	25	32	40
Gripping force per finger Effective value(N)	External	3.3	11	34	45	69	160	255	1.9	7	27	35	55	133	220	-	-	-	-	-	-	-
	Internal	6.1	17	45	68	102	195	320	-	-	-	-	-	-	3.7	13	38	59	87	163	270	
Opening/Closing stroke(Both sides)(mm)		3	4	6	10	14	22	30	3	4	6	10	14	22	30	3	4	6	10	14	22	30
Weight (g)	F Type	24	-	-	-	-	-	-	25	-	-	-	-	-	25	-	-	-	-	-	-	
	Others	25	56	124	236	428	729	1268	26	57	125	238	430	778	1365	26	57	125	238	430	778	1365

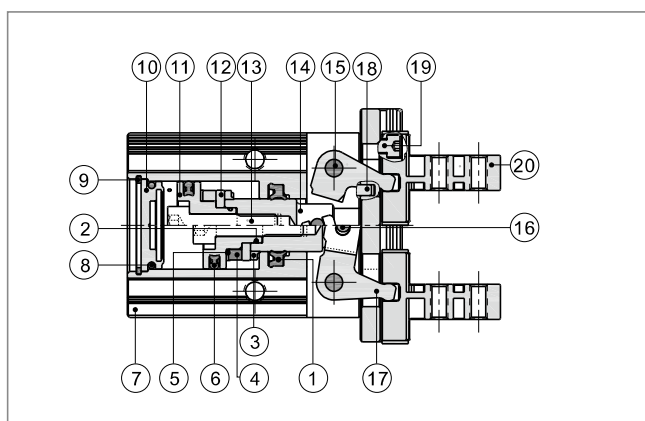
[Note] The gripping force in the above table is in the working pressure of 0.5MPa, and with a gripping point of L=20mm.

Add) Please refer to page 280 for the definition of "L".

Ordering code

HFZ 20 □					
① Model		② Bore size		③ Finger type	
HFZ: Air finger(Double acting) HFSZ: Air finger (Single acting and normally closed) HFTZ: Air finger (Single acting and normally opened)		6 10 16 20 25 32 40		Blank:Standard 	
		6		B:Side mounting type 	N:Thru.hole mounting type
HFZ series are all attached with magnet. Sensor switch should be ordered individually.					

Inner structure and material of major parts



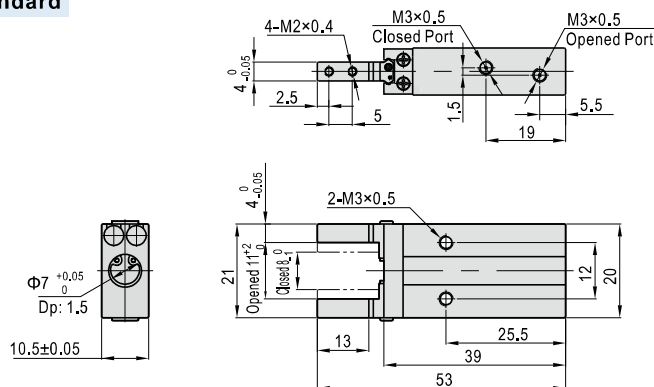
NO.	Item	Material
1	Rod packing	NBR
2	O-ring	NBR
3	Bumper	TPU
4	Magnet	Sintered metal(Neodymium-iron-boron)
5	Magnet washer	NBR
6	Piston seal	NBR
7	Body	Aluminum alloy
8	O-ring	NBR
9	C clip	Spring steel
10	Back cover	Aluminum alloy
11	Piston	Aluminum alloy/Stainless steel
12	Magnet fixed plate	Stainless steel
13	Screw	Alloy steel
14	Piston rod	Aluminum alloy/Stainless steel
15	Pin	Stainless steel
16	Pin	Stainless steel
17	Curved bar	Stainless steel
18	Pin	Stainless steel
19	Countersink screw	Alloy steel
20	Assembly of clamping jaw and guide rail	Alloy steel

HFZ Series

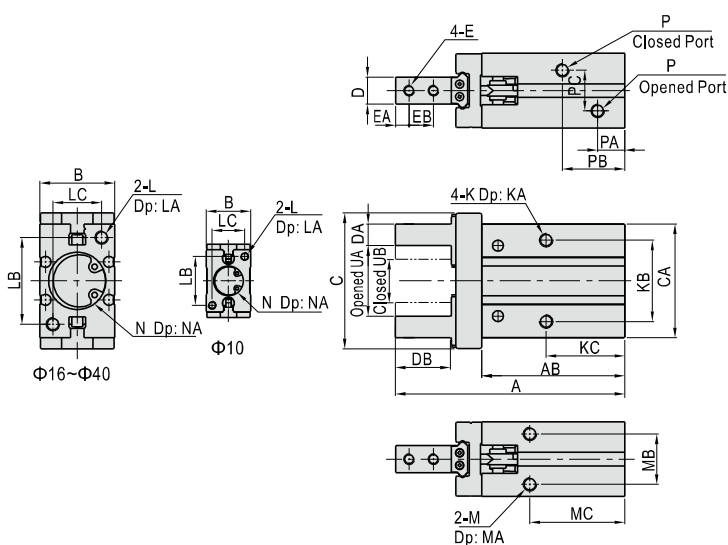
Dimensions

Standard

Φ6



Φ10~Φ40



Model\Item	A	AB	B	C	CA	D	DA	DB	E	EA
HFZ10	57	37.5	16.5	30	23	5 ⁰ _{-0.05}	4 ⁰ _{-0.05}	12	M2.5×0.45	3
HFZ16	67.5	42.5	23.5	39	30.5	8 ⁰ _{-0.05}	5 ⁰ _{-0.05}	15	M3×0.5	4
HFZ20	85	53	27.5	53	42	10 ⁰ _{-0.05}	8 ⁰ _{-0.05}	20	M4×0.7	5
HFZ25	103	64	33.5	71	52	12 ⁰ _{-0.05}	10 ⁰ _{-0.05}	25	M5×0.8	6
HFZ32	113(122)	67(76)	40	106	60	15 ⁰ _{-0.05}	12 ⁰ _{-0.05}	29	M6×1.0	7
HFZ40	139(152)	83(96)	48	132	72	18 ⁰ _{-0.05}	14 ⁰ _{-0.05}	36	M8×1.25	9

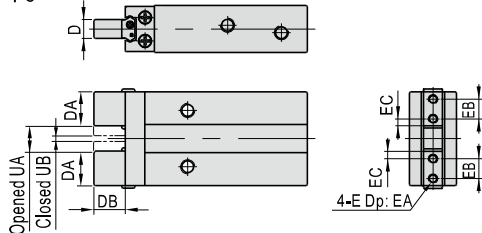
Model\Item	EB	K	KA	KB	KC	L	LA	LB	LC	M	MA	MB
HFZ10	5.7	M3×0.5	5	16	23	M3×0.5	6	18	12	M3×0.5	6	11.5
HFZ16	7	M4×0.7	7	24	24.5	M4×0.7	8	22	15	M4×0.7	4.5	16
HFZ20	9	M5×0.8	8	30	29	M5×0.8	10	32	18	M5×0.8	8	18.5
HFZ25	12	M6×1.0	10	36	30	M6×1.0	12	40	22	M6×1.0	10	22
HFZ32	14	M6×1.0	10	46	40(49)	M6×1.0	12	46	26	M6×1.0	10	26
HFZ40	17	M8×1.25	12	56	49(62)	M8×1.25	16	56	32	M8×1.25	12	32

Model\Item	MC	N	NA	P	PA	PB	PC	UA(Opened)	UB(Closed)
HFZ10	27	Φ11 ^{+0.05} ₀	1.5	M3×0.5	7	19	10	15.5 ⁺⁰ ₀	11.5 ⁻⁰ ₀
HFZ16	30	Φ17 ^{+0.05} ₀	1.5	M5×0.8	7.5	19	13	21 ⁺⁰ ₀	15 ⁻⁰ ₀
HFZ20	35	Φ21 ^{+0.05} ₀	2	M5×0.8	9.5	23	15	26.5 ⁺⁰ ₀	16.5 ⁻⁰ ₀
HFZ25	36.5	Φ26 ^{+0.05} ₀	2	M5×0.8	9	24	20	33.5 ⁺⁰ ₀	19.5 ⁻⁰ ₀
HFZ32	48(57)	Φ34 ^{+0.05} ₀	2.5	M5×0.8	9.5	31(40)	24	48 ^{+0.5} ₀	26 ⁻⁰ ₀
HFZ40	58(71)	Φ42 ^{+0.05} ₀	2.5	M5×0.8	10.5	38(50)	28	60 ^{+0.5} ₀	30 ⁻⁰ ₀

[Note] The values in "()" in the above table are single acting type sizes.

Bottom mounting type(F type)

Φ6

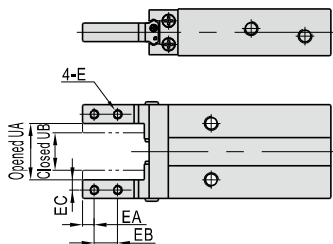


Model\Item	D	DA	DB	EA	EB	E
HFZ6F	4 ⁰ _{-0.05}	7.5	7	3	3.5	M2×0.4

Model\Item	UA(Opened)	UB(Closed)
HFZ6F	5 ^{+1.5} ₀	1.8 ^{-0.5} ₀

Side mounting type(B type)

Φ6

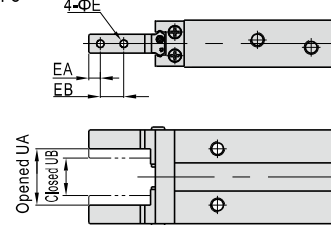


Model\Item	E	EA	EB	EC
HFZ6B	M2×0.4	2.5	5	2

Model\Item	UA(Opened)	UB(Closed)
HFZ6B	11 ⁺⁰ ₀	8 ⁻⁰ ₀

Thru-hole mounting type(N type)

Φ6



Model\Item	E	EA	EB
HFZ6N	2.3	2.5	5

Model\Item	UA(Opened)	UB(Closed)
HFZ6N	11 ⁺⁰ ₀	8 ⁻⁰ ₀

[Note] The other dimensions are the same as standard type.

How to select product \ Installation and application

Please refer to HFK series for details.



Air gripper—HFK Series

Parallel style with guide track—roller bearing

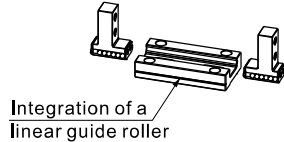
Compendium of HFK Series

Six kinds of bore size and three kinds of type

Bore size: 10, 16, 20, 25, 32, 40,
HFK: Double acting
HFSK: Single acting and normally closed
HFTK: Single acting and normally opened

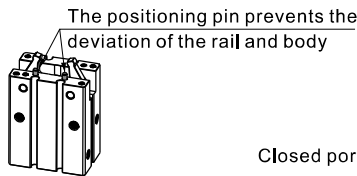
Integrated design of linear guide roller

Integrated design of linear guide roller,
high rigidity and high precision.



With positioning pin

A positioning pin is attached to the bottom of the linear guide rail, which can prevent the deviation of the positioning rail and body.



With squareness magnetic switch slots

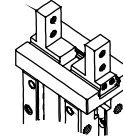
The squareness magnetic switch slots convenient to install DMSG\CMSG\EMSG type inducting switch.

With roundness magnetic switch slots

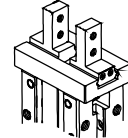
The roundness magnetic switch slots convenient to install DMSH\CMSH\EMSH type inducting switch.

Seven kinds of finger type

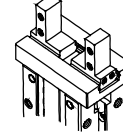
Standard type



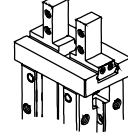
Narrow type(R)



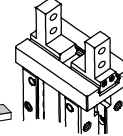
Side mounting type(B)



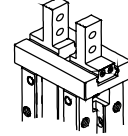
Side mounting and narrow type(W)



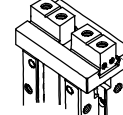
Thru.hole mounting type(N)



Thru.hole mounting and narrow type(M)



Bottom mounting type(F)

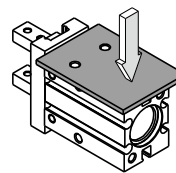


According to the actual using requirements of customers, the initial position of clamping jaw can be customized to meet the different needs under different working conditions.

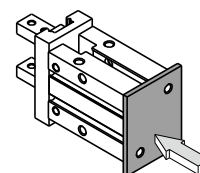
Can be mounted from three directions

With mounting holes on the side and tail.

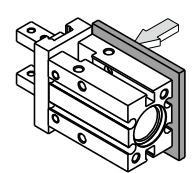
Surface installation



Tail installation

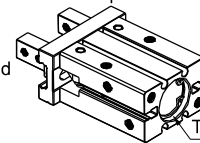


Front installation



With positioning hole

The positioning hole can improve the precision and the consistency of repeated dismounting and positioning.



The positioning hole

Bore size (mm)		10	16	20	25	32	40	
Acting type		Double acting		Single acting				
Fluid		Air(to be filtered by 40μm filter element)						
Operating pressure	Double acting	Φ10	0.2~0.7MPa(28~100psi)(2.0~7.0bar)					
		Others	0.15~0.7MPa(22~100psi)(1.5~7.0bar)					
	Single acting	Φ10	0.35~0.7MPa(50~100psi)(3.5~7.0bar)					
		Others	0.25~0.7MPa(36~100psi)(2.5~7.0bar)					
Temperature °C		-20~70						
Lubrication		Not required						
Repeatability mm		±0.01			±0.02			
Max. frequency		180(c.p.m)			60(c.p.m)			
Sensor switches		CMSH\DMSH EMSH		CMSG\DMMSG\EMSG CMSH\DMSH\EMSH				
Port size		M3×0.5		M5×0.8				

Note) Refer to P362 for detail of sensor switch.

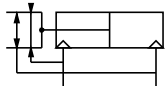


HFK Series

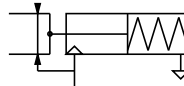


Symbol

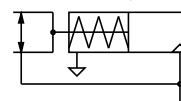
HFK: Double acting



HFTK: Single acting and normally opened



HFSK: Single acting and normally closed



Gripping force and stroke

Acting type		Double acting(HFK)						Single acting_NO (HFTK)						Single acting_NC (HFSK)					
Bore size		10	16	20	25	32	40	10	16	20	25	32	40	10	16	20	25	32	40
Gripping force per finger Effective value(N)	External	11	34	45	69	160	255	7	27	35	55	133	220	-	-	-	-	-	-
	Internal	17	45	68	102	195	320	-	-	-	-	-	-	13	38	59	87	163	270
Opening/Closing stroke(Both sides)(mm)		4	6	10	14	22	30	4	6	10	14	22	30	4	6	10	14	22	30
Weight (g)	F Type	56	124	236	418	750	1340	57	125	238	420	799	1437	57	125	238	420	799	1437
	Others	56	124	236	428	729	1268	57	125	238	430	778	1365	57	125	238	430	778	1365

[Note] The gripping force in the above table is in the working pressure of 0.5MPa, and with a gripping point of L=20mm.

Add) Please refer to page 280 for the definition of "L".

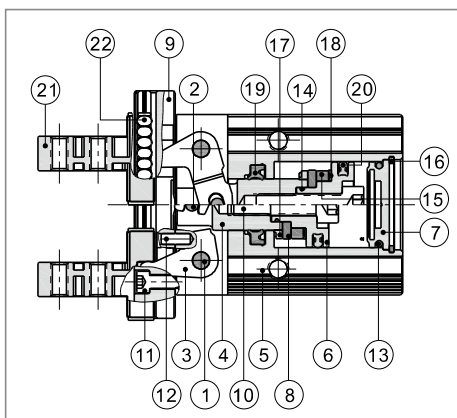
Ordering code

HFK 20 □

① ② ③

① Model	② Bore size	③ Finger type			
HFK: Air finger(Double acting) HFSK: Air finger (Single acting and normally closed) HFTK: Air finger (Single acting and normally opened)	10 16 20 25 32 40	Blank: Standard 	B: Side mounting type 	R: Narrow type 	F: Bottom mounting type
	10 16 20 25	N: Thru.hole mounting type 	W: Side mounting and narrow type 	M: Thru.hole mounting and narrow type 	HFK series are all attached with magnet. Sensor switch should be ordered individually.

Inner structure and material of major parts



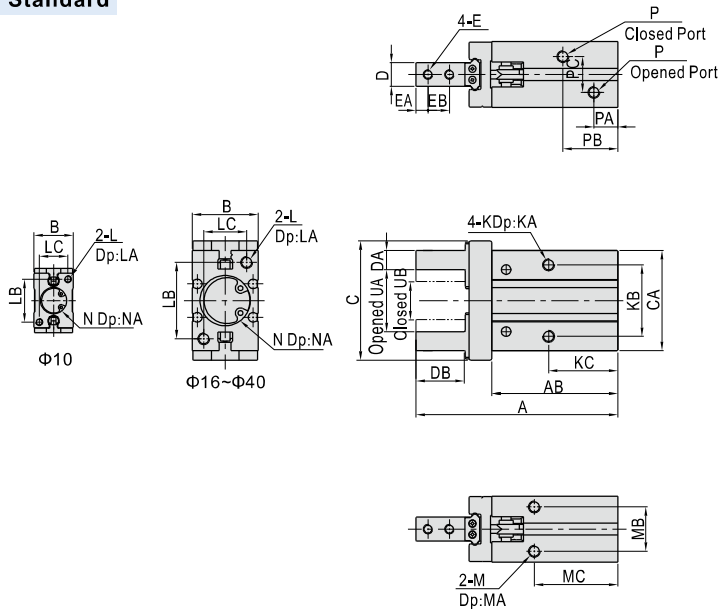
NO.	Item	Material	NO.	Item	Material
1	Pin	Stainless steel	12	Pin	Bearing steel
2	Pin	Stainless steel	13	O-ring	NBR
3	Curved bar	Stainless steel	14	O-ring	NBR
4	Piston rod	Aluminum alloy/Stainless steel	15	Magnet	Sintered metal(Neodymium-iron-boron)
5	Body	Aluminum alloy	16	C clip	Spring steel
6	Piston	Aluminum alloy/Stainless steel	17	Bumper	TPU
7	Back cover	Brass/Aluminum alloy	18	Magnet washer	NBR
8	Magnet fixed plate	Aluminum alloy/Stainless steel	19	Rod packing	NBR
9	Rail	Alloy steel	20	Piston seal	NBR
10	Countersink screw	Alloy steel	21	Clamping jaw	Bearing steel
11	Countersink screw	Alloy steel	22	Guide roller	Bearing steel

Air gripper(parallel style——roller bearing)

HFK Series

Dimensions

Standard



Model/Item	A	AB	B	C	CA	D	DA	DB	E	EA
HFK10	57	37.5	16.5	30	23	5 _{-0.05} ⁰	4 _{-0.05} ⁰	12	M2.5×0.45	3
HFK16	67.5	42.5	23.5	39	30.5	8 _{-0.05} ⁰	5 _{-0.05} ⁰	15	M3×0.5	4
HFK20	85	53	27.5	53	42	10 _{-0.05} ⁰	8 _{-0.05} ⁰	20	M4×0.7	5
HFK25	103	64	33.5	71	52	12 _{-0.05} ⁰	10 _{-0.05} ⁰	25	M5×0.8	6
HFK32	113(122)	67(76)	40	106	60	15 _{-0.05} ⁰	12 _{-0.05} ⁰	29	M6×1.0	7
HFK40	139(152)	83(96)	48	132	72	18 _{-0.05} ⁰	14 _{-0.05} ⁰	36	M8×1.25	9

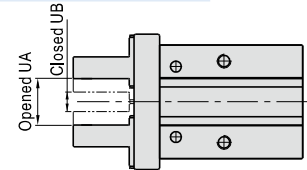
Model/Item	EB	K	KA	KB	KC	L	LA	LB	LC	M	MA	MB
HFK10	5.7	M3×0.5	5	16	23	M3×0.5	6	18	12	M3×0.5	6	11.5
HFK16	7	M4×0.7	7	24	24.5	M4×0.7	8	22	15	M4×0.7	4.5	16
HFK20	9	M5×0.8	8	30	29	M5×0.8	10	32	18	M5×0.8	8	18.5
HFK25	12	M6×1.0	10	36	30	M6×1.0	12	40	22	M6×1.0	10	22
HFK32	14	M6×1.0	10	46	40(49)	M6×1.0	12	46	26	M6×1.0	10	26
HFK40	17	M8×1.25	12	56	49(62)	M8×1.25	16	56	32	M8×1.25	12	32

Model/Item	MC	N	NA	P	PA	PB	PC	UA(Opened)	UB(Closed)
HFK10	27	Φ11 ^{+0.05}	1.5	M3×0.5	7	19	10	15.5 ₀ ⁺²	11.5 ₋₁ ⁰
HFK16	30	Φ17 ^{+0.05}	1.5	M5×0.8	7.5	19	13	21 ₀ ⁺²	15 ₋₁ ⁰
HFK20	35	Φ21 ^{+0.05}	2	M5×0.8	9.5	23	15	26.5 ₀ ⁺²	16.5 ₋₁ ⁰
HFK25	36.5	Φ26 ^{+0.05}	2	M5×0.8	9	24	20	33.5 ₀ ⁺²	19.5 ₋₁ ⁰
HFK32	48(57)	Φ34 ^{+0.05}	2.5	M5×0.8	9.5	31(40)	24	48 ₀ ^{+2.5}	26 ₋₁ ⁰
HFK40	58(71)	Φ42 ^{+0.05}	2.5	M5×0.8	10.5	38(50)	28	60 ₀ ^{+2.5}	30 ₋₁ ⁰

[Note] The values in "()" in the above table are single acting type sizes.

Narrow type(R type)

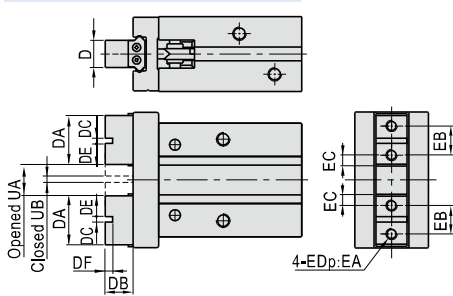
Φ10~Φ25



Model/Item	UA(Opened)	UB(Closed)
HFK10R	10 ₀ ⁺²	6 ₋₁ ⁰
HFK16R	12.5 ₀ ⁺²	6.5 ₋₁ ⁰
HFK20R	17 ₀ ⁺²	7 ₋₁ ⁰
HFK25R	23 ₀ ^{+2.5}	9 ₋₁ ⁰

Bottom mounting type(F type)

Φ10~Φ40

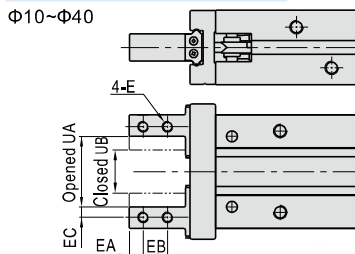


Model/Item	D	DA	DB	DC	DE	E
HFK10F	5 _{-0.05} ⁰	11	5	2 _{+0.04} ^{+0.01}	4.5	M2.5×0.45
HFK16F	8 _{-0.05} ⁰	14	8	2.5 _{+0.04} ^{+0.01}	5.8	M3×0.5
HFK20F	10 _{-0.05} ⁰	18	10.5	3 _{+0.04} ^{+0.01}	7.5	M4×0.7
HFK25F	12 _{-0.05} ⁰	22	13	4 _{+0.04} ^{+0.01}	9	M5×0.8
HFK32F	15 _{-0.05} ⁰	34.5	18	5 _{+0.04} ^{+0.01}	14.8	M6×1.0
HFK40F	18 _{-0.05} ⁰	41.5	22	6 _{+0.04} ^{+0.01}	17.7	M8×1.25

Model/Item	DF	EA	EB	EC	UA(Opened)	UB(Closed)
HFK10F	2	4	6	2.45	5.5 ₀ ⁺²	1.8 _{-0.5} ⁰
HFK16F	2.5	6	8	3.05	7.5 ₀ ⁺²	1.8 _{-0.5} ⁰
HFK20F	3	8	10	3.95	11.5 ₀ ⁺²	1.8 _{-0.5} ⁰
HFK25F	4	10	12	4.9	16 ₀ ^{+2.5}	2.4 _{-0.5} ⁰
HFK32F	5	12	20	7.3	25 ₀ ^{+2.5}	3.4 _{-0.5} ⁰
HFK40F	6	16	24	8.7	33 ₀ ⁺³	3.4 _{-0.5} ⁰

Side mounting type(B type)

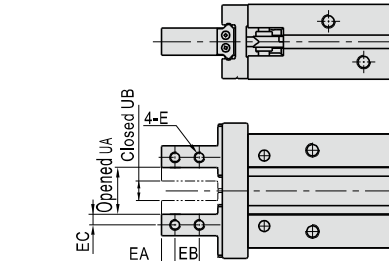
Φ10~Φ40



Model/Item	E	EA	EB	EC	UA(Opened)	UB(Closed)
HFK10B	M2.5×0.45	3	5.7	2	15.5 ₀ ⁺²	11.5 ₋₁ ⁰
HFK16B	M3×0.5	4	7	2.5	21 ₀ ⁺²	15 ₋₁ ⁰
HFK20B	M4×0.7	5	9	4	26.5 ₀ ⁺²	16.5 ₋₁ ⁰
HFK25B	M5×0.8	6	12	5	33.5 ₀ ⁺²	19.5 ₋₁ ⁰
HFK32B	M6×1.0	7	14	6	48 ₀ ^{+2.5}	26 ₋₁ ⁰
HFK40B	M8×1.25	9	17	7	60 ₀ ^{+2.5}	30 ₋₁ ⁰

Side mounting and narrow type(W type)

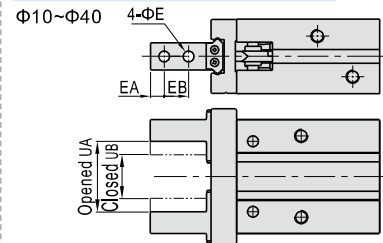
Φ10~Φ25



Model/Item	E	EA	EB	EC	UA(Opened)	UB(Closed)
HFK10W	M2.5×0.45	3	5.7	2	10 ₀ ⁺²	6 ₋₁ ⁰
HFK16W	M3×0.5	4	7	2.5	12.5 ₀ ⁺²	6.5 ₋₁ ⁰
HFK20W	M4×0.7	5	9	4	17 ₀ ⁺²	7 ₋₁ ⁰
HFK25W	M5×0.8	6	12	5	23 ₀ ^{+2.5}	9 ₋₁ ⁰

Thru-hole mounting type(N type)

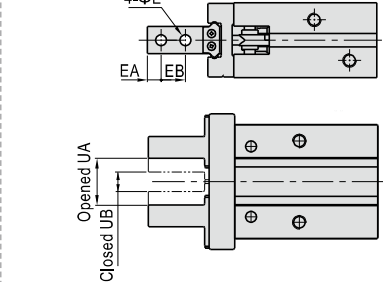
Φ10~Φ40



Model/Item	E	EA	EB	UA(Opened)	UB(Closed)
HFK10N	2.8	3	5.7	15.5 ₀ ⁺²	11.5 ₋₁ ⁰
HFK16N	3.3	4	7	21 ₀ ⁺²	15 ₋₁ ⁰
HFK20N	4.5	5	9	26.5 ₀ ⁺²	16.5 ₋₁ ⁰
HFK25N	5.5	6	12	33.5 ₀ ⁺²	19.5 ₋₁ ⁰
HFK32N	6.5	7	14	48 ₀ ^{+2.5}	26 ₋₁ ⁰
HFK40N	9	9	17	60 ₀ ^{+2.5}	30 ₋₁ ⁰

Thru-hole mounting and narrow type(M type)

Φ10~Φ25



Model/Item	E	EA	EB	UA(Opened)	UB(Closed)
HFK10M	2.8	3	5.7	10 ₀ ⁺²	6 ₋₁ ⁰
HFK16M	3.3	4	7	12.5 ₀ ⁺²	6.5 ₋₁ ⁰
HFK20M	4.5	5	9	17 ₀ ⁺²	7 ₋₁ ⁰
HFK25M	5.5	6	12	23 ₀ ^{+2.5}	9 ₋₁ ⁰

[Note] The other dimensions are the same as standard type.

HFZ, HFK Series

How to select product

Please select pneumatic finger according to the following steps:

- ① The selection of the effective gripping force >> ② the confirmation of the gripping point >> ③ the confirmation of the external force put on the gripping jaw

1. The selection of the gripping force

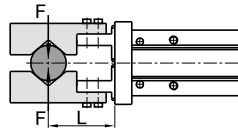
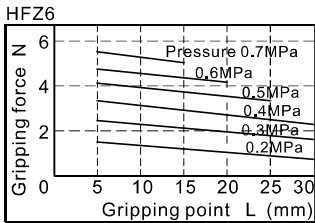
The gripping work-pieces shown below, on the impact condition of ordinary handling state, taking safety coefficient a=4, have a gripping force that is more than 10-20 times of the mass of the gripped objects.

	The work-pieces as shown in the left :	The condition that the work-pieces won't drop is: $2 \times \mu F > mg$ so: $F > \frac{mg}{2 \times \mu}$ Safety coefficient is a, so F is: $F = \frac{mg}{2 \times \mu} \times a$	$\mu=0.2$ $F = \frac{mg}{2 \times 0.2} \times 4 = 10 \times mg$ 10 times of the mass of the gripped objects	$\mu=0.1$ $F = \frac{mg}{2 \times 0.1} \times 4 = 20 \times mg$ 20 times of the mass of the gripped objects
	F: Gripping force (N) μ: friction coefficient between fittings and work-pieces. m: mass of work-pieces g: acceleration of gravity (=9.8m/s ²)			

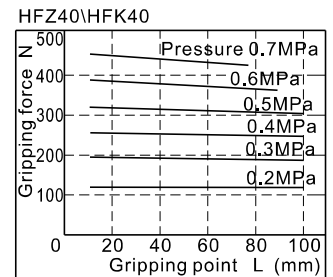
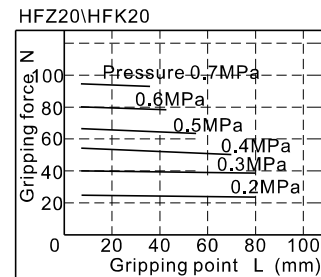
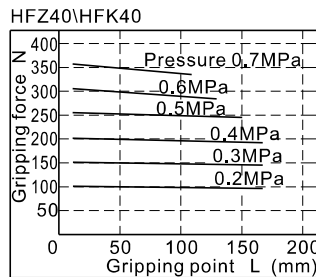
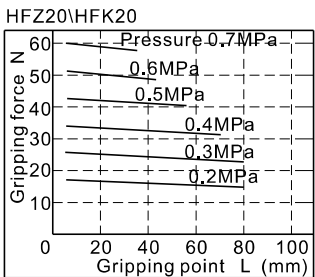
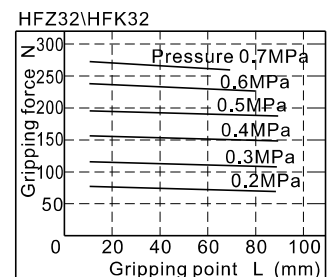
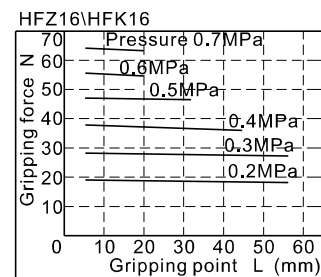
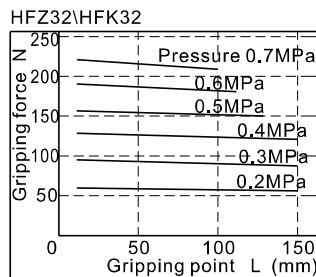
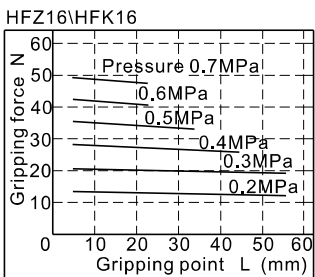
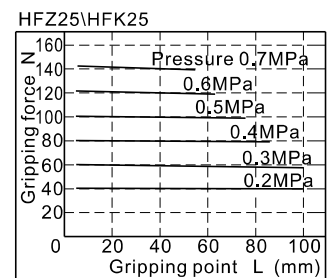
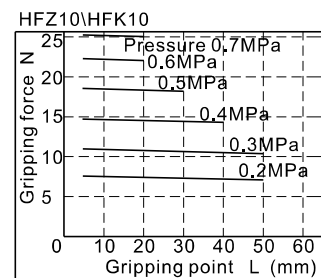
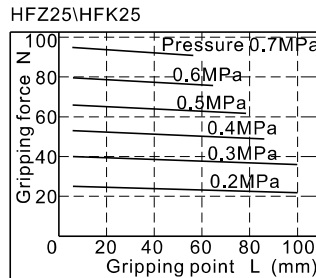
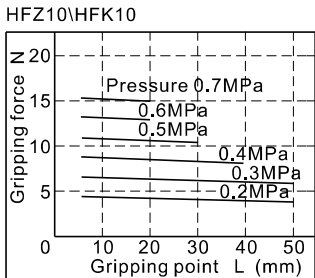
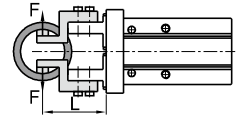
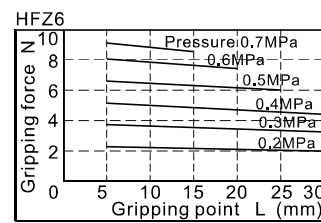
Note) If the friction coefficient $\mu > 0.2$, for safety, please also select clamping force according to the principle of 10~20 times of the mass of the clamped objects. As for large acceleration and shock, it requires for greater safety coefficient.

1.1) The actual gripping force must be within the effective gripping forces of different pneumatic fingers specifications shown in the below chart.

Double acting type closed gripping force

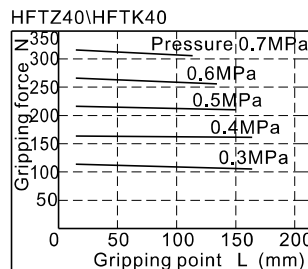
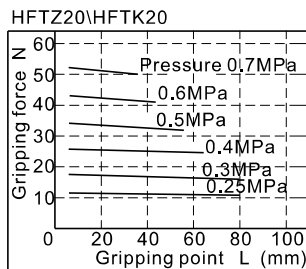
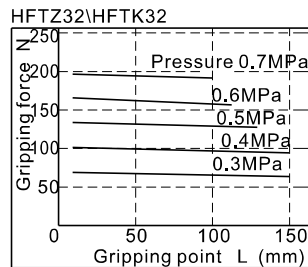
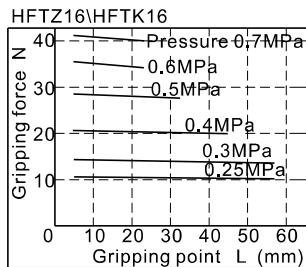
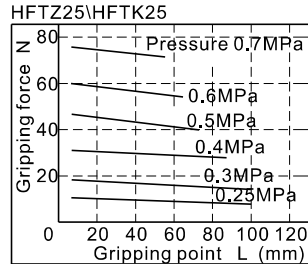
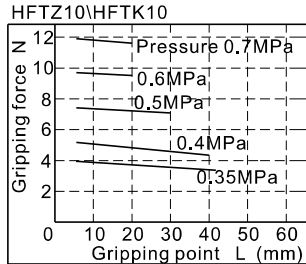
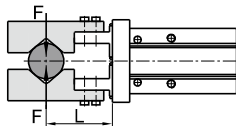
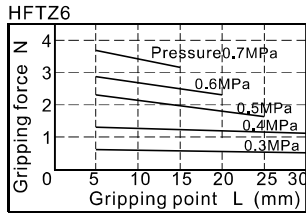


Double acting type opened gripping force

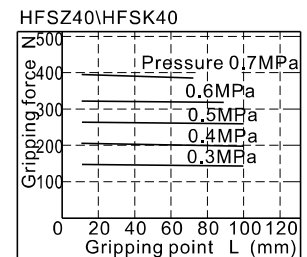
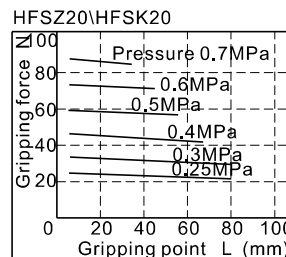
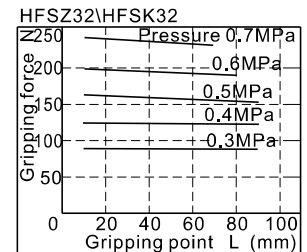
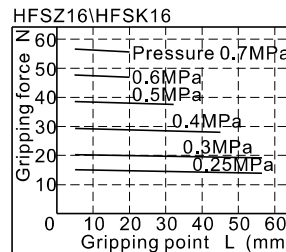
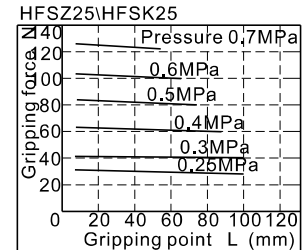
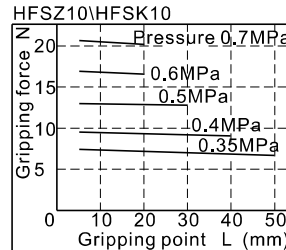
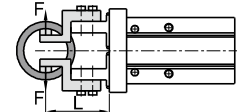
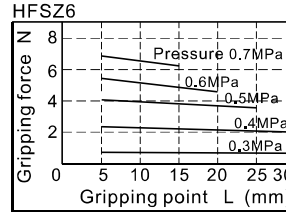


HFZ, HFK Series

Single acting normally opened gripping force



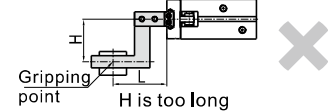
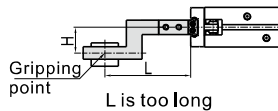
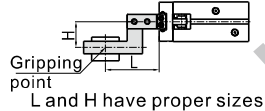
Single acting normally closed clamping force



2. The selection of the gripping point

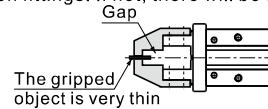
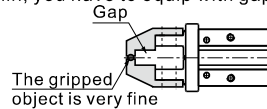
2.1) Please select the gripping point within the limited field shown below.

Over the limits, gripping jaws would be subjected to excessive torque loads, and lead to short life of the air gripper.

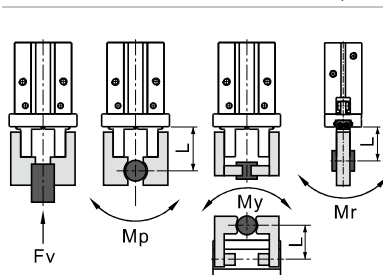


2.2) In the allowable range of gripping point, it is better to design for short and light fittings. If the fittings are long and heavy, the inertia force when the finger is open and close will become larger, and the performance of gripping jaw will be degraded, at the same time it will affect the life.

2.3) When the gripped object is very fine and thin, you have to equip with gap between fittings. If not, there will be unstable clamp, resulting in a position offset and adverse clamping and so on.



3. The confirmation of the external force put on the gripping jaw.



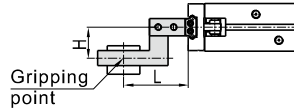
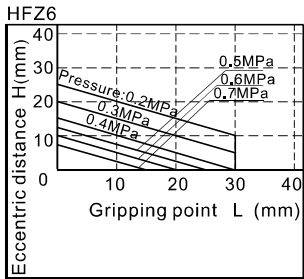
Bore size	The allowed vertical loads Fv(N)		Max. permissible torque(Nm)			The calculation of allowable forces when moment loads work	Examples of calculation
	HFZ	HFK	Mp	My	Mr		
6	10	-	0.04	0.04	0.08	$\frac{M(\text{Maximum permissible moment})(N.m)}{L \times 10^{-3}}$ Unit conversion constant	In the guide rail of HFK16, the external force of the pitching moment static loads put on the point of L=30mm is f=10 N, $\text{Allowable load } F = \frac{0.68}{30 \times 10^{-3}} = 22.7(N)$ Actual load f=10(N)<22.7(N) To meet the using requirements
10	58	87	0.26	0.26	0.53		
16	98	147	0.68	0.68	1.36		
20	147	221	1.32	1.32	2.65		
25	255	382	1.94	1.94	3.88		
32	343	514	3	3	6		
40	490	735	4.5	4.5	9		

[Note] The loads and torque values of said are all static values.

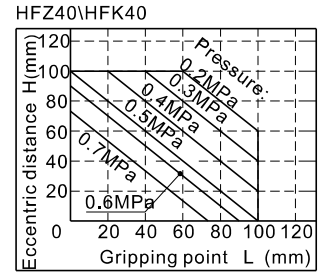
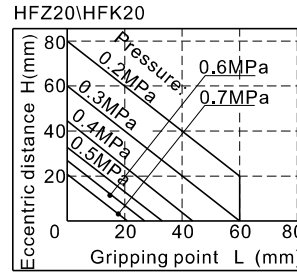
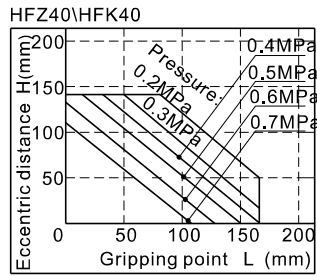
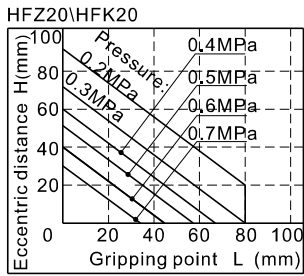
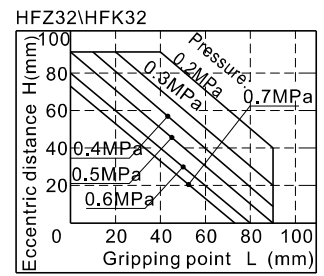
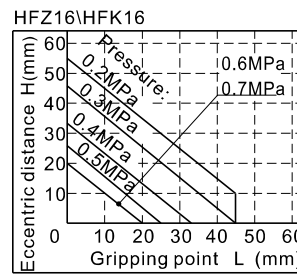
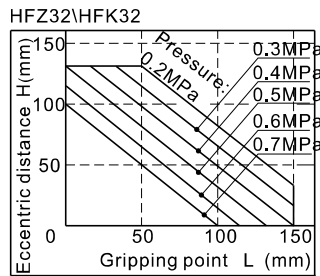
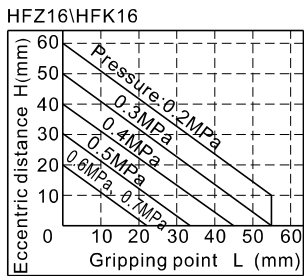
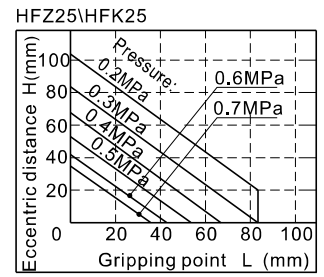
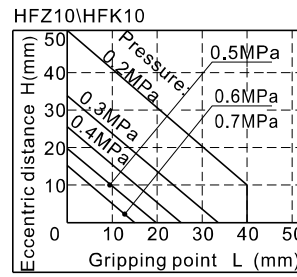
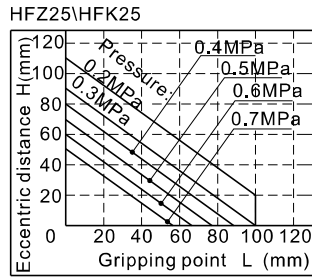
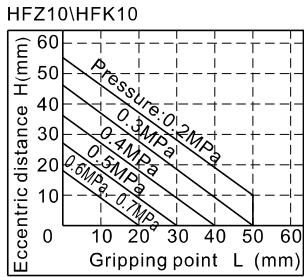
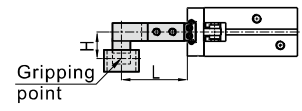
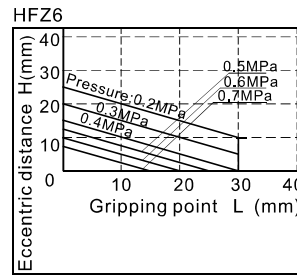


HFZ, HFK Series

The range of the closed gripping points



The range of the opened clamping point

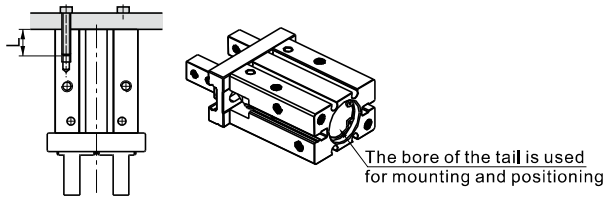


HFZ, HFK Series

Installation and application

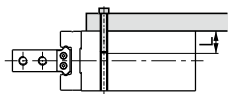
1. Due to the abrupt changes, the circuit pressure is low, which will lead to the decrease of the gripping force and falling of the work-pieces. In order to avoid the harm to the human body and damage to the equipment, anti-dropping device must be equipped.
2. Don't use the air gripper under strong external force and impact force.
3. Please contact with us when the single acting type clamps only with the spring force.
4. When install and fix the air gripper, avoid falling down, collision and damage.
5. When fixing the gripping jaw parts, don't twist the gripping jaw.
6. There are several kinds of installation method, and the locking torque of fastening screw must be within the prescribed torque range shown in the below chart. If the locking torque is too large, it will cause the dysfunctional. If the locking torque is too small, it will cause the position deviation and fall.

Tail installation type



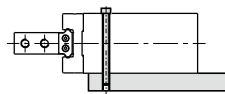
Bore size	The bolts type	Max. locking moment	Max. screwed depth	The aperture of the positioning bore	The depth of the positioning bore
10	M3×0.5	0.88N.m	6mm	Φ11mm ^{+0.05} ₀	1.5mm
16	M4×0.7	2.1N.m	8mm	Φ17mm ^{+0.05} ₀	1.5mm
20	M5×0.8	4.3N.m	10mm	Φ21mm ^{+0.05} ₀	2mm
25	M6×1.0	7.3N.m	12mm	Φ26mm ^{+0.05} ₀	2mm
32	M6×1.0	7.9N.m	12mm	Φ34mm ^{+0.05} ₀	2.5mm
40	M8×1.25	17.7N.m	16mm	Φ42mm ^{+0.05} ₀	2.5mm

The installation of the front threaded hole

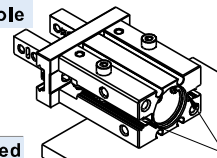


Bore size	The bolts type	Max. locking moment(Nm)	Max. screwed depth(mm)
6	M3×0.5	0.88	10
10	M3×0.5	0.69	5
16	M4×0.7	2.1	7
20	M5×0.8	4.3	8
25	M6×1.0	7.3	10
32	M6×1.0	7.9	12
40	M8×1.25	17.7	12

The installation of the front through hole

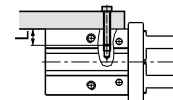


Bore size	The bolts type	Max. locking moment(Nm)	Max. screwed depth(mm)
6	M2.5×0.45	0.49	-
10	M2.5×0.45	0.49	5
16	M3×0.5	0.88	8
20	M4×0.7	2.1	10
25	M5×0.8	4.3	12
32	M5×0.8	4.3	13
40	M6×1.0	7.3	16



When installed from front through holes, sensors can not be installed in the sensor grooves that are interfered by screws.

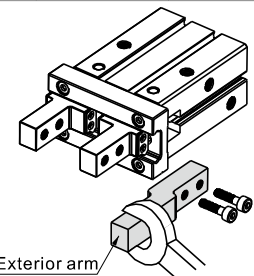
Surface installation type



Bore size	The bolts type	Max. locking moment(Nm)	Max. screwed depth(mm)
10	M3×0.5	0.9	6
16	M4×0.7	1.6	4.5
20	M5×0.8	3.3	8
25	M6×1.0	5.9	10
32	M6×1.0	5.9	10
40	M8×1.25	13.7	12

7. The installation method of the gripping jaw fittings
When install the gripping jaw fittings, you have to pay particular attention that you can only hold the gripping jaw by using spanner, and then lock the screws with allen wrench. Never clamp the body directly and then lock the screws, otherwise the parts will be easily damaged.

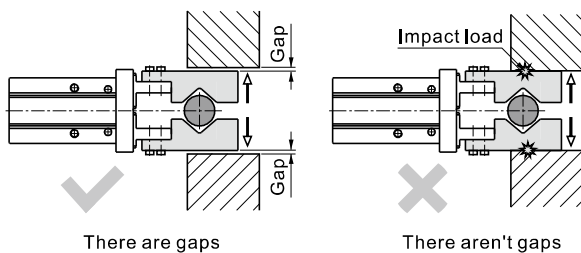
Bore size	The bolts type	Max. locking moment(Nm)
6	M2×0.4	0.15
10	M2.5×0.45	0.31
16	M3×0.5	0.59
20	M4×0.7	1.4
25	M5×0.8	2.8
32	M6×1.0	4.9
40	M8×1.25	11.8



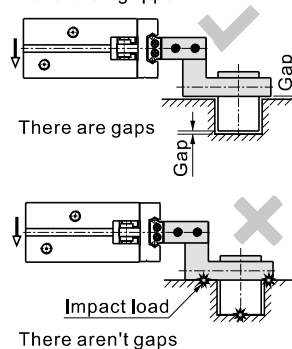
8. Confirm that there is no external forces exerted on the gripping jaw.

Transverse load acts on the gripping jaw, which will cause impact load and leads to the shaking and damage of gripping jaw. Equip with gaps so that the air gripper will not crash into work-pieces and accessories at the end of its trip.

- 8.1) The end of stroke under the open state of air gripper

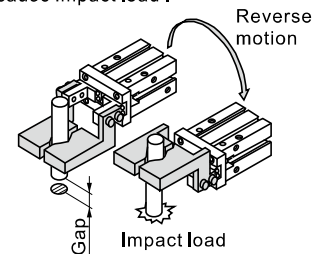


- 8.2) The end of stroke under the move state of air gripper

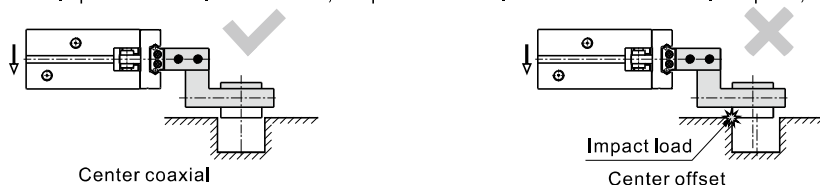


- 8.3) Reverse motion state

When reverse motion state, the gripping point must be precision, otherwise in the reverse motion state the air gripper maybe impact with ambience and will cause impact load.



9. When the work-pieces are inserted, the center line should be coaxial, no offset, in case there are external force generated on gripping jaw. When testing, it is specially required that the manual operation should be reduced, the pressure should be used to run it at a low speed, and guarantee the safety and no impact.



10. Please use the flow control valve to adjust the opening and closing speed of gripping jaw if too fast.
11. People can not enter the movement path of air gripper and articles can not be placed on the path too.
12. Before removing the air gripper, please confirm that it is out of working state, and then discharge of compressed air.

Parallel Gripper with dust-proof cover and roller bearing style **AIRTAC**

HFKP Series



Specification

Bore size (mm)	16	20	25	32
Acting type	Double acting			
Fluid	Air(to be filtered by 40 μm filter element)			
Operating pressure	0.15~0.7MPa(22~100psi)(1.5~7.0bar)			
Temperature °C	-20~70			
Lubrication	Not required			
Repeatability mm	±0.01			±0.02
Max. frequency	180(c.p.m)			60(c.p.m)
Sensor switches	CMSh、DMSH、EMSH、CMShG、DMSG、EMSG			
Port size	M5×0.8			

Note) Refer to P362 for detail of sensor switch.

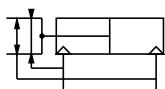
Gripping force and stroke

Bore size		16	20	25	32	
		Gripping force per finger	Closed	30	42	65
	Effective value(N)	open	40	66	104	193
Opening/Closing stroke(Both sides)(mm)		6	10	14	22	
Weight (g)		130	251	475	792	

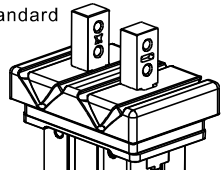
[Note] The gripping force in the above table is at working pressure of 0.5MPa, and with a gripping point of L=20mm.

Add) Please refer to page 287 for the definition of "L".

Symbol

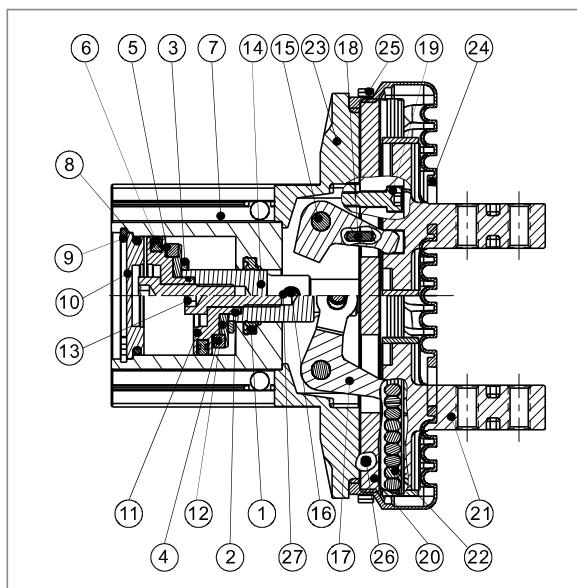


Ordering code

HFKP 32 □		
① Model	② Bore size	③ Finger type
HFKP: Parallel Gripper with dust-proof cover and roller bearing style(Double acting)	16 20 25 32	Blank: Standard 

[Note]:HFKP series are all standard come with magnet, (not includes sensor)

Inner structure and material of major parts



NO.	Item	Material	NO.	Item	Material
1	Rod packing	NBR	15	Pin	Stainless steel
2	O-ring	NBR	16	Pin	Stainless steel
3	Bumper	TPU	17	Curved bar	Stainless steel
4	Magnet	Neodymium-iron-boron	18	Pin	Bearing steel
5	Magnet washer	NBR	19	Countersink screw	Alloy steel
6	Piston seal	NBR	20	Guide roller	Alloy steel
7	Body	Aluminum alloy	21	Clamping jaw	Bearing steel
8	O-ring	NBR	22	Guide rail	Bearing steel
9	C clip	Spring steel	23	Dustproof cover ring	Resin
10	Back cover	Aluminum alloy	24	Dustproof cover	NBR
11	Piston	Aluminum alloy	25	Fixed rod	Cold rolled sheet
12	Magnet fixed flake	Aluminum alloy /Stainless steel	26	Screw	Alloy steel
13	Countersink screw	Alloy steel	27	Pin bushing	Stainless steel
14	Piston rod	Aluminum alloy/Stainless steel			

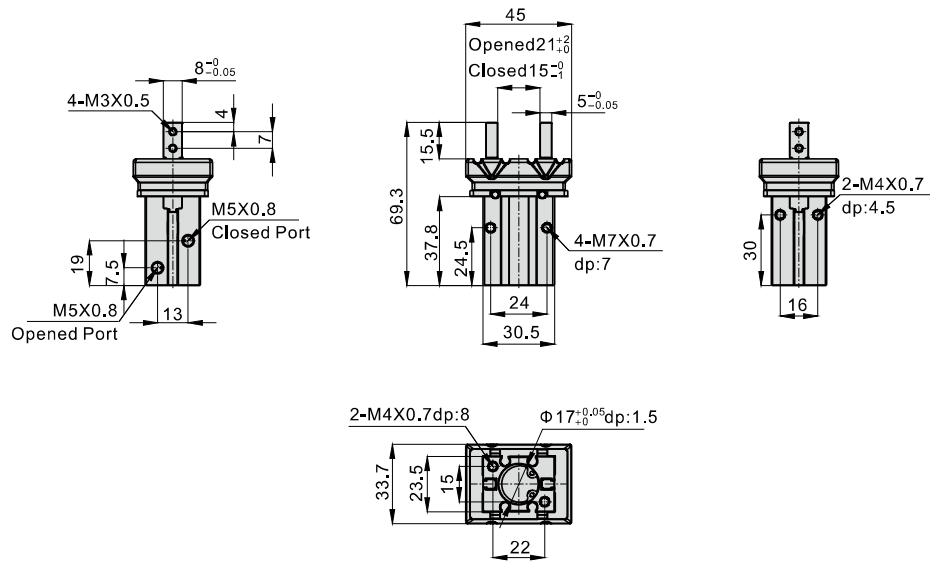
[Note]: No. 25 and No. 26 in the above table are only for HFKP32.

Parallel Gripper with dust-proof cover and roller bearing style **AIRTAC**

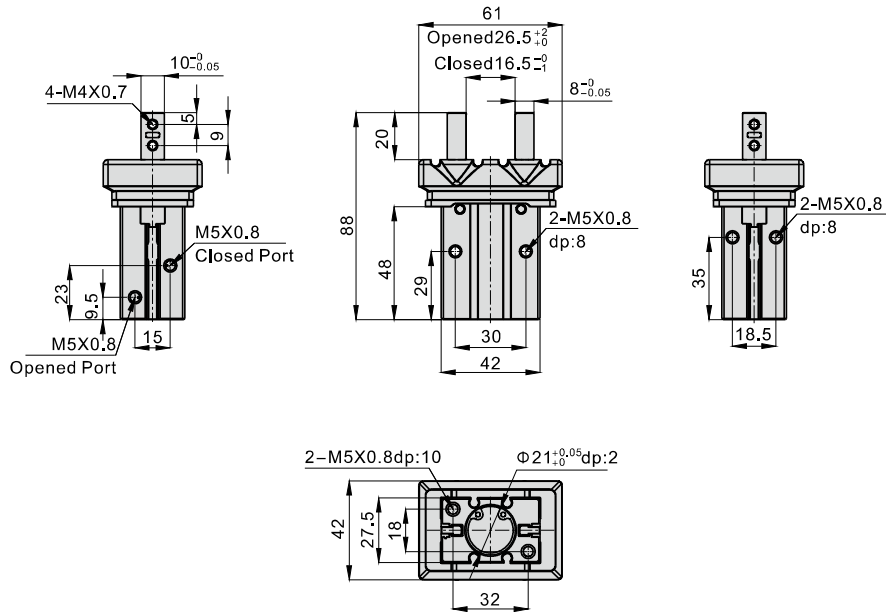
HFKP Series

Dimensions

HFKP16



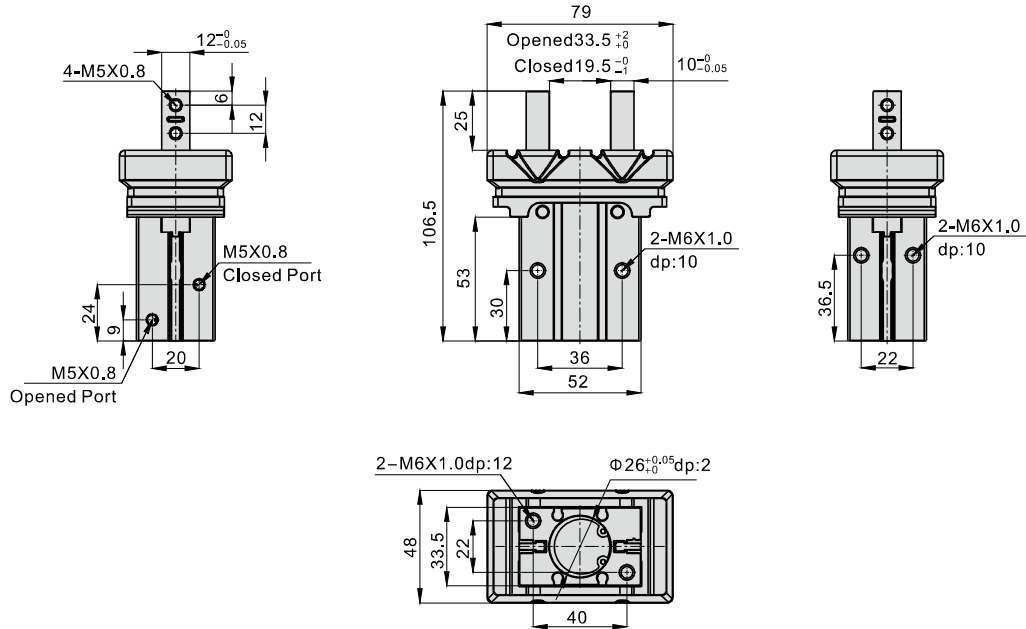
HFKP20



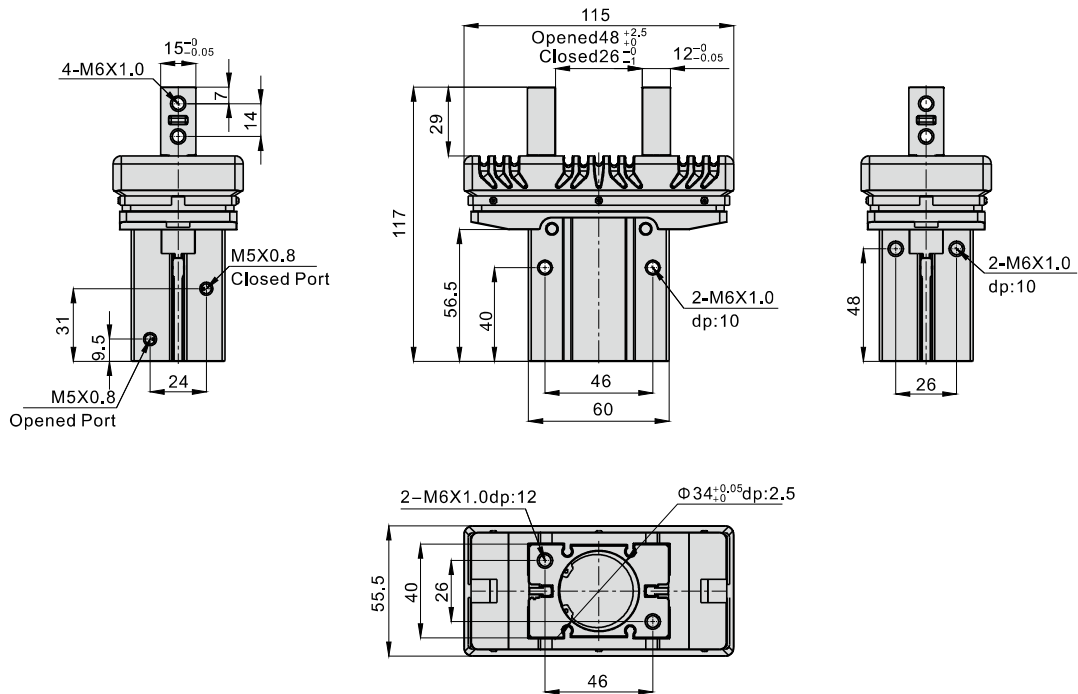
Parallel Gripper with dust-proof cover and roller bearing style **AirTAC**

HFKP Series

HFKP25



HFKP32



HFKP Series

How to select product

Please select pneumatic finger according to the following steps:

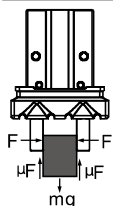
① The selection of the effective gripping force

② the confirmation of the gripping point

③ the confirmation of the external force put on the gripping jaw

1. The selection of the gripping force

The gripping work-pieces shown below, on the impact condition of ordinary handling state, taking safety coefficient $a=4$, have a gripping force that is more than 10-20 times of the mass of the gripped objects.



The work-pieces as shown in the left :

F: Gripping force (N)
 μ : friction coefficient between fittings and work-pieces.
 m: mass of work-pieces
 g: acceleration of gravity ($=9.8m/s^2$)

The condition that the work-pieces won't drop is: $2 \times \mu F > mg$

$$\text{so: } F > \frac{mg}{2 \times \mu}$$

Safety coefficient is a, so F is:

$$F = \frac{mg}{2 \times \mu} \times a$$

$\mu = 0.2$

$$F = \frac{mg}{2 \times 0.2} \times 4 = 10 \times mg$$

10 times of the mass of the gripped objects

$\mu = 0.1$

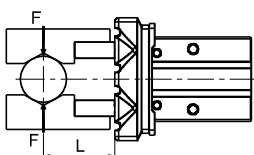
$$F = \frac{mg}{2 \times 0.1} \times 4 = 20 \times mg$$

20 times of the mass of the gripped objects

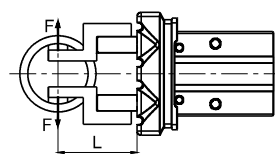
Note) If the friction coefficient $\mu > 0.2$, for safety, please also select clamping force according to the principle of 10~20 times of the mass of the clamped objects. As for large acceleration and shock, it requires for greater safety coefficient.

1.1) The actual gripping force must be within the effective gripping forces of different pneumatic fingers specifications shown in the below chart.

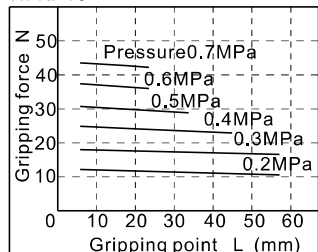
Closed gripping force



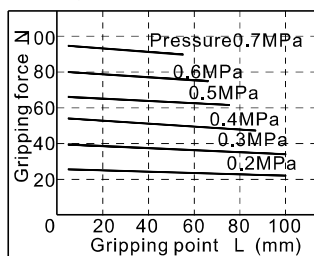
Opened gripping force



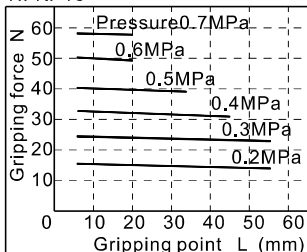
HFKP16



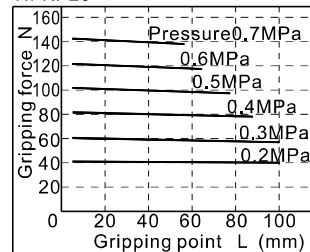
HFKP25



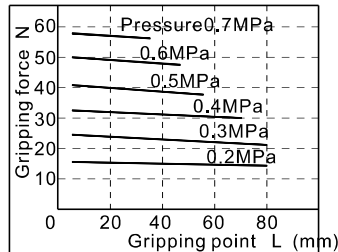
HFKP16



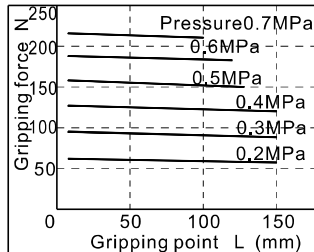
HFKP25



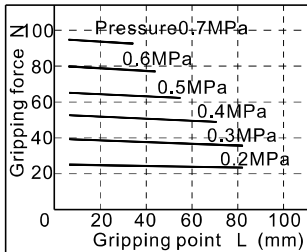
HFKP20



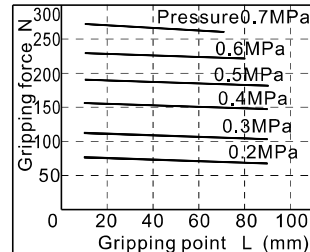
HFKP32



HFKP20



HFKP32

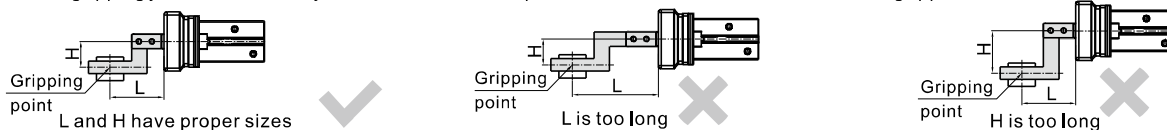


HFKP Series

2. The selection of the gripping point

2.1) Please select the gripping point within the limited field shown below.

Over the limits, gripping jaws would be subjected to excessive torque loads, and lead to short life of the air gripper.



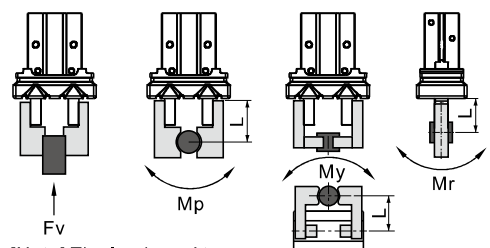
2.2) In the allowable range of gripping point, it is better to design for short and light fittings. If the fittings are long and heavy, the inertia force when the finger is open and close will become larger, and the performance of gripping jaw will be degraded, at the same time it will affect the life.

2.3) When the gripped object is very fine and thin, you have to equip with gap between fittings. If not, there will be unstable clamp, resulting in a position offset and adverse clamping and so on.



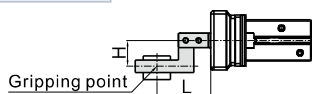
3. The confirmation of the external force put on the gripping jaw.

Bore size	The allowed vertical loads Fv(N)	Max. permissible torque(Nm)			The calculation of allowable forces when moment loads work	Examples of calculation
		Mp	My	Mr		
16	147	0.68	0.68	1.36	$\frac{\text{Allowable load(N)} \times \text{M(Maximum permissible moment)(N.m)}}{L \times 10^{-3}}$ Unit conversion constant	In the guide rail of HFKP16, the external force of the pitching moment static loads put on the point of L=30mm is f=10 N, Allowable load F= 0.68/(30×10 ⁻³) = 22.7(N) Actual load f=10(N)<22.7(N) To meet the using requirements
20	221	1.32	1.32	2.65		
25	382	1.94	1.94	3.88		
32	514	3	3	6		

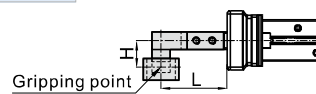


[Note] The loads and torque values of said are all static values.

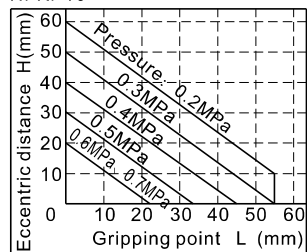
Closed gripping points



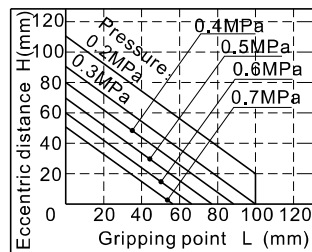
Opened clamping point



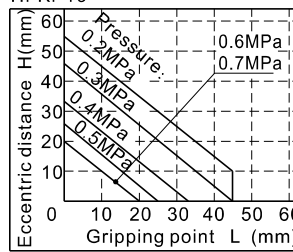
HFKP16



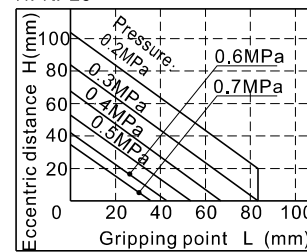
HFKP25



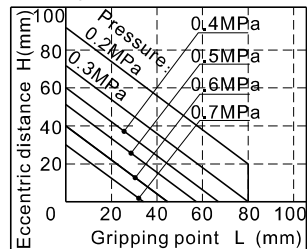
HFKP16



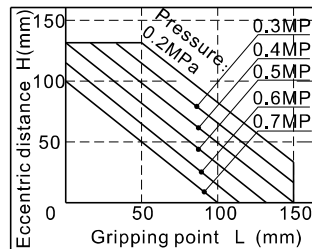
HFKP25



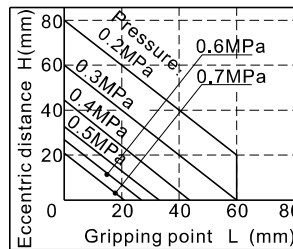
HFKP20



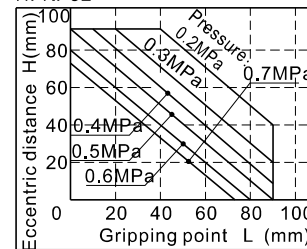
HFKP32



HFKP20



HFKP32

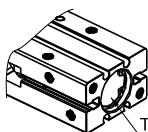
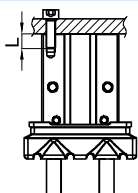


HF KP Series

Installation and application

1. Due to the abrupt changes, the circuit pressure is low, which will lead to the decrease of the gripping force and falling of the work-pieces. In order to avoid the harm to the human body and damage to the equipment, anti-dropping device must be equipped.
2. Don't use the air gripper under strong external force and impact force.
3. When install and fix the air gripper, avoid falling down, collision and damage.
4. When fixing the gripping jaw parts, don't twist the gripping jaw.
5. There are several kinds of installation method, and the locking torque of fastening screw must be within the prescribed torque range shown in the below chart. If the locking torque is too large, it will cause the dysfunctional. If the locking torque is too small, it will cause the position deviation and fall.

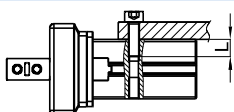
Tail installation type



The bore of the tail is used for mounting and positioning

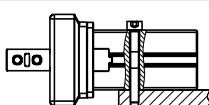
Bore size	The bolts type	Max. locking moment	Max. screwed depth	The aperture of the positioning bore	The depth of the positioning bore
16	M4×0.7	2.1N.m	8mm	Φ17mm ^{+0.05} ₀	1.5mm
20	M5×0.8	4.3N.m	10mm	Φ21mm ^{+0.05} ₀	2mm
25	M6×1.0	7.3N.m	12mm	Φ26mm ^{+0.05} ₀	2mm
32	M6×1.0	7.9N.m	12mm	Φ34mm ^{+0.05} ₀	2.5mm

The installation of the front threaded hole

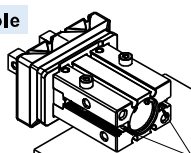


Bore size	The bolts type	Max. locking moment(Nm)	Max. screwed depth(mm)
16	M4×0.7	2.1	7
20	M5×0.8	4.3	8
25	M6×1.0	7.3	10
32	M6×1.0	7.9	10

The installation of the front through hole

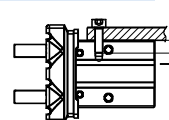


Bore size	The bolts type	Max. locking moment(Nm)	Max. screwed depth(mm)
16	M3×0.5	0.88	8
20	M4×0.7	2.1	10
25	M5×0.8	4.3	12
32	M5×0.8	4.3	13



When installed from front through holes, sensors can not be installed in the sensor grooves that are interfered by screws.

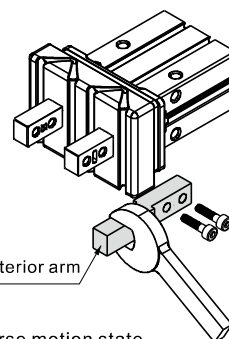
Surface installation type



Bore size	The bolts type	Max. locking moment(Nm)	Max. screwed depth(mm)
16	M4×0.7	1.6	4.5
20	M5×0.8	3.3	8
25	M6×1.0	5.9	10
32	M6×1.0	5.9	10

6. The installation method of the gripping jaw fittings
When install the gripping jaw fittings, you have to pay particular attention that you can only hold the gripping jaw by using spanner, and then lock the screws with allen wrench. Never clamp the body directly and then lock the screws, otherwise the parts will be easily damaged.

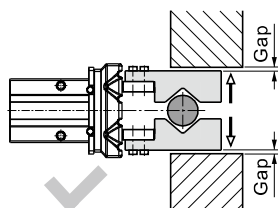
Bore size	The bolts type	Max. locking moment(Nm)
16	M3×0.5	0.59
20	M4×0.7	1.4
25	M5×0.8	2.8
32	M6×1.0	4.9



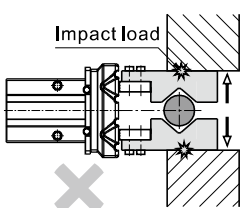
7. Confirm that there is no external forces exerted on the gripping jaw.

Transverse load acts on the gripping jaw, which will cause impact load and leads to the shaking and damage of gripping jaw. Equip with gaps so that the air gripper will not crash into work-pieces and accessories at the end of its trip.

- 7.1) The end of stroke under the open state of air gripper

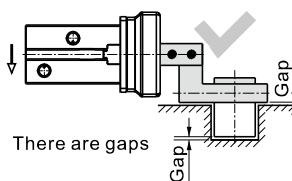


There are gaps

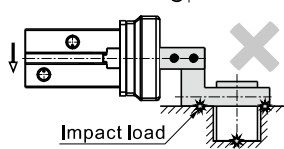


There aren't gaps

- 7.2) The end of stroke under the move state of air gripper



There are gaps

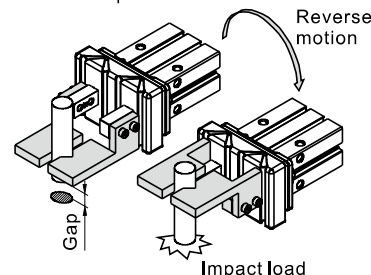


Impact load

There aren't gaps

- 7.3) Reverse motion state

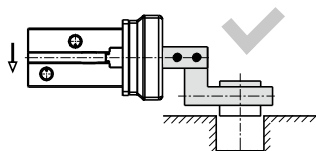
When reverse motion state, the gripping point must be precision, otherwise in the reverse motion state the air gripper maybe impact with ambience and will cause impact load.



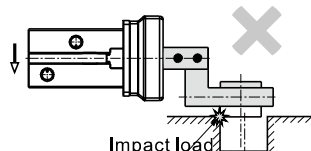
Reverse motion

Impact load

8. When the work-pieces are inserted, the center line should be coaxial, no offset, in case there are external force generated on gripping jaw. When testing, it is specially required that the manual operation should be reduced, the pressure should be used to run it at a low speed, and guarantee the safety and no impact.



Center coaxial



Center offset

9. Please use the flow control valve to adjust the opening and closing speed of gripping jaw if too fast.
10. People can not enter the movement path of air gripper and articles can not be placed on the path too.
11. Before removing the air gripper, please confirm that it is out of working state, and then discharge of compressed air.





Air gripper—HFP Series

Mechanical parallel style

Compendium of HFP Series

Five kinds of bore size and two kinds of type

Bore size: 10, 16, 20, 25, 32
 HFP: Double acting
 HFTP: Single acting and normally opened

Structure of lever type gripping

A structure of lever type gripping is designed to reduce the cost under the premise of accuracy. The finger clamps when the piston rod pushes out and stretches when the piston rod retracts. The gripping force is 20%~30% greater than the tensile force.

Anti-abrasion

A sheet metal is installed between the finger and body to reduce abrasion and extend the service life.

Opened port

Closed port

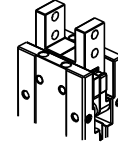
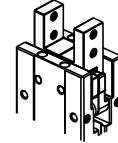
With magnetic switch slots

The magnetic switch slots convenient to install inducting switch.

Two kinds of finger type

Standard type

Thru.hole mounting type(N)



High gripping accuracy

The contact area between finger and body is enlarged to reduce shaking and enhance the gripping accuracy.

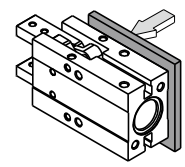
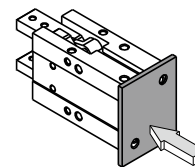
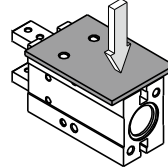
Can be mounted from two directions

With mounting holes on the side and tail.

Surface installation

Tail installation

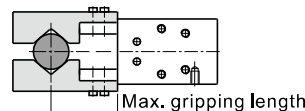
Front installation



Bore size (mm)		10	16	20	25	32
Acting type		Double acting , Single acting				
Fluid		Air(to be filtered by 40µm filter element)				
Operating pressure	Double acting	Φ10	0.2~0.7MPa(28~100psi)(2.0~7.0bar)			
		Others	0.15~0.7MPa(22~100psi)(1.5~7.0bar)			
	Single acting	Φ10	0.35~0.7MPa(50~100psi)(3.5~7.0bar)			
		Others	0.25~0.7MPa(36~100psi)(2.5~7.0bar)			
Proof pressure		1.05MPa(150psi)(10.5bar)				
Temperature °C		-20~70				
Lubrication		Cylinder : Not required ; Gripper jaws: Lubricate grease				
Max. gripping length [Note1] mm		30	40	60	70	90
Max. frequency		180(c.p.m)				60(c.p.m)
Sensor switches [Note2]		CMSG\DMMSG\EMSG				CMSG\DMMSG\EMSG CMSH\DMSSH\EMSH
Port size		M3×0.5			M5×0.8	

[Note1] Refer to right graph for the definition of max. gripping length.

[Note2] Sensor switch should be ordered additionally, please refer to P362 for detail of sensor switch.

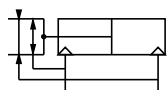


HFP Series

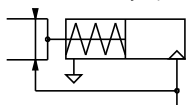


Symbol

HFP: Double acting



HFTP: Single acting and normally opened

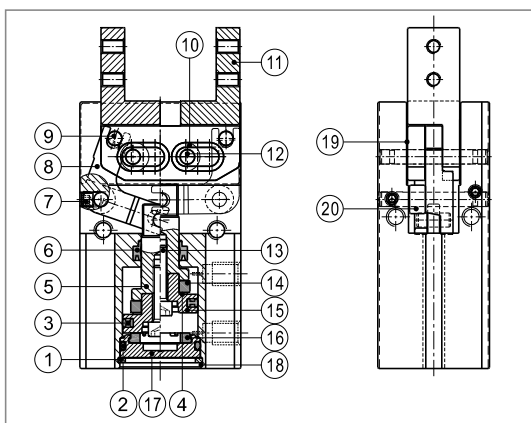


Ordering code

HFP 20 □		
① Model	② Bore size	③ Finger type
HFP: Air finger(Double acting) (mechanical parallel style)	10 16 20 25 32	Blank: Standard
HFTP: Air finger (Single acting and normally opened) (mechanical parallel style)		N: Thru.hole mounting type

[Note] HFP series are all attached with magnet.

Inner structure and material of major parts

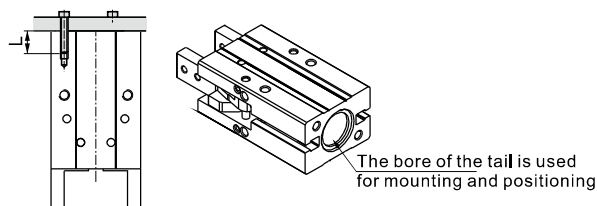


NO.	Item	Material	NO.	Item	Material
1	C clip	Spring steel	11	Gripping jaws	Stainless steel
2	O-ring	NBR	12	Pin	Stainless steel
3	Piston seal	NBR	13	Screw	Carbon steel
4	Magnet washer	NBR	14	Magnet	Sintered metal (Neodymium-iron-boron)
5	Piston rod	Aluminum alloy Stainless steel	15	Piston	Aluminum alloy Stainless steel
6	Rod packing	NBR	16	Bumper	TPU
7	Countersink screw	Carbon steel	17	Back cover	Aluminum alloy
8	Curved bar	Stainless steel	18	Body	Aluminum alloy
9	Pin	Stainless steel	19	Retaining ring	Stainless steel
10	Guide sleeve	Stainless steel	20	Stopper sleeve	Stainless steel

Installation and application

- Due to the abrupt changes, the circuit pressure is low, which will lead to the decrease of the gripping force and falling of the work-pieces. In order to avoid the harm to the human body and damage to the equipment, anti-dropping device must be equipped.
- Don't use the air gripper under strong external force and impact force.
- When install and fix the air gripper, avoid falling down, collision and damage.
- When fixing the gripping jaw parts, don't twist the gripping jaw.
- There are several kinds of installation method, and the locking torque of fastening screw must be within the prescribed torque range shown in the below chart. If the locking torque is too large, it will cause the dysfunctional. If the locking torque is too small, it will cause the position deviation and fall.

Tail installation type



Bore size	The bolts type	Max. locking moment	Max. screwed depth	The aperture of the positioning bore	The depth of the positioning bore
10	M3×0.5	1.0N.m	6mm	Φ11mm ^{+0.05} ₀	1.0mm
16	M4×0.7	2.0N.m	8mm	Φ17mm ^{+0.05} ₀	1.2mm
20	M5×0.8	4.5N.m	10mm	Φ21mm ^{+0.05} ₀	1.2mm
25	M6×1.0	7.0N.m	12mm	Φ26mm ^{+0.05} ₀	1.5mm
32	M6×1.0	7.0N.m	12mm	Φ34mm ^{+0.05} ₀	1.5mm

The installation of the front threaded hole

Bore size	The bolts type	Max. locking	Max. screwed
10	M3×0.5	0.7	5
16	M4×0.7	2.0	8
20	M5×0.8	4.5	10
25	M6×1.0	7.0	12
32	M6×1.0	7.0	12

Surface installation type

Bore size	The bolts type	Max. locking	Max. screwed
10	M3×0.5	1.0	6
16	M4×0.7	2.0	8
20	M5×0.8	4.5	10
25	M6×1.0	7.0	12
32	M6×1.0	7.0	12

- Other contents of installation and operation are the same with those of HFZ. Refer to the "Installation and Operation" instruction of HFZ.

HFP Series

How to select product

Please select pneumatic finger according to the following steps:

- ① The selection of the effective gripping force
- ② the confirmation of the gripping point
- ③ the confirmation of the external force put on the gripping jaw

1. The selection of the gripping force

The gripping work-pieces shown below, on the impact condition of ordinary handling state, taking safety coefficient $a=4$, have a gripping force that is more than 10-20 times of the mass of the gripped objects.

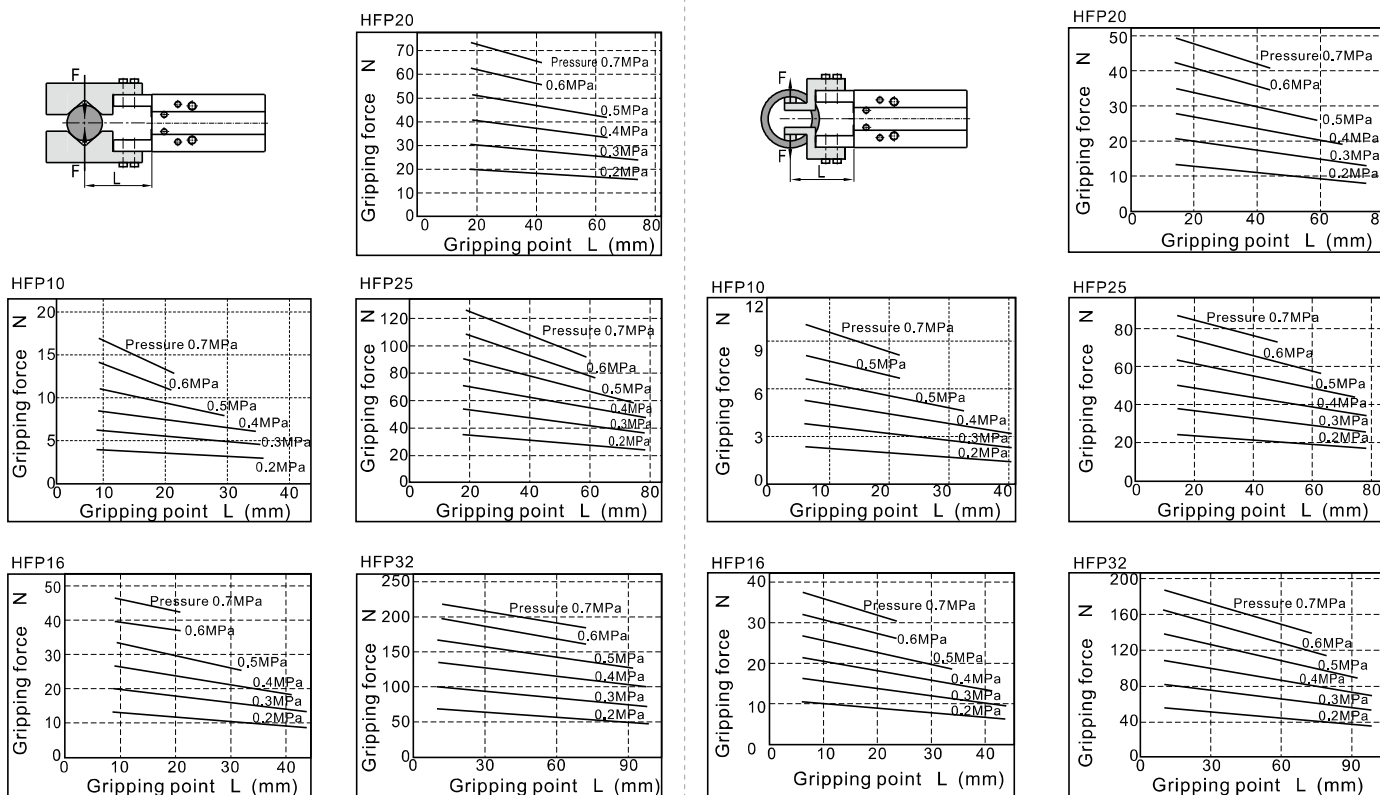
	The work-pieces as shown in the left :	$\mu=0.2$	$\mu=0.1$
	<p>F: Gripping force (N) μ: friction coefficient between fittings and work-pieces. m: mass of work-pieces g: acceleration of gravity ($=9.8m/s^2$)</p> <p>The condition that the work-pieces won't drop is: $2 \times \mu F > mg$ so: $F > \frac{mg}{2 \times \mu}$</p> <p>Safety coefficient is a, so F is: $F = \frac{mg}{2 \times \mu} \times a$</p>	$F = \frac{mg}{2 \times 0.2} \times 4 = 10 \times mg$	$F = \frac{mg}{2 \times 0.1} \times 4 = 20 \times mg$
		10 times of the mass of the gripped objects	20 times of the mass of the gripped objects

Note) If the friction coefficient $\mu > 0.2$, for safety, please also select clamping force according to the principle of 10~20 times of the mass of the clamped objects. As for large acceleration and shock, it requires for greater safety coefficient.

1.1) The actual gripping force must be within the effective gripping forces of different pneumatic fingers specifications shown in the below chart.

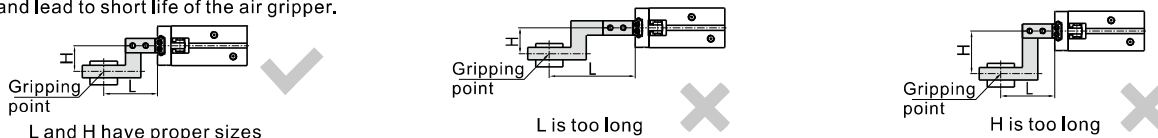
Double acting type closed gripping force

Double acting type opened gripping force



2. The selection of the gripping point

2.1) Select the gripping point within the maximum gripping length range. Over the limits, gripping jaws would be subjected to excessive torque loads, and lead to short life of the air gripper.



2.2) In the allowable range of gripping point, it is better to design for short and light fittings. If the fittings are long and heavy, the inertia force when the finger is open and close will become larger, and the performance of gripping jaw will be degraded, at the same time it will affect the life.

2.3) When the gripped object is very fine and thin, you have to equip with gap between fittings. If not, there will be unstable clamp, resulting in a position offset and adverse clamping and so on.



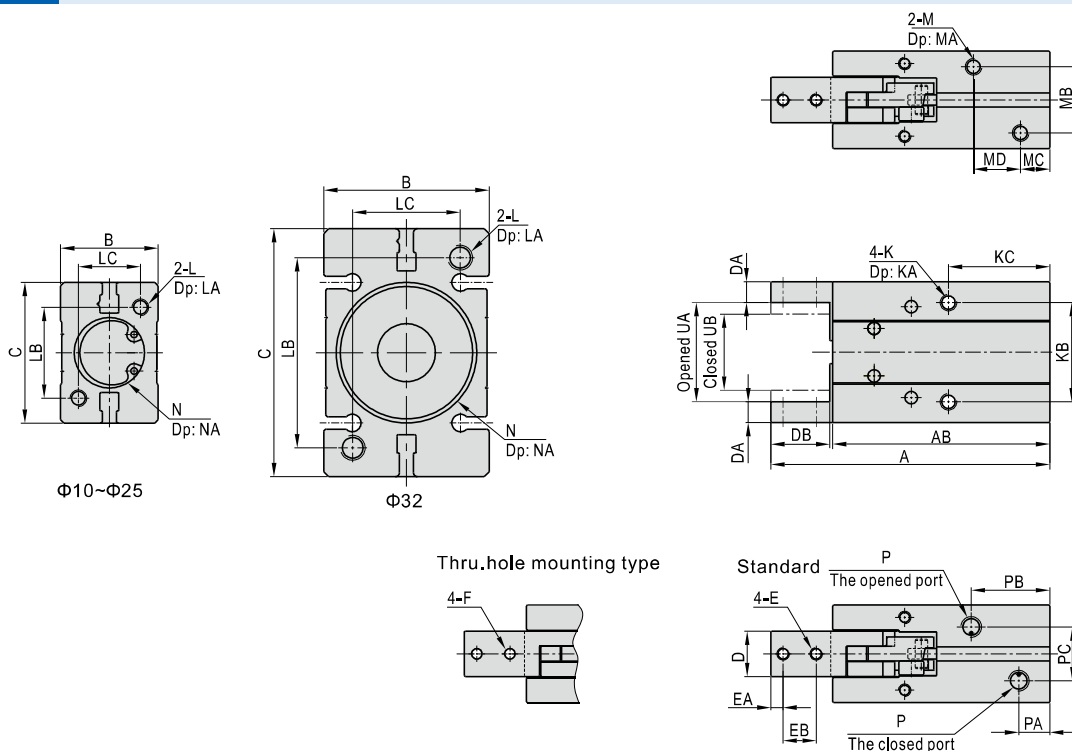
HFP Series

3. The confirmation of the external force put on the gripping jaw.

Bore size	The allowed vertical loads Fv(N)	Max. permissible torque(Nm)			The calculation of allowable forces when moment loads work	Examples of calculation
		Mp	My	Mr		
10	58	0.26	0.26	0.53	$\frac{\text{Allowable load(N)} \times \text{M(Maximum permissible moment)(N,m)}}{L \times 10^{-3}}$ Unit conversion constant	In the guide rail of HFP16, the external force of the pitching moment static loads put on the point of L=30mm is f=10 N, Allowable load $F = \frac{0.68}{30 \times 10^{-3}} = 22.7(N)$ Actual load f=10(N)<22.7(N) To meet the using requirements
16	98	0.68	0.68	1.36		
20	147	1.32	1.32	2.65		
25	255	1.94	1.94	3.88		
32	343	3	3	6		

[Note] The loads and torque values of said are all static values.

Dimensions



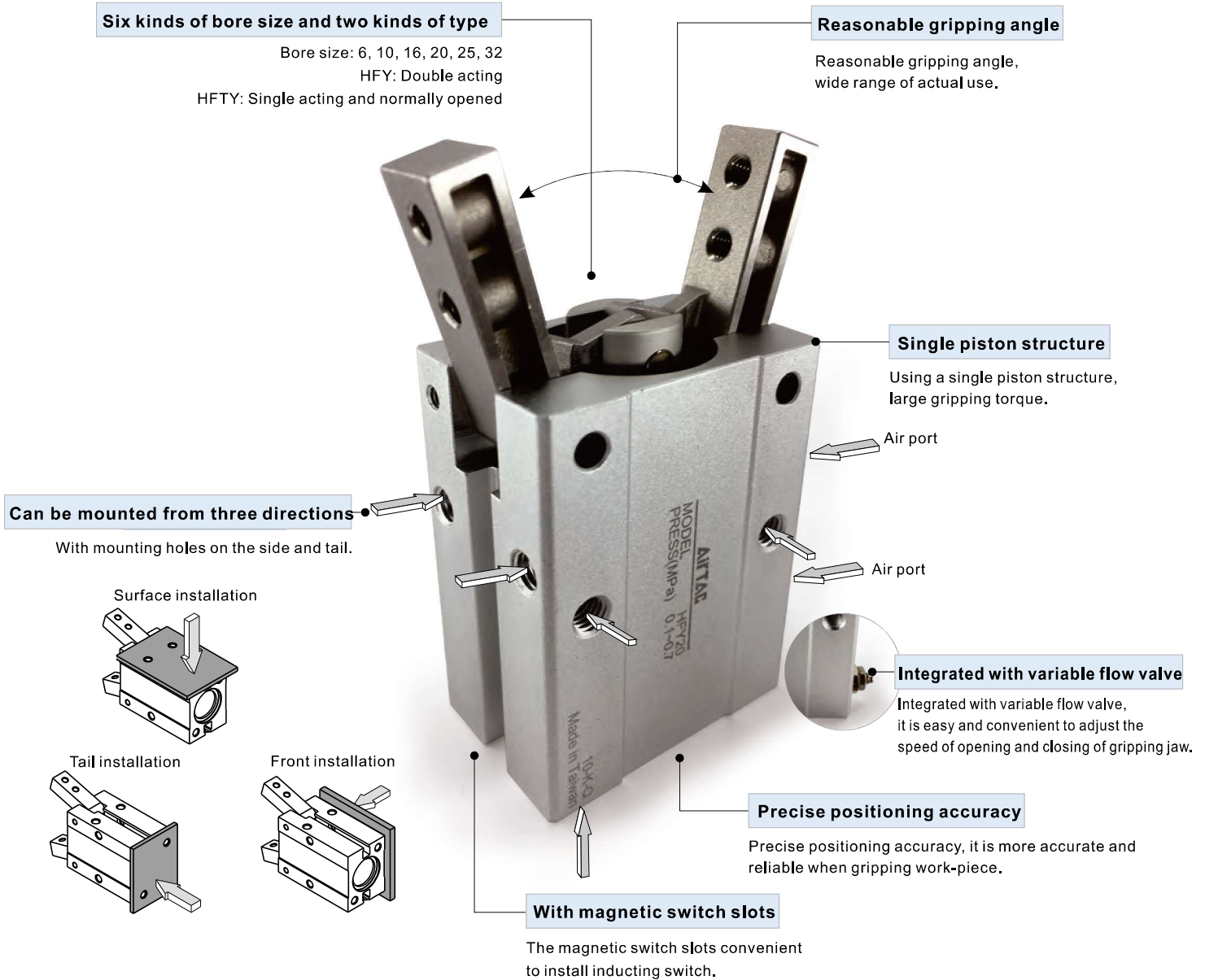
Model\Item	A	AB	B	C	D	DA	DB	E	EA	EB	F	K	KA	KB	KC	L	LA
HFP10	57(62)	44.5(49.5)	16	23	7	4	12	M2.5×0.45	3	5.5	Φ2.8	M3×0.5	5	16	23(28)	M3×0.5	6
HFP16	72(77)	56.5(61.5)	23.5	34	11	5	15	M3×0.5	4	7	Φ3.3	M4×0.7	8	24	29(34)	M4×0.7	8
HFP20	89.5(94.5)	69(74)	27.5	45	12	6	20	M4×0.7	5	9	Φ4.5	M5×0.8	10	30	34(39)	M5×0.8	10
HFP25	104.5(109.5)	78.5(83.5)	33.5	52	14	8	25	M5×0.8	6	12	Φ5.5	M6×1.0	12	36	31.5(36.5)	M6×1.0	12
HFP32	118(126)	88(96)	40	60	18	9	29	M6×1.0	7	14	Φ6.5	M6×1.0	12	46	37.5(45.5)	M6×1.0	12

Model\Item	LB	LC	M	MA	MB	MC	MD	N	NA	P	PA	PB	PC	UA(Opened)	UB(Closed)
HFP10	18	12	M3×0.5	6	10	6(11)	10	Φ11 ^{+0.05} ₀	1	M3×0.5	6	16.5(23)	10	14.5 ^{+1.5} ₀	10.5 ⁻¹ ₀
HFP16	22	15	M4×0.7	8	16	6(11)	16	Φ17 ^{+0.05} ₀	1.2	M5×0.8	7.5	20(25)	13	23.5 ^{+1.5} ₀	15.5 ⁻¹ ₀
HFP20	32	18	M5×0.8	10	18	8(13)	16	Φ21 ^{+0.05} ₀	1.2	M5×0.8	7.5	24(29)	15	32.5 ^{+1.5} ₀	20.5 ⁻¹ ₀
HFP25	40	22	M6×1.0	12	24	8(13)	16	Φ26 ^{+0.05} ₀	1.5	M5×0.8	8	22(29)	20	35.5 ^{+1.5} ₀	21.5 ⁻¹ ₀
HFP32	46	26	M6×1.0	12	30	8(16)	20	Φ34 ^{+0.05} ₀	1.5	M5×0.8	9.5	26(37)	22	42 ^{+1.5} ₀	26.5 ⁻¹ ₀

[Note]The values in “()” in the above table are single acting type sizes.



Compendium of HFY Series



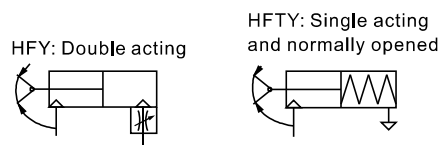
Bore size (mm)		6	10	16	20	25	32	
Acting type	Double acting			Double acting		Single acting		
	Fluid	Air(to be filtered by 40μm filter element)						
Operating pressure	Double acting	0.2~0.7MPa(29~100psi)(2.0~7.0bar)		0.15~0.7MPa(22~100psi)(1.5~7.0bar)				
	Single acting	Φ6	0.3~0.7MPa(45~100psi)(3.0~7.0bar)					
		Φ10~Φ32	0.25~0.7MPa(36~100psi)(2.5~7.0bar)					
Temperature °C		-20~70						
Lubrication		Cylinder: Not required; Gripper jaws: Lubricate grease						
Cushion type		Bumper						
Max. frequency		180(c.p.m)						
Sensor switches [Note1]		CMSH\DMSH\EMSH			CMSG\DMSG\EMSG			
Port size		M3×0.5			M5×0.8			

[Note1] Sensor switch should be ordered additionally, please refer to P362 for detail of sensor switch.

HFY Series



Symbol

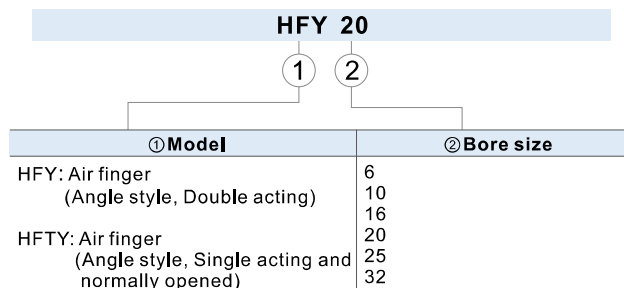


Gripping force and stroke

Acting type		Double acting(HFY)						Single acting Normally opened(HFTY)					
Bore size		6	10	16	20	25	32	6	10	16	20	25	32
Theoretical gripping torque (N·cm)	Closed	7.4×P	17.6×P	90×P	152×P	304×P	637×P	5.7×P	11.8×P	71.2×P	122.4×P	252×P	589×P
	Opened	10.6×P	29.4×P	129×P	252×P	473×P	904×P	-	-	-	-	-	-
Max. length of gripping point (L)(mm)		30	30	40	60	70	85	30	30	40	60	70	85
Opening angle (°)								30 ⁺³ ₀					
Closing angle (°)								-10 ⁰ ₋₃					

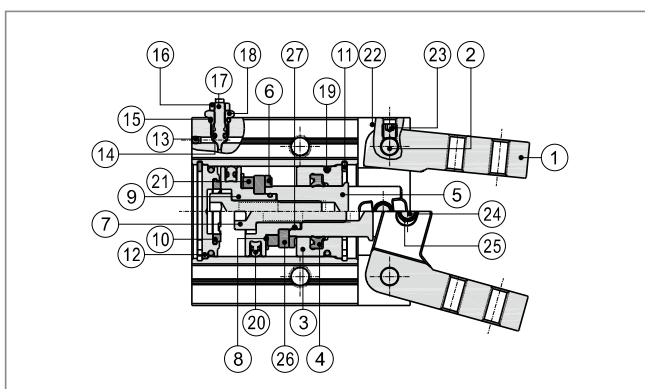
[Note] The P in the gripping torque shown in the above chart represents the actual use of air pressure.

Ordering code

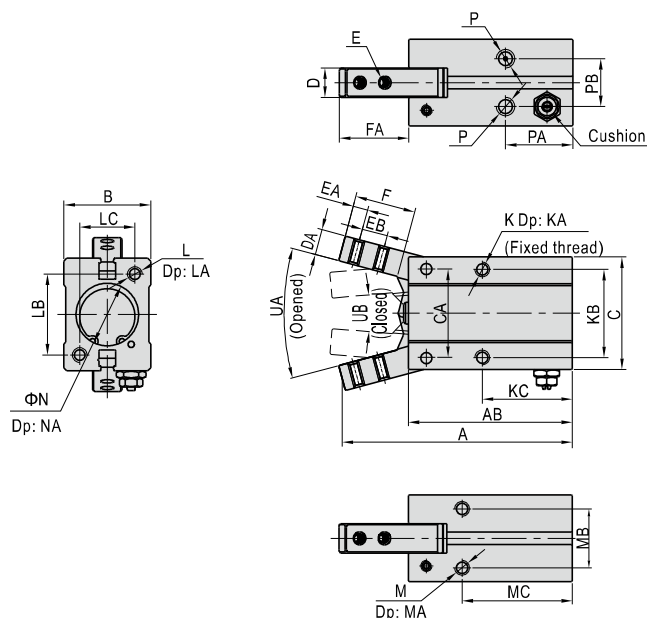


[Note] HFY series are all attached with magnet.

Inner structure and material of major parts



NO.	Item	Material
1	Gripping jaws	Carbon steel
2	Pin	Stainless steel
3	Front cover	Aluminum alloy
4	Rod packing	NBR
5	Piston rod	Aluminum alloy/Stainless steel
6	Bumper	TPU
7	Countersink screw	Carbon steel
8	Magnet washer	NBR
9	Piston	Aluminum alloy/Stainless steel
10	Bumper	TPU
11	C clip	Spring steel
12	Back cover	Aluminum alloy
13	Steel ball	Stainless steel
14	O-ring	NBR
15	O-ring	NBR
16	Screw cap	Carbon steel
17	Adjustable nut	Brass
18	Fixed nut	Brass
19	O-ring	NBR
20	Piston seal	NBR
21	Magnet	Sintered metal(Neodymium-iron-boron)
22	Body	Aluminum alloy
23	Countersink screw	Alloy steel
24	Pin	Stainless steel
25	Pin sheath	Stainless steel
26	Magnet fixed plate	Stainless steel
27	O-ring	NBR



Bore size\Item	A	AB	B	C	CA	D	DA	E	EA	EB	F	FA	K	KA	KB	KC	L
6	47.5	36	10.5	20	14	4	4	M2×0.4	2.5	5	11	12	M3×0.5	Thru. thread	12	26	-
10	52.5	38.5	16.5	23	14	6.4	4	M2.5×0.45	3	5.7	12	14.5	M3×0.5	5	16	23	M3×0.5
16	62.5	44.5	23.5	30.5	24	8	7	M3×0.5	4	7	16	19	M4×0.7	7	24	24.5	M4×0.7
20	78	55	27.5	42	30	10	8	M4×0.7	5	9	20	23.5	M5×0.8	8	30	29	M5×0.8
25	92	60.5	33.5	52	36	12	10	M5×0.8	8	12	27	33	M6×1.0	10	36	30	M6×1.0
32	96.5	68	40	60	42	18	10	M6×1.0	6	14	27	29.5	M6×1.0	10	44	37.5	M6×1.0

Bore size\Item	LA	LB	LC	M	MA	MB	MC	N	NA	P	PA	PB	UA(Opened)	UB(Closed)
6	-	-	-	-	-	-	-	$7^{+0.05}_0$	1.5	M3×0.5	19	1.5	30°	10°
10	6	18	12	M3×0.5	6	11.5	27	$11^{+0.05}_0$	1.5	M3×0.5	19	10	30°	10°
16	8	22	15	M4×0.7	8	16	30	$17^{+0.05}_0$	1.5	M5×0.8	18.5	13	30°	10°
20	10	32	18	M5×0.8	10	18.5	35	$21^{+0.05}_0$	1.5	M5×0.8	22	15	30°	10°
25	12	40	22	M6×1.0	10	22	36.5	$26^{+0.05}_0$	1.5	M5×0.8	23.5	20	30°	10°
32	12	46	26	M6×1.0	10	26	30	$34^{+0.05}_0$	2	M5×0.8	31	24	30°	10°

How to select product

1. The selection of the gripping force

The gripping work-pieces shown below, on the impact condition of ordinary handling state, taking safety coefficient a=4, have a gripping force that is more than 10-20 times of the mass of the gripped objects.

	The work-pieces as shown in the left :		$\mu=0.2$	$\mu=0.1$
	<p>F: Gripping force (N) μ: friction coefficient between fittings and work-pieces. m: mass of work-pieces g: acceleration of gravity ($=9.8m/s^2$)</p> <p>The condition that the work-pieces won't drop is: $2 \times \mu F > mg$ so: $F > \frac{mg}{2 \times \mu}$ Safety coefficient is a, so F is: $F = \frac{mg}{2 \times \mu} \times a$</p>		$F = \frac{mg}{2 \times 0.2} \times 4 = 10 \times mg$	$F = \frac{mg}{2 \times 0.1} \times 4 = 20 \times mg$
		10 times of the mass of the gripped objects	20 times of the mass of the gripped objects	

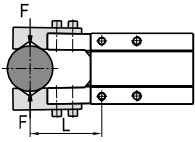
Note) If the friction coefficient $\mu > 0.2$, for safety, please also select clamping force according to the principle of 10~20 times of the mass of the clamped objects. As for large acceleration and shock, it requires for greater safety coefficient.

2. The selection of the gripping point

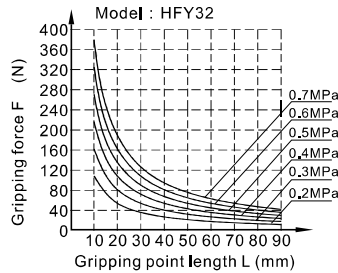
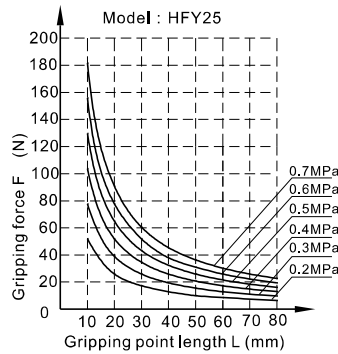
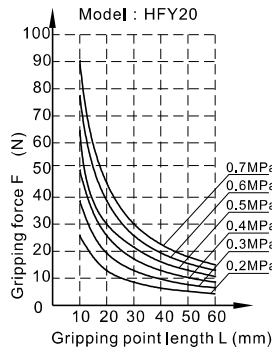
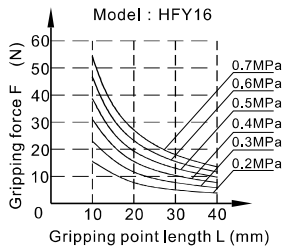
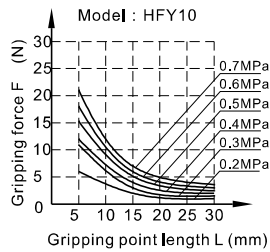
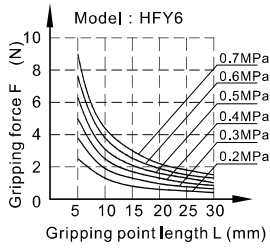
When the gripping force is determined, select the gripping point according to the limitation ranges shown in the below chart. If the gripping point is over the limit, the gripping jaw will be subjected to excessive moment load, and lead to short life of air gripper.

HFY Series

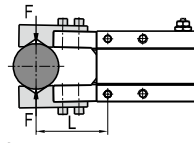
Double acting type closed gripping force



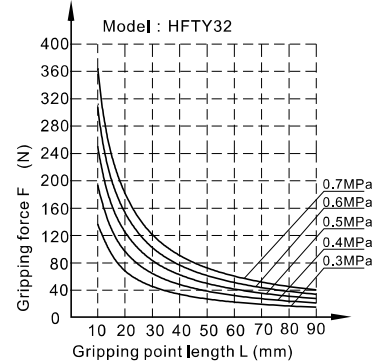
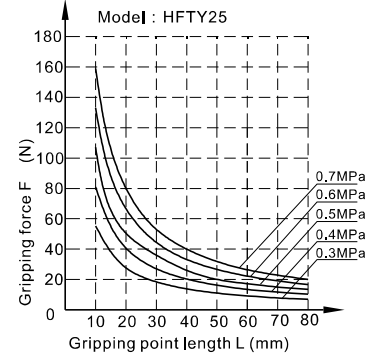
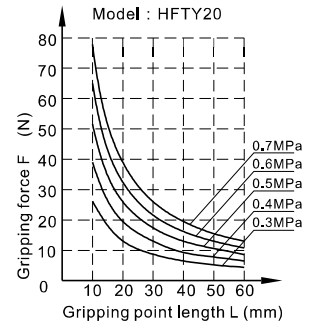
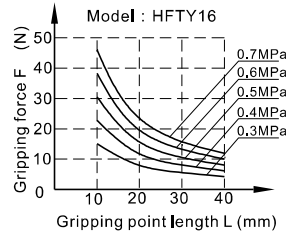
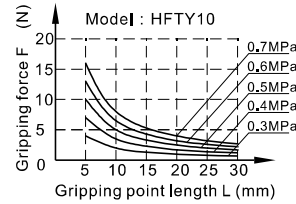
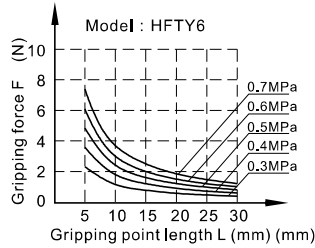
Gripping point length (mm)



Single acting closed gripping force



Gripping point length (mm)

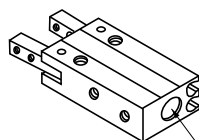
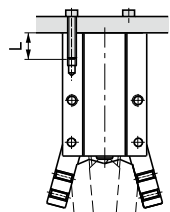


HFY Series

Installation and application

1. Due to the abrupt changes, the pressure is low, which will lead to the decrease of the gripping force and falling of the work-pieces. In order to avoid the harm to the human body and damage to the equipment, anti-dropping device must be equipped.
2. Don't use the air gripper under strong external force and impact force.
3. When install and fix the air gripper, avoid falling down, collision and damage.
4. When fixing the gripping jaw parts, don't twist the gripping jaw.
5. There are several kinds of installation method, and the torque of fastening screw must be within the prescribed moment range shown in the below chart. If the locking moment is too large, it will cause the dysfunctional. If the locking moment is too small, it will cause the position deviation and fall.

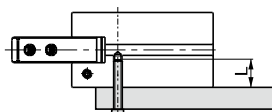
Tail installation type



The bore of the tail is used for mounting and positioning

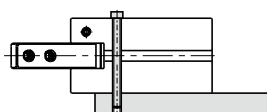
Bore size	The bolts type	Max. locking moment	Max. screwed depth	The aperture of the positioning bore	The depth of the positioning bore
6	-	-	-	Φ7mm ^{+0.04} _{-0.01}	1.5mm
10	M3×0.5	0.88N.m	6mm	Φ11mm ^{+0.04} _{+0.01}	1.5mm
16	M4×0.7	2.1N.m	8mm	Φ17mm ^{+0.05} ₀	1.5mm
20	M5×0.8	4.3N.m	10mm	Φ21mm ^{+0.05} ₀	1.5mm
25	M6×1.0	7.3N.m	12mm	Φ26mm ^{+0.05} ₀	1.5mm
32	M6×1.0	7.3N.m	12mm	Φ34mm ^{+0.05} ₀	2.0mm

The installation of the front threaded hole

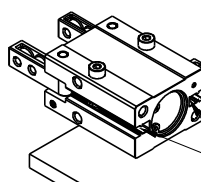


Bore size	The bolts type	Max. locking moment(Nm)	Max. screwed depth(mm)
6	M3×0.5	0.69	5
10	M3×0.5	0.69	5
16	M4×0.7	2.1	7
20	M5×0.8	4.3	8
25	M6×1.0	7.3	10
32	M6×1.0	7.3	10

The installation of the front through hole

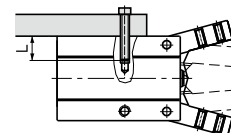


Bore size	The bolts type	Max. locking moment(Nm)	Max. screwed depth(mm)
6	M2.5×0.45	0.49	5
10	M2.5×0.45	0.49	5
16	M3×0.5	0.88	7
20	M4×0.7	2.1	8
25	M5×0.8	4.3	10
32	M5×0.8	4.3	10



When installed from front through holes, sensors can not be installed in the sensor grooves that are interfered by screws.

Surface installation type

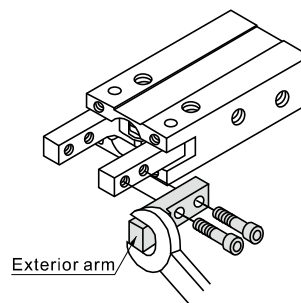


Bore size	The bolts type	Max. locking moment(Nm)	Max. screwed depth(mm)
6	-	-	-
10	M3×0.5	0.88	6
16	M4×0.7	1.6	6.5
20	M5×0.8	3.3	8
25	M6×1.0	5.9	10
32	M6×1.0	5.9	10

6. The installation method of the gripping jaw fittings

When install the gripping jaw fittings, you have to pay particular attention that you can **only hold** the gripping jaw by using spanner, and then **lock** the screws with allen wrench. **Never clamp** the body directly and then **lock** the screws, otherwise the parts will be easily damaged.

Bore size	The bolts type	Max. locking moment(Nm)
6	M2×0.4	0.15
10	M2.5×0.45	0.31
16	M3×0.5	0.59
20	M4×0.7	1.4
25	M5×0.8	2.8
32	M6×1.0	4.9



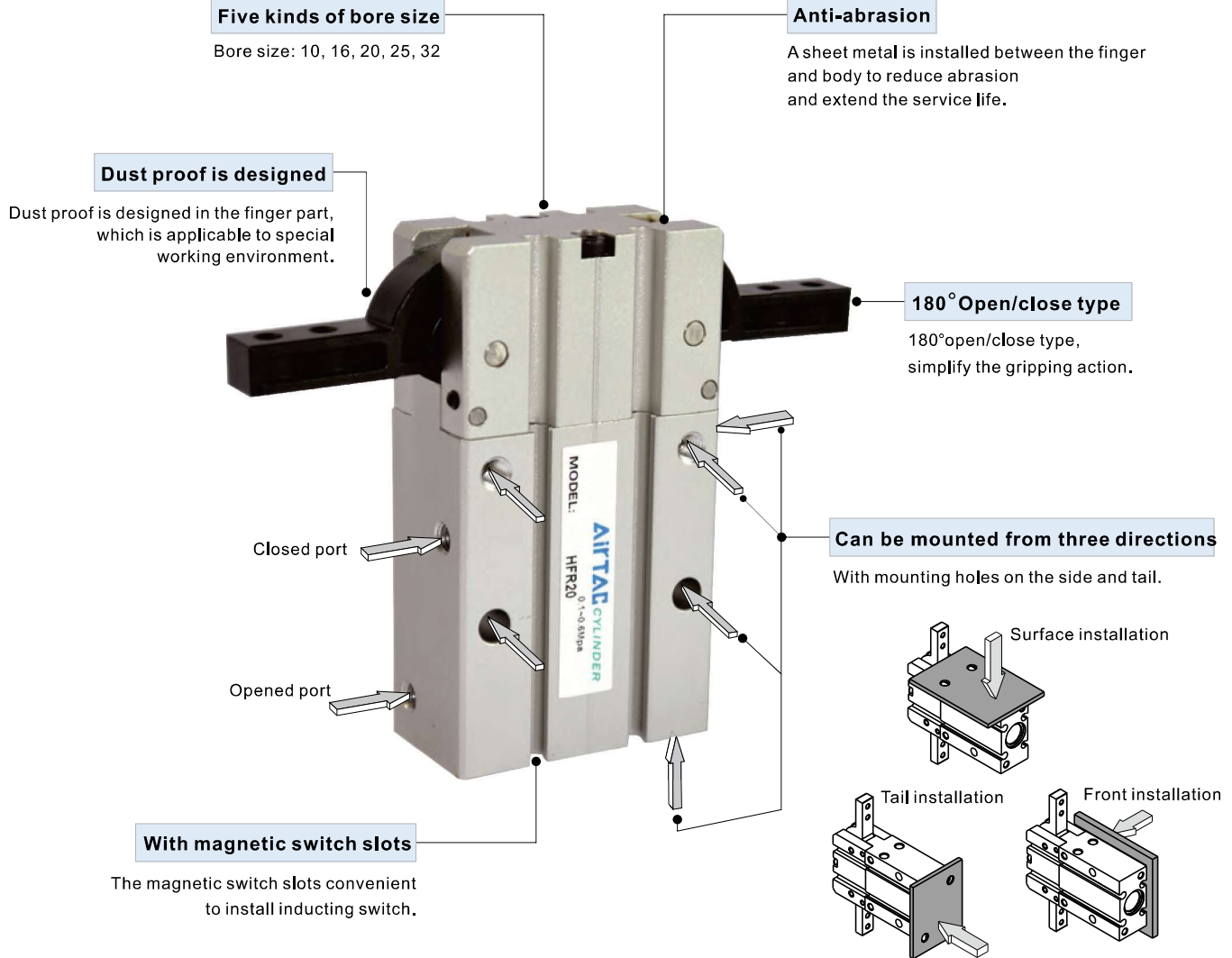
7. When gripping work-piece, the work-piece must be located in the center line of the two gripping jaws, and the two gripping jaws also need to touch the work-piece at the same time, otherwise they will be easily damaged.
8. Confirm that there is no additional external forces that are exerted on the gripping jaw. Transverse load acts on the gripping jaw, which will cause impact load and leads to the shaking and damage of gripping jaw. Equip with gaps so that the air gripper will not crash into work-pieces and accessories at the end of its trip.
9. When the work-pieces are inserted, the center line should be coaxial, no offset, in case there are external force generated on gripping jaw. When testing, it is specially required that the manual operation should be reduced, the pressure should be used to run it at a low speed, and guarantee the safety and no impact.
10. Please use the flow control valve to adjust the opening and closing speed of gripping jaw if too fast.
11. People can not enter the movement path of air gripper and articles can not be placed on the path too.
12. Before removing the air gripper, please confirm that it is out of working state, and then discharge of compressed air.



Air gripper—HFR Series

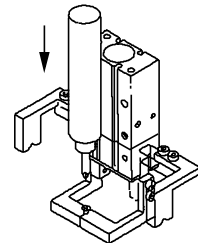
180° open/close style

Compendium of HFR Series

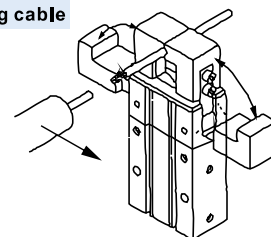


Example

Screw down



Clamping cable



Bore size (mm)	10	16	20	25	32
Acting type	Double acting				
Fluid	Air(to be filtered by 40µm filter element)				
Operating pressure	Φ10: 0.2~0.7MPa(29~100psi)(2.0~7.0bar) Others: 0.15~0.7MPa(22~100psi)(1.5~7.0bar)				
Temperature °C	-20~70				
Lubrication	Cylinder: Not required; Gripper jaws: Lubricate grease				
Cushion type	Bumper				
Max. frequency	60(c.p.m)				
Repeatability	±0.2mm				
Gripping force [Note1]	0.16N.m	0.55N.m	1.10N.m	2.30N.m	5.00N.m
Open or close angle	Close: -2° ~ -5° Open: 180° ±2°				
Port size	M5×0.8				
Sensor switches [Note2]	CM5HDM5H/EM5H				

[Note1] The gripping force is the value when the operating pressure is 0.5Mpa.

[Note2] Sensor switch should be ordered additionally, please refer to P362 for detail of sensor switch.

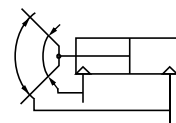


Air gripper(180° open/close style)

HFR Series



Symbol

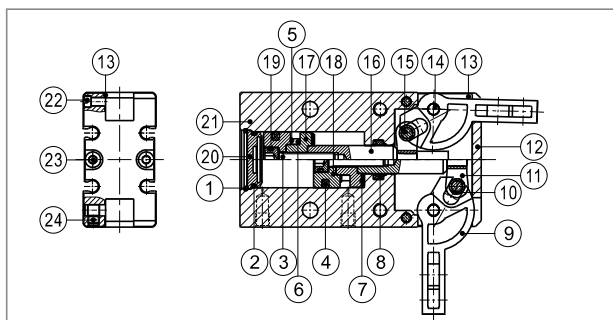


Ordering code

HFR 20 □		
① Model	② Bore size	③ Mounting type
HFR: 180° open/close air gripper	10	Blank: Mounting through tapped holes
	16	
	20	N: Mounting through holes (tapped in open/close direction)
	25	
	32	

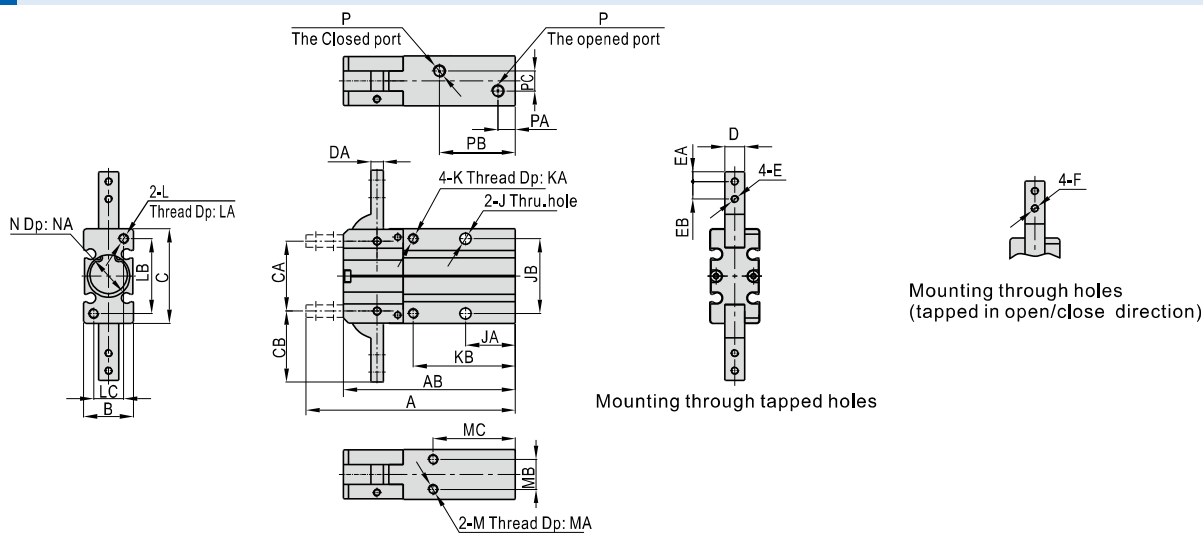
[Note] HFR series are all attached with magnet.

Inner structure and material of major parts



NO.	Item	Material	NO.	Item	Material
1	C clip	Spring steel	12	Front cover	Aluminum alloy
2	O-ring	NBR	13	Sheet metal	Stainless steel
3	Countersink screw	Carbon steel	14	Pin	Stainless steel
			15	Pin	Stainless steel
4	Piston seal	NBR	16	Piston rod	Stainless steel
5	Magnet washer	NBR	17	Magnet holder	Aluminum alloy
6	Magnet	Sintered metal (Neodymium-iron-iron)	18	Piston	Aluminum alloy
			19	O-ring	NBR
7	Bumper	TPU	20	Back cover	Aluminum alloy
8	Rod packing	NBR	21	Body	Aluminum alloy
9	Gripping jaws	Stainless steel	22	Pin	Stainless steel
10	Pin sheath	Stainless steel	23	Countersink screw	Carbon steel
11	Push block	Stainless steel	24	Countersink screw	Carbon steel

Dimensions



Bore size\Item	A	AB	B	C	CA	CB	D	DA	E	F	EA	EB	J	JA	JB	K	KA
10	71	58	15	30	22	23.5	6	4	M3×0.5	Φ3.3	3	6	Φ3.3	18	24	M3×0.5	6
16	84	69	20	38	28	28.5	8	5	M3×0.5	Φ3.3	4	7	Φ4.5	20	30	M4×0.7	8
20	106	86	26	48	36	37	10	8	M4×0.7	Φ4.5	5	9	Φ5.5	25	36	M5×0.8	10
25	131	107	30	58	45	45	12	10	M5×0.8	Φ5.5	6	12	Φ6.5	30	42	M6×1.0	12
32	158.5	122	40	72	55	62.5	14	12	M6×1.0	Φ6.5	9	16	Φ6.5	35	46	M6×1.0	12

Bore size\Item	KB	L	LA	LB	LC	M	MA	MB	MC	N	NA	P	PA	PB	PC
10	35	M3×0.5	6	24	9	M3×0.5	4	9	30	Φ11 ^{+0.05} ₀	1.5	M5×0.8	7	28.5	3
16	41	M4×0.7	8	30	12	M4×0.7	5	12	33	Φ17 ^{+0.05} ₀	1.5	M5×0.8	7	30.5	8
20	50	M5×0.8	10	38	16	M5×0.8	8	14	42	Φ21 ^{+0.05} ₀	1.5	M5×0.8	8	38.5	12
25	60	M6×1.0	12	46	18	M6×1.0	10	16	50	Φ26 ^{+0.05} ₀	1.5	M5×0.8	8	48	14
32	64	M6×1.0	12	46	26	M6×1.0	12	26	59	Φ34 ^{+0.05} ₀	2	M5×0.8	9	56	18



HFR Series

How to select product

1. Confirmation of effective gripping force

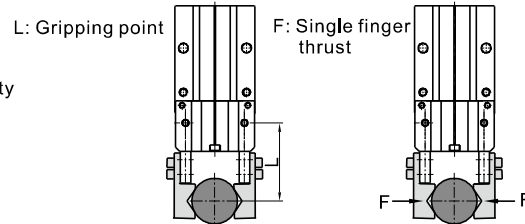
- 1.1) Though the coefficient of friction between the attachments and the workpiece is different, select a gripping force which is 10 to 20 times greater than the workpiece weight.
- 1.2) If high acceleration or impact forces are encountered during motion, a further margin of safety should be considered.

Example: When the workpiece weight is 0.05 and the gripping point distance L is 30mm, the operating pressure will be 5kgf/cm².

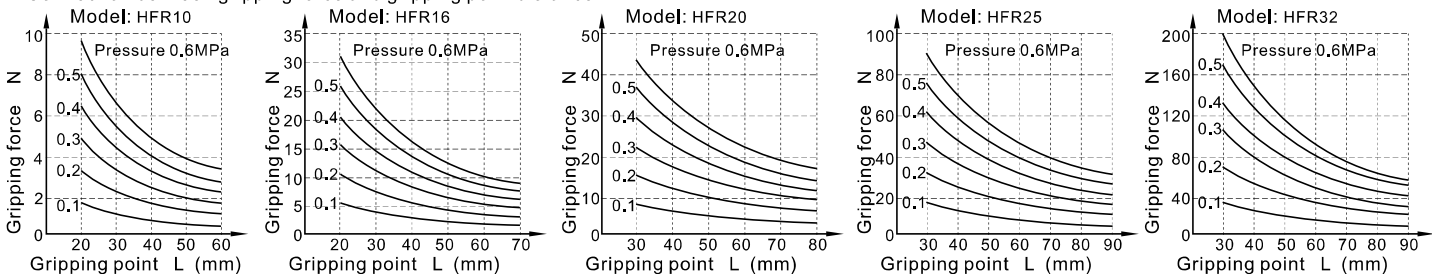
Effective gripping force=0.05kg×20 times×9.8m/s²=more than 10N

Model selection: HFR16 is recommended. The effective gripping force is 17N, which is 20 times greater than the set value of gripping force.

- 1.3) The finger thrust is expressed as F, when both fingers and attachments are in full contact with the workpiece as shown in the figure below.

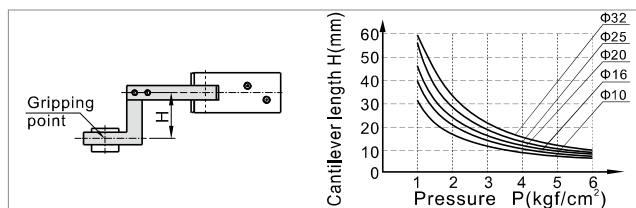


2. Connection between gripping force and gripping point distance



3. The selection of the gripping point

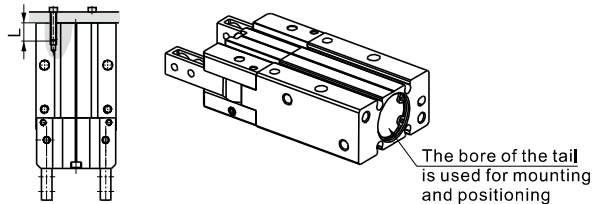
- 3.1) Please select the gripping point within the limited field shown left. Over the limits, gripping jaws would be subjected to excessive torque loads, and lead to short life of the air gripper.
- 3.2) In the allowable range of gripping point, it is better to design for short and light fittings. If the fittings are long and heavy, the inertia force when the finger is open and close will become larger, and the performance of gripping jaw will be degraded, at the same time it will affect the life.



Installation and application

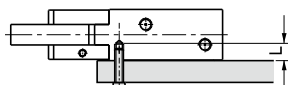
1. Due to the abrupt changes, the pressure is low, which will lead to the decrease of the gripping force and falling of the work-pieces. In order to avoid the harm to the human body and damage to the equipment, anti-dropping device must be equipped.
2. Don't use the air gripper under strong external force and impact force.
3. When install and fix the air gripper, avoid falling down, collision and damage.
4. When fixing the gripping jaw parts, don't twist the gripping jaw.
5. There are several kinds of installation method, and the torque of fastening screw must be within the prescribed moment range shown in the below chart. If the locking moment is too large, it will cause the dysfunctional. If the locking moment is too small, it will cause the position deviation and fall.

Tail installation type



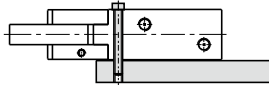
Bore size	The bolts type	Max. locking moment	Max. screwed depth	The aperture of the positioning bore	The depth of the positioning bore
10	M3×0.5	1.0N.m	6mm	Φ11mmH9	1.5mm
16	M4×0.7	2.0N.m	8mm	Φ17mmH9	1.5mm
20	M5×0.8	4.5N.m	10mm	Φ21mmH9	1.5mm
25	M6×1.0	7.0N.m	12mm	Φ26mmH9	1.5mm
32	M6×1.0	7.0N.m	14mm	Φ34mmH9	2.0mm

The installation of the front threaded hole



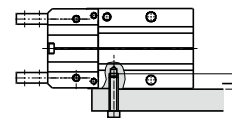
Bore size	The bolts type	Max. locking moment(Nm)	Max. screwed depth(mm)
10	M3×0.5	1.0	6
16	M4×0.7	2.0	8
20	M5×0.8	4.5	10
25	M6×1.0	7.0	12
32	M6×1.0	7.0	14

The installation of the front through hole



Bore size	The bolts type	Max. locking moment(Nm)
10	M3×0.5	1.0
16	M4×0.7	2.0
20	M5×0.8	4.5
25	M6×1.0	7.0
32	M6×1.0	7.0

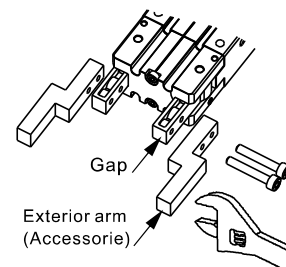
Surface installation type



Bore size	The bolts type	Max. locking moment(Nm)	Max. screwed depth(mm)
10	M3×0.5	0.6	4
16	M4×0.7	1.5	5
20	M5×0.8	3.5	8
25	M6×1.0	6.0	10
32	M6×1.0	6.0	12

6. The installation method of the gripping jaw fittings. When install the gripping jaw fittings, you have to pay particular attention that you can only hold the gripping jaw by using spanner, and then lock the screws with allen wrench. Never clamp the body directly and then lock the screws, otherwise the parts will be easily damaged.
7. Other contents of installation and operation are the same with those of HFY. Refer to the "Installation and Operation" instruction of HFY.

Bore size	The bolts type	Max. locking moment(Nm)
10	M3×0.5	0.6
16	M3×0.5	0.6
20	M4×0.7	0.8
25	M5×0.8	1.5
32	M6×1.0	3.0





Air gripper—HFC Series

Parallel open/close style

Compendium of HFC Series

Seven kinds of bore size
Bore size: 16, 20, 25, 32, 40, 50, 63

Three kinds of finger type
Two fingers (I Type) Three fingers (Y Type) Four fingers (X Type)

Uniform block construct
Uniform block is adopted in the interior of the air gripper to afford larger gripper force.

Bumper design
The bumper is adopted in the front of piston, which can reduce the noise of metal bump.

With positioning hole
A positioning hole is attached to the bottom of the body, which can improve the precision and the consistency of repeated dismounting and positioning.

Can be mounted from two directions
Tail installation (thread hole) Front installation (thru.hole)

With roundness magnetic switch slots
The roundness magnetic switch slots convenient to install CMSH\DMSEMSH type inducting switch.

Gripping force and stroke

Model	Gripping force per finger Effective valve(N)		Opening/Closing stroke (Both sides)(mm)	
	Internal	External		
2 grippers	HFCI16	23	21	4
	HFCI20	42	37	4
	HFCI25	71	63	6
	HFCI32	123	111	8
	HFCI40	195	177	8
	HFCI50	306	280	12
	HFCI63	537	502	16
3 grippers	HFCY16	16	14	4
	HFCY20	28	25	4
	HFCY25	47	42	6
	HFCY32	82	74	8
	HFCY40	130	118	8
	HFCY50	204	187	12
	HFCY63	359	335	16
4 grippers	HFCX16	12	10	4
	HFCX20	21	19	4
	HFCX25	35	31	6
	HFCX32	61	55	8
	HFCX40	97	88	8
	HFCX50	153	140	12
	HFCX63	268	251	16

Note) The gripping force in the above table is in the working pressure of 0.5MPa, and with a gripping point of L=20mm(Φ16~Φ25) or L=30mm(Φ32~Φ63).

Add) Please refer to page 306 for the definition of "L".

Installation and application



1. Dirty substances in the pipe must be eliminated before air gripper is connected with pipeline to prevent the entrance of impurities into the cylinder.
2. The medium used by cylinder shall be filtered to 40μm or below.
3. Anti-freezing measure shall be adopted under low temperature environment to prevent moisture freezing.
4. If the air gripper is dismantled and stored for a long time, pay attention to conduct anti-rust treatment to the surface. Anti-dust caps shall be added in air inlet and outlet ports.



Air gripper(parallel open/close style)

HFC Series

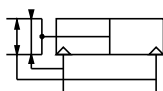


Specification

Bore size (mm)	16	20	25	32	40	50	63
Acting type	Double acting						
Fluid	Air(to be filtered by 40μm filter element)						
Operating pressure	0,2~0,7MPa(28~100psi)(2,0~7,0bar)			0,15~0,7MPa(22~100psi)(1,5~7,0bar)			
Temperature °C	-20~70						
Lubrication	Not required						
Repeatability mm	±0,01						
Max. frequency	120(c.p.m)			60(c.p.m)			
Sensor switches	CMSH\DMSH\EMSH [Note]						
Port size	M3×0,5			M5×0,8			

[Note] Sensor switch should be ordered additionally, please refer to P362 for detail of sensor switch.

Symbol



Product feature

1. Cuniform block is adopted in the interior of the air gripper to afford larger gripper force.
2. The bumper is adopted in the front of piston, which can reduce the noise of metal bump.
3. A positioning hole is attached to the bottom of the body, which can improve the precision and the consistency of repeated dismounting and positioning.
4. Precision repeating snatch which adopted roboticized equipment.
5. Kinds of series and styles for you to choice which snatch multiform workpiece.

Ordering code

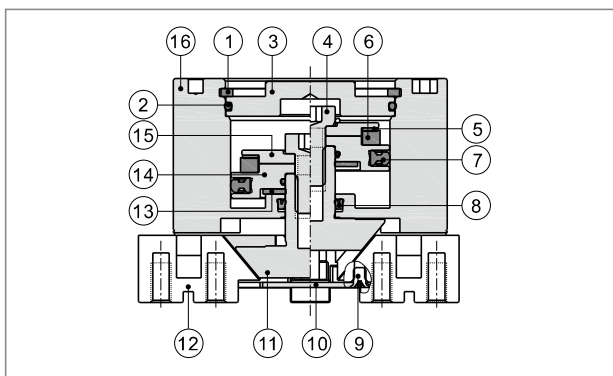
HFC Y 20



① Model	② Finger type			③ Bore size
HFC: Air finger (Double acting, parallel type)	I: Two grippers	Y: Three grippers	X: Four grippers	16
				20
				25
				32
				40
			50	
			63	

Note: HFC series are all attached with magnet.

Inner structure and material of major parts



NO.	Item	Material
1	C clip	Spring steel
2	O-ring	NBR
3	Back cover	Aluminum alloy
4	Screw	Carbon steel
5	Magnet washer	NBR
6	Magnet	Sintered metal(Neodymium-iron-boron)
7	Piston seal	NBR
8	Rod packing	NBR
9	Countersink screw	Stainless steel
10	Cover blank	Stainless steel
11	Piston rod	Stainless steel
12	Gripper	Stainless steel
13	Bumper	TPU
14	Piston	Aluminum alloy
15	Magnet holder	Aluminum alloy
16	Body	Aluminum alloy

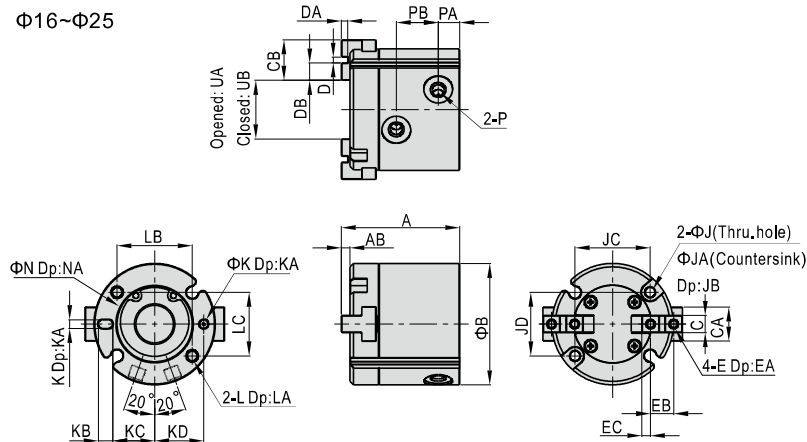
Air gripper(parallel open/close style)

HFC Series

Dimensions

Two grippers

Φ16~Φ25

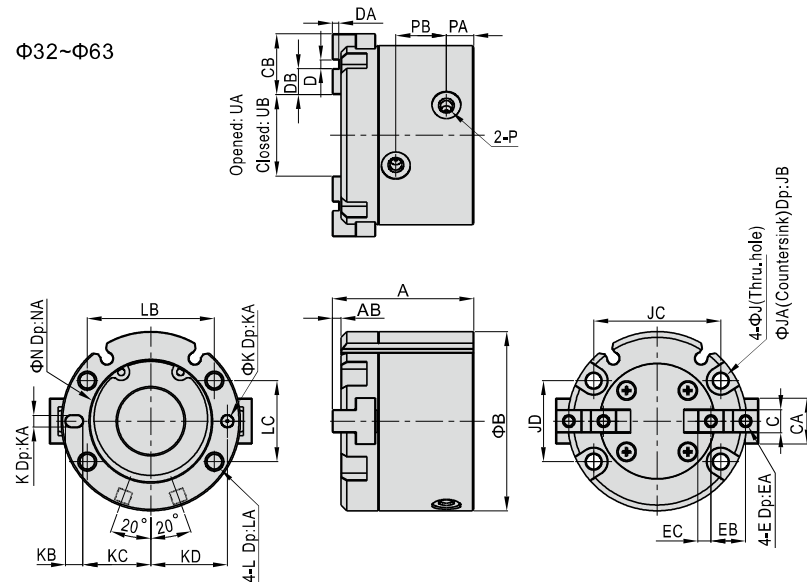


Model/Item	A	AB	B	C	CA	CB	D	DA	DB	E	EA
HFCI16	35	3	30	$5_{-0.03}^{+0.01}$	8	10	$2_{+0.01}^{+0.04}$	$2_{+0.01}^{+0.2}$	4	M3×0.5	5
HFCI20	39	3	36	$6_{-0.03}^{+0.01}$	10	12	$2_{+0.01}^{+0.04}$	$2_{+0.01}^{+0.2}$	5	M3×0.5	5
HFCI25	41	3	42	$6_{-0.03}^{+0.01}$	12	14	$2_{+0.01}^{+0.04}$	$2_{+0.01}^{+0.2}$	6	M3×0.5	5

Model/Item	EB	EC	J	JA	JB	JC	JD	K	KA	KB	KC	KD
HFCI16	6	2	3.4	6	6	18	16	$2_{+0.01}^{+0.04}$	2	3	11	12.5
HFCI20	7	2.5	3.4	6	6	24	18	$2_{+0.01}^{+0.04}$	2	3	13	14.5
HFCI25	8	3	3.4	6	6	26	22	$3_{+0.01}^{+0.04}$	3	5	14.5	17

Model/Item	L	LA	LB	LC	N	NA	P	PA	PB	UA	UB
HFCI16	M4×0.7	8	18	16	$17_{+0.05}^{+0.05}$	1.5	M3×0.5	7	10	14	10
HFCI20	M4×0.7	8	24	18	$21_{+0.05}^{+0.05}$	1.5	M5×0.8	7	13	16	12
HFCI25	M4×0.7	8	26	22	$26_{+0.05}^{+0.05}$	1.5	M5×0.8	7.5	14.5	20	14

Φ32~Φ63

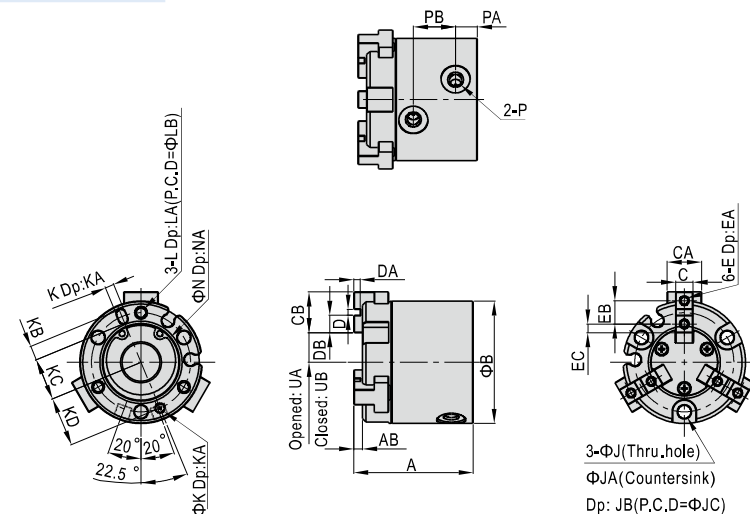


Model/Item	A	AB	B	C	CA	CB	D	DA	DB	E	EA
HFCI32	45	3	55	$8_{-0.03}^{+0.01}$	14	20	$2_{+0.01}^{+0.04}$	$2_{+0.01}^{+0.2}$	9	M4×0.7	8
HFCI40	49	3	62	$8_{-0.03}^{+0.01}$	16	21	$3_{+0.01}^{+0.04}$	$2_{+0.01}^{+0.2}$	9	M4×0.7	8
HFCI50	57	3	70	$10_{-0.03}^{+0.01}$	18	24	$4_{+0.01}^{+0.04}$	$2_{+0.01}^{+0.2}$	10	M5×0.8	9
HFCI63	68	4	86	$12_{-0.03}^{+0.01}$	24	28	$6_{+0.01}^{+0.04}$	$3_{+0.01}^{+0.2}$	11	M5×0.8	9

Model/Item	EB	EC	J	JA	JB	JC	JD	K	KA	KB	KC	KD
HFCI32	11	4.5	4.2	8	9	38	25	$3_{+0.01}^{+0.04}$	3	5	20.5	23
HFCI40	12	4.5	5.2	9.5	9	44	28	$4_{+0.01}^{+0.04}$	4	6	23.5	26.5
HFCI50	14	5	5.2	9.5	12	52	34	$4_{+0.01}^{+0.04}$	4	6	28	31
HFCI63	17	5.5	5.2	9.5	14	66	38	$5_{+0.01}^{+0.04}$	5	7	34.5	38

Model/Item	L	LA	LB	LC	N	NA	P	PA	PB	UA	UB
HFCI32	M5×0.8	10	38	25	$34_{+0.05}^{+0.05}$	2	M5×0.8	8.5	16	24	16
HFCI40	M6×1.0	12	44	28	$42_{+0.05}^{+0.05}$	2	M5×0.8	9.5	17.5	28	20
HFCI50	M6×1.0	12	52	34	$52_{+0.05}^{+0.05}$	2	M5×0.8	9.5	21	34	22
HFCI63	M6×1.0	12	66	38	$65_{+0.05}^{+0.05}$	2.5	M5×0.8	12	24	46	30

Three grippers



Model/Item	A	AB	B	C	CA	CB	D	DA	DB	E	EA
HFCY16	35	3	30	$5_{-0.03}^{+0.01}$	8	10	$2_{+0.01}^{+0.04}$	$2_{+0.01}^{+0.2}$	4	M3×0.5	5
HFCY20	39	3	36	$6_{-0.03}^{+0.01}$	10	12	$2_{+0.01}^{+0.04}$	$2_{+0.01}^{+0.2}$	5	M3×0.5	5
HFCY25	41	3	42	$6_{-0.03}^{+0.01}$	12	14	$2_{+0.01}^{+0.04}$	$2_{+0.01}^{+0.2}$	6	M3×0.5	5
HFCY32	45	3	52	$8_{-0.03}^{+0.01}$	14	20	$2_{+0.01}^{+0.04}$	$2_{+0.01}^{+0.2}$	9	M4×0.7	8
HFCY40	49	3	62	$8_{-0.03}^{+0.01}$	16	21	$3_{+0.01}^{+0.04}$	$2_{+0.01}^{+0.2}$	9	M4×0.7	8
HFCY50	57	3	70	$10_{-0.03}^{+0.01}$	18	24	$4_{+0.01}^{+0.04}$	$2_{+0.01}^{+0.2}$	10	M5×0.8	9
HFCY63	68	4	86	$12_{-0.03}^{+0.01}$	24	28	$6_{+0.01}^{+0.04}$	$3_{+0.01}^{+0.2}$	11	M5×0.8	9

Model/Item	EB	EC	J	JA	JB	JC	K	KA	KB	KC	KD	L
HFCY16	6	2	3.4	6	6	25	$2_{+0.01}^{+0.04}$	2	3	11	12.5	M3×0.5
HFCY20	7	2.5	3.4	6	6	29	$2_{+0.01}^{+0.04}$	2	3	13	14.5	M3×0.5
HFCY25	8	3	4.5	8	9	34	$3_{+0.01}^{+0.04}$	3	5	14.5	17	M4×0.7
HFCY32	11	4.5	4.5	8	9	44	$3_{+0.01}^{+0.04}$	3	5	19.5	22	M4×0.7
HFCY40	12	4.5	5.5	9.5	9	53	$4_{+0.01}^{+0.04}$	4	6	23.5	26.5	M5×0.8
HFCY50	14	5	5.5	9.5	12	62	$4_{+0.01}^{+0.04}$	4	6	28	31	M5×0.8
HFCY63	17	5.5	6.6	11	14	76	$5_{+0.01}^{+0.04}$	5	7	34.5	38	M6×1.0

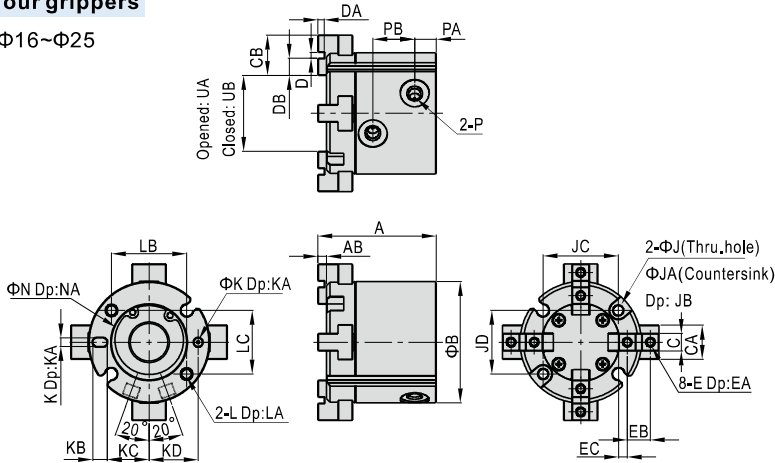
Model/Item	LA	LB	N	NA	P	PA	PB	UA	UB
HFCY16	6	25	$17_{+0.05}^{+0.05}$	1.5	M3×0.5	7	10	7	5
HFCY20	6	29	$21_{+0.05}^{+0.05}$	1.5	M5×0.8	7	13	8	6
HFCY25	8	34	$26_{+0.05}^{+0.05}$	1.5	M5×0.8	7.5	14.5	10	7
HFCY32	8	44	$34_{+0.05}^{+0.05}$	2	M5×0.8	8.5	16	12	8
HFCY40	10	53	$42_{+0.05}^{+0.05}$	2	M5×0.8	9.5	17.5	14	10
HFCY50	10	62	$52_{+0.05}^{+0.05}$	2	M5×0.8	9.5	21	17	11
HFCY63	12	76	$65_{+0.05}^{+0.05}$	2.5	M5×0.8	12	24	23	15

Air gripper(parallel open/close style)

HFC Series

Four grippers

Φ16~Φ25

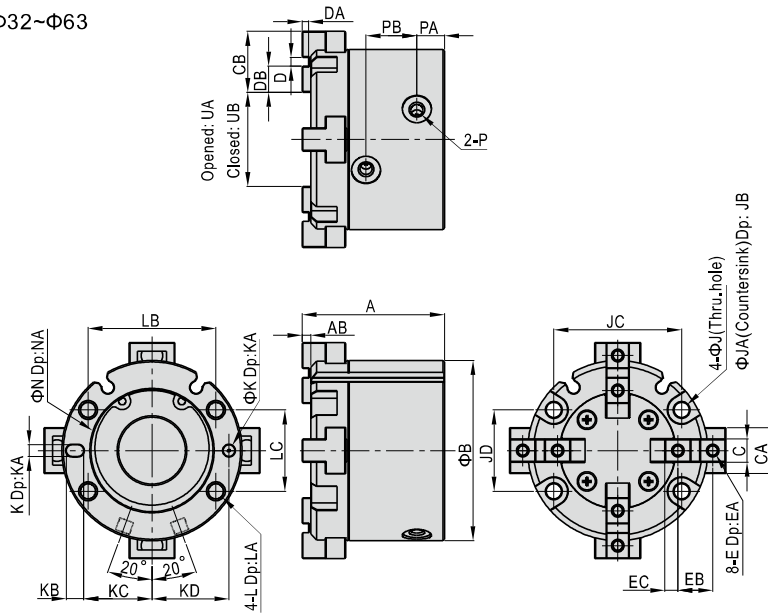


Model\Item	A	AB	B	C	CA	CB	D	DA	DB	E	EA
HFCX16	35	3	30	5 ^{-0.01} _{-0.03}	8	10	2 ^{+0.04} _{-0.01}	2 ^{+0.2} ₀	4	M3×0.5	5
HFCX20	39	3	36	6 ^{-0.01} _{-0.03}	10	12	2 ^{+0.04} _{-0.01}	2 ^{+0.2} ₀	5	M3×0.5	5
HFCX25	41	3	42	6 ^{-0.01} _{-0.03}	12	14	2 ^{+0.04} _{-0.01}	2 ^{+0.2} ₀	6	M3×0.5	5

Model\Item	EB	EC	J	JA	JB	JC	JD	K	KA	KB	KC	KD
HFCX16	6	2	3.4	6	6	18	16	2 ^{+0.05} ₀	2	3	11	12.5
HFCX20	7	2.5	3.4	6	6	24	18	2 ^{+0.05} ₀	2	3	13	14.5
HFCX25	8	3	3.4	6	6	26	22	3 ^{+0.05} ₀	3	5	14.5	17

Model\Item	L	LA	LB	LC	N	NA	P	PA	PB	UA	UB
HFCX16	M4×0.7	8	18	16	17 ^{+0.05} ₀	1.5	M3×0.5	7	10	17	13
HFCX20	M4×0.7	8	24	18	21 ^{+0.05} ₀	1.5	M5×0.8	7	13	19	15
HFCX25	M4×0.7	8	26	22	26 ^{+0.05} ₀	1.5	M5×0.8	7.5	14.5	26	20

Φ32~Φ63



Model\Item	A	AB	B	C	CA	CB	D	DA	DB	E	EA
HFCX32	45	3	55	8 ^{-0.01} _{-0.03}	14	20	2 ^{+0.04} _{-0.01}	2 ^{+0.2} ₀	9	M4×0.7	8
HFCX40	49	3	62	8 ^{-0.01} _{-0.03}	16	21	3 ^{+0.04} _{-0.01}	2 ^{+0.2} ₀	9	M4×0.7	8
HFCX50	57	3	70	10 ^{-0.01} _{-0.03}	18	24	4 ^{+0.04} _{-0.01}	2 ^{+0.2} ₀	10	M5×0.8	9
HFCX63	68	4	86	12 ^{-0.01} _{-0.03}	24	28	6 ^{+0.04} _{-0.01}	3 ^{+0.2} ₀	11	M5×0.8	9

Model\Item	EB	EC	J	JA	JB	JC	JD	K	KA	KB	KC	KD
HFCX32	11	4.5	4.2	8	9	38	25	3 ^{+0.04} _{-0.01}	3	5	20.5	23
HFCX40	12	4.5	5.2	9.5	9	44	28	4 ^{+0.04} _{-0.01}	4	6	23.5	26.5
HFCX50	14	5	5.2	9.5	12	52	34	4 ^{+0.04} _{-0.01}	4	6	28	31
HFCX63	17	5.5	5.2	9.5	14	66	38	5 ^{+0.04} _{-0.01}	5	7	34.5	38

Model\Item	L	LA	LB	LC	N	NA	P	PA	PB	UA	UB
HFCX32	M5×0.8	10	38	25	34 ^{+0.05} ₀	2	M5×0.8	8.5	16	28	20
HFCX40	M6×1.0	12	44	28	42 ^{+0.05} ₀	2	M5×0.8	9.5	17.5	32	24
HFCX50	M6×1.0	12	52	34	52 ^{+0.05} ₀	2	M5×0.8	9.5	21	38	26
HFCX63	M6×1.0	12	66	38	65 ^{+0.05} ₀	2.5	M5×0.8	12	24	51	36

How to select product

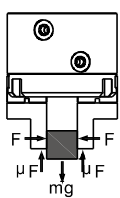
Please select pneumatic finger according to the following steps:

① The selection of the effective gripping force

② the confirmation of the gripping point

1. The selection of the gripping force

The gripping work-pieces shown below, on the impact condition of ordinary handling state, taking safety coefficient a=4, have a gripping force that is more than 10-20 times of the mass of the gripped objects.



The work-pieces as shown in the left :

n: number of gripper
 F: Gripping force (N)
 μ: friction coefficient between fittings and work-pieces.
 m: mass of work-pieces
 g: acceleration of gravity (=9.8m/s²)

The condition that the work-pieces won't drop is: $n \times \mu F > mg$

$$\text{so: } F > \frac{mg}{n \times \mu}$$

Safety coefficient is a, so F is:

$$F = \frac{mg}{n \times \mu} \times a$$

μ=0.2

$$F = \frac{mg}{2 \times 0.2} \times 4 = 10 \times mg$$

10 times of the mass of the gripped objects

μ=0.1

$$F = \frac{mg}{2 \times 0.1} \times 4 = 20 \times mg$$

20 times of the mass of the gripped objects

Note) If the friction coefficient μ > 0.2, for safety, please also select clamping force according to the principle of 10~20 times of the mass of the clamped objects. As for large acceleration and shock, it requires for greater safety coefficient.

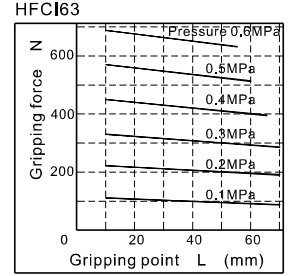
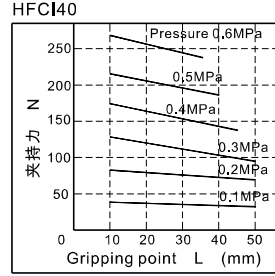
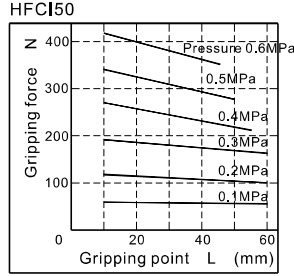
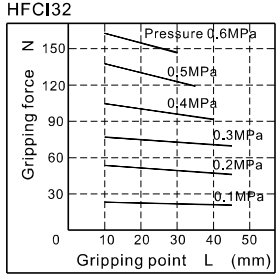
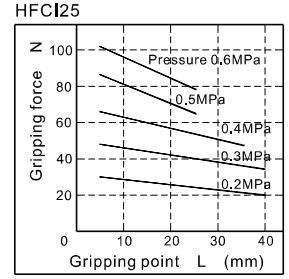
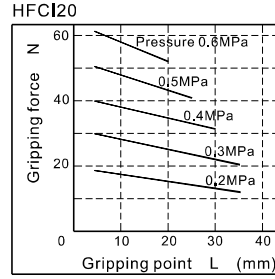
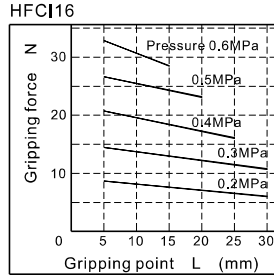
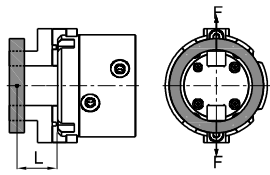
1.1) The actual gripping force must be within the effective gripping forces of different pneumatic fingers specifications shown in the below chart.



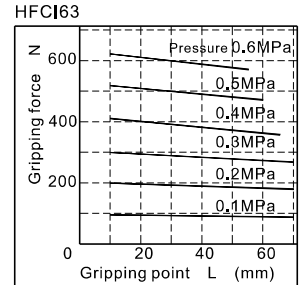
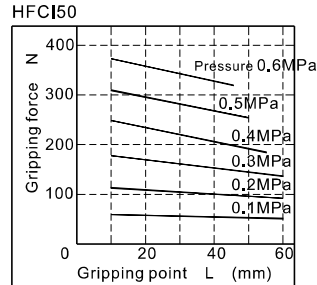
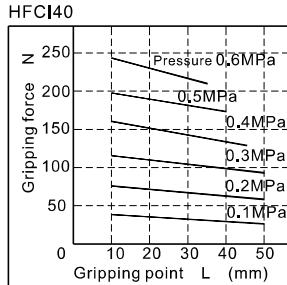
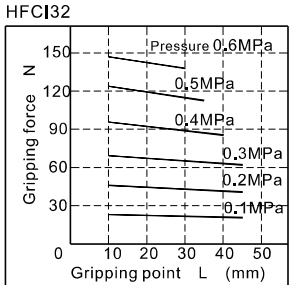
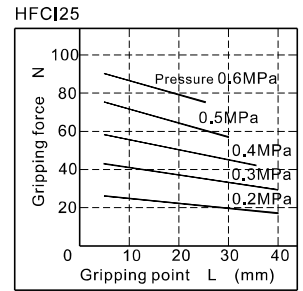
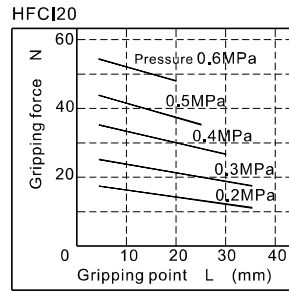
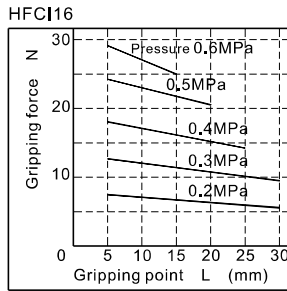
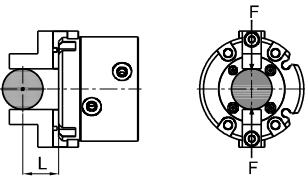
Air gripper(parallel open/close style)

HFC Series

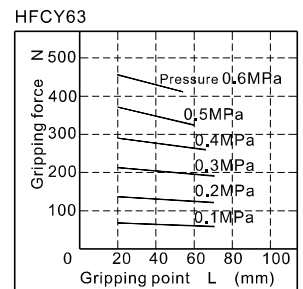
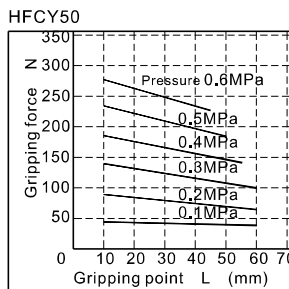
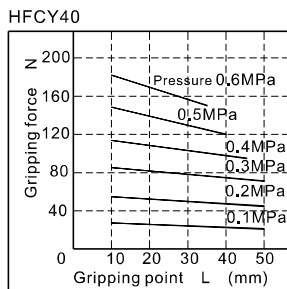
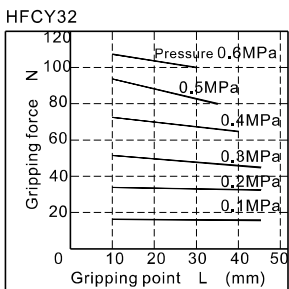
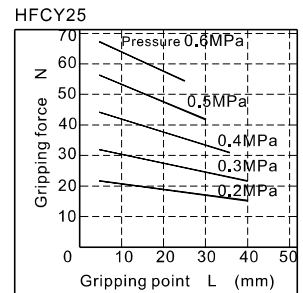
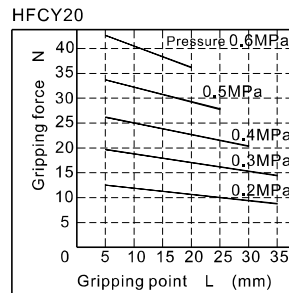
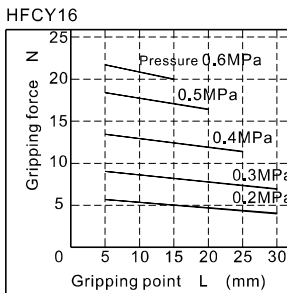
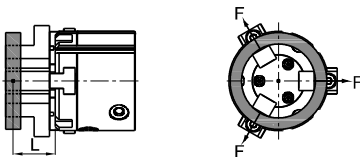
Opened gripping force(I Type)



Closed gripping force(I Type)



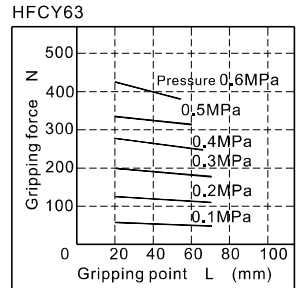
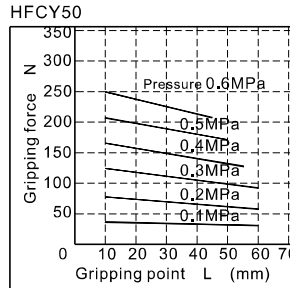
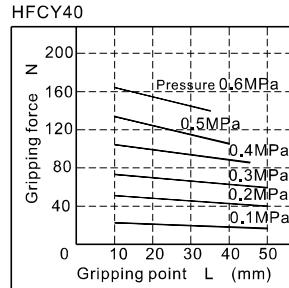
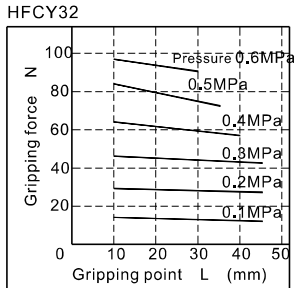
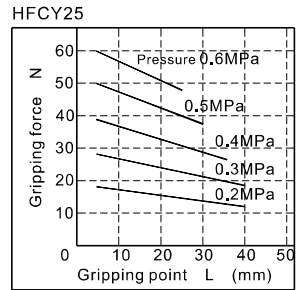
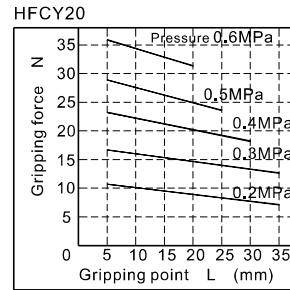
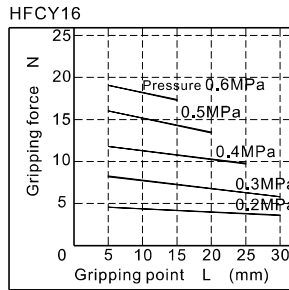
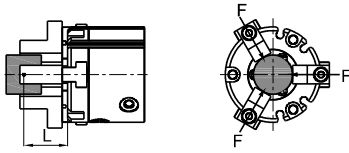
Opened gripping force(Y Type)



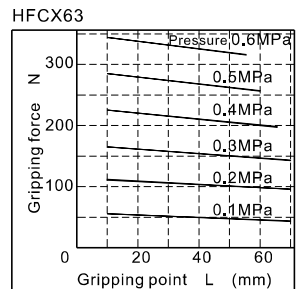
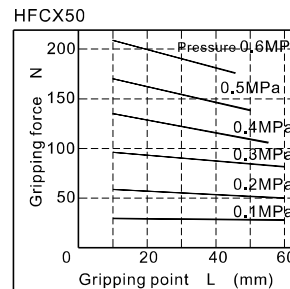
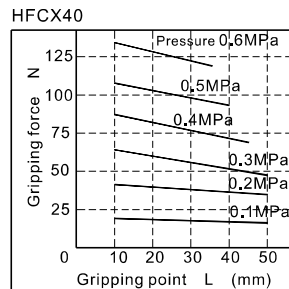
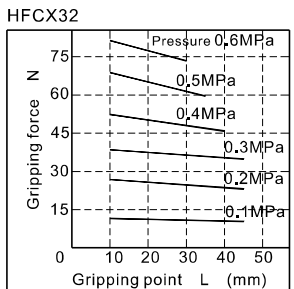
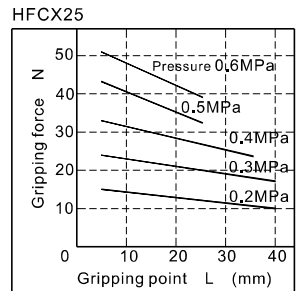
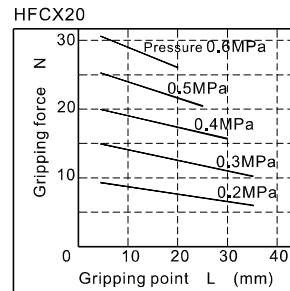
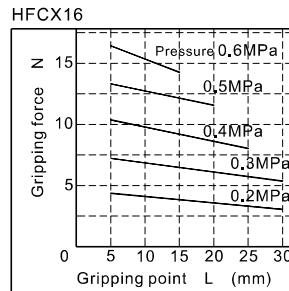
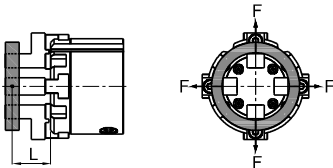
Air gripper(parallel open/close style)

HFC Series

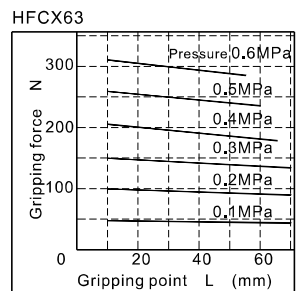
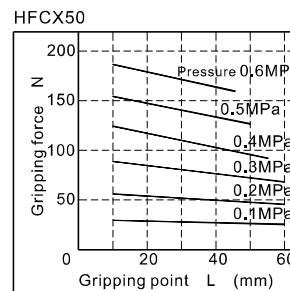
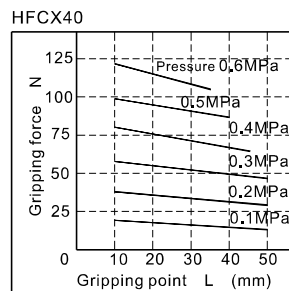
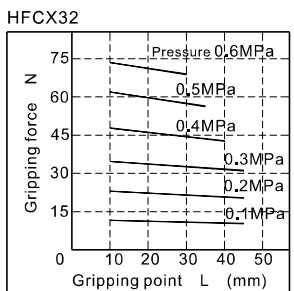
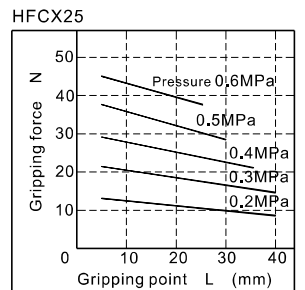
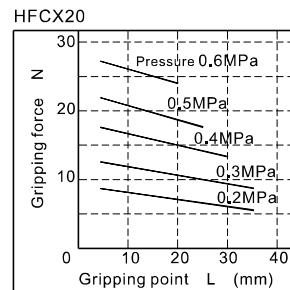
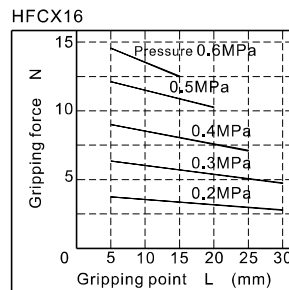
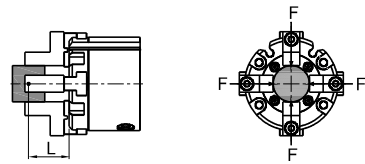
Closed gripping force(Y Type)



Opened gripping force(X Type)



Closed gripping force(X Type)

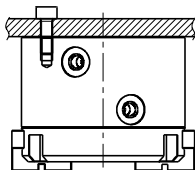


HFC Series

Installation and application

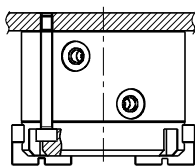
1. Due to the abrupt changes, the circuit pressure is low, which will lead to the decrease of the gripping force and falling of the work-pieces. In order to avoid the harm to the human body and damage to the equipment, anti-dropping device must be equipped.
2. Don't use the air gripper under strong external force and impact force.
3. When install and fix the air gripper, avoid falling down, collision and damage.
4. When fixing the gripping jaw parts, don't twist the gripping jaw.
5. There are several kinds of installation method, and the locking torque of fastening screw must be within the prescribed torque range shown in the below chart. If the locking torque is too large, it will cause the dysfunctional. If the locking torque is too small, it will cause the position deviation and fall.

Tail installation type



Model	Bore size	The bolts type	Max. locking moment(Nm)	Max. screwed depth(mm)	The aperture of the positioning bore(mm)	The depth of the positioning bore(mm)
HFCI HFCX	16	M4×0.7	2.1	8	Φ17 ^{+0.05} ₀	1.5
	20	M4×0.7	2.1	8	Φ21 ^{+0.05} ₀	1.5
	25	M4×0.7	2.1	8	Φ26 ^{+0.05} ₀	1.5
	32	M5×0.8	4.3	10	Φ34 ^{+0.05} ₀	2
	40	M6×1.0	7.3	12	Φ42 ^{+0.05} ₀	2
	50	M6×1.0	7.3	12	Φ52 ^{+0.05} ₀	2
HFCY	63	M6×1.0	7.3	12	Φ65 ^{+0.05} ₀	2.5
	16	M3×0.5	0.88	6	Φ17 ^{+0.05} ₀	1.5
	20	M3×0.5	0.88	6	Φ21 ^{+0.05} ₀	1.5
	25	M4×0.7	2.1	8	Φ26 ^{+0.05} ₀	1.5
	32	M4×0.7	2.1	8	Φ34 ^{+0.05} ₀	2
	40	M5×0.8	4.3	10	Φ42 ^{+0.05} ₀	2
50	M5×0.8	4.3	10	Φ52 ^{+0.05} ₀	2	
63	M6×1.0	7.3	12	Φ65 ^{+0.05} ₀	2.5	

The installation of the front through hole

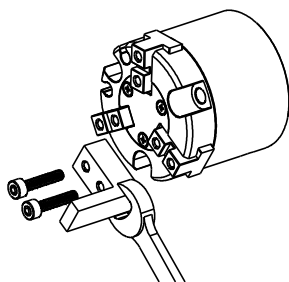


Model	Bore size	The bolts type	Max. locking moment(Nm)
HFCI HFCX	16	M3×0.5	0.88
	20	M3×0.5	0.88
	25	M3×0.5	0.88
	32	M4×0.7	2.1
	40	M5×0.8	4.3
	50	M5×0.8	4.3
HFCY	63	M5×0.8	4.3
	16	M3×0.5	0.88
	20	M3×0.5	0.88
	25	M4×0.7	2.1
	32	M4×0.7	2.1
	40	M5×0.8	4.3
50	M5×0.8	4.3	
63	M6×1.0	7.3	

6. The installation method of the gripping jaw fittings

When install the gripping jaw fittings, you have to pay particular attention that you can only hold the gripping jaw by using spanner, and then lock the screws with allen wrench. Never clamp the body directly and then lock the screws, otherwise the parts will be easily damaged.

Install the gripping jaw fittings

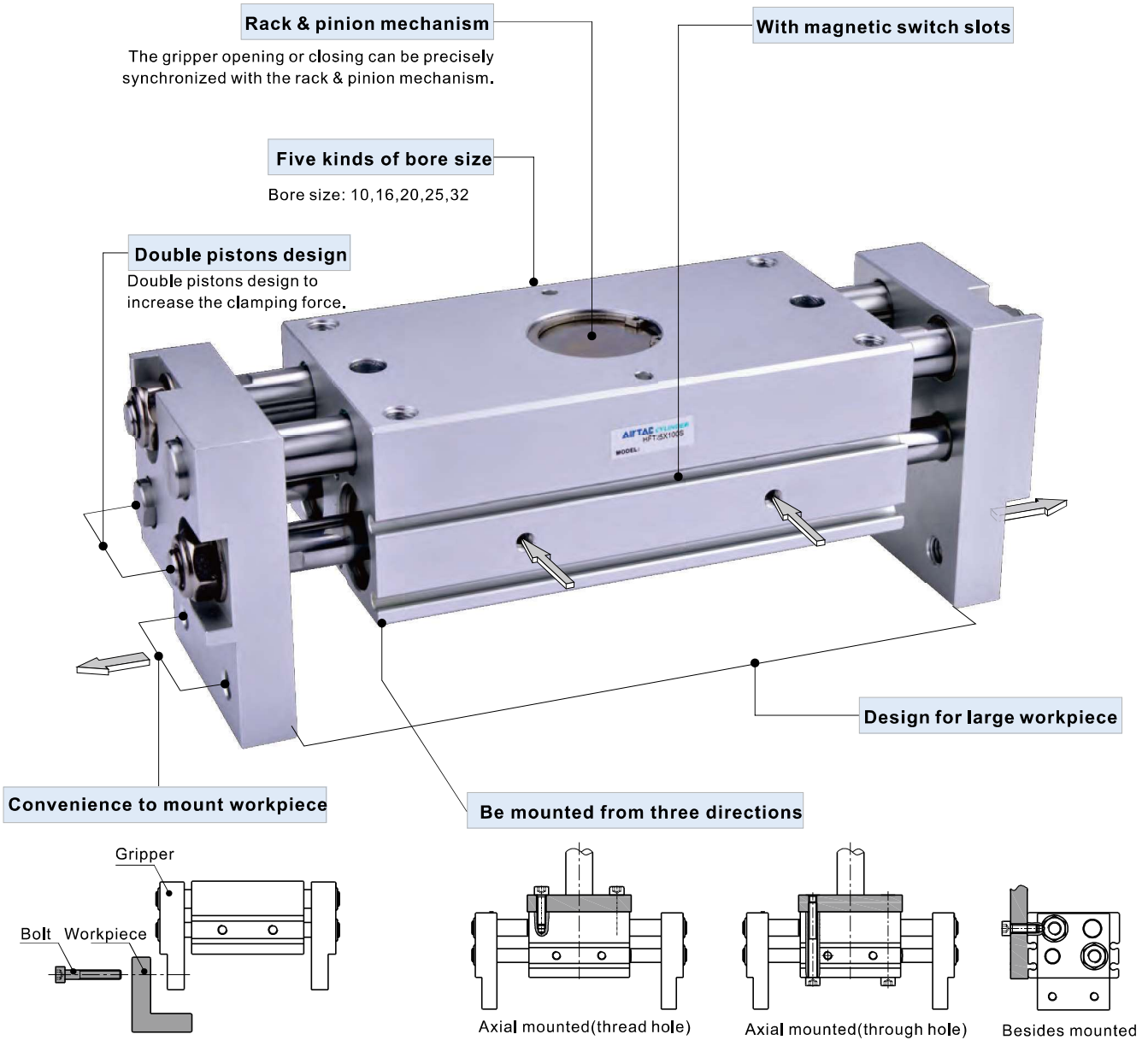


Bore size	The bolts type	Max. locking moment(Nm)
16	M3×0.5	0.59
20	M3×0.5	0.59
25	M3×0.5	0.59
32	M4×0.7	1.4
40	M4×0.7	1.4
50	M5×0.8	2.8
63	M5×0.8	2.8



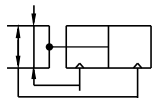
Wide air gripper—HFT Series

Compendium of HFT Series





Symbol



Product feature

1. Design for large workpiece.
2. Double pistons design to increase the clamping force.
3. Magnet is included in the standard configuration.
4. The gripper opening or closing can be precisely synchronized with the rack & pinion mechanism.

Specification

Bore size (mm)	10	16	20	25	32
Acting type	Double acting				
Fluid	Air(to be filtered by 40µm filter element)				
Operating pressure	0.25~0.7MPa(35~100psi)		0.15~0.7MPa(22~100psi)		
Proof pressure	1.2MPa(175psi)				
Temperature	-20~70°C				
Lubrication	Cylinder : No necessary				
Cushion type	Bumper				
Repeatability	±0.1mm				
Gripping force (N)[Note1]	14	45	74	131	228
Max. frequency	40 cycle/minute				20 cycle/minute
Port size	M5×0.8 1/8"				

[Note1] Pressure 0.5MPa and gripping length 40mm(∅10 ~ ∅25) or 80mm(∅32).
Add) Refer to P362 for detail of sensor switch.

Stroke

Bore size (mm)	Standard stroke (mm)	Max. stroke (mm)
10	20 30 40 60	60
16	30 40 60 80	80
20	40 60 80 100	100
25	40 60 80 100	100
32	60 80 100 150	150

[Note] Consult us for non-standard stroke.

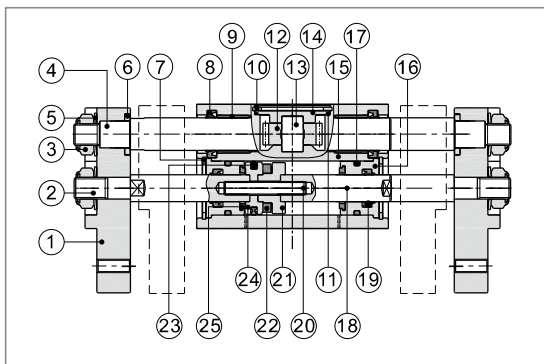
Ordering code

HFT 10 × 20 S □

① ② ③ ④ ⑤

① Model	② Bore size	③ Stroke	④ Magnet	⑤ Thread type
HFT: Wide air gripper (Double acting)	10	20 30 40 60	S: With magnet	No this code Blank: PT G: G T: NPT
	16	30 40 60 80		
	20	40 60 80 100		
	25	40 60 80 100		
	32	60 80 100 150		

Inner structure and material of major parts



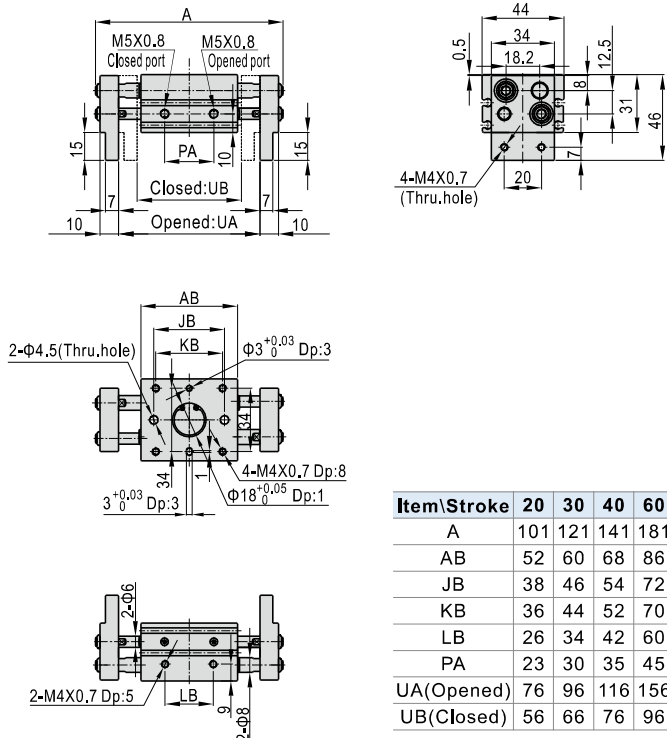
NO.	Item	Material	NO.	Item	Material
1	Faceplate	Aluminum alloy	14	Gear cover	Carbon steel
2	Piston rod A	Stainless steel	15	Body	Aluminum alloy
3	Locknut	Carbon steel	16	Front cover	Aluminum alloy
4	Leader	Stainless steel	17	O-ring	NBR
5	Washer	Spring steel	18	Piston rod B	Stainless steel
6	Gasket	Carbon steel	19	O-ring	NBR
7	C clip	Spring steel	20	Joint bolt	Stainless steel
8	Dustproof ring	TPU	21	Magnet seat	Brass/Aluminum alloy
9	Bearing	Wear resistant material	22	Magnet	Sintered metal (Neodymium-iron-boron)
10	C clip	Spring steel	23	Piston O-ring	NBR
11	O-ring	NBR	24	Piston	Brass/Aluminum alloy
12	Gear	Chrome molybdenum steel	25	Bumper	TPU
13	Gear axes	Bearing steel			

Air gripper(wide style)

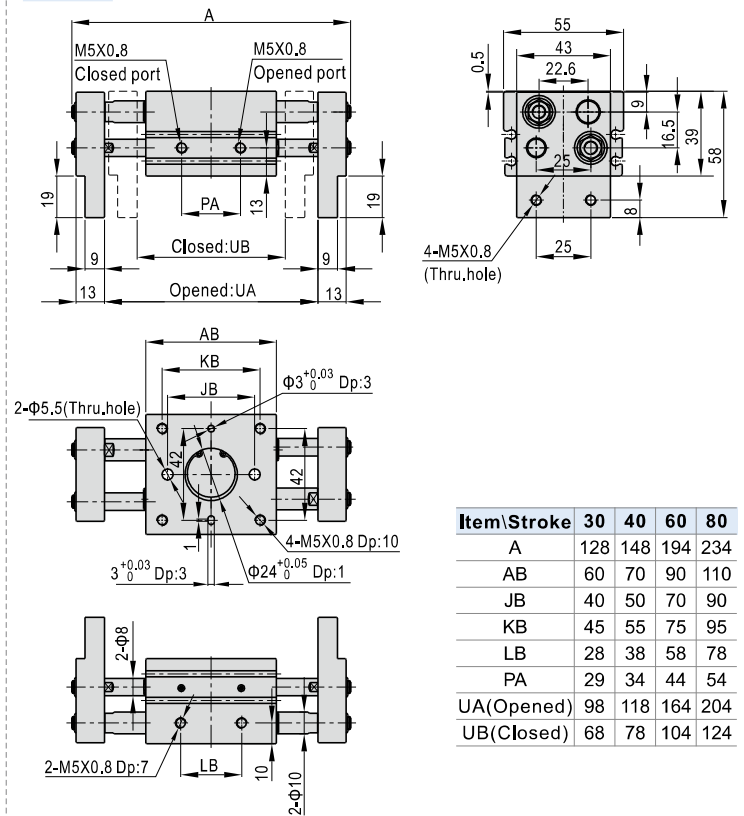
HFT Series

Dimensions

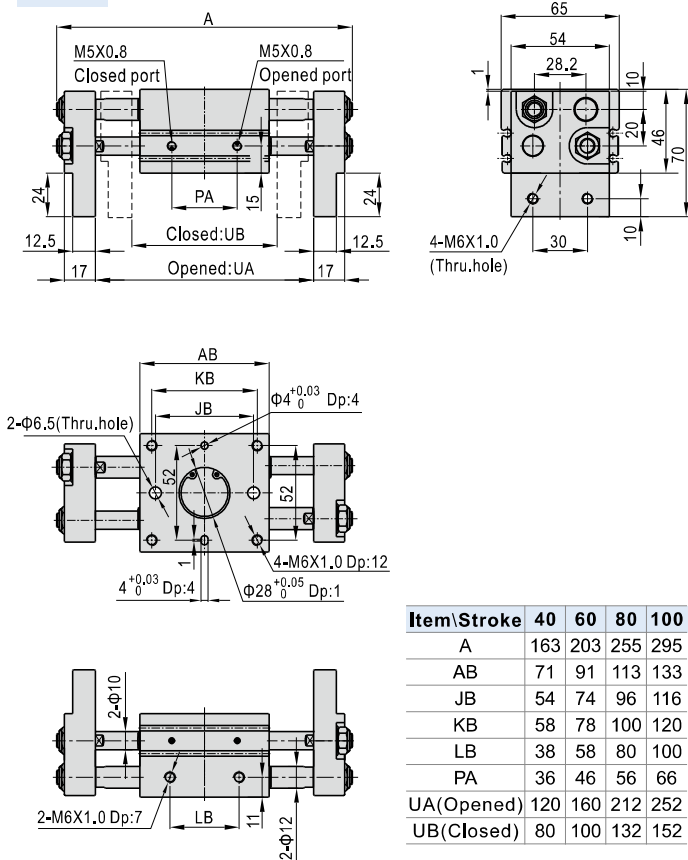
HFT10



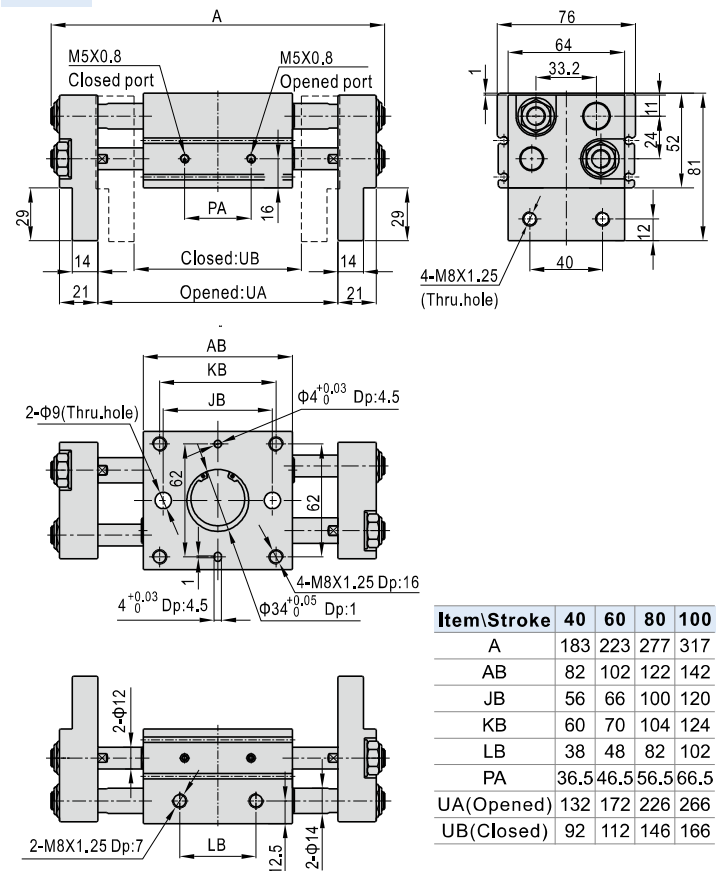
HFT16



HFT20

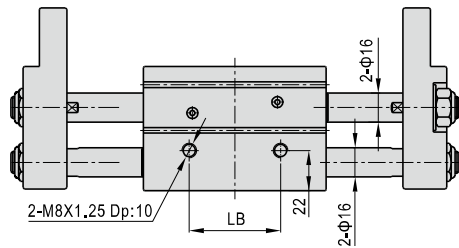
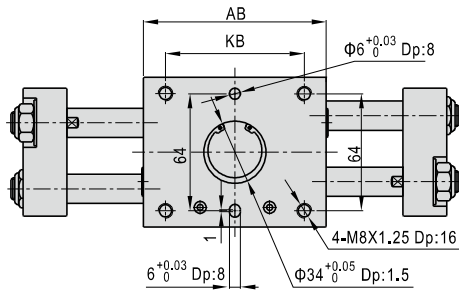
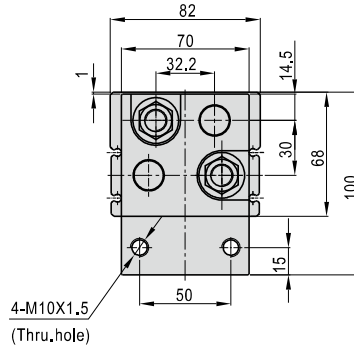
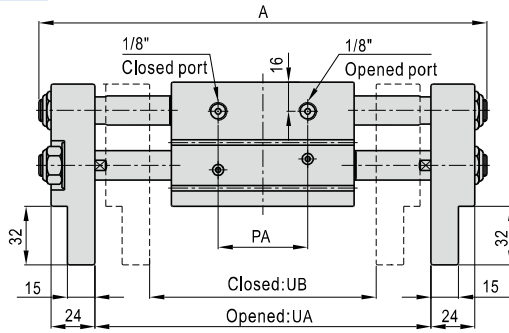


HFT25



HFT Series

HFT32



Item\Stroke	A	AB	KB	LB	PA	UA(Opened)	UB(Closed)
60	245	100	76	50	48	184	124
80	285	120	86	60	58	224	144
100	343	158	134	108	68	282	182
150	443	208	184	158	93	382	232

How to select product

1. Please select pneumatic finger according to the following steps:

Confirmation of conditions

Select possible type according to the workpiece length

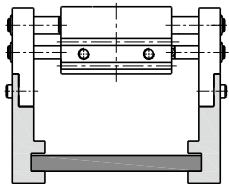
Calculation of required gripping force

Selection of model by gripping force graph

Workpiece form
Diameter x Length
200 mm x 20 mm plate

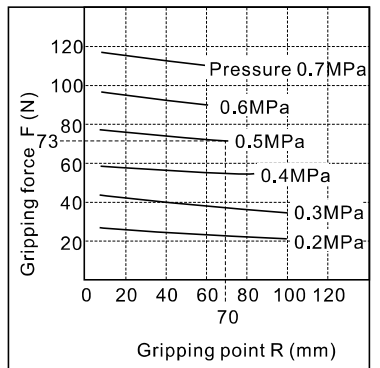
Workpiece length: From the dimensions of models that have an opening width of 200 mm or more
HFT16×80
HFT20×80/HFT20×100
HFT25×80/HFT25×100

Workpiece mass: 0.3 kg



1. Although conditions differ according to the workpiece shape and the coefficient of friction between the attachments and the workpiece, select a model that can provide a gripping force of 10 to 20 times the workpiece mass, or more.
2. Further allowance should be provided when great acceleration or impact is expected during workpiece transfer.
Example: For setting the gripping force to be at least 20 times the workpiece mass:
Required gripping force = $0.3\text{kg} \times 20 \times 9.8 \text{ m/s}^2 \approx 60 \text{ N}$

HFT20×80/HFT20×100



Gripping point R = 70 mm

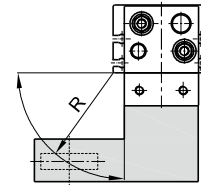
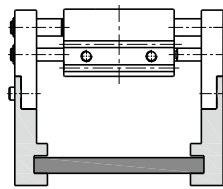
Operating pressure: 0.5 MPa

1. Selecting the HFT20×80 A gripping force of 73 N is obtained from the intersection point of gripping point position R= 70 and a pressure 0.5 MPa.
2. The gripping force is 24 times greater than the workpiece mass, and therefore satisfies a gripping force setting value of 20 times or more.

HFT Series

2. Gripping Point

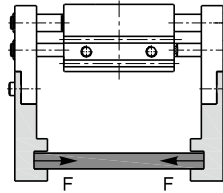
- 2.1) The workpiece gripping point distance should be within the gripping force ranges given for each pressure in the effective gripping force graphs below.
- 2.2) If operated with the workpiece gripping point beyond the indicated ranges, the load that will be applied to the fingers or the guide will become excessively unbalanced. As a result, the fingers could become loosened and adversely affect the service life of the unit.



R: Gripping position (mm)

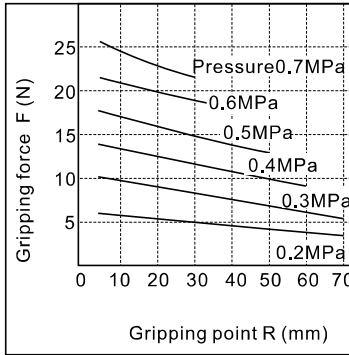
3. Effective Gripping Force

The gripping force shown in the tables represents the gripping force of one finger when all fingers and attachments are in contact with the work.

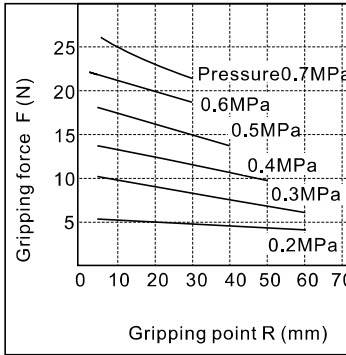


F = one finger thrust.

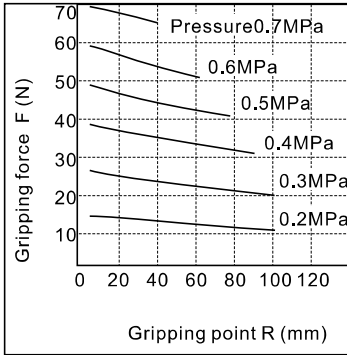
HFT10×20/HFT10×30



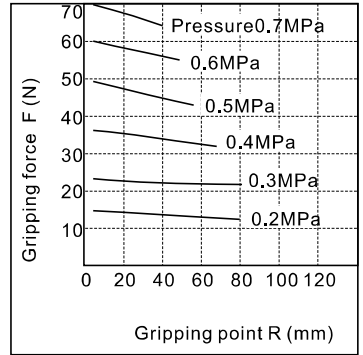
HFT10×40/HFT10×60



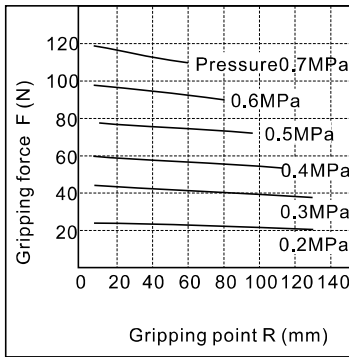
HFT16×30/HFT16×40



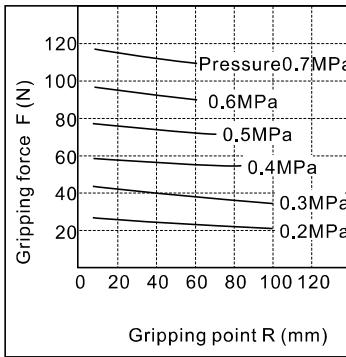
HFT16×60/HFT16×80



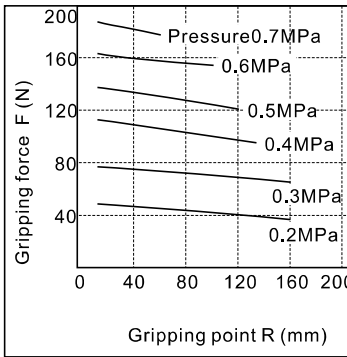
HFT20×40/HFT20×60



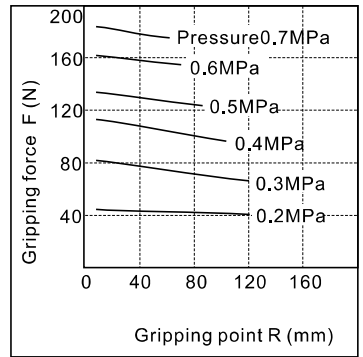
HFT20×80/HFT20×100



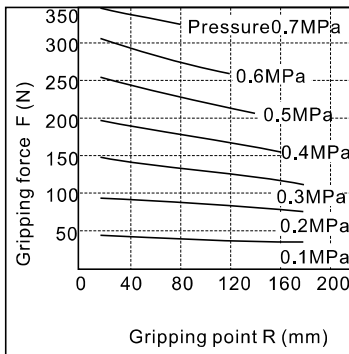
HFT25×40/HFT25×60



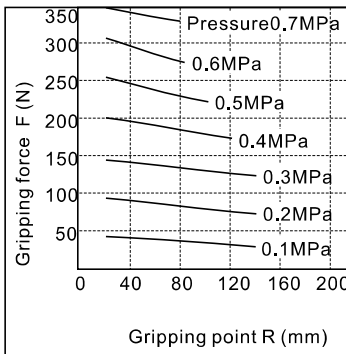
HFT25×80/HFT25×100



HFT32×60/HFT32×80

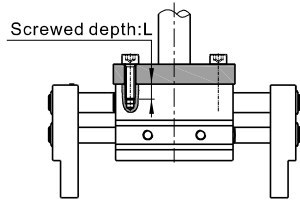


HFT32×100/HFT32×150

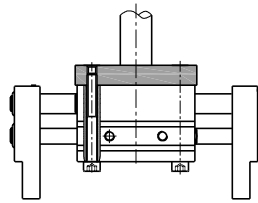


Installation and application

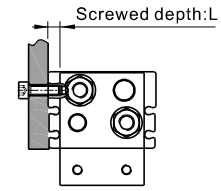
1. Due to the abrupt changes, the circuit pressure is low, which will lead to the decrease of the gripping force and falling of the work-pieces. In order to avoid the harm to the human body and damage to the equipment, anti-dropping device must be equipped.
2. Don't use the air gripper under strong external force and impact force.
3. When install and fix the air gripper, avoid falling down, collision and damage.
4. When fixing the gripping jaw parts, don't twist the gripping jaw.
5. There are several kinds of installation method, and the locking torque of fastening screw must be within the prescribed torque range shown in the below chart. If the locking torque is too large, it will cause the dysfunctional. If the locking torque is too small, it will cause the position deviation and fall.



Axial mounted(thread hole)



Axial mounted(through hole)



Besides mounted

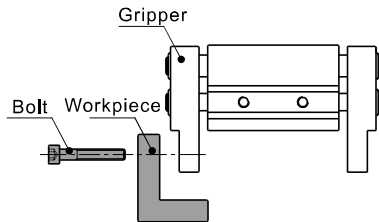
Bore size	The bolts type	Max. locking moment (Nm)	Max. screwed depth (mm)
10	M4×0.7	2.1	8
16	M5×0.8	4.3	10
20	M6×1.0	7.3	12
25	M8×1.25	17.7	16
32	M8×1.25	17.7	16

Bore size	The bolts type	Max. locking moment (Nm)
10	M4×0.7	2.1
16	M5×0.8	4.3
20	M6×1.0	7.3
25	M8×1.25	17.7
32	No Axial mounted(through hole)	

Bore size	The bolts type	Max. locking moment (Nm)	Max. screwed depth (mm)
10	M4×0.7	1.4	5
16	M5×0.8	2.8	7
20	M6×1.0	4.8	7
25	M8×1.25	12	7
32	M8×1.25	12	10

6. The installation method of the gripping jaw fittings

When install the gripping jaw fittings, you have to pay particular attention that you can only hold the gripping jaw by using spanner, and then lock the screws with allen wrench. Never clamp the body directly and then lock the screws, otherwise the parts will be easily damaged.

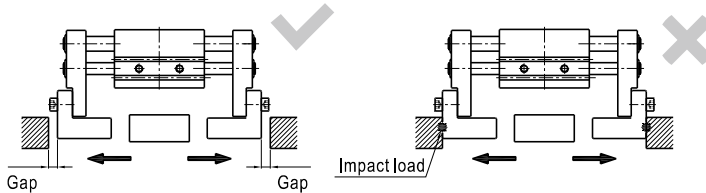


Bore size	The bolts type	Max. locking moment(Nm)
10	M4×0.7	1.4
16	M5×0.8	2.8
20	M6×1.0	4.8
25	M8×1.25	12
32	M10×1.5	24

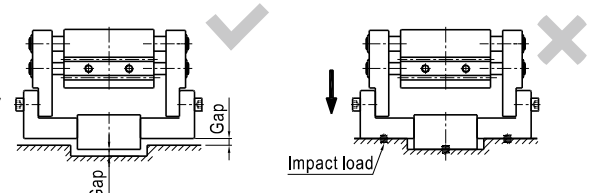
7. Confirm that there is no external forces exerted on the gripping jaw.

Transverse load acts on the gripping jaw, which will cause impact load and leads to the shaking and damage of gripping jaw. Equip with gaps so that the air gripper will not crash into work-pieces and accessories at the end of its trip.

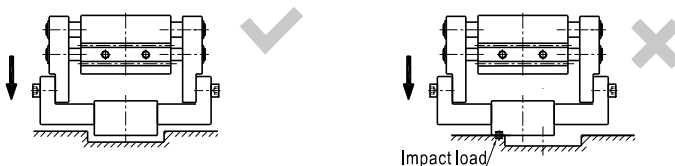
7.1) The end of stroke under the open state of air gripper



7.2) The end of stroke under the move state of air gripper



8. When the work-pieces are inserted, the center line should be coaxial, no offset, in case there are external force generated on gripping jaw. When testing, it is specially required that the manual operation should be reduced, the pressure should be used to run it at a low speed, and guarantee the safety and no impact.

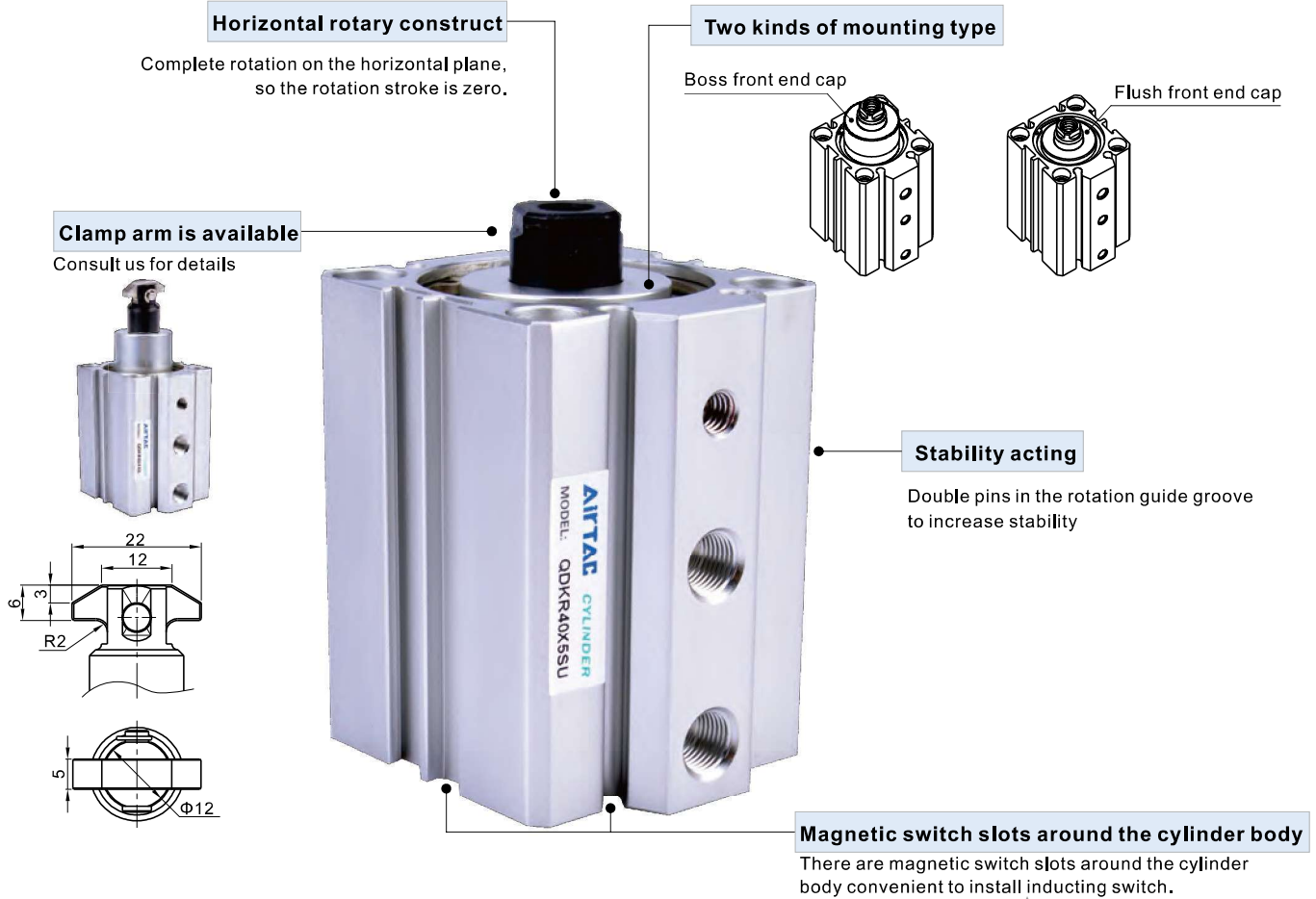


9. Please use the flow control valve to adjust the opening and closing speed of gripping jaw if too fast.
10. People can not enter the movement path of air gripper and articles can not be placed on the path too.
11. Before removing the air gripper, please confirm that it is out of working state, and then discharge of compressed air.



Horizontal rotary clamp cylinder—QDK Series

Compendium of QDK Series



Criteria for selection: Cylinder thrust

Unit: Newton(N)

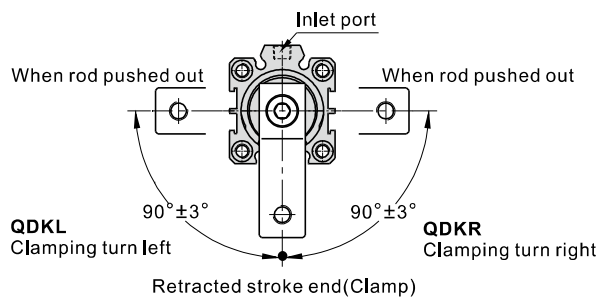
Bore size	Rod size	Acting type	Operating pressure(MPa)							
			0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8
20	12	IN(Clamp)	-	20.1	40.2	60.3	80.4	100.5	120.6	140.7
25	12	IN(Clamp)	17.7	55.5	93.3	131.1	168.9	206.7	244.5	282.3
32	12	IN(Clamp)	43.1	111.2	181.3	250.4	319.5	388.6	457.7	526.8
40	16	IN(Clamp)	75.2	180.7	286.2	391.7	497.2	602.7	708.2	813.7

Installation and application



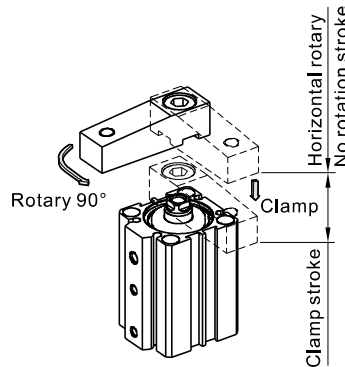
1. Dirty substances in the pipe must be eliminated before cylinder is connected with pipeline to prevent the entrance of impurities into the cylinder.
2. The medium used by cylinder shall be filtered to 40μm or below.
3. Anti-freezing measure shall be adopted under low temperature environment to prevent moisture freezing.
4. If the cylinder is dismantled and stored for a long time, please conduct anti-rust treatment to the surface. Anti-dust jam cap shall be added in air inlet and outlet ports.
5. To insure the life-span of cylinder and jig, please use flow control valve to control the speed of cylinder.

The definition of rotation direction and angle

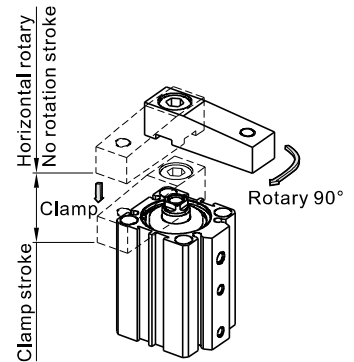


Lavorotary(QDKL):
When the piston of cylinder moves downward, the swivel arms moves anticlockwise, this is called lavorotary.

Dextrorotary(QDKR):
When the piston of cylinder moves downward, the swivel arms moves clockwise, this is called dextrorotary.



The order code is L



The order code is R



Horizontal rotary clamp cylinder

QDK Series

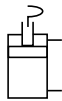


Specification

Bore size(mm)	20	25	32	40
Acting type	Double acting			
Fluid	Air(to be filtered by 40μm filter element)			
Operating pressure	0.15~1.0MPa(22~145psi)			
Proof pressure	1.5MPa(220psi)			
Temperature	-20~70°C			
Rotation angle	90°			
Repeatability	±2°			
Rotation direction	Turn left or turn right			
Rotation stroke(mm)	0(Horizontal rotary)			
Clamping stroke (mm)	5			
Cushion type	Bumper			
Port size	M5×0.8			1/8"

Add) please refer to Page 362 for the specific content of sensor switch.

Symbol



Product feature

1. Complete rotation on horizontal plane, so save more space compare with QCK series.
2. Boss front end cap and flush front end cap are available.
3. Double pins in the rotation guide groove to increase stability.
4. There are magnetic switch slots around the cylinder body convenient to install inducting switch.

Ordering code

QDK L 32 × 5 S U □

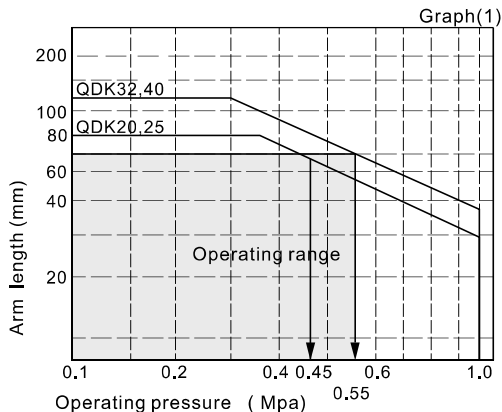
① ② ③ ④ ⑤ ⑥ ⑦

① Model	② Rotation direction	③ Bore size	④ Clamping stroke	⑤ Magnet	⑥ Front cover type	⑦ Thread type [Note1]
QDK: Horizontal rotary clamp cylinder	L: Push and turn left R: Push and turn right	20 25 32 40	5: 5mm	S: With magnet	Blank: Boss front end cap U: Flush front end cap	Blank: PT G: G

[Note1] When the thread is standard, the code is blank.

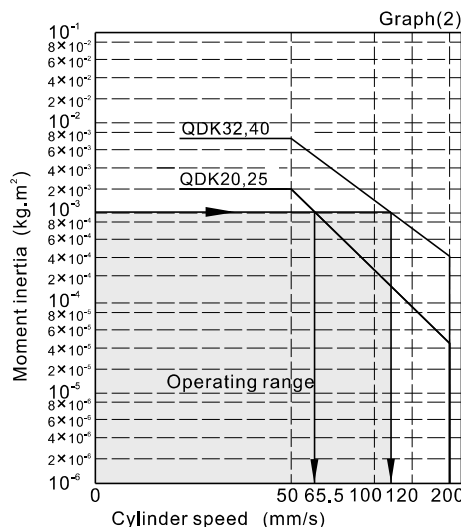
How to select product

1. When arms are to be made separately, their length and weight should be within the following range.
2. Allowable bending moment:
Use the arm length and operating pressure within graph(1) for allowable bending moment loaded piston rod.



Example: When arm length is 80mm, pressure should be less than
QDK20/25:0.45MPa
QDK32/40:0.55MPa

3. Moment of inertia:
When the arm is long and heavy, damage of internal parts may be caused due to inertia. Use the inertia moment and cylinder speed within graph(2) based on arm requirements.



Example: When arm's moment of inertia is $10^{-3} \text{Kg}\cdot\text{m}^2$, cylinder speed should be less than
QDK20/25:65.5mm/s
QDK32/40:120mm/s

Note) The average speed of piston= the highest speed of piston/1.6

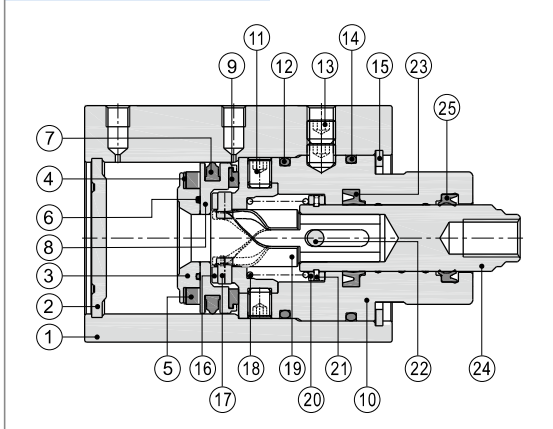


Horizontal rotary clamp cylinder

QDK Series

Inner structure and material of major parts

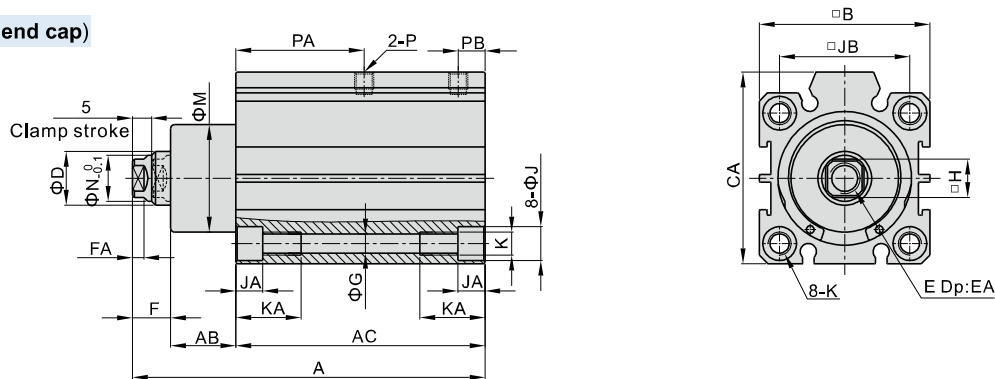
QDK(Boss front end cap)



NO.	Item	Material	NO.	Item	Material
1	Body	Aluminum alloy	13	Fixing screw	Carbon steel
2	Back cover	Aluminum alloy	14	O-ring	NBR
3	Magnet holder	Aluminum alloy	15	C clip	Spring steel
4	Magnet washer	NBR	16	Middle seat	SCr440
5	Magnet	Sintered metal (Neodymium-iron-boron)	17	Pin	SUJ2
			18	Spring	Stainless steel
6	O-ring	NBR	19	Rotary axis	Scr440
7	Piston seal	NBR	20	Stop flake	Stainless steel
8	Piston	Aluminum alloy(Φ40)/brass(Other)	21	C clip	Spring steel
9	Bumper	TPU	22	Pin	SUJ2
10	Front cover	Aluminum alloy	23	Front cover packing	NBR
11	Fixing screw	Carbon steel	24	Piston rod	Scr440
12	O-ring	NBR	25	Front cover packing	NBR

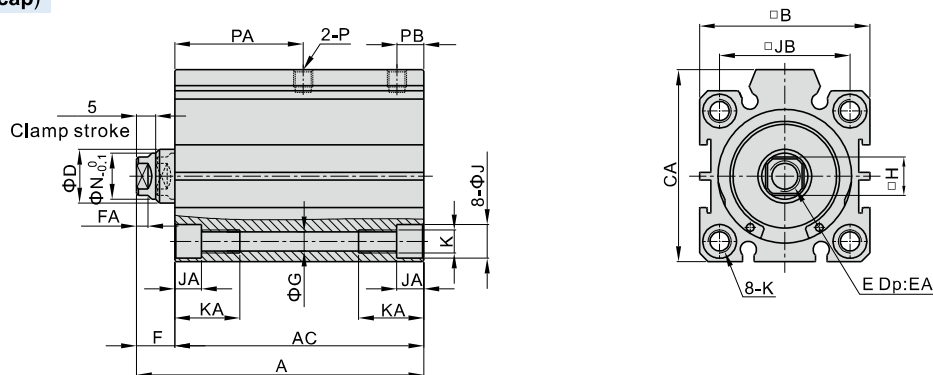
Dimensions

QDK(Boss front end cap)



Bore size\Item	A	AB	AC	B	CA	D	E	EA	F	FA	G	H	J	JA	JB	K	KA	M	N	P	PA	PB
20	86.5	16.5	60	34	-	12	M6X1.0	12	10	3	4.2	8	7.3	4.5	24	M5X0.8	14	24	10	M5X0.8	31.5	7
25	86.5	16.5	60	40	-	12	M8X1.25	12	10	3	5.2	10	9	5.5	28	M6X1.0	17	26	-	M5X0.8	31	7
32	92	17	65	44.5	50	14	M8X1.25	12	10	3	5.2	10	9	5.5	34	M6X1.0	17	28	12	M5X0.8	33.5	7
40	98	18	70	52	58.5	16	M8X1.25	12	10	3	6.8	14	10.5	6.5	40	M8X1.25	20	30	-	1/8"	35	9

QDK-J(Flush front end cap)



Bore size\Item	A	AC	B	CA	D	E	EA	F	FA	G	H	J	JA	JB	K	KA	N	P	PA	PB
20	70	60	34	-	12	M6X1.0	7.5	10	3	4.2	8	7.3	4.5	24	M5X0.8	14	10	M5X0.8	31.5	7
25	70	60	40	-	12	M8X1.25	8	10	3	5.2	10	9	5.5	28	M6X1.0	17	-	M5X0.8	31	7
32	75	65	44.5	50	14	M8X1.25	10	10	3	5.2	10	9	5.5	34	M6X1.0	17	12	M5X0.8	33.5	7
40	80	70	52	58.5	16	M8X1.25	10	10	3	6.8	14	10.5	6.5	40	M8X1.25	20	-	1/8"	35	9

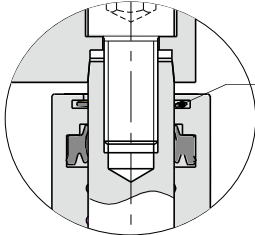


Rotary clamp cylinder—QCK Series

Compendium of QCK Series

Dustproof and welding slag out design

The front cover with stainless steel dust scraping ring, can keep the dust and welding slag out, and protect cylinder internal parts.



Stainless steel dust scraping ring

Two kinds of rod type

Taper type
(with clamp arm)



Across flat position rod type
(without clamp arm)

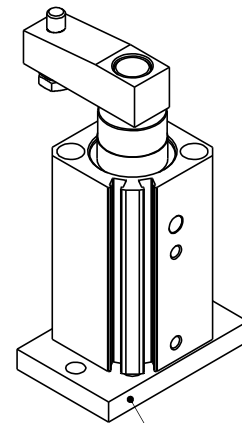


Be used on welding fixture

It can be used on welding fixture, the QPQ surface treatment prevent piston rod damage by welding slag; better than chrome plated piston rod.

Better commonness

The mounting dimension of body is the same as ACQ series, can use ACQ series' accessories.



ACQ series' accessories

Magnetic switch slots around the cylinder body

There are magnetic switch slots around the cylinder body convenient to install inducting switch.

Criteria for selection: Cylinder thrust

Unit : Newton(N)

Bore size	Rod size	Acting type	Operating pressure(MPa)							
			0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8
12	6	IN(Clamp)	8.5	17.0	25.4	33.9	42.4	50.9	59.4	67.9
		OUT(Release)	11.3	22.6	33.9	45.2	56.5	67.9	79.2	90.4
16	8	IN(Clamp)	15.1	30.2	45.2	60.3	75.4	90.5	105.6	120.6
		OUT(Release)	20.1	40.2	60.3	80.4	100.5	120.6	140.7	160.8
20	12	IN(Clamp)	20.1	40.2	60.3	80.4	100.5	120.6	140.7	160.8
		OUT(Release)	31.4	62.8	94.2	125.7	157.1	188.5	219.9	251.3
25	12	IN(Clamp)	37.8	75.6	113.3	151.1	188.9	226.7	264.4	302.2
		OUT(Release)	49.1	98.2	147.3	196.3	245.4	294.5	343.6	392.7
32	16	IN(Clamp)	60.3	120.6	181.0	241.3	301.6	361.9	422.2	482.5
		OUT(Release)	80.4	160.8	241.3	321.7	402.1	482.5	563.0	643.4
40	16	IN(Clamp)	105.6	211.1	316.7	422.2	527.8	633.3	738.9	844.5
		OUT(Release)	125.7	251.3	377.0	502.7	628.3	754.0	879.6	1005.3
50	20	IN(Clamp)	164.9	329.9	494.8	659.7	824.7	989.6	1154.5	1319.5
		OUT(Release)	196.3	392.7	589.0	785.4	981.7	1178.1	1374.4	1570.8
63	20	IN(Clamp)	280.3	560.6	840.9	1121.2	1401.5	1681.9	1962.2	2242.5
		OUT(Release)	311.7	623.4	935.2	1246.9	1558.6	1870.3	2182.1	2493.8

Installation and application



1. Dirty substances in the pipe must be eliminated before cylinder is connected with pipeline to prevent the entrance of impurities into the cylinder.
2. The medium used by cylinder shall be filtered to 40μm or below.
3. Anti-freezing measure shall be adopted under low temperature environment to prevent moisture freezing.
4. If the cylinder is dismantled and stored for a long time, please conduct anti-rust treatment to the surface. Anti-dust jam cap shall be added in air inlet and outlet ports.
5. To insure the life-span of cylinder and jig, please use flow control valve to control the speed of cylinder.



QCK Series

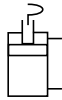


Specification

Bore size(mm)	12	16	20	25	32	40	50	63
Acting type	Double acting							
Fluid	Air(to be filtered by 40μm filter element)							
Operating pressure	0.2~1.0MPa(29~145psi)(2.0~10bar)				0.15~1.0MPa(22~145psi)(1.5~10bar)			
Proof pressure	1.5MPa(215psi)(15bar)							
Temperature	-20~70°C							
Speed range	50~200mm/s							
Rotation angle	90°							
Repeatability	±2°							
Rotation direction	Turn left or turn right							
Rotation stroke(mm)	7.5		9.5		15		19	
Clamping stroke (mm)	10 20		10 20 30		10 20 30 50			
Stroke tolerance	+1.0 0							
Cushion type	Bumper							
Port size [Note1]	M5×0.8				1/8"		1/4"	

[Note1]PT thread, G thread are available.
Add) QCK series are all attached with magnet,
please refer to Page 362 for the specific content of sensor switch.

Symbol



Product feature

1. It can be used on welding fixture, the QPQ surface treatment prevent piston rod damage by welding slag; better than chrome plated piston rod.
2. The front cover with stainless steel dust scraping ring, can keep the dust and welding slag out, and protect cylinder internal parts.
3. The mounting dimension of body is the same as ACQ series, can use ACQ series' accessories.

Ordering code

QCK L 32×10 S M FB □

① ② ③ ④ ⑤ ⑥ ⑦ ⑧

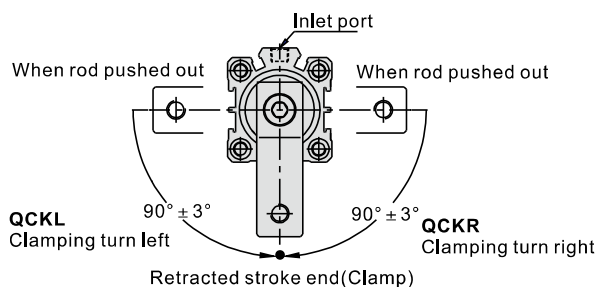
① Model	② Rotation direction	③ Bore size	④ Clamping stroke	⑤ Magnet	⑥ Rod type	⑦ Mounting type [Note1]	⑧ Thread type [Note2]
QCK: Rotary clamp cylinder	L: Push and turn left R: Push and turn right	12	10 20	S: With magnet	Blank: Taper type (with clamp arm) M: Across flat position type(without clamp arm)	Blank: No bracket FB: FB type	Blank: PT G: G
		16	10 20 30				
		20					
		25	10 20 30 50				
		32					
		40					
		50					
63							

[Note1] Back flange is same as ACQ series (please refer right table), if need front flange, please contact us.

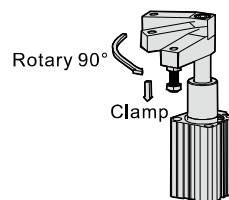
[Note2] When the thread is standard, the code is blank.

Bore size\Accessories	FB	Material	Bore size\Accessories	FB	Material
12	F-ACQ12FA	Aluminum alloy	32	F-ACQ32FA	Aluminum alloy
16	F-ACQ16FA		40	F-ACQ40FA	
20	F-ACQ20FA		50	F-ACQ50FA	
25	F-ACQ25FA		63	F-ACQ63FA	

The definition of rotation direction and angle

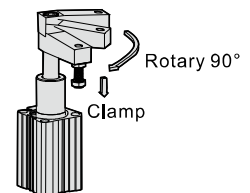


Levorotatory(QCKL):
When the piston of cylinder moves downward, the swivel arms moves anticlockwise, this is called levorotatory.



The order code is L

Dextrorotatory(QCKR):
When the piston of cylinder moves downward, the swivel arms moves clockwise, this is called dextrorotatory.

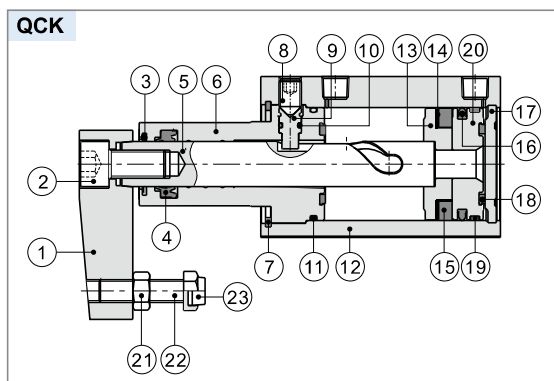


The order code is R

Rotary clamp cylinder

QCK Series

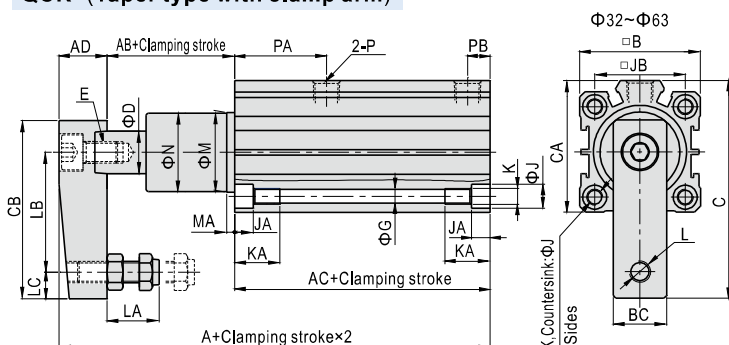
Inner structure and material of major parts



NO.	Item	Material	NO.	Item	Material
1	Rocker	Carbon steel	14	Magnet washer	NBR
2	Screw	Carbon steel	15	Magnet	Sintered metal (Neodymium-iron-boron(Φ12~Φ25))
3	Dust scraping ring	No(Φ12, Φ16) Stainless steel(Others)			Plastic(Others)
4	Front cover packing	NBR			16
5	Piston rod	Scr440	17	Back cover	Aluminum alloy
6	Front cover	Aluminum alloy	18	Bumper	TPU(Φ12~Φ25)\NBR(Others)
7	C Clip	Spring steel	19	Wear ring	No(Φ12~Φ32) Wear resistant material(Others)
8	Screw	Carbon steel			20
9	Operating screw	SCr440	21	Screw	Carbon steel
10	O-ring	NBR	22	Fixing screw	Carbon steel
11	O-ring	NBR	23	Bumper	PTFE(Φ12~Φ40)\POM(Others)
12	Body	Aluminum alloy			
13	Magnet holder	Brass(Φ12, Φ16) Aluminum alloy(Others)			

Dimensions

QCK□ (Taper type with clamp arm)

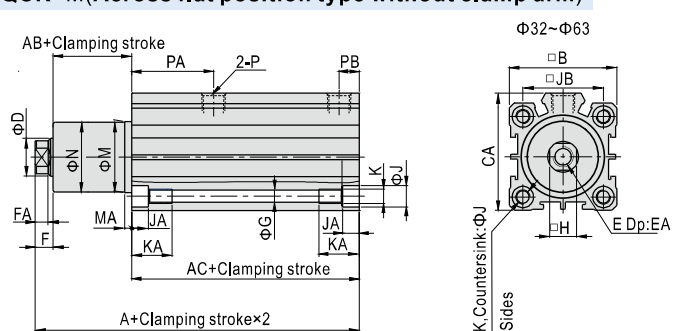


Bore size\Item	A	AB	AC	AD	B	BC	C	CA	CB	D
12	55	10.5	35.5	9	25	9	36.5	-	29	6
16	59	10.5	35.5	13	29	11	44.5	-	36	8
20	86	8	62	16	36	16	60	-	51	12
25	87	8	63	16	40	16	62	-	51	12
32	108	17.5	71.5	19	45	19	82	49.5	67	16
40	109	25	65	19	53	19	85.5	57	67	16
50	133	31	76.5	25.5	64	25.5	114	71	88	20
63	136	30.5	80	25.5	77	25.5	120.5	84	88	20

Bore size\Item	E	G	J	JA	JB	JC	K
12	M3×0.5	3.3	6	3.5	15.5	22	M4×0.7
16	M5×0.8	3.3	6	3.5	20	28	M4×0.7
20	M8×1.25	5	9	5.5	25.5	36	M6×1.0
25	M8×1.25	5	9	5.5	28	40	M6×1.0
32	M10×1.5	5	9	5.5	34	-	M6×1.0
40	M10×1.5	5	9	5.5	40	-	M6×1.0
50	M12×1.75	6.5	10.5	6.5	50	-	M8×1.25
63	M12×1.75	8.5	14	9	60	-	M10×1.5

Bore size\Item	KA	L	LA	LB	LC	M	MA	N	P	PA	PB
12	11	M4×0.7	7~13	20	4	11	3	10.8	M5×0.8	13.5	5.5
16	11	M4×0.7	7~13	25	5	14	3	13.8	M5×0.8	15	5.5
20	17	M6×1.0	9.5~20.5	35	7	18	3	17.8	M5×0.8	30	6
25	17	M6×1.0	9.5~20.5	35	7	23	6	22.5	M5×0.8	30	7
32	17	M8×1.25	13.5~25.5	45	10	30	7	29.5	1/8"	34.5	8.5
40	17	M8×1.25	13.5~25.5	45	10	30	3	29.5	1/8"	26.5	9
50	22	M10×1.5	14.5~30	65	10	37	3.5	36.5	1/4"	34	11.5
63	28.5	M10×1.5	14.5~30	65	10	48	3.5	47.5	1/4"	34.5	11.5

QCK□M (Across flat position type without clamp arm)



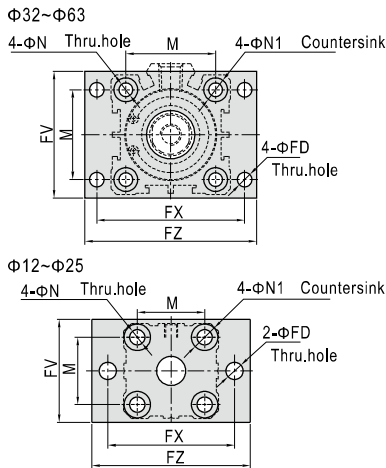
Bore size\Item	A	AB	AC	B	CA	D	F	FA
12	48	9.5	35.5	25	-	6	3	2.5
16	48	9.5	35.5	29	-	8	3	2.5
20	72.5	6.5	62	36	-	12	4	3
25	73.5	6.5	63	40	-	12	4	3
32	93.5	15.5	71.5	45	49.5	16	6.5	5.5
40	94.5	23	65	53	57	16	6.5	5.5
50	112	28	76.5	64	71	20	7.5	5.5
63	115	27.5	80	77	84	20	7.5	5.5

Bore size\Item	H	E	EA	G	J	JA
12	5	M3×0.5	6	3.3	6	3.5
16	7	M5×0.8	7	3.3	6	3.5
20	10	M8×1.25	13	5	9	5.5
25	10	M8×1.25	13	5	9	5.5
32	14	M10×1.5	15	5	9	5.5
40	14	M10×1.5	15	5	9	5.5
50	17	M12×1.75	20	6.5	10.5	6.5
63	17	M12×1.75	20	8.5	14	9

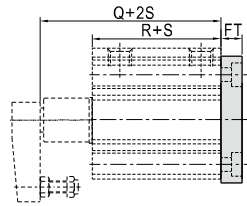
Bore size\Item	JB	JC	K	KA	M	MA	N	P	PA	PB
12	15.5	22	M4×0.7	11	11	3	10.8	M5×0.8	13.5	5.5
16	20	28	M4×0.7	11	14	3	13.8	M5×0.8	15	5.5
20	25.5	36	M6×1.0	17	18	3	17.8	M5×0.8	30	6
25	28	40	M6×1.0	17	23	6	22.5	M5×0.8	30	7
32	34	-	M6×1.0	17	30	7	29.5	1/8"	34.5	8.5
40	40	-	M6×1.0	17	30	3	29.5	1/8"	26.5	9
50	50	-	M8×1.25	22	37	3.5	36.5	1/4"	34	11.5
63	60	-	M10×1.5	28.5	48	3.5	47.5	1/4"	34.5	11.5

QCK Series

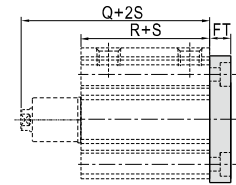
QCK-FB(With flange)



QCK□-FB(Taper type with clamp arm)



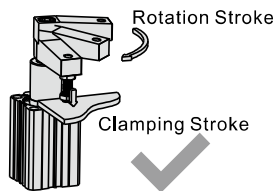
QCK□M-FB(Across flat position rod without clamp arm)



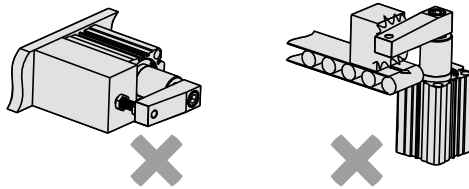
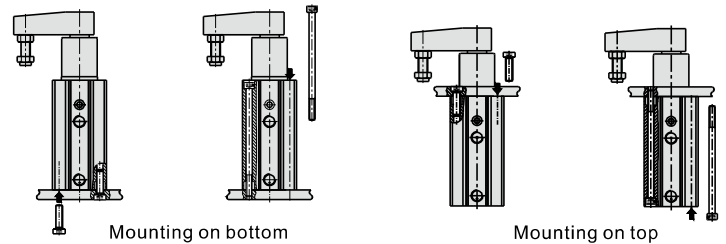
Bore size\Item	R	Q(QCK□)	Q(QCK□M)	M	N	N1	FD	FT	FV	FX	FZ
12	35.5	46	48	15.5	4.5	7.5	4.5	5.5	25	45	55
16	35.5	46	48	20	4.5	7.5	4.5	5.5	30	45	55
20	62	70	72.5	25.5	6.5	10.5	6.5	8	39	48	60
25	63	71	73.5	28	6.5	10.5	6.5	8	42	52	64
32	71.5	89	93.5	34	6.5	10.5	5.5	8	48	56	65
40	65	90	94.5	40	6.5	10.5	5.5	8	54	62	72
50	76.5	107.5	112	50	8.5	13.5	6.5	9	67	76	89
63	80	110.5	115	60	10.5	16.5	9	9	80	92	108

Installation and operation

- To insure the life-span of cylinder and jig, please use flow control valve to control the speed of cylinder.
- The method of installation are mounted by flange on top or bottom.
- Before the cylinder is connected to pipeline sundries in the pipe must be eliminated, or may cause leakage.
- Please clean the piston-rod and dust scraping ring to protect the cylinder.
- The cylinder using normal magnet ring can use the same sensor as ACQ series. For the cylinder using strong magnet ring we suggest using AirTAC's DS1-69AM sensor.
- Because the rotary force is strong when the cylinder's acting, we suggest using flow control valve to control the speed to protect cylinder.
- Please install the cylinder following the right diagram.
- The installation method as the diagram below is wrong, and will injure the cylinder and shorten the cylinder life.

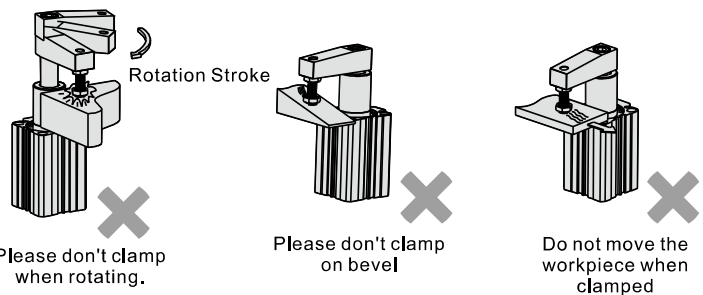


Only can clamping in clamping stroke.



Don't installed horizontally

Don't exert horizontally load or force



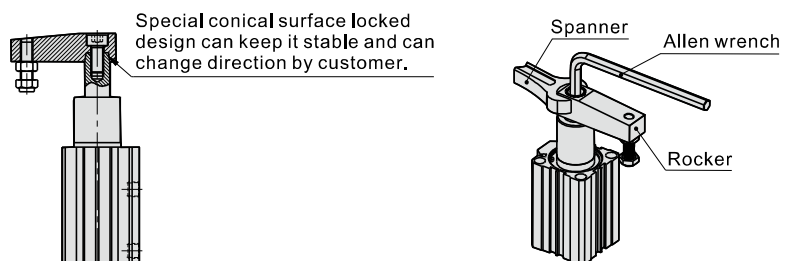
Please don't clamp when rotating.

Please don't clamp on bevel

Do not move the workpiece when clamped

9. Rocker

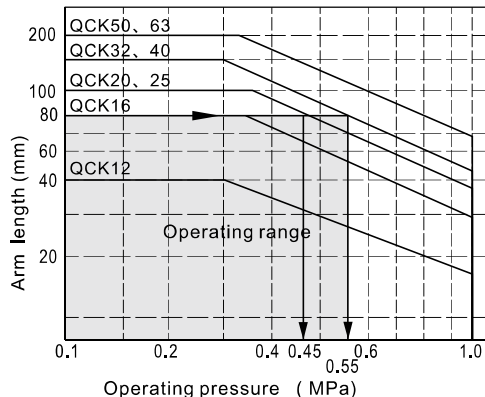
- The design of rocker can keep it stable and can change direction by customer.
- Please follow the diagram below on right side to assemble/disassemble the rocker by spanner and allen wrench; don't hold the body to assemble/disassemble rocker, or will damage the cylinder.
- If need customize rocker, please contact us.



QCK Series

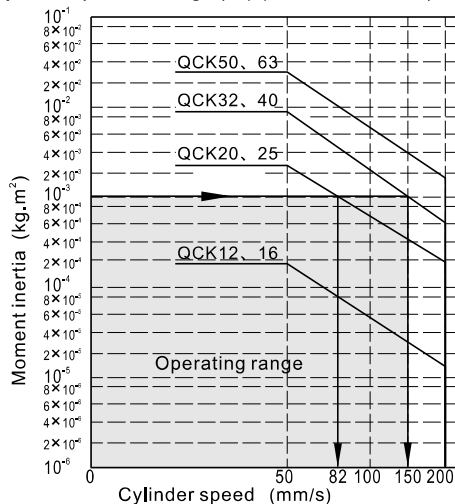
How to select product

- When arms are to be made separately, their length and weight should be within the following range.
- Allowable bending moment:
Use the arm length and operating pressure within graph(1) for allowable bending moment loaded piston rod.



Example: When arm length is 80mm, pressure should be less than
 QCK20/25:0.45MPa
 QCK32/40:0.55MPa

- Moment of inertia:
When the arm is long and heavy, damage of internal parts may be caused due to inertia. Use the inertia moment and cylinder speed within graph(2) based on arm requirements.



Example: When arm's moment of inertia is 10⁻³Kg·m², cylinder speed should be less than
 QCK20/25:82mm/s
 QCK32/40:150mm/s

Note) The average speed of piston=the highest speed of piston/1.6

- Moment of inertia of cylinder's arm when rotating based on its rotary axis, shown in graph(3).

Model	Moment of inertia(Kg·m ²)
QCK12	3.555×10 ⁻⁶
QCK16	1.053×10 ⁻⁵
QCK20/25	5.257×10 ⁻⁵
QCK32/40	1.653×10 ⁻⁴
QCK50/63	7.387×10 ⁻⁴

- Calculation reference :
 5.1)Moment of inertia of arm (I₁) : Refer to the graph(3) after the cylinder bore diameter is determined.

- 5.2)Moment of inertia of jig (I₂) : According to shape of the jig and the next item 6 "Calculation for moment of inertia", pick out a proper formula for calculation.

The jig shown on the right graph is a cylinder, its formula of moment of inertia is:

$$I_2 = (m_2 \cdot D^2) / 8 + m_2 \cdot L^2$$

When QCK32 is selected: L=0.045m (arm length);

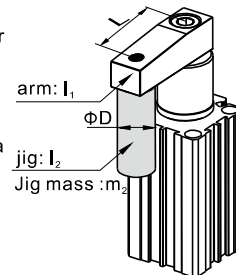
If D=0.04m m₂=0.4kg

From graph(3): I₁=1.653×10⁻⁴(Kg·m²)

$$\text{By Calculation: } I_2 = (m_2 \cdot D^2) / 8 + m_2 \cdot L^2 = (0.4 \cdot 0.04^2) / 8 + 0.4 \cdot 0.045^2 = 8.9 \times 10^{-4} \text{ (Kg} \cdot \text{m}^2)$$

Total value: I=I₁+I₂=10.553×10⁻⁴=1.0553×10⁻³(Kg·m²)

According to graph(2), the highest speed of the cylinder should be less than 150 mm/s;
 According to graph(1), it can be used under a pressure of 0.9Mpa. The average speed of piston=the highest speed of piston/1.6=94 mm/s.



- Calculation for moment of inertia

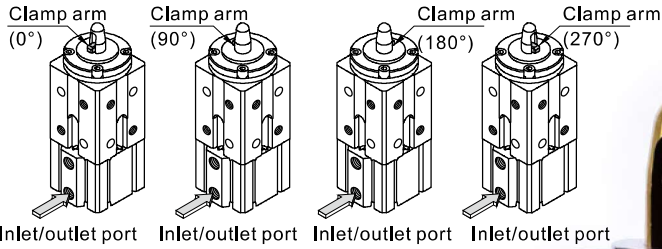
Diagram	Calculation formula of moment of inertia
1. Thin bar Position of rotary axis: Vertical to the bar and through the end	$I = \frac{m_1 a_1^2 + m_2 a_2^2}{3}$
2. Thin bar Position of rotary axis: Vertical to the bar and through the center of gravity	$I = \frac{ma^2}{12}$
3. Load at the end of lever arm	$I = m_1 \times \frac{a_1^2}{3} + m_2 \times a_2^2 + k$ $k = m_2 \times \frac{2r^2}{5}$
4. Thin rectangular plate (Rectangular parallelepiped) Position of rotary axis: Parallel to side b and through the center of gravity	$I = \frac{ma^2}{12}$
5. Thin rectangular plate (Rectangular parallelepiped) Position of rotary axis: Vertical to the plate and through the end	$I = m_1 \times \frac{4a_1^2 + b^2}{12} + m_2 \times \frac{4a_2^2 + b^2}{12}$
6. Thin rectangular plate (Rectangular parallelepiped) Position of rotary axis: Through the center of gravity and vertical to the plate (Same as also thick rectangular plate)	$I = \frac{ma^2 + mb^2}{12}$



Pin clamp cylinder—AQK Series

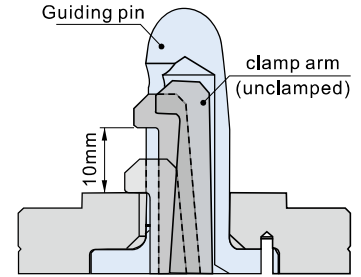
Compendium of AQK Series

Four clamp arm position options



With positioning and clamping function

Pin diameter located, built-in clamp arm fastened



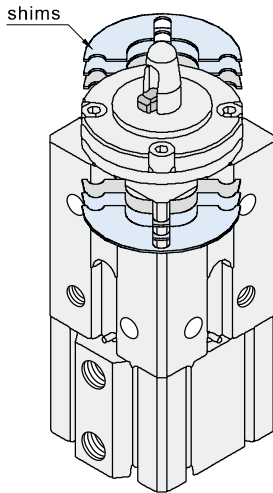
Multiple pin diameter are applicable to various workpiece port size.

Guiding pin diameter(mm)	Workpiece port size(mm)
Φ14.□ (Note)	Φ15
Φ15.□	Φ16
Φ17.□	Φ18
Φ19.□	Φ20
Φ24.□	Φ25

(Note) "□" represents 1-9.

Clamp position is adjustable by select shims

Adjustable range: 0.5~2mm
Attach with a 1mm and 2 of 0.5mm shims
(one side : 3 shims/ two sides : 6 shims)



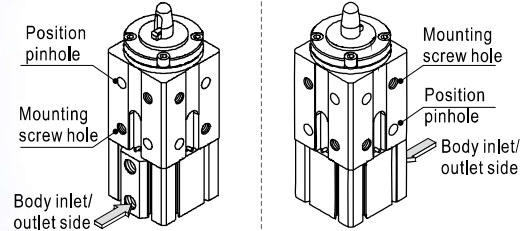
With sensor groove

With sensor groove around cylinder body

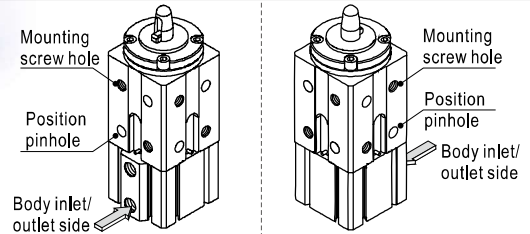
Mounting diversity

All four sides are equipped with positioning pinhole and mounting screw hole. Specific configuration in the following options

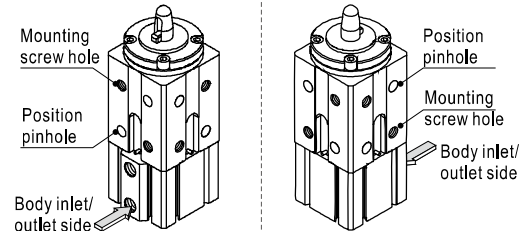
A type mounting groove



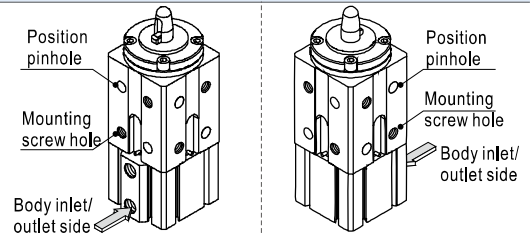
B type mounting groove



C type mounting groove



D type mounting groove



Installation instructions (general)



1. Before piping is connected, it should be thoroughly blown out with air (flushing) or washed to remove chips, cutting oil and other debris inside the pipe.
2. operating fluid need to be filtered by 40μm filter element.
3. During low temperature environment, cryogenic measures should be taken to prevent freezing water in the system.
4. Beware of the surface rust on the cylinder after disassemble for a long time. Dust cover should be added on inlet port and apply anti-rust oil on rod and action part.
5. Please attach a meter-out controller at the port to protect product life of cylinder and jig.



Pin clamp cylinder

AQK Series



Specification

Bore size(mm)	50	
Acting type	Double acting	
Fluid	Air(to be filtered by 40µm filter element)	
Operating pressure	0.15~1.0MPa(22~145psi)	
Proof pressure	1.5MPa(215psi)	
Temperature °C	-20~70	
Cushion type	Bumper	
Clamp stroke	Without shims: 10 _{-0.5} mm	With shims: 10~12mm
Port size [Note]	1/4"	

[Note] PT thread is available.

Please refer to page 362 for sensor applications.

Product feature

1. According to JIS standards
2. Pin surface adopted titanium alloy processing to enhance friction resistance.
3. Part of cylinder front cover has equipped with metallic rod wiper that can effectively remove slag and debris etc.
4. Possible to mount on 4 surfaces.
5. With sensor groove around cylinder body, easy to mount sensors.

Ordering code

AQK50 S A A A □ □-177X340

① ② ③ ④ ⑤ ⑥ ⑦ ⑧ ⑨

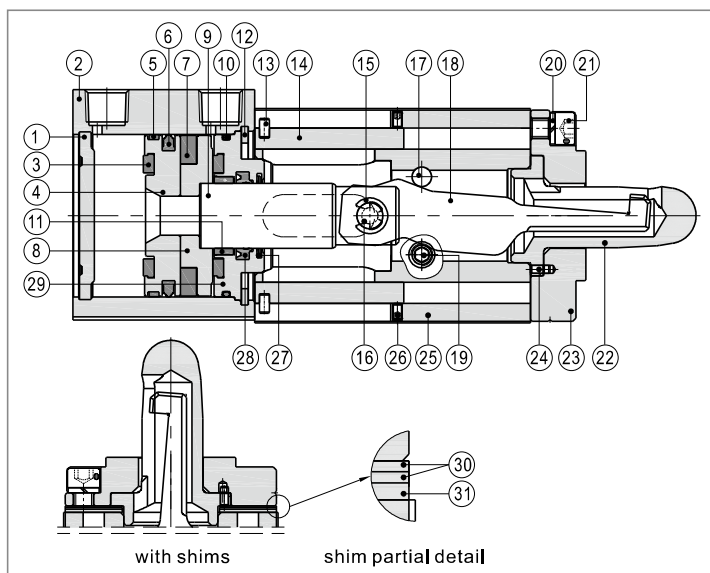
① Model	AQK : Pin clamp cylinder					
② Bore size	50					
③ Magnet	S : With magnet					
④ Install dim.	A: Mounting screws M10X1.5/ pinhole diameter Φ10			B: Mounting screws M12X1.75/ pinhole diameter Φ10		
⑤ The relative position of screw surface and pinhole	A:A type mounting groove		B:B type mounting groove		C:C type mounting groove	
	D:D type mounting groove					
⑥ Clamp arm position	A: Clamp arm same side with inlet port		B: Clamp arm at 90° with inlet port		C: Clamp arm at 180° with inlet port	
	D: Clamp arm at 270° with inlet port					
⑦ Adjusting shims	Blank: Without adjustable shims				2: With adjusting shim 2mm (2 of 0.5mm+1 of 1mm)	
⑧ Thread code	Blank: PT1/4					
⑨ Guide pin specification code	Code [Note]	Pin height (without shims)	Code	Pin height (with shims)	Pin diameter	Workpiece port size
	14□X290	29	14□X310	31	Φ14.□	Φ15
	15□X290	29	15□X310	31	Φ15.□	Φ16
	17□X340	34	17□X360	36	Φ17.□	Φ18
	19□X340	34	19□X360	36	Φ19.□	Φ20
24□X340	34	24□X360	36	Φ24.□	Φ25	

[Note] "□" means 1-9. Take 177X340 for example, 177 means pinhole diameter 17.7mm, 340 means guiding pin height 34mm.

Pin clamp cylinder

AQK Series

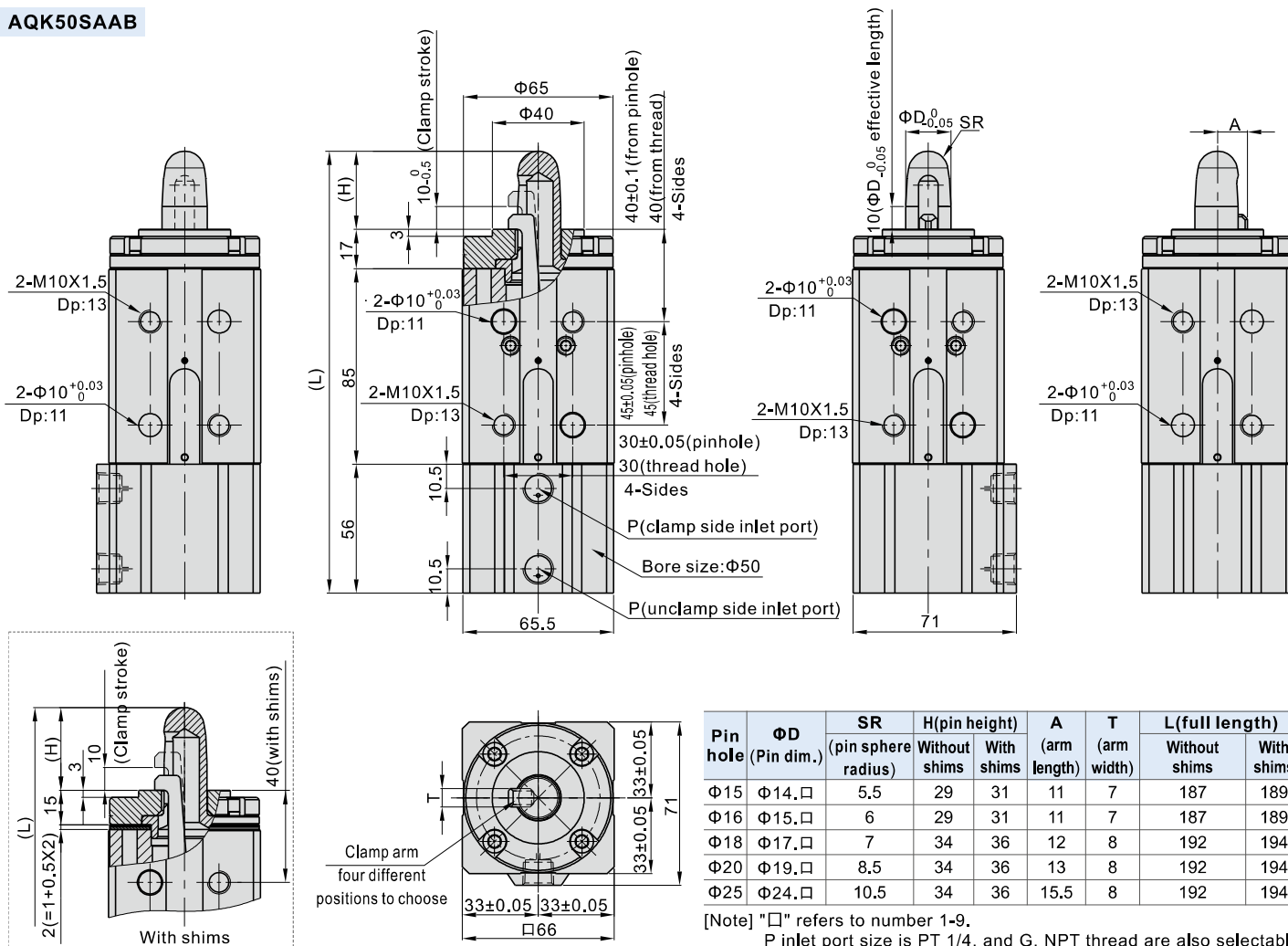
Inner structure and material of major parts



NO.	Item	Material	NO.	Item	Material
1	back cover	Aluminum alloy	17	guiding pin	Alloy steel
2	body	Aluminum alloy	18	lever	die steel
3	Bumper	NBR	19	socket set screws	Alloy steel
4	Piston	Aluminum alloy	20	spring washer	Spring steel
5	wear ring	Wear resistant material	21	screws	Alloy steel
6	Piston packing	NBR	22	pin	Stainless steel
7	magnet	plastic	23	cap	Alloy steel
8	magnet holder	Aluminum alloy	24	Pin	Stainless steel
9	rod	S45C hard chrome plating bar	25	pin body	Aluminum alloy
10	o ring	NBR	26	socket set screws	Alloy steel
11	bushing	Wear resistant material	27	wiper ring	Stainless steel
12	C clip	Spring steel	28	spool packing	NBR
13	Pin	Stainless steel	29	front cover	Aluminum alloy
14	dedust gate	Aluminum alloy	30	gasket 1	Stainless steel
15	E clip	Spring steel	31	gasket 2	Stainless steel
16	PIN	S45C grinded bar			

Dimensions

AQK50SAAB



Pin hole	ΦD (Pin dim.)	SR (pin sphere radius)	H (pin height)		A (arm length)	T (arm width)	L (full length)	
			Without shims	With shims			Without shims	With shims
Φ15	Φ14, □	5.5	29	31	11	7	187	189
Φ16	Φ15, □	6	29	31	11	7	187	189
Φ18	Φ17, □	7	34	36	12	8	192	194
Φ20	Φ19, □	8.5	34	36	13	8	192	194
Φ25	Φ24, □	10.5	34	36	15.5	8	192	194

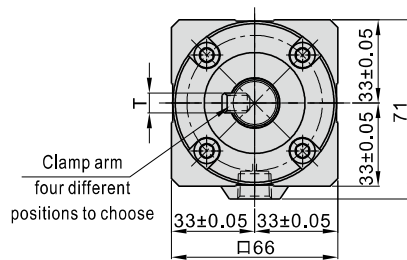
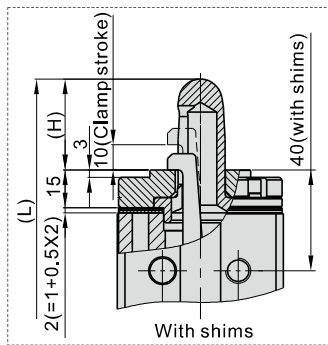
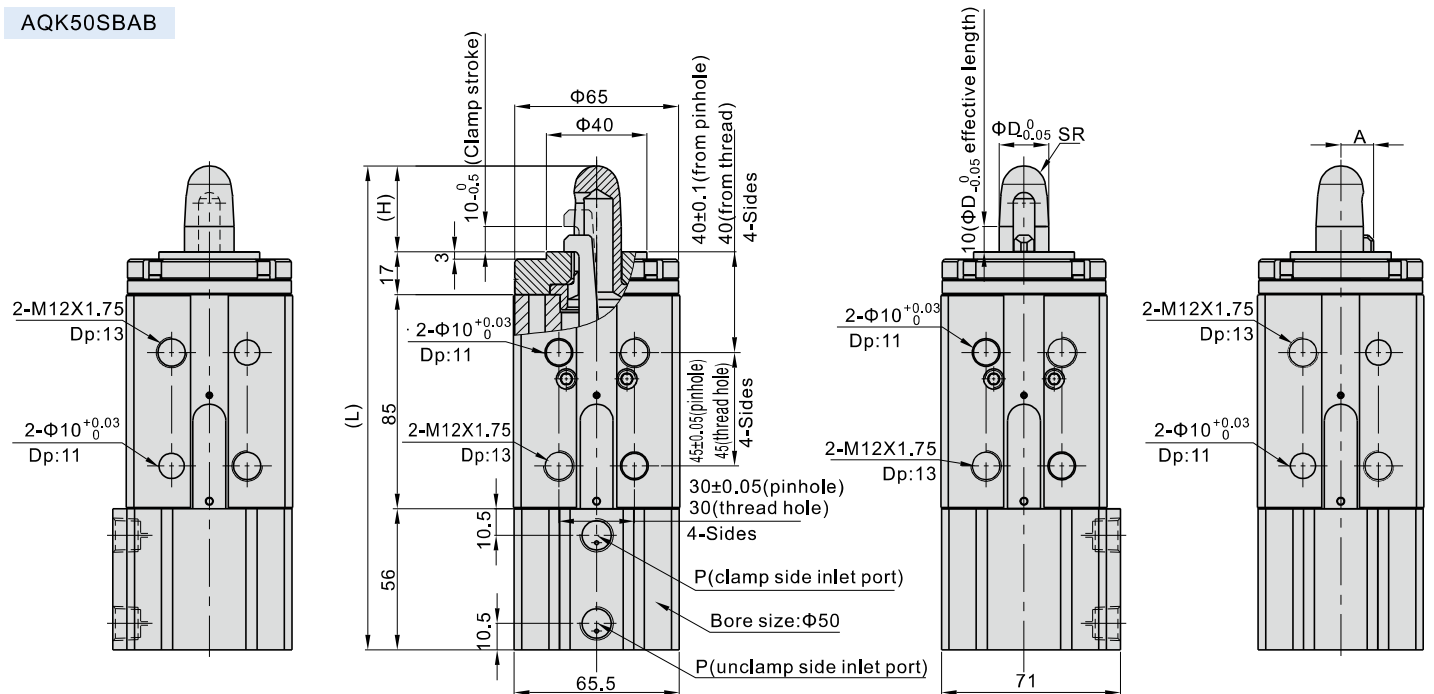
[Note] "□" refers to number 1-9.

P inlet port size is PT 1/4, and G, NPT thread are also selectable.

Pin clamp cylinder

AQK Series

AQK50SBAB



Pin hole	ΦD (Pin dim.)	SR (pin sphere radius)	H (pin height)		A (arm length)	T (arm width)	L (full length)	
			Without shims	With shims			Without shims	With shims
Φ15	Φ14.□	5,5	29	31	11	7	187	189
Φ16	Φ15.□	6	29	31	11	7	187	189
Φ18	Φ17.□	7	34	36	12	8	192	194
Φ20	Φ19.□	8,5	34	36	13	8	192	194
Φ25	Φ24.□	10,5	34	36	15,5	8	192	194

[Note] "□" refers to number 1-9.
P inlet port size is PT 1/4, and G, NPT thread are also selectable.

Installation instruction

1. Sensor options and mounting :

Applicable sensors for AQK series are CMSG(DMSG/EMSG). Those sensors can easily fix on the cylinder as the right figure, other accessories are not needed. Loosen the mounting screws on sensor, import it to mounting groove to the suitable position and it can be fixed after tighten screws.

Also: in the power magnetic environment, you should choose the anti-interference sensor, the specific selection of the reference P336 page.

2. Since the cylinder performs both positioning and clamping simultaneously, any other application may cause an accident or damage to the cylinder.

3. The thickness of clamping workpiece should be under 10mm, the clamping cylinder with shim can clamp up to 12 mm (with all shims removed).

4. Only apply to the workpiece has flat side, do not clamp without setting the workpiece.

5. Please attach a speed controller and adjust the cylinder speed by meter-out.

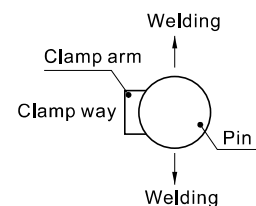
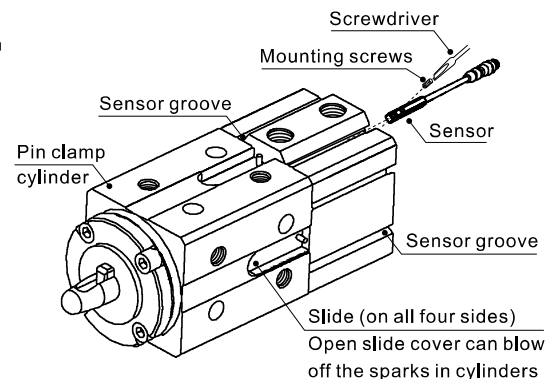
6. prevent any foreign material, such as machining chips, from entering into internal cylinder.

And the opening part of a guide pin should not face in the same direction as oncoming spatter. If the spatter enters the cylinder from the opening part of the guide pin, it will shorten the product life and cause a malfunction.

7. Consider the welding point of the guide pin when determining the direction of the clamp arm setting.

The clamp arm will be damaged if clamping is performed at the welded point of the guide pin. Therefore, set the clamping directions as illustrated right figure to prevent the clamping damaged from welded point.

8. If sparks enters the cylinder body, remove it by first detaching the covers. Do not scratch or make dents on the sliding parts of the piston rod by striking it or grasping them with other objects. Or it may cause seal damage and leakage.





Pin clamp cylinder(Lock type)——BAQK Series

Compendium of BAQK Series

Bidirectional locked
Both stretch and retract can lock cylinder equivalently unrelated to piston action

Applicable with AQK series pin clamp cylinder
Same instructions as AQK series

Spring + Clip clamping device
Simple structure, fast and effective unlock, stable switch state

General pin specification with AQK series

Multiple unlock options
Pneumatic and manual unlock options

Pneumatic unlock
compressed air

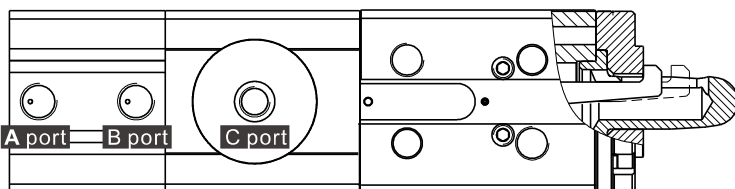
Manual unlock
Manual unlock screw

Applicable with AQK series pin clamp cylinder

Installation instructions (general)



- Before piping is connected, it should be thoroughly blown out with air (flushing) or washed to remove chips, cutting oil and other debris inside the pipe.
- operating fluid need to be filtered by 40 μ m filter element.
- During low temperature environment, cryogenic measures should be taken to prevent freezing water in the system.
- Beware of the surface rust on the cylinder after disassemble for a long time.
Dust cover should be added on inlet port and apply anti-rust oil on rod and action part.
- Please attach a meter-out controller at the port to protect product life of cylinder and jig.
- The locking device can only work when cylinder stops, do not activate the rod under working condition.
It's necessary to take extra measures if the control system has safety requirement.
- The locking device can be released only when the force on both sides of the piston reaches equilibrium or the cylinder stops, otherwise it may cause accident by rod sudden action.
- application example.

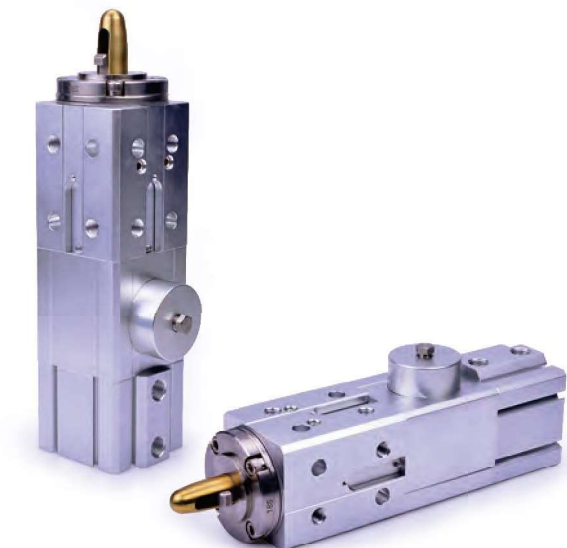


Circulation	Inlet			Acting	
	A port	B port	C port		
	no	no	yes	clamp machine unlocked	
	no	yes	yes	Clamp arm fastened workpiece	0~0.5S
	no	no	no	clamp machine locked	
	no	no	yes	clamp machine unlocked	0.5S above
	yes	no	yes	clamp arm loosen workpiece	0~0.5S



Pin clamp cylinder—Lock type

BAQK Series



Specification

Bore size(mm)	50	
Acting type	Double acting	
Fluid	Air(to be filtered by 40µm filter element)	
Operating pressure	0.15~1.0MPa(22~145psi)	
Proof pressure	1.5MPa(215psi)	
Temperature °C	-20~70	
Cushion type	Bumper	
Clamp stroke	Without shims: 10 _{-0.5} ⁰ mm	With shims: 10~12mm
Unlock pressure	0.3~0.7MPa(45~100psi)	
Static retention	1400N	
Port size	Cylinder	1/4"
[Note]	Clamp device	G1/8

[Note] PT thread is available.

Please refer to page 362 for sensor applications.

Product feature

1. According to JIS standards
2. Pin surface adopted titanium alloy processing to enhance friction resistance.
3. Part of cylinder front cover has equipped with metallic rod wiper that can effectively remove slag and debris etc.
4. Possible to mount on 4 surfaces.
5. With sensor groove around cylinder body, easy to mount sensors.

Ordering code

BAQK50 S A A A □ □-177X340

① ② ③ ④ ⑤ ⑥ ⑦ ⑧ ⑨

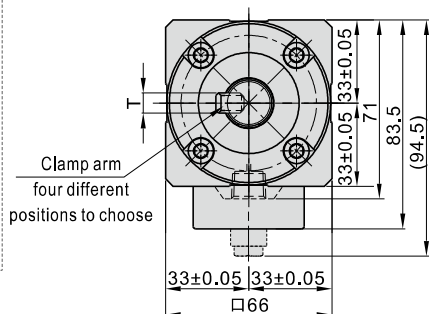
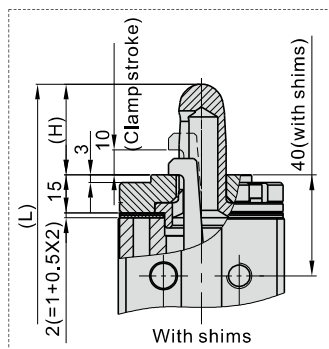
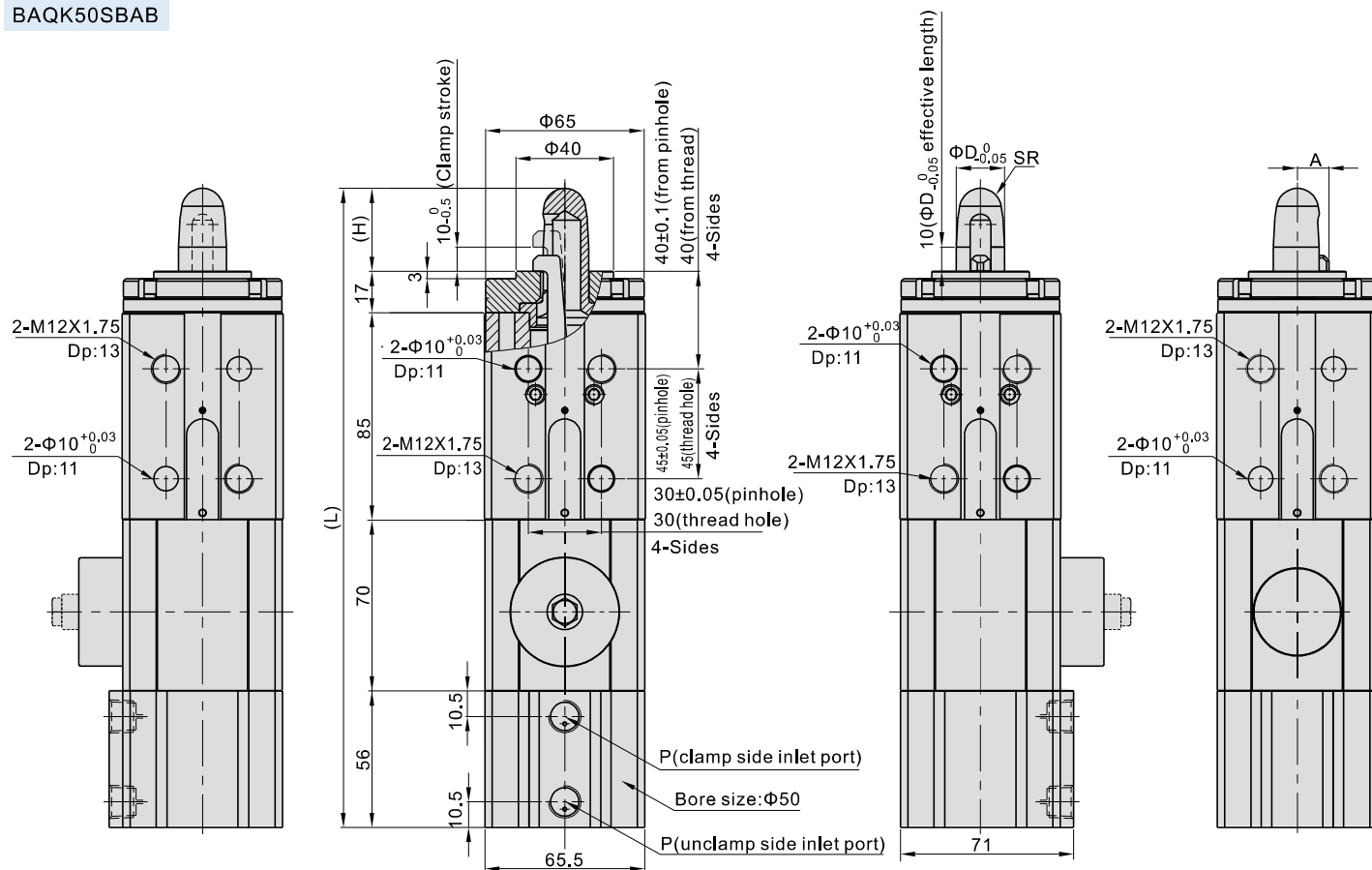
① Model	BAQK : Pin clamp cylinder(lock type)					
② Bore size	50					
③ Magnet	S : With magnet					
④ Install dim.	A : Mounting screws M10X1.5/ pinhole diameter Φ10			B : Mounting screws M12X1.75/ pinhole diameter Φ10		
⑤ The relative position of screw surface and pinhole	A:A type mounting groove	B:B type mounting groove	C:C type mounting groove	D:D type mounting groove		
	Refer to AQK series ordering code for specific mounting groove					
⑥ Clamp arm position	A : Clamp arm same side with inlet port	B : Clamp arm at 90° with inlet port	C : Clamp arm at 180° with inlet port	D : Clamp arm at 270° with inlet port		
	The relation between clamp arm and inlet port please refer to AQK series ordering code content					
⑦ Adjusting shims	Blank: Without adjustable shims			2 : With adjusting shim 2mm (2 of 0.5mm+1 of 1mm)		
⑧ Thread code	Blank: PT1/4					
⑨ Guide pin specification code	Code [Note]	Pin height (without shims)	Code	Pin height (with shims)	Pin diameter	Workpiece port size
	14□X290	29	14□X310	31	Φ14.□	Φ15
	15□X290	29	15□X310	31	Φ15.□	Φ16
	17□X340	34	17□X360	36	Φ17.□	Φ18
	19□X340	34	19□X360	36	Φ19.□	Φ20
	24□X340	34	24□X360	36	Φ24.□	Φ25

[Note] "□" means 1-9. Take 177X340 for example, 177 means pinhole diameter 17.7mm, 340 means guiding pin height 34mm.

Pin clamp cylinder—Lock type

BAQK Series

BAQK50SBAB



Pin hole	ΦD (Pin dim.)	SR (pin sphere radius)	H(pin height)		A (arm length)	T (arm width)	L(full length)	
			Without shims	With shims			Without shims	With shims
Φ15	Φ14, □	5,5	29	31	11	7	257	259
Φ16	Φ15, □	6	29	31	11	7	257	259
Φ18	Φ17, □	7	34	36	12	8	262	264
Φ20	Φ19, □	8,5	34	36	13	8	262	264
Φ25	Φ24, □	10,5	34	36	15,5	8	262	264

[Note] "□" refers to number 1-9.
P inlet port size is PT 1/4, and G, NPT thread are also selectable.

Installation instruction

BAQK series mounting dimensions are equivalent to AQK series, please refer to AQK series for specific mounting groove.



Clamping cylinder—MCK Series

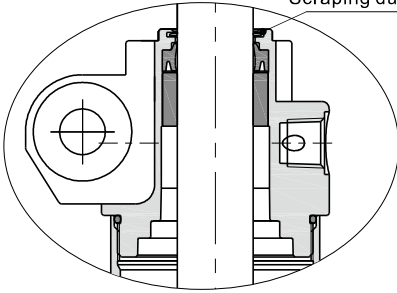
Compendium of MCK Series

Dustproof and welding slag out design

There is a scraping dust ring in front cover, and it is firm and durable that can avoid dust and splashed welding slag breaking cylinders. It is more reliable than dust helmet.

It is more reliable than dust helmet.

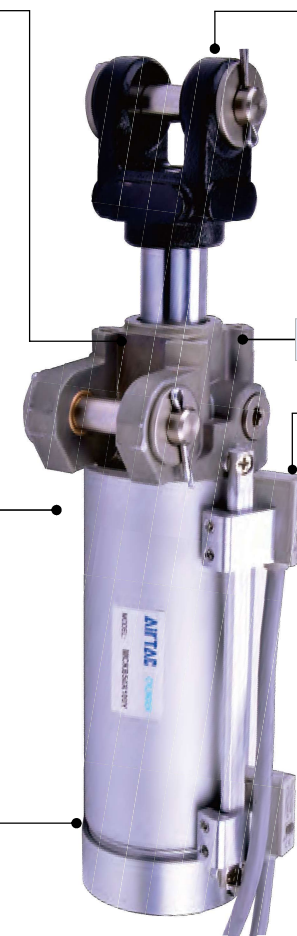
Scraping dust ring



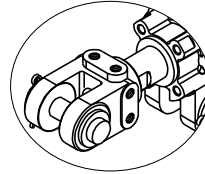
Two orifice models air available

Rolling packed structure

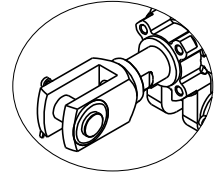
Back cover and barrel adopt riveted rolling packed structure to form a reliable connection.



Y knuckle is available



Y : With M6 thread hole



YW : Without M6 thread hole

Buffer adjustment and speedlimit adjustment are built-in

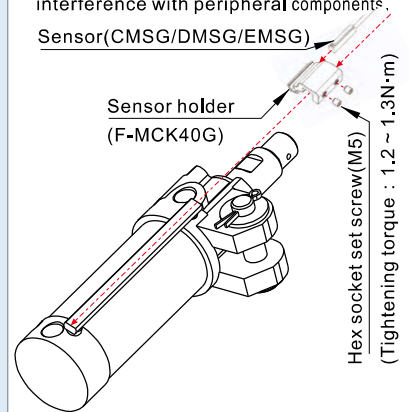
Various types of sensor switches are available.

1. The Anti-magnetic sensor should be used with the anti-magnetic bracket. For details, refer to page P335.
2. Common sensors (DMSG/EMSG, CMSG) should be used with the sensor holder (F-MCK40G). Please refer to common sensors for details about DMSG/EMSG and CMSG sensor. The matching sensor holders need to be ordered separately. The ordering method and installation method are as follows:

Sensor holder's ordering code	F-MCK40G(Matching with MCK)
-------------------------------	-----------------------------

- Installation steps :**
1. The sensor is installed in the G-shaped groove of the sensor fixing base and locked with a slotted screwdriver;
 2. The sensor holder is installed on the fixing bar, moves to a proper position and closes to the outer cylinder of the cylinder, and then tightens the hexagonal cap screws with the hexagonal wrench.
 3. Avoid mechanical damage during installation;
 4. When installing, pay attention to avoid interference with peripheral components.

Sensor's installation method



Theoretical clamping force

Unit : Newton(N)

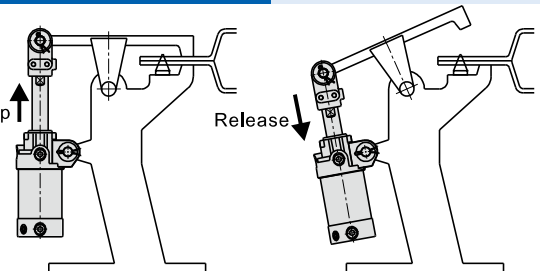
Bore size	Rod size	Acting type	Operating pressure(MPa)							
			0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8
40	20	Double acting Push side	125.6	251.2	376.8	502.4	628.0	753.6	879.2	1004.8
		Pull side	94.2	188.4	282.6	376.8	471.0	565.2	659.4	753.6
50	20	Double acting Push side	196.3	392.6	588.9	785.2	981.5	1177.8	1374.1	1570.4
		Pull side	164.9	329.8	494.7	659.6	824.5	989.4	1154.3	1319.2
63	20	Double acting Push side	311.7	623.4	935.1	1246.8	1558.5	1870.2	2181.9	2493.6
		Pull side	280.3	560.6	840.9	1121.2	1401.5	1681.8	1962.1	2242.4
80	25	Double acting Push side	502.6	1005.2	1507.8	2010.4	2513.0	3015.6	3518.2	4020.8
		Pull side	453.6	907.2	1360.8	1814.4	2268.0	2721.6	3175.2	3628.8

Installation and application



1. In normal situation such as: edge packing, installation, jig test...and so on. Standard cylinder is suggested.
2. In case of high-magnetic field generated by welding in the vicinity, anti-magnetic welding clamp cylinder shall be used and corresponding anti-magnetic sensor switch shall be matched.
3. Before cylinder connecting, the dust must be eliminated to avoid it entering in the cylinder.
4. The medium used by cylinder shall be filtered to 40µm or below.
5. Under high temperature environment, the cylinder of high-temperature resistance shall be selected. Anti-freezing measure shall be adopted under low temperature environment to prevent the water freezing in cylinder.
6. If cylinder is not used for a long time, please advert the surface to get rusty. Inlet and outlet ports should have anti-dust caps and also spread the oil to avoid getting rusty on piston rod.

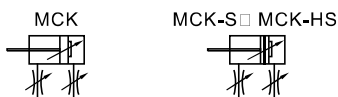
Application examples



MCK Series



Symbol



Stroke


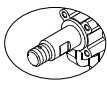
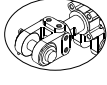
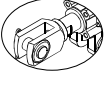
Bore size(mm)	Standard stroke(mm)	Available stroke
40, 50, 63, 80	50 75 100 125 150	150

Remark) Consult us for non-standard stroke.

Ordering code

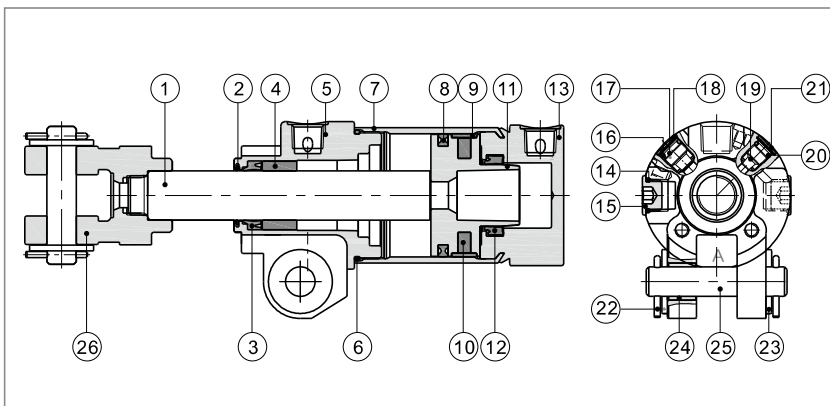
MCK A 50×75 S □ Y □



① Model	② Orifice model	③ Bore size	④ Stroke	⑤ Magnet	⑥ Mounting type	⑦ Mounting type	⑧ Thread type	
MCK: Clamping cylinder (Double acting)	A: Orifice model A	40	Refer to Stroke table for detail	Blank: Without magnet S: With normal magnet[Note1]	Blank: Three groups air port in the front and back cover (Variable cushion for back and front cover)  Variable cushion for back cover and front cover	Blank: Without Y knuckle 	Blank: PT G: G	
	B: Orifice model B	50				Y : With Y knuckle (With M6 thread hole) 		YW : With Y knuckle (No M6 thread hole) 
		63						
	No this code	80						

[Note1] In powerful magnetic field, sensor switch for high-magnet shall be matched. Please refer to Page 335 for option.

Inner structure and material of major parts



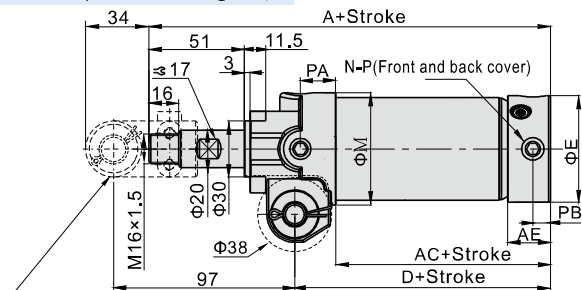
No.	Item	Material	No.	Item	Material
1	Piston rod	Carbon steel	15	Stop screw	Carbon steel
2	Scraping dust ring	Stainless steel	16	O-ring	NBR
3	Spool packing	NBR	17	Cush controlled screw	Aluminum alloy
4	Sliding bushing	Aluminum alloy	18	Bead flange	Spring steel
5	Front cover	Aluminum alloy	19	Speed controlled screw	Aluminum alloy
6	O-ring	NBR	20	O-ring	NBR
7	Barrel	Aluminum alloy	21	Bead flange	Spring steel
8	Piston O-ring	NBR	22	Orifice Pin	Midl steel
9	Wear ring	Wear resistant material	23	Cover blake	SPCC
10	Magnet	Magnetism material	24	Sliding bushing	Wear resistant material
11	Piston	Aluminum alloy	25	Pin	S45C
12	Cushion O-ring	TPU	26	Y knuckle	Nodular cast iron
13	Back cover	Aluminum alloy			
14	O-ring	NBR			

Clamping cylinder

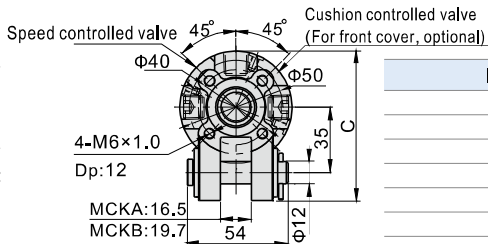
MCK Series

Dimensions

φ40/50/63(Without magnet)

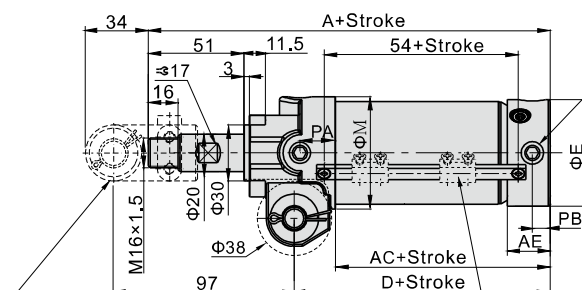


If it goes with hinged-support, the width would be the same with front cover of cylinder.



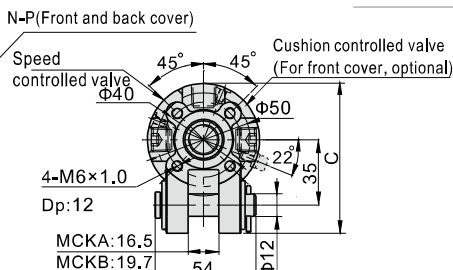
Item\Bore size	40	50	63	
A	162	165	167	
AC	59	65	67	
AE	20	22	23	
C	76	80	87	
D	84	87	89	
E	47	57	70	
M	52	60	74	
N (Number of hole)	Variable cushion for back and front cover	6	6	6
	Variable cushion for back cover	2	2	2
P(Inlet and out let port)			1/4"	
PA		20	19	19
PB		9	9.5	9.5

φ40/50/63(With magnet)



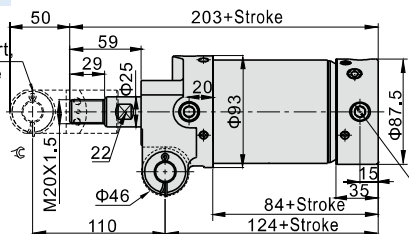
If it goes with hinged-support, the width would be the same with front cover of cylinder.

Mounting seat for Anti-magnetic sensor switch(available)

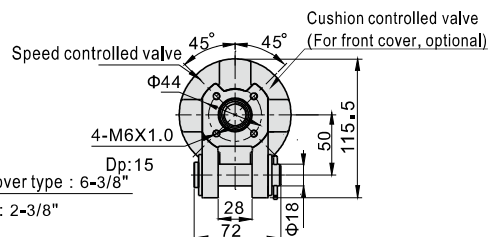


φ80(Without magnet)

If it goes with hinged-support, the width would be the same with front cover of cylinder.

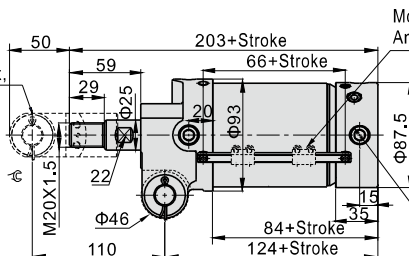


Variable cushion for back and front cover type : 6-3/8"
Variable cushion for back cover type : 2-3/8"



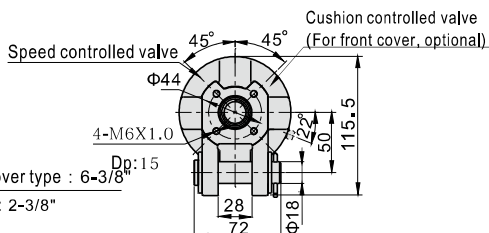
φ80(With magnet)

If it goes with hinged-support, the width would be the same with front cover of cylinder.



Mounting seat for Anti-magnetic sensor switch(available)

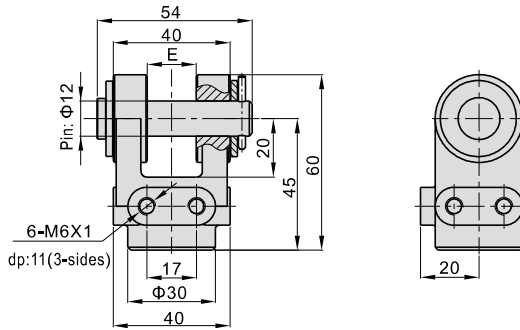
Variable cushion for back and front cover type : 6-3/8"
Variable cushion for back cover type : 2-3/8"



MCK Series

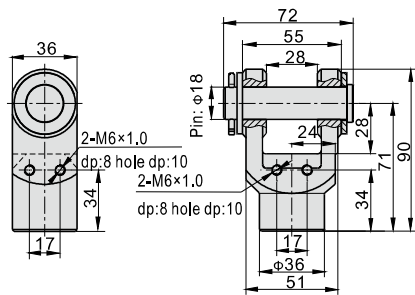
Specifications and ordering codes of Y knuckle

Φ40/50/63



Model	Ordering code	Applicable bore size	E
MCKA	MCKA50-Y	40\50\63	16.5
MCKB	MCKB50-Y	40\50\63	19.5

Φ80



Model	Ordering code	Applicable bore size
MCK	MCK80-Y	80

Clamping cylinder

Sensor switch—DS1-69AM Series



Feature

DS1-69AM series are anti-magnetic sensor switch, which are for AC magnetic environment.

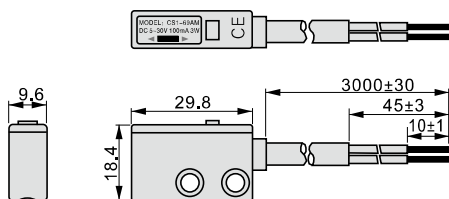
Ordering code

DS1-69AM	
①	②
① Number of sensor switch	② Code
	69AM: Anti-magnetic sensor switch (AC resistant welder)

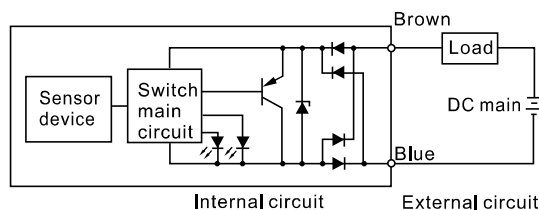
Specification

Item/Type	DS1-69AM
Switch logic	Transistor without contact, normally opened type
Sensor type	Transistor, two-line, nonpolarity
Operating voltage (V)	10~30V/DC
Max. Switching current	100mA Max.
Switching Rating (W)	3W Max.
Anti-magnetic current	AC 17000A
Voltage drop	4.8V Max. @100mA DC
Leakage current	0.6mA Max. @30V DC
Min. working current	3mA Min.
Indicator	Stable range:Green LED ; Non-table range:Red LED
Cable	Φ5.3/0.5SQ×2C×3m/oil resistant, Flame retarded, flection/gravy PVC
Sensitivity	30~40 Gauss
Max. Frequency	8Hz
Temperature range	-10~70°C
Shock	50m/s ²
Vibration	9m/s ²
Protection	IP 67(EN60529)
Protection circuit	Transistor without contact, surge suppression
Fire retardant grade	UL94-V0

Dimensions



Wiring diagram

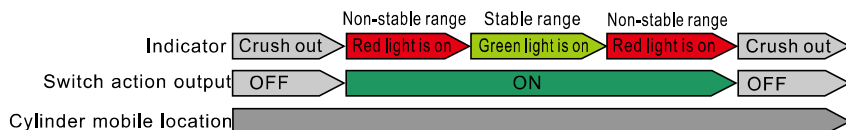


Mounting

In powerful magnetic field, sensor switch for high-magnet shall be matched, and the anti-magnetic bracket (F-MCK40H for MCK series or F-AQK50H for AQK50 Series) must be ordered separately, the ordering code, dimensions and the mounting method are below:

Ordering code	Dimensions	Mounting
F-MCK40H (For MCK Series)		
F-AQK50H (For AQK50 Series)		

Indicator action illustration





Power clamp cylinder—JSCK Series

Compendium of JSCK Series

4 Arm styles are available
4 Arm styles AM1, AM2, AM3 and AM4 each with 3 specifications R, C and L for uses in different situations.

Standard and Manual type are available

Manual type Standard type

4 sides are to be mounted
With dimensions subject to DIN standard.

Designed as a whole
Mechanism and cylinder designed as a whole.

Mechanism

Cylinder

Oval-shaped cylinder which is space efficient

Rod-crank-slider structure
Rod-crank-slider structure made of high-strength, highly-wear-resisting material is adopted.
a) Stable and reliable structure which can produce large clamping force at low working pressure.
b) Self-lock mechanism is adopted at clamping position which can still provide clamping force even after compressed air is off.

Electrical or Air inductive approaching sensor

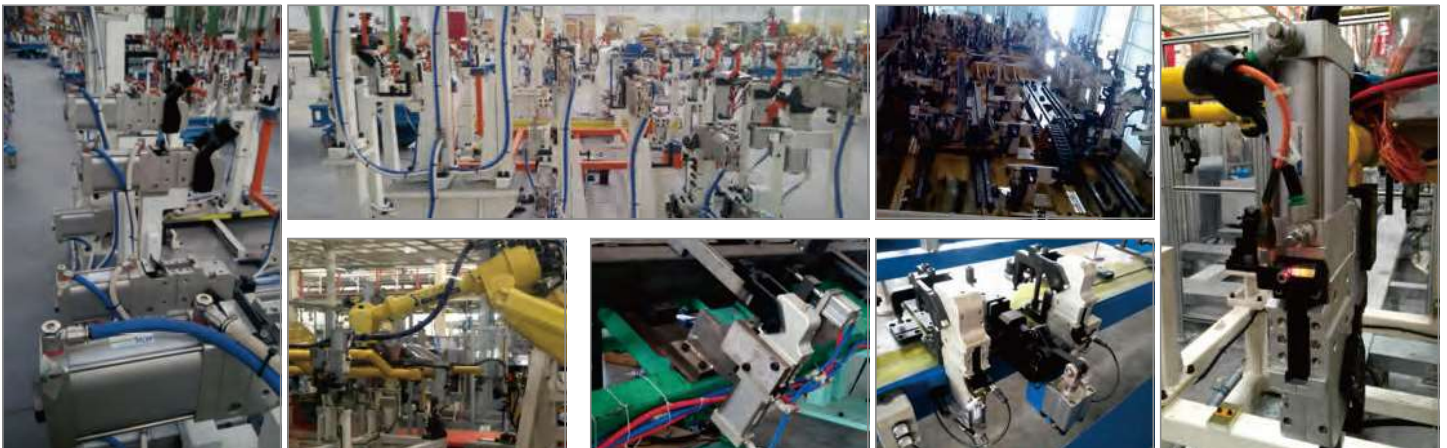
No sensor

Electrical Inductive approaching sensor (PNP/NPN type to be chosen)

Fixed opening angle
9 opening angles are optional by changing the barrel length; The smaller the opening angle, the shorter the barrel.

Rod-crank-slider structure

Application



Power clamp cylinder

JSKC Series—Standard type

Specification



Model	JSCK40	JSCK50	JSCK63	JSCK80
Output torque (0.5MPa)	120N.m	160N.m	380N.m	800N.m
Acting type	Double acting			
Fluid	Air(to be filtered by 40μm filter element)			
Operating pressure	0.3~0.8MPa(43~116psi)			
Proof pressure	1.2MPa(175psi)			
Temperature	-20~70 °C			
Opening angle	15°/30°/45°/60°/75°/90°/105°/120°/135°			
Minimum opening and closure time	1 second clamping, 1 second opening			
Position sensing	Electrical approaching sensor			
Cushion type	Air buffer			
Weight (135°) [Note1]	2.0kg	3.7kg	5.0kg	12.0kg
Port size [Note2]	1/8"		1/4"	

[Note1] This weight includes 15mm offset clamping arm;

[Note2] PT thread, G thread are available.

Ordering code

JSCK □ 50×135 AM1R K □ □

① ② ③ ④ ⑤ ⑥ ⑦ ⑧

① Model	② Clamping arm position	③ Bore size	④ Opening angle	⑤ Clamping arm [Note2]	⑥ Sensor switch[Note3]	⑦ Thread type	⑧ Port				
JSCK: Power clamp cylinder (Double acting)	Blank: horizontal	40(circular)	15 30 45 60 75 90 105 120 135 [Note1]	Blank: No clamping arm	Blank: No sensor switch	Blank: PT	Blank				
				AM1: Offset 15mm			R C L	B			
							AM3: Offset 45mm	R C L	Port		
							AM2: Offset 15mm	R C L	Port		
	V: Vertical			50(oval) 63(oval) 80(oval)			[Note1]	Blank: No clamping arm	K: With electrical sensor switch (PNP) KN: With electrical sensor switch (NPN)	G: G	Blank
											AM1: Offset 15mm
			AM3: Offset 45mm		R C L	Port					
			AM4: Offset 45mm		R C L	Port					

[Note1] Please refer to the right table for details of max. opening angle.

[Note2] Please refer to the drawing for detailed dimensions of clamping arm. Clamping arm AM1 and AM2 for 80 offset 20mm.

[Note3] K/KN type sensor switch can be ordered separately and please refer to relative contents.

Bore size	Arm position	Arm type	Maximum opening angle	Bore size	Arm position	Arm type	Maximum opening angle
40	horizontal	AM1	135°	50 63 80	horizontal	AM1, AM3	135°
		AM3	105°			AM2, AM4	
	Vertical(V)	AM1	120°		Vertical(V)	AM1, AM3	105°
		AM3	105°			AM2, AM4	

Weight Comparison with JCK series

Opening angle	40			50			63			80		
	JSCK	JCK	Weight reduction	JSCK	JCK	Weight reduction	JSCK	JCK	Weight reduction	JSCK	JCK	Weight reduction
15°	1.46	1.71	14.6%	2.61	3.36	22.3%	3.64	4.84	24.8%	8.87	11.30	21.5%
30°	1.47	1.70	13.5%	2.63	3.34	21.3%	3.68	4.80	23.3%	8.99	11.22	19.9%
45°	1.48	1.70	12.9%	2.65	3.32	20.2%	3.72	4.77	22.0%	9.08	11.16	18.6%
60°	1.49	1.70	12.4%	2.67	3.30	19.1%	3.76	4.74	20.7%	9.18	11.11	17.4%
75°	1.50	1.69	11.2%	2.70	3.27	17.4%	3.80	4.71	19.3%	9.27	11.09	16.4%
90°	1.51	1.69	10.7%	2.71	3.25	16.6%	3.83	4.68	18.2%	9.36	10.99	14.8%
105°	1.52	1.68	9.5%	2.74	3.23	15.2%	3.87	4.65	16.8%	9.46	10.93	13.4%
120°	1.53	1.68	8.9%	2.75	3.21	14.3%	3.90	4.62	15.6%	9.53	10.88	12.4%
135°	1.54	1.67	7.8%	2.77	3.20	13.4%	3.93	4.57	14.0%	9.59	10.84	11.5%

[Note] The above weight does not include the weight of the clamping arm. (Unit: kg)

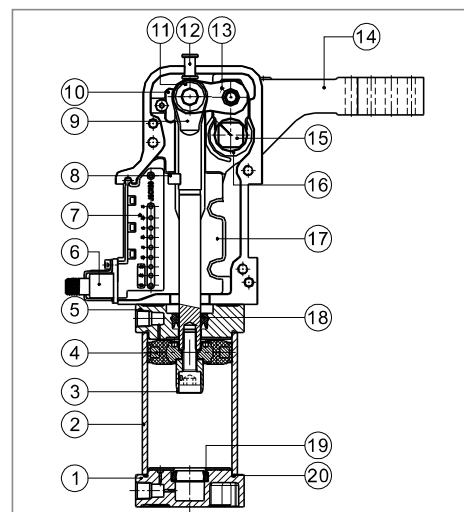


Power clamp cylinder

JSCK Series—Standard type

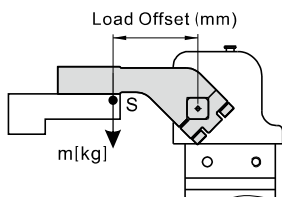
Inner structure and material of major parts

NO.	Item	Material	NO.	Item	Material
1	Back cover	Aluminum alloy	11	Bushing	Alloy steel
2	Aluminum barrel	Aluminum alloy	12	Retaining pin	Carbon steel
3	Cushion body	Aluminum alloy	13	Connecting rod	Carbon steel
4	Piston	Aluminum alloy+NBR	14	Clamping arm	Carbon steel
5	Front cover	Aluminum alloy	15	Pivot	Alloy steel
6	Sensor switch		16	Bushing	Alloy steel
7	Sensor switch fix	Plastic	17	End cap	Aluminum alloy
8	Inductive block	Carbon steel	18	Spool O-ring	TPU
9	I Knuckle	Alloy steel	19	Cushing O-ring	TPU
10	Strengthen steel plate	Alloy steel	20	O-ring	NBR



How to select product

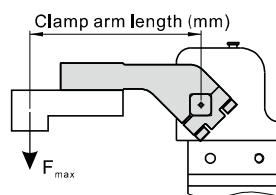
1. Please design appropriate fixture according to "Allowable Arm Load-Load Offset curve" diagram.



Bore size	Maximum load torque	
	1 second period	2 second period
40	2.2Nm	3.3Nm
50	4.5Nm	6.7Nm
63	6.0Nm	9.0Nm
80	8.0Nm	11.2Nm

S: distance from pivot point to center of mass of clamping arm
m: weight of clamping arm

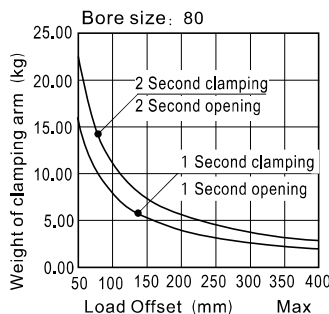
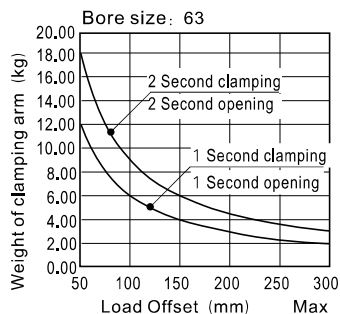
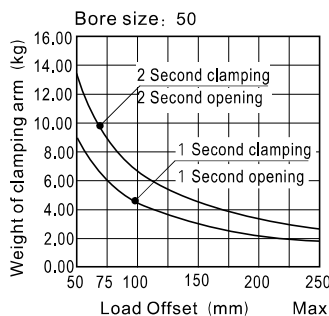
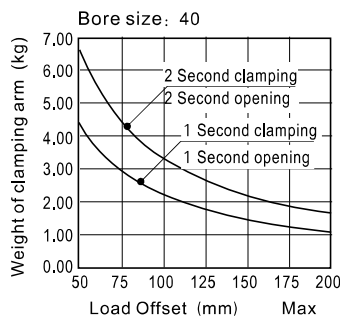
2. Please choose appropriate clamping position according to "Torque-Clamping Arm Length curve" diagram.



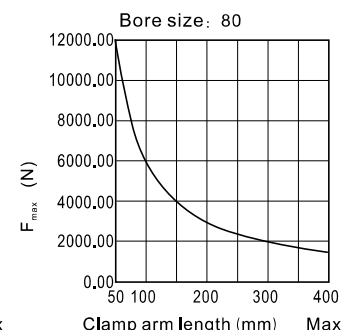
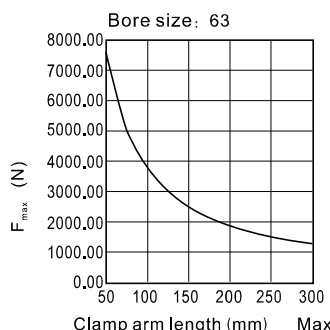
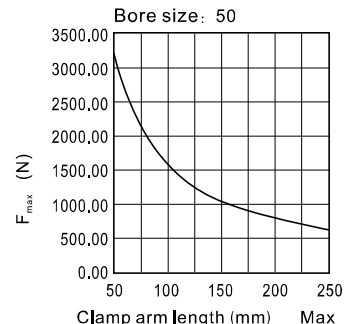
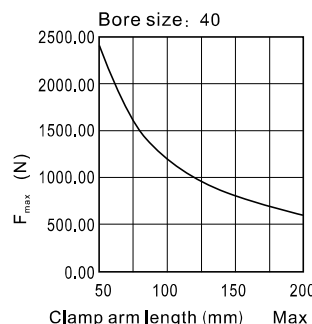
Note: For clamping force is produced by elbow mechanism, maximum torque is only reached at final clamping arm position.

Bore size	Maximum holder torque
40	380Nm
50	800Nm
63	1500Nm
80	2500Nm

Bore size	Maximum clamp torque					
	0.3MPa	0.4MPa	0.5MPa	0.6MPa	0.7MPa	0.8MPa
40	72Nm	95Nm	120Nm	143Nm	167Nm	191Nm
50	99Nm	132Nm	165Nm	198Nm	230Nm	264Nm
63	230Nm	307Nm	384Nm	460Nm	537Nm	614Nm
80	482Nm	643Nm	803Nm	964Nm	1124Nm	1285Nm



Attention: Please use with speed control valve.



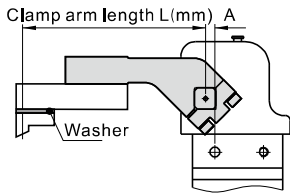
Power clamp cylinder

JSCK Series—Standard type

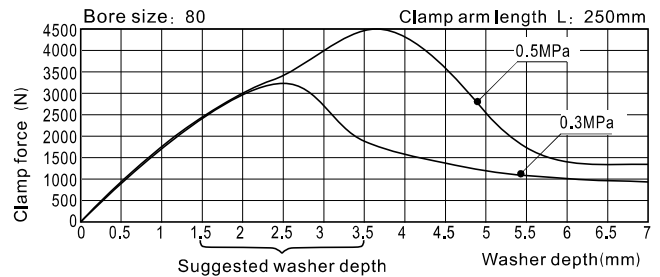
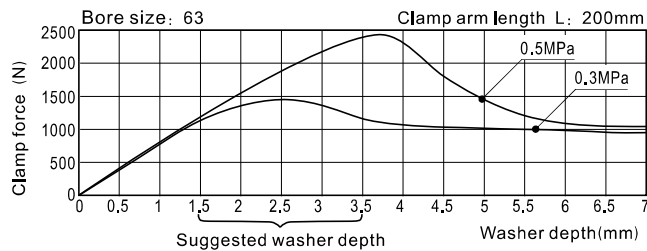
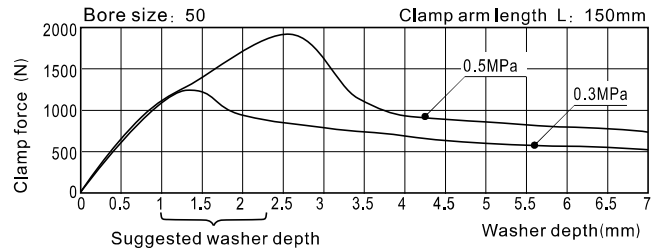
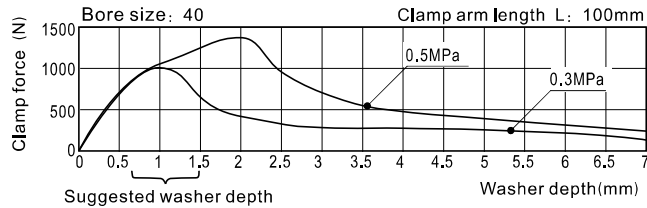
3. Please choose appropriate washer according to “Torque-Spacer thickness curve” diagram.

Note: Inserted washer exceeding maximum clamping torque position may lead to self-lock failure. Take safety issue into account when considering thickness of spacer inserted.

Besides, clamping arm length L represents distance from pivot point to clamping position. For distance from mounting base locating hole to pivot A, please refer to the following table.

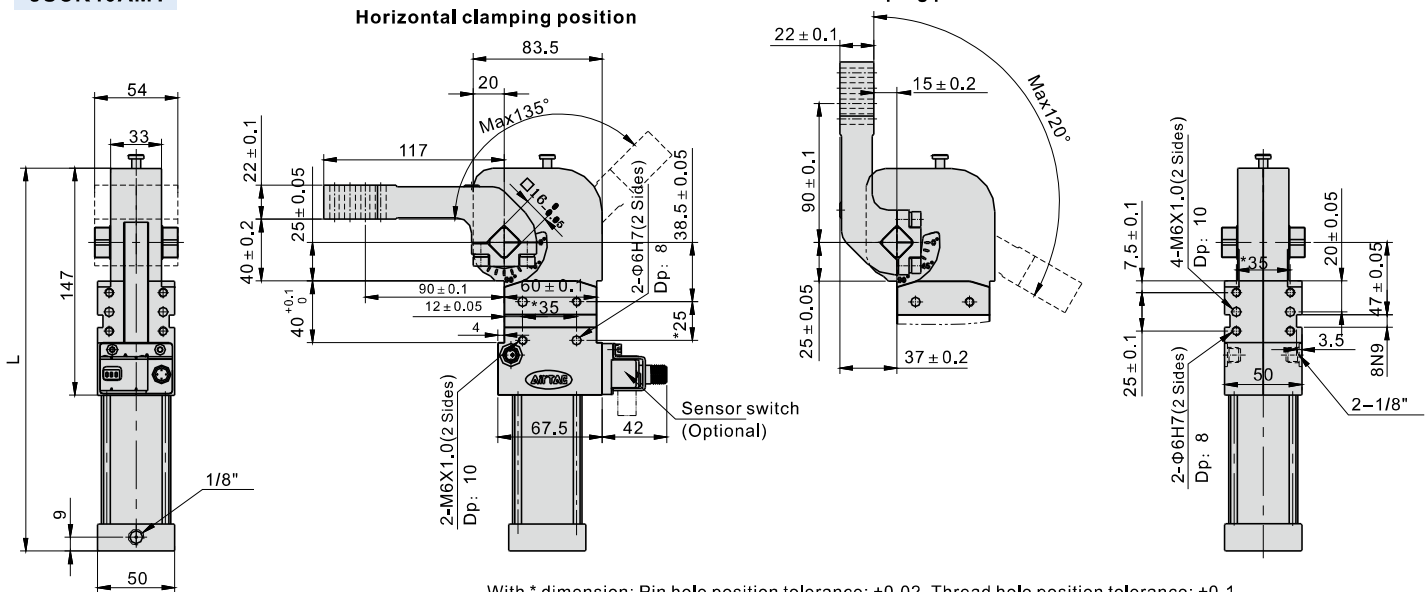


Bore size	A(mm)
40	12
50	10
63	10
80	15



Dimensions

JSCK40AM1



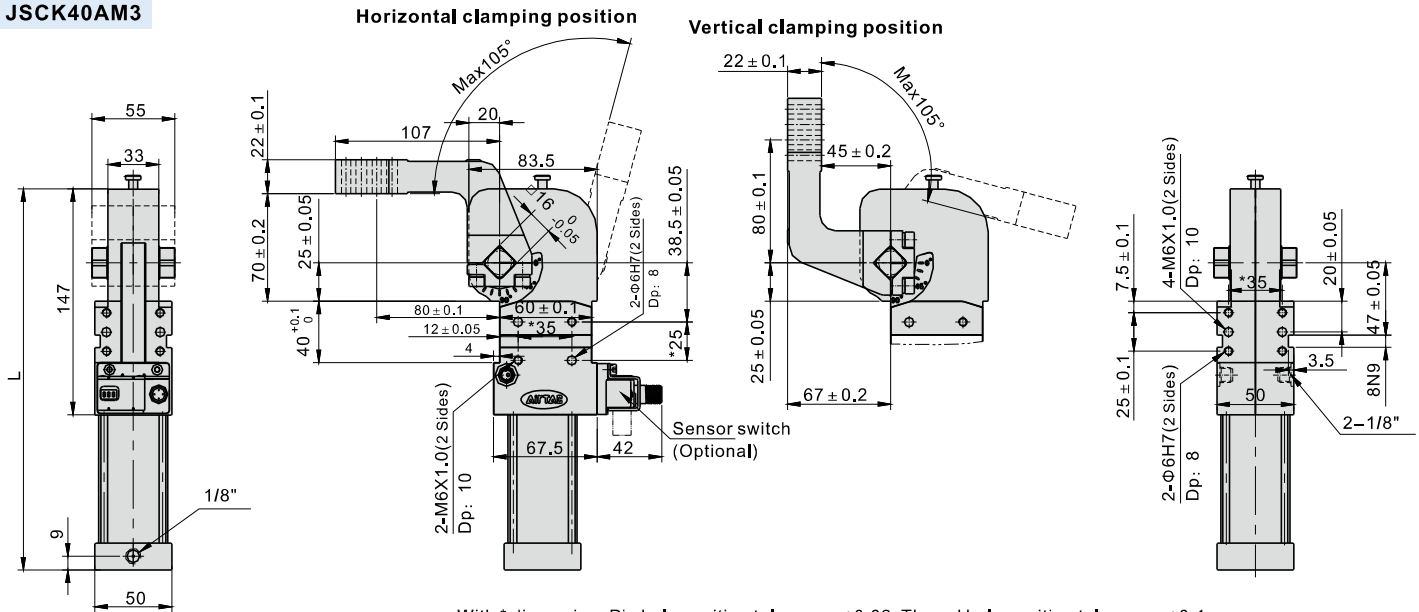
With * dimension: Pin hole position tolerance: ±0.02. Thread hole position tolerance: ±0.1.

Maximum opening angle	Total length of cylinder(L)	Maximum opening angle	Total length of cylinder(L)
15°	196.5	90°	231
30°	204.5	105°	238
45°	211	120°	244
60°	218	135°	248
75°	224.5		

Power clamp cylinder

JSCK Series—Standard type

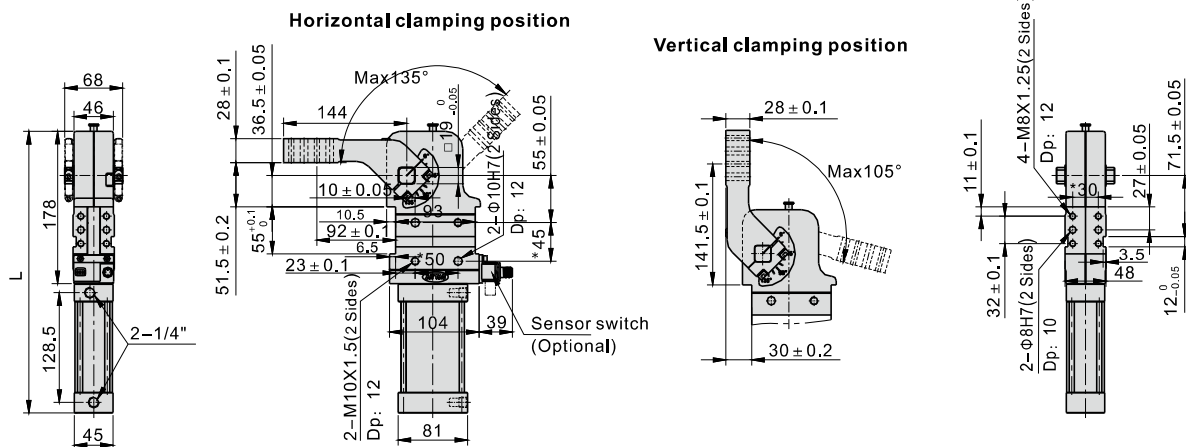
JSCK40AM3



With * dimension: Pin hole position tolerance: ± 0.02 , Thread hole position tolerance: ± 0.1 .

Maximum opening angle	Total length of cylinder(L)	Maximum opening angle	Total length of cylinder(L)
15°	196.5	90°	231
30°	204.5	105°	238
45°	211	120°	244
60°	218	135°	248
75°	224.5		

JSCK50AM1(2)



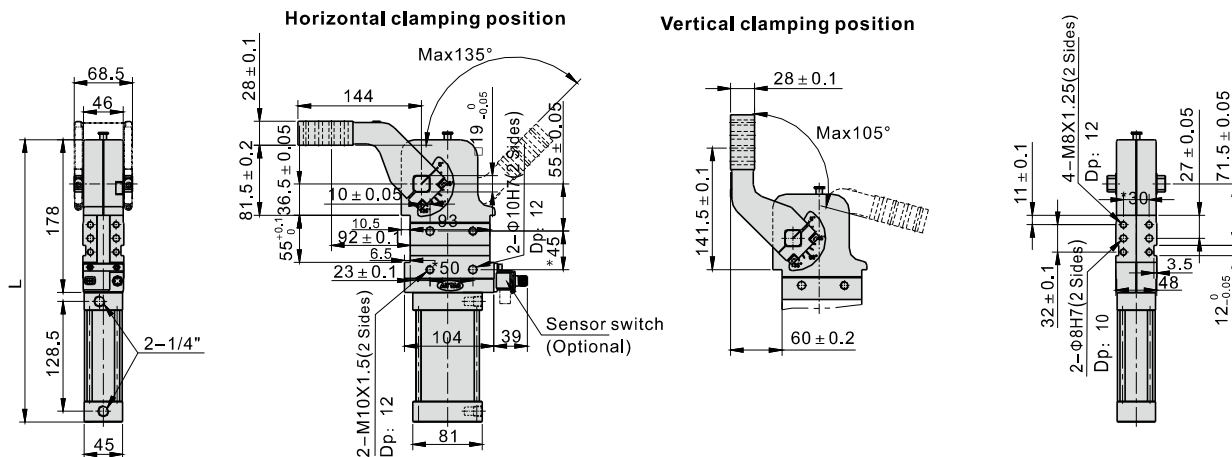
With * dimension: Pin hole position tolerance: ± 0.02 , Thread hole position tolerance: ± 0.1 .

Maximum opening angle	Total length of cylinder(L)	Maximum opening angle	Total length of cylinder(L)
15°	273.5	90°	311
30°	282	105°	318
45°	289	120°	324.5
60°	296.5	135°	329
75°	303.5		

Power clamp cylinder

JSKC Series—Standard type

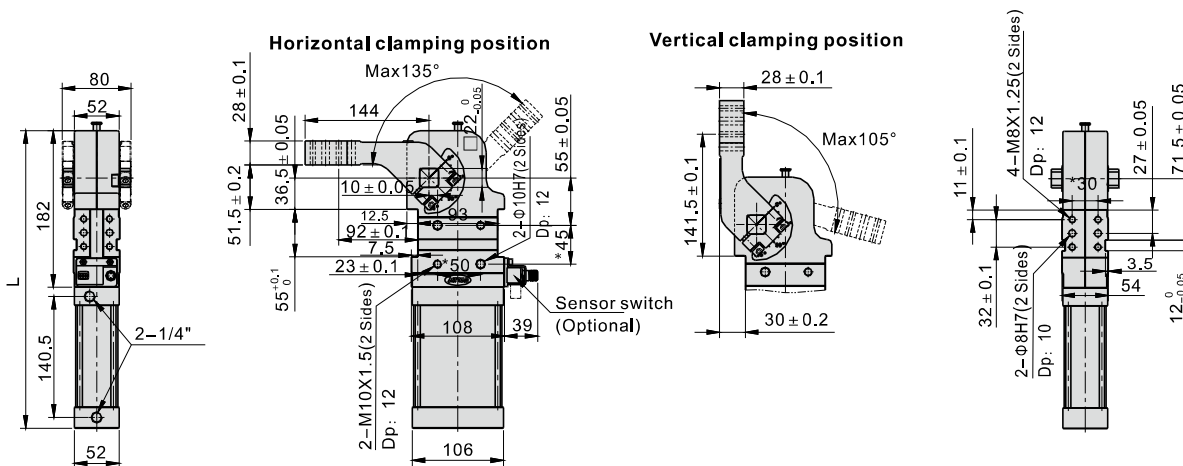
JSKC50AM3(4)



With * dimension: Pin hole position tolerance: ±0.02. Thread hole position tolerance: ±0.1.

Maximum opening angle	Total length of cylinder(L)	Maximum opening angle	Total length of cylinder(L)
15°	273.5	90°	311
30°	282	105°	318
45°	289	120°	324.5
60°	296.5	135°	329
75°	303.5		

JSKC63AM1(2)



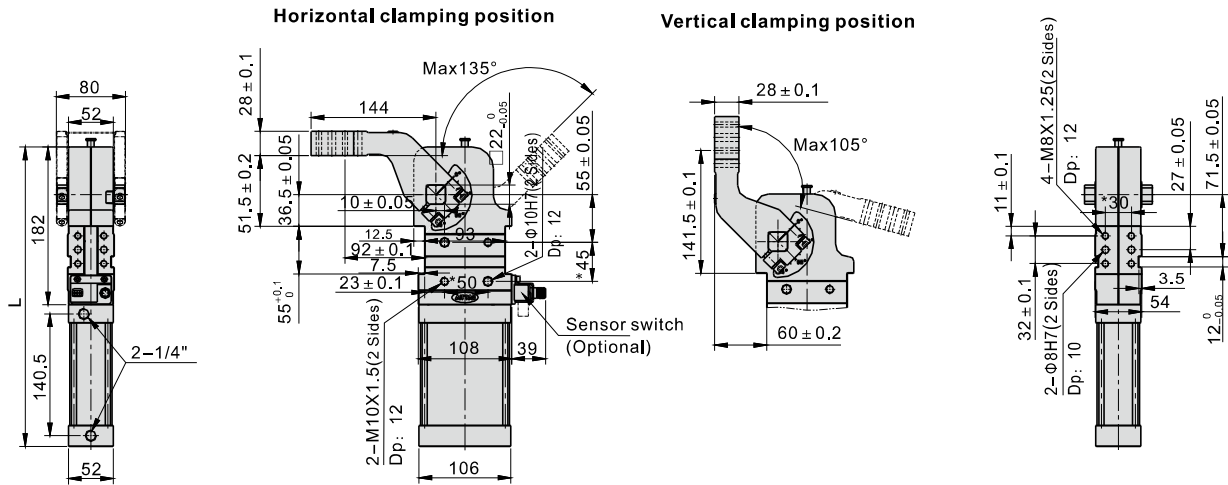
With * dimension: Pin hole position tolerance: ±0.02. Thread hole position tolerance: ±0.1.

Maximum opening angle	Total length of cylinder(L)	Maximum opening angle	Total length of cylinder(L)
15°	283	90°	325
30°	293	105°	333
45°	301	120°	340
60°	309	135°	345.5
75°	317		

Power clamp cylinder

JSCK Series—Standard type

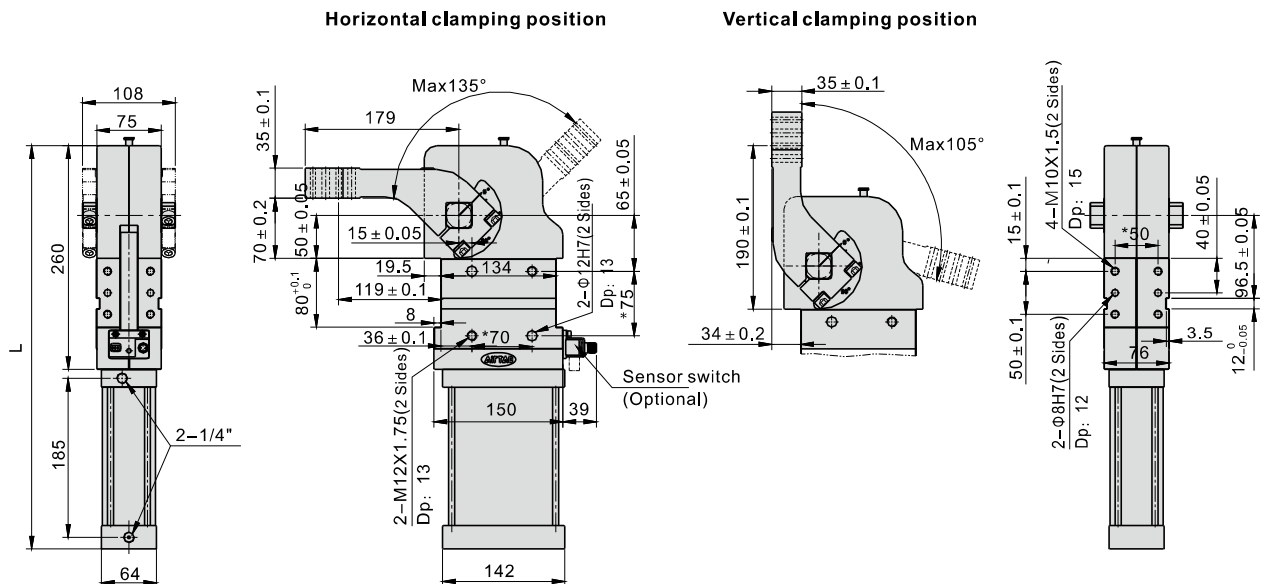
JSCK63AM3(4)



With * dimension: Pin hole position tolerance: ± 0.02 , Thread hole position tolerance: ± 0.1 .

Maximum opening angle	Total length of cylinder(L)	Maximum opening angle	Total length of cylinder(L)
15°	283	90°	325
30°	293	105°	333
45°	301	120°	340
60°	309	135°	345.5
75°	317		

JSCK80AM1(2)



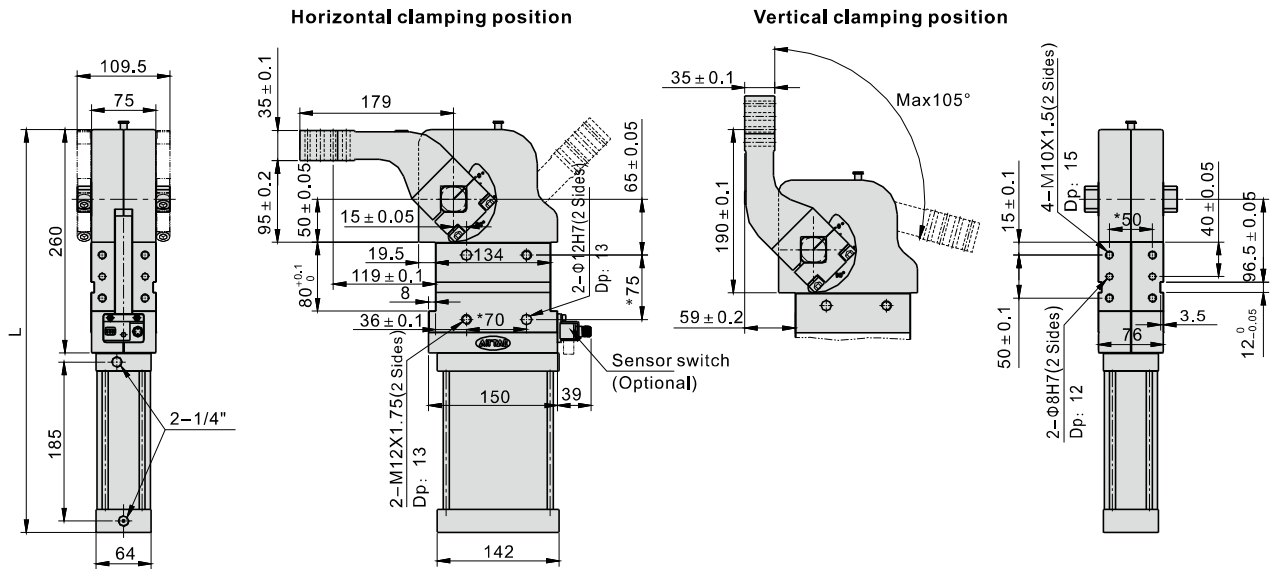
With * dimension: Pin hole position tolerance: ± 0.02 , Thread hole position tolerance: ± 0.1 .

Maximum opening angle	Total length of cylinder(L)	Maximum opening angle	Total length of cylinder(L)
15°	378.5	90°	440.5
30°	393	105°	452
45°	405	120°	462
60°	417	135°	469
75°	429		

Power clamp cylinder

JSCK Series—Standard type

JSCK80AM3(4)



With * dimension: Pin hole position tolerance: ± 0.02 . Thread hole position tolerance: ± 0.1 .

Maximum opening angle	Total length of cylinder(L)	Maximum opening angle	Total length of cylinder(L)
15°	378.5	90°	440.5
30°	393	105°	452
45°	405	120°	462
60°	417	135°	469
75°	429		



Specification

Model	JSCK40	JSCK50	JSCK6380
Output torque (0.5MPa)	120N.m	160N.m	380N.m
Acting type	Double acting		
Fluid	Air(to be filtered by 40μm filter element)		
Operating pressure	0.3~0.8MPa(43~116psi)		
Proof pressure	1.2MPa(175psi)		
Temperature	-20~70 °C		
Opening angle	15°/30°/45°/60°/75°/90°/105°/120°		
Minimum opening and closure time	1 second clamping, 1 second opening		
Position sensing	Electrical approaching sensor		
Cushion type	Air buffer		
Weight (135°) [Note1]	2.4kg	4.2kg	5.5kg
Port size [Note2]	1/8"	1/4"	

[Note1] This weight includes 15mm offset clamping arm;

[Note2] PT thread, G thread are available.

Ordering code

JSCK □ 50X120 AM1R HL K □ □

① ② ③ ④ ⑤ ⑥ ⑦ ⑧ ⑨

① Model	② Clamping arm position	③ Bore size	④ Opening angle	⑤ Clamping arm [Note2]	⑥ Handle location	⑦ Sensor switch	⑧ Thread type	⑨ Port
JSCK: Power clamp cylinder (Double acting)	Blank: horizontal 	40 (circular)	15 30 45 60 75 90 105 120 [Note1]	Blank: No clamping arm	Blank: non-manual HL: handle on the left 	Blank: No sensor switch K: With electrical sensor switch (PNP) KN: With electrical sensor switch (NPN) [Note3]	Blank: PT G: G	Blank B
	V: Vertical 			Blank: No clamping arm				HR: handle on the right
		50(oval) 63(oval)		AM1: Offset 15mm R C L 				
				AM3: Offset 45mm R C L 				
				AM2: Offset 15mm R C L 				
				AM4: Offset 45mm R C L 				

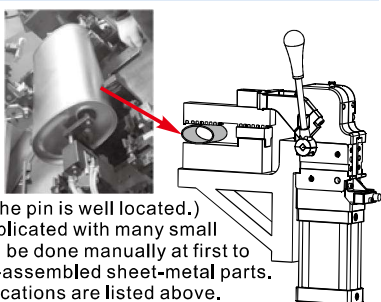
[Note1] Please refer to the right table for details of max. opening angle.

[Note2] K/KN type sensor switch can be ordered separately and please refer to relative contents.

Bore size	Arm position	Arm type	Maximum opening angle	Bore size	Arm position	Arm type	Maximum opening angle
40	horizontal	AM1	105°	50	horizontal	AM1, AM3	120°
	Vertical(V)	AM3			Vertical(V)	AM2, AM4	

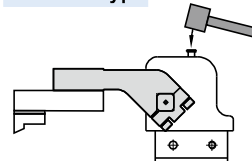
Examples for using

- When the clamped plate is hollow and thin, the final clamping position should be reached manually at low speed before clamping with force to avoid scallops left by fast clamping.
 - When clamping forearm has a locating pin, it should be pushed out of the locating hole manually. (Clamping should be done before the pin is well located.)
 - When clamping mechanism is complicated with many small sheet-metal parts, clamping should be done manually at first to avoid compressed air flushing well-assembled sheet-metal parts.
- Note: Part of manually clamping applications are listed above.
Other welding process may be in need of manually clamping.



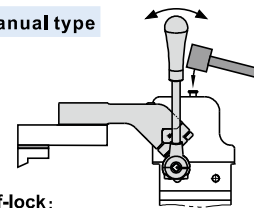
Contrast of self-lock and unlock

Standard type



- Self-lock:**
1. By inletting compressed air.
- Unlock:**
1. By inletting compressed air.
2. By knocking retaining pin.

Manual type



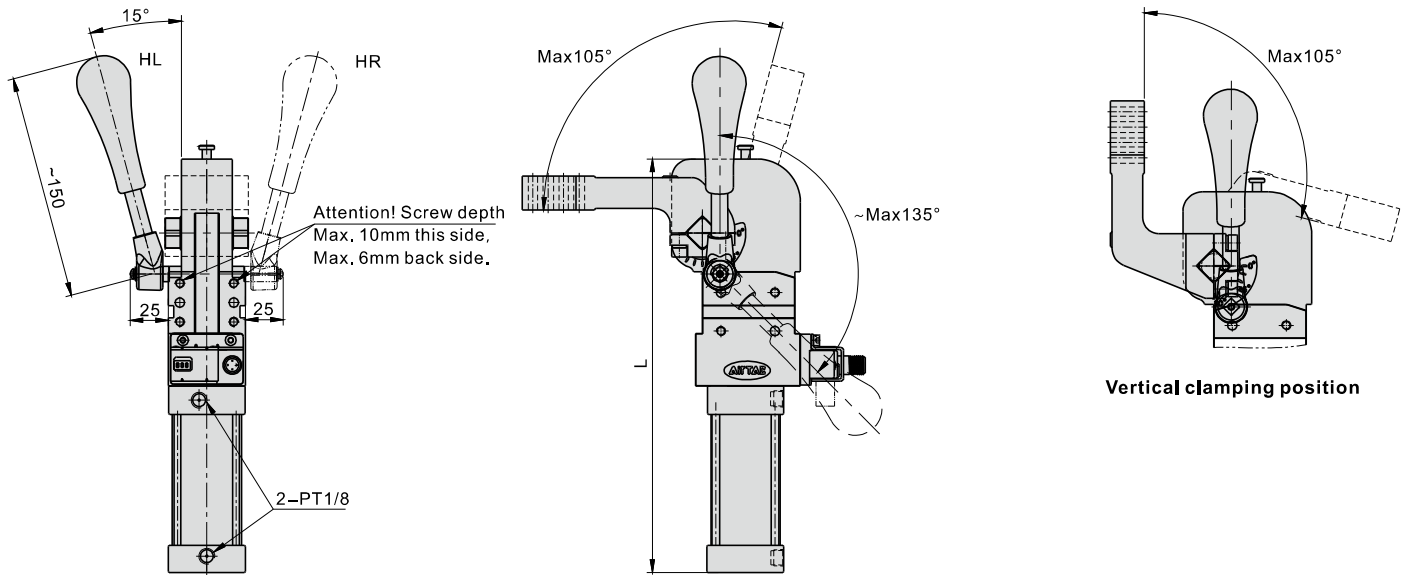
- Self-lock:**
1. By inletting compressed air.
2. By handle.
- Unlock:**
1. By inletting compressed air.
2. By knocking retaining pin.
3. By handle.

Power clamp cylinder

JSCK Series—Manual type

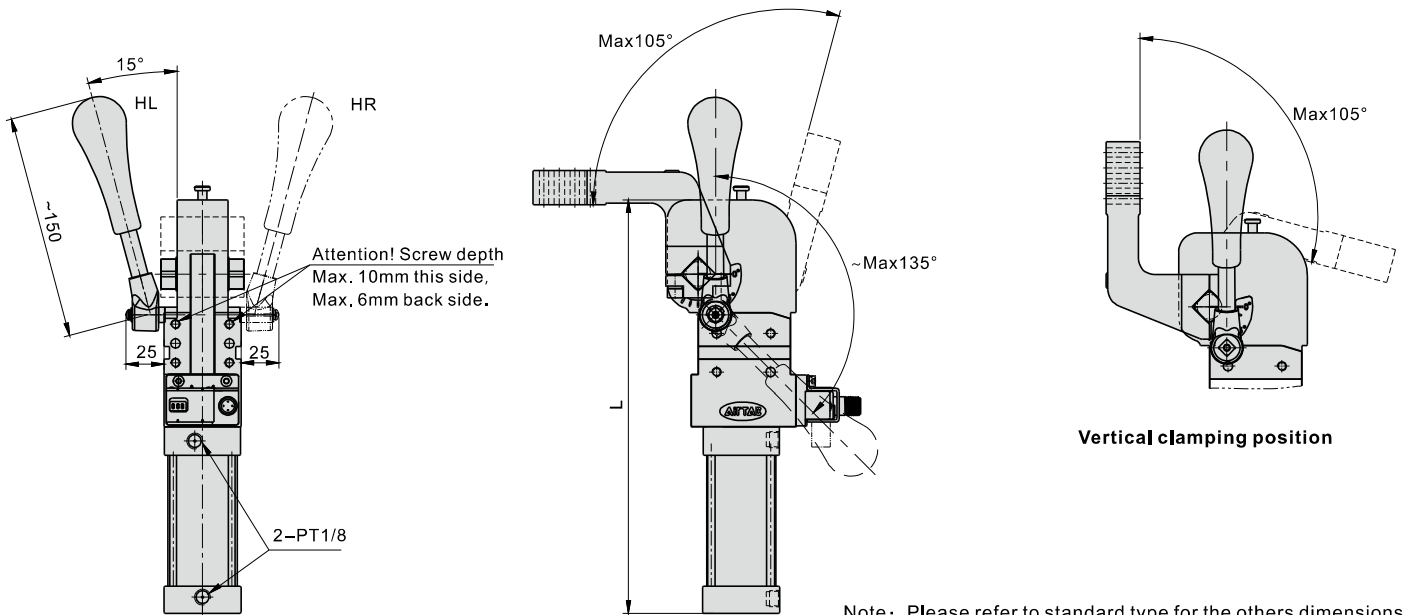
Dimensions

JSCK40AM1HL(HR)



Note: Please refer to standard type for the others dimensions.

JSCK40AM3HL(HR)



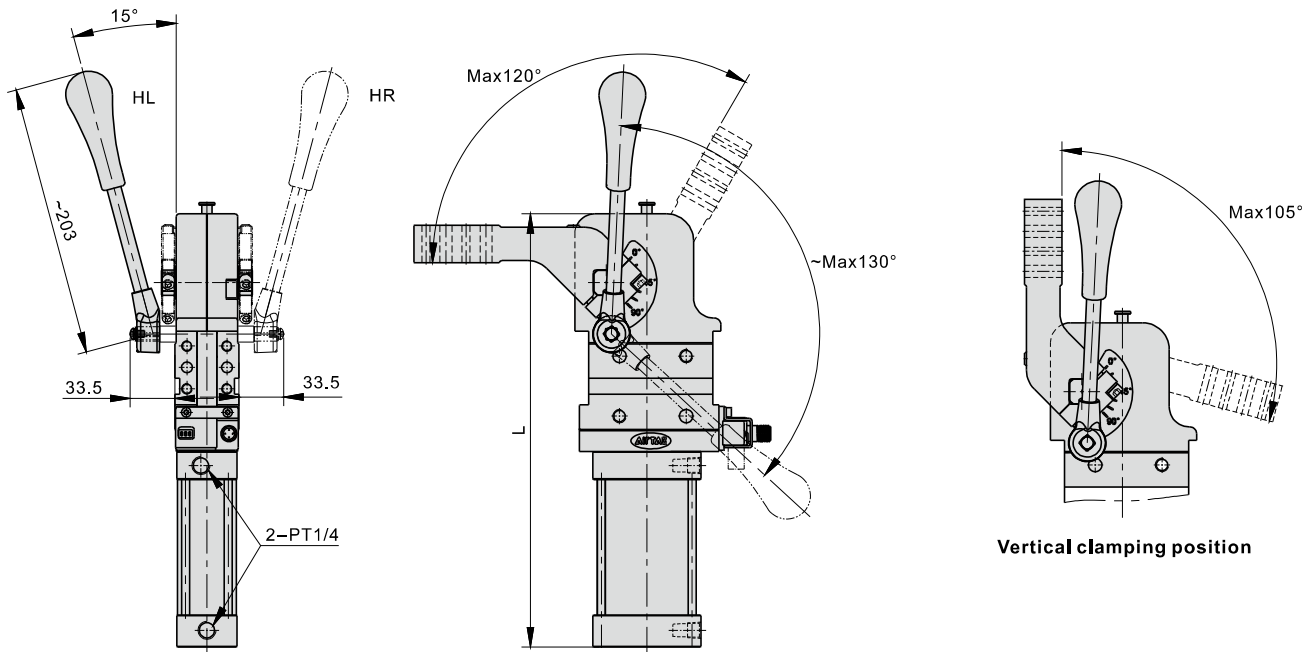
Note: Please refer to standard type for the others dimensions.

Maximum opening angle	Total length of cylinder(L)	Maximum opening angle	Total length of cylinder(L)
15°	226.5	75°	254.5
30°	234.5	90°	261
45°	241	105°	268
60°	248		

Power clamp cylinder

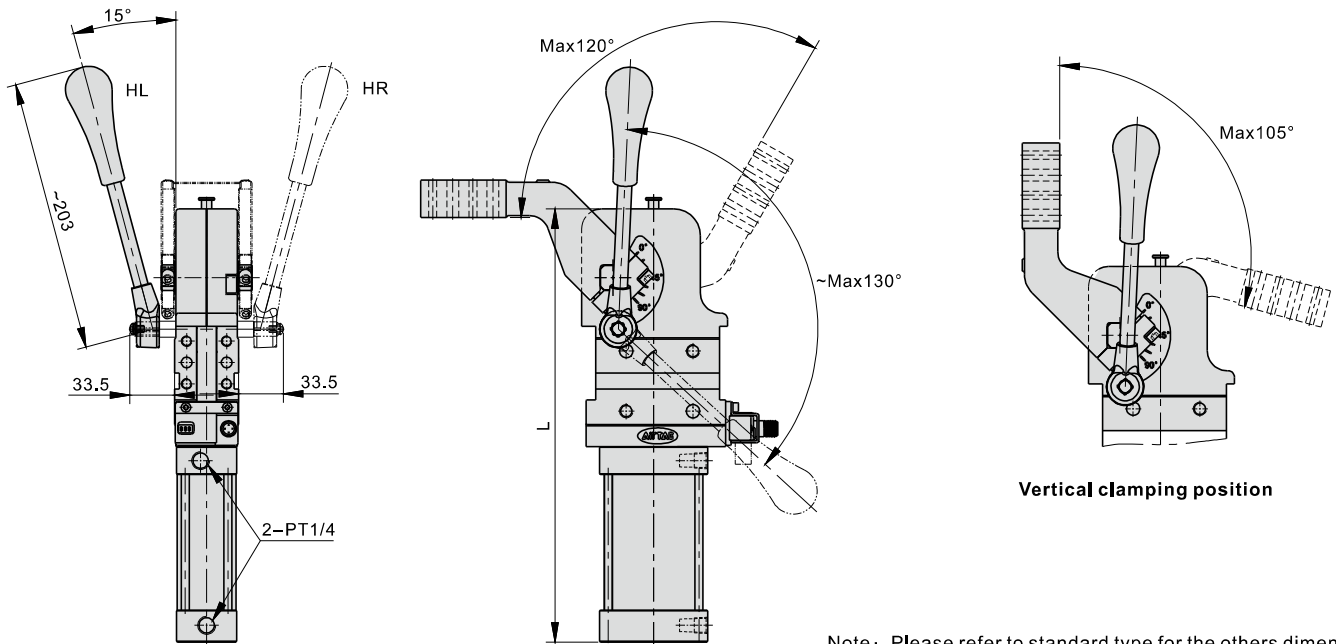
JSKC Series—Manual type

JSKC50AM1(2)HL(HR)



Note: Please refer to standard type for the others dimensions.

JSKC50AM3(4)HL(HR)



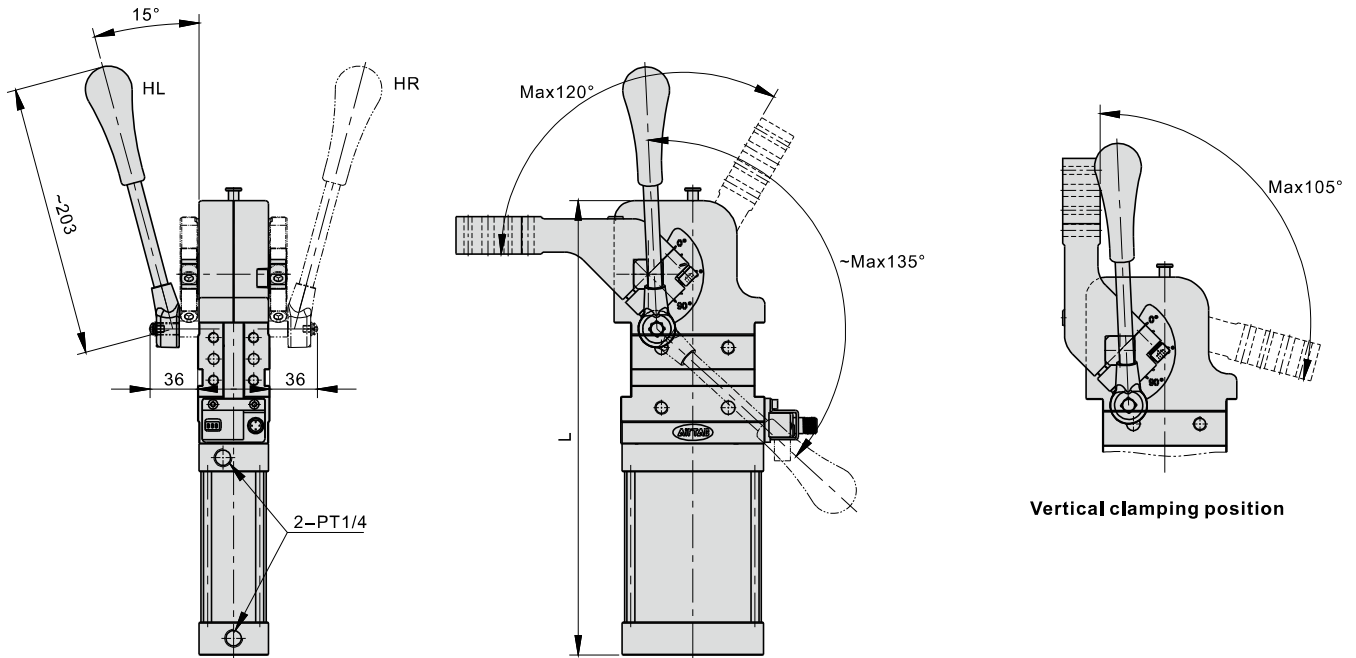
Note: Please refer to standard type for the others dimensions.

Maximum opening angle	Total length of cylinder(L)	Maximum opening angle	Total length of cylinder(L)
15°	273.5	75°	303.5
30°	282	90°	311
45°	289	105°	318
60°	296.5	120°	324.5

Power clamp cylinder

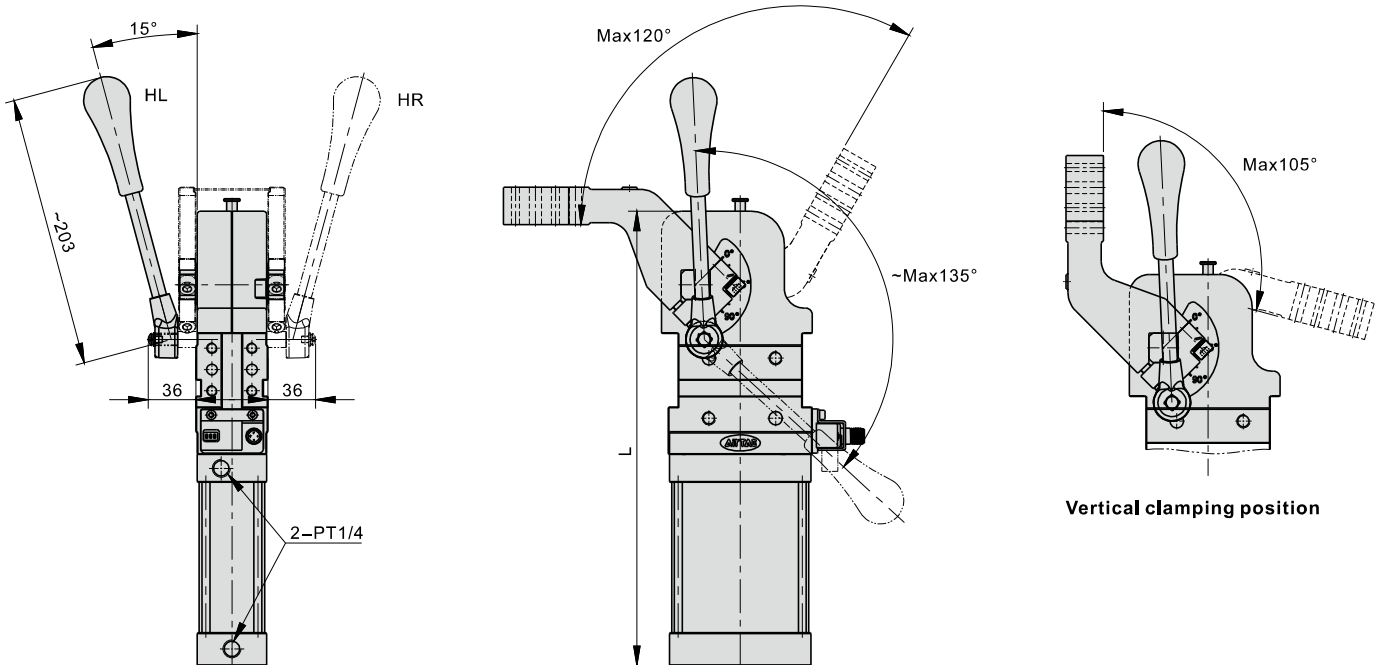
JSKC Series—Manual type

JSC63AM1(2)HL(HR)



Note: Please refer to standard type for the others dimensions.

JSC63AM3(4)HL(HR)



Note: Please refer to standard type for the others dimensions.

Maximum opening angle	Total length of cylinder(L)	Maximum opening angle	Total length of cylinder(L)
15°	283	75°	317
30°	293	90°	325
45°	301	105°	333
60°	309	120°	340

Power clamp cylinder

JSCK Series—Clamp arm



How to select clamp arm

Accessories\Cylinder type		JSCK40	JSCK50	JSCK63	JSCK80
F-JCK□□AM1R	F-JCK□□AM3R	●	●	●	●
F-JCK□□AM1C	F-JCK□□AM3C	●	●	●	●
F-JCK□□AM1L	F-JCK□□AM3L	●	●	●	●
F-JCK□□AM2R	F-JCK□□AM4R		●	●	●
F-JCK□□AM2C	F-JCK□□AM4C		●	●	●
F-JCK□□AM2L	F-JCK□□AM4L		●	●	●

Clamp arm ordering code

F-JCK 63 AM1C

① ② ③ ④

① Accessory code	② Cylinder type	③ Bore size	④ Clamping arm	
	Power clamp cylinder (Double acting)	40: Φ 40mm	Blank: No clamping arm	
			AM1: Offset 15mm	R C L
			AM3: Offset 45mm	R C L
			Blank: No clamping arm	
		50: Φ 50mm 63: Φ 64mm 80: Φ 80mm	AM1: Offset 15mm	R C L
			AM3: Offset 45mm	R C L
			AM2: Offset 15mm	R C L
			AM4: Offset 45mm	R C L

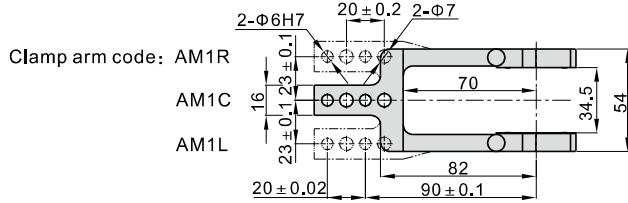
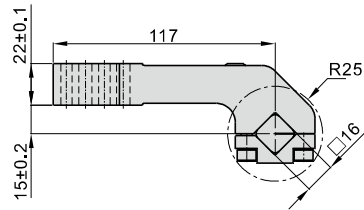
[Note2] Please refer to the drawing for detailed dimensions of clamping arm. Clamping arm AM1 and AM2 for 80 offset 20mm.

Power clamp cylinder

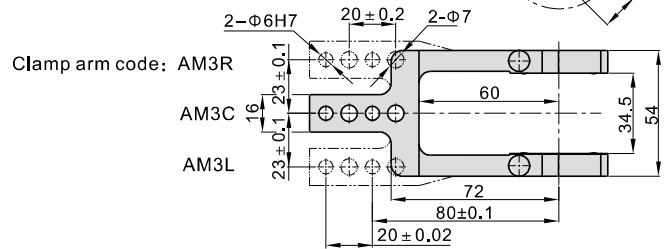
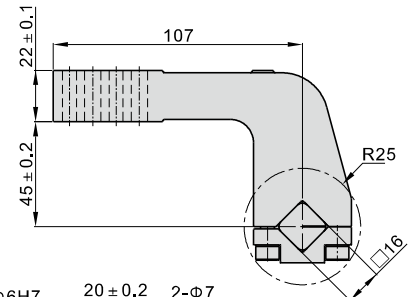
JSCK Series—Clamp arm

Dimensions of clamp arm

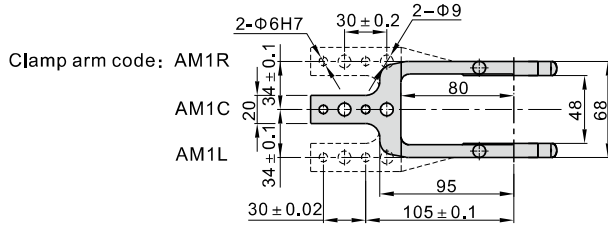
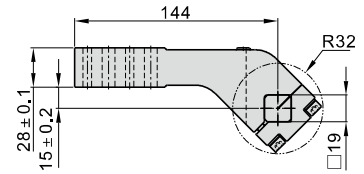
F-JCK40AM1



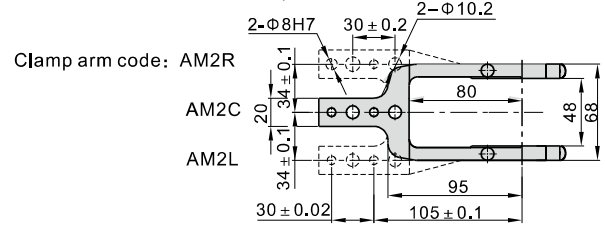
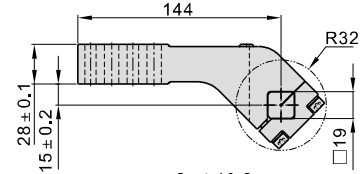
F-JCK40AM3



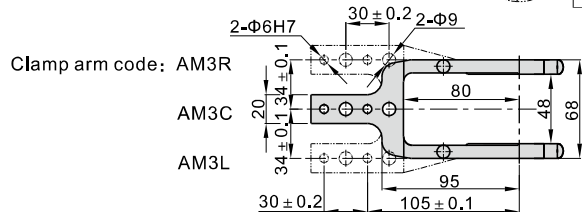
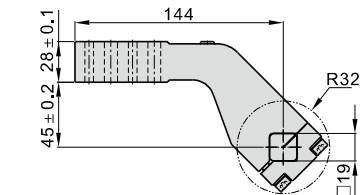
F-JCK50AM1



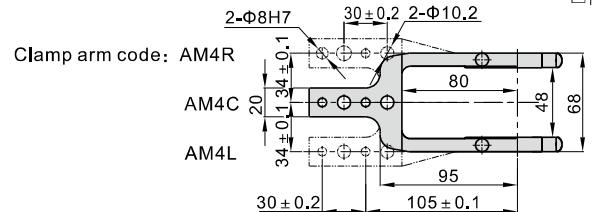
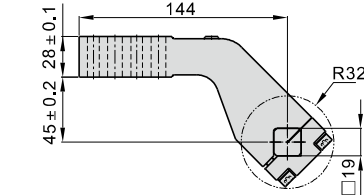
F-JCK50AM2



F-JCK50AM3



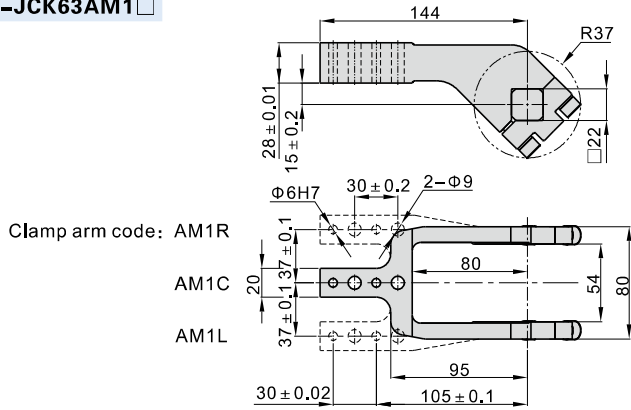
F-JCK50AM4



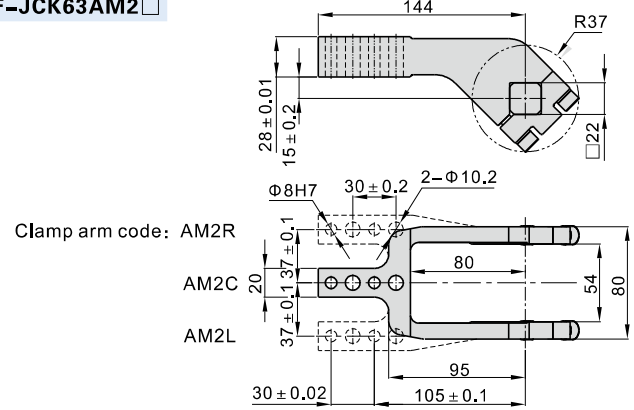
Power clamp cylinder

JSCK Series—Clamp arm

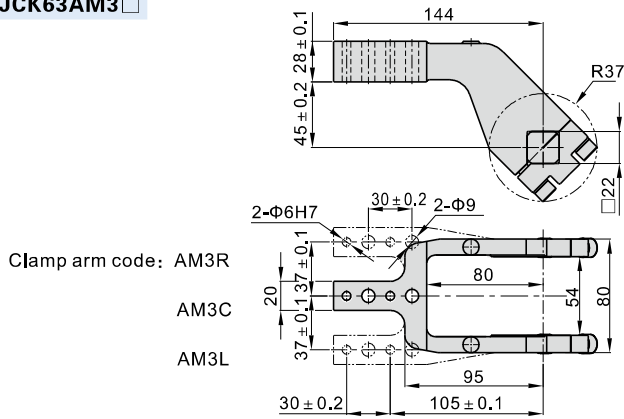
F-JCK63AM1 □



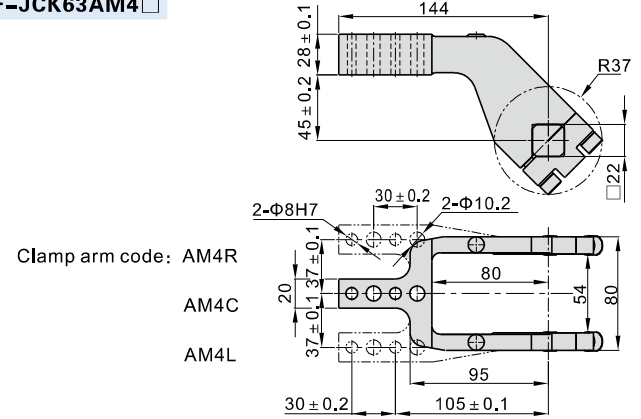
F-JCK63AM2 □



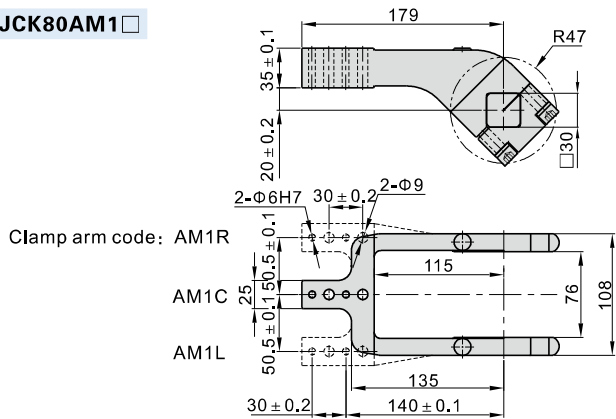
F-JCK63AM3 □



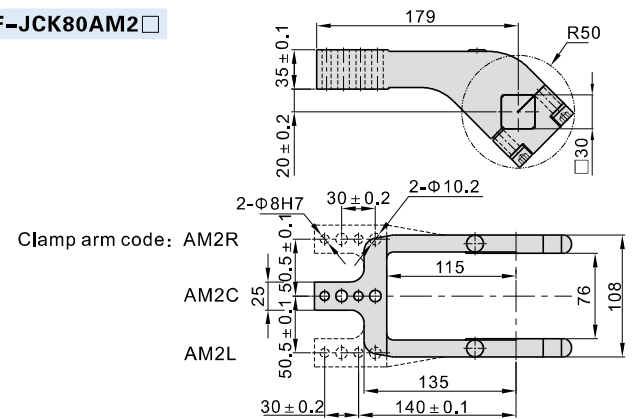
F-JCK63AM4 □



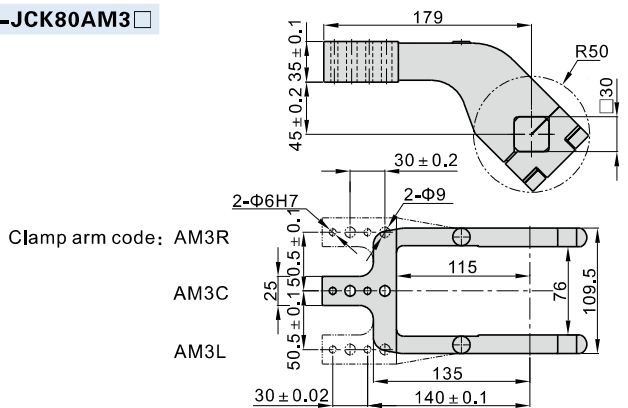
F-JCK80AM1 □



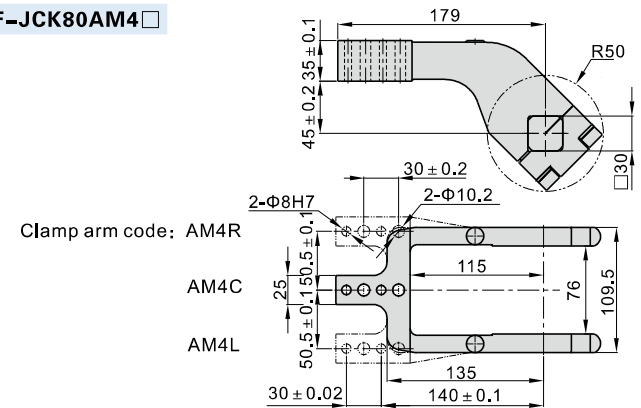
F-JCK80AM2 □



F-JCK80AM3 □



F-JCK80AM4 □



Power clamp cylinder

JSCK Series—Sensor switch



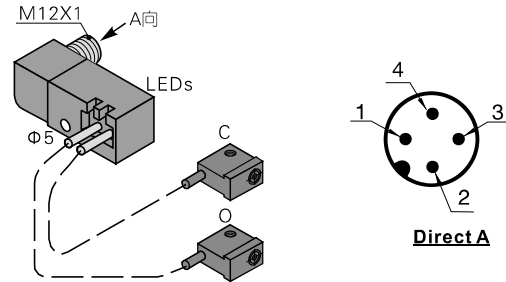
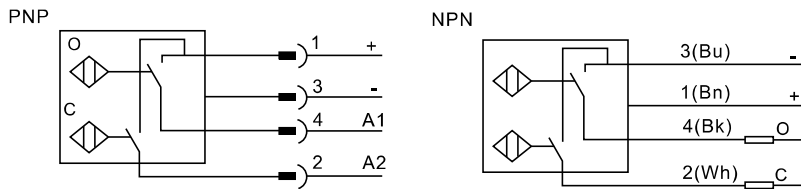
Specification

Operating range	2mm
Voltage range	10~30V DC
Output type	N.O., PNP, NPN
Rated DC	150mA(max)
Switch frequency	30Hz
Shell material	PBT
Switch status indication	Clamping: Red Opening: Yellow
Voltage indication	Green

Ordering code

DS1 KP 63			
	①	②	③
① Model	② Output type	③ Bore size	
DS1:	KP: PNP	63(Bore size: 40、50、63)	
Sensor switch	KN: NPN	80(Bore size: 80)	

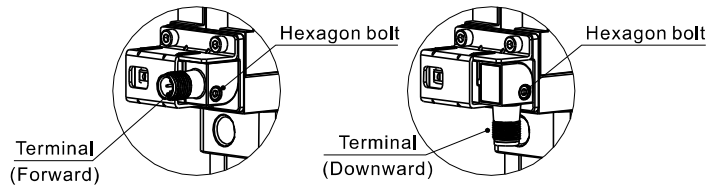
Hookup



Installation and application of sensor switch

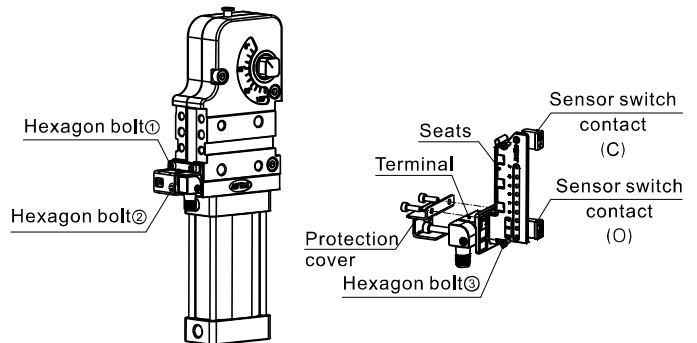
1. Sensor switch is well assembled before leaving factory which is free of adjusting. If you need to change terminals' wiring direction, change new sensor or rearrange angle, please do as follows:

1.1) Steps of changing terminals' wiring direction:



(See figure above.) Unscrew the hexagon bolt→rotate terminals' wiring direction as you need→screw up the hexagon bolt.

1.2) Steps of change new sensor switch:



(See figure above.) unscrew two hexagon bolts ①→dismount sensor seats as a whole→unscrew two hexagon bolts ③→dismount two sensor switch contacts(SO1\SO2)→unscrew hexagon bolt ②→remove the sensor switch→choose new sensor switch→replace new sensor switch contact and screw up hexagon bolt ②→replace new wiring box and screw up hexagon bolt ①→finished.

Recommended lock torque of hexagon bolt is listed in the following table:

Bore size	Recommended lock torque of hexagon bolt ①		Recommended lock torque of hexagon bolt ②		Recommended lock torque of hexagon bolt ③	
	Hexagon bolt type	Lock torque(N,m)	Hexagon bolt type	Lock torque(N,m)	Hexagon bolt type	Lock torque(N,m)
40、50	M4 × 0.7	2.0~3.0	M5 × 0.8	4.0~5.0	M3 × 0.5	1.2~1.5
63、80	M4 × 0.7	2.0~3.0				

1.3) Steps of readjusting angle: For more details, see latter contents.

1.4) Sensor switch's connection:

Sensor switch's connection need to use relevant male connector, which have separate male connector, and with wire male connector to be choosed.

The ordering code as below:

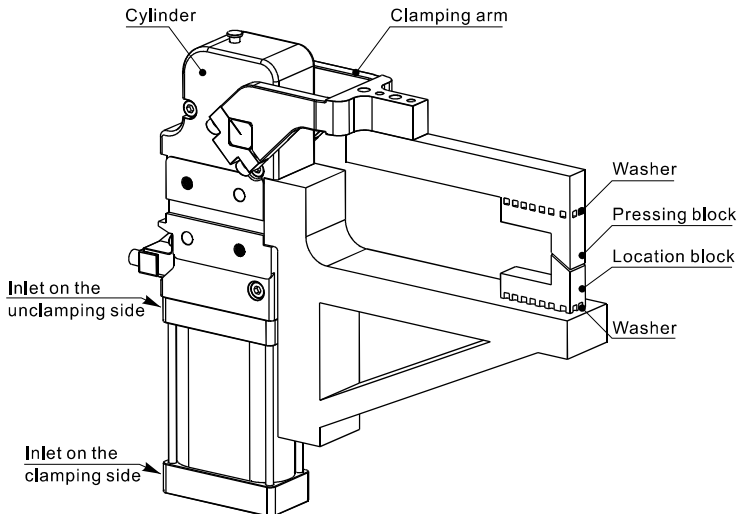
Name: On end cable(3 meters length)	Name: L shape cable(3 meters length)	Name: On end connector(rotundity)	Name: L shape connector (rotundity)
Ordering code: X-F-PPVCS	Ordering code: X-F-PPVCL	Ordering code: X-F-PPVCV	Ordering code: X-F-PPVCH



Installation and application

1. Mount the cylinder at desired place with bolts and locating pin after choosing a mounting surface. Connect the cylinder and control valve with joint and rubber hose. To adjust the opening and closure speed, our pneumatic power welding clamp is equipped with return stroke air buffering. Buffering cannot function well if the clamping arm is over-weighted so that clamping arm' weight must be within the allowable limit;
2. Using clamping arm beyond the listed in this catalog is forbidden.
3. Workpiece mounting method:

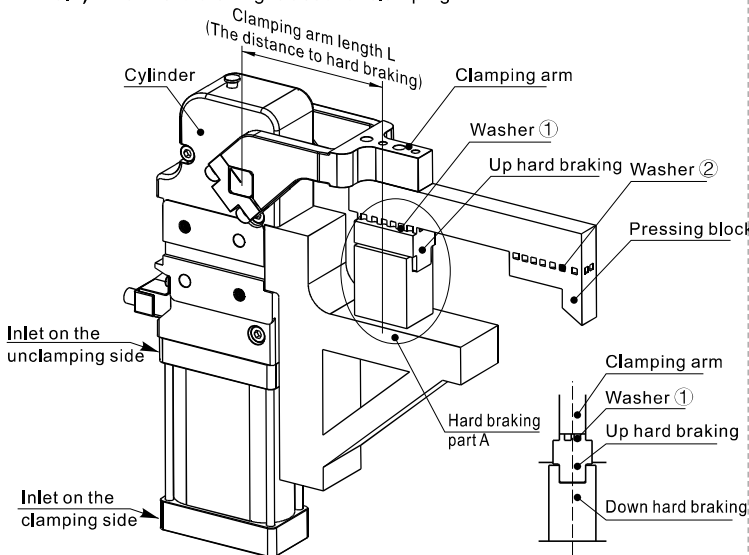
3.1) When only clamping torque is used for clamping:



Please follow the steps to mount the workpiece onto the clamping arm:

- A) Clamping the arm: supply compressed air through the inlet on the clamping side to keep the arm and pressing block at the closure position simultaneously. Make sure the arm is locked up.
- B) Adjusting the clamping gap: adjust the spacer under the mentioned state to make the pressing block in line with the workpiece's thickness. (At this moment no clamping torque is produced theoretically.)
- C) Applying clamping torque: Insert the spacer furthermore under the mentioned state until the gap is smaller than the workpiece's thickness and desired clamping torque is produced. (Make sure the mechanism passes the dead position to produce self-locking i.e. the retaining pin is pushed out.)

3.2) When hard braking is used for clamping:



Detail drawing of hard braking part A

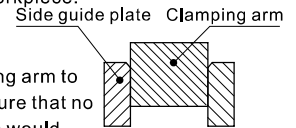
Please follow the steps to mount the workpiece onto the clamping arm:

- A) clamping the arm: supply compressed air through the inlet on the closure side to keep the arm and the braking block at the clamping position simultaneously. Make sure the arm is locked up;

- B) Adjusting the clamping gap: Adjust washer ① under the mentioned state until the gap between the upside braking block and downside one. (At this moment no clamping torque is produced theoretically.)
- C) Applying clamping torque: insert the washer ① furthermore under the mentioned state to produce desired clamping torque. (Make sure the mechanism passes the dead position to produce self-locking i.e. the retaining pin is pushed out.)
- D) Adjust washer ② under the state mentioned in C to make the pressing block in contact with the workpiece.

3.3) When side guide plate is mounted:

Side guide plate is mounted on the clamping arm to prevent transverse movement and make sure that no transverse load is applied and that the arm would not be stuck.



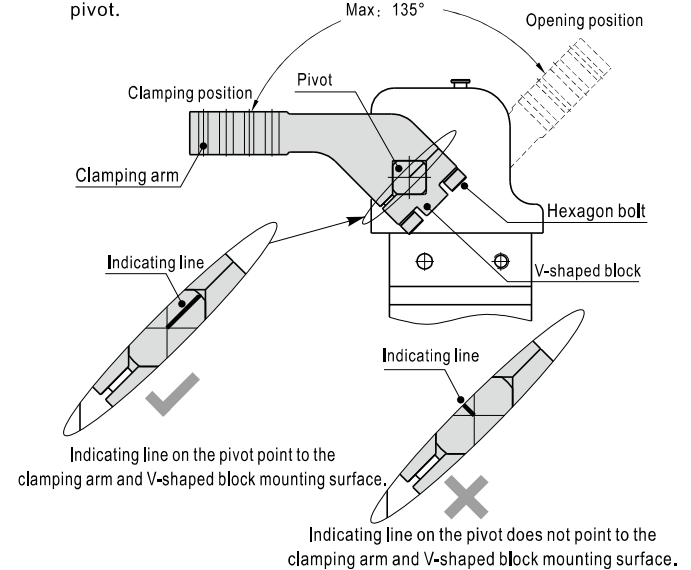
4. Mounting clamping arm:

The clamping arm is already mounted when leaving factory which can be remounted by yourself horizontally or vertically according to your actual need.

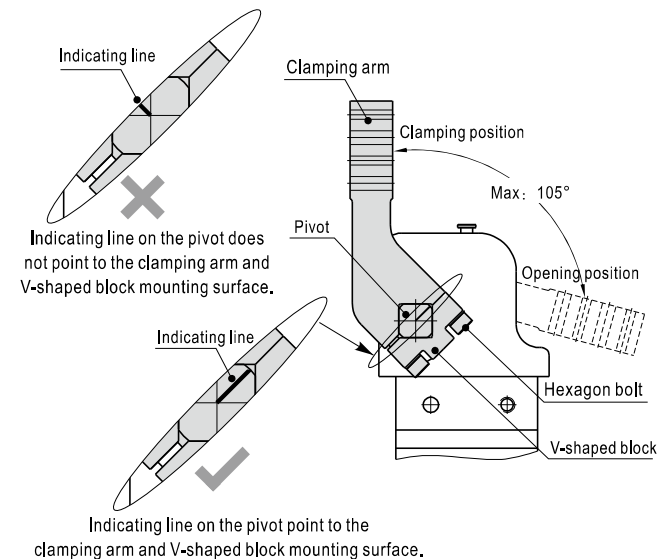
4.1) Mounting clamping arm horizontally:

Unscrew 4 hexagon bolts on both sides of the clamping arm to remove V-shaped block and then the clamping arm for substituting your desired one.

When mounting, please note the direction of the indicating line on the pivot.

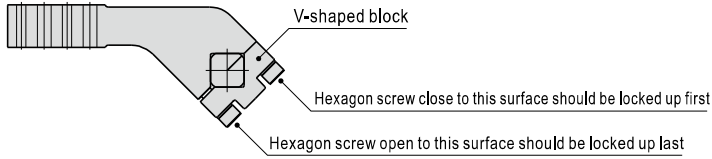


4.2) Mounting clamping arm vertically:



JSKC Series

4.3) V-shaped block mounting:



4.4) Holding torque of clamping arm (recommended):

When holding clamping arm, please choose recommended value in the following list:

Bore size	Bolt type	Holding torque (N.m)
40	M6 × 1.0	13.8
50	M6 × 1.0	13.8
63	M8 × 1.25	33.0
80	M10 × 1.5	66.0

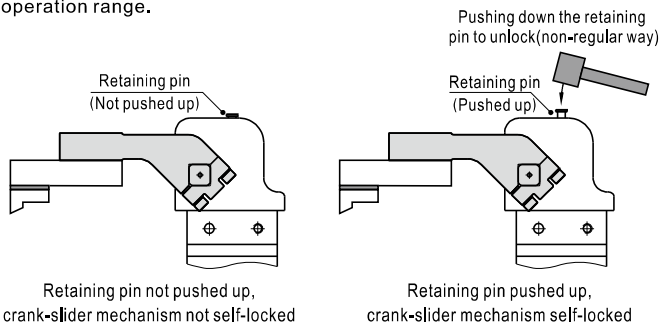
5. Self-lock function:

At the end of stroke, the crank-slider mechanism passes the dead point and gets self-locked up. The retaining pin gets pushed up at this moment. Even when compressed air is off, the cylinder can remain at closure state for safety. To open self-locking of the crank-slider mechanism, push down the retaining pin when compressed air is off.

Warning:

Pushing down the retaining pin may cause clamping arm to spring off at closure state.

So when using the pin, please get yourself away from the clamping arm's operation range.



Power clamp cylinder

JSK Series



Specification

Model	JSK40	JSK50	JSK63	JSK80
Output torque (0.5MPa)	120N.m	160N.m	380N.m	800N.m
Acting type	Double acting			
Fluid	Air(to be filtered by 40μm filter element)			
Operating pressure	0.3~0.8MPa(43~116psi)			
Proof pressure	1.2MPa(175psi)			
Temperature	-20~70 °C			
Opening angle	5° ~ 135°			
Minimum opening and closure time	1 second clamping, 1 second opening			
Position sensing	Electrical Inductive approaching sensor			
Cushion type	Air buffer			
Weight [Note1]	2.0kg	3.7kg	5.0kg	11.5kg
Port size [Note2]	1/8"		1/4"	

[Note1] This weight includes 15mm offset clamping arm;

[Note2] G thread is available.

Ordering code

JSK □ 50 AM1R K G □

① ② ③ ④ ⑤ ⑥ ⑦

① Model	② Clamping arm position	③ Bore size	④ Clamping arm [Note2]	⑤ Sensor switch [Note3]	⑥ Thread type	⑦ Port
JSK: Power clamp cylinder	Blank: Horizontal 	40 (circular)	Blank: No clamping arm AM1: Offset 15mm AM3: Offset 45mm 	Blank: No sensor switch K: With electrical sensor switch(PNP) KN: With electrical sensor switch(NPN)	G: G	Blank
	V: Vertical 		Blank: No clamping arm AM1: Offset 15mm AM3: Offset 45mm AM2: Offset 15mm AM4: Offset 45mm 			Blank

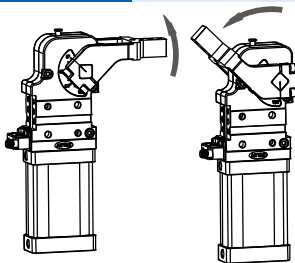
[Note1] Please refer to the right table for details of max. opening angle.

[Note2] Please refer to the drawing for detailed dimensions of clamping arm. Clamping arm AM1 and AM2 for 80 offset 20mm. products come with opening angle of 90°.

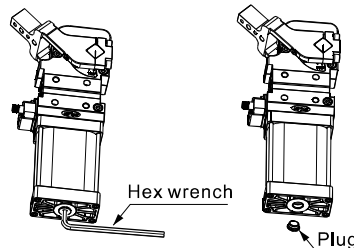
[Note3] K/KN type sensor switch can be ordered separately and please refer to relative contents.

Bore size	Arm position	Arm type	Maximum opening angle	Bore size	Arm position	Arm type	Maximum opening angle
40	horizontal	AM1	135°	50 63 80	horizontal	AM1, AM3 AM2, AM4	135°
		AM3	105°			Vertical(V)	AM1, AM3 AM2, AM4
	Vertical(V)	AM1	120°		Vertical(V)		AM1, AM3 AM2, AM4
		AM3	105°				

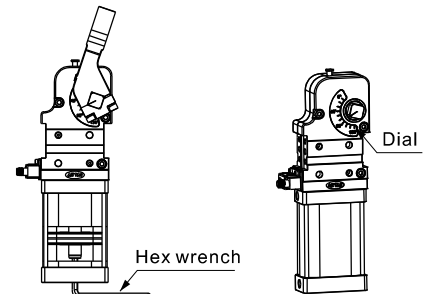
Instructions



Step1: Adjust the clamping arm to the maximum opening angle;



Step2: Unscrew the plug by H6(40) or H8(50,63,80) hex wrench;



Step3: Adjust the clamping arm to the desired opening angle by H6(40) or H8(50,63,80) hex wrench.

Instructions

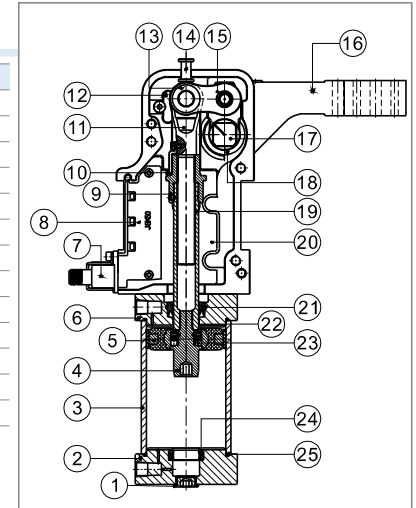
- Cushioning body and piston are connected by thread and riveting.
- Inductive block is fixed on the piston rod, which will move with piston rod while adjusting.
- Sensor switch does not need further adjustment after finishing the angle adjustment.

Power clamp cylinder

JSK Series

Inner structure and material of major parts

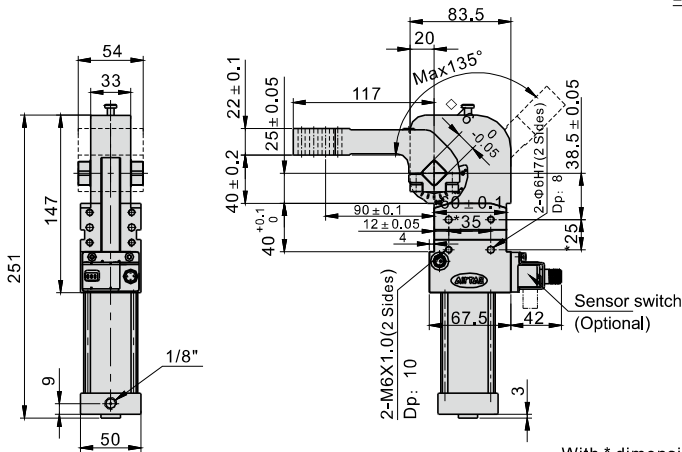
NO.	Item	Material	NO.	Item	Material
1	Plug	Carbon steel	14	Retaining pin	Carbon steel
2	Back cover	Aluminum alloy	15	Connecting rod	Alloy steel
3	Aluminum barrel	Aluminum alloy	16	Clamping arm	Carbon steel
4	Cushion body	Carbon steel	17	Pivot	Alloy steel
5	Piston	Aluminum alloy+NBR	18	Bushing	Alloy steel
6	Front cover	Aluminum alloy	19	Piston rod	Carbon steel
7	Sensor switch		20	End cap	Aluminum alloy
8	Sensor switch fix	Plastic	21	Spool O-ring	TPU
9	Joint	Alloy steel	22	Spring	Spring steel
10	Inductive block	Carbon steel	23	Steel ball	Stainless steel
11	I Knuckle	Alloy steel	24	Cushing O-ring	TPU
12	Strengthen steel plate	Alloy steel	25	O-ring	NBR
13	Bushing	Alloy steel			



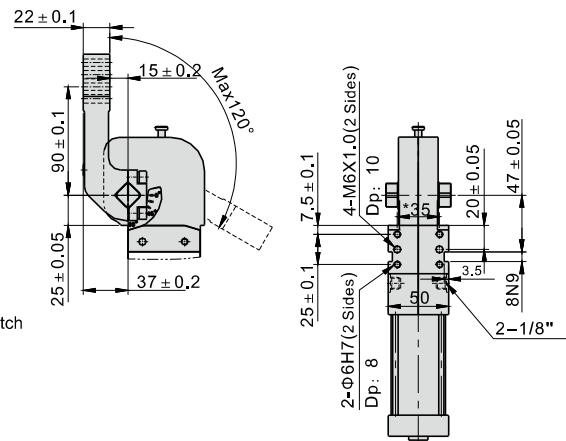
Dimensions

JSK40AM1

Horizontal clamping position



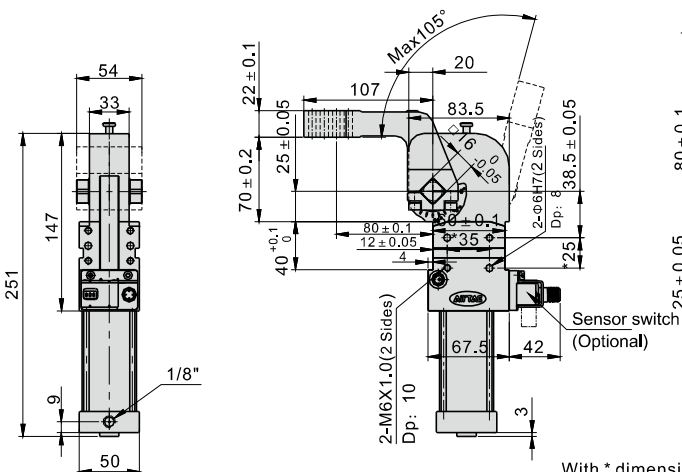
Vertical clamping position



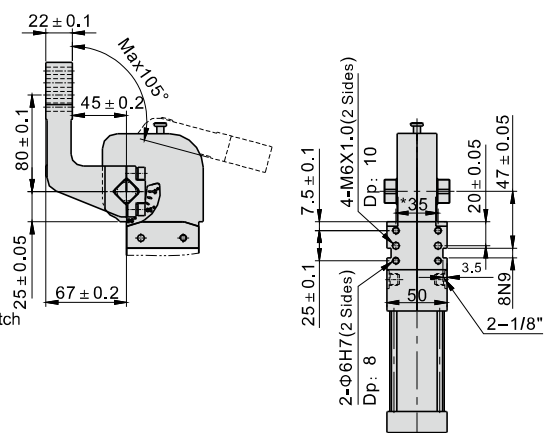
With * dimension: Pin hole position tolerance: ±0.02. Thread hole position tolerance: ±0.1.

JSK40AM3

Horizontal clamping position



Vertical clamping position

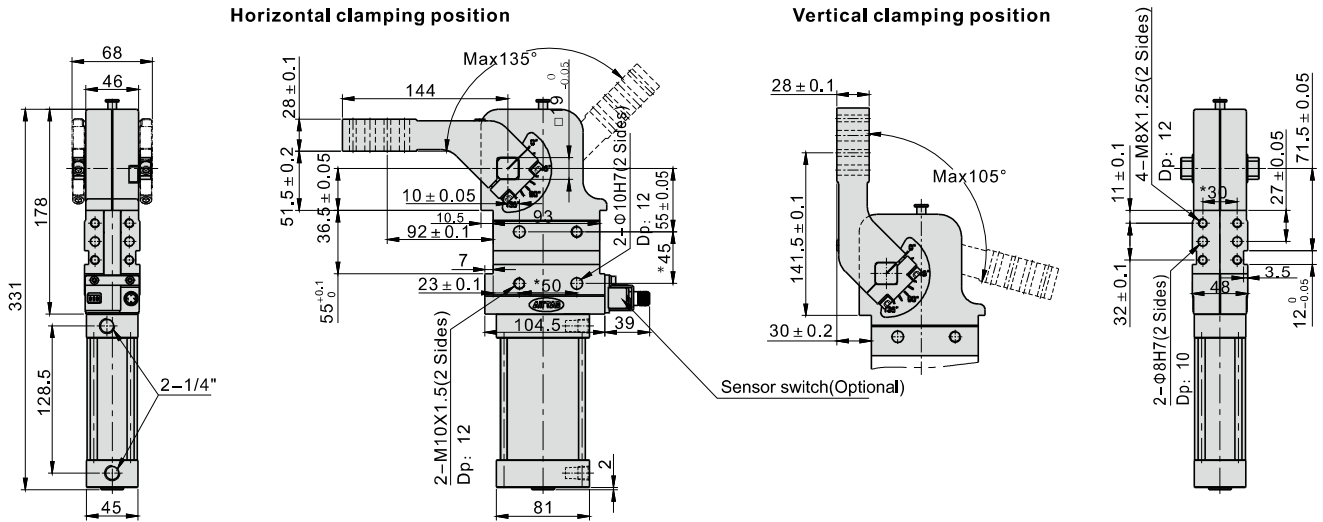


With * dimension: Pin hole position tolerance: ±0.02. Thread hole position tolerance: ±0.1.

Power clamp cylinder

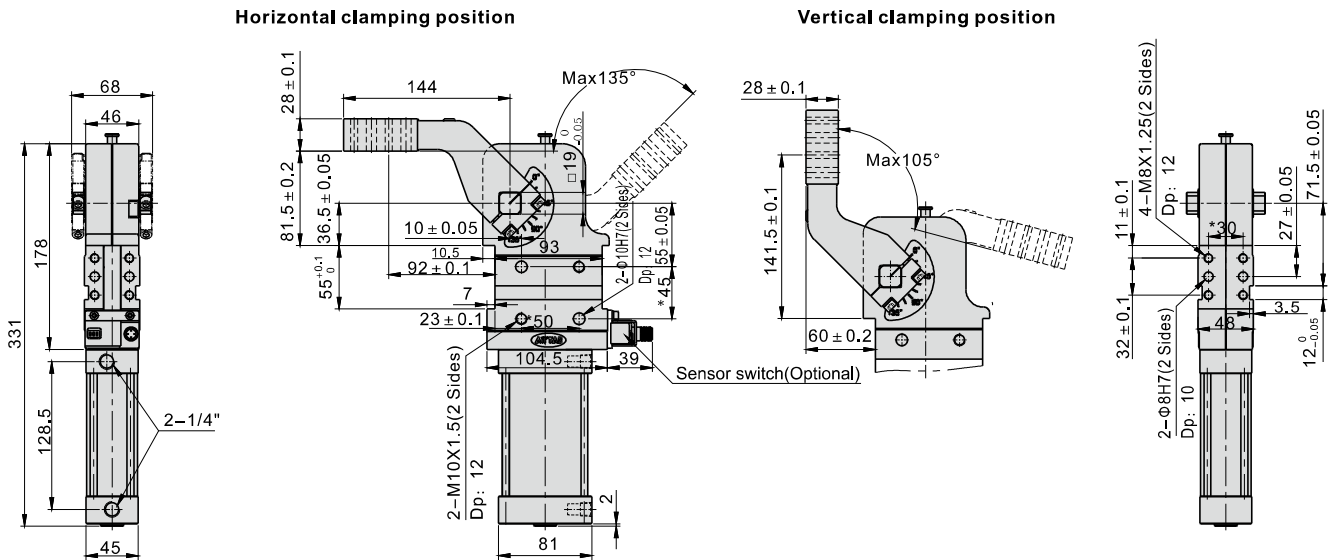
JSK Series

JSK50AM1(2)



With * dimension: Pin hole position tolerance: ±0.02. Thread hole position tolerance: ±0.1.

JSK50AM3(4)

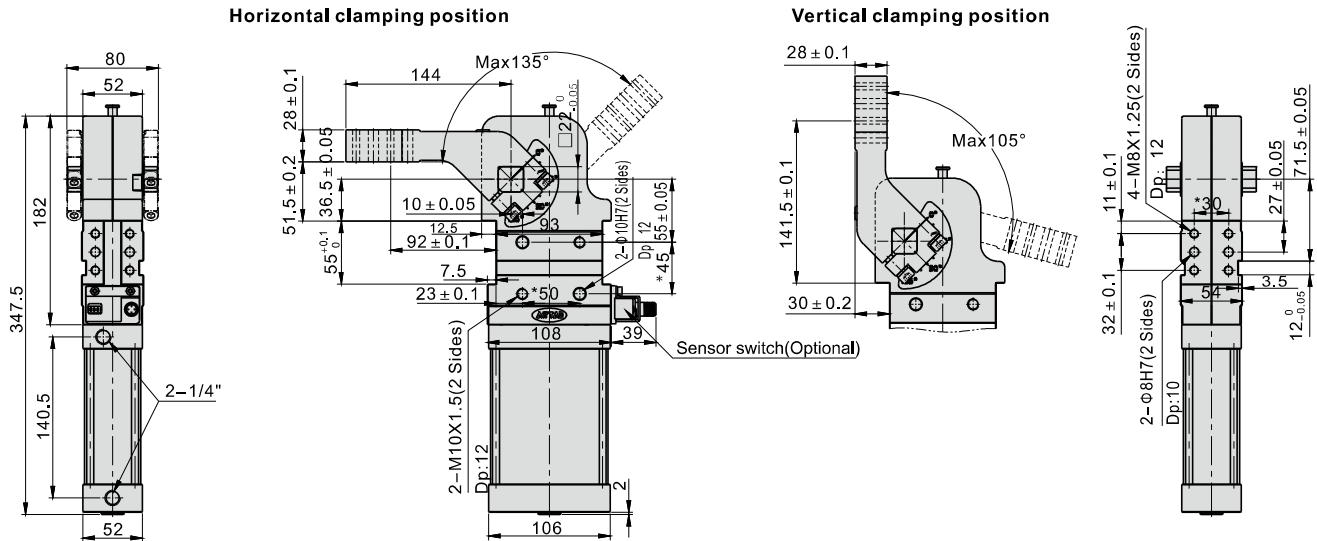


With * dimension: Pin hole position tolerance: ±0.02. Thread hole position tolerance: ±0.1.

Power clamp cylinder

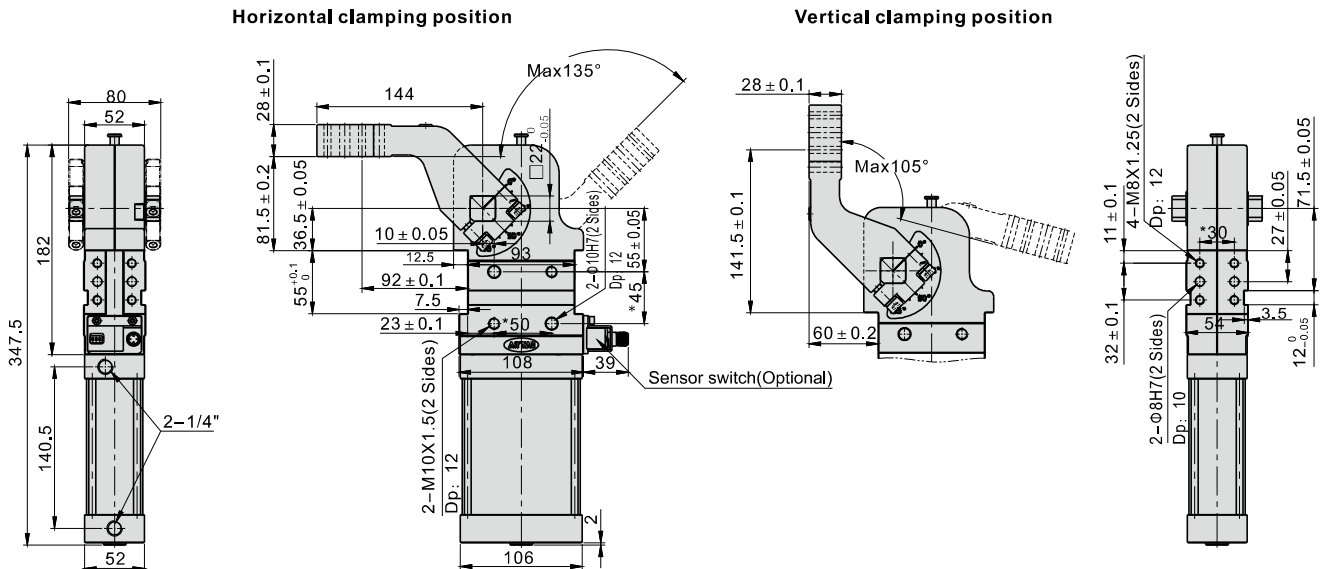
JSK Series

JSK63AM1(2)



With * dimension: Pin hole position tolerance: ±0.02. Thread hole position tolerance: ±0.1.

JSK63AM3(4)



With * dimension: Pin hole position tolerance: ±0.02. Thread hole position tolerance: ±0.1.

I Knuckle



Ordering code

F-M16 X150 I



① Accessories code	② Screw thread	③ Thread pitch	④ Code
	M3 : M3	050 : 0.5mm	I : I Knuckle
	M4 : M4	070 : 0.7mm	
	M5 : M5	080 : 0.8mm	
	M6 : M6	100 : 1.0mm	
	M8 : M8	125 : 1.25mm	
	M10 : M10		
	M12 : M12		
	M14 : M14	150 : 1.5mm	
	M16 : M16		
	M18 : M18		
	M20 : M20		
	M22 : M22		
	M26 : M26		
	M27 : M27	200 : 2.0mm	
	M36 : M36		
	M42 : M42		

Table for I knuckle and cylinder

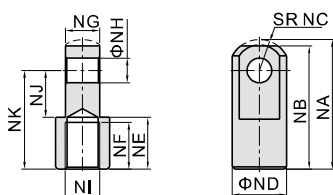
Cylinder Accessory	SE						SAI									
	32	40	50	63	80	100	125	32	40	50	63	80	100	125	160	200
F-M10X125I	•							•								
F-M12X125I		•							•							
F-M16X150I			•	•						•	•					
F-M20X150I					•	•						•	•			
F-M27X200I							•							•		
F-M36X200I															•	•

Cylinder Accessory	SGC				SC/SAU					SC				JSI								
	125	160	200	250	32	40	50	63	80	100	125	160	200	250	32	40	50	63	80	100	125	
F-M10X125I																						
F-M12X125I																						
F-M14X150I																						
F-M16X150I																						
F-M18X150I																						
F-M20X150I																						
F-M22X150I																						
F-M26X150I																						
F-M27X200I																						
F-M36X200I																						
F-M42X200I																						

Cylinder Accessory	MI							MPG					
	8	10	12	16	20	25	32	40	6	8	10	12	16
F-M3X050I													
F-M4X070I													
F-M5X080I													
F-M6X100I													
F-M8X125I													
F-M10X125I													
F-M12X125I													

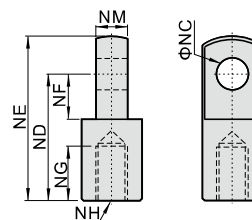
Dimensions

M14\M18\M22\M26



Type\Item	NA	NB	NC	ND	NE	NF	NG	NH	NJ	NK	NI
F-M14X150I	52.5	50	12.5	22	21	19	13.8	10	19	40	M14×1.5
F-M18X150I	66.5	64	16.5	28	27	24	19.8	14	24	50	M18×1.5
F-M22X150I	83.5	80	23.5	40	29	26	29.8	22	34	60	M22×1.5
F-M26X150I	83.5	80	23.5	40	29	26	29.8	22	34	60	M26×1.5

Others



Type\Item	NC	ND	NE	NF	NG	NH	NM
F-M3x050I	3	12	15.5	5	5	M3×0.5	3
F-M4x070I	4	16	21	6.8	8	M4×0.7	4
F-M5x080I	5	25	32	14.1	7.5	M5×0.8	6.3
F-M6x100I	6	21	28	8.5	8	M6×1.0	6
F-M8x125I	8	30	40	11	15	M8×1.25	8
F-M10x125I	10	40	50	15	20	M10×1.25	10
F-M12x125I	12	48	62	24	20	M12×1.25	12
F-M16x150I	16	64	82	32	23	M16×1.5	16
F-M20x150I	20	80	102	40	30	M20×1.5	20
F-M27x200I	30	110	139	51	45	M27×2.0	30
F-M36x200I	35	144	181	65	55	M36×2.0	35
F-M42x200I	40	168	211	85	62	M42×2.0	40

Y Knuckle



Table for Y knuckle and cylinder

Cylinder Accessory	SE						SAI									
	32	40	50	63	80	100	125	32	40	50	63	80	100	125	160	200
F-M10X125Y	•							•								
F-M12X125Y		•							•							
F-M16X150Y			•	•						•	•					
F-M20X150Y					•	•						•	•			
F-M27X200Y							•							•		
F-M36X200Y															•	•

Ordering code

F-M16 X150 Y



① Accessories code	② Screw thread	③ Thread pitch	④ Code
	M3 : M3	050 : 0.5mm	
	M4 : M4	070 : 0.7mm	
	M5 : M5	080 : 0.8mm	
	M6 : M6	100 : 1.0mm	
	M8 : M8		
	M10 : M10	125 : 1.25mm	
	M12 : M12		
	M14 : M14		
	M16 : M16		
	M18 : M18	150 : 1.5mm	
	M20 : M20		
	M22 : M22		
	M26 : M26		
	M27 : M27		
	M36 : M36	200 : 2.0mm	
	M42 : M42		

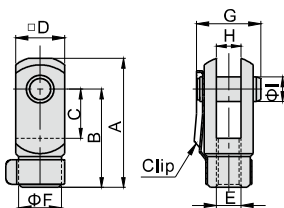
Y:Y Knuckle

Cylinder Accessory	SGC				SC/SAU				SC				JSI									
	125	160	200	250	32	40	50	63	80	100	125	160	200	250	32	40	50	63	80	100	125	
F-M10X125Y					•										•							
F-M12X125Y						•																
F-M14X150Y																	•					
F-M16X150Y							•	•														
F-M18X150Y																	•	•				
F-M20X150Y									•	•												
F-M22X150Y																					•	
F-M26X150Y																						•
F-M27X200Y	•												•									•
F-M36X200Y		•	•										•	•								
F-M42X200Y				•																		

Cylinder Accessory	MI						MPG						
	8	10	12	16	20	25	32	40	6	8	10	12	16
F-M3X050Y													
F-M4X070Y	•	•									•	•	
F-M5X080Y												•	•
F-M6X100Y				•	•								
F-M8X125Y					•								
F-M10X125Y						•	•						
F-M12X125Y								•					

Dimensions

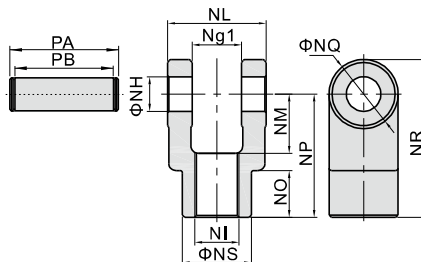
M10 and below



Type/Item	A	B	C	D	F
F-M3X050Y	15.5	12	5	6	6
F-M4X070Y	22	16	8	8	7
F-M5X080Y	28	21	10.2	12	10
F-M6X100Y	32	24	12	12	10
F-M8X125Y	42	32	16	16	14
F-M10X125Y	52	40	20	19	18

Type/Item	E	G	H	I
F-M3X050Y	M3×0.5	9	3	3
F-M4X070Y	M4×0.7	11.5	4	4
F-M5X080Y	M5×0.8	15.5	6.5	5
F-M6X100Y	M6×1.0	16	6	6
F-M8X125Y	M8×1.25	21	8	8
F-M10X125Y	M10×1.25	25	10	10

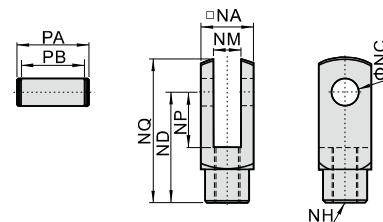
M14\M18\M22\M26



Type/Item	NG1	NH	NI	NL	NM
F-M14X150Y	14.2	10	M14×1.5	27.8	19
F-M18X150Y	20.2	14	M18×1.5	39.8	24
F-M22X150Y	30.2	22	M22×1.5	59.8	34
F-M26X150Y	30.2	22	M26×1.5	59.8	34

Type/Item	NO	NP	NQ	NR	NS	PA	PB
F-M14X150Y	17	40	22	51	22	34.6	28.8
F-M18X150Y	19	50	28	64	28	47	40.8
F-M22X150Y	20	65	40	85	40	69.2	60.8
F-M26X150Y	20	65	40	85	40	69.2	60.8

Others



Type/Item	NA	NC	ND	NP	NQ
F-M12X125Y	25.4	12	48	24	62
F-M16X150Y	32	16	64	32	80
F-M20X150Y	44.4	20	80	40	101
F-M27X200Y	54	30	110	55	139
F-M36X200Y	70	35	144	73	179
F-M42X200Y	85	40	168	86	211

Type/Item	NM	NH	PA	PB
F-M12X125Y	12	M12×1.25	32.4	26.2
F-M16X150Y	16	M16×1.5	39	32.8
F-M20X150Y	20	M20×1.5	53.4	45.2
F-M27X200Y	30	M27×2.0	64.2	54.8
F-M36X200Y	35	M36×2.0	80.2	70.8
F-M42X200Y	40.3	M42×2.0	115	93

Universal Joint



Ordering code

F-M10 X125 U



① Accessories code	② Screw thread	③ Thread pitch	④ Code
	M4 : M4	070 : 0.7mm	U: Universal joint
	M5 : M5	080 : 0.8mm	
	M6 : M6	100 : 1.0mm	
	M8 : M8	125 : 1.25mm	
	M10 : M10		
	M12 : M12		
	M14 : M14		
	M16 : M16	150 : 1.5mm	
	M18 : M18		
	M20 : M20		
	M26 : M26		
	M27 : M27	200 : 2.0mm	
	M36 : M36		

Table for universal joint and cylinder

Cylinder Accessory	SE						SAI					SAI/SC				
	32	40	50	63	80	100	125	32	40	50	63	80	100	125	160	200
F-M10X125U	•							•								
F-M12X125U		•							•							
F-M16X150U			•	•						•	•					
F-M20X150U					•	•						•	•			
F-M27X200U							•							•		
F-M36X200U															•	•

Cylinder Accessory	SGC				SC/SAU						JSI						
	125	160	200	250	32	40	50	63	80	100	32	40	50	63	80	100	125
F-M10X125U																	
F-M12X125U																	
F-M14X150U																	
F-M16X150U																	
F-M18X150U																	
F-M20X150U																	
F-M26X150U																	
F-M27X200U																	
F-M36X200U																	

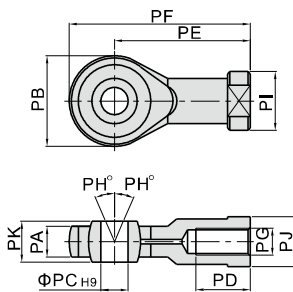
Cylinder Accessory	ACQ									
	12	16	20	25	32	40	50	63	80	100
F-M5X080U	•									
F-M6X100U		•								
F-M8X125U			•							
F-M10X125U				•						
F-M12X125U					•	•				
F-M14X150U							•	•		
F-M16X150U									•	•
F-M18X150U										
F-M20X150U										
F-M26X150U										

Cylinder Accessory	MA					MF				MBL							
	16	20	25	32	40	50	63	20	25	32	40	20	25	32	40	50	63
F-M6X100U	•																
F-M8X125U		•															
F-M10X125U			•	•													
F-M12X125U					•												
F-M14X150U																	

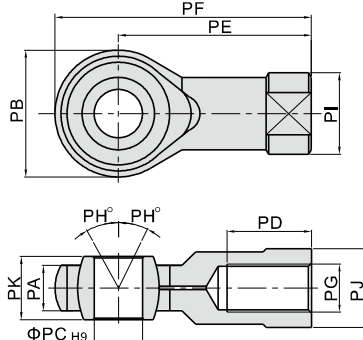
Cylinder Accessory	PB					MI							
	4	6	10	12	16	8	10	12	16	20	25	32	40
F-M4X070U													
F-M5X080U													
F-M6X100U													
F-M8X125U													
F-M10X125U													
F-M12X125U													

Dimensions

M8 and below



M10 and above



Type/Item	PA	PB	PC	PD	PE	PF	PG	PH	PI	PJ	PK
F-M4X070U	6	18	5	10	27	36	M4×0.7	13	12.5	10	8
F-M5X080U	6	18	5	10	27	36	M5×0.8	13	12.5	10	8
F-M6X100U	6.8	20	6	12	30	40	M6×1.0	13	13	11	9
F-M8X125U	9	24	8	16	36	48	M8×1.25	13	16	14	12
F-M10X125U	11	26	10	20	43	56	M10×1.25	13	19	17	14
F-M12X125U	12	32	12	22	50	66	M12×1.25	13	22	19	16
F-M14X150U	14	36	14	28	57	75	M14×1.5	13	25	22	19
F-M16X150U	15	40	16	28	64	84	M16×1.5	15	27	22	21
F-M18X150U	16.5	46	18	30	71	94	M18×1.5	15	31	27	23
F-M20X150U	18	46	20	33	77	100	M20×1.5	15	34	30	25
F-M26X150U	22	60	25	48	94	124	M26×1.5	15	42	36	31
F-M27X200U	25	70	30	51	110	145	M27×2.0	15	50	41	37
F-M36X200U	27.5	80	35	56	125	165	M36×2.0	15	57.5	50	43



Compendium of DMS Series

Three types of sensors

General type(DMS)	
General type(Aqua Blue)	Waterproof type(Yellow)

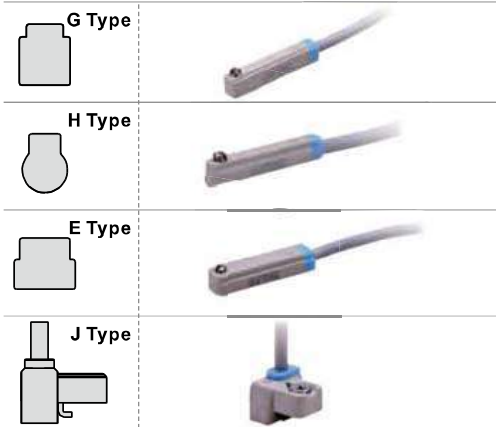
Manipulator industry(A05-DMS)	Oil resistance and deflection resistance (A06-DMS)
Product characteristics: 1. Flexure resistant curve material can be used in manipulator industry, such as multi joint manipulator and tank chain. 2. In case of high temperature, much dust, or water droplets and oil dust, the sensor shall take corresponding dust-proof measures.	Product characteristics: 1. Flexure resistant curve material can be used in manipulator industry, such as multi joint manipulator and tank chain. 2. In case of welding slag, corresponding protective measures shall be taken for the sensor.
High deflection wire The deflection is increased by about 20% compared with the general type	Oil resistant and flexural curve material The deflection is increased by about 20% compared with the general type. It can be used in oil dust environment.
	Waterproof design(IP68)

DMSG can be mounted with 2 accessories, applicable to multi-cylinders.

DMSG	F-MQ
	F-SC

Note: The recommended minimum bending radius of A05-DMS, A06-DMS cables is 19mm.

Four types of cross section



DMS Specifications

Item	DMS		
	2-wire	NPN	PNP
Model			
Power supply voltage	10V ~ 28V DC	5V ~ 30V DC	
Switching current	2.5mA ~ 100mA	30V/200mA Max.	
Contact capacity	2.8W Max.	6.0W Max.	
Current consumption	3mA Max.	5mA Max.	
Internal voltage drop	3.5V Max.	0.7V Max.	
Leakage current	0.05mA Max.	0.01mA Max.	
Switching frequency	1000Hz		
Impact resistance	50G		
Circuit protection	Reverse polarity protection Surge protection		
Operating Temp.	-10°C ~ 70°C		
Enclosure	DMS, A05-DMS: IP64 / A06-DMS: IP68		
Standard	CE marking, RoHS		

[Note] A05 \ A06 type has only two-wire type.

Ordering code for DMS

DMS G - □ 020 - □		
A05-DMS G - □ 020		G H E J
A06-DMS G - □ 020		M08 M12
①	②	③
④	⑤	⑥
① Industry code	Blank: General type A05: Manipulator industry A06: Oil resistance and deflection resistance	
② Model	DMS : Solid State Sensor	
③ Specifications	G H E J [Noet1]	
④ Output type	Blank: 2 wire N : NPN [Noet2] P : PNP	
	020: 2m 030: 3m 050: 5m 100: 10m	
⑤ Lead wire	M08: 0.5m with M8 plug connector M12: 0.5m with M12 plug connector	
	M08010: 1m with M8 plug connector M12010: 1m with M12 plug connector M08020: 2m with M8 plug connector M12020: 2m with M12 plug connector M08030: 3m with M8 plug connector M12030: 3m with M12 plug connector	
⑥ Additional specification	Blank: General type W: Waterproof type IP68 [note4]	

[Note1] Type J is not available for A06. [Note2] A05 and A06 have no NPN and PNP option. [Note3] A05 and A06 have no plug connector option. [Note4] A05, J type and M08, M12 don't have a-w Waterproof option. Standard A06 model already has a waterproof function. Add: The sockets of M08 and M12 need additional order. Please check on page 371.





Compendium of EMS Series

Three types of sensors

General type(EMS)

General type(Aqua Blue) Waterproof type(Yellow)

Manipulator industry(A05-EMS) **Oil resistance and deflection resistance (A06-EMS)**

Product characteristics:
 1. Flexure resistant curve material can be used in manipulator industry, such as multi joint manipulator and tank chain.
 2. In case of high temperature, much dust, or water droplets and oil dust, the sensor shall take corresponding dust-proof measures.

Product characteristics:
 1. Flexure resistant curve material can be used in manipulator industry, such as multi joint manipulator and tank chain.
 2. In case of welding slag, corresponding protective measures shall be taken for the sensor.

High deflection wire
 The deflection is increased by about 20% compared with the general type

Oil resistant and flexural curve material
 The deflection is increased by about 20% compared with the general type. It can be used in oil dust environment.

Waterproof design(IP68)

Bending resistance

SR: bending resistance

Impact resistant materials

High cylinder installation flexibility

MSG is the mini type corresponding to DMSG, which can be used for long and short strokes.
 MSH is the mini type corresponding to DMSH, which can be used for long and short strokes.

Note: The recommended minimum bending radius of A05-EMS,A06-EMS cables is 19mm.

Two types of cross section

G Type	General type(Aqua Blue)	Waterproof type(Yellow)
H Type	General type(Aqua Blue)	Waterproof type(Yellow)

EMS Specifications

Item	EMS
Model	2-wire
Power supply voltage	10V ~ 28V DC
Switching current	2.5mA ~ 100mA
Contact capacity	2.8W Max.
Current consumption	3mA Max.
Internal voltage drop	3.5V Max.
Leakage current	0.06mA Max.
Switching frequency	1000Hz
Impact resistance	50G
Circuit protection	Reverse polarity protection Surge protection
Operating Temp.	-10°C ~ 70°C
Enclosure	EMS,A05-EMS: IP64 / A06-EMS: IP68
Standard	CE marking, RoHS
Note	Temperature overheat protection

Ordering code for EMS

EMS G - □ 020 - □	
A05-EMS G - □ 020	
A06-EMS G - □ 020	

① ② ③ ④ ⑤ ⑥

G H M08 M12

① Industry code	Blank: General type A05: Manipulator industry A06: Oil resistance and deflection resistance
② Model	EMS : Solid State Sensor
③ Specifications	G H
④ Output type	Blank: 2 wire
⑤ Lead wire	Direct lead wire 020: 2m 030: 3m 050: 5m 100: 10m
⑤ Lead wire	Plug connector [Noet1]
⑥ Additional specification	Blank: General type W: Waterproof type IP68 [note2]

[Note1]A05 and A06 have no plug connector option. [Note2]A05 and A06 don't have a-w Waterproof option. Standard A06 model has a waterproof function. Add:The sockets of M08 and M12 need additional order. Please check on page 371.





Compendium of CMS Series

Two types of sensors

General type (CMS)

General type (blue) High temperature type (red)

Manipulator industry (A05-CMS)

Product characteristics:

1. Flexure resistant curve material can be used in manipulator industry, such as multi joint manipulator and tank chain.
2. In case of high temperature, much dust, or water droplets and oil dust, the sensor shall take corresponding dust-proof measures.

High deflection wire

The deflection is increased by about 20% compared with the general type

Note: The recommended minimum bending radius of A05-CMS cables is 19mm.

Bending resistance

SR: bending resistance

Impact resistant materials

Two kinds of accessories

CMSG can be mounted with 2 accessories, applicable to multi-cylinders.

Four types of cross section

G Type		
H Type		
E Type		
J Type		

CMSG	F-MQ□
	F-SC□SH

CMS Specifications

Item	CMS	
	General	Heat resistant
Model	General	Heat resistant
Power supply voltage	5V ~ 240V AC/DC	
Switching current	100mA	
Contact capacity	10W Max.	
Current consumption	N/A	
Internal voltage drop	2.5V Max. @100mA DC	N/A
Leakage current	N/A	
Switching frequency	200Hz	
Impact resistance	50G	
Circuit protection	N/A	
Operating Temp.	-10°C ~ 70°C	-10°C ~ 125°C
Enclosure	IP64	
Standard	CE marking, RoHS	

Ordering code for CMS

CMS G - 020 - □

A05-CMS G - 020

① ② ③ ④ ⑤

G H E J M08 M12

① Industry code	Blank: General type A05: Manipulator industry
② Model	CMS : Reed Sensor
③ Specifications	G H E J
④ Lead wire	Direct lead wire 020: 2m 030: 3m 050: 5m 100: 10m
	Plug connector [Noet1]
⑤ Additional specification	Blank: General type H: Heat resistant [note2]

[Note1] A05 has no plug connector option. [Note2] A05 has no heat resistant option.
Add: The sockets of M08 and M12 need additional order. Please check on page 371.



Ordering code for accessories

F - MQ □ Cylinder Accessory

① ② ③



① Category		F : Accessory							
② Model		MQ : Cylinder Accessory							
③ Cylinder	Aluminum alloy			Aluminum alloy (Thick type)			Stainless steel		
	Code	For series	For bore size	Code	For series	For bore size	Code	For series	For bore size
	A20: Φ20mm	MCK MBL	Φ20	A32T: Φ32mm	TWG	Φ32	S06: Φ6mm	PB/PBR MI MF MG MA/MAC	Φ6
A25: Φ25mm	Φ25		A40T: Φ40mm	Φ40		S08: Φ8mm	Φ8		
A32: Φ32mm	Φ32		A50T: Φ50mm	Φ50		S10: Φ10mm	Φ10		
A40: Φ40mm	Φ40				S12: Φ12mm	Φ12			
A50: Φ50mm	Φ50				S16: Φ16mm	Φ16			
A63: Φ63mm	Φ63				S20: Φ20mm	Φ20			
A80: Φ80mm	Φ80			S25: Φ25mm	Φ25				
						S32: Φ32mm		Φ32	
						S40: Φ40mm		Φ40	
						S50: Φ50mm		Φ50	
						S63: Φ63mm		Φ63	

F - SC □ SH Tie Rod Cylinder Accessory

① ② ③ ④

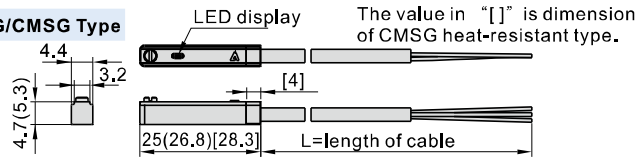


① Category		F : Accessory		
② Model		SC : Tie Rod Cylinder Accessory		
③ Cylinder	Code	For series SC SGC	For bore size	
	32		Φ32, Φ40	
	50		Φ50	
	63		Φ63	
	80		Φ80, Φ100	
	125		Φ125	
	160		Φ160, Φ200	
250	Φ250			
④ Attached				

DMS, EMS, CMS Series

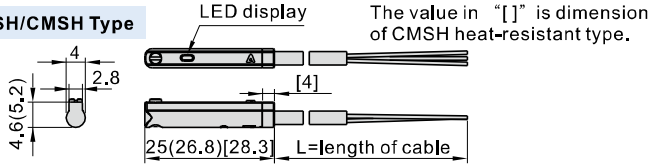
Dimensions

DMSG/CMMSG Type



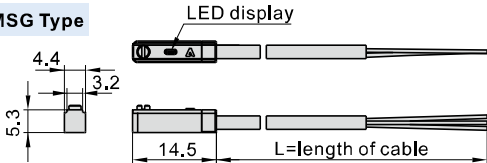
Note: The value in "()" is dimension of CMMSG type.

DMSH/CMMSH Type



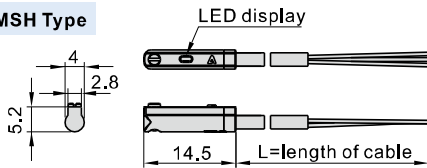
Note: The value in "()" is dimension of CMMSH type.

EMSG Type

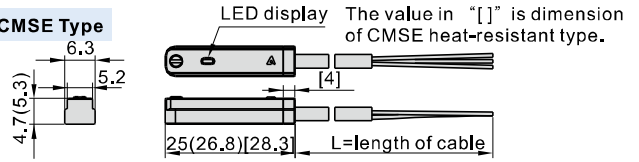


Note: a number in the bracket is the dimension of CMMSH.

EMSH Type

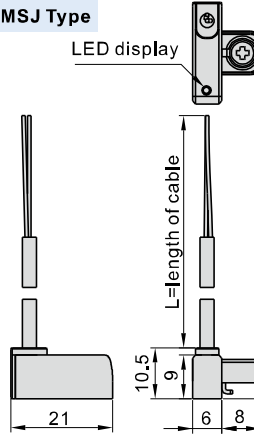


DMSE/CMSE Type

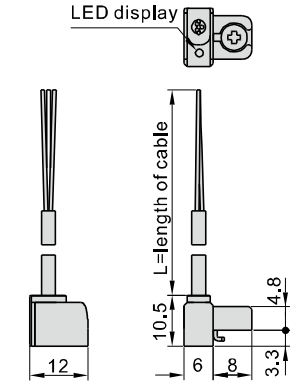


Note: The value in "()" is dimension of CMSE type.

CMSJ Type



DMSJ Type

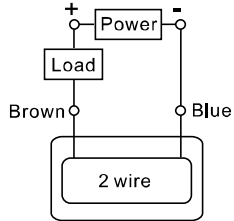


length of cable specification	length of cable(L)
020 Type	2000mm
030 Type	3000mm
050 Type	5000mm

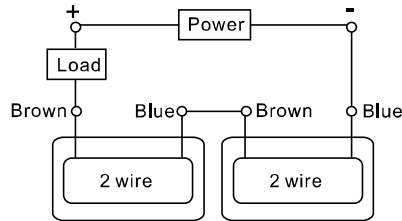
Connection method

2 wire, reed sensor connection

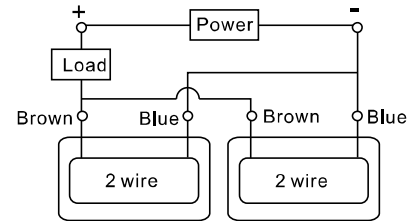
1.General connection



2.Series connection(And)

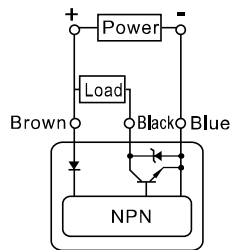


3.Parallel connection(OR)



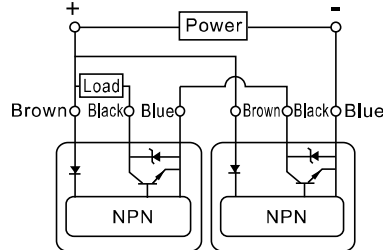
3 wire, solid state NPN connection

1.General connection

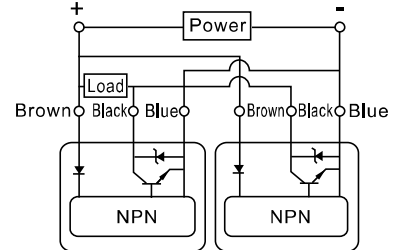


Note: The indicator lights will light up when both auto switches are turned NO.

2.Series connection(And)

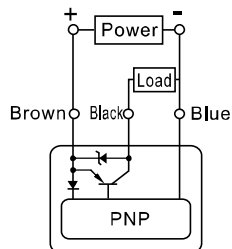


3.Parallel connection(OR)



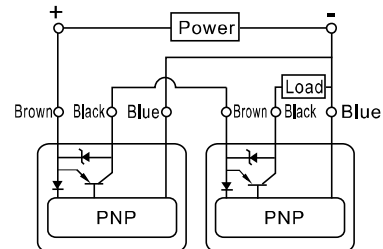
3 wire, solid state PNP connection

1.General connection

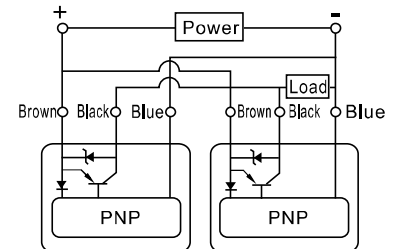


Note: The indicator lights will light up when both auto switches are turned NO.

2.Series connection(And)



3.Parallel connection(OR)



DMS, EMS, CMS Series

The selection of sensor

DMSG	CMSG	EMSG	HFKL				MCK				ACQ/TACQ								ACQ				RMTL	RMTL	SDA/RMT/RMTL				SDA						
			10	16	20	25	25	32	40	50	63	80	12	16	20	25	32	40	50	63	80	100	125	140	160	10	16	20	25	32	40	50	63	80	100
			•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
			HFK	HFK/HFKP			HFK	TCL/TCM								QCK				TR															
			10	16	20	25	32	40	6	10	12	16	20	25	32	40	50	63	80	100	12	16	20	25	32	40	50	63	6	10	16	20	25	32	
			•	•	•	•	•					•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	
			SAU				HFZ				HFY				HFP				MD/MK				AQK/BAQK												
			32	40	50	63	80	100	6	10	16	20	25	32	40	6	10	16	20	25	32	10	16	20	25	32	6	10	16	20	25	32	50		
			•	•	•	•	•					•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	

		Stainless steel																															
		PB/PBR				MI		MI/TMI		MI		MF		MG				MA/MAC															
		6	8	10	12	16	8	10	12	16	20	25	32	40	20	25	32	40	20	25	32	40	50	63	16	20	25	32	40	50	63		
		•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
		Aluminum alloy																															
		MBL				MCK																											
		20	25	32	40	50	63	40	50	63	80																						
		•	•	•	•	•	•	•	•	•	•																						

It needs an accessory to mount a sensor on a cylinder

		SC								SGC					
		32	40	50	63	80	100	125	160	200	250	125	160	200	250
		•	•	•	•	•	•	•	•	•	•	•	•	•	•


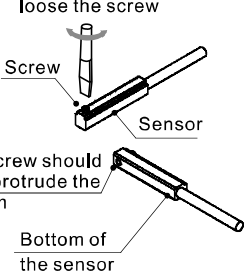
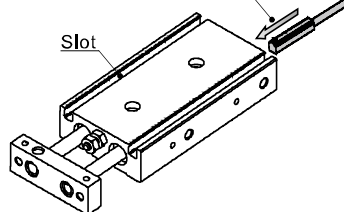
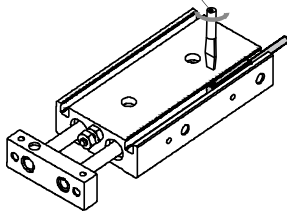

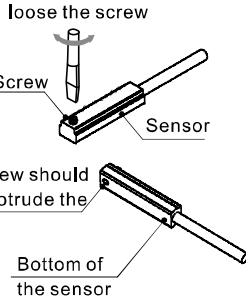
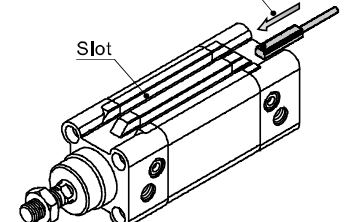
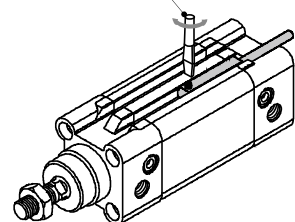

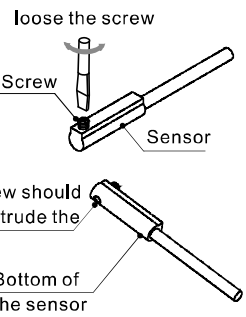
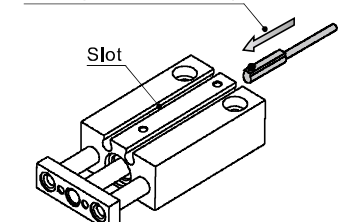
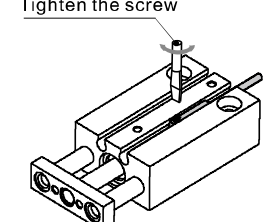

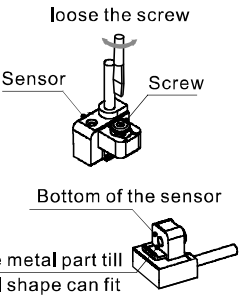
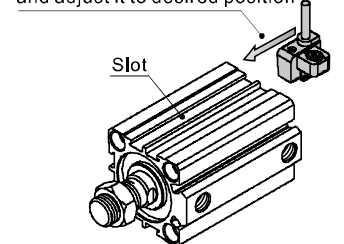
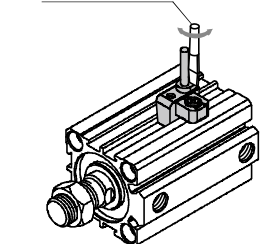
It needs an accessory to mount a sensor on a cylinder

DMSJ	CMSJ	ACQ/TACQ								SDA								QCK				QDK				TN					
		32	40	50	63	80	100	12	16	20	25	32	40	50	63	80	100	32	40	50	63	20	25	32	40	10	16	20	25	32	
		•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•

DMSH	CMSH	EMSH	ACQ		TC		HFZ				HFY		HFP		HFR				HFC				HFT												
			125	140	160	6	10	6	10	16	20	25	32	40	6	32	10	16	20	25	32	16	20	25	32	40	50	63	10	16	20	25	32		
			•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•		
			QDK		HLQ/HLQL				HLS/HLSL				MU				HLH		MPG																
			20	25	32	40	6	8	12	16	20	25	6	8	12	16	20	25	6	8	10	12	16	20	6	10	16	20	6	8	10	12	16		
			•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•		
			HRQ				HFK				HLF				HGS		RMH		HFD																
			2	3	7	10	20	30	50	70	100	200	10	16	20	25	32	40	8	12	16	20	6	8	10	12	10	16	20	25	8	12	16	20	25
			•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
			HFKL		HFCQ				HRS				HFKP																						
			10	16	20	25	16	20	25	32	40	50	63	10	15	20	30	40	16	20	25	32													
			•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•												

DMSE	CMSE	SAI/TSAI				SAI				ACE				ACE/JSI							
		32	40	50	63	80	100	125	160	200	12	16	20	25	32	40	50	63	80	100	125
		•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•

Installation

Sensor model	Procedure		
DMSG/CMMSG/EMSG 	1  <p>loose the screw</p> <p>Screw</p> <p>Sensor</p> <p>The screw should NOT protrude the bottom</p> <p>Bottom of the sensor</p>	2  <p>Insert the sensor into the slot and adjust it to desired position</p> <p>Slot</p>	3  <p>Tighten the screw</p>
DMSE/CMSE 	1  <p>loose the screw</p> <p>Screw</p> <p>Sensor</p> <p>The screw should NOT protrude the bottom</p> <p>Bottom of the sensor</p>	2  <p>Insert the sensor into the slot and adjust it to desired position</p> <p>Slot</p>	3  <p>Tighten the screw</p>
DMSH/CMSSH/EMSH 	1  <p>loose the screw</p> <p>Screw</p> <p>Sensor</p> <p>The screw should NOT protrude the bottom</p> <p>Bottom of the sensor</p>	2  <p>Insert the sensor into the slot and adjust it to desired position</p> <p>Slot</p>	3  <p>Tighten the screw</p>
DMSJ/CMJS 	1  <p>loose the screw</p> <p>Sensor</p> <p>Screw</p> <p>Bottom of the sensor</p> <p>Adjust the metal part till the lateral shape can fit the slot of the cylinder</p>	2  <p>Insert the sensor into the slot and adjust it to desired position</p> <p>Slot</p>	3  <p>Tighten the screw</p>

DMS, EMS, CMS Series

Sensor model	Procedure	
<p>DMSG+(F-SC□SH) CMSG+(F-SC□SH)</p> 	<p>1</p>  <p>Bracket Screw Screw LED light Click Click the wire into the bracket</p>	<p>2</p>  <p>Tied rod Assemble the bracket and a rod</p> <p>The sensor will attach to the surface</p>
<p>DMSG+(F-MQ□) CMSG+(F-MQ□)</p> 	<p>1</p>  <p>Groove for sensor Band Screw (sensor) Screw (accessory) Insert the sensor into the groove</p>	<p>2</p>  <p>Tie up the band with a sensor on a cylinder and assemble two plastic parts till a click sound</p> <p>Cylinder</p>
	<p>3</p>  <p>Adjust the sensor to desired position</p>	<p>4</p>  <p>Tighten the screw</p>

Sensor for "米" shape cylinder

SAI, SAU series will substitute for SI, SU series. And the corresponding sensors have some adjustments as the chart below.

		New type(SAI)		Previous type(SI)	
Cylinder and accessory	Cylinder		Sensor CMSE \ DMSE	Cylinder	Sensor CS1B1 / DS1B1 CS1B2 / DS1B2 CS1B3 / DS1B3 CS1B4 / DS1B4 CS1B5 / DS1B5 CS1B6 / DS1B6 CS1B7 / DS1B7
	Installation			 Sensor (CS1F/DS1F/CS1U/DS1U) Mounting bracket (F-SI32H~F-SI200H) "米" shape cylinder (SI series)	
Cylinder and accessory	Cylinder		Sensor DMSG \ CMSG \ EMSG	Cylinder	Sensor CS1B1 / DS1B1 CS1B2 / DS1B2 CS1B3 / DS1B3 CS1B4 / DS1B4
	Installation			 Sensor (CS1F/DS1F/CS1U/DS1U) Mounting bracket (F-SU32H~F-SU100H) "米" shape cylinder (SU series)	

DMS、EMS、CMS Series

Socket

Ordering code

F - EC M08 B 020 - □

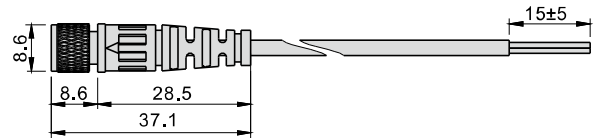
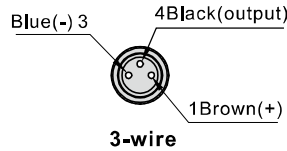
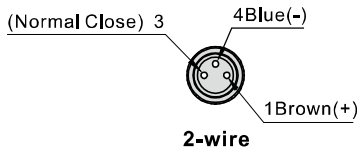
① ② ③ ④ ⑤ ⑥



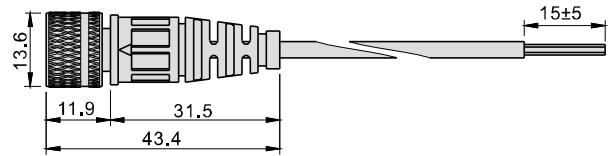
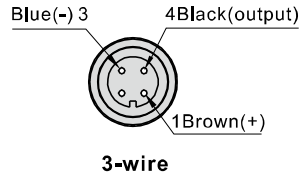
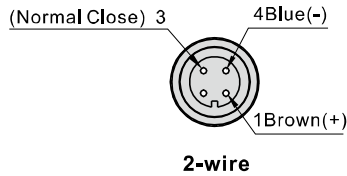
① Category code	F : Accessory			
② Specification code	EC : Connecting Wire			
③ Socket type	M08:M8 socket	M12:M12 socket		
④ Wire type	B: 2-wire type		C:3-wire type	
⑤ Wire length	020: 2 meters	030:3meters	050:5meters	100:10meters
⑥ Additional specification	Blank: General type			

Appearance

M8 socket



M12 socket



Instruction

- Sensor shall not fall down or bear great impact when it is installed.
- The wire of the Sensor shall not move with the action of cylinder.
- Clamping torque shall be within the allowable scope when the Sensor is installed(0.15~0.2Nm).
- Sensor shall be installed in the middle position of the action scope.
- Sensor wiring:
 - The wire is unable to bear repetitive torsion and tension. Please wire an external load before switch the power on.
 - No poor insulation in wire.
 - Do not wire with power line, high voltage line or use one wiring pipe.
 - Please wire the circuit correctly base on the circuit diagram.
- Execute scheduled maintenance by the following guidelines:
 - Make sure the sensor is firmly fixed.
 - Make sure the wire is intact.
 - Make sure that LED indicate the movement of cylinder correctly.
- Application of environment:
 - It is Not allow to use the sensor in the environment with explosive gas.
 - Magnetic sensor shall not be used in the environment with external magnetism.
 - Magnetic sensor shall not be used in the environment that is always eroded by water.
 - Magnetic sensor shall not be used in the environment with oil moisture or chemical substance.
 - Magnetic sensor shall not be used in the environment with periodically changing temperature.
 - Magnetic sensor shall not be used in the environment with excessively great impact.
 - Magnetic sensor shall not be used in the environment with sources of electrical pulse.
 - Avoid the environment with accumulated iron power and dense magnetic objects.



Shock absorber—ACA, ACJ Series

Compendium of ACA/ACJ Series

Excellent and stable deceleration and shock absorbing

If impacted by load,
the resistance will automatically adjust.

Three kinds of impact speed

High speed(Light load)
Middle speed(Middle load)
Low speed(Heavy load)

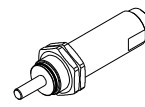
All threaded outer body

It is easy to install and adjust
and has good heat dissipation.

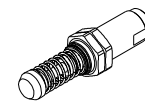
Two kinds of type

ACA: Self-compensation type shock absorber
ACJ: Adjustable type shock absorber

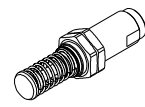
Three kinds of prevention crash cap



No cap



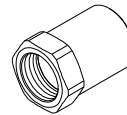
Plastic cap



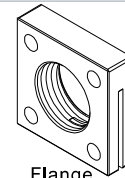
Iron cap

Integrated structure

Two kinds of mounting accessories



Stop collar



Flange

Specification

Model	Stroke (mm)	Max. energy absorbed (Nm)	Max. energy absorbed/hour(Nm/h)	Max. effective mass(kg)			Max. impact speed(m/s)			Weight (g)
				High speed	Middle speed	Low speed	High speed	Middle speed	Low speed	
ACA0806	6	3	5400	5	20	25	4	2	1	12
ACA1007	7	6	14500	10	40	50	4	2	1	26
ACA1210	10	10	30000	18	60	80	4	2	1	40
ACA1215	15	14	35000	25	90	115	4	2	1	48
ACA1412	12	18	36000	30	110	150	4	2	1	70
ACA1416	16	22	39000	40	140	180	4	2	1	78
ACA1420	20	25	45000	45	155	200	4	2	1	85
ACA1616	16	35	43000	60	220	285	4	2	1	105
ACA1620	20	40	47000	70	250	325	4	2	1	115
ACA1625	25	45	51000	80	280	365	4	2	1	125
ACA2020	20	60	50000	240	660	960	4	2	1	175
ACA2025	25	65	54000	260	720	1040	4	2	1	185
ACA2030	30	70	58000	280	780	1120	4	2	1	210
ACA2040	40	80	65000	320	890	1280	4	2	1	225
ACA2525	25	100	75000	400	1100	1600	4	2	1	290
ACA2550	50	150	85000	600	1650	2400	4	2	1	370
ACA2725	25	140	85000	560	1550	2240	4	2	1	372
ACA2750	50	250	95000	1000	2780	4000	4	2	1	475
ACA3325	25	180	100000	720	2000	2880	4	2	1	596
ACA3350	50	300	120000	1200	3300	4800	4	2	1	750
ACA3625	25	220	135000	880	2400	3500	4	2	1	702
ACA3650	50	350	150000	1400	2500	5600	4	2	1	889

Model	Stroke(mm)	Max. energy absorbed (Nm)	Max. energy absorbed/hour(Nm/h)	Max. effective mass(kg)	Max. impact speed(m/s)	Weight(g)
ACJ1007	7	6	14500	50	4	28
ACJ1210	10	10	30000	80	4	43
ACJ1412	12	20	36000	160	4	75
ACJ2020	20	60	50000	960	4	189
ACJ2525	25	100	75000	1600	4	308
ACJ2550	50	150	85000	2400	4	395
ACJ2725	25	140	85000	2240	4	396
ACJ2750	50	250	95000	4000	4	510
ACJ3325	25	180	100000	2880	4	540
ACJ3350	50	300	110000	4800	4	800
ACJ3625	25	220	125000	2500	4	750
ACJ3650	50	350	130000	5600	4	950
ACJ4225	25	350	150000	5600	4	1150
ACJ4250	50	700	180000	11200	4	1420
ACJ4275	75	1050	210000	16800	4	1720



ACA, ACJ Series



Product feature

1. Excellent and stable deceleration and shock absorbing; if impacted by load, the resistance will automatically adjust.
2. Outer body of integrated structure is treated by QPQ, which has optimum corrosion and wear resistance and can withstand high pressure; it is easy to install and adjust for all threaded outer body which has good heat dissipation.
3. With high hardness stainless steel shaft, the shock absorber has better impact and corrosion resistance, and it can work under adverse conditions.
4. Special oiling process leads to stable shock absorbing.
5. Compact structure and high max. absorbed energy.
6. We use Special lubricants as buffer medium, which adapts to wide temperature range and ensures stable cushioning.

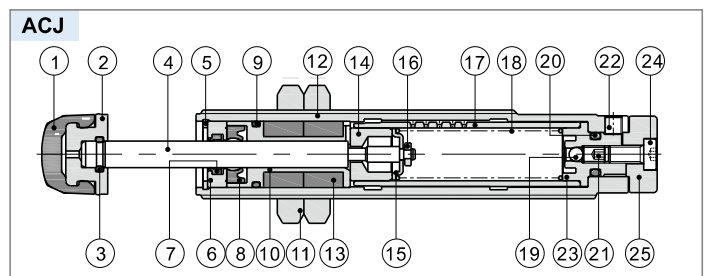
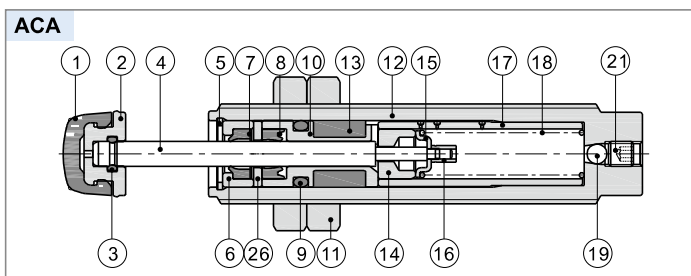
Ordering code

ACA 20 20 -1 N



① Model	② Body male thread	③ Stroke	④ Impact speed	⑤ Prevention crash cap	
ACA: Self-compensation type shock absorber	08:M8	Refer to the specification table for details.	1: High speed(Light load) 2: Middle speed(Middle load) 3: Low speed(Heavy load)	Blank: Plastic cap N: No cap	
	10:M10			Blank: Plastic cap F: Iron cap N: No cap	
	12:M12				
	14:M14				
	16:M16				
	20:M20				
	25:M25				
ACJ: Adjustable type shock absorber	27:M27		Not this code	Blank: Plastic cap N: No cap	Blank: Plastic cap F: Iron cap
	33:M33				Blank: Plastic cap F: Iron cap N: No cap
	36:M36				
	10:M10				
	12:M12				
	14:M14				
	20:M20				
25:M25	Blank: Plastic cap F: Iron cap N: No cap				
27:M27					
33:M33					
36:M36					
42:M42	Blank: Plastic cap F: Iron cap				

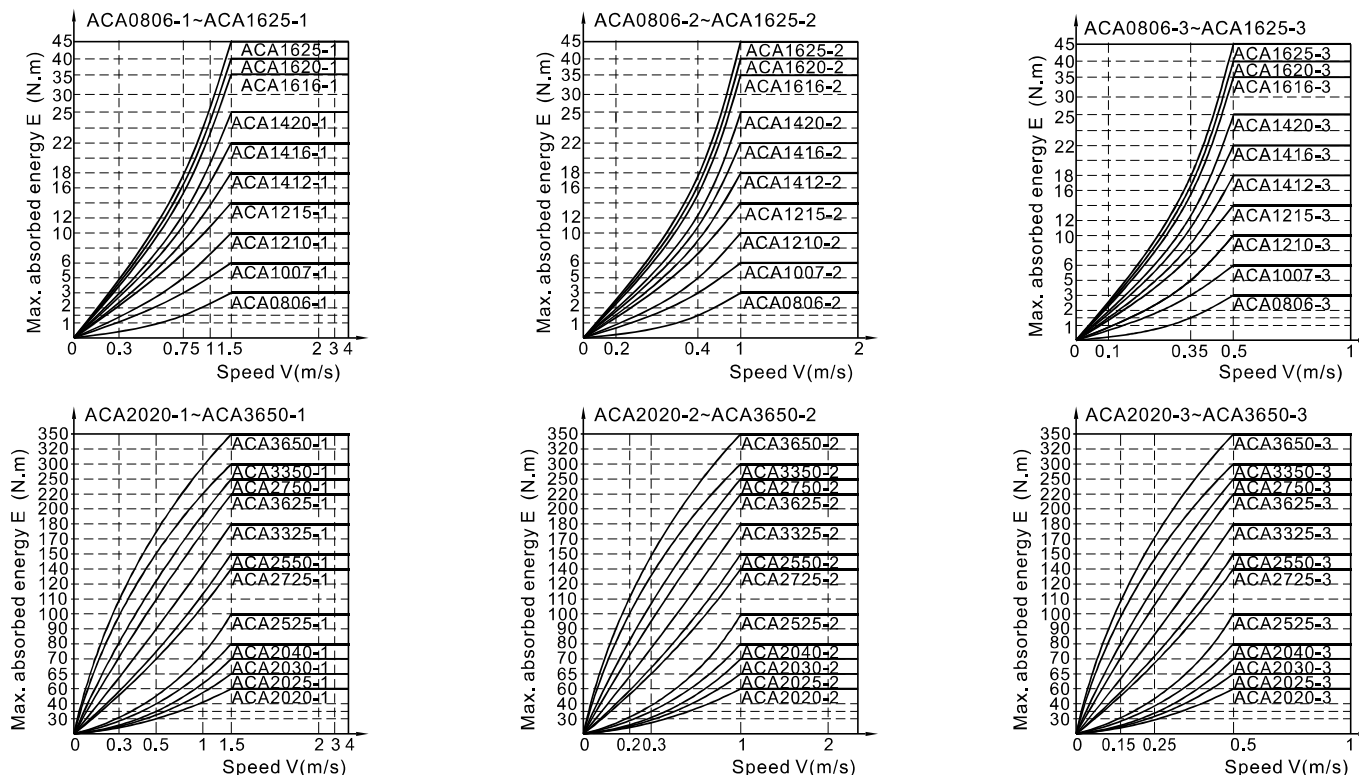
Inner structure and material of major parts



No.	Item	Material	No.	Item	Material
1	Bump cap	PA66(M8)\TPU(M10~M14)\TPU or S45C(M20~M42)	14	Piston	Brass
2	Bump cap(core)	No(M8)\Cutting steel(Others)	15	Spring seat	Spring steel
3	O-ring	NBR	16	Busher	Brass(M8~M12)\Aluminum alloy(M20~M27)
4	Piston rod	Stainless steel(M8~M27)\S45C(M33~M42)	17	Inlet body	Cutting steel(M8~M14)\Seamless steel tube(M20~M42)
5	Clip	No(M8~M10)\Spring steel(M12~M42)	18	Spring	SWPB
6	Front cover	Brass(M8)\Cutting steel(M10)\Aluminum(M12~M42)	19	Ball	GCr15
7	Front cover gasket	No(M8)\TPU(M10~M42)	20	O-ring	NBR
8	Front cover gasket	NBR	21	Set screw	Alloy steel
9	O-ring	NBR	22	Set screw	Alloy steel
10	Correcting body	Brass	23	Back cover	Brass
11	Nut	SS41	24	Screw	Alloy steel
12	Body	Cutting steel	25	Knob	Aluminum alloy
13	Accumulator	Foamex	26	Washer	SUS304(M10~M14)\No(Others)

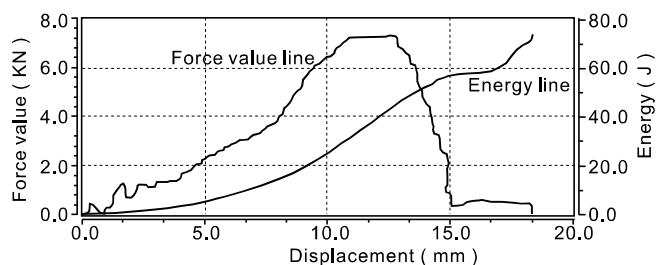
ACA, ACJ Series

Max. absorbed energy and speed curve



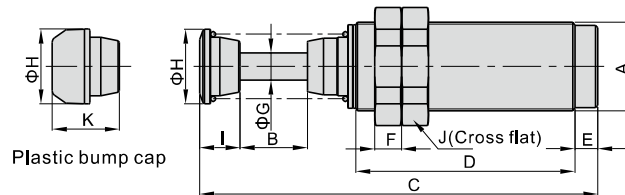
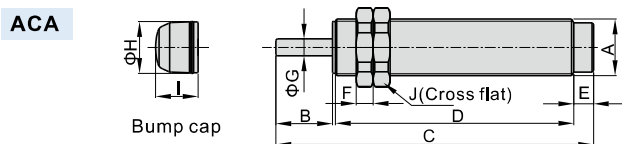
Note : 1. The interval under the red line shows the energy range absorbed by corresponding shock absorber.
 2. It is better to use 20%-80% of the Max. absorbed energy.

Buffer curve



Note: As the chart shows, energy is absorbed by a lower reaction force at the beginning of the stroke, then by a smooth linear deceleration. It decelerates smoothly at last.

Dimensions

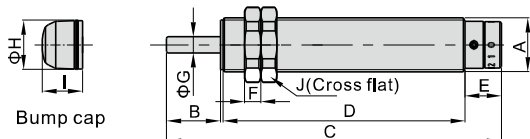


Model/Item	A	B	C	D	E	F	G	H	I	J
ACA0806	M8×1.0	6	46	32	5	4	3	6.5	6	11
ACA1007	M10×1.0	7	56	41	5	4	3	8.5	7.5	14
ACA1210	M12×1.0	10	63.5	47.5	5	4	3	10	7.5	17
ACA1215	M12×1.0	15	79	58	5	4	3	10	7.5	17
ACA1412	M14×1.5	12	80.5	62.5	5	6	4	12	12	19
ACA1416	M14×1.5	16	92.5	70.5	5	6	4	12	12	19
ACA1420	M14×1.5	20	103	77	5	6	4	12	12	19
ACA1616	M16×1.5	16	100.5	78.5	5	6	5	14	12	21
ACA1620	M16×1.5	20	109	83	5	6	5	14	12	21
ACA1625	M16×1.5	25	125	94	5	6	5	14	12	21
ACA2020	M20×1.5	20	112.5	84.5	7	6	6	18	15	26
ACA2025	M20×1.5	25	122.5	89.5	7	6	6	18	15	26
ACA2030	M20×1.5	30	142	104	7	6	6	18	15	26
ACA2040	M20×1.5	40	167.5	119.5	7	6	6	18	15	26
ACA2525	M25×1.5	25	123	89	8	6	6	23	16	32
ACA2550	M25×1.5	50	183	124	8	6	6	23	16	32
ACA2725	M27×1.5	25	127	93	8	6	8	24.5	17	36
ACA2750	M27×1.5	50	192	133	8	6	8	24.5	17	36

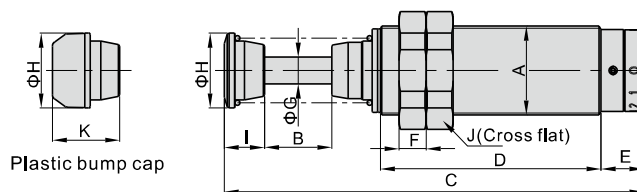
Model/Item	A	B	C	D	E	F	G	H	I	J	K
ACA3325	M33×1.5	25	148	81.5	8.5	10	10	27.8	15	41	25
ACA3350	M33×1.5	50	213	121.5	8.5	10	10	27.8	15	41	25
ACA3625	M36×1.5	25	148	81.5	8.5	10	10	27.8	15	46	25
ACA3650	M36×1.5	50	213	121.5	8.5	10	10	27.8	15	46	25

ACA, ACJ Series

ACJ



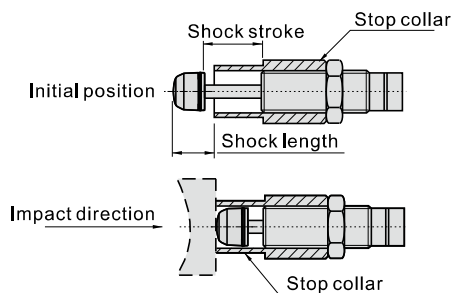
Model\Item	A	B	C	D	E	F	G	H	I	J
ACJ1007	M10×1.0	7	67	45.5	11	4	3	8.5	7.5	14
ACJ1210	M12×1.0	10	74	52	11	4	3	10	7.5	17
ACJ1412	M14×1.5	12	91	66.5	11.5	6	4	12	12	19
ACJ2020	M20×1.5	20	124.5	90	13.5	6	6	18	15	26
ACJ2525	M25×1.5	25	132.5	92	14.5	6	6	23	16	32
ACJ2550	M25×1.5	50	192.5	127	14.5	6	6	23	16	32
ACJ2725	M27×1.5	25	137	96.5	14.5	6	8	24.5	17	36
ACJ2750	M27×1.5	50	202	136.5	14.5	6	8	24.5	17	36



Model\Item	A	B	C	D	E	F	G	H	I	J	K
ACJ3325	M33×1.5	25	156	82	16	10	10	27.8	15	41	25
ACJ3350	M33×1.5	50	221	122	16	10	10	27.8	15	41	25
ACJ3625	M36×1.5	25	156	82	16	10	10	27.8	15	46	25
ACJ3650	M36×1.5	50	221	122	16	10	10	27.8	15	46	25
ACJ4225	M42×1.5	25	161.5	85.5	16	12	12	34.8	15	50	25
ACJ4250	M42×1.5	50	226.5	125.5	16	12	12	34.8	15	50	25
ACJ4275	M42×1.5	75	291.5	165.5	16	12	12	34.8	15	50	25

Accessories

How to set stop collar



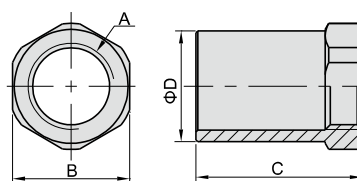
Ordering code

F - ACA 08 LM

① Accessory	② Model	③ Female thread size	④ Accessories type
		08 : M8	LM: Stop collar
		10 : M10	
		12 : M12	
		14 : M14	
		16 : M16	
		20 : M20	
		25 : M25	
		27 : M27	
		33 : M33	
		36 : M36	
		42 : M42	FA: Flange

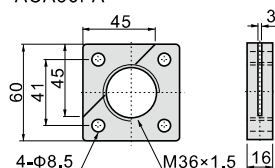
Dimensions

Model\Item	A	B	C
F-ACA08LM	M8×1.0	11	14
F-ACA10LM	M10×1.0	14	16
F-ACA12LM	M12×1.0	17	20

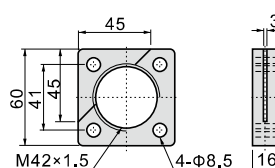


Model\Item	A	B	C	D
F-ACA14LM	M14×1.5	19	27	18
F-ACA16LM	M16×1.5	21	32	20
F-ACA20LM	M20×1.5	26	35	25
F-ACA25LM	M25×1.5	32	45	31
F-ACA27LM	M27×1.5	36	50	35
F-ACA33LM	M33×1.5	41	80	40
F-ACA36LM	M36×1.5	46	80	45

F-ACA36FA



F-ACA42FA



Selecting list

Model	Compatible absorber
F-ACA08LM	ACA0806
F-ACA10LM	ACA1007, ACJ1007
F-ACA12LM	ACA1210, ACA1215, ACJ1210
F-ACA14LM	ACA1412, ACA1416, ACA1420, ACJ1412
F-ACA16LM	ACA1616, ACA1620, ACA1625
F-ACA20LM	ACA2020, ACA2025, ACA2030, ACA2040, ACJ2020
F-ACA25LM	ACA2525, ACA2550, ACJ2525, ACJ2550
F-ACA27LM	ACA2725, ACA2750, ACJ2725, ACJ2750
F-ACA33LM	ACA3325, ACA3350, ACJ3325, ACJ3350
F-ACA36LM	ACA3625, ACA3650, ACJ3625, ACJ3650
F-ACA36FA	ACA3625, ACA3650, ACJ3625, ACJ3650
F-ACA42FA	ACJ4225, ACJ4250, ACJ4275

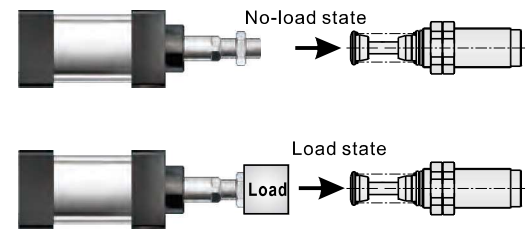
ACA, ACJ Series

How to select

Theoretical energy parameter table for cylinders under no-load state

Unit : J (N.m)

Stroke(mm)	6	7	10	12	15	16	20	25	30	40	50	75	
Bore size (mm)	6	0.102	0.119	0.170	0.203	0.254	0.271	0.339	0.424	0.509	0.678	0.848	1.27
	8	0.181	0.211	0.301	0.362	0.452	0.482	0.603	0.754	0.904	1.21	1.51	2.26
	10	0.283	0.330	0.471	0.565	0.707	0.754	0.942	1.18	1.413	1.88	2.36	3.53
	12	0.407	0.475	0.678	0.814	1.017	1.085	1.36	1.70	2.035	2.71	3.39	5.09
	16	0.723	0.844	1.21	1.45	1.809	1.929	2.41	3.01	3.617	4.82	6.03	9.04
	20	1.13	1.32	1.88	2.26	2.826	3.014	3.77	4.71	5.652	7.54	9.42	14.13
	25	1.77	2.06	2.94	3.53	4.416	4.710	5.89	7.36	8.831	11.8	14.7	22.1
	32	2.89	3.38	4.82	5.79	7.235	7.717	9.65	12.1	14.47	19.3	24.1	36.2
	40	4.52	5.28	7.54	9.04	11.3	12.06	15.1	18.8	22.6	30.1	37.7	56.5
	50	7.07	8.24	11.8	14.1	17.7	18.84	23.6	29.4	35.33	47.1	58.9	88.3
	63	11.2	13.1	18.7	22.4	28.0	29.91	37.4	46.7	56.08	74.8	93.5	140.2
	80	18.1	21.1	30.1	36.2	45.2	48.23	60.3	75.4	90.43	120.6	150.7	226.1
	100	28.3	33.0	47.1	56.5	70.7	75.36	94.2	117.8	141.3	188.4	235.5	353.3
	125	44.2	51.5	73.6	88.3	110.4	117.8	147.2	184.0	220.8	294.4	368.0	552.0
	160	72.3	84.4	120.6	144.7	180.9	192.9	241.2	301.4	361.7	482.3	602.9	904.3
	200	113.0	131.9	188.4	226.1	282.6	301.4	376.8	471.0	565.2	753.6	942.0	1413.0
250	176.6	206.1	294.4	353.3	441.6	471.0	588.5	735.9	883.1	1177.5	1471.9	2207.8	
320	289.4	337.6	482.3	578.8	723.5	771.7	964.6	1205.8	1446.9	1929.2	2411.5	3617.3	



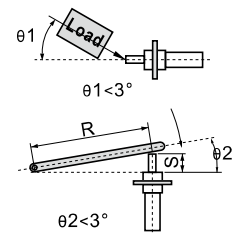
For example:

When the pressure is 0.6MPa, bore size of $\phi 40$ under no-load state plus shock stroke of 12mm can produce energy of 9.04 N.m. Refer to the specification table, you will find ACA1412 fits.

Note: Cylinders under full-load state can produce as twice as the energy shown above.

Installation and Operation

- The scale range of adjustable shock absorbers is 0 to 9 (8). Factory set is at 6 (4) position. 0 means the softest, while 9 means the hardest;
- Correct selection of shock absorbers can ensure a smooth deceleration and good shock absorbing properties;
- If there exists rebounding at the beginning of the stroke, it shows the effective weight is too high. In this case, self-compensation type shall be replaced by high speed type (-1), while adjustable type shall be adjusted to softer, that is closer to 0;
- If there exists rebounding at the end of the stroke, it shows the effective weight is too low. In this case, self-compensation type shall be replaced by low speed type (-3), while adjustable type shall be adjusted to harder, that is closer to 9;
- In the work process, lateral load should be avoided as possible as one can. Eccentric angle must be controlled within 3° . Shock absorbers shall be securely locked;
- The operating temperature range shall be -5 to 70°C ;
- To extend the service life, piston shall be stopped 1mm before reaching the end. It is better to install set screw with positioning and precise adjustment;
- If two or more shock absorbers are installed at the same side, please make sure that they act synchronously;
- No painting, welding or cleaning with corrosive substance on the body as well as the piston rod.
- When installed the absorber, the moment forced on absorber can't be out of the range given in below list or may cause the absorber damage.



Compatible absorber	Male thread Spec(of body)	Max. Assembly Force on absorber(N.m)
ACA0806	M8x1.0[Note]	2.0
ACA1007, ACJ1007	M10x1.0	3.5
ACA1210, ACA1215, ACJ1210	M12x1.0	8.0
ACA1412, ACA1416, ACA1420, ACJ1412	M14x1.5	11.0
ACA1616, ACA1620, ACA1625	M16x1.5	15.0
ACA2020, ACA2025, ACA2030, ACA2040, ACJ2020	M20x1.5	24.0
ACA2525, ACA2550, ACJ2525, ACJ2550	M25x1.5	40.0
ACA2725, ACA2750, ACJ2725, ACJ2750	M27x1.5	63.0

[Note]
When ACA0806 is selected, bottom diameter of internal thread before tapping is $\phi 7.1_{0.1}^{0.1}$.

Calculation of energy under load state

Horizontal impact			Vertical impact			Rotation impact		
1) Horizontal impact Impact weight (kg): m Impact speed (m/s): v Kinetic energy (J(N.m): $E1 = \frac{m \times v^2}{2}$ Propelling energy(J(N.m): $E2 = 0$ Gross energy (J(N.m): $E = E1 + E2$			1) Free fall Impact weight (kg): m Impact speed (m/s): v Kinetic energy (J(N.m): $E1 = m \times g \times h$ Propelling energy(J(N.m): $E2 = m \times g \times L$ Gross energy (J(N.m): $E = E1 + E2$			1) Rocker Impact weight (kg): m Impact speed (m/s): $v = R \times \omega$ Kinetic energy (J(N.m): $E1 = \frac{I \times \omega^2}{2}$ Propelling energy(J(N.m): $E2 = \frac{T \times L}{R}$ Gross energy (J(N.m): $E = E1 + E2$		
2) Horizontal impact with cylinder thrust Impact weight (kg): m Impact speed (m/s): v Kinetic energy (J(N.m): $E1 = \frac{m \times v^2}{2}$ Propelling energy(J(N.m): $E2 = F \times L$ Gross energy (J(N.m): $E = E1 + E2$			2) Push-down by cylinder Impact weight (kg): m Impact speed (m/s): v Kinetic energy (J(N.m): $E1 = \frac{m \times v^2}{2}$ Propelling energy(J(N.m): $E2 = (mg + F) \times L$ Gross energy (J(N.m): $E = E1 + E2$			2) Rotation Impact weight (kg): m Impact speed (m/s): $v = R \times \omega$ Kinetic energy (J(N.m): $E1 = \frac{I \times \omega^2}{2}$ Propelling energy(J(N.m): $E2 = \frac{T \times L}{R}$ Gross energy (J(N.m): $E = E1 + E2$		
Code	Explanation	Unit	Code	Explanation	Unit	Code	Explanation	Unit
m	Impact weight	kg	F	Thrust($(\pi \times D^2 \times P) / 4$)	N	N	Round per Minute	rpm
v	Impact speed	m/s	D	Nore size	mm	R	Distance fron rotation center to impact point	m
E	Gross energy	J(N.m)	P	Air pressure	MPa	I	Moment of Inertia ($I = m \times r^2 / 2$)	kg×m ²
E1	Kinetic energy(Potential energy)	J(N.m)	L	Shock stroke	m	ω	Angular velocity($\omega = 2\pi N / 60$)	rad,s
E2	Propelling energy	J(N.m)	h	Height	m			
g	Gravity acceleration	9.8(m/s ²)	T	Torque	N.m			





Technology information about actuator

Cylinder bore size, theory basic speed and corresponding valves list

Bore size (mm)	Theory basic speed (mm/s)	Necessary orifice size (mm ²)	Corresponding valves				Corresponding accessories		Corresponding tube between valve and cylinder
			Single solenoid valve	Double solenoid valve	Single air control valve	Double air control valve	Speed control valve	Silencer	
Φ6	500	0.1							
Φ10	500	0.2	6V0510M5/6V110M5 4V110M5 4M110M5	6V0520M5/6V120M5 4V120M5 4M120M5	4A110M5	4A120M5	GPTLM5 GPSTM5 GPSSM5	GBSLM5 GBSLMM5	Φ4XΦ2.5 tube
Φ12	500	0.3							
Φ16	500	0.5							
Φ20	300	0.5	6V0510M5/6V110M5 4V110M5/4V11006 4M110M5/4M11006	6V0520M5/6V120M5 4V120M5/4V12006 4M120M5/4M12006	4A110M5 4A11006	4A120M5 4A12006	GPTLM5 GPSTM5 GPSSM5 GPTL01 GPSL01 GPSS01 ASC10006	GBSLM5 GBSLMM5 GBSL01 GBSLM01 GBESL01	Φ6XΦ4 tube
	400	0.7							
	500	0.8							
	600	1.0							
	700	1.2							
Φ25	800	1.3	6V0510M5/6V110M5 6V11006 4V110M5/4V11006 4M110M5/4M11006	6V0520M5/6V120M5 6V12006 4V120M5/4V12006 4M120M5/4M12006	4A110M5 4A11006	4A120M5 4A12006	GPTLM5 GPSTM5 GPSSM5 GPTL01 GPSL01 GPSS01 ASC10006	GBSLM5 GBSLMM5 GBSL01 GBSLM01 GBESL01	Φ6XΦ4 tube
	300	0.8							Φ8XΦ5 tube
	400	1.0							
	500	1.3							
	600	1.5							
Φ32	700	1.8	6V11006/6V21006 4V11006/4V21006 4M11006/4M21006	6V12006/6V22006 4V12006/4V22006 4M12006/4M22006	4A11006 4A21006	4A12006 4A22006	GPTL01 GPSL01 GPSS01 ASC10006	GBSL(M)01 GBESL01	Φ6XΦ4 tube
	800	2.0							Φ8XΦ5 tube
	300	1.3							
	400	1.7							
	500	2.1							
Φ40	600	2.5	6V11006/6V21006 6V21008 4V11006/4V21006 4V21008/4M11006 4M21006/4M21008	6V12006/6V22006 6V22008 4V12006/4V22006 4V22008/4M12006 4M22006/4M22008	4A11006 4A21006 4A21008	4A12006 4A22006 4A22008	GPTL01 GPSL01 GPSS01 ASC10006 GPTL02/GPSL02 GPSS02 ASC20008	GBSL01/02 GBSLM01/02 GBESL01/02	Φ8XΦ5 tube
	700	2.9							Φ10XΦ6.5 tube
	800	3.4							
	300	2.0							
	400	2.6							
Φ50	500	3.3	6V21008 4V21008 4M21008	6V22008 4V22008 4M22008	4A21008	4A22008	GPTL02 GPSL02 GPSS02 ASC20008	GBSL02 GBSLM02 GBESL02	Φ6XΦ4 tube
	600	3.9							Φ8XΦ5 tube
	700	4.6							
	800	5.2							
	300	3.1							
Φ63	400	4.1	6V21008/6V31010 4V21008/4V31008 4V31010/4M21008 4M31008/4M31010	6V22008/6V32010 4V22008/4V32008 4V32010/4M22008 4M32008/4M32010	4A21008 4A31008 4A31010	4A22008 4A32008 4A32010	GPTL02 GPSL02 GPSS02 ASC20008 GPTL03 GPSL03 GPSS03 ASC30010	GBSL02/03 GBSLM02/03 GBESL02/03	Φ8XΦ5
	500	8.1							Φ10XΦ6.5 tube
	600	9.7							
	700	11.4							
	800	13.0							
Φ80	300	7.9	6V31010 4V31010 4M31010	6V32010 4V32010 4M32010	4A31010	4A32010	GPTL03 GPSL03 GPSS03 ASC30010	GBSL03 GBSLM03 GBESL03	Φ10XΦ6.5 tube
	400	10.5							Φ16XΦ11 tube
	500	13.1							
	600	15.7							
	700	18.3							
Φ100	800	20.9	6V31010 4V31010 4V41015 4M31010	6V32010 4V32010 4V42015 4M32010	4A31010 4A41015	4A32010 4A42015	GPTL03 GPSL03 GPSS03 ASC30010 GPTL04/GPSL04 GPSS04 ASC30015	GBSL03/04 GBSLM03/04 GBESL03/04	Φ10XΦ6.5 tube
	300	12.3							Φ16XΦ11 tube
	400	16.4							
	500	20.4							
	600	24.5							
	700	28.6							
	800	32.7							





Technology information about products

Production weight(Standard cylinder)

Unit: g

SC	Bore size (mm)							SC	Bore size (mm)						
									125	160	200	250			
	Without magnet	Weight when stroke is zero	488	611	890	1235	2151		2732	Without magnet	Weight when stroke is zero	3864.0	7349.0	9725.0	22021.0
	With magnet	stroke is zero	496	624	909	1262	2190		2782	With magnet	stroke is zero	3909.0	7416.0	9808.0	22190.0
Add weight of per 1mm stroke		2.29	3.15	4.25	5.08	7.92	8.43	Add weight of per 1mm stroke		14.08	21.96	23.24	35.88		

BSC Series															
Series		BSC							BSCD						
Bore size (mm)		32	40	50	63	80	100	125	32	40	50	63	80	100	125
Weight	Stroke=25mm	952.7	1191.2	1965.6	2568.8	5399.7	6969.0	11137.2	1069.5	1369.5	2266.4	2864.1	5958.7	7537.6	12134.3
	Add weight of per 5mm stroke	11.4	15.2	21.8	25.6	39.4	39.6	67.3	15.9	23.2	33.8	37.7	48.4	58.6	98.7
	Add weight of with magnet	7.2	12.0	17.4	26.4	36.6	48.0	45.0	7.2	12.0	17.4	26.4	36.6	48.0	45.0

SCF	Bore size (mm)							SCLF	Bore size (mm)							
									40	50	63	80	100			
	Without magnet	Weight when stroke is zero	819.8	943.0	1222.6	1725.6	2644.4		3265.0	Without magnet	Weight when stroke is zero	676.0	939.6	1273.6	2294.0	3371.0
	With magnet	stroke is zero	827.0	955.0	1240.0	1752.0	2681.0		3313.0	With magnet	stroke is zero	688.0	957.0	1300.0	2330.6	3419.0
Add weight of per 1mm stroke		2.29	3.15	4.25	5.08	7.92	8.43	Add weight of per 1mm stroke		3.15	4.25	5.08	7.92	8.43		
SCLB								SCLB								
	Without magnet	Weight when stroke is zero	709.0	995.6	1345.0	2389.0	3495.0		Without magnet	Weight when stroke is zero	721.0	1013.0	1371.4	2425.6	3543.0	
	With magnet	stroke is zero	721.0	1013.0	1371.4	2425.6	3543.0		With magnet	stroke is zero	721.0	1013.0	1371.4	2425.6	3543.0	
	Add weight of per 1mm stroke		3.15	4.25	5.08	7.92	8.43		Add weight of per 1mm stroke		3.15	4.25	5.08	7.92	8.43	

SAI	Bore size (mm)							SAI	Bore size (mm)					
									32	40	50	63	80	100
	Without magnet	Weight when stroke is zero	489.8	733.0	1106.0	1495.3	2301.4		3237.0	5611.3	10343.0	13667.5		
	With magnet	stroke is zero	497.0	745.0	1123.4	1521.7	2338.0		3285.0	5656.3	10410.0	13750.5		
Add weight of per 1mm stroke		2.54	3.48	4.96	5.49	7.96	9.34	14.65	26.49	30.42				

SAIF	Bore size (mm)							BSAI	Bore size (mm)							
									32	40	50	63	80	100	125	
	Without magnet	Weight when stroke is zero	816.0	1064.0	1437.0	1985.3	2792.4		3768.0	Stroke=25mm	927.3	1431.0	2279.6	2942.9	5549.0	7597.5
	With magnet	stroke is zero	828.0	1076.0	1454.4	2011.7	2829.0		3816.0	Add weight of per 5mm stroke	12.7	17.4	24.8	27.5	39.8	46.7
Add weight of per 1mm stroke		2.54	3.48	4.96	5.49	7.96	9.34	Add weight of with magnet		7.2	12	17.4	26.4	36.6	48	45.0

TSAIM	Bore size (mm)							
	Standard	Weight when stroke is zero	2880	3660	5640	7680	14300	18115
		Add weight of per 1mm stroke	7.5	8.4	9.9	10.3	19.1	20.7
Add weight of standard with magnet		7.5	15	17.5	26.5	36.5	48	
TSAIL	Bore size (mm)							
	Standard	Weight when stroke is zero	2330	3080	5020	7060	12530	16330
		Add weight of per 1mm stroke	5.7	6.6	9.9	10.3	15.7	17.3
Add weight of standard with magnet		7.5	15	17.5	26.5	36.5	48	

SAILF	Bore size (mm)									
	Without magnet	Weight when stroke is zero	731.0	1221.6	1638.1	2717.0	3609.0	6360.0	11588.5	15245.0
			743.0	1239.0	1664.5	2753.6	3657.0	6405.0	11655.5	15328.0
Add weight of per 1mm stroke		3.48	4.96	5.49	7.96	9.34	14.65	26.49	30.42	
SAILB	Bore size (mm)									
	Without magnet	Weight when stroke is zero	761.0	1263.6	1711.6	2790.0	3737.0	6639.0	12112.5	15718.0
			773.0	1281.0	1738.0	2826.6	3785.0	6684.0	12179.5	15801.0
Add weight of per 1mm stroke		3.48	4.96	5.49	7.96	9.34	14.65	26.49	30.42	

SAU	Bore size (mm)							SAUF	Bore size (mm)								
									32	40	50	63	80	100			
	Without magnet	Weight when stroke is zero	471.8	605.7	851.2	1140.4	2045.4		2495.0	Without magnet	Weight when stroke is zero	802.8	936.7	1182.2	1630.4	2536.4	3026.0
	With magnet	stroke is zero	479.0	617.7	868.6	1166.8	2082.0		2543.0	With magnet	stroke is zero	810.0	948.7	1199.6	1656.8	2573.0	3074.0
Add weight of per 1mm stroke		2.56	3.52	4.99	5.77	7.90	9.60	Add weight of per 1mm stroke		2.56	3.52	4.99	5.77	7.90	9.60		

SG\SGC					JSI	Bore size (mm)									
						32	40	50	63	80	100	125			
SG series	Weight when stroke is zero	7690	14210	19800		33950	Without magnet	Weight when stroke is zero	456.8	615.0	993.6	1218.6	2133.4	2998.0	4426.0
		7250	13140	17860		30460	With magnet	stroke is zero	464.0	627.0	1011.0	1245.0	2170.0	3046.0	4471.0
Add weight of per 1mm stroke		13.51	22.12	23.82	36.66	Add weight of per 1mm stroke		2.54	3.48	4.96	5.49	7.96	11.79	14.65	

Note : The data in the weight table is for reference only, and the actual weight shall be subject to the actual product.





Technology information about products

Production weight(Roundline cylinder)

Unit: g

St.	MI8			MI10		MI12		MI16				MI20				MI25				MI32			MI40		
	CA	U		CA	U	CA	U	CA	CM	U	R	CA	CM	U	R	CA	CM	U	R	CM	U	R	CM	U	R
10	36	35		39	38	74	69	88	92	84	84	158	164	146	146	220	226	205	208	284	259	262	653	612	612
15	37	35		40	39	76	71	91	94	86	87	162	168	150	150	226	232	211	214	293	268	270	664	623	623
20	38	36		42	40	78	73	93	97	89	89	166	172	154	153	231	238	216	219	301	276	279	676	635	635
25	39	37		/	/	80	75	96	99	91	92	170	176	158	157	237	244	222	225	310	285	287	688	647	647
30	39	38		44	43	82	77	98	102	94	94	173	179	161	161	243	250	228	231	318	293	296	700	659	659
40	41	40		46	45	87	82	103	107	99	99	181	187	169	168	255	261	240	243	335	310	313	723	682	682
50	43	41		49	47	91	86	108	112	104	104	188	194	176	176	266	273	251	254	352	327	330	746	705	705
60	44	43		51	50	95	90	113	117	109	109	196	202	184	183	278	285	263	266	369	344	347	770	729	729
75	47	45		55	53	102	97	121	124	116	117	207	213	195	194	295	302	280	283	395	370	372	805	764	764
80	48	46		56	54	104	99	123	127	119	119	210	216	198	198	301	308	286	289	403	378	381	817	776	776
100	51	50		61	59	113	108	133	137	129	129	225	231	213	213	325	331	310	313	437	412	415	864	823	823
125	55	54		66	65	124	119	146	149	141	142	244	250	232	231	354	360	339	342	480	455	457	922	881	881
150	62	60		72	71	135	130	158	162	154	154	262	268	250	250	383	389	368	371	522	497	500	981	940	940
160				75	73	139	134	163	167	159	159	270	276	258	257	394	401	379	382	539	514	517	1004	963	963
175				78	77	146	141	171	174	166	167	281	287	269	268	412	418	397	400	565	540	542	1039	998	998
200				84	83	156	151	183	187	179	179	300	306	288	287	441	447	426	429	607	582	585	1098	1057	1057
250						178	173	208	212	204	204	337	343	325	324	499	505	484	487	692	667	670	1215	1174	1174
300	/	/	/					233	237	229	229	374	380	362	361	557	564	542	545	777	752	755	1333	1292	1292
350				/	/	/	/	258	262	254	254	411	417	399	398	615	621	600	603	/	/	/	/	/	/
400				/	/	/	/	283	287	279	279	448	454	436	436	673	680	658	661	947	922	925	1567	1526	1526
450								308	312	304	304	485	491	473	473	732	738	717	720	1032	1007	1010	1684	1643	1643
500								333	337	329	329	523	529	511	510	790	796	775	778	1117	1092	1095	1801	1760	1760

MIC16				MIC20				MIC25				MIC32			MIC40		
St.	CA	CM	U	St.	CA	CM	U	St.	CA	CM	U	St.	CM	U	St.	CM	U
10	84	87	80	10	156	162	144	10	233	238	215	10	332	305	10	653	608
15	87	90	83	15	160	166	148	15	235	240	217	15	340	313	15	665	620
20	89	92	85	20	164	170	152	20	237	242	219	20	347	320	20	677	632
25	92	95	88	25	167	173	155	25	240	245	222	25	355	328	25	689	644
30	94	97	90	30	171	177	159	30	242	247	224	30	363	336	30	702	657
40	100	103	96	40	179	185	167	40	246	251	228	40	379	352	40	726	681
50	105	108	101	50	187	193	175	50	251	256	233	50	394	367	50	750	705
60	110	113	106	60	194	200	182	60	256	261	238	60	410	383	60	774	729
75	118	121	114	75	206	212	194	75	263	268	245	75	433	406	75	811	766
80	120	123	116	80	209	215	197	80	265	270	247	80	441	414	80	823	778
100	131	134	127	100	225	231	213	100	274	279	256	100	472	445	100	872	827
125	143	146	139	125	244	250	232	125	286	291	268	125	511	484	125	932	887
150	156	159	152	150	263	269	251	150	297	302	279	150	550	523	150	993	948
160	161	164	157	160	271	277	259	160	302	307	284	160	566	539	160	1017	972
175	169	172	165	175	282	288	270	175	309	314	291	175	589	562	175	1054	1009
200	182	185	178	200	301	307	289	200	320	325	302	200	628	601	200	1114	1069
250	208	211	204	250	340	346	328	250	343	348	325	250	706	679	250	1236	1191
300	234	237	230	300	378	384	366	300	366	371	348	300	784	757	300	1357	1312
350	259	262	255	350	416	422	404	350	389	394	371	350	862	835	350	1478	1433
400	285	288	281	400	454	460	442	400	412	417	394	400	940	913	400	1600	1555
450	311	314	307	450	493	499	481	450	435	440	417	450	1018	991	450	1721	1676
500	337	340	333	500	531	537	519	500	458	463	440	500	1096	1069	500	1842	1797

TMIM	Standard	Bore size (mm)			
		12	16	20	25
		Weight when stroke is zero			
		490	505	1075	1230
		Add weight of per 1mm stroke			
		1.7	1.7	2.5	4.3
		Add weight of standard with magnet			
		1	1	2	3
TMIL	Standard	Bore size (mm)			
		12	16	20	25
		Weight when stroke is zero			
		380	395	870	940
		Add weight of per 1mm stroke			
		1.2	1.3	2.0	2.9
		Add weight of standard with magnet			
		1	1	2	3

PB4		PB6		PB10				PB12				PB16			
St.	R	St.	R	St.	U	CB	R	St.	U	CB	R	St.	U	CB	R
5	12	10	17	10	25	28	25	10	44	49	44	10	51	57	52
10	12,5	15	18	15	27	30	27	15	46	51	46	15	53	60	54
15	13	20	18	20	28	31	28	20	47	52	47	20	55	62	56
20	13,5	25	19	25	29	32	29	25	48	53	48	25	58	64	59
		30	20	30	30	33	30	30	50	55	50	30	60	66	61
		40	21	40	33	36	33	40	53	58	53	40	64	71	65
		50	23	50	35	38	35	50	55	60	55	50	69	75	70
		60	24	60	37	40	37	60	58	63	58	60	73	80	74
				75	41	44	41	75	62	67	62	75	80	86	81
				80	42	45	42	80	64	69	64	80	82	89	83
				100	47	50	47	100	69	74	69	100	91	98	92
				125	53	56	53	125	76	81	76	125	102	109	103
				150	59	62	59	150	83	88	83	150	113	120	114
				160	61	64	61	160	86	91	86	160	118	124	119
				175	65	68	65	175	90	95	90	175	125	131	126
				200	71	74	71	200	97	102	97	200	136	142	137
												250	158	165	159
												300	181	187	182

Note : The data in the weight table is for reference only, and the actual weight shall be subject to the actual product.





Technology information about products

Production weight(Roundline cylinder)

Unit: g

PBR6		PBR8			PBR10			PBR10			PBR12			PBR16		
St.	R	St.	U	R	St.	U	R	St.	U	R	St.	U	R	St.	U	R
10	20	10	32	32	10	33	33	10	33	33	10	56	56	10	59	60
15	20.6	15	33	33	15	34	34	15	34	34	15	58	58	15	61	62
20	21	20	34	34	20	35	35	20	35	35	20	59	59	20	64	65
25	22	25	35	35	25	36	36	25	36	36	25	60	60	25	66	67
30	23	30	36	36	30	37	37	30	37	37	30	62	62	30	68	69
40	24	40	37	37	40	40	40	40	40	40	40	65	65	40	73	74
50	26	50	39	39	50	42	42	50	42	42	50	67	67	50	77	78
60	27	60	40	40	60	45	45	60	45	45	60	70	70	60	82	83
		75	43	43	75	48	48	75	48	48	75	74	74	75	88	89
		80	44	44	80	49	49	80	49	49	80	76	76	80	91	92
		100	47	47	100	54	54	100	54	54	100	81	81	100	99	100
		125	51	51	125	60	60	125	60	60	125	88	88	125	111	112
		150	58	58	150	66	66	150	66	66	150	95	95	150	122	123
					160	69	69	160	69	69	160	98	98	160	126	127
					175	72	72	175	72	72	175	102	102	175	133	134
					200	78	78	200	78	78	200	109	109	200	144	145
														250	167	168
														300	189	190

MF20				MF25				MF32				MF40			
St.	CM	CA	U	St.	CM	CA	U	St.	CM	CA	U	St.	CM	CA	U
10	143	144	133	10	215	216	202	10	276	288	265	10	578	585	549
15	147	148	137	15	220	221	207	15	284	296	273	15	590	597	561
20	151	152	141	20	225	226	212	20	292	304	281	20	602	609	573
25	155	156	145	25	230	231	218	25	300	312	289	25	614	621	585
30	158	159	148	30	235	236	223	30	308	320	297	30	626	633	597
40	166	167	156	40	246	247	233	40	323	335	312	40	649	656	620
50	173	174	163	50	256	257	243	50	339	351	328	50	673	680	644
60	181	182	171	60	266	267	254	60	355	367	344	60	697	704	668
75	192	193	182	75	282	283	269	75	379	391	368	75	732	739	703
80	196	197	186	80	287	288	274	80	387	399	376	80	744	751	715
100	211	212	201	100	308	309	295	100	419	431	408	100	791	798	762
125	230	231	220	125	333	334	321	125	459	471	448	125	850	857	821
150	248	249	238	150	359	360	347	150	498	510	487	150	910	917	881
160	256	257	246	160	370	371	357	160	514	526	503	160	933	940	904
175	267	268	257	175	385	386	373	175	538	550	527	175	969	976	940
200	286	287	276	200	411	412	398	200	578	590	567	200	1028	1035	999
250	323	324	313	250	463	464	450	250	657	669	646	250	1146	1153	1117
300	361	362	351	300	514	515	502	300	737	749	726	300	1264	1271	1235
400	436	437	426	400	618	619	605	400	895	907	884	400	1501	1508	1472
450	473	474	463	450	669	670	657	450	975	987	964	450	1619	1626	1590
500	511	512	501	500	721	722	708	500	1054	1066	1043	500	1737	1744	1708

Add weight of with magnet: 2

Add weight of with magnet: 3

Add weight of with magnet: 7

Add weight of with magnet: 10

MFC20				MFC25				MFC32				MFC40			
St.	CM	CA	U	St.	CM	CA	U	St.	CM	CA	U	St.	CM	CA	U
10	144	145	134	10	215	214	200	10	277	289	266	10	577	584	548
15	148	149	138	15	220	219	206	15	285	297	274	15	589	596	560
20	152	153	142	20	226	225	211	20	292	304	281	20	600	607	571
25	156	157	146	25	231	230	216	25	299	311	288	25	612	619	583
30	160	161	150	30	236	235	222	30	306	318	295	30	623	630	594
40	167	168	157	40	247	246	233	40	321	333	310	40	646	653	617
50	175	176	165	50	258	257	243	50	336	348	325	50	669	676	640
60	182	183	172	60	269	268	254	60	350	362	339	60	692	699	663
75	194	195	184	75	285	284	270	75	372	384	361	75	727	734	698
80	198	199	188	80	290	289	276	80	379	391	368	80	738	745	709
100	213	214	203	100	312	311	297	100	409	421	398	100	784	791	755
125	232	233	222	125	338	337	324	125	445	457	434	125	842	849	813
150	251	252	241	150	365	364	351	150	481	493	470	150	899	906	870
160	259	260	249	160	376	375	362	160	496	508	485	160	922	929	893
175	271	272	261	175	392	391	378	175	518	530	507	175	957	964	928
200	290	291	280	200	419	418	405	200	554	566	543	200	1014	1021	985
250	328	329	318	250	473	472	458	250	627	639	616	250	1129	1136	1100
300	366	367	356	300	526	525	512	300	700	712	689	300	1244	1251	1215
400	443	444	433	400	634	633	619	400	846	858	835	400	1474	1481	1445
450	481	482	471	450	688	687	673	450	919	931	908	450	1589	1596	1560
500	520	521	510	500	741	740	727	500	992	1004	981	500	1704	1711	1675

Add weight of with magnet: 2

Add weight of with magnet: 3

Add weight of with magnet: 7

Add weight of with magnet: 10

Note : The data in the weight table is for reference only, and the actual weight shall be subject to the actual product.





Technology information about products

Production weight(Roundline cylinder)

Unit: g

MG20			MG25			MG32			MG40						
St.	MG	Add weight of with magnet: 1	St.	MG	Add weight of with magnet: 5	St.	MG	Add weight of with magnet: 7	St.	MG	Add weight of with magnet: 12				
10	111			10		166			10	249			10	440	
15	115			15		172			15	257			15	451	
20	119			20		177			20	265			20	463	
25	123			25		182			25	272			25	474	
30	126			30		188			30	280			30	485	
40	134			40		198			40	296			40	508	
50	141			50		209			50	311			50	530	
60	149			60		220			60	326			60	553	
75	160			75		236			75	349			75	586	
80	164			80		241			80	357			80	598	
100	179			100		262			100	388			100	643	
125	198			125		289			125	426			125	699	
150	217			150		316			150	464			150	755	
160	224			160		326			160	480			160	778	
175	236		175	342		175	503		175	811					
200	254		200	369		200	541		200	868					
			250	423		250	618		250	980					
			300	476		300	694		300	1093					

MG20			MG25			MG32			MG40						
St.	MG	Add weight of with magnet: 1	St.	MG	Add weight of with magnet: 5	St.	MG	Add weight of with magnet: 7	St.	MG	Add weight of with magnet: 12				
201	267			301		495			301	1031			301	1197	
225	280			350		539			350	1096			350	1290	
250	299			400		593			400	1172			400	1402	
300	336			500		1020			500	1326			500	1627	
350	374														
400	412														
450	449														
500	487														

MGC20			MGC25			MGC32			MGC40			MGC50			MGC63								
St.	MGC	Add weight of with magnet: 1	St.	MGC	Add weight of with magnet: 5	St.	MGC	Add weight of with magnet: 7	St.	MGC	Add weight of with magnet: 12	St.	MGC	Add weight of with magnet: 15	St.	MGC	Add weight of with magnet: 22						
10	115			10		125			10	244			10		452			10	797		10	1068	
15	119			15		131			15	252			15		464			15	816		15	1091	
20	123			20		138			20	260			20		476			20	835		20	1113	
25	126			25		145			25	268			25		487			25	854		25	1136	
30	130			30		152			30	276			30		499			30	873		30	1158	
40	138			40		166			40	293			40		523			40	910		40	1203	
50	145			50		180			50	309			50		546			50	948		50	1248	
60	153			60		193			60	325			60		569			60	986		60	1293	
75	164			75		214			75	350			75		605			75	1042		75	1360	
80	168			80		221			80	358			80		616			80	1061		80	1382	
100	183			100		248			100	391			100		663			100	1136		100	1472	
125	202			125		283			125	432			125		722			125	1231		125	1584	
150	221			150		317			150	472			150		781			150	1325		150	1696	
160	228			160		331			160	489			160		804			160	1362		160	1741	
175	239		175	351		175	513		175	839		175	1419		175	1808							
200	258		200	386		200	554		200	898		200	1513		200	1921							
			250	455		250	636		250	1015		250	1701		250	2145							
			300	523		300	717		300	1132		300	1890		300	2369							

MGC20			MGC25			MGC32			MGC40			MGC50			MGC63								
St.	MG	Add weight of with magnet: 1	St.	MG	Add weight of with magnet: 5	St.	MG	Add weight of with magnet: 7	St.	MG	Add weight of with magnet: 12	St.	MG	Add weight of with magnet: 15	St.	MG	Add weight of with magnet: 22						
201	268			301		540			301	741			301		1170			301	1963		301	2460	
225	286			350		607			350	821			350		1285			350	2147		350	2680	
250	305			400		676			400	902			400		1402			400	2336		400	2904	
300	343			500		813			500	1065			500		1636			500	2712		500	3352	
350	381																						
400	418																						
450	456																						
500	494																						

Note : The data in the weight table is for reference only, and the actual weight shall be subject to the actual product.





Technology information about products

Production weight(Roundline cylinder)

Unit: g

St.	MA16			Add weight of with magnet: 3	MA20			Add weight of with magnet: 4	MA25			Add weight of with magnet: 5	MA32			Add weight of with magnet: 7	MA40			Add weight of with magnet: 10
	CA	CM	U		CA	CM	U		CA	CM	U		CA	CM	U		CA	CM	U	
10	91	92	85		164	161	150		219	217	204		311	305	290		476	314	289	
15	93	95	87		168	165	154		225	223	210		318	313	297		488	326	301	
20	96	97	90		172	169	158		230	228	215		326	321	305		500	338	313	
25	98	100	92		176	173	162		236	234	221		334	329	313		512	350	325	
30	101	102	95		179	176	165		241	239	226		342	336	321		524	362	337	
40	106	107	100		187	184	173		252	250	237		357	352	336		549	387	362	
50	111	113	105		195	192	181		263	261	248		373	367	352		573	411	386	
60	116	118	110		202	199	188		274	272	259		388	383	367		597	435	410	
75	124	125	118		214	211	200		291	289	276		412	406	391		634	472	447	
80	126	128	120		217	214	203		296	294	281		419	414	398		646	484	459	
100	136	138	130		233	230	219		318	316	303		451	445	430		695	533	508	
125	149	150	143		252	249	238		346	344	331		489	484	468		756	594	569	
150	161	163	155		271	268	257		373	371	358		528	523	507		817	655	630	
160	166	168	160		278	275	264		384	382	369		544	538	523		841	679	654	
175	174	175	168		290	287	276		401	399	386		567	562	546		878	716	691	
200	187	188	181		309	306	295		428	426	413		606	600	585		939	777	752	
250	212	213	206		347	344	333		483	481	468		684	678	663		1061	899	874	
300	237	238	231		385	382	371		538	536	523		761	756	740		1182	1020	995	
400	287	289	281		461	458	447		648	646	633		917	911	896		1426	1264	1239	
450	312	314	306		499	496	485		703	701	688		994	989	973		1548	1386	1361	
500	338	339	332		541	538	527		758	756	743		1072	1066	1051		1670	1508	1483	

St.	MAC16			Add weight of with magnet: 3	MAC20			Add weight of with magnet: 4	MAC25			Add weight of with magnet: 5	MAC32			Add weight of with magnet: 7	MAC40			Add weight of with magnet: 10	MAC50			Add weight of with magnet: 15	MAC63			Add weight of with magnet: 22
	CA	CM	U		CA	CM	U		CA	CM	U		CA	CM	U		CA	CM	U		CA	CM	U		CA	CM	U	
10	84	85	78		162	159	148		219	217	204		305	299	284		382	220	195		815	824	774		1160	1154	1112	
15	87	88	81		166	163	152		224	222	209		313	307	292		399	237	212		829	838	788		1174	1168	1126	
20	89	91	83		170	167	156		229	227	214		320	315	299		415	253	228		844	853	803		1189	1183	1141	
25	92	94	86		174	171	160		235	233	220		328	323	307		432	270	245		858	867	817		1204	1198	1156	
30	95	96	89		177	174	163		240	238	225		336	330	315		448	286	261		872	881	831		1219	1213	1171	
40	100	102	94		185	182	171		250	248	235		351	346	330		481	319	294		901	910	860		1248	1242	1200	
50	106	107	100		193	190	179		261	259	246		367	361	346		514	352	327		930	939	889		1278	1272	1230	
60	111	112	105		200	197	186		272	270	257		382	377	361		547	385	360		959	968	918		1307	1301	1259	
75	119	121	113		212	209	198		288	286	273		406	400	385		596	434	409		1002	1011	961		1352	1346	1304	
80	122	123	116		215	212	201		293	291	278		414	408	393		612	450	425		1016	1025	975		1366	1360	1318	
100	133	134	127		230	227	216		314	312	299		445	439	424		678	516	491		1074	1083	1033		1426	1420	1378	
125	146	148	140		249	246	235		340	338	325		483	478	462		760	598	573		1146	1155	1105		1499	1493	1451	
150	160	161	154		268	265	254		367	365	352		522	517	501		842	680	655		1218	1227	1177		1573	1567	1525	
160	165	166	159		276	273	262		378	376	363		538	532	517		875	713	688		1247	1256	1206		1603	1597	1555	
175	173	175	167		287	284	273		393	391	378		561	556	540		924	762	737		1290	1299	1249		1647	1641	1599	
200	187	188	181		306	303	292		420	418	405		600	594	579		1007	845	820		1362	1371	1321		1721	1715	1673	
250	214	215	208		344	341	330		473	471	458		678	672	657		1171	1009	984		1506	1515	1465		1869	1863	1821	
300	241	242	235		382	379	368		526	524	511		755	750	734		1335	1173	1148		1650	1659	1609		2016	2010	1968	
350	268	269	262		420	417	406		579	577	564		833	827	812		1499	1337	1312		1794	1803	1753		2164	2158	2116	
400	295	296	289		458	455	444		632	630	617		911	905	890		1664	1502	1477		1938	1947	1897		2312	2306	2264	
450	322	323	316		496	493	482		685	683	670		988	983	967		1828	1666	1641		2082	2091	2041		2460	2454	2412	
500	349	350	343		534	531	520		738	736	723		1066	1060	1045		1992	1830	1805		2226	2235	2185		2607	2601	2559	

St./Bore Size	20		Add weight of with magnet: 1	25		Add weight of with magnet: 5	32		Add weight of with magnet: 7	40		Add weight of with magnet: 10	50		Add weight of with magnet: 15	63		Add weight of with magnet: 22
	MARF	MARU		MARF	MARU		MARF	MARU		MARF	MARU		MARF	MARU		MARF	MARU	
10	175	174		236	249		342	340		593	597		792	1040		1109	1472	
15	179	178		242	255		350	348		605	609		807	1055		1125	1488	
20	182	182		248	260		358	356		617	621		821	1069		1141	1504	
25	186	186		254	265		366	364		629	633		836	1084		1157	1520	
30	189	190		259	271		373	371		642	645		850	1098		1173	1537	
40	196	197		271	281		389	387		666	669		879	1127		1206	1569	
50	203	205		283	292		405	403		690	694		908	1156		1238	1601	
60	210	213		294	303		421	419		714	718		937	1185		1270	1633	
75	221	224		312	319		445	443		750	754		981	1229		1318	1681	
80	224	228		317	324		452	450		762	766		995	1243		1334	1697	
100	238	243		341	346		484	482		810	814		1053	1301		1398	1761	
125	256	262		370	373		524	522		870	874		1126	1374		1478	1841	
150	273	282		399	400		563	561		931	935		1198	1446		1559	1922	
160	280	289		410	410		579	577		955	959		1227	1475		1591	1954	
175	291	301		428	427		603	601		991	995		1271	1519		1639	2002	
200	308	320		457	453		642	640		1051	1055		1343	1591		1719	2082	
250	343	358		515	507		721	719		1172	1176		1488	1736		1879	2243	
300	378	396		573	561		800	798		1292	1296		1633	1881		2040	2403	
350	413	435		631	615		879	877		1413	1417		1778	2026		2200	2563	
400	448	473		689	668		958	956		1533	1537		1923	2171		2361	2724	
450	483	511		747	722		1037	1035		1654	1658		2068	2316		2521	2884	
500	518	549		805	776		1116	1114		1774	1778		2213	2461		2682	3045	

Note : The data in the weight table is for reference only, and the actual weight shall be subject to the actual product.





Technology information about products

Production weight(Roundline cylinder)

Unit: g

Series		MBL																							
		MBL/MBLC						MSBL/MTBL				MBLD/MBLCD						MBLJ/MBLCJ							
Bore size (mm)		20	25	32	40	50	63	20	25	32	40	20	25	32	40	50	63	20	25	32	40	50	63		
U Type without magnet	Stroke=5mm	-	-	-	-	-	-	156.7	197.0	302.3	572.3	-	-	-	-	-	-	-	-	-	-	-	-		
	Stroke=10mm	144	181	275	532	769	1055	-	-	-	-	203.6	266.7	352.6	711.6	1025	1299	-	-	-	-	-	-		
	Stroke=55mm	-	-	-	-	-	-	212.4	274.7	425.9	740.9	-	-	-	-	-	-	-	-	-	-	-	-		
	Stroke=105mm	-	-	-	-	-	-	267.9	351.1	536.5	905.3	-	-	-	-	-	-	-	-	-	-	-	-		
Adj. stroke=10mm	Stroke=10mm	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	252.3	339.5	428.2	850	1164	1437		
Add weight of per 5mm stroke		4.4	5.9	7.9	12.2	13.4	15.0	4.4	5.9	7.9	12.2	6.0	6.8	12.5	20.2	21.5	28.7	6.0	6.8	12.5	20.2	21.5	28.7		
Add weight when with magnet		4.0	4.8	6.9	11.7	17.3	26.4	4.0	4.8	6.9	11.7	4.0	4.8	6.9	11.7	17.3	26.4	4.0	4.8	6.9	11.7	17.3	26.4		
Add weight when CA type		14.9	14.6	10.5	31.4	40.2	37.4	14.9	14.6	10.5	31.4	-	-	-	-	-	-	-	-	-	-	-	-		
Add weight of per 10mm adj.stroke		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	20.8	31.2	33.7	61.4	61.4	61.4		

St./Bore Size		MBL																							
		20		25		32		40		50		63													
CA	U	CA	U	CA	U	CA	U	CA	U	CA	U	CA	U												
10	168	153	214	200	317	296	572	540	823	782	1171	1131													
15	172	157	220	206	325	305	585	553	836	795	1184	1144													
20	176	161	226	212	333	313	597	565	850	809	1197	1157													
25	180	165	232	218	341	321	609	577	863	822	1211	1170													
30	184	169	238	224	349	329	622	590	877	836	1224	1183													
40	193	178	250	235	357	336	646	614	903	862	1250	1209													
50	201	186	262	247	373	352	671	639	930	889	1276	1236													
60	209	194	274	259	389	368	695	663	957	916	1302	1262													
75	222	207	292	277	413	393	732	700	997	956	1342	1301													
80	226	211	297	283	421	401	745	713	1010	969	1355	1314													
100	243	228	321	307	454	433	794	762	1063	1022	1407	1367													
125	264	249	351	336	494	474	856	824	1130	1089	1473	1432													
150	285	270	381	366	535	514	917	885	1197	1156	1538	1498													
160	293	278	392	378	551	530	942	910	1224	1183	1564	1524													
175	305	290	410	396	575	555	979	947	1264	1223	1604	1563													
200	326	311	440	425	616	595	1040	1008	1330	1289	1669	1629													
250	368	353	499	485	697	676	1163	1131	1464	1423	1800	1760													
300	410	395	559	544	778	757	1287	1255	1597	1556	1931	1891													
350	451	436	618	604	859	838	1410	1378	1731	1690	2062	2022													
400	493	478	677	663	940	919	1533	1501	1864	1823	2193	2153													
450	535	520	737	722	1021	1000	1656	1624	1998	1957	2324	2284													
500	576	561	796	782	1102	1081	1779	1747	2131	2090	2455	2415													

St./Bore Size		MBLC																							
		20		25		32		40		50		63													
CA	U	CA	U	CA	U	CA	U	CA	U	CA	U														
10	177	162	218	203	301	280	544	512	831	790	1115	1075													
15	180	165	224	209	309	288	557	525	844	803	1130	1089													
20	184	169	229	215	317	296	569	537	856	815	1144	1104													
25	187	172	235	221	325	304	582	550	869	828	1159	1118													
30	191	176	241	226	333	312	594	562	882	841	1173	1133													
40	198	183	252	238	349	329	619	587	907	866	1202	1162													
50	205	190	264	249	365	345	645	613	932	891	1231	1191													
60	213	198	275	261	382	361	670	638	958	917	1260	1220													
75	223	208	293	278	406	385	707	675	996	955	1304	1263													
80	227	212	298	284	414	394	720	688	1008	967	1318	1278													
100	242	227	321	307	446	426	770	738	1059	1018	1376	1336													
125	260	245	350	336	487	466	833	801	1122	1081	1449	1408													
150	278	263	379	365	528	507	896	864	1185	1144	1521	1481													
160	285	270	391	376	544	523	921	889	1211	1170	1550	1510													
175	296	281	408	393	568	548	958	926	1249	1208	1594	1553													
200	314	299	437	422	609	588	1021	989	1312	1271	1666	1626													
250	350	335	494	480	690	669	1147	1115	1438	1397	1811	1771													
300	386	371	552	537	771	750	1272	1240	1565	1524	1956	1916													
350	422	407	609	595	852	831	1398	1366	1691	1650	2101	2061													
400	458	443	667	652	933	912	1523	1491	1818	1777	2246	2206													
450	494	479	724	710	1014	993	1649	1617	1944	1903	2391	2351													
500	530	515	782	768	1095	1075	1774	1742	2071	2030	2536	2496													

Note : The data in the weight table is for reference only, and the actual weight shall be subject to the actual product.





Technology information about products

Production weight(Compact cylinder)

Unit: g

ACE	Bore size (mm)		12	16	20	25	32	40	50	63	80	100	125
	Female thread	Weight when stroke is zero	69,5	85,5	119,2	171,6	263,5	316,4	446	702	1041,5	1832	3467
	Add weight of per 1mm stroke	1,4	1,76	2,34	2,78	3,55	3,92	5,8	6,55	9	10,4	11	
	Add weight of magnet	3	3,5	9	8,5	16,5	17	30	30	59	60	132	
	Add weight of magnet	1	1	2,5	3,5	11	11,5	17	24,5	34,5	47,5	54	

TACE	Bore size (mm)		12	16	20	25	32	40	50	63	80	100
	Female thread	Weight when stroke is zero	90	104,9	183,6	234	427	480	690,5	711,5	1455	2380
	Add weight of per 1mm stroke	1,4	1,76	2,34	2,78	3,55	3,92	5,8	6,55	9	10,4	
	Add weight of magnet	1	1	2,5	3,5	11	11,5	17	24,5	34,5	47,5	

ACQ	Bore size (mm)				TACO	Bore size (mm)													
	Without magnet	Female thread	With magnet	Weight when stroke is zero		12	16	20	25	32	40	50	63	80	100				
				1480	3616	4788	6241	Standard	Weight when stroke is zero	41,5	59	84	125	174,5	281,5	434	672	1168	2650
				20,6	21,7	24,6	31,7		Add weight of per 1mm stroke	1,67	2,5	2,9	3,7	5	5,7	8,8	11	18	24,5
				2177	3661	4840	6300	With magnet	Weight when stroke is zero	61,5	89	124,3	165	234	359,4	533	857	1353	2682,5
				20,6	21,7	24,6	31,7		Add weight of per 1mm stroke	1,6	2,5	2,8	3,7	5	5,47	8,8	11	18	24,5

ACQ												
Bore size (mm)		12	16	20	25	32	40	50	63	80	100	
Without magnet	Female thread	Weight when stroke is zero	39	40	56	75,5	106	196	299	498	975	1480
		Add weight of per 1mm stroke	1,5	1,9	2,9	3,5	4,3	5,1	7,5	9,0	14,6	20,6
With magnet	Female thread	Weight when stroke is zero	47	76,3	103	122,7	159	269,3	402	683	1168	2177
		Add weight of per 1mm stroke	1,4	1,9	2,8	3,4	4,3	5,1	7,5	9,0	14,6	20,6

SDA												
Bore size (mm)		12	16	20	25	32	40	50	63	80	100	
Without magnet	Female thread	Weight when stroke is zero	29	44	61	70	112	170	273	442	870	1618
	Male	Weight when stroke is zero	32	49	65	79,5	131	215	361	538	-	-
With magnet	Female thread	Weight when stroke is zero	48	68	89	109	163	242	379	614	1119	1941
		Add weight of per 1mm stroke	1,3	1,7	2,3	2,9	3,5	5,0	7,2	8,9	13,7	19,3

Production weight(Multi-mounting cylinder)

Unit: g

MU																							
Bore size (mm)		4				6	8	10	6	8	10	6	8	10	12	16	20	12	16	20	12	16	20
Stroke		4	6	8	10	15	20	4	4	4	Add weight of per 2mm stroke	Add weight of per 5mm stroke	5 (Transverse mounted)			Add weight of axial mounted							
Double acting	No thread	6	7	8	9	10	11	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Female	-	-	-	-	-	-	10	12	14													
	Female (with magnet)	-	-	-	-	-	-	11	14	16	1	1	1,5	2,5	2,5	3	5	7	11	23	37	50	
	Male	7	8	9	10	11	13	11	14	17										26	41	59	1
Single acting	Male (with magnet)	-	-	-	-	-	-	12	16	19										34	49	76	1,5
	No thread	6	7	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Female	-	-	-	-	-	-	11	13	15													
	Female (with magnet)	-	-	-	-	-	-	12	14	17	1	1	1,5	2,5	2,5	3	5	7	11	30	46	64	
	Male	7	8	-	-	-	-	12	15	18										33	51	73	1,5
	Male (with magnet)	-	-	-	-	-	-	13	16	20										41	59	90	2,5

MD							
Bore size (mm)		10	16	20	25	32	
MD	Without magnet	Weight when stroke is zero	31	43	87	165,5	278
	With magnet	Weight when stroke is zero	32	58	118	211	349
		Add weight of per 1mm stroke	0,8	1,2	2,0	3,2	4,6

MK								
Bore size (mm)		6	10	16	20	25	32	
MK	Without magnet	Weight when stroke is zero	24,7	36	53,2	97	190,5	330
	With magnet	Weight when stroke is zero	25,1	17	62,7	128	232	399
		Add weight of per 1mm stroke	0,86	1	1,1	2,2	3,5	5,4

Production weight(Plate cylinder and Thread cylinder)

Unit: g

MPG							
Bore size (mm)		6	8	10	12	16	
MPG	Without magnet	Weight when stroke is zero	9,65	19,05	21,8	32,6	36
	With magnet	Weight when stroke is zero	16	22,7	26,6	37,4	42
	Short weight of no screw	0,64	1,4	1,4	1,4	1,4	
	Add weight of per 1mm stroke	0,45	0,5	0,5	0,74	0,8	
	Weight of body and nut	3,12	4,58	4,58	5,19	5,19	

MPE							
Bore size (mm)		6	8	10	12	16	
MPE	Without magnet	Weight when stroke is zero	12,3	20,4	23,5	46,5	64
	With magnet	Weight when stroke is zero	0,64	1,4	1,4	1,4	1,4
	Short weight of no screw	0,64	1,4	1,4	1,4	1,4	
	Add weight of per 1mm stroke	0,5	0,68	1,4	1,75	2	
	Weight of body and nut	3,12	4,58	4,06	10,25	10,64	

Note : The data in the weight table is for reference only, and the actual weight shall be subject to the actual product.





Technology information about products

Production weight(Twin-rod cylinder and slide table cylinder)

Unit: g

TR						
St.	TR6	TR10	TR16	TR20	TR25	TR32
10	88	158	252	420	640	1183
20	102	178	280	456	692	1270
30	118	198	308	492	744	1357
40	132	218	334	529	798	1444
50	146	236	360	566	850	1531
60		256	387	603	902	1618
70		276	414	640	954	1704
80		296	441	677	1019	1791
90		316	468	714	1074	1878
100	/	336	495	751	1126	1965
125			563	844	1256	2176
150		/	631	937	1392	2386
175			699	1030	1522	2596
200			768	1123	1652	2806

TN					
St.	TN10	TN16	TN20	TN25	TN32
10	130	246	390	584	1390
20	148	272	426	632	1480
30	166	297	462	684	1570
40	184	322	498	732	1660
50	202	348	532	780	1750
60	220	372	567	828	1840
70	238	398	602	876	1930
80	256	424	638	924	2020
90	274	450	675	972	2111
100	292	476	712	1022	2212
125		542	798	1144	2428
150	/	608	886	1268	2652
175		674	975	1388	2876
200		740	1064	1508	3100

HLQ											
Model	St.										Note
	10	20	30	40	50	75	100	125	150		
HLQ6	72	90	104	130	146			/			HLQL=HLQ
HLQ8	138	162	196	226	280	360		/			
HLQ12	298	300	342	390	426	591	682	/			
HLQ16	528	536	594	648	726	912	1124	1256	/		
HLQ20	848	862	880	966	1078	1340	1732	1920	2158		
HLQ25	1392	1410	1426	1555	1774	2100	2512	3038	3318		

HLH				
St.	HLH6	HLH10	HLH16	HLH20
5	62	118	218	430
10	68	128	233	446
15	76	140	248	462
20	82	150	264	478
25	90	162	277	494
30	96	172	290	510
40		194	320	556
50	/	214	350	605
60		/	382	654

HLS											
Model	St.										Note
	10	20	30	40	50	75	100	125	150		
HLS6	72	89	104	136	158			/			HLSL=HLS
HLS8	148	164	194	232	278	396		/			
HLS12	352	354	360	431	498	674	878	/			
HLS16	556	564	572	659	736	1012	1284	1556	/		
HLS20	935	947	958	1056	1154	1540	1992	2358	2829		
HLS25	1468	1484	1500	1632	1774	2343	2862	3465	4014		

HLF				
St.	HLF8	HLF12	HLF16	HLF20
10	122	206	383	530
20	143	234	421	575
30	163	267	453	621
40		319	549	743
50	/	353	579	808
75		/	740	990
100		/	880	1161

TCL																				
Model/St.	5	10	15	20	25	30	40	50	60	70	75	80	90	100	125	150	175	200	225	250
TCL12		220		254	271	288	344	378	412	446	463	480	517	551	653	738			/	
TCL16		318		364	387	410	480	526	572	618	641	664	710	756	896	1011	1126	1241		/
TCL20				623	658	693	844	914	984	1054	1089	1124	1194	1264	1483	1658	1833	2008	2226	2401
TCL25				854	901	948	1141	1235	1329	1423	1470	1517	1611	1705	1990	2225	2460	2695	2955	3190
TCL32	/		/		1236	1366	1496	1626	1994	2124	2189	2254	2384	2514	2912	3237	3562	3887	4311	4636
TCL40	/	/			1532	1606	1754	1902	2282	2430	2504	2578	2726	2874	3315	3685	4055	4425	4880	5250
TCL50	/	/	/		2514	2625	2847	3069	3514	3736	3847	3958	4180	4402	5151	5706	6252	6807	7550	8105
TCL63	/	/	/	/	3218	3352	3620	3888	4516	4784	4918	5052	5320	5588	6369	7039	7709	8379	9234	9904
TCL80	/	/	/	/	5387	5562	5912	6262	6612	7758	7933	8108	8458	8808	9683	10558	11672	12547	13422	14297
TCL100	/	/	/	/	8416	8656	9136	9616	10096	11715	11955	12195	12675	13155	14355	15555	17084	18284	19484	20684

TCM																				
Model/St.	5	10	15	20	25	30	40	50	60	70	75	80	90	100	125	150	175	200	225	250
TCM6	45	51	57	63										/						
TCM10	68	76	84	92	100	108								/						
TCM12		237		275	294	313	351	389	458	496	515	534	572	610	754	849			/	
TCM16		344		394	419	444	495	545	651	701	726	751	801	851	1045	1170	1295	1420		/
TCM20				682	720	758	845	921	1113	1189	1227	1265	1341	1417	1710	1900	2090	2280	2470	2660
TCM25				946	1000	1054	1171	1279	1584	1638	1692	1746	1854	1962	2358	2628	2898	3168	3438	3708
TCM32	/	/	/		1572	1646	1794	1942	2313	2461	2535	2609	2757	2905	3440	3810	4180	4550	5055	5425
TCM40	/	/	/	/	1806	1890	2058	2226	2604	2772	2856	2940	3108	3276	3843	4263	4683	5103	5641	6061
TCM50	/	/	/	/	2795	2906	3128	3350	3936	4158	4269	4380	4602	4824	5585	6140	6695	7250	7990	8545
TCM63	/	/	/	/	3526	3660	3928	4196	4826	5094	5228	5362	5630	5898	6758	7428	8098	8768	9651	10321
TCM80	/	/	/	/	5974	6166	6550	6934	7318	8706	8898	9090	9474	9858	10818	11778	13152	14112	15072	16032
TCM100	/	/	/	/	9120	9368	9864	10360	10856	12746	12994	13242	13738	14234	15474	16714	18507	19747	20987	22227

Note : The data in the weight table is for reference only, and the actual weight shall be subject to the actual product.





Technology information about products

Production weight(Rodless cylinder)

Unit: g

RMS						
St.	RMS10	RMS16	RMS20	RMS25	RMS32	RMS40
50	136	250	545	750	1345	2153
100	150	276	580	795	1410	2230
150	164	302	615	840	1475	2307
200	178	328	650	885	1540	2384
250	192	354	688	930	1605	2461
300	206	380	725	975	1670	2538
350	/	407	763	1020	1735	2615
400	/	433	800	1065	1800	2692
450	/	459	835	1110	1863	2769
500	/	485	868	1155	1925	2845
600	/	/	934	1245	2050	3003
700	/	/	1000	1335	2175	3161
750	/	/	1033	1380	2235	3240
800	/	/	1066	1425	2295	3319
900	/	/	1125	1515	2415	3480
1000	/	/	1191	1605	2535	3638

RMH				
St.	RMH10	RMH16	RMH20	RMH25
50	754	704	1582	1813
100	809	781	1694	1940
150	865	857	1805	2067
200	921	934	1916	2194
250	976	1010	2028	2320
300	1032	1087	2139	2447
350	/	1164	2251	2574
400	/	1240	2390	2701
450	/	1317	2501	2828
500	/	1394	2613	2955
600	/	/	2836	3208
700	/	/	3285	3462
750	/	/	3396	3589
800	/	/	3508	3716

Bore size St.	RMT(No sensor /With adjustable screw)					RMT(No sensor /With shock absorber)					RMT(With sensor /With adjustable screw)					RMT(With sensor /With shock absorber)				
	16	20	25	32	40	16	20	25	32	40	16	20	25	32	40	16	20	25	32	40
50	1018	1726	2173	4509	5936	1028	1736	2203	4599	6026	1040	1750	2197	4535	5964	1050	1760	2227	4625	6054
100	1135	1899	2374	4766	6395	1145	1909	2404	4856	6485	1165	1930	2405	4800	6430	1175	1940	2435	4890	6520
150	1253	2091	2574	5023	6853	1263	2101	2604	5113	6943	1290	2130	2613	5065	6896	1300	2140	2643	5155	6986
200	1370	2273	2774	5281	7311	1380	2283	2804	5371	7401	1415	2320	2821	5330	7362	1425	2330	2851	5420	7452
250	1487	2456	2975	5538	7770	1497	2466	3005	5628	7860	1540	2510	3029	5595	7828	1550	2520	3059	5685	7918
300	1605	2638	3175	5795	8228	1615	2648	3205	5885	8318	1665	2700	3237	5860	8294	1675	2710	3267	5950	8384
350	1722	2820	3375	6052	8686	1732	2830	3405	6142	8776	1790	2890	3445	6125	8760	1800	2900	3475	6215	8850
400	1839	3003	3576	6310	9145	1849	3013	3606	6400	9235	1915	3080	3653	6390	9226	1925	3090	3683	6480	9316
450	1956	3185	3776	6567	9603	1966	3195	3806	6657	9693	2040	3270	3861	6655	9692	2050	3280	3891	6745	9782
500	2074	3367	3976	6824	10061	2084	3377	4006	6914	10151	2165	3460	4069	6920	10158	2175	3470	4099	7010	10248
600	/	3732	4377	7339	10978	/	3742	4407	7429	11068	/	3840	4485	7450	11090	/	3850	4515	7540	11180
700	/	4096	4777	7854	11894	/	4106	4807	7944	11984	/	4220	4901	7980	12022	/	4230	4931	8070	12112
750	/	4279	4978	8111	12353	/	4289	5008	8201	12443	/	4410	5109	8245	12488	/	4420	5139	8335	12578
800	/	4461	5178	8368	12811	/	4471	5208	8458	12901	/	4600	5317	8510	12954	/	4610	5347	8600	13044
900	/	/	/	/	13728	/	/	/	/	13818	/	/	/	/	13886	/	/	/	/	13976
1000	/	/	/	/	14644	/	/	/	/	14734	/	/	/	/	14818	/	/	/	/	14908

Bore size St.	RMTL(No sensor rail /With adjustable screw)						RMTL(No sensor rail /With adjustable screw and shock absorber)						RMTL(With sensor rail /With adjustable screw)						RMTL(With sensor rail /With adjustable screw and shock absorber)					
	10	16	20	25	32	40	10	16	20	25	32	40	10	16	20	25	32	40	10	16	20	25	32	40
50	929	1421	2527	2964	5312	9656	959	1471	2587	3084	5622	9966	952	1445	2553	2990	5340	9690	982	1495	2613	3110	5650	10000
100	1002	1528	2681	3156	5600	10049	1032	1578	2741	3276	5910	10359	1033	1560	2715	3190	5636	10090	1063	1610	2775	3310	5946	10400
150	1076	1635	2836	3349	5888	10441	1106	1685	2896	3469	6198	10751	1114	1675	2877	3390	5932	10490	1144	1725	2937	3510	6242	10800
200	1149	1743	2990	3541	6177	10833	1179	1793	3050	3661	6487	11143	1195	1790	3039	3590	6228	10890	1225	1840	3099	3710	6538	11200
250	1222	1850	3144	3733	6466	11226	1252	1900	3204	3853	6776	11536	1276	1905	3201	3790	6525	11290	1306	1955	3261	3910	6835	11600
300	1295	1957	3299	3926	6754	11618	1325	2007	3359	4046	7064	11928	1357	2020	3363	3990	6821	11690	1387	2070	3423	4110	7131	12000
350	/	2065	3453	4118	7043	12010	/	2115	3513	4238	7353	12320	/	2135	3525	4190	7117	12090	/	2185	3585	4310	7427	12400
400	/	2172	3607	4310	7331	12402	/	2222	3667	4430	7641	12712	/	2250	3687	4390	7413	12490	/	2300	3747	4510	7723	12800
450	/	2279	3761	4502	7619	12795	/	2329	3821	4622	7929	13105	/	2365	3849	4590	7709	12890	/	2415	3909	4710	8019	13200
500	/	2387	3916	4695	7908	13187	/	2437	3976	4815	8218	13497	/	2480	4011	4790	8005	13290	/	2530	4071	4910	8315	13600
600	/	/	4224	5079	8484	13972	/	/	4284	5199	8794	14282	/	/	4335	5190	8597	14090	/	/	4395	5310	8907	14400
700	/	/	4533	5464	9061	14756	/	/	4593	5584	9371	15066	/	/	4659	5590	9189	14890	/	/	4719	5710	9499	15200
750	/	/	4687	5656	9349	15149	/	/	4747	5776	9659	15459	/	/	4821	5790	9485	15290	/	/	4881	5910	9795	15600
800	/	/	4842	5849	9637	15541	/	/	4902	5969	9947	15851	/	/	4983	5990	9781	15690	/	/	5043	6110	10091	16000
900	/	/	/	/	/	16325	/	/	/	/	/	16635	/	/	/	/	/	16490	/	/	/	/	/	16800
1000	/	/	/	/	/	17110	/	/	/	/	/	17420	/	/	/	/	/	17290	/	/	/	/	/	17600

Note : The data in the weight table is for reference only, and the actual weight shall be subject to the actual product.





Technology information about products

Production weight(Air gripper)

Unit: g

HFT																				
Bore size (mm)	10				16				20				25				32			
Stroke	20	30	40	60	30	40	60	80	40	60	80	100	40	60	80	100	60	80	100	150
Weight	305	340	380	465	585	660	805	950	1020	1225	1460	1660	1615	1890	2190	2460	2750	3130	3685	4650

HFY							
Bore size (mm)	6	10	16	20	25	32	
Weight	HFY	23.5	44.5	97.9	172.6	299.4	424.5
	HFTY	24.3	44	106	170.5	295	430.5

HFZ							
Bore size (mm)	6	10	16	20	25	32	40
Weight	HFZ	27.5	60	132.4	246.7	460.7	1350.3
	HFTZ	28	60.6	133.4	247	465.5	1418.5
	HFSZ	27.9	58.5	122.5	234	445	815.1

HFC							
Bore size (mm)	16	20	25	32	40	50	63
Weight	HFCI	60	97	138.5	257	355	524.5
	HFCY	60.5	99	139.5	240.5	363	541.5
	HFCX	65.5	107	154	284	388	573

HFK						
Bore size (mm)	10	16	20	25	32	40
Weight	HFK	58.3	124.4	243.5	456.0	751.0
	HFTK	60.6	133.3	254.0	466.1	804.7
	HFSK	60.8	132.7	254.7	465.9	813.1

Production weight(Rotary clamp cylinder)

Unit: g

QCK									
Stroke\ Bore size(mm)	12	16	20	25	32	40	50	63	
10	75	105	235	300	455	540	920	1350	
20	90	135	280	355	525	635	1060	1540	
30	-	165	330	410	600	730	1200	1725	
50	-	-	-	-	810	915	1480	2100	
Add weight when with clamping arm	15	30	75	75	140	140	340	340	

QDK			
	QDK	QDK-U	
QDK20	210	QDK20-U	185
QDK25	270	QDK25-U	240
QDK32	365	QDK32-U	325
QDK40	505	QDK40-U	460

HRQ			
Model	With adjustable screw	Model	With shock absorber
HRQ2	120		/
HRQ3	175		/
HRQ7	270		/
HRQ10	535	HRQ10A	543
HRQ20	940	HRQ20A	960
HRQ30	1260	HRQ30A	1280
HRQ50	2060	HRQ50A	2076
HRQ70	2890	HRQ70A	2958
HRQ100	4100	HRQ100A	4168
HRQ200	7650	HRQ200A	7756

ACK	Bore size(mm)					
	Single arm	25	32	40	50	63
	Add weight of double arm	47.5	138	138	309.5	309.5

AQK					
Model	Pin height				
	149X290	159X290	179X340	199X340	249X340
AQK50	1802	1805	1810	1815	1825
BQK50	2592	2595	2600	2605	2615

MCK	Bore size (mm)						
	Without magnet	Weight when stroke is zero	25	32	40	50	63
	Add weight of per 1mm stroke	1.5	2	3.5	4	4	6

Y	MCKA					
	87.5	87.5	215	215	215	518.5
	MCKB					
	79	79	260	260	260	

Production weight(Cylinder joint accessory)

Unit: g

I Knuckle	Model	Model	Weight
	F-M3X050I	F-M3X050IN	2.0
	F-M4X070I	F-IJ004M04N	4.5
	F-M5X080I	F-IJC0065M05N	21.5
	F-M6X100I	F-M6X100IN	14.5
	F-M8X125I	F-IJ008M08N	38.0
	F-M10X125I	F-IJ010M10N	75.0
	F-M12X125I	F-IJ012M12N	127.0
	F-M14X150I	F-IJJ014M14N	91.0
	F-M16X150I	F-IJ016M16N	312.0
	F-M18X150I	F-IJJ020M18N	194.0
	F-M20X150I	F-IJ020M20N	608.0
	F-M22X150I	F-IJJ030M22N	515.0
	F-M26X150I	F-IJJ030M26N	1187.0
	F-M27X200I	F-IJ030M27N	1201.0
F-M36X200I	F-IJ035M36N	2176.0	
F-M42X200I	F-IJ040M42N	4123.0	

Y Knuckle	Model	Weight
	F-M3X050Y	2.7
	F-M4X070Y	6.0
	F-M5X080Y	16.5
	F-M6X100Y	20.5
	F-M8X125Y	47.3
	F-M10X125Y	86
	F-M12X125Y	175
	F-M14X150Y	107.4
	F-M16X150Y	367.5
	F-M18X150Y	249
	F-M20X150Y	860
	F-M22X150Y	792.1
	F-M26X150Y	771.8
	F-M27X200Y	1473
F-M36X200Y	3083.8	
F-M42X200Y	5480	

Floating joint	Model	Weight
	F-M3X050F	12
	F-M4X070F	13
	F-M5X080F	19
	F-M6X100F	21
	F-M8X125F	66
	F-M10X125F	107
	F-M12X125F	130
	F-M14X150F	240
	F-M16X150F	543
	F-M18X150F	565
	F-M20X150F	865
	F-M22X150F	936
	F-M26X150F	1354
	F-M27X200F	1470
F-M36X200F	4126	

Universal joint	Model	Weight
	F-M4X070U	19
	F-M5X080U	18
	F-M6X100U	26
	F-M8X125U	46
	F-M10X125U	69
	F-M12X125U	108
	F-M14X150U	159
	F-M16X150U	204
	F-M18X150U	304
	F-M20X150U	370
	F-M26X150U	690
	F-M27X200U	1210
	F-M36X200U	1664
	/	/
/	/	

Note : The data in the weight table is for reference only, and the actual weight shall be subject to the actual product.



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