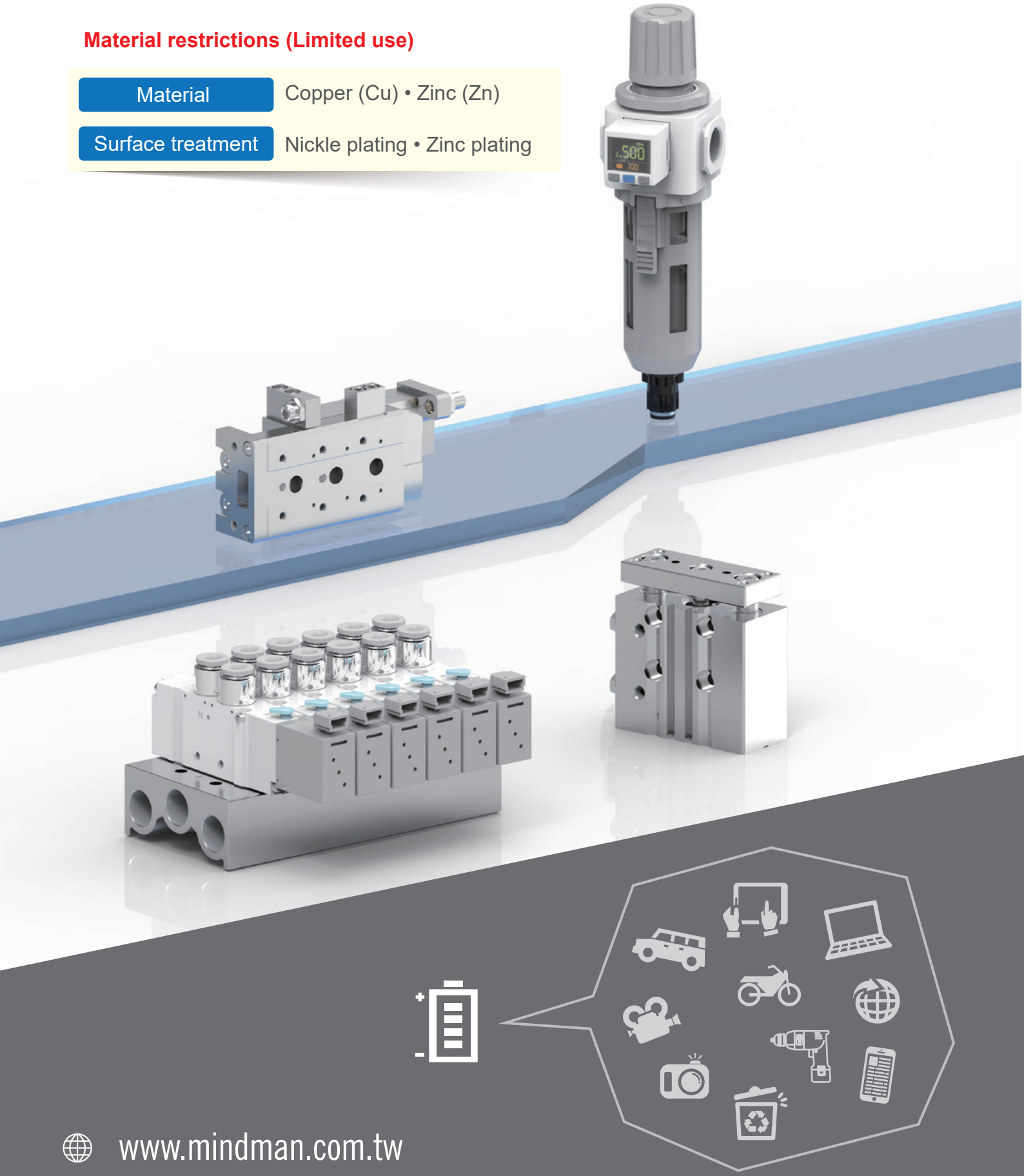
Secondary Battery

mindman

Connect Your Future

Material restrictions (Limited use)

Material	Copper (Cu) • Zinc (Zn)
Surface treatment	Nickle plating • Zinc plating

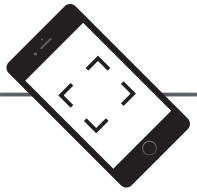


www.mindman.com.tw

http

Web

2D/3D download



YouTube

Video

Solenoid Valve

Air Treatment Unit

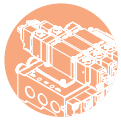
Gripper

CONTENTS

CONTENTS 1
CORRESPONDING SERIES 2
MATERIAL RESTRICTIONS 3
ABOUT MINDMAN 4
MINDMAN GROUP 8
OUR ADVANTAGE 9
GLOBAL NETWORK 10
PNEUMATIC CIRCUIT DIAGRAM 11
ONLINE EXHIBITION 12

1 AIR TREATMENT UNIT

F.R.unit 1-2
Filter 1-5
Pressure regulator 1-9
Air / Mist / Micromist filter 1-11
Accessory 1-12
Pneumatic pressure switch 1-14
Pressure gauge 1-18



2 DIRECTIONAL CONTROL VALVE

Solenoid valve (5 port / 3 port) 2-2
Solenoid valve (2 port) 2-16
ON-OFF valve 2-18

3 AIR CYLINDER / GRIPPER

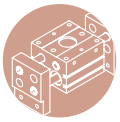
Standard cylinder 3-2
Compact cylinder 3-14
Multi-mount cylinder 3-37
Mini cylinder 3-46
Pen cylinder 3-58
Guide cylinder 3-76
Table 3-90
Rotary actuator 3-115
Gripper 3-126

4 AUXILIARY EQUIPMENT

Sensor switch 4-2
Circular connector 4-11
Shock absorber 4-12

4 PISCO®

Tube fitting 4-26
Speed controller 4-31
Tube 4-32



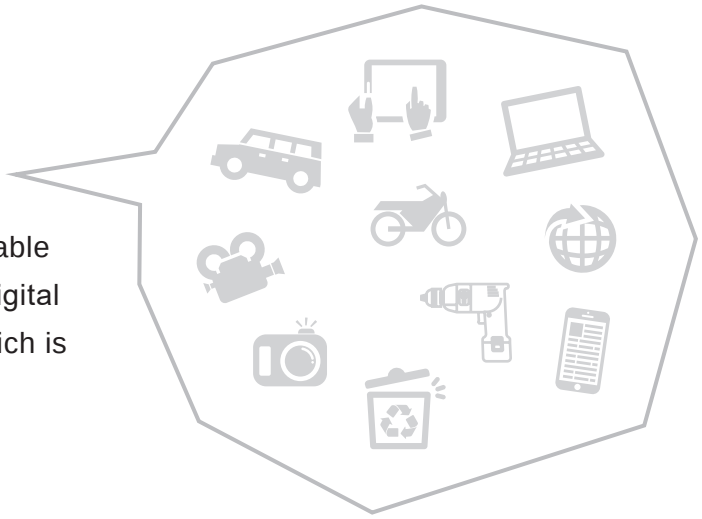
5 CAUTION FOR SAFETY

All products 5-1
Sensor switch 5-3

CORRESPONDING SERIES

MINDMAN provides products conforming to production safety in the secondary battery manufacturing process from electrode manufacturing to packaging.

In the trend of environment protection and sustainable development, people are more emphasizing the renewable energy. Secondary battery is one of the critical eco-friendly renewable energy that is applied in smartphone, laptop, digital camera, wearable devices, electric vehicle ,which is all around in our daily life.



1 Electrode manufacturing engineering

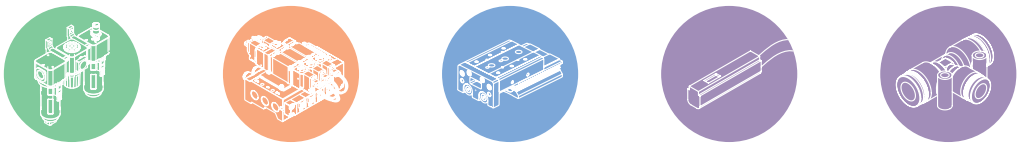
1. Electrode material
2. Weighting / Kneading
3. Coating / Drying / Rolling
4. Slitting
5. Electrode punching

2 Battery assembly engineering

6. Winding
7. Press
8. TAB / insulation plate mounting
9. Electrolyte pouring
10. Cell lid welding

3 Inspection / Packaging

11. Charge and discharge
12. Aging
13. Inspecting
14. Packaging

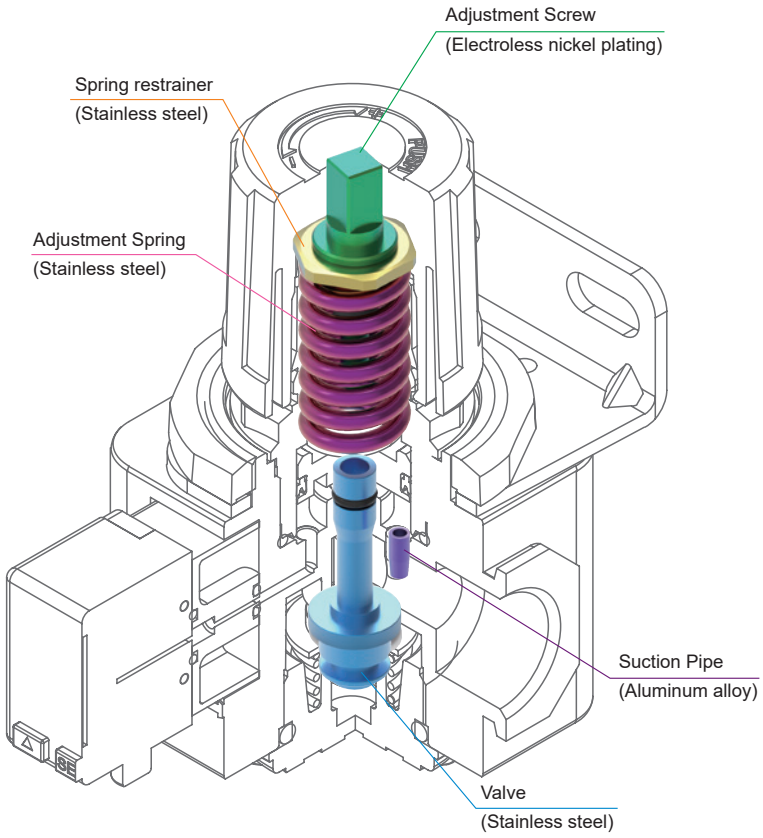


No.	Process	Air treatment unit	Directional control valve	Air cylinder / Gripper	Auxiliary equipment	Fitting / Tube
1	Kneading					
2	Coating					
3	Slitting					
4	Winding					
5	Assembly					
6	Pouring					
7	Welding					
8	Inspecting					
9	Packaging					

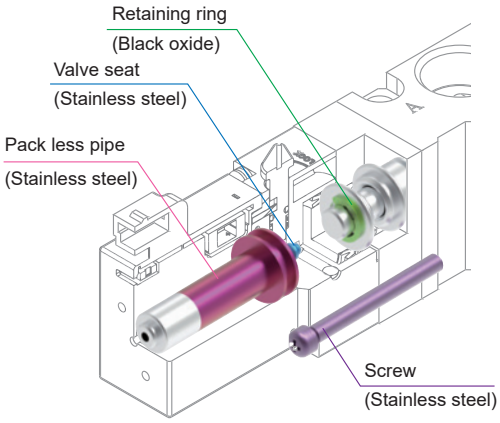
20 series

Material restrictions (Limited use)	
Material	Surface treatment
Copper (Cu) • Zinc (Zn)	Nickle plating • Zine plating

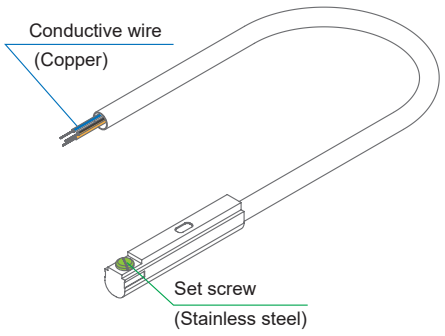
Air treatment unit



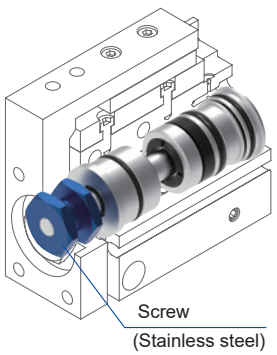
Directional control valve

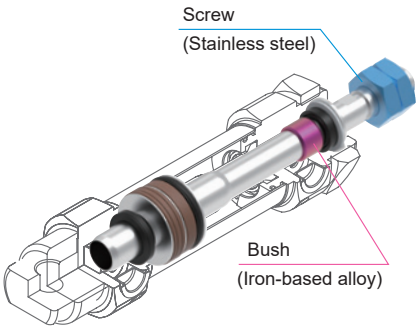


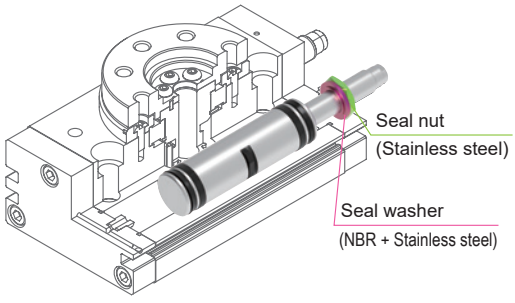
Auxiliary equipment



Air cylinders







MINDMAN.
GLOBAL VISION AND LOCAL OPERATION

Core Business:
Manufacture and sale for varieties of high quality automation components.

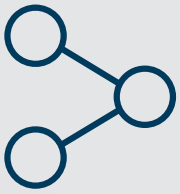
1979
FOUNDED

CHING-CHENG HUANG
PRESIDENT

CAPITAL
USD 12,558,000

600 PEOPLE

EMPLOYEES



97 COUNTRIES

SALES NETWORK

No.1

Quantity supplied of
pneumatic components in Taiwan.

HEADQUARTERS IN

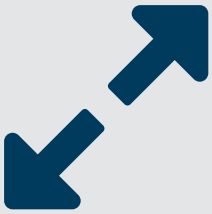
TAIPEI

CITY, TAIWAN

MANUFACTURE BASE IN

TAINAN

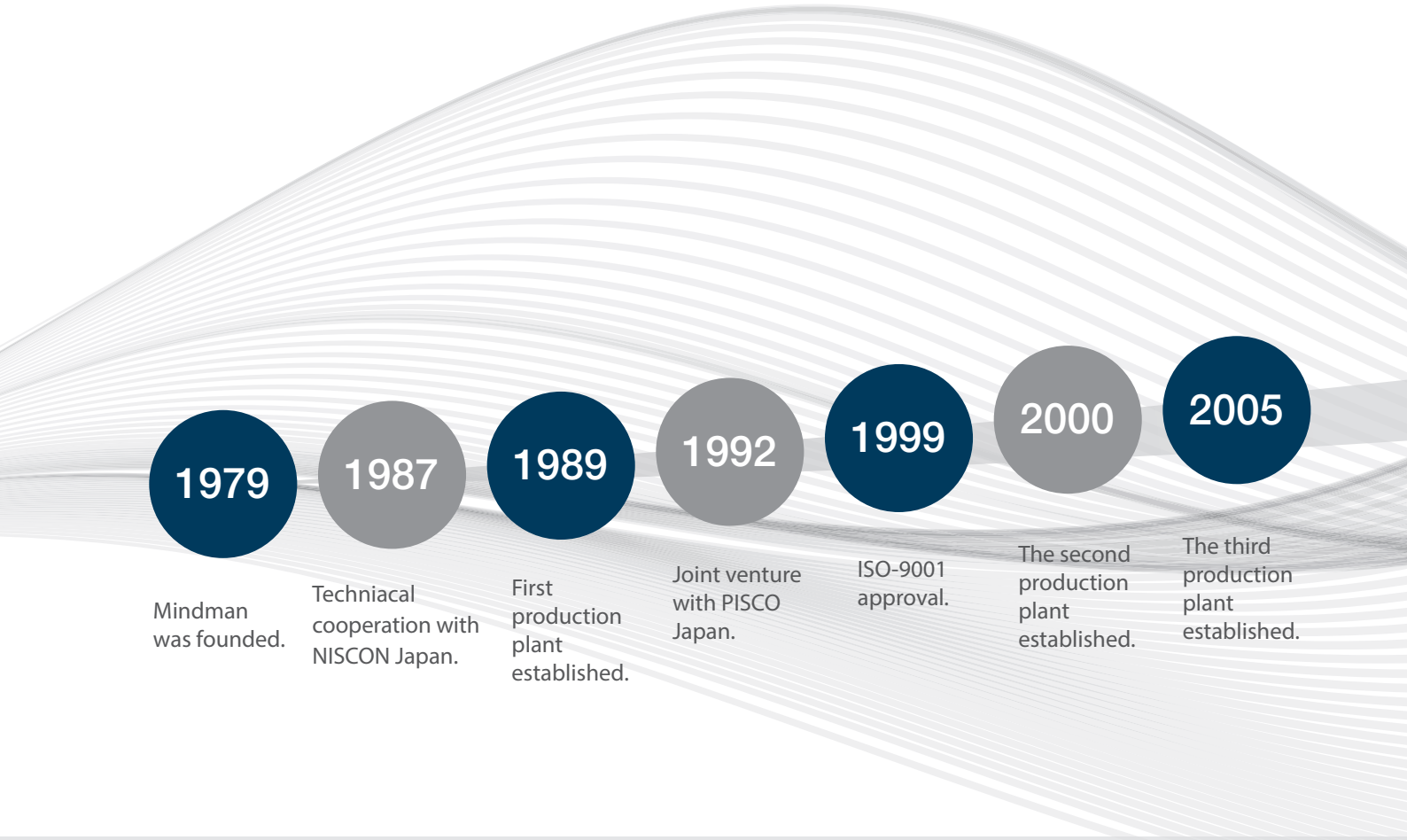
CITY, TAIWAN



90,000 m^2

Plant Size

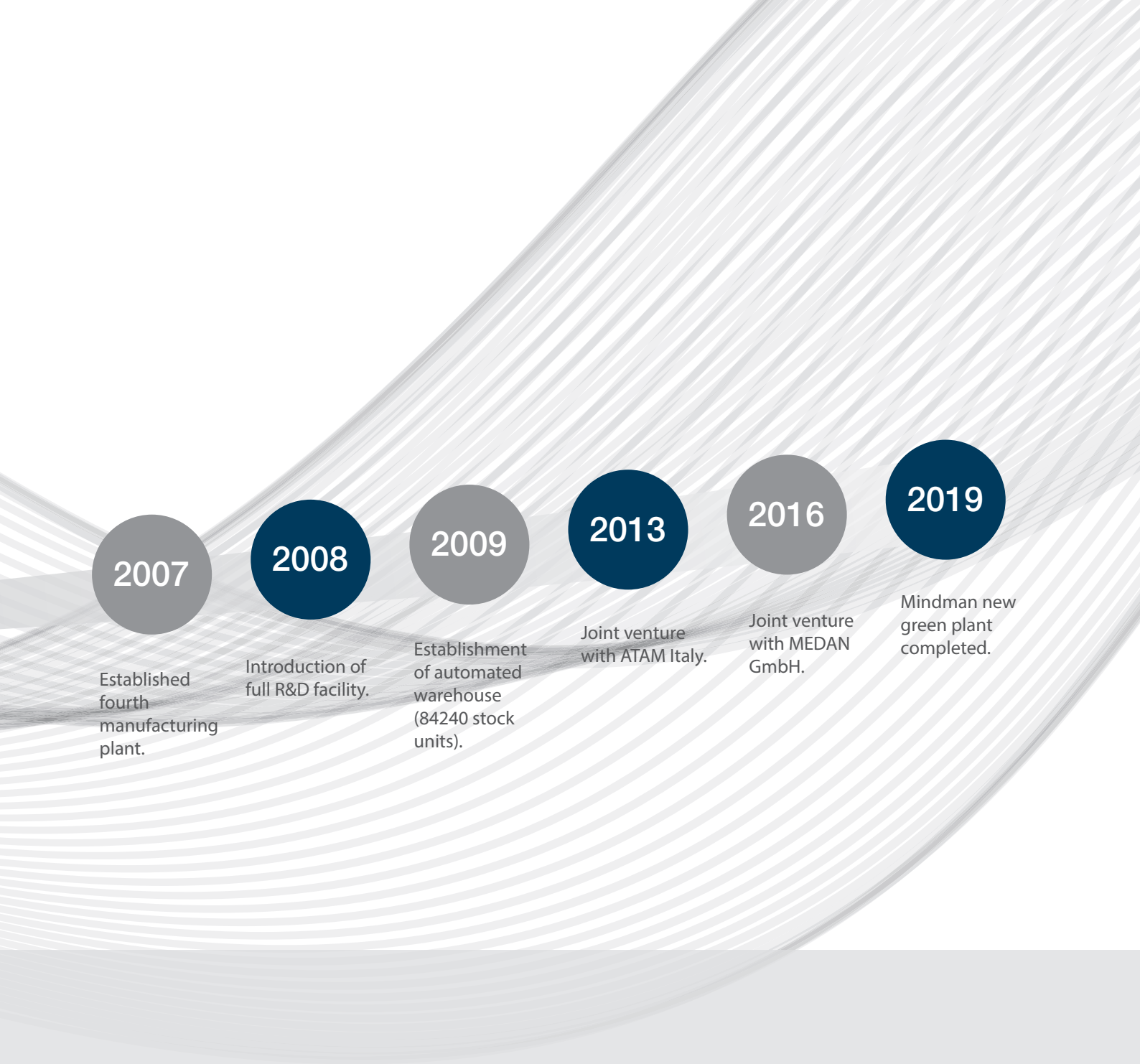
OUR **MILESTONES**



Mindman Industrial Co., Ltd. was established in 1979 with a destination to provide high quality automation components for a wide variety of industries.

During the past 40 years, Mindman has devoted to the expansion of our product range. Thanks to our R&D department, we are proud to possess the diversified product lineup includes solenoid valves, air treatment units, pneumatic cylinders, electric actuators and all different types of fluid power accessories.

We always believe that fast delivery of automation components is the key of success in the market. Through the complete vertical integration of all manufacturing processes and automated warehouse, we are confident to achieve on time delivery.



To keep quality high during the whole production process, we implement the strict quality control standard. We thoroughly control the process via standard operation procedure (SOP), statistical process control system (SPC) and total productive management (TPM). Most important of all, Mindman commits to providing the products with 100% inspection after assembly.

Currently, Mindman products are exported to more than 90 countries around the world. We devoted ourselves to building the relationship with customers worldwide and provide them with the strong support, such as online 3D drawing, inventory check and promotional program…etc. In the vast automation market, Mindman will spare no effort in establishing a brand – a world-class premium automation components supplier.

MINDMAN GROUP

Strategy of diversification is our direction to remain at the forefront in the industry.

OUR **ADVANTAGE**

Nonstop effort and everlasting insistence

Productivity

- Products self-made ratio above 90%
- 100% Made in Taiwan
- Highly automated

Quality

- 100% quality inspection before delivery
- Minimum one-year guarantee
- ISO 9001 certified

Elasticity

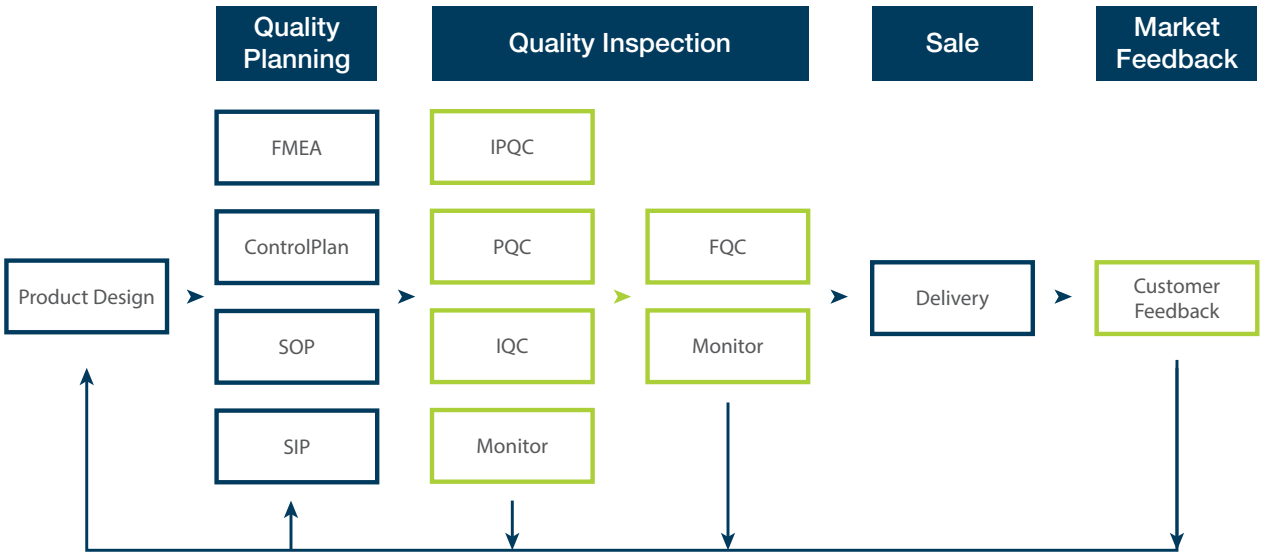
- Flexible production
- Customized service
- Fast delivery

Completeness

- Global strategic partnership
- One stop shopping

Quality Control Process

Through the complete quality control process, we are confident to provide the highest quality products to our customers.



GLOBAL NETWORK

If you care much about quality, please find our distributors worldwide.

Germany

MEDAN GmbH
TEL : 49 7123-92 9990
E-mail : c.neubauer@medan-gmbh.com

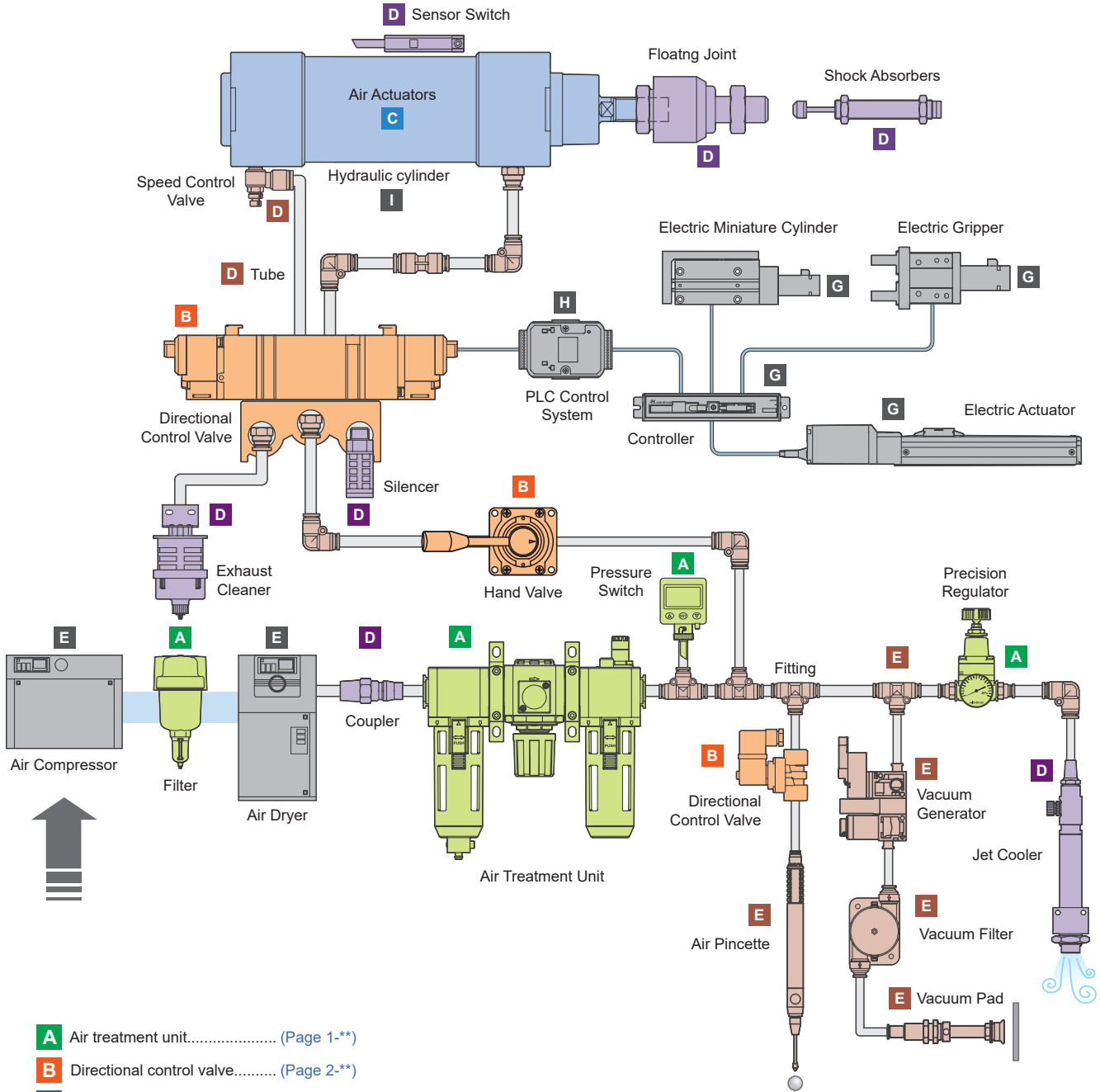
China

MDN Industrial Co., Ltd.
TEL : 0512-69291735
E-mail : szmindman@mindman.com.tw

Headquarter

Mindman Industrial Co. Ltd.
TEL : 886-2-25914100
E-mail : mindman@mindman.com.tw

PNEUMATIC CIRCUIT DIAGRAM



A Air treatment unit..... (Page 1-**)
B Directional control valve..... (Page 2-**)
C Air cylinder / gripper..... (Page 3-**)
D Auxiliary equipment..... (Page 4-**)
E PISCO products..... (Page 4-**)
F Compressed air dryer..... (Mindman website)
G Electric Actuators..... (Mindman website)
H PLC control system..... (Mindman website)
I Hydraulic cylinders ..... (Mindman website)

* MINDMAN website (www.mindman.com.tw)

ONLINE EXHIBITION

www.mindman.com.tw

online exhibition

GRIPPER & ROTARY ACTUATOR

AIR CYLINDER

DIRECTIONAL CONTROL VALVE

AIR TREATMENT UNIT

ELECTRIC ACTUATOR

AIR TREATMENT UNIT

F.R.unit

MAFR 20-MAFR302 1-2
20-MAFR403 1-3

Filter

MAF 20-MAF302 1-5
20-MAF302G 1-5
20-MAF403 1-7

Pressure regulator

MAR 20-MAR302 1-9
20-MAR403 1-10

Air/Mist/Micromist filter

MAF 20-MAF302D/M 1-11

Accessory

MA** 20-B* / A / T* / K* 1-12

Pneumatic pressure switch

MP 20-MP41 1-14

Pressure gauge

PG 20-PG 1-18

20-MAFR302 series

AIR UNIT (F.R.UNIT)

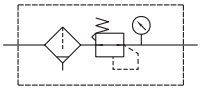
Option: **20-MP41**

Specification

Model	20-MAFR302		
Bore No.	8A	10A	15A
Port size	1/4	3/8	1/2
Medium	Air		
Operating perssure range (*)	0.05~1 MPa		
Proof pressure	1.5 MPa		
Regulated pressure range	0.05~0.85 MPa		
Ambient temperature	– 5~+60°C (No freezing)		
Filter element	Standard: 5μm, Option: 40μm		
Drain capacity	35 cm^3		
Attachment	Gauge adapter set, bracket		
Weight	490 g		

* Standard Unit contains semi-auto-drain function when operating pressure below 0.05 MPa.
* Choose auto-drain 20-FMRF300, the pressure rang is 0.15~1 MPa.

Symbol



Order example

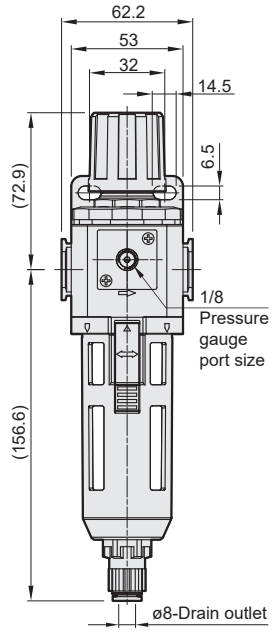
20 – MAFR302 K – 8A – □ – ND – E1 – □ – □

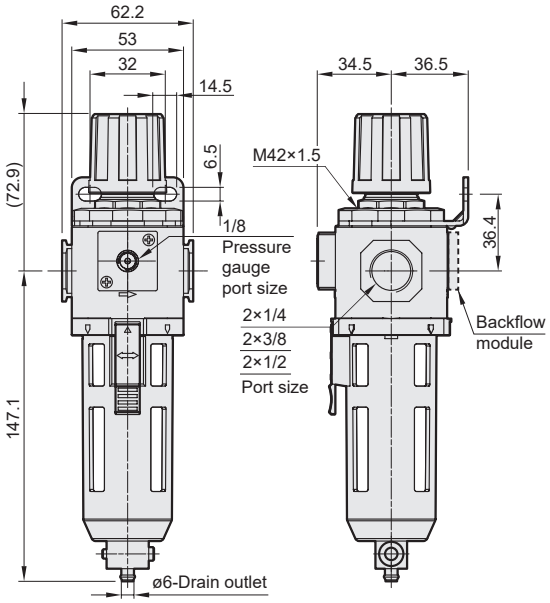
- **MATERIAL RESTRICTIONS** (Secondary battery)
- **MODEL**
- Blank: Standard
  K: Backflow function ⚠
  * The caution please refer to page 1-8.
- **PORT SIZE**
  8A: 1/4
  10A: 3/8
  15A: 1/2
- **EXHAUST MECHANISM**
  Blank: Relieving type
  Q: Non-relieving type
- Blank: PC bowl+ Semi-auto drain
  N: Nylon bowl
  D: Auto drain valve (20-FMRF300)
- **(Option) PRESSURE SWITCH**
  E1: 20-MP41P-022
  E2: 20-MP41P-022-QD
  E5: 20-MP41P-042
  E6: 20-MP41P-042-QD
- **FILTER ELEMENT**
  Blank: 5μm
  40u: 40μm
- **PORT THREAD**
  Blank: Rc thread
  G: G thread
  NPT: NPT thread

* Standard type regulator can not release the outlet pressure completely, even if inlet pressure was cut off, and the backflow function (K) must be applied to completely remove the residual pressure.
* The (Q) non-relieving type regulator is used. When the output pressure is higher than the set pressure, the output pressure will not flow out through the exhaust hole.
* Gauge adapter set is excluded if selecting (E*) pressure switch. Specification for (E*), please refer to page 1-14.
* Pointer pressure gauge is not included.

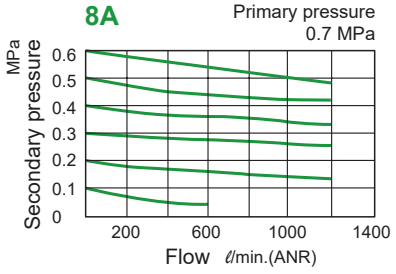
20-MAFR302-D

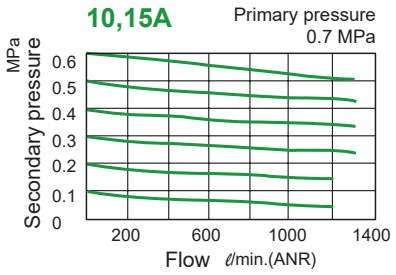
Option: Auto drain valve





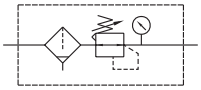
Flow feature





Option: **20-MP41**

Symbol



Specification

Model	20-MAFR403		
Bore No.	8A	10A	15A
Port size	1/4	3/8	1/2
Medium	Air		
Operating perssure range (*)	0.05~1 MPa		
Proof pressure	1.5 MPa		
Regulated pressure range	0.1~0.85 MPa		
Ambient temperature	– 5~+60°C (No freezing)		
Filter element	Standard: 40μm, Option: 5μm		
Drain capacity	75 cm^3		
Attachment	Gauge adapter set		
Weight	620 g		

* Standard unit contains semi-auto-drain function when operating pressure below 0.05 MPa.
* Choose auto-drain 20-FMRF300, the pressure range is 0.15~1 MPa.

Order example

20 – MAFR403 K – 8A – □ – ND – E1 – □ – □ – □

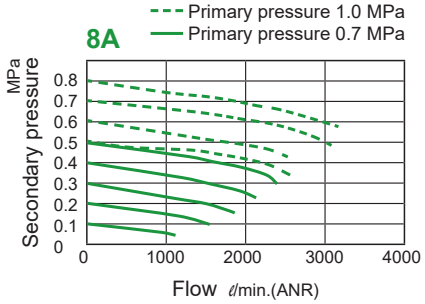
- MATERIAL RESTRICTIONS (Secondary battery)
- MODEL
- Blank: Standard
  K: Backflow function ⚠
  * The caution please refer to page 1-8.
- PORT SIZE
  8A: 1/4
  10A: 3/8
  15A: 1/2
- EXHAUST MECHANISM
  Blank: Relieving type
  Q: Non-relieving type
- (Option) PRESSURE SWITCH
  E1: 20-MP41P-022
  E2: 20-MP41P-022-QD
  E5: 20-MP41P-042
  E6: 20-MP41P-042-QD
- FILTER ELEMENT
  Blank: 40μm
  5u: 5μm
- (Option) BRACKET
  Blank: Without
  B2: Screw fixed
- PORT THREAD
  Blank: Rc thread
  G: G thread
  NPT: NPT thread

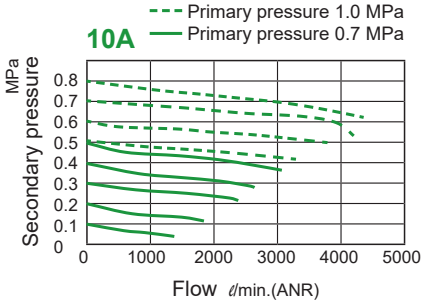
(Option) ACCESSORIES

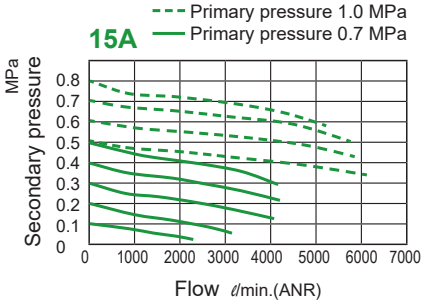
Bowl	Drain valve
Blank: PC bowl **N**: Nylon bowl	Blank: Semi-auto drain **D**: Auto drain valve (20-FMRF300)

* Standard type regulator can not release the outlet pressure completely, even if inlet pressure was cut off, and the backflow function (K) must be applied to completely remove the residual pressure.
* The (Q) non-relieving type regulator is used. When the output pressure is higher than the set pressure, the output pressure will not flow out through the exhaust hole.
* Gauge adapter set is excluded if selecting (E*) pressure switch. Specification for (E*), please refer to page 1-14.
* Pointer pressure gauge is not included.

Flow feature

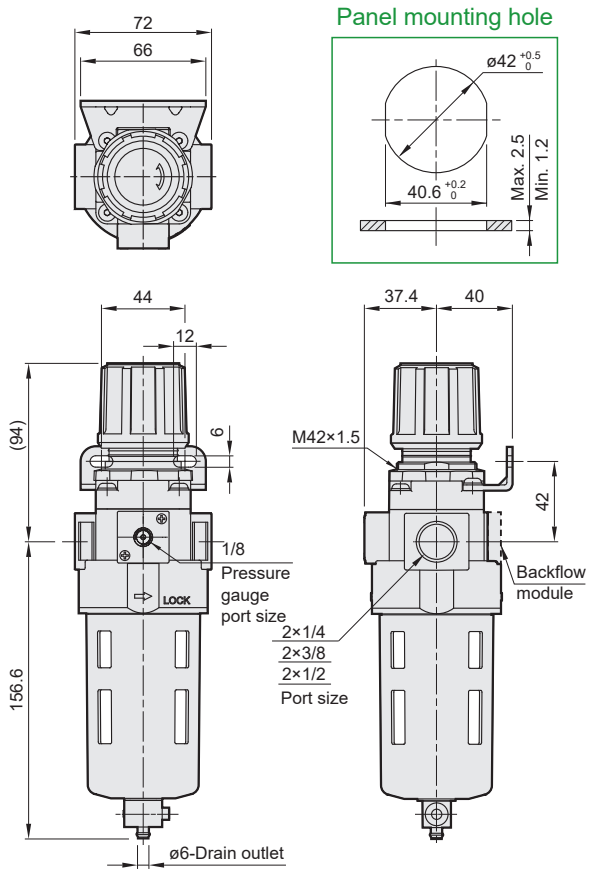






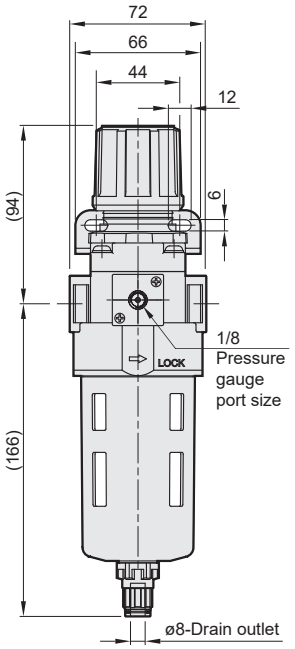
20-MAFR403 Dimensions

AIR UNIT (F.R.UNIT)



20-MAFR403-D

Auto drain valve

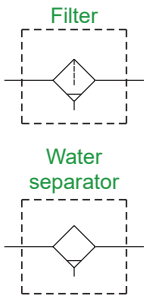


20-MAF302 / 302G series

AIR UNIT (FILTER / WATER SEPARATOR)

mindman
Connect Your Future

Symbol



Specification

Model	20-MAF302		
Bore No.	8A	10A	15A
Port size	1/4	3/8	1/2
Medium	Air		
Operating perssure range (*1)	0.05~1 MPa		
Proof pressure	1.5 MPa		
Ambient temperature	– 5~+60°C (No freezing)		
Drain capacity	35 cm^3		

Filter	20-MAF302	
Filter element	Standard: 5μm, Option: 40μm	
Weight	335 g	
Water separator	**20-MAF302G**	
Water droplet removal ratio (*2)	99±1%	
Rated flow l/min(ANR) (*3)	550	1280
Weight	345 g	

*1. Standard unit contains semi-auto-drain function when operating pressure below 0.05 MPa.
Choose auto-drain 20-FMRF300, the pressure range is 0.15~1 MPa.
*2. This shows the water droplet removal ratio at the rated flow.
*3. Input pressure: 0.7 MPa. When fluid flows exceeding the rated flow, the accumulated condensate may be pulled up and may flow out to outlet side.

Order example

20 – MAF302G – 8A – ND – □ – □ – □

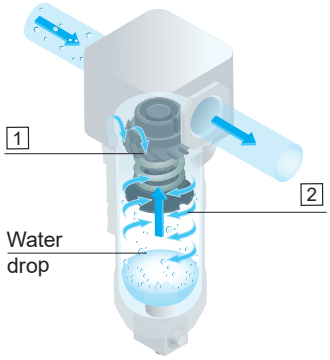
- MODEL: MATERIAL RESTRICTIONS (Secondary battery)
- PORT SIZE: **8A**: 1/4, **10A**: 3/8, **15A**: 1/2
- BOWL: Blank: PC bowl, **N**: Nylon bowl
- (*) FILTER ELEMENT: Blank: 5μm, **40u**: 40μm
- PORT THREAD: Blank: Rc thread, **G**: G thread, **NPT**: NPT thread
- Blank: Filter, **G**: Water separator (Removal ratio 99%±1)
- Blank: Semi-auto drain, **D**: Auto drain valve (20-FMRF300)
- Blank: Without bracket, **B**: C type bracket

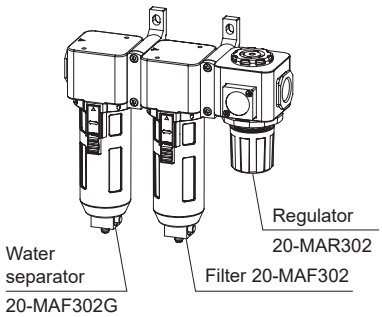
* There is not filter element in MAF302G series.

Water separator features

1 Water droplets are removed by centrifugal force.
This product can remove water droplets in the compressed air, but cannot remove moisture content (water vapor).

2 Filter element is not needed. Water droplet removal ratio: 99%

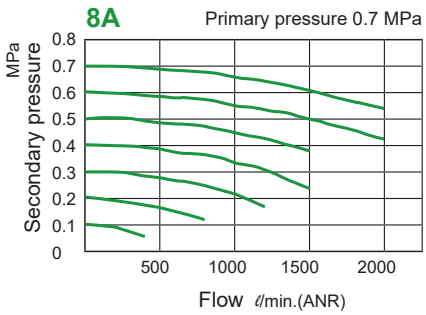


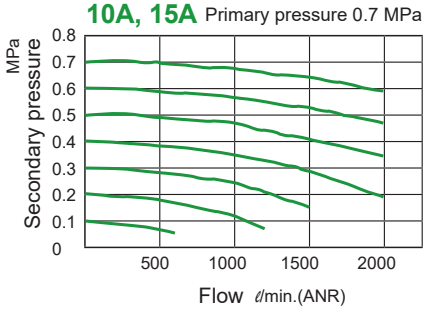


Assembly example

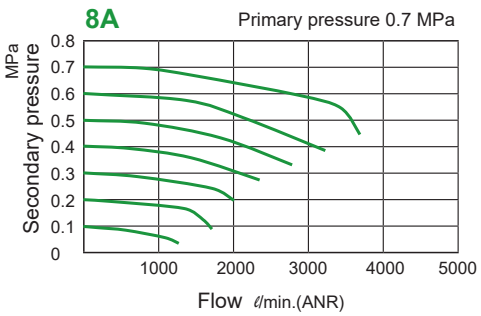
Flow feature

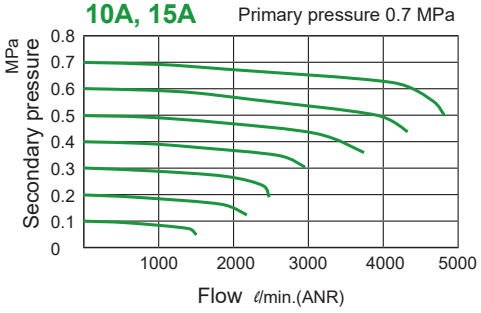
20-MAF302 (Filter)





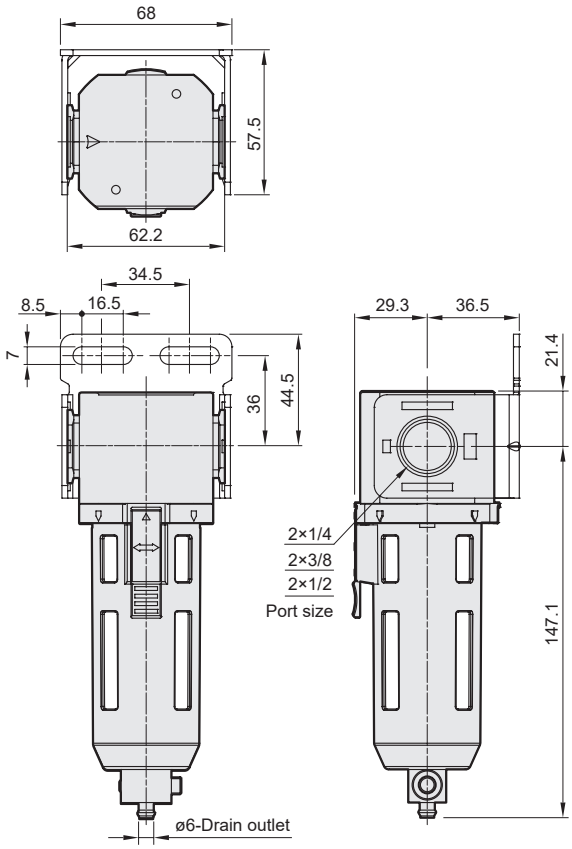
20-MAF302G (Water separator)





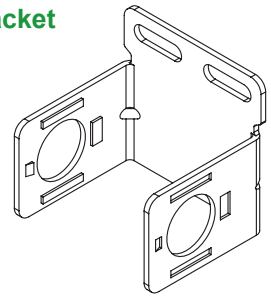
20-MAF302 / 302G Dimensions

AIR UNIT (FILTER / WATER SEPARATOR)



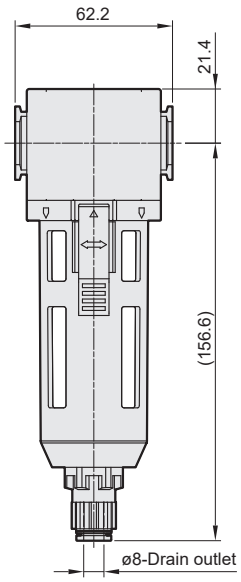
Option accessories

C type bracket

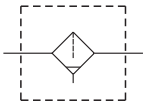


20-MAF302-D

Auto drain valve



Symbol



Specification

Model	20-MAF403		
Bore No.	8A	10A	15A
Port size	1/4	3/8	1/2
Medium	Air		
Operating perssure range (*)	0.05~1 MPa		
Proof pressure	1.5 MPa		
Ambient temperature	– 5~+60°C (No freezing)		
Filter element	Standard: 40μm, Option: 5μm		
Drain capacity	75 cm^3		
Weight	345 g		

* Standard unit contains semi-auto-drain function when operating pressure below 0.05 MPa.

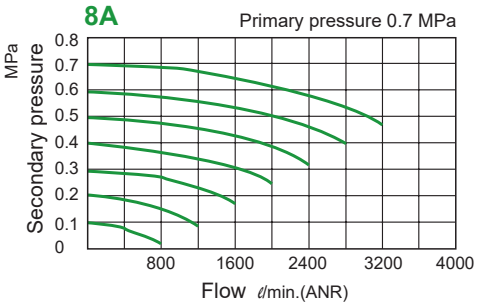
* Choose auto-drain 20-FMRF300, the pressure range is 0.15~1 MPa.

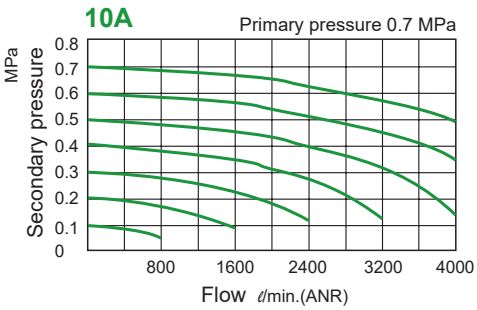
Order example

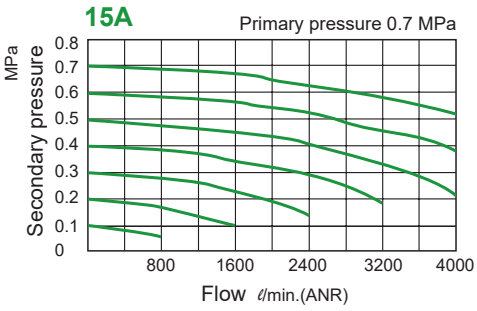
20 – MAF403 – 8A – ND – □ – □ – □

- MODEL: MAF403
- PORT SIZE: **8A**: 1/4, **10A**: 3/8, **15A**: 1/2
- BOWL: Blank: PC bowl, **N**: Nylon bowl
- FILTER ELEMENT: Blank: 40μm, **5u**: 5μm
- PORT THREAD: Blank: Rc thread, **G**: G thread, **NPT**: NPT thread
- MATERIAL RESTRICTIONS (Secondary battery)
- Blank: Semi-auto drain, **D**: Auto drain valve (20-FMRF300)
- Blank: Without bracket, **B**: C type bracket

Flow feature

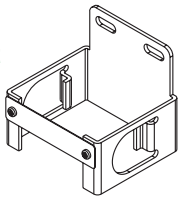


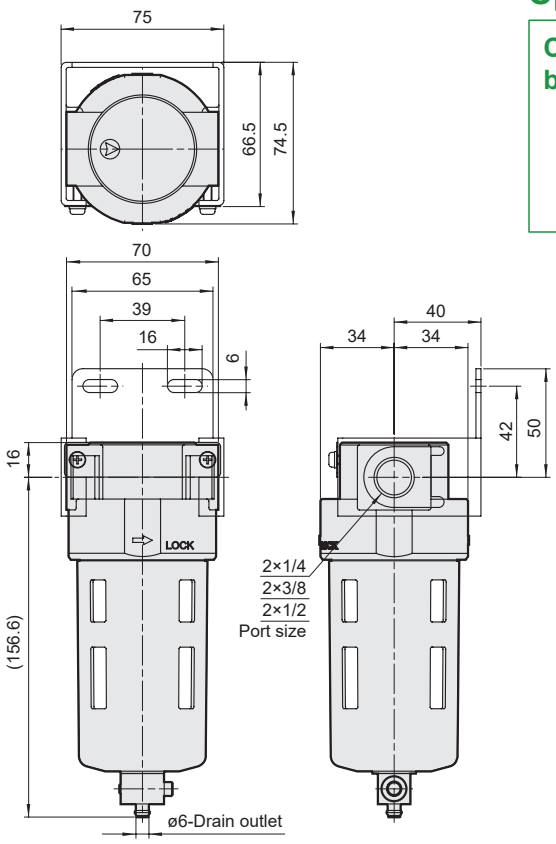




Option accessories

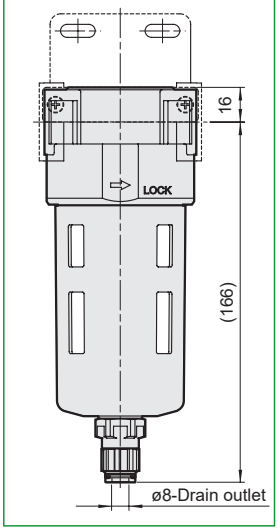
C type bracket





20-MAF403-D

Auto drain valve



20-MAFR / MAR ⚠ Caution for backflow function

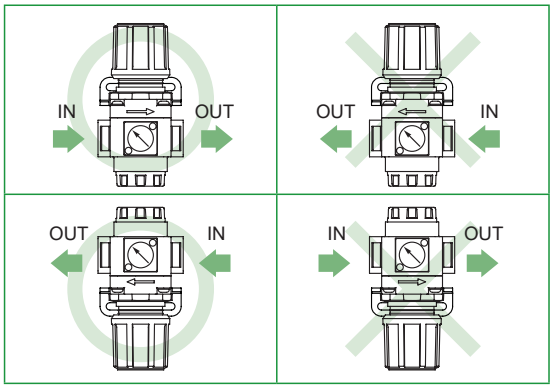
PRESSURE REGULATOR

for **20-MAFR302 / 403**

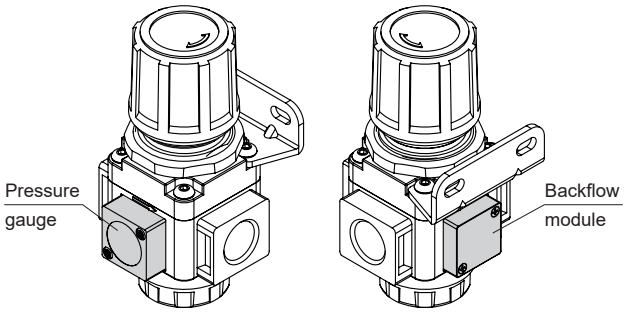
for **20-MAR302 / 403**

Installation direction

When choosing the flow direction, the backflow module can not be exchanged with gauge. If you have special order request, please contact our sales department.



Precautions

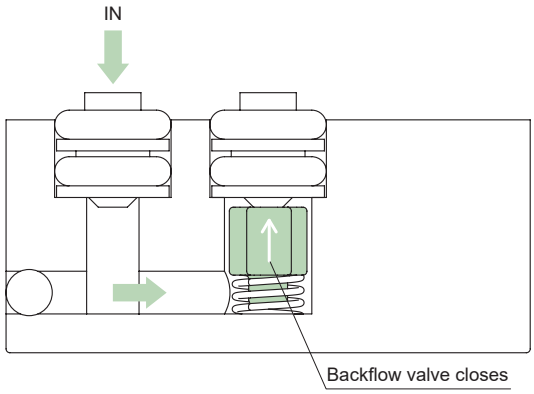


- When the air supply is cut off, the inlet pressure less than outlet pressure, the residual pressure return to the inlet side.
- Please set the inlet pressure to at least 0.05 MPa higher than the set pressure.

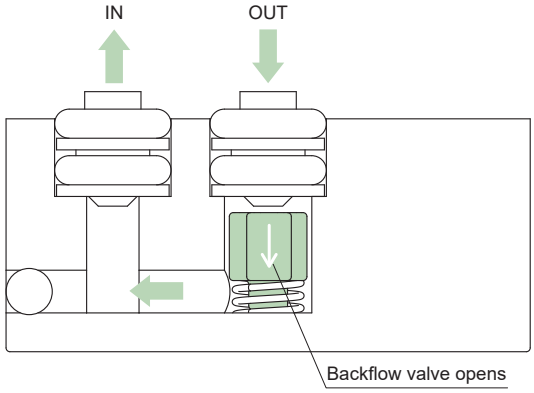
Working principle of backflow function

Normally, as the inlet pressure (IN) is higher than the setting pressure (pressure of outlet), the backflow valve is closed. If the inlet pressure is cut off, backflow valve will be open and the outlet pressure is exhausted to IN port.

Normal air supply

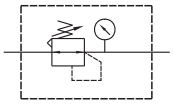


Cut off air source

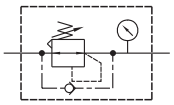


Option: **20-MP41**

Symbol



Standard



Backflow

Specification

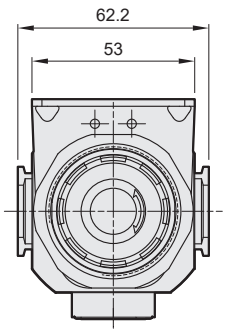
Model	20-MAR302		
Bore No.	8A	10A	15A
Port size	1/4	3/8	1/2
Medium	Air		
Max. operating pressure	1 MPa		
Proof pressure	1.5 MPa		
Regulated pressure range	0.05~0.85 MPa		
Ambient temperature	– 5~+60°C (No freezing)		
Attachment	Gauge adapter set, bracket		
Weight	270 g		

Order example

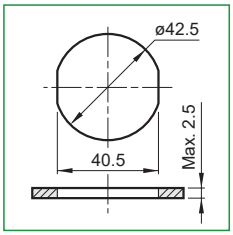
20 – MAR302 K – 8A – □ – □ – E1 – □

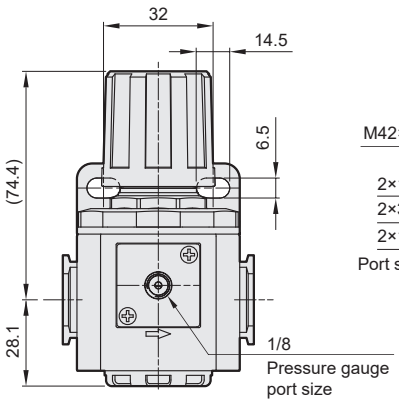
- MATERIAL RESTRICTIONS (Secondary battery)
- MODEL
- Blank: Standard
  K: Backflow function ⚠
  * The caution please refer to page 1-8.
- PORT SIZE
  8A: 1/4
  10A: 3/8
  15A: 1/2
- EXHAUST MECHANISM
  Blank: Relieving type
  Q: Non-relieving type
- Blank: Gauge adapter set
- (Option) PRESSURE SWITCH
  E1: 20-MP41P-022
  E2: 20-MP41P-022-QD
  E5: 20-MP41P-042
  E6: 20-MP41P-042-QD
- PORT THREAD
  Blank: Rc thread
  G: G thread
  NPT: NPT thread

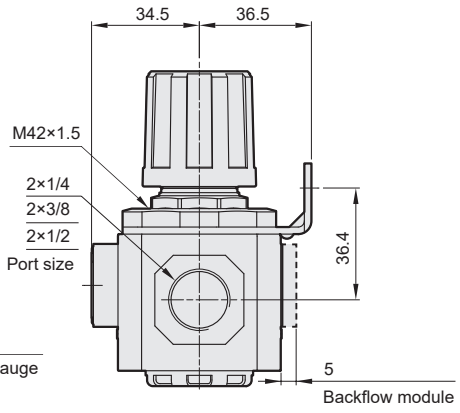
* Standard type regulator can not release the outlet pressure completely, even if inlet pressure was cut off, and the backflow function (K) must be applied to completely remove the residual pressure.
* The (Q) non-relieving type regulator is used. When the output pressure is higher than the set pressure, the output pressure will not flow out through the exhaust hole.
* Gauge adapter set is excluded if selecting (E*) pressure switch. Specification for (E*), please refer to page 1-14.
* Pointer pressure gauge is not included.



Panel mounting hole

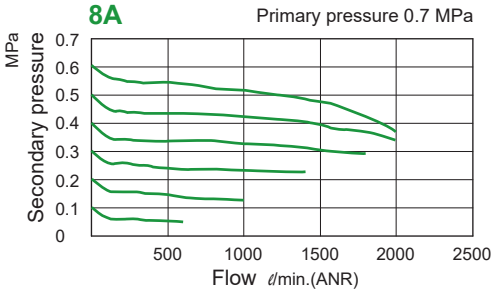




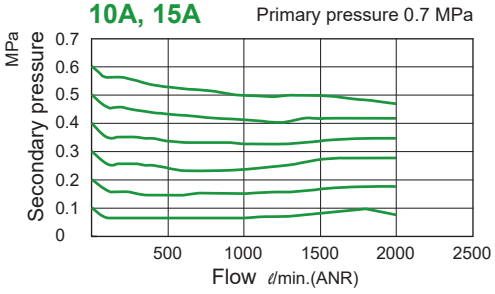


Flow feature

8A Primary pressure 0.7 MPa



10A, 15A Primary pressure 0.7 MPa

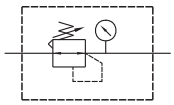


20-MAR403 series

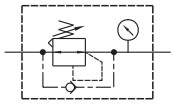
PRESSURE REGULATOR

Option: **20-MP41**

Symbol



Standard



Backflow

Specification

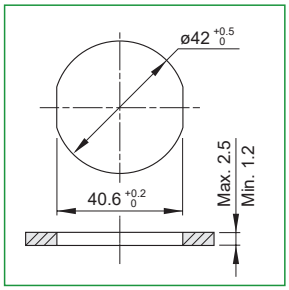
Model	20-MAR403		
Bore No.	8A	10A	15A
Port size	1/4	3/8	1/2
Medium	Air		
Max. operating pressure	1 MPa		
Proof pressure	1.5 MPa		
Regulated pressure range	0.1~0.85 MPa		
Ambient temperature	– 5~+60°C (No freezing)		
Attachment	Gauge adapter set		
Weight	450 g		

Order example

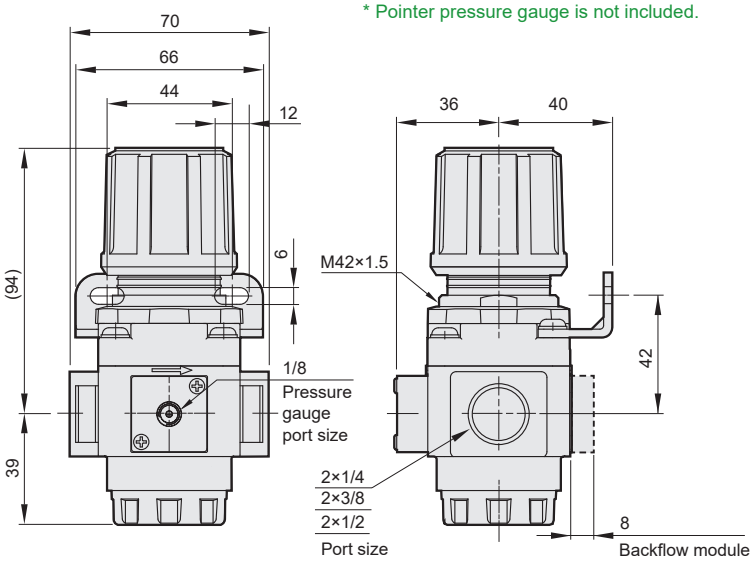
20 – MAR403 K – 8A – □ – E1 – □ – □

- MATERIAL RESTRICTIONS (Secondary battery)
- MODEL
- Blank: Standard
  K: Backflow function ⚠
  * The caution please refer to page 1-8.
- PORT SIZE
  8A: 1/4
  10A: 3/8
  15A: 1/2
- EXHAUST MECHANISM
  Blank: Relieving type
  Q: Non-relieving type
- (Option) PRESSURE SWITCH
  E1: 20-MP41P-022
  E2: 20-MP41P-022-QD
  E5: 20-MP41P-042
  E6: 20-MP41P-042-QD
- (Option) BRACKET
  Blank: Without
  B2: Screw fixed
- PORT THREAD
  Blank: Rc thread
  G: G thread
  NPT: NPT thread

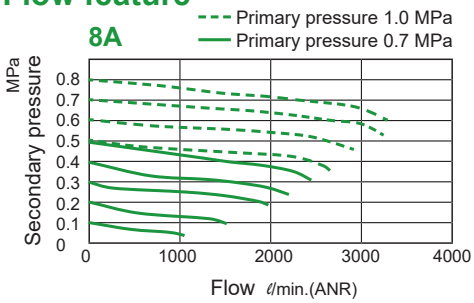
Panel mounting hole

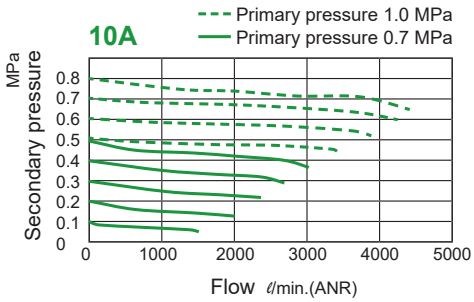


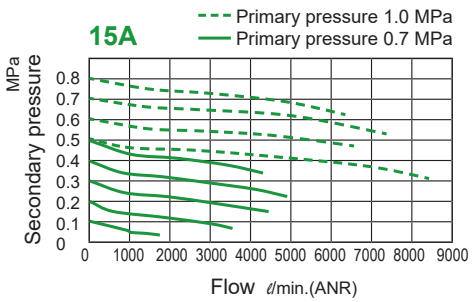
* Standard type regulator can not release the outlet pressure completely, even if inlet pressure was cut off, and the backflow function (K) must be applied to completely remove the residual pressure.
* The (Q) non-relieving type regulator is used. When the output pressure is higher than the set pressure, the output pressure will not flow out through the exhaust hole.
* Gauge adapter set is excluded if selecting (E*) pressure switch. Specification for (E*), please refer to page 1-14.
* Pointer pressure gauge is not included.



Flow feature



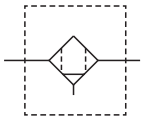




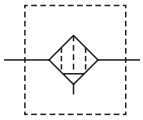
20-MAF302D / M series

AIR UNIT (Air/Mist/Micromist filter)

Symbol



D: 0.3μm



M: 0.01μm

- 20-MA302D is designed for removal of foreign matter as well as oil mist (Element: 0.3μm)
- 20-MA302M is designed for removal of foreign matter as well as oil mist (Element: 0.01μm)

Specification

Model	20-MAF302D/M		
Bore No.	8A	10A	15A
Port size	1 /4	3/8	1/2
Medium	Air		
Operating perssure range (*)	0.05~1 MPa		
Proof pressure	1.5 MPa		
Regulated pressure range	-5~+60°C (No freezing)		
Filter element	0.3 μm, 0.01 μm		
Drain capacity	35 cm^3		
Weight	365 g		

* Standard Unit contains semi-auto-drain function when operating pressure below 0.05 MPa.
* Choose auto-drain 20-FMRF300,the pressure rang is 0.15~1 MPa.

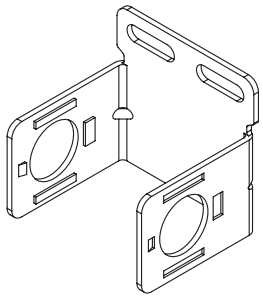
Order example

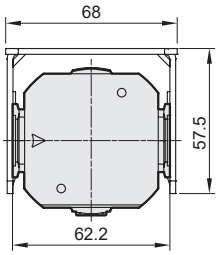
20 – MAF302D – 8A – □ – □ – □

- 20: MATERIAL RESTRICTIONS (Secondary battery)
- MAF302D: MODEL
- 8A: PORT SIZE — **8A**: 1/4, **10A**: 3/8, **15A**: 1/2
- □: FILTER ELEMENT — **D**: 0.3 μm, **M**: 0.01 μm
- □: Blank: PC bowl+Semi-auto drain, **D**: Auto drain valve (20-FMRF300), **N**: Nylon bowl
- □: Blank: Without bracket, **B**: C type bracket
- □: PORT THREAD — Blank: Rc thread, **G**: G thread, **NPT**: NPT thread

Option accessories

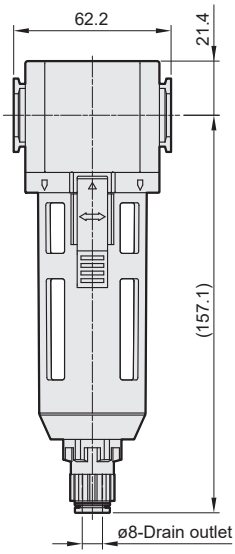
C type bracket

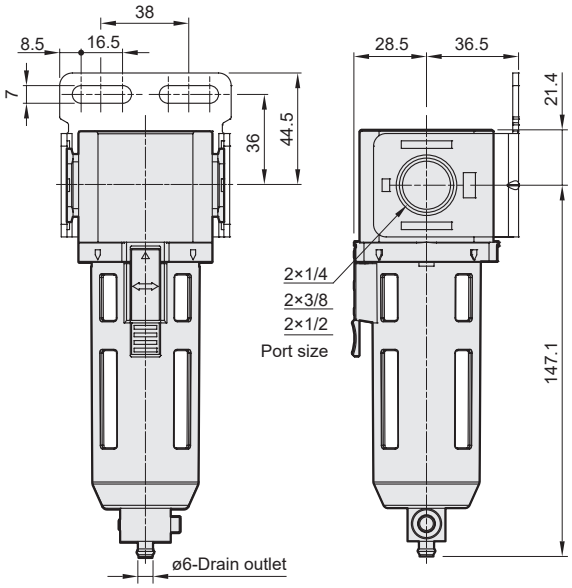




20-MAF302D/M-D

Auto drain valve

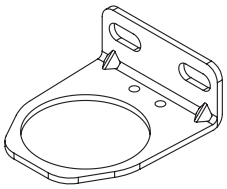
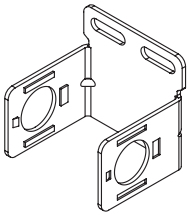
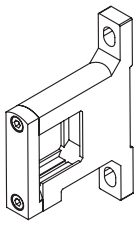
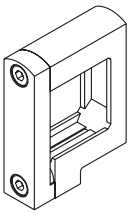


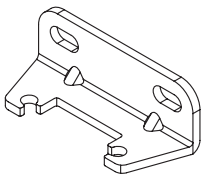
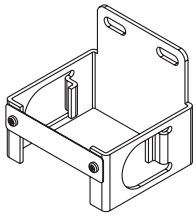
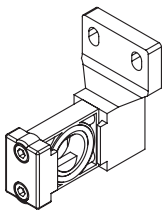


20-MA* Accessory selector table

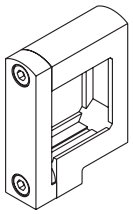
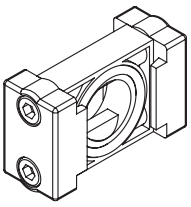
AIR UNIT (Air Units)

Bracket set

Order example	20-B1-MAR302	20-B2-MAF302	20-BT-MACP302	20-BS-MACP302
Pictures				
Applicable model	20-MAFR302, 20-MAR302	20-MAF302(G), 20-MAF302D/M	20-MAFR302, 20-MAF302(G), 20-MAR302, 20-MAF302D/M	20-MAFR302, 20-MAF302(G), 20-MAR302, 20-MAF302D/M

Order example	20-B2-MAR401	20-B2-MAF401	20-BL-MACP403
Pictures			
Applicable model	20-MAFR403, 20-MAR403	20-MAF403	20-MAFR403,20-MAR403, 20-MAF403

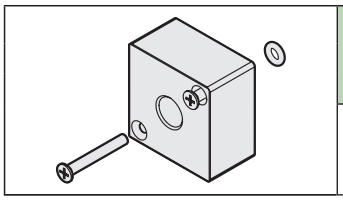
Joiner set

Order example	20-BS-MACP302	20-BS-MACP403
Pictures		
Applicable model	20-MAFR302, 20-MAF302(G), 20-MAR302, 20-MAF302D/M	20-MAFR403,20-MAR403, 20-MAF403

Gauge adapter set

*Order example : **20-A-MAR302-NPT**

● Standard type ◎ Option

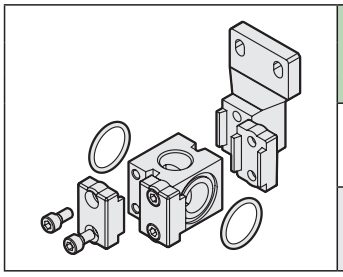


Applicable model	Order example	Port thread	
		–	**NPT**
		Rc thread	NPT thread
20-MAFR302,20-MAR302, 20-MAFR403,20-MAR403	**20–A–MAR302–□**	●	◎

T type module mounting bracket

*Order example : **20-T8-MACP302-G**

● Standard type ◎ Option

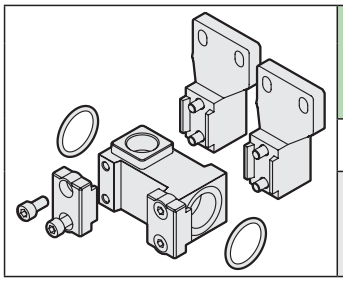


Applicable model	Order example	Port size		Port thread	
		T8,T10	**T15**	–	**G, NPT**
		1/4, 3/8	1/2	Rc thread	G,NPT thread
20-MAFR302, 20-MAF302(G), 20-MAR302, 20-MAF302D/M	**20–T8/T10/T15–MACP302–□**	◎	◎	●	◎
20-MAFR403, 20-MAF403 20-MAR403	**20–T8/T10/T15–MACP403–□**	◎	◎	●	◎

Check valve

*Order example : **20-K8-MACP403-G**

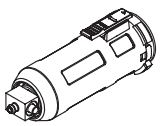
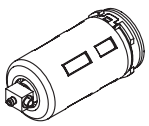
● Standard type ◎ Option



Applicable model	Order example	Port size	Port thread	
		K8,K10	–	**G, NPT**
		1/4, 3/8	Rc thread	G,NPT thread
20-MAFR302, 20-MAR302	**20–K8/K10–MACP302–□**	◎	●	◎
20-MAFR403, 20-MAF403 20-MAR403	**20–K8/K10–MACP403–□**			

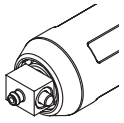
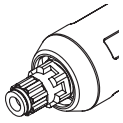
Bowl (For 20-MAFR / MAF series)

● Standard type ◎ Option

Series			302	403
Fig				
Order example			**20-BOWL–MAF302–[1][2][3]**	**20-BOWL–MAF403–[1][2][3]**
Applicable model			20-MAFR302, 20-MAF302	20-MAFR403, 20-MAF403
[1] Bowl	PC	–	●	●
	Nylon	**N**	◎	◎
[2] Bowl	None	–	◎	◎
	Guard	**U**	●	●
[3] Drain valve		–	●	●
		D2	◎	◎

*Order example: **20-BOWL-MAF403-NUD2** (N: Nylon, U: Bowl guard, D2: Auto drain valve)

Auto drain valve

Auto drain valve	Blank	D2
Fig		
Description	Semi-auto drain	20-FMRF300

(For 20-MAFR / MAF series)

20-MP41 series

HIGH PRECISION DIGITAL **PRESSURE SWITCH**

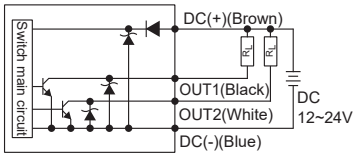
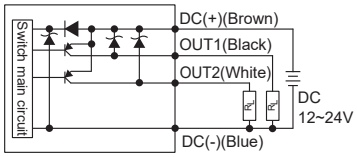
Features

- Hysteresis adjustable.
- High accuracy and Resolution.
- Low cost.
- Pressure unit selectable: Kpa, MPa, kgf/cm ^{2}, bar, psi, inHg, mmHg

Specification

Model		20-MP41C (Compound)	20-MP41P (Positive)
Rated pressure range		— 100.0 ~ 100.0 kPa	0.000 ~ 1.000 MPa
Setting pressure range		— 101.0 ~ 101.0 kPa	– 0.100 ~ 1.000 MPa
Withstand pressure		300 kPa	1.5 MPa
Fluid		Air, Non-corrosive gases, incombustible gases	
Set pressure resolution	kPa / MPa	0.1 / —	— / 0.001
	kgf/cm^2 / bar	0.001	0.01
	psi	0.01	0.1
	inHg / mmHg	0.1 / 1	—
Power supply voltage		12 to 24V DC ±10%, Ripple (P-P) 10% or less	
Current consumption		≤ 40mA (With no load)	
Switch output	Output type	2 NPN or 2 PNP open collector	
	Max. load current	125mA	
	Max. supply voltage	30V DC (at NPN output), 24V DC (at PNP output)	
	Residual voltage	≤1.5V	
	Response time	Chattering-proof function: 50ms, 250ms, 500ms, 1000ms, 2000ms, 3000ms selections	
	Output short circuit protection	Yes	
Display	LCD display	Two color(Red/Green) main & unit display, Orange sub-display (Sampling rate: 5 times/1sec.)	
	Switch ON Indicator	Orange (1 & 2 Indicator) OUT1 OUT2	
	Updates time	Adjustable	
	Indicator accuracy	≤±2% F.S. ±1 digit (ambient temperature: 25 ± 3°C)	
Repeatability (Switch output)		≤± 0.2% F.S. ±1 digit	
Environment	Enclosure	IP40	
	Ambient temp. range	Operation: 0 ~ 50°C, storage : — 10 ~ 60°C (No condensation or freezing)	
	Ambient humidity range	35 ~ 85% RH (No condensation)	
	Withstand voltage	1000V AC in 1-min. (between case and lead wire)	
	Insulation resistance	50M Ω min. (at 500V DC, between case and lead wire)	
	Vibration	Total amplitude 1.5mm or 10G,10Hz-150Hz-10Hz scan for 1 minute, two hours each direction of X,Y and Z	
	Shock	100m/s^2 (10G),3 times each in direction of X,Y and Z	
Temperature characteristic		≤±2% F.S. of detected pressure (25°C) at temp. Range of 0~50°C	
Lead wire		Oil-resistance cable (0.15mm^2)	
Weight		Approx. 65 g (with 2 meter lead wire), Approx. 30g (with male connector)	

Output circuit wiring graph

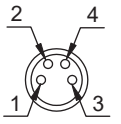
Model	20-MP41□-022	20-MP41□-042
Connect diagram		
Output method	2 NPN output	2 PNP output

Order example

20 – MP41P – 022 – QD – W

- MATERIAL RESTRICTIONS (Secondary battery)
- MODEL
- PRESSURE RANGE
  - **C**: Compound (–101.0~101.0 kPa)
  - **P**: Positive (–0.100~1.000 MPa)
- OUTPUT METHOD
  - **022**: 2 NPN output
  - **042**: 2 PNP output
- CABLE LENGTH / CONNECTOR
  - Blank: With 2 meter cable
  - **QD**: With M8, 4-Pin male connector
- HOLDER
  - **W**: White (for MA**302 / 403 series)

QD Pinout



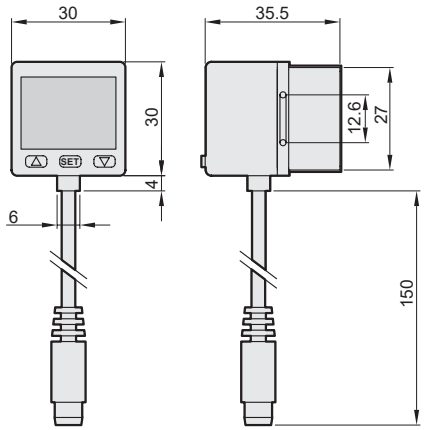
(1) Brown (+)
(2) White(OUT2)
(3) Blue(-)
(4) Black(OUT1)

Mounting accessories (Option)

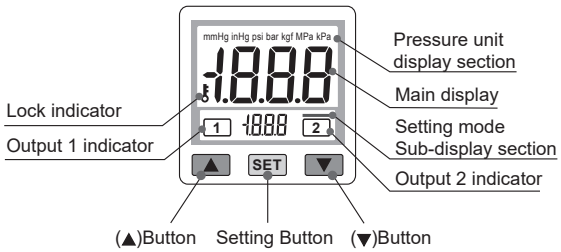
MP – D1

- MODEL
- OPTION PARTS
  - **D1**: M8 4Pin female connector (M84R-W0085-2M)

Dimensions



Panel instructions

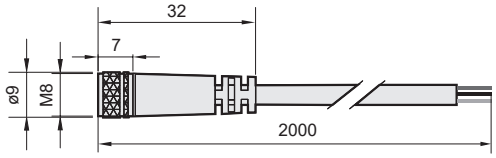


Applicable model

Series	302	403
F.R.Unit	**20-MAFR302**	**20-MAFR403**
Pressure regulator	**20-MAR302**	**20-MAR403**

Optional part dimensions

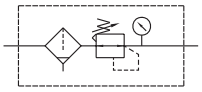
M8 4-Pin female connector
Model: **MP-D1**



1 20-MP41 With 20-MA**302

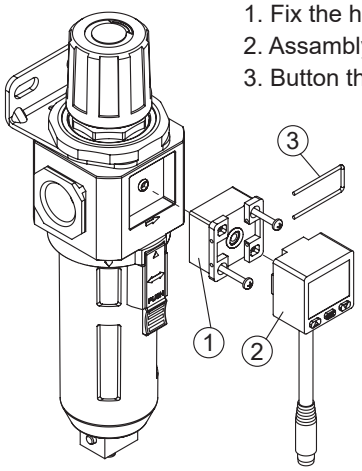
HIGH PRECISION DIGITAL **PRESSURE SWITCH**

Symbol



Mounting procedures

1. Fix the holder
2. Assambly the digital pressure switch.
3. Button the n-ring.



Order example (Air Units)

20 — MAFR302 — 8A — □□ — E1 — □ — G

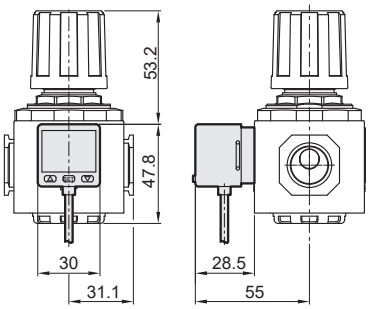
- MATERIAL RESTRICTIONS (Secondary battery)
- MODEL: **MAFR302**, **MAR302**
- PORT SIZE: **8A**: 1/4, **10A**: 3/8, **15A**: 1/2
- (Option) ACCESSORIES (*)

Bowl	Drain valve
Blank: PC bowl **N**: Nylon bowl	Blank: Semi-auto drain **D**: Auto drain valve (20-FMRF300)

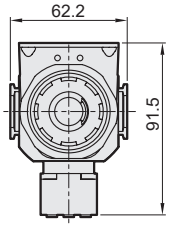
- PRESSURE SWITCH: **E1**: 20-MP41P-022, **E2**: 20-MP41P-022-QD, **E5**: 20-MP41P-042, **E6**: 20-MP41P-042-QD
- (*) FILTER ELEMENT: Blank: 5μm, **40u**: 40μm
- PORT THREAD: Blank: Rc thread, **G**: G thread, **NPT**: NPT thread

* Not applicable to **MAR302**

20-MAR302

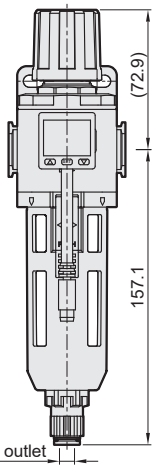


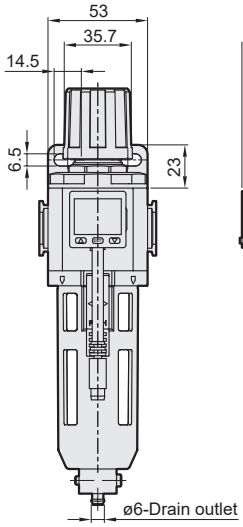
20-MAFR302

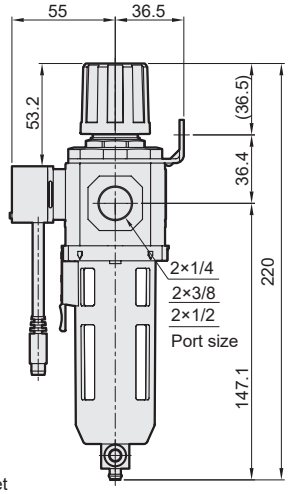


20-MAFR302-D

Operating pressure range
0.15~1 MPa





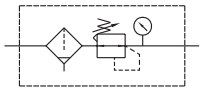


20-MP41 With 20-MA**403

HIGH PRECISION DIGITAL **PRESSURE SWITCH**

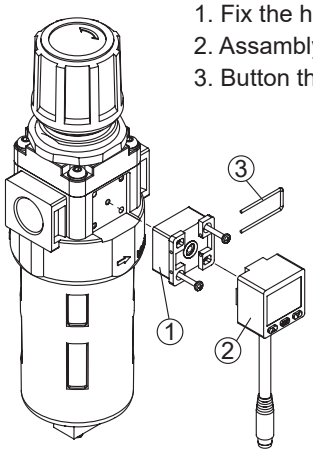
mindman
Connect Your Future

Symbol



Mounting procedures

1. Fix the holder.
2. Assambly the digital pressure switch.
3. Button the n-ring.



Order example (Air Units)

20 — MAFR403 — 8A — □□— E1 — □ — □ — G

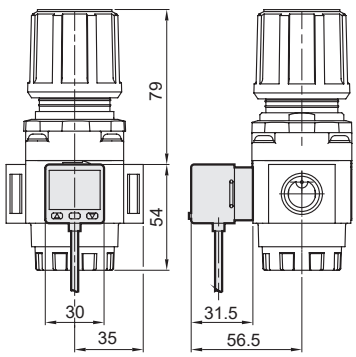
- MATERIAL RESTRICTIONS (Secondary battery)
- MODEL
  - **MAFR403**
  - **MAR403**
- PORT SIZE
  - **8A**: 1/4
  - **10A**: 3/8
  - **15A**: 1/2
- PRESSURE SWITCH
  - **E1**: 20-MP41P-022
  - **E2**: 20-MP41P-022-QD
  - **E5**: 20-MP41P-042
  - **E6**: 20-MP41P-042-QD
- (*) FILTER ELEMENT
  - Blank: 40μm
  - **5u**: 5μm
- (Option) BRACKET
  - Blank: Without
  - **B2**: Screw fixed
- PORT THREAD
  - Blank: Rc thread
  - **G**: G thread
  - **NPT**: NPT thread

(Option) ACCESSORIES (*)

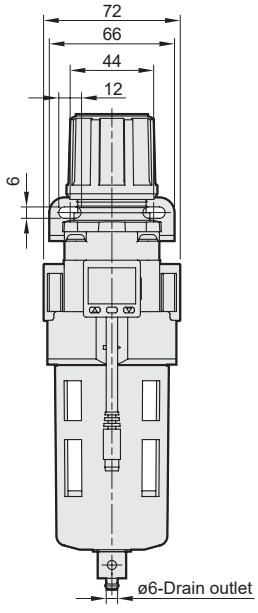
Bowl	Drain valve
Blank: PC bowl **N**: Nylon bowl	Blank: Semi-auto drain **D**: Auto drain valve (20-FMRF300)

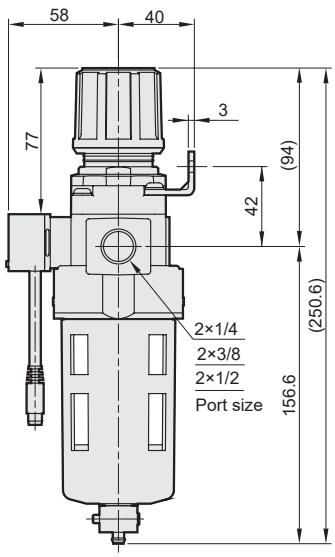
* Not applicable to **MAR403**

20-MAR403



20-MAFR403





20-PG series

PRESSURE GAUGE

Specification

Model	20-PG-40S1
Bore No.	6A
Bore No.	1/8
Medium	Air
Operating perssure range	By order specifications
Ambient temperature	–5~+60°C (No freezing)
Precision	JIS 2.5 class or ASME B class
Weight	54 g

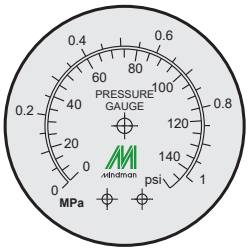
Order example

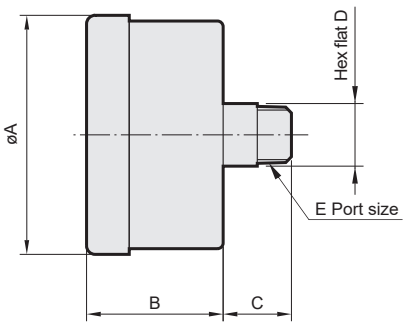
20 — PG — 40 S1 — 2K — NPT

- 20 — MATERIAL RESTRICTIONS (Secondary battery)
- PG — MODEL
- 40 — GAUGE SIZE: **40**
- S1 — CASE MATERIAL: **S1**: Stainless steel
- 2K — PRESSURE RANGE: Blank: 0~1 MPa; **2K**: 0~0.2 MPa; **4K**: 0~0.4 MPa
- NPT — PORT THREAD: Blank: R thread; **NPT**: NPT thread

* Adopting stainless steel for gauge surface (gauge case, port thread, screws).
Internal parts, Burdon tube, is still contained copper.

20-PG-40S1





Code / Model	A	B	C	D	E
20-PG-40S1	42	25	15	11	1/8

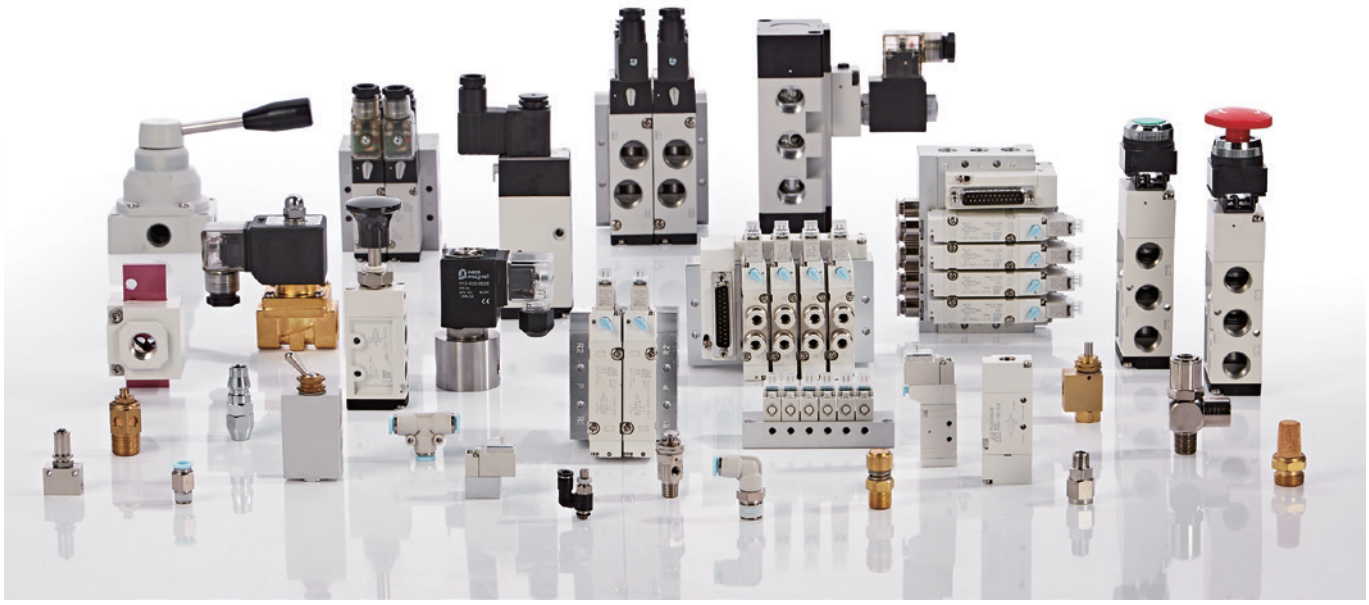
MEMO

NOTE

MEMO

NOTE

DIRECTIONAL CONTROL VALVE



Solenoid valve (5 port / 3 port)

MVSC1 Features.....2-2
20-MVSC1-180 2-3
MVSP Features.....2-2
20-MVSP-156 2-7
20-MVSP-188 2-11
Blocking plate 20-MVS*.....2-15

Solenoid valve (2 port)

MUSC MUSC 2-16
MXVC MXVC.....2-17

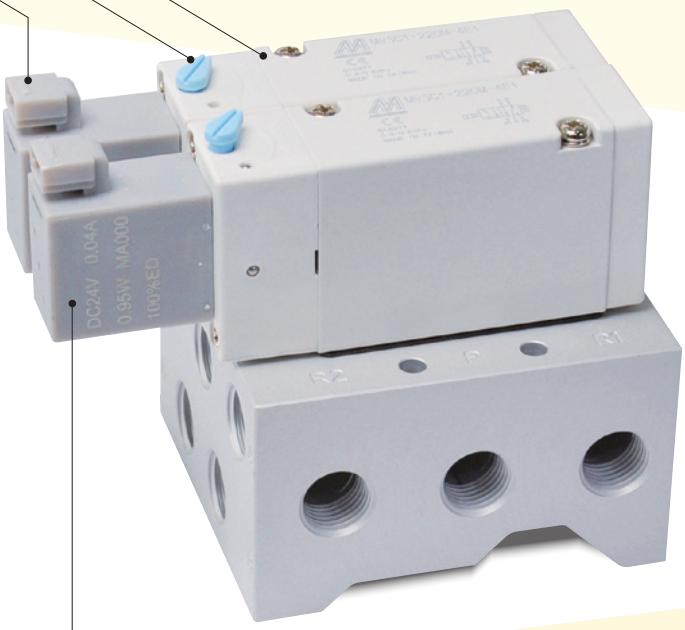
ON-OFF valve

MVHR 2-18

20-MVSC1 / MVSP series Features

SOLENOID **VALVE**

- Manual override design, easier to test.
- Quick plug design, easier to wiring by socket.
- DISK seal and U-packing (HNBR): High wear resistance, wide working temperature (−40～+150ºC), excenllent sealability, lifetime 50 million cycles.
- Quick response time 25～30ms (DC type).
- [Low power output PLC] can drive solenoid valve directly.



CONNECTOR

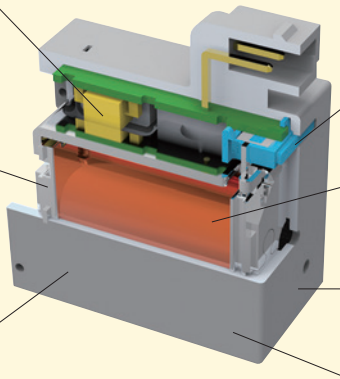
(**D**) DIN connector

(**L**) DIN connector with LED indicator

(**W**) Lead wire

(**H**) Horizontal connector with LED indicator

COIL FEATURES



Bridge rectifier design:
Converting AC voltage to DC, it can eliminate operating noise.

Low power consumption:
DC power 0.95W, it can save over 70% power consumption compared with other brand (3W).

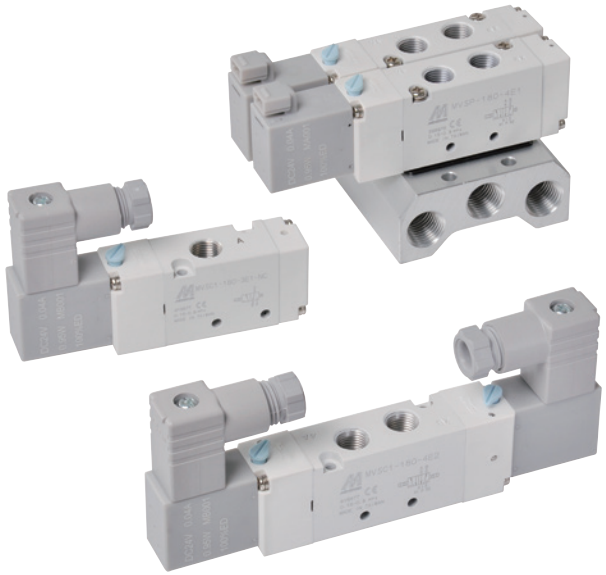
Low current consumption:
It can extend lifetime of driver (PLC, Relay...).

Indicator (LED):
Indicating coil operating condition.

Cooper wire insulation class:
H class/180°C.

Coil insulation class:
F class/155°C.

Low ambient temperature as operating.



Specification

Model	3E1	3E2	4E1	4E2	4E2 C.P.R
Port size	Rc1/8				
No. of port / position	3 / 2		5 / 2		5 / 3
Medium	Air				
Operating perssure range	0.15~0.8 MPa				0.2~0.7 MPa
Proof pressure	1 MPa				
Effective orifice	15 mm^2		12 mm^2		9 mm^2
Reponse time	DC < 25 ms ; AC < 35 ms				DC<30 ms; AC<45 ms
Ambient temperature	-5~+50°C (No freezing)				
Voltage	AC110V, 220V (50/60)Hz, DC24/12V				
Power consumption	AC=1.12VA, DC=0.95W				
Available voltage range	±5%				
Insulation class	F class				
Weight	90 g	125 g	94 g	129 g	143 g

Order example of valve

20 — MVSC1 — 180 — 4E2C — NC— AC110 — H1 — G

- MATERIAL RESTRICTIONS (Secondary battery)
- MODEL
- BODY WIDTH
- **3**: 3 way (3 port)
  4: 4 way (5 port)
- **E1**: Single Solenoid
  E2: Double Solenoid
- **C**: Closed center
  P: Pressure center
  R: Exhaust center
  (Only for **4E2** type)
- **NC**: Normally closed
  NO: Normally open
  (Only for **3E1** type)
- VOLTAGE
  AC220V(50/60)Hz
  AC110V(50/60)Hz
  DC24V
  DC12V
- CONNECTOR

D: DIN connector	**L**: DIN connector
	With LED indicator
W: Lead wire	**H**: Horizontal connector
Wire length: 500mm	With LED indicator

- PORT THREAD
  Blank: Rc thread
  G: G thread
  NPT: NPT thread

Wire length	
—	500mm
1	1000mm
2	2000mm
3	3000mm

* Wire length only for "**H**: Horizontal connector".

Order example of manifold

20 — MVSC1 — 180 — 3B3 — G

- MATERIAL RESTRICTIONS (Secondary battery)
- MODEL
- MANIFOLD
  3B: 3 port (for body ported type)
  5B: 5 port (for body ported type)
- MANIFOLD NUMBER
  1, 2, 3...
- PORT THREAD
  Blank: Rc thread
  G: G thread
  NPT: NPT thread

Order example of wire

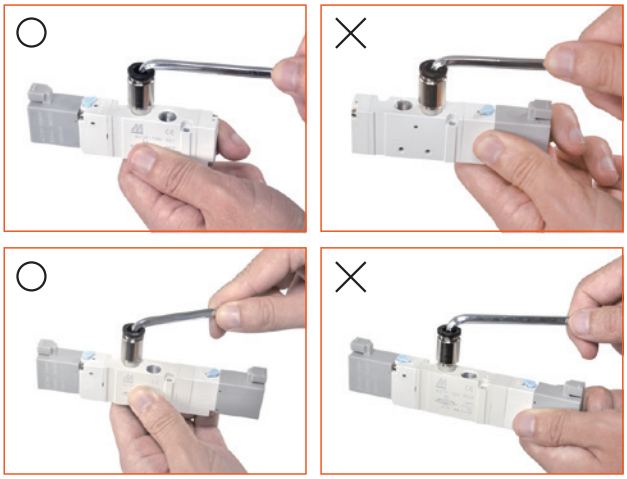
* Use the same wire with MVDY.
* Only for "**H**: Horizontal connector".

MVDY — 100 — WA2J2

- MODEL
- VOLTAGE
  A2: AC220V(50/60)Hz
  A1: AC110V(50/60)Hz
  D: DC24V/12V/6V
- WIRE
  J: JPC type
- WIRE LENGTH
  Blank: 500mm
  1: 1000mm
  2: 2000mm
  3: 3000mm

Caution

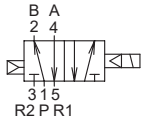
Prohibit apply force to coil when tighten the tube fitting.

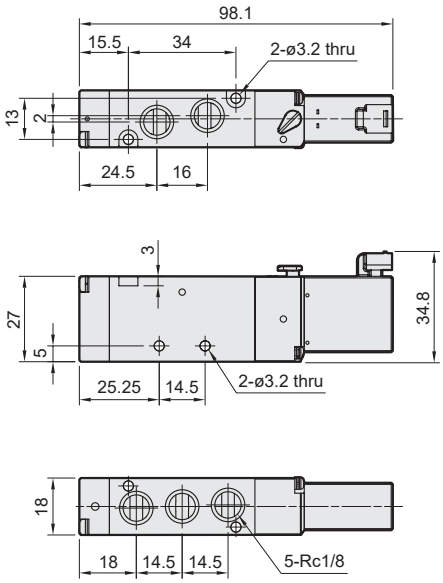


20-MVSC1-180 Dimensions

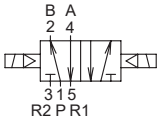
SOLENOID **VALVE**

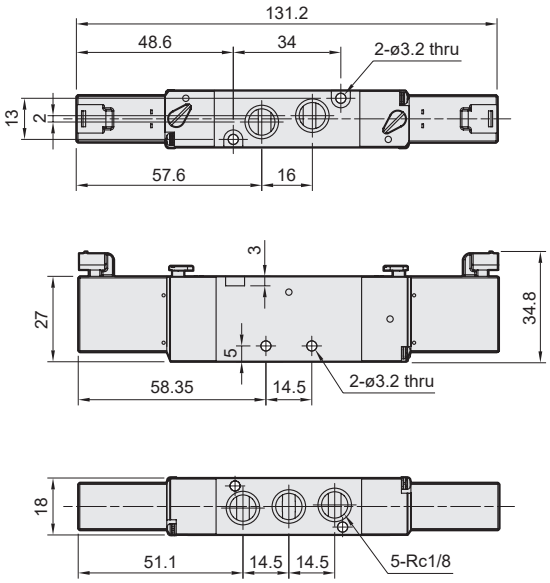
20-MVSC1-180-4E1





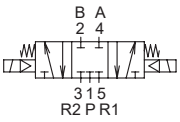
20-MVSC1-180-4E2



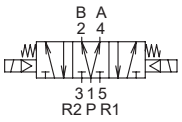


20-MVSC1-180-4E2C.P.R

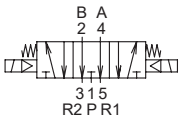
4E2C

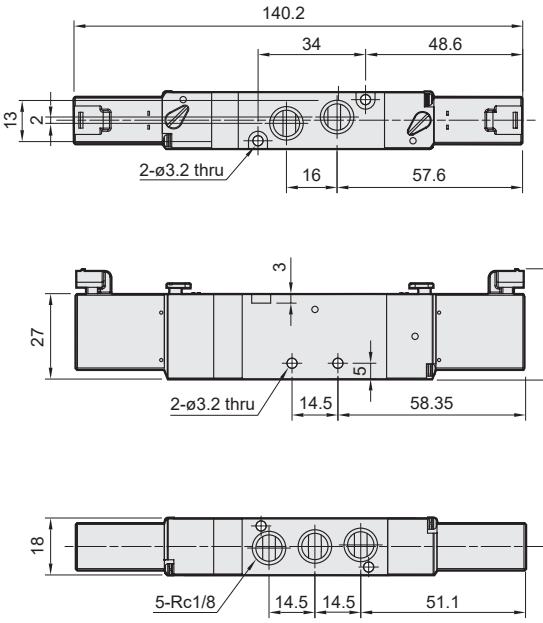


4E2P

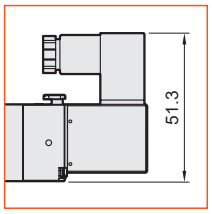


4E2R

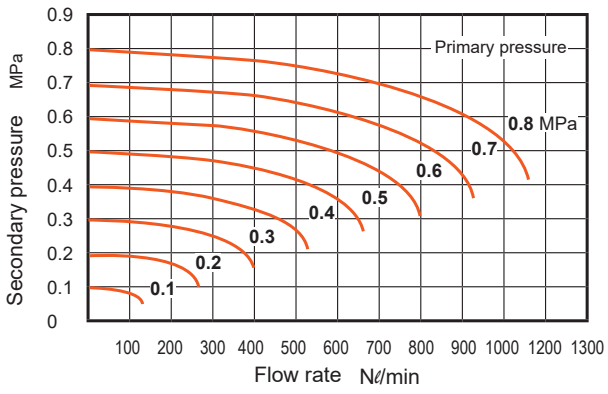




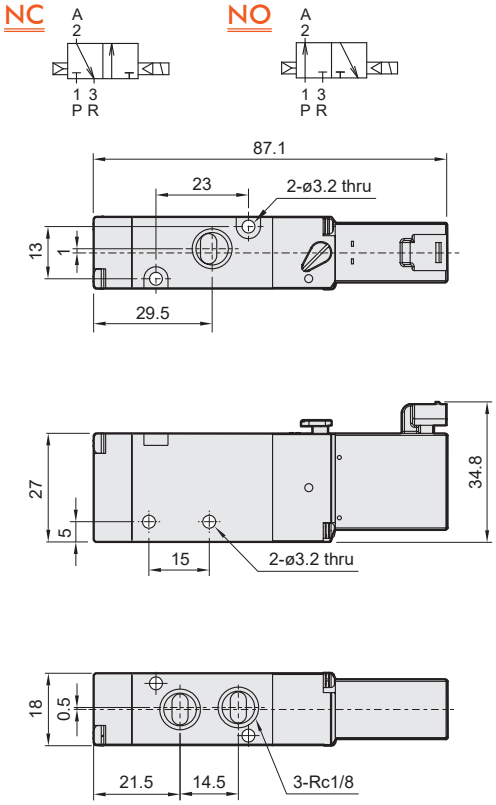
DIN connector /
DIN connecotr
with LED indicator



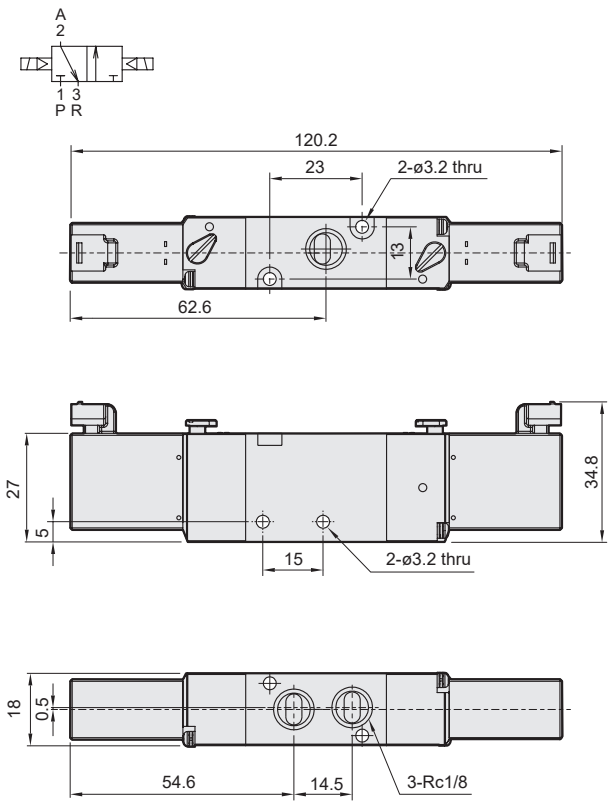
Flow features



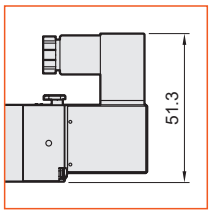
20-MVSC1-180-3E1-NC/NO



20-MVSC1-180-3E2



DIN connector /
DIN connecotr with LED indicator

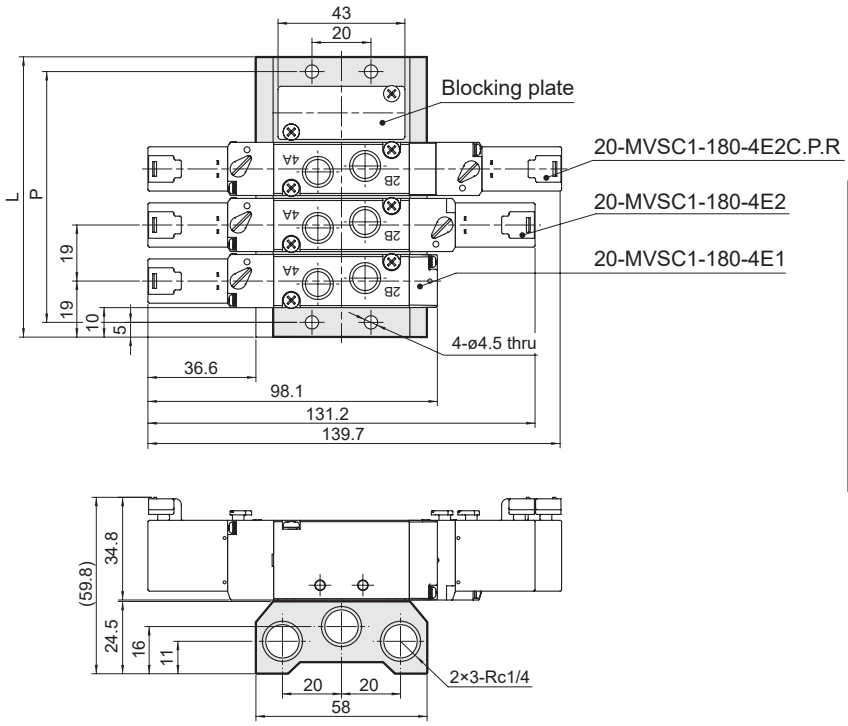


20-MVSC1-180 Manifold

SOLENOID **VALVE**

20-MVSC1-180-5B*

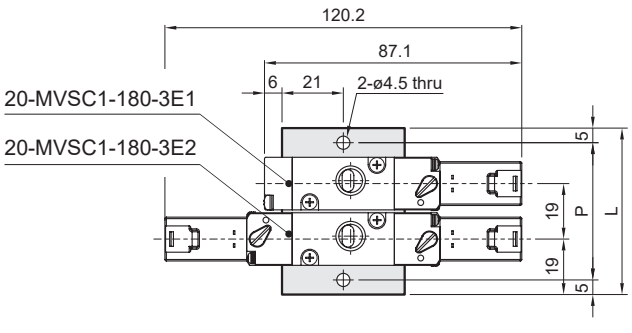
5 port (for body ported type)

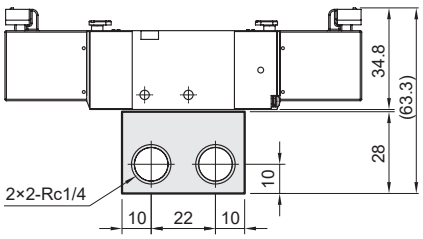


No. of stations	P	L
2	47	57
3	66	76
4	85	95
5	104	114
6	123	133
7	142	152
8	161	171
9	180	190
10	199	209

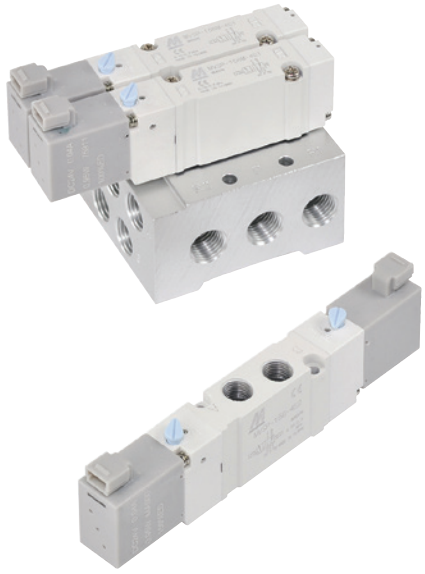
20-MVSC1-180-3B*

3 port (for body ported type)





No. of stations	P	L
2	47	57
3	66	76
4	85	95
5	104	114
6	123	133
7	142	152
8	161	171
9	180	190
10	199	209



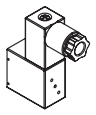
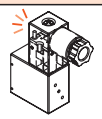
Specification

Model		4E1	4E2	4E2 C.P.R
Port size		Rc1/8		
No. of port / position		5 / 2		5 / 3
Medium		Air		
Operating perssure range		0.15~0.7 MPa		0.2~0.7 MPa
Proof pressure		1 MPa		
Effective orifice	Body ported	11 mm^2		9.5 / 14.6 / 9.5 mm^2
	Manifold	10 mm^2		7.5 /13 / 8 mm^2
Reponse time		AC<36ms, DC<25ms		AC<46ms, DC<25ms
Ambient temperature		-5~+50°C (No freezing)		
Voltage		AC110V, 220V (50/60)Hz, DC24/12V		
Power consumption		AC=1.12VA, DC=0.95W		
Available voltage range		±5%		
Insulation class		F class		
Weight		83 g	118 g	127 g

Order example of valve

20 — MVSP — 156M — 4E2C — AC110 — H1 — G

- MATERIAL RESTRICTIONS (Secondary battery)
- MODEL
- BODY WIDTH
  - Blank: Body ported type
  - **M**: Manifold type
- **4**: 4 way (5 port)
  - **E1**: Single Solenoid
  - **E2**: Double Solenoid
- VOLTAGE
  - **AC220**V(50/60)Hz
  - **AC110**V(50/60)Hz
  - **DC24**V
  - **DC12**V
- **C**: Closed center
  P: Pressure center
  R: Exhaust center
  (Only for **4E2** type)
- CONNECTOR

D: DIN connector	**L**: DIN connector
	 With LED indicator
W: Lead wire	**H**: Horizontal connector
 Wire length: 500mm	 With LED indicator

- PORT THREAD
  Blank: Rc thread
  G: G thread
  NPT: NPT thread
  (Only for body ported type)

Wire length	
—	500mm
1	1000mm
2	2000mm
3	3000mm

* Wire length only for "**H**: Horizontal connector".

Order example of manifold

* Use the same manifold with MVSY.

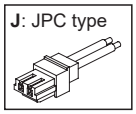
20 — MVSY — 156M — 5B3 — G

- MATERIAL RESTRICTIONS (Secondary battery)
- MODEL
- Blank: Body ported type
  M: Manifold type
- MANIFOLD
  5B: 5 port (for body ported type)
  5M: 5 port (for manifold type)
- MANIFOLD NUMBER
  1, 2, 3...
- PORT THREAD
  Blank: Rc thread
  G: G thread
  NPT: NPT thread

Order example of wire

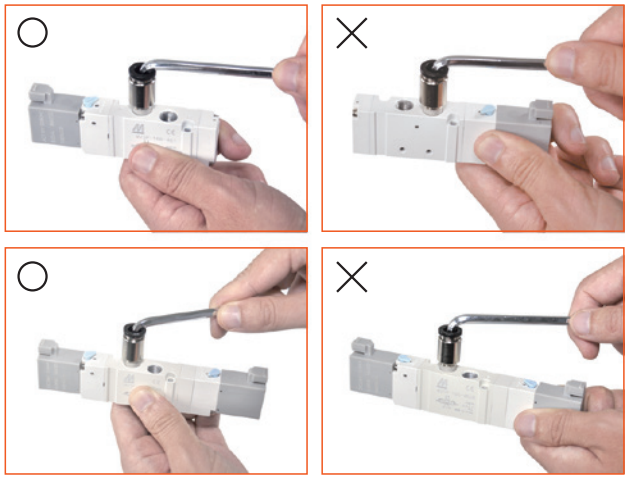
* Use the same wire with MVDY.
* Only for "**H**: Horizontal connector".

MVDY — 100 — WA2J2

- MODEL
- VOLTAGE
  A2: AC220V(50/60)Hz
  A1: AC110V(50/60)Hz
  D: DC24V/12V/6V
- WIRE
  J: JPC type
  
- WIRE LENGTH
  Blank: 500mm
  1: 1000mm
  2: 2000mm
  3: 3000mm

Caution

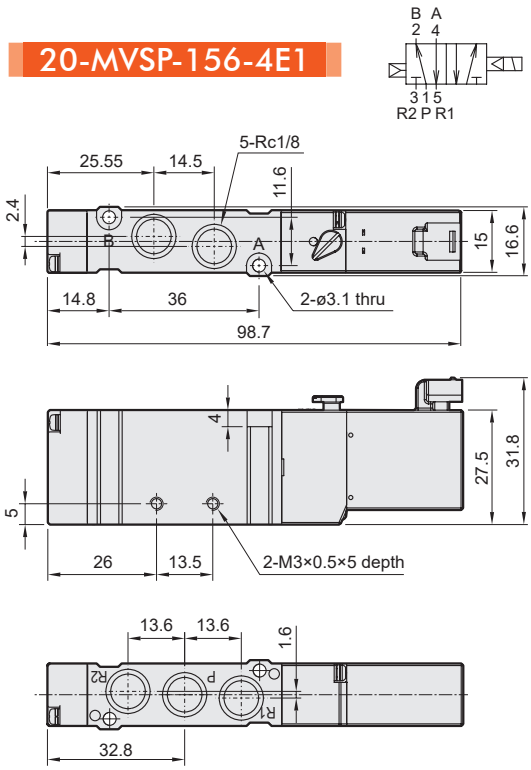
Prohibit apply force to coil when tighten the tube fitting.



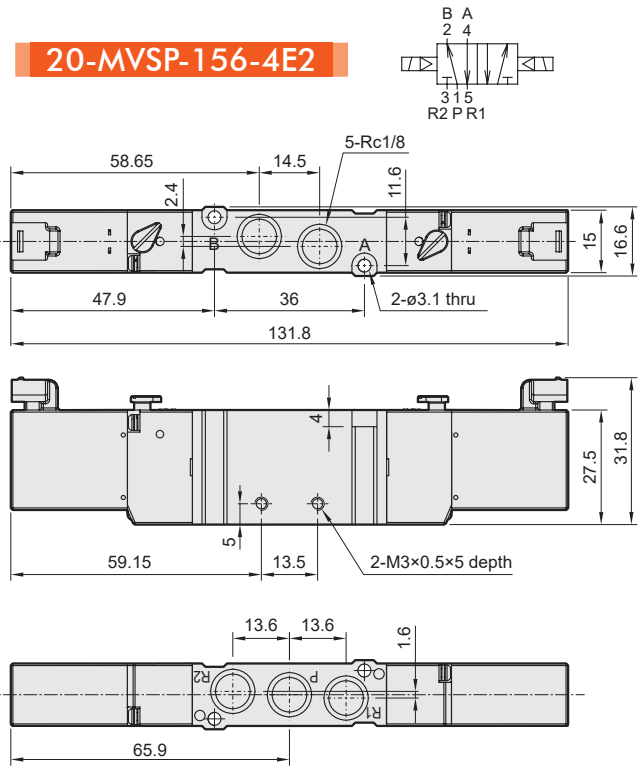
20-MVSP-156 Dimensions

SOLENOID **VALVE**

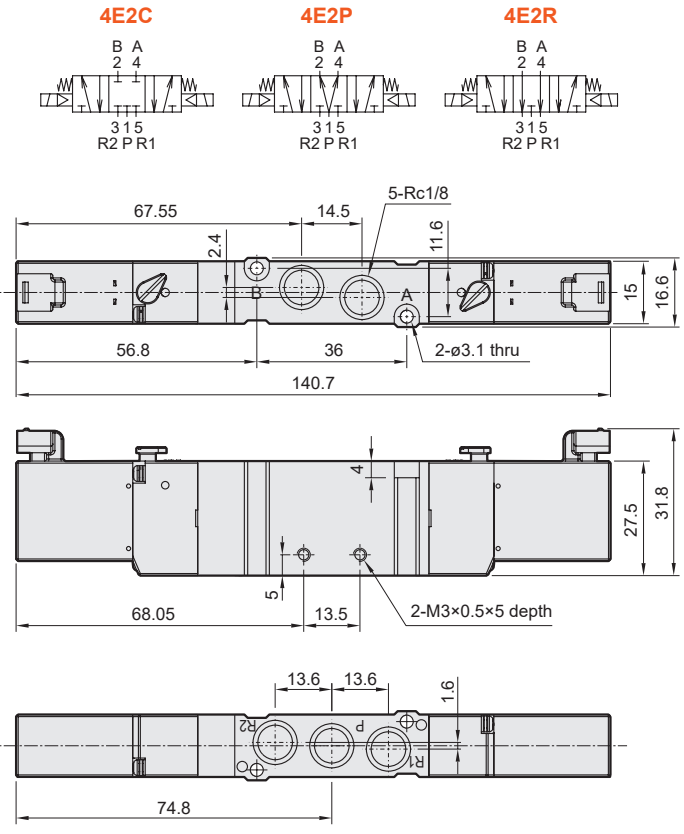
20-MVSP-156-4E1



20-MVSP-156-4E2

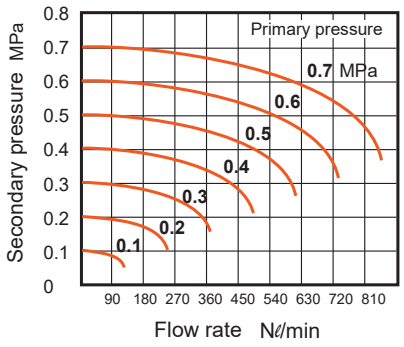


20-MVSP-156-4E2C.P.R

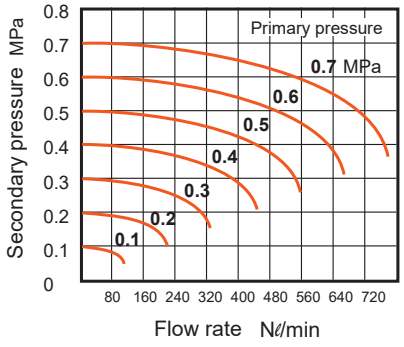


Flow features

20-MVSP-156-4E1/4E2



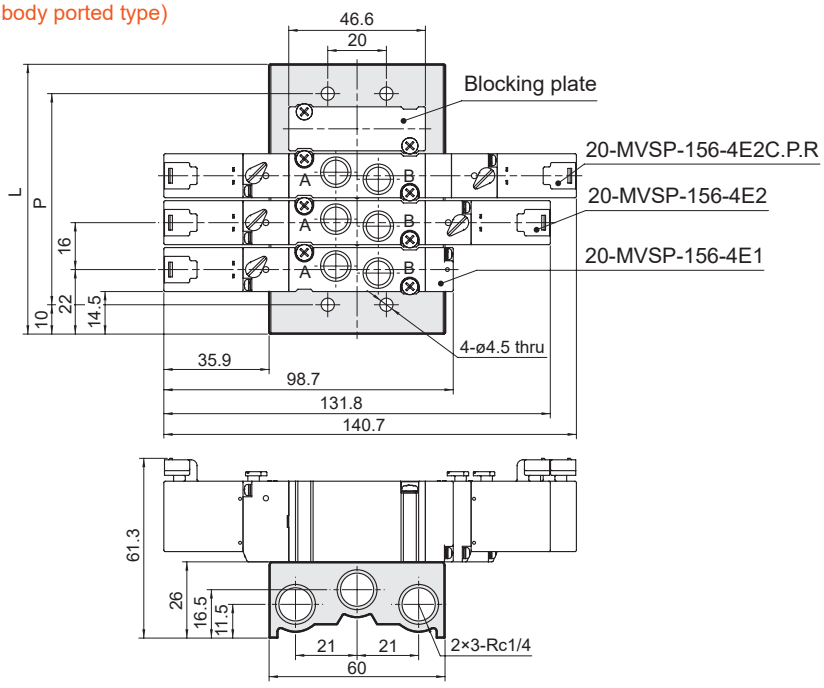
20-MVSP-156M-4E1/4E2



20-MVSY-156-5B*

* Use the same Manifold with MVSY.

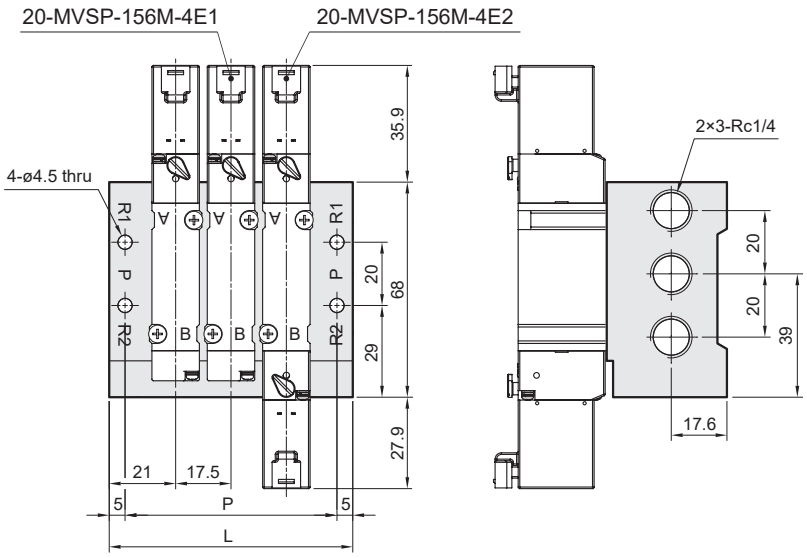
5 port (for body ported type)

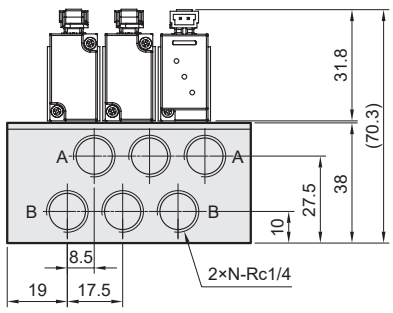


No. of stations (N)	P	L
2	40	60
3	56	76
4	72	92
5	88	108
6	104	124
7	120	140
8	136	156
9	152	172
10	168	188

20-MVSY-156M-5M*

5 port (for manifold type)





No. of stations (N)	P	L
2	49.5	59.5
3	67	77
4	84.5	94.5
5	102	112
6	119.5	129.5
7	137	147
8	154.5	164.5
9	172	182
10	189.5	199.5

20-MVSP-156 Mounting bracket & Spacer assembly

SOLENOID **VALVE**

Order example of bracket

* Use the same bracket with MVSY.

20 — MVSY — 156 — 1A

- 20: MATERIAL RESTRICTIONS (Secondary battery)
- MVSY: MODEL
- 156: MOUNTING BRACKET
  - **1A**
  - **2A**

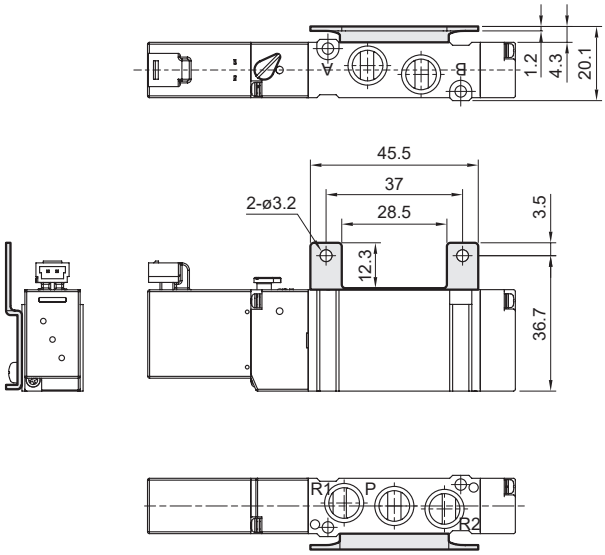
Order example of spacer assembly

* Use the same spacer assembly with MVSY.

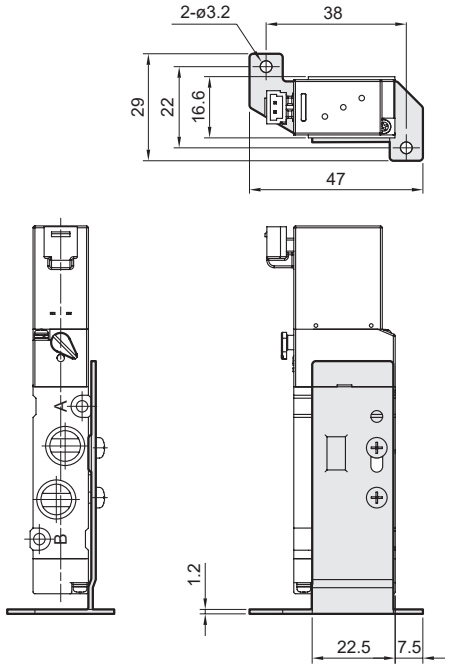
20 — MVSY — 156M — 5BP

- 20: MATERIAL RESTRICTIONS (Secondary battery)
- MVSY: MODEL
- 156M: Blank: Body ported type, **M**: Manifold type
- 5BP: SPACER ASSEMBLY
  - **5B**: 5 Port (for body ported type)
  - **5M**: 5 Port (for Manifold type)
  - P: Individual SUP spacer assembly
  - R: Individual EXH spacer assembly
  - PR: Individual SUP spacer assembly+ Individual EXH spacer assembly

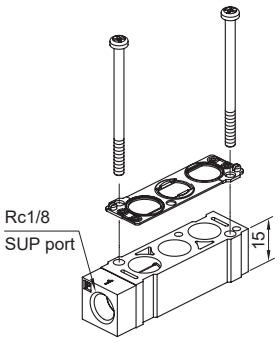
20-MVSY-156-1A



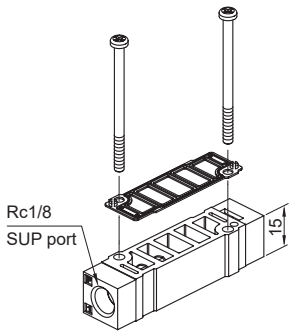
20-MVSY-156-2A



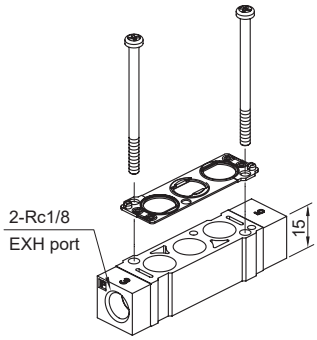
20-MVSY-156-5BP



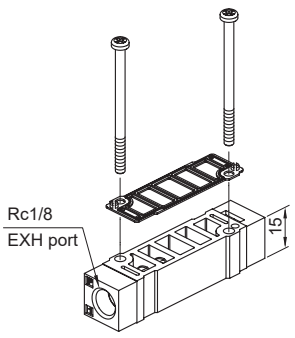
20-MVSY-156M-5MP



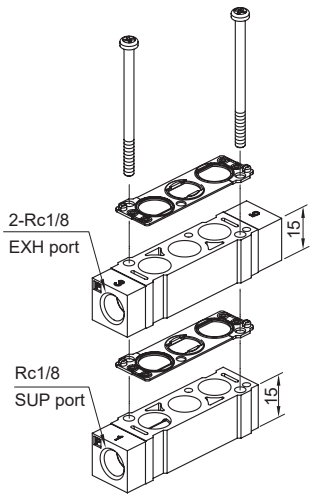
20-MVSY-156-5BR



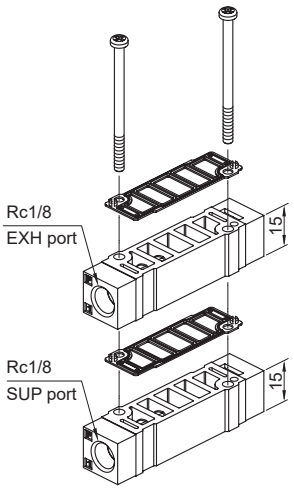
20-MVSY-156M-5MR

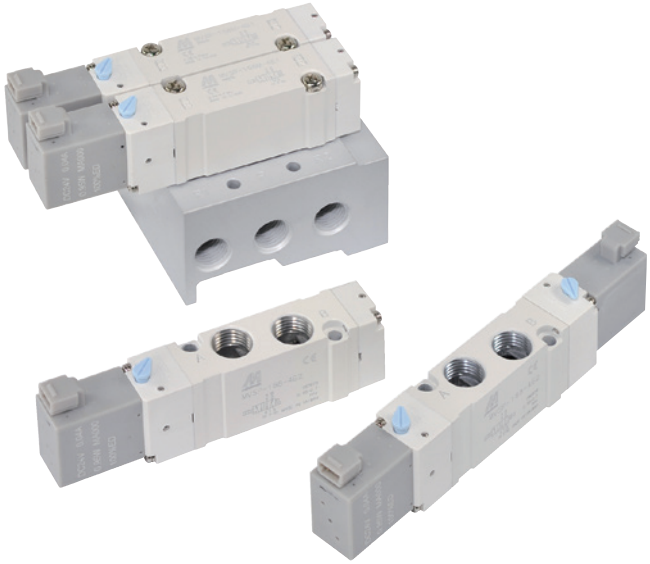


20-MVSY-156-5BPR



20-MVSY-156M-5MPR





Specification

Model	4E1	4E2	4E2 C.P.R
Port size	Rc1/4		
No. of port / position	5 / 2		5 / 3
Medium	Air		
Operating perssure range	0.15~0.7 MPa		0.2~0.7 MPa
Proof pressure	1 MPa		
Effective orifice — Body ported	15 mm^2		16.3 / 27 / 12.4 mm^2
Effective orifice — Manifold	13 mm^2		13.5 /18.4 / 11 mm^2
Reponse time	DC<25 ms ; AC<35 ms		DC<33 ms ; AC<45 ms
Ambient temperature	-5~+50°C (No freezing)		
Voltage	AC110V, 220V (50/60)Hz, DC24/12V		
Power consumption	AC=1.12VA, DC=0.95W		
Available voltage range	±5%		
Insulation class	F class		
Weight	96 g	132 g	142 g

Order example of valve

20 — MVSP — 188M — 4E2C — AC110 — H1 — G

- MATERIAL RESTRICTIONS (Secondary battery)
- MODEL
- BODY WIDTH
  - Blank: Body ported type
  - **M**: Manifold type
- **4**: 4 way (5 port)
  - **E1**: Single Solenoid
  - **E2**: Double Solenoid
- VOLTAGE
  - **AC220**V(50/60)Hz
  - **AC110**V(50/60)Hz
  - **DC24**V
  - **DC12**V
- **C**: Closed center
- **P**: Pressure center
- **R**: Exhaust center
  - (Only for **4E2** type)

CONNECTOR

D: DIN connector	**L**: DIN connector
	With LED indicator
W: Lead wire	**H**: Horizontal connector
Wire length: 500mm	With LED indicator

- PORT THREAD
  - Blank: Rc thread
  - **G**: G thread
  - **NPT**: NPT thread
  - (Only for body ported type)

Wire length	
—	500mm
1	1000mm
2	2000mm
3	3000mm

* Wire length only for "**H**: Horizontal connector".

Order example of manifold

* Use the same manifold with MVSY.

20 — MVSY — 188M — 5B3 — G

- MATERIAL RESTRICTIONS (Secondary battery)
- MODEL
- Blank: Body ported type
  M: Manifold type
- MANIFOLD NUMBER
  1, 2, 3...
- MANIFOLD
  5B: 5 port (for body ported type)
  5M: 5 port (for manifold type)
- PORT THREAD
  - Blank: Rc thread
  - **G**: G thread
  - **NPT**: NPT thread

Order example of wire

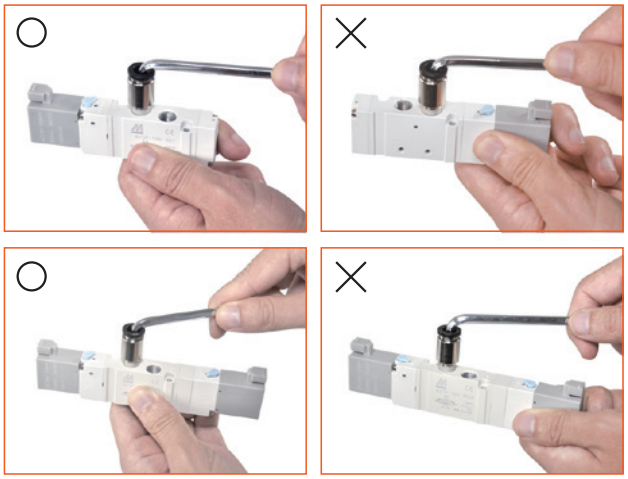
* Use the same wire with MVDY.
* Only for "**H**: Horizontal connector".

MVDY — 100 — WA2J2

- MODEL
- VOLTAGE
  - **A2**: AC220V(50/60)Hz
  - **A1**: AC110V(50/60)Hz
  - **D**: DC24V/12V/6V
- WIRE
  - **J**: JPC type
- WIRE LENGTH
  - Blank: 500mm
  - **1**: 1000mm
  - **2**: 2000mm
  - **3**: 3000mm

Caution

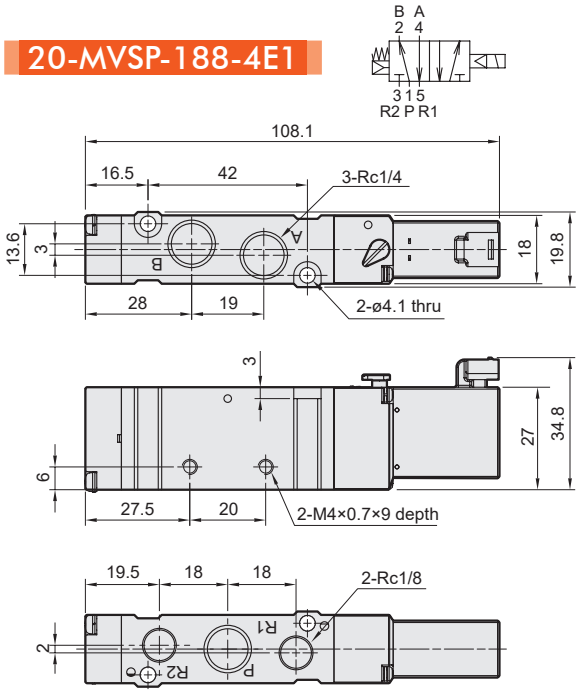
Prohibit apply force to coil when tighten the tube fitting.



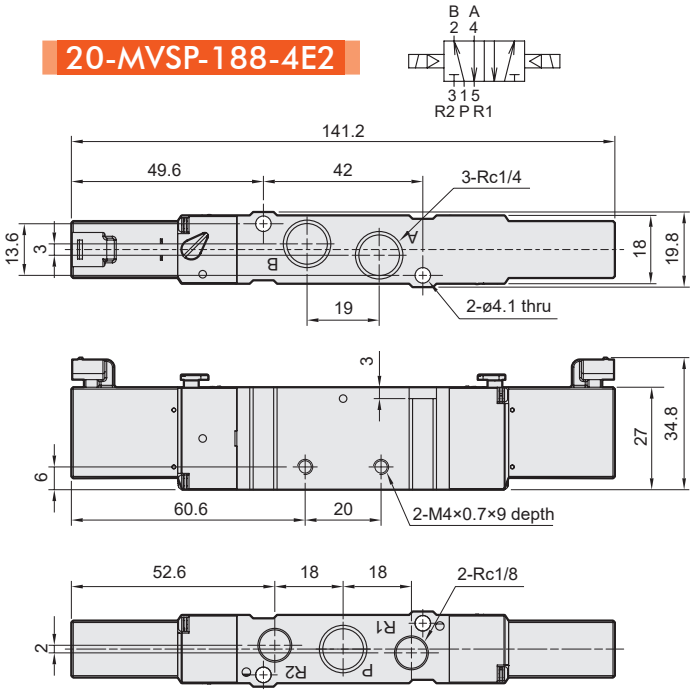
20-MVSP-188 Dimensions

SOLENOID **VALVE**

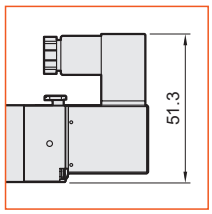
20-MVSP-188-4E1



20-MVSP-188-4E2

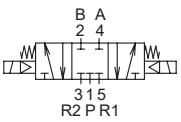


DIN connector /
DIN connecotr
with LED indicator

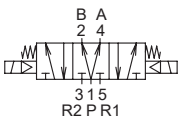


20-MVSP-188-4E2C.P.R

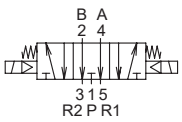
4E2C

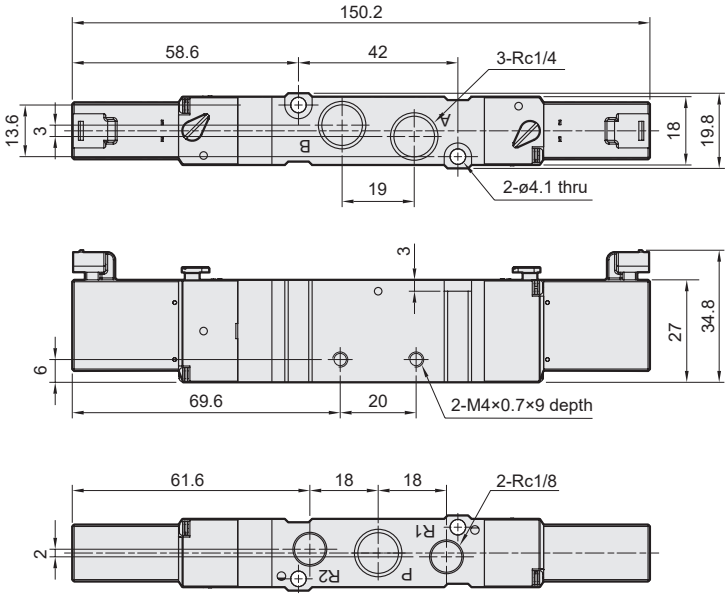


4E2P



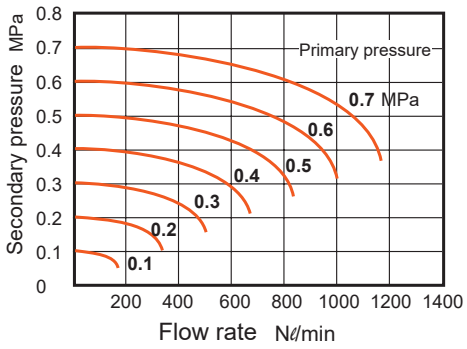
4E2R



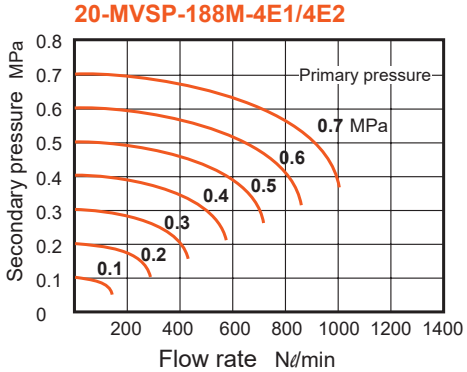


Flow features

20-MVSP-188-4E1/4E2



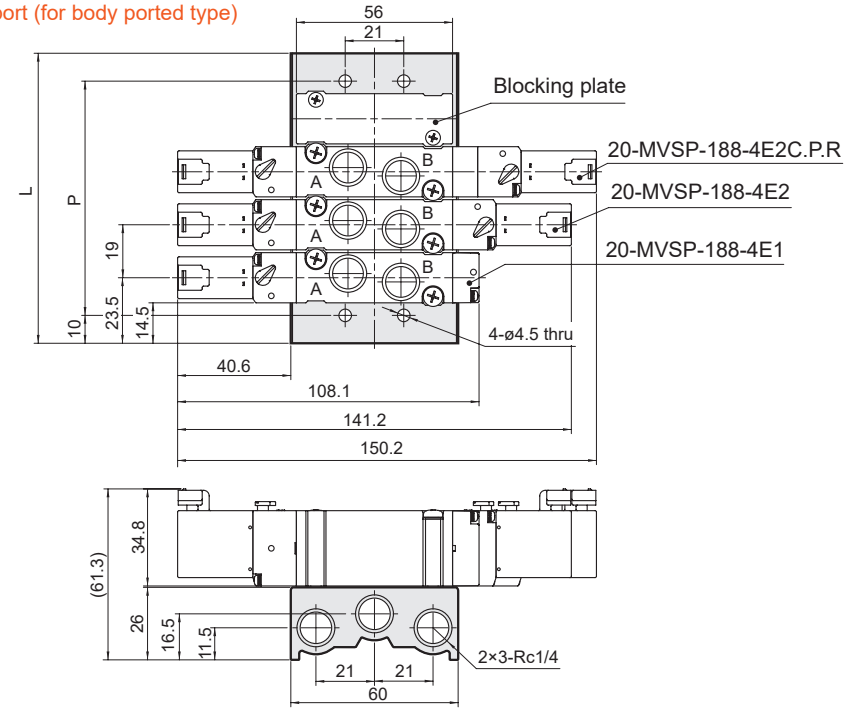
20-MVSP-188M-4E1/4E2



20-MVSY-188-5B*

* Use the same Manifold with MVSY.

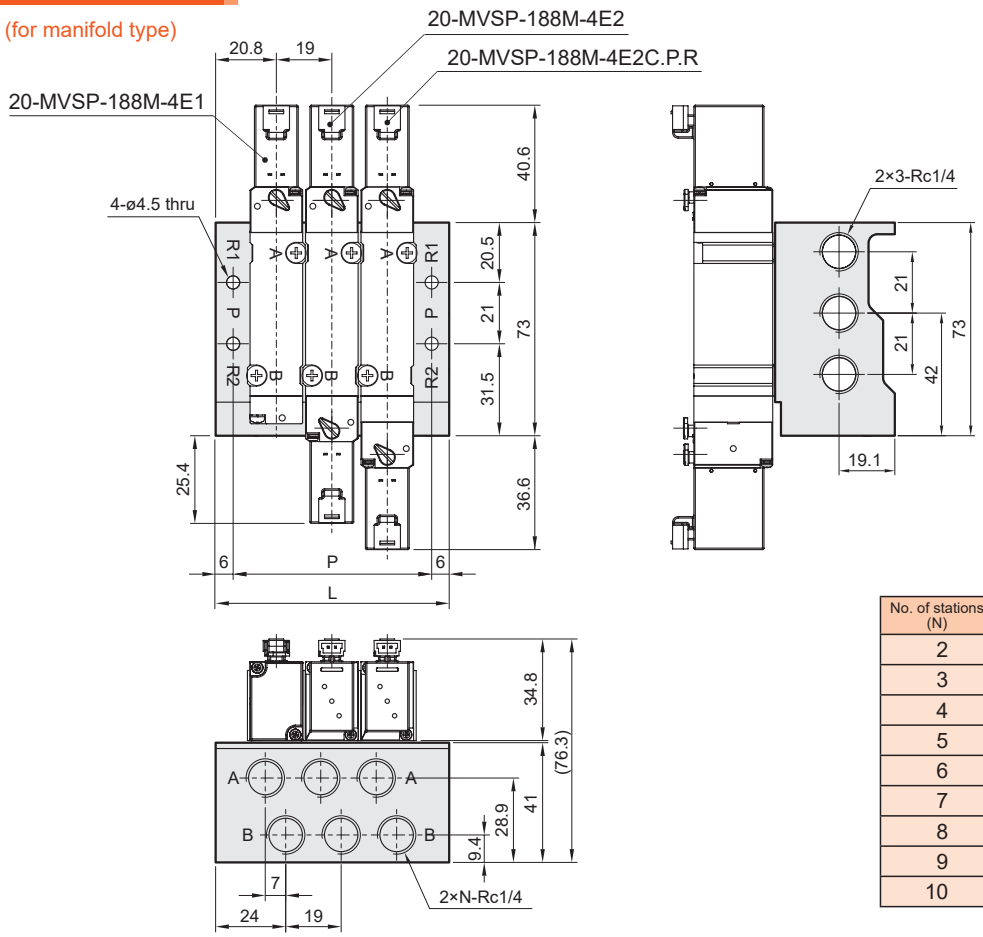
5 port (for body ported type)



No. of stations	P	L
2	46	66
3	65	85
4	84	104
5	103	123
6	122	142
7	141	161
8	160	180
9	179	199
10	198	218

20-MVSY-188M-5M*

5 port (for manifold type)



No. of stations (N)	P	L
2	49	61
3	68	80
4	87	99
5	106	118
6	125	137
7	144	156
8	163	175
9	182	194
10	201	213

20-MVSP-188 Mounting bracket & Spacer assembly

SOLENOID **VALVE**

Order example of bracket

* Use the same bracket with MVSY.

20 — MVSY — 188 — 1A

- 20: MATERIAL RESTRICTIONS (Secondary battery)
- MVSY: MODEL
- 188: MOUNTING BRACKET
- 1A / 2A

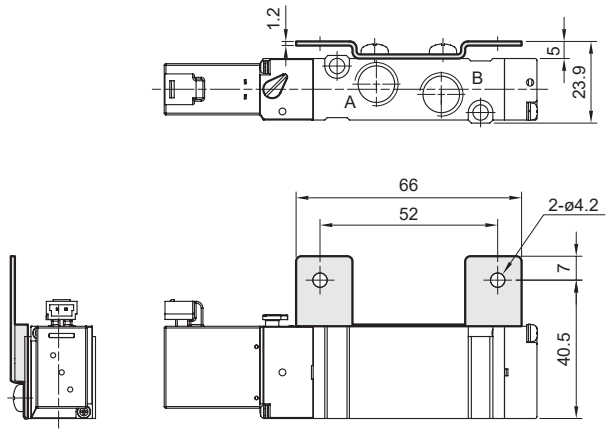
Order example of spacer assembly

* Use the same spacer assembly with MVSY.

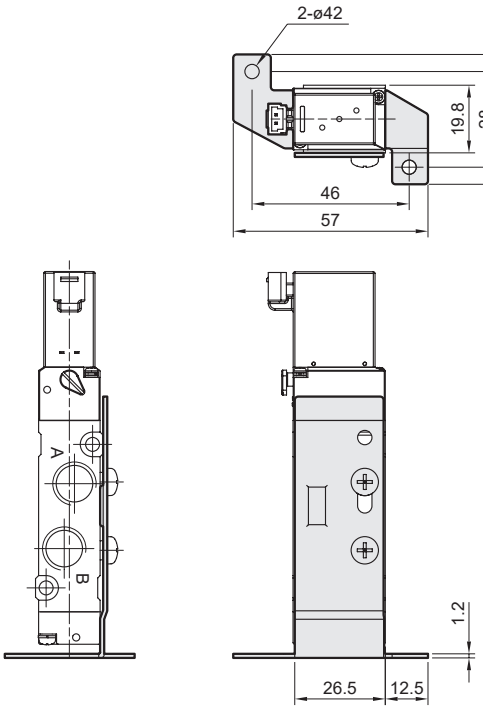
20 — MVSY — 188M — 5BP

- 20: MATERIAL RESTRICTIONS (Secondary battery)
- MVSY: MODEL
- Blank: Body ported type / **M**: Manifold type
- **5B**: 5 Port (for body ported type) / **5M**: 5 Port (for Manifold type)
- SPACER ASSEMBLY: **P**: Individual SUP spacer assembly / **R**: Individual EXH spacer assembly / **PR**: Individual SUP spacer assembly+ Individual EXH spacer assembly

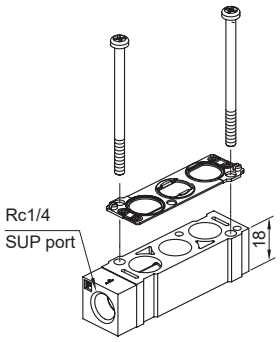
20-MVSY-188-1A



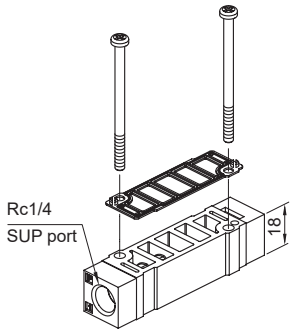
20-MVSY-188-2A



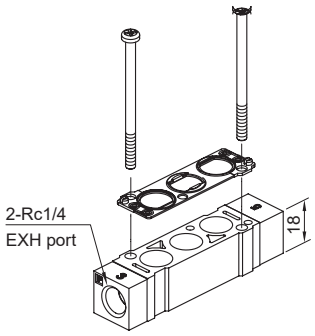
20-MVSY-188-5BP



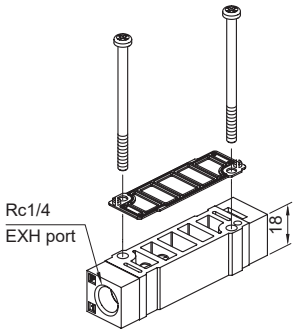
20-MVSY-188M-5MP



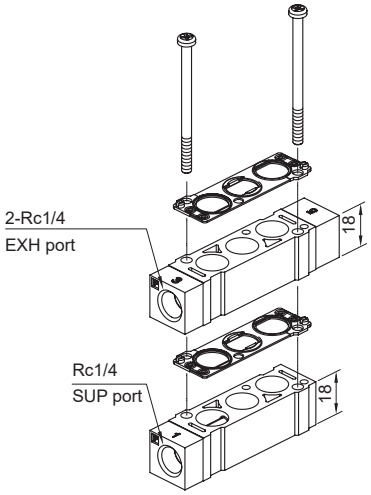
20-MVSY-188-5BR



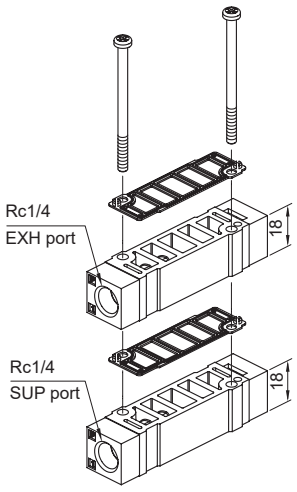
20-MVSY-188M-5MR



20-MVSY-188-5BPR



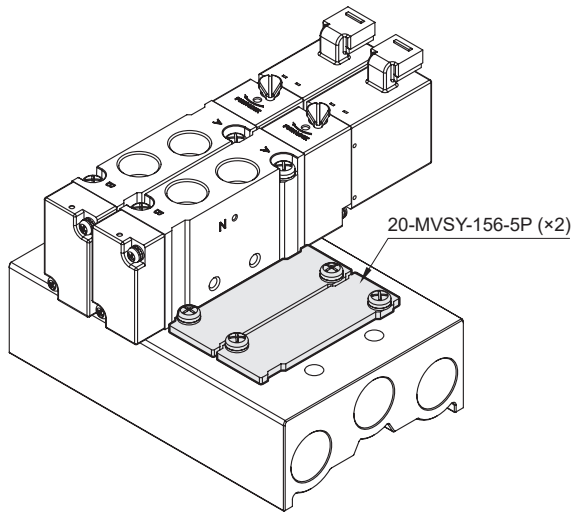
20-MVSY-188M-5MPR



Order example

20 —MVSC1 — 180 — 5P

- 20: MATERIAL RESTRICTIONS (Secondary battery)
- MVSC1: MODEL
- 180: BLOCKING PLATE
  3P: for 3 port
  5P: for 5 port

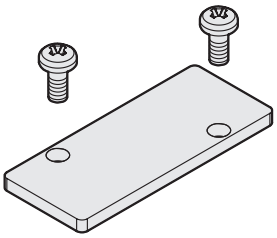


Blocking plate table

Applicable model	Symbol for order	
	3P: for 3 port	**5P**: for 5 port
20-MVSC1-180	20-MVSC1-180-3P	20-MVSC1-180-5P
20-MVSP-156	—	20-MVSY-156-5P (*1)
20-MVSP-188	—	20-MVSY-188-5P (*1)

*1. Use the same blocking plate with MVSY.

Blocking plate parts



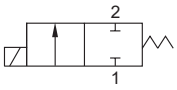
Bolt × 2

Blocking plate × 1

MUSC series

2/2 WAY N.C. PLUNGER TYPE DIRECT ACTING **SOLENOID VALVE**

2/2 N.C.



Specification

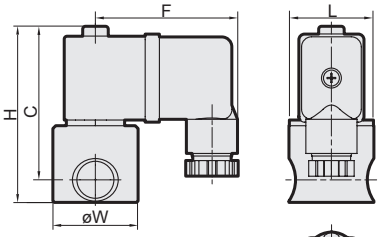
- IP65 waterproof coil.
- Continuous cycle, 100% ED.
- Ex coil is EExm II T4 PTB approval.

Power consumption

Coil power	2	3	2E	4	5	3E
AC (VA)	6.9	8.0	5.3	19.5	27.5	8.6
DC (W)	6.2	6.8	5.2	15.0	18.5	10.0

Dimensions

Model	MUSC											
Code Dimension (mm)	03			06			08			10		
	2	3	2E	2	3	2E	4	5	3E	4	5	3E
L	25			30			40			42		
W	25	30		25	30		–			–		
H	58			63			86			87		
C	51			53			75			75		
D	18			23			31			31		
F	50			50			53			53		
M	M4			M4			M5			M5		
A	–			–			22			24		
N.W (kg)	0.18	0.23	0.5	0.23	0.28	0.55	0.49	0.57	0.8	0.51	0.59	0.83



Order example

MUSC—06—2—N—□—3—D—AC110

- MODEL: MUSC
- CODE: **03**: 1/8; **06**: 1/4; **08**: 1/4; **10**: 3/8
- FIG.: **1**, **2**, **3**, **4**, **5**, **6**, **7**, **8**, **9**
- SEAL MAT'L: **N**: NBR; **J**: EPDM; **V**: VITON; **T**: TEFLON (*1); **R**: RUBY (*1); **Z**: FFKM
- FIXED HOLE: Blank: Opposite; **S**: Diagonal hole
- COIL: **2**, **3**, **2E**, **4**, **5**, **3E** (*2)
- PLUG: Blank: DIN; **O**: None; **D**: LED; **G**: 1/2" NPT; **Y**: 2 wires (only for coil #2)
- VOLTAGE: **AC220**V(50/60)Hz; **AC110**V(50/60)Hz; **DC24**V

*1. When the seal material is (**T**) TEFLON or (**R**) RUBY, the valve has slight leakage.
*2. Explosion-Proof (**2E/3E**) coil with LED (**D**) plug is not applicable.

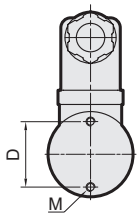
Specification

Model **MUSC**: 303 S.S. body, for water, air, gas, light oil, vacuum. 2/2 way N.C.

Code (Port) G	Fig. no.	Seal Mat'l	Coil	Orifice mm	Temp. °C					Working pressuer 0~bar						CV	VAC. torr
					Coil 2/2E			Coil 3		Coil 2		Coil 3		Coil 2E			
					N	JV	TZ	N	JVTZ	AC	DC	AC	DC	AC	DC		
03(1/8) 06(1/4)	1	N J V T Z	2 3 2E	1.0	-5 ~ 80	-10 ~ 80	-20 ~ 80	-5 ~ 80	-10 ~ 145	20	13	30	24	20		0.03	10^{-2}
	2			1.3						16	10	25	20	16		0.05	
	3			1.6						13	8	20	16	14		0.09	
	4			2.0						10	7	15	13	10		0.14	
	5			2.5						7	5	10	10	7		0.18	10^{-1}
	6			3.0						5	3	7	7	5		0.27	
	7			5.0						1	0.5	3	2	1		0.40	10

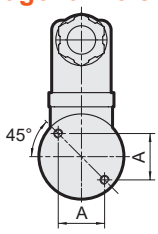
Code (Port) G	Fig. no.	Seal Mat'l	Coil	Orifice mm	Temp. °C						Max. O.P.D. bar (Min. 0 bar)						CV	VAC. torr
					Coil 4, 3E			Coil 5			Coil 4		Coil 5		Coil 3E			
					N	JV	TRZ	N	JV	TRZ	AC	DC	AC	DC	AC	DC		
08(1/4) 10(3/8)	1	N J V T R Z	4 5 3E	1.6	-5 ~ 80	-10 ~ 145	-20 ~ 160	-5 ~ 80	-10 ~ 145	-20 ~ 185	30	20	40	30	20	14	0.10	10^{-2}
	2			2.0							20	14	30	20	14	10	0.15	
	3			2.5							14	10	20	14	10	7	0.20	
	4			3.0							10	7	14	10	7	5	0.31	
	5			4.0							7	4	10	7	5	4	0.54	10^{-1}
	6			5.0							5	3	7	4	4	3	0.80	
	7			5.5							4	2	5	3	3	2	0.95	
	8			7.5							3	1	3	2	2	1	1.10	10
	9			10.0							1	0.5	2	1	1	0.5	1.30	

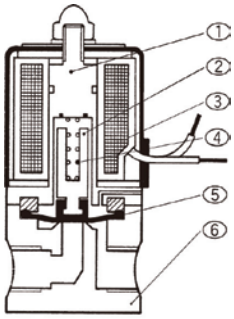
* Max. Orifice: 03/06 **T**=2.5mm, **Z**=3.0mm., 08/10 **J**=5.0mm, **T**=4.0mm, **R**=2.5mm, **Z**=5.0mm
* Seal **T** and **R** will have slight leakage, so it will not be suitable for vacuum. Evaporable and flammable danger fluids.



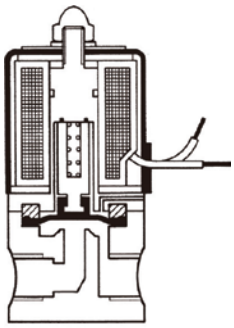
S

Diagonal hole



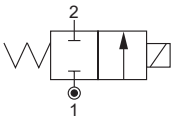


Flow direction
Unexcited



Flow direction
Unexcited

2/2 N.C.



Caution

- Direct-acting valves are ideally suited to allocate at any angle
- Voltage drop range is within ± 10%.
- The max operating temperature of the fluid must not exceed 80 °C.
- Suitable for strong acid alkaline fluids.

Not for fluid of

- Liquid when heat, solid when cool.
- Viscosity over 50 cst.

Material

Code	Part	Material
1	Tube	Stainless steel
2	Core	Stainless steel
3	Coil	Copper wire
4	Spring	Stainless steel
5	Body	PTFE
6	Diaphragm	PTFE

Dimensions

Model	MXVC		
Code	202	203	204
Orifice / Dimension (mm)	3T / 6T	3T / 6T	8T / 12T
A	40	50	70
B	12.5	13.5	19
C	89	120	155
D	42	52	60
G	1/4"	3/8"	1/2"
Weight (kg)	0.35	0.55	1.5

Order example

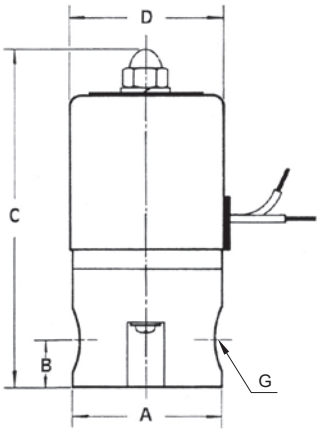
MXVC — 202 — 3T — RF1 — 220VAC — □

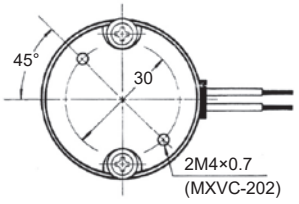
MODEL

Code	Orifice	Coil
202	**3T** : 3mm	**RF1**: Round outlet 13 mm
	6T : 6mm	
203	**3T** : 3mm	**RF2** : Round outlet 16 mm
	6T : 6mm	
204	**8T** : 8mm	**RF3** : Round outlet 20 mm
	12T : 12mm	

VOLTAGE

PORT THREAD
Blank: Rc thread
G: G thread
NPT: NPT thread





Specification

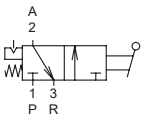
MXVC: (PTFE valve body), Fluid: acid alkaline					
Code (Port)	Seal mat'l	Orifice mm	Fluid temp. °C	Operated pressure range (0~bar)	CV
				Acid alkaline	
202-3T(1/4")	PTFE	3	-10 ~ 40	0~2	0.26
202-6T(1/4")		6		0~0.5	1.12
203-3T(3/8")		3		0~5	0.26
203-6T(3/8")		6		0~1	1.12
204-8T(1/2")		8		0~1	1.40
204-12T(1/2")		12		0~0.5	3.30

20-MVHR series

ON-OFF **VALVE**

(Lock is not attached)

Symbol



Specification

Model		20-MVHR-302 / 400		
Bore No.		8A	10A	15A
Port size		Rc1/4	Rc3/8	Rc1/2
No. of port		3		
No. of position		2		
Medium		Air		
Operating pressure range		0.1~1 MPa		
Proof pressure		1.5 MPa		
Effective orifice (mm^2)	IN → OUT	39	56	66
	OUT → EXH	39	45	58
Ambient temperature		-5~+60°C (No freezing)		
Weight		304g / 311g		

Order example

20 — MVHR — 302□ — 3H — 8A — 3 — B — G

- 20 — MATERIAL RESTRICTIONS (Secondary battery)
- MVHR — MODEL
- 302□ — MODEL for F.R.L
  - **302**: for MA**302 series
  - **400**: for MA**401, 403 series
- 302□ — CONTROL MODEL
  - Blank: Manual type
- 3H — **3H**: 3way (3port) (Residual pressure release)
- 8A — PORT SIZE
  - **8A**: Rc1/4
  - **10A**: Rc3/8
  - **15A**: Rc1/2
- 3 — Apply to MVHR-400
  - **3**: Cool gray (For air unit 403 series)
- B — BRACKET
  - Blank: Without
  - **B**: With bracket
- G — PORT THREAD
  - Blank: Rc thread
  - **G**: G thread
  - **NPT**: NPT thread

Order example of bracket

20 — MVHR — 302 — B

- 20 — MATERIAL RESTRICTIONS (Secondary battery)
- B — BRACKET
  - * 302 and 400 use the same bracket.

⚠ Precautions

Please note during trial operation and maintenance.

❶ When the A port is open to the atmosphere, do not switch the valve to prevent leakage and malfunction of the seal ring due to fluid flow.

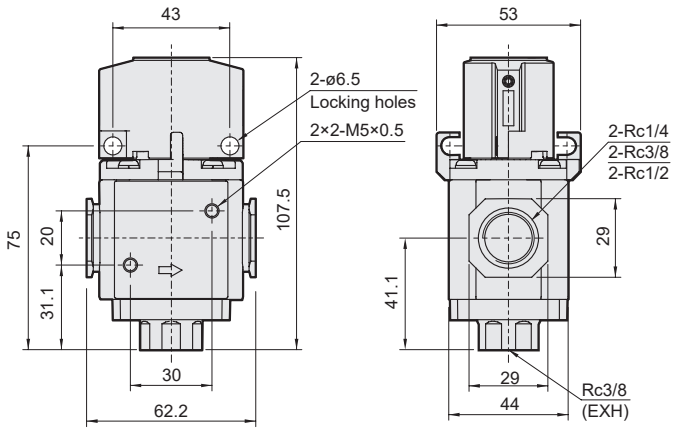
❷ Dust entering the valve body will cause malfunction or damage to the seal.

❸ Please install a filter and oil mist separator on the inlet side (With a filtration of 5 micron or lower).

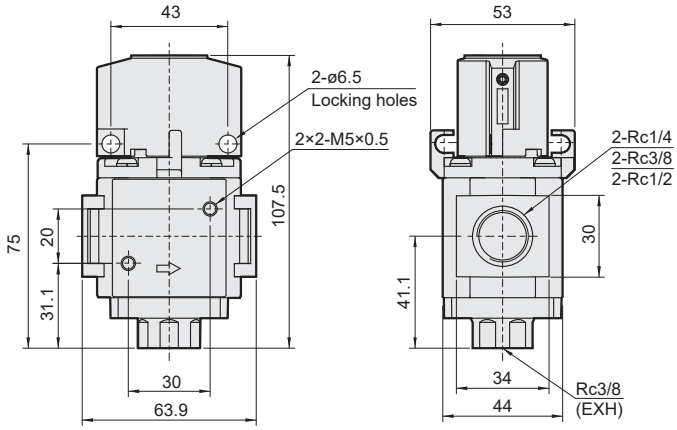
❹ Be sure of cleaning the cutting fluid and foreign material in the pipe before connection to avoid malfunction.

❺ The internal grease may flow out on the outlet side, so it is not recommended to use it in a completely oil-free environment in pipe.

20-MVHR-302

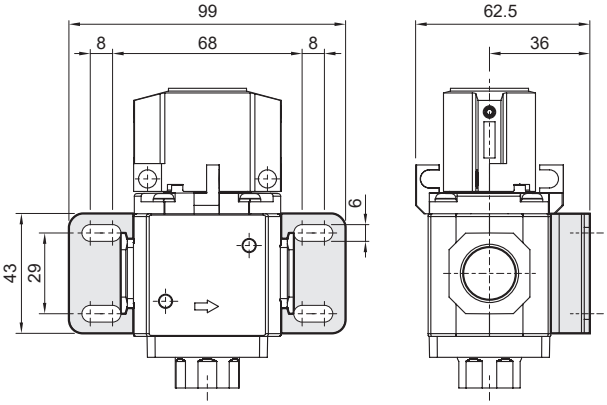


20-MVHR-400



20-MVHR-*-B

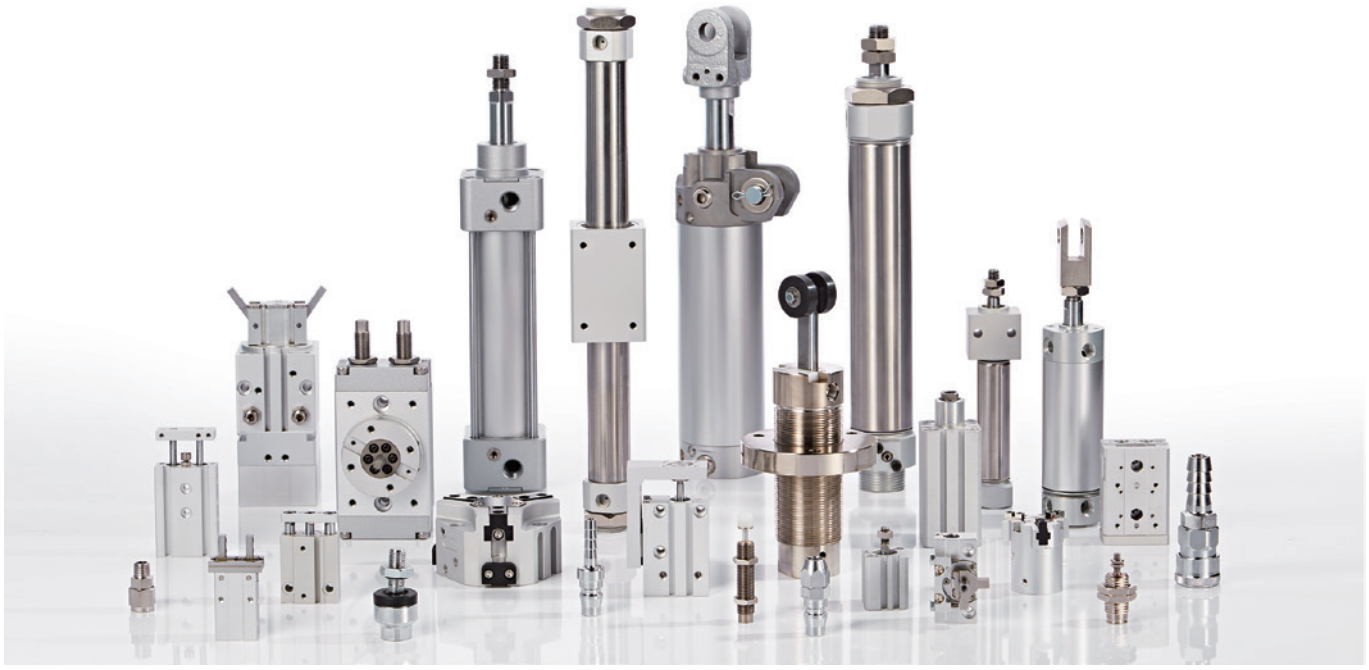
Bracket



MEMO

NOTE

AIR CYLINDER / GRIPPER



Standard cylinder

20-MCQV* ø32~ø100.....3-2

Compact cylinder

20-MCJQ ø12~ø100.....3-14

Multi-mount cylinder

20-MCFA ø6~ø32.....3-37
20-MCFB ø6~ø20.....3-43

Mini cylinder

20-MCMB ø20~ø40.....3-46

Pen cylinder

20-MCMJ ø6~ø16.....3-58
20-MCMJP ø6~ø15.....3-71

Guide cylinder

20-MCG* Function 3-76
20-MCGS ø6~ø63.....3-77

Table

20-MCSS ø6~ø25.....3-90
20-MCSH ø6~ø20.....3-111

Rotary actuator

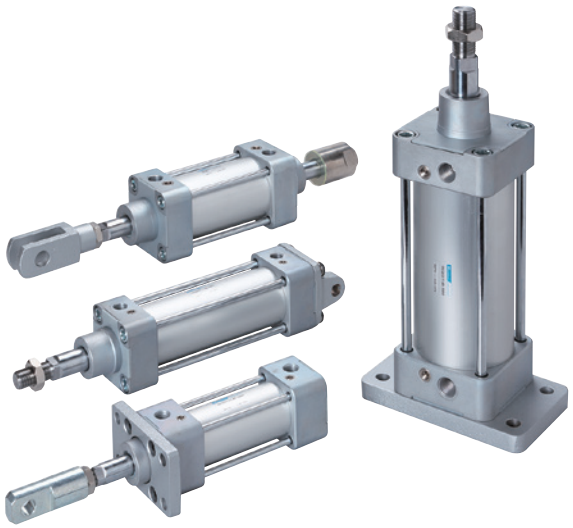
20-MCR* Moment of inertia 3-115
20-MCRQ ø12~ø40.....3-117
20-MCRQ-S ø16~ø25.....3-123

Gripper

20-MCH* Model selection 3-126
20-MCHA ø12~ø32.....3-127
20-MCHB ø12~ø32.....3-131
20-MCHC ø10~ø25.....3-134

20-MCQV2 series

ISO-VDMA **STANDARD CYLINDER**



Features

■ Non lubrication

Special housing and bushing enables self lubrication of piston rod.

■ High quality long service life

Hard anodised aluminium cylinder tubes offer a high resistance to corrosion and low internal friction.

■ ISO-VDMA standard specification

Conforms to ISO-6431 and VDMA 24562 specification enabling worldwide interchangeability.

■ Cylinder mountings

Available with comprehensive internationally recognised range of fixed and flexible mountings.

Specification

Model	20-MCQV2		
Tube I.D. (mm)	32,40	50,63	80,100
Medium	Air		
Operating perssure range	0.05~1 MPa		
Proof pressure	1.5 MPa		
Ambient temperature	-5~+60°C (No freezing)		
Available speed range	50~500 mm/sec		

Table for standard stroke

Tube I.D.	Stroke (mm)
ø32,40	50,75,100,125,150,175,200,250,300,350,400,450,500
ø50,63	↑ 600
ø80,100	↑ 600,700

• Please consult us if stroke out of specification.

* Use the same Accessories with MCQV.

Order example

20 — MCQV2 — 11 — 40 — 100M

- 20: MATERIAL RESTRICTIONS (Secondary battery)
- MCQV2: MODEL
- 11: STYLE (**1**: Single rod, **2**: Double rod)
- 40: TUBE I.D.
- 100: STROKE
- M: **M**: Magnet

STYLE

Code		Symbol	Description
1	1		Double acting / Male thread
2	1		Double rod / Male thread
2	7		Double rod / Adjustable male thread

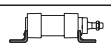
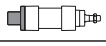
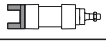
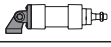
* Order example for **Rc** or **NPT** thread please consult us.

Mounting accessories

20 —FAC — MCQV — 40

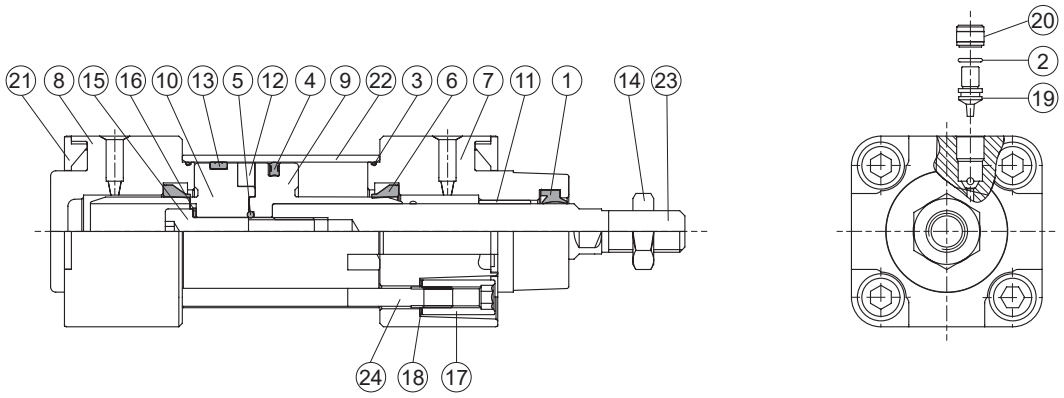
- 20: MATERIAL RESTRICTIONS (Secondary battery)
- FAC: MOUNTING TYPE
- MCQV: MODEL
- 40: TUBE I.D.

MOUNTING TYPE

	**LB**
	**CA**
	**CB**
	**CDB** (+CB+PIN)
	**FAC**
	**FBC**
	**TA**
	**TB**
	**TC**
	**Y**
	**I**

Single rod 11 type

ø32~ø100



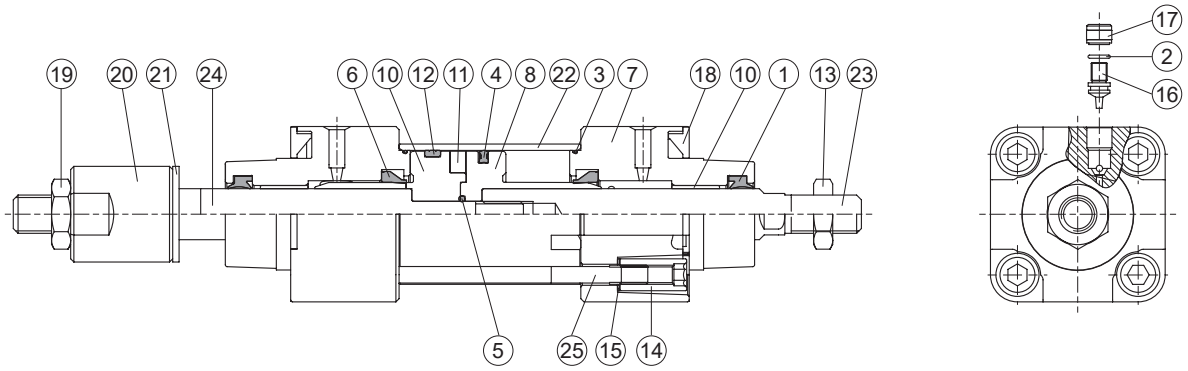
No.	Part name	Material	Q'y	Component parts (inclusion) ø32~ø100	Repair kits (inclusion) ø32~ø100	Note
1	Rod packing	NBR	1	●	●	
2	O-ring	NBR	2	●		
3	O-ring	NBR	2	●	●	
4	Piston packing	NBR	1	●	●	
5	O-ring	NBR	1	●	●	
6	Cushion packing	NBR	2	●	●	
7	Rod cover	Aluminum alloy	1	●		
8	Head cover	Aluminum alloy	1	●		
9	Piston-R	Aluminum alloy	1	●		
10	Piston-H	Aluminum alloy	1	●		
11	Bush	Iron-based alloy	1	●		
12	Magnet ring	Magnet material	1	◎		◎ Option
13	Wear ring	Teflon	1	●		
14	Hex nut	Carbon steel	1	●		
15	Bolt	Carbon steel	1	●		
16	Washer	Carbon steel	1	●		ø32 does not contain item
17	Tie rod nut	Carbon steel	8	●		
18	Tie rod washer	Carbon steel	8	●		
19	Needle valve	Stainless steel	2	●		
20	Insert nut	Stainless steel	2	●		
21	Cover plate	Plastic	2	●		
22	Cylinder tube	Aluminum alloy	1			
23	Piston rod	Carbon steel	1			
24	Tie rod	Stainless steel	4			

20-MCQV2-2* Inside structure & Parts list

ISO-VDMA **STANDARD CYLINDER**

Double rod 21 / 27 type

ø32~ø100



No.	**21** type	**27** type	Part name	Material	Q'y	Component parts (inclusion) ø32~ø100	Repair kits (inclusion) ø32~ø100	Note
1	●	●	Rod packing	NBR	2	●	●	
2	●	●	O-ring	NBR	2	●		
3	●	●	O-ring	NBR	2	●	●	
4	●	●	Piston packing	NBR	1	●	●	
5	●	●	O-ring	NBR	1	●	●	
6	●	●	Cushion packing	NBR	2	●	●	
7	●	●	Rod cover	Aluminum alloy	2	●		
8	●	●	Piston-R	Aluminum alloy	1	●		
9	●	●	Piston-H	Aluminum alloy	1	●		
10	●	●	Bush	Iron-based alloy	2	●		
11	◎	◎	Magnet ring	Magnet material	1	◎		◎ Option
12	●	●	Wear ring	Teflon	1	●		
13	●	●	Screw	Carbor steel	1	●		
14	●	●	Tie rod nut	Carbor steel	8	●		
15	●	●	Tie rod washer	Carbor steel	8	●		
16	●	●	Needle valve	Stainless steel	2	●		
17	●	●	Insert nut	Stainless steel	2	●		
18	●	●	Cover plate	Plastic	2	●		
19	●	●	Hex nut	Carbor steel	1	●		
20		●	Snap ring	Stainless steel	1			
21		●	Gasket	PU	1			
22	●	●	Cylinder tube	Aluminum alloy	1			
23	●	●	Piston rod #1	Carbor steel	1			
24	●	●	Piston rod #2	Carbor steel	1			
25	●	●	Tie rod	Stainless steel	4			

Order example of component parts

20 — CP — MCQV2 — 2 — 40 M

- MATERIAL RESTRICTIONS (Secondary battery)
- MODEL
- Blank: Single rod **2**: Double rod
- TUBE I.D. **32** **40** **50** **63** **80** **100**
- **M**: Magnet

* Order example for **Rc** or **NPT** thread please consult us.

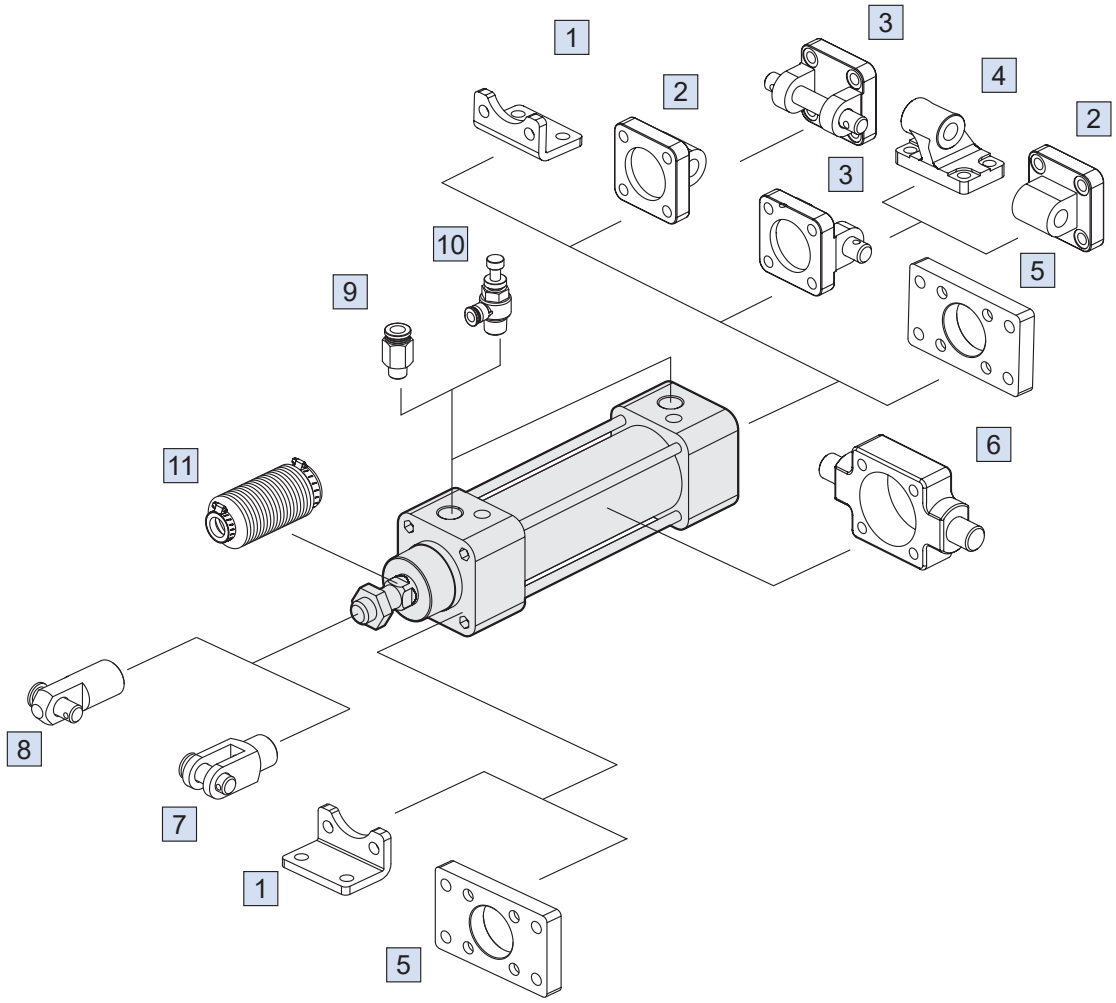
Order example of repair kits

PS — MCQV2 — 2 — 40 — XB6

- MODEL
- Blank: Single rod **2**: Double rod
- TUBE I.D. **32** **40** **50** **63** **80** **100**
- Blank: NBR **XB6**: Heat resistant material

20-MCQV2 Accessories

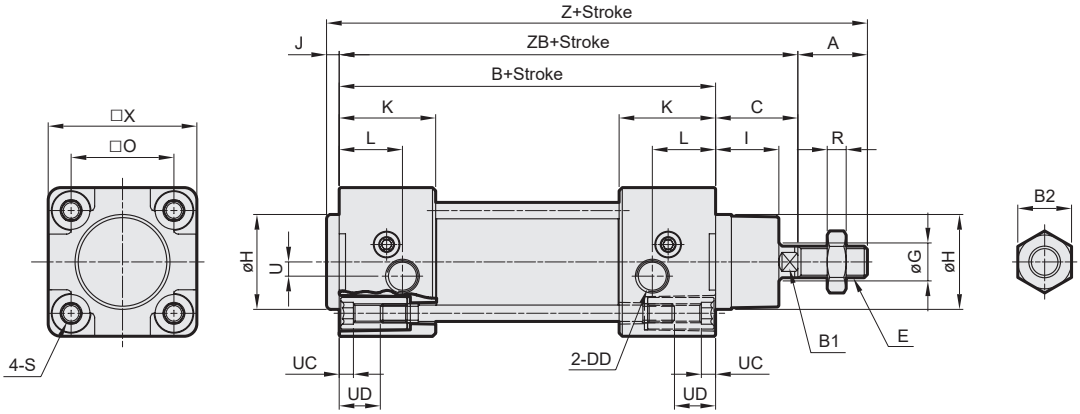
ISO-VDMA **STANDARD CYLINDER**



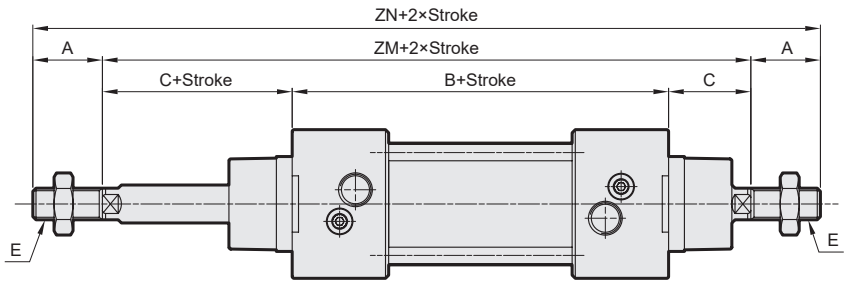
No.	Accessories	Page
1	Mounting accessories LB	3-8
2	Mounting accessories CA	3-10
3	Mounting accessories CB+PIN	3-10, 13
4	Mounting accessories CDB	3-11
5	Mounting accessories FAC / FBC	3-9
6	Mounting accessories TA / TB / TC	3-12
7	Accessories Y+PIN	3-13
8	Accessories I+PIN	3-13

No.	Accessories	Page
9	Fitting PC (PISCO)	4-26
10	Speed controller JSC (PISCO)	4-31
11	Protective bellows kit	–

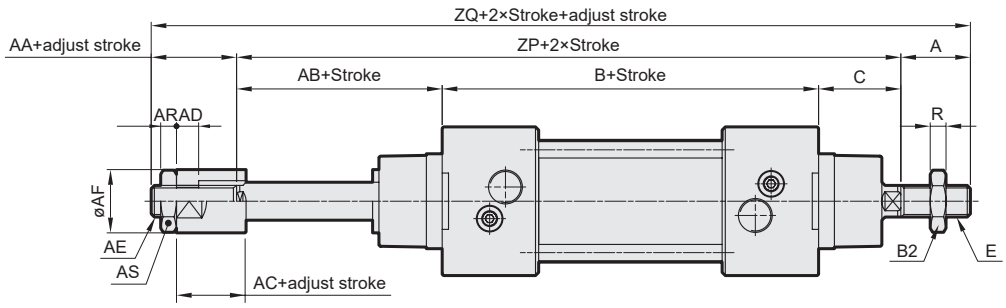
11



21



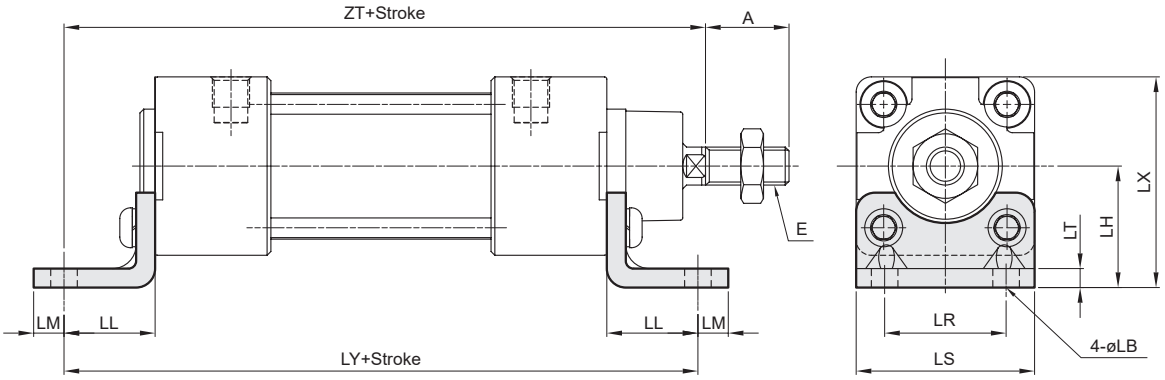
27



Code / Tube I.D.	A	AA	AB	AC	AD	AE	AF	AR	AS	B	B1	B2	C	DD	E	G	H	I	J	K	L	O	R
32	22	16	26	12	7	M10×1.25	20	5	17	94	10	17	26	G1/8	M10×1.25	12	30	20	4	30.5	20	32.5	5
40	24	20	27	12	7	M12×1.25	30	6	19	105	13	19	30	G1/4	M12×1.25	16	35	20.5	4	34	14.5	38	6
50	32	18	34	15	10	M16×1.5	40	8	24	106	16	24	37	G1/4	M16×1.5	20	40	28	4	31	16	46.5	8
63	32	20	32	15	10	M16×1.5	40	8	24	121	16	24	37	G3/8	M16×1.5	20	45	26	4	33	16	56.5	8
80	40	32	41	20	14	M22×1.5	50	13	32	128	21	30	46	G3/8	M20×1.5	25	45	32.5	4	35.5	20.5	72	10
100	40	30	46	20	14	M22×1.5	50	13	32	138	21	30	51	G1/2	M20×1.5	25	55	37.5	4	37	19	89	10

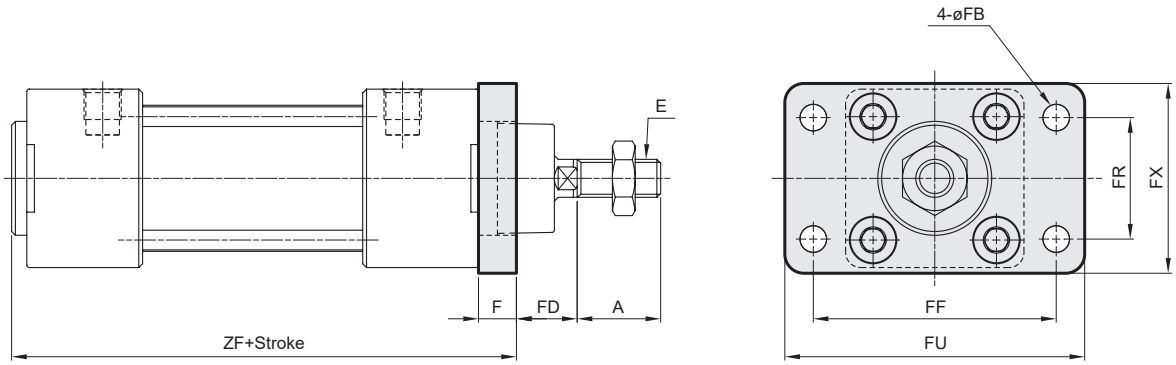
Code / Tube I.D.	S	U	UC	UD	X	Z	ZB	ZM	ZN	ZP	ZQ
32	M6×1.0	4.5	4.5	12	47	146	120	146	190	146	184
40	M6×1.0	5.3	4.5	12	55	163	135	165	213	162	206
50	M8×1.25	8.5	4.5	16	65	179	143	180	244	177	227
63	M8×1.25	8	4.5	16	78	194	158	195	259	190	242
80	M10×1.5	9	4.5	18	95	218	174	220	300	215	287
100	M10×1.5	13	4.5	18	115	233	189	240	320	235	305

LB



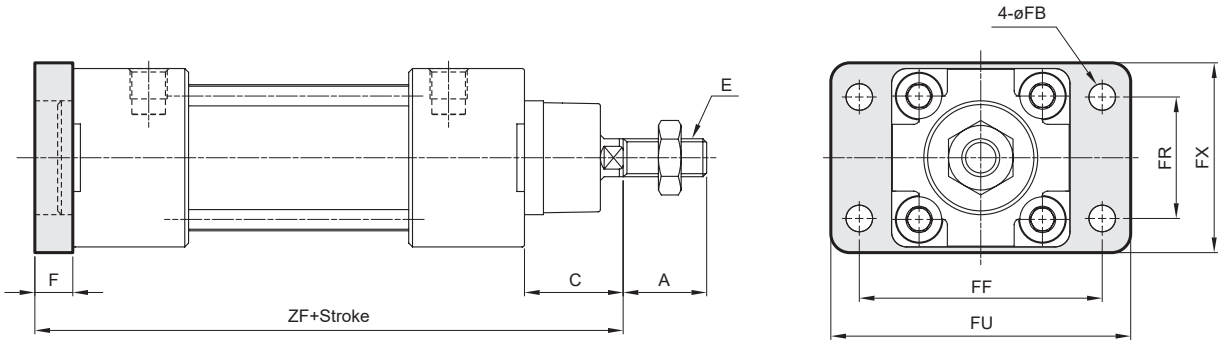
Code / Tube I.D.	A	E	LB	LH	LL	LM	LR	LS	LT	LX	LY	ZT
32	22	M10×1.25	7	32	24	8	32	47	5	55.5	142	144
40	24	M12×1.25	9	36	28	10	36	53	5	63.2	161	163
50	32	M16×1.5	9	45	32	10	45	65	5	77.5	170	175
63	32	M16×1.5	9	50	32	10	50	75	5	89.0	185	190
80	40	M20×1.5	12	63	41	13	63	95	6	110.5	210	215
100	40	M20×1.5	14	71	41	13	75	115	6	128.5	220	230

FAC



Code / Tube I.D.	A	E	F	FB	FD	FF	FR	FU	FX	ZF
32	22	M10×1.25	10	7	16	64	32	79	50	108
40	24	M12×1.25	10	9	20	72	36	93	54	120
50	32	M16×1.5	12	9	25	90	45	112	67	123
63	32	M16×1.5	12	9	25	100	50	127	79	137
80	40	M20×1.5	16	12	30	126	63	158	98	148
100	40	M20×1.5	16	14	35	150	75	185	116	158

FBC

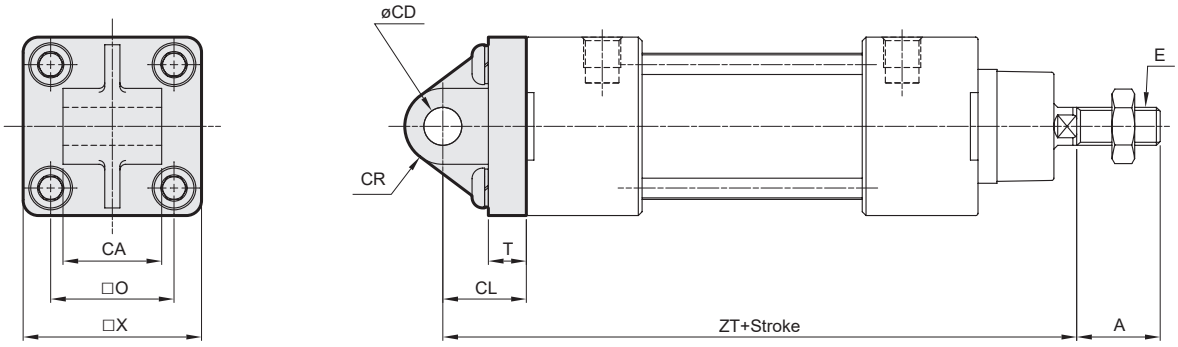


Code / Tube I.D.	A	C	E	F	FB	FF	FR	FU	FX	ZF
32	22	26	M10×1.25	10	7	64	32	79	50	130
40	24	30	M12×1.25	10	9	72	36	93	54	145
50	32	37	M16×1.5	12	9	90	45	112	67	155
63	32	37	M16×1.5	12	9	100	50	127	79	170
80	40	46	M20×1.5	16	12	126	63	158	98	190
100	40	51	M20×1.5	16	14	150	75	185	116	205

20-MCQV2 Mounting accessories ø32~ø100

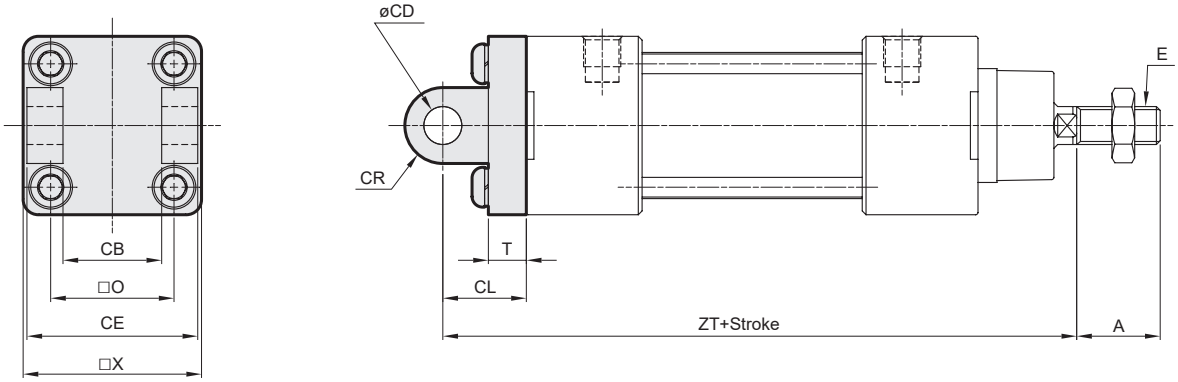
ISO-VDMA **STANDARD CYLINDER**

CA



Code / Tube I.D.	A	CA	CD	CL	CR	E	O	T	X	ZT
32	22	26 $^{-0.1}_{-0.3}$	10H9	22	R10.5	M10×1.25	32.5	10	46	142
40	24	28 $^{-0.1}_{-0.3}$	12H9	25	R12	M12×1.25	38	9	52	160
50	32	32 $^{-0.1}_{-0.3}$	12H9	27	R14	M16×1.5	46.5	9	63.5	170
63	32	40 $^{-0.1}_{-0.3}$	16H9	32	R18	M16×1.5	56.5	9	75	190
80	40	50 $^{-0.1}_{-0.3}$	16H9	36	R17	M20×1.5	72	12	93	210
100	40	60 $^{-0.1}_{-0.3}$	20H9	41	R21	M20×1.5	89	11	112	230

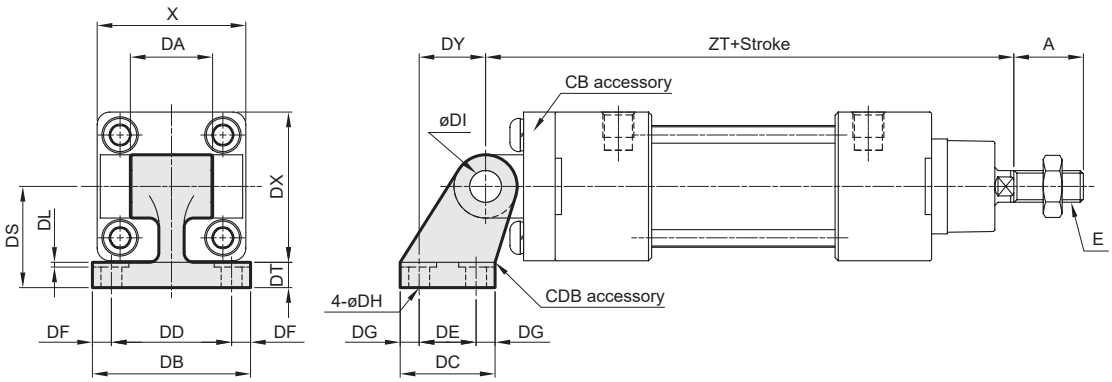
CB



Code / Tube I.D.	A	CB	CD	CE	CL	CR	E	O	T	X	ZT
32	22	26 $^{+0.3}_{+0.1}$	10H9	45	22	R10.5	M10×1.25	32.5	10	46	142
40	24	28 $^{+0.3}_{+0.1}$	12H9	52	25	R12	M12×1.25	38	9	52	160
50	32	32 $^{+0.3}_{+0.1}$	12H9	60	27	R14	M16×1.5	46.5	9	63.5	170
63	32	40 $^{+0.3}_{+0.1}$	16H9	70	32	R18	M16×1.5	56.5	9	75	190
80	40	50 $^{+0.3}_{+0.1}$	16H9	90	36	R17	M20×1.5	72	12	93	210
100	40	60 $^{+0.3}_{+0.1}$	20H9	110	41	R21	M20×1.5	89	11	112	230

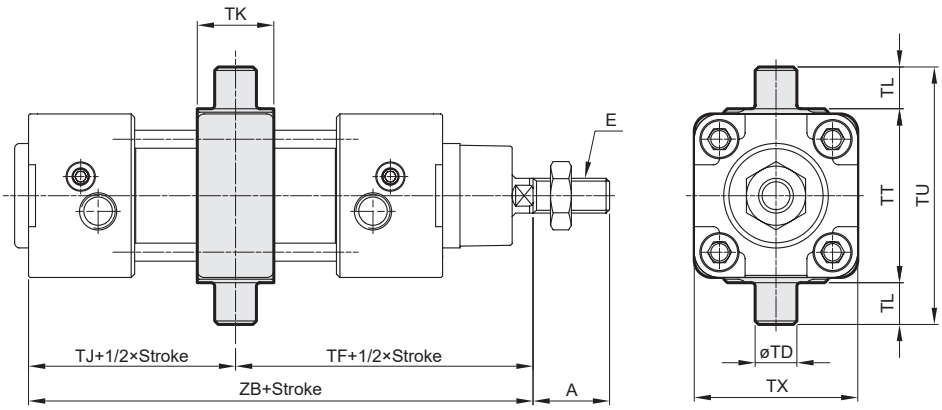
CDB

CB+Pin (Extra purchase)



Code / Tube I.D.	A	DA	DB	DC	DD	DE	DF	DG	DH	DI	DL	DS	DT	DX	DY	E	X	ZT
32	22	26	50	30	38	18	6	6	6.6	10	1.5	32	8	47.5	21	M10×1.25	47	142
40	24	28	53	34	41	22	6	6	6.6	12	1.5	36	10	52.5	24	M12×1.25	55	160
50	32	32	65	45	50	30	7.5	7.5	9	12	1.5	45	12	65.5	33	M16×1.5	65	170
63	32	40	67	50	52	35	7.5	7.5	9	16	1.5	50	12	75.5	37	M16×1.5	78	190
80	40	50	86	60	66	40	10	10	11	16	2.5	63	14	96.5	47	M20×1.5	95	210
100	40	60	96	70	76	50	10	10	11	20	2.5	71	15	113.5	55	M20×1.5	115	230

TC

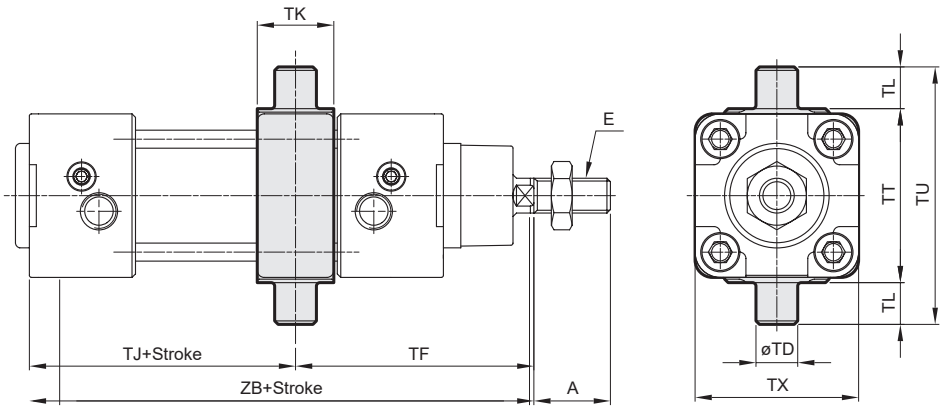


Code / Tube I.D.	A	E	TD	TF	TJ	TK	TL	TT	TU	TX	ZB
32	22	M10×1.25	12e8	73	47	22	12	50	74	47	120
40	24	M12×1.25	16e8	82.5	52.5	22	16	63	95	53	135
50	32	M16×1.5	16e8	90	53	22	16	75	107	66	143
63	32	M16×1.5	20e8	97.5	60.5	28	20	90	130	80	158
80	40	M20×1.5	20e8	110	64	34	20	110	150	106	174
100	40	M20×1.5	25e8	120	69	40	25	132	182	126	189

20-MCQV2 Mounting accessories ø32~ø100

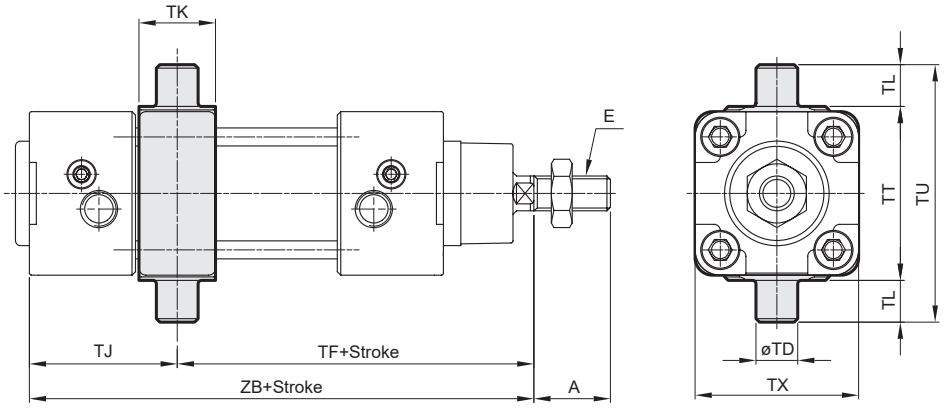
ISO-VDMA **STANDARD CYLINDER**

TA



Code / Tube I.D.	A	E	TD	TF	Without magnet		Magnet		TK	TL	TT	TU	TX
					TJ	ZB	TJ	ZB					
32	22	M10×1.25	12e8	68.5	51.5	120	81.5	150	22	12	50	74	47
40	24	M12×1.25	16e8	76	59	135	89	165	22	16	63	95	53
50	32	M16×1.5	16e8	80	63	143	93	173	22	16	75	107	66
63	32	M16×1.5	20e8	85	73	158	103	188	28	20	90	130	80
80	40	M20×1.5	20e8	99.5	74.5	174	114.5	214	34	20	110	150	106
100	40	M20×1.5	25e8	109	80	189	120	229	40	25	132	182	126

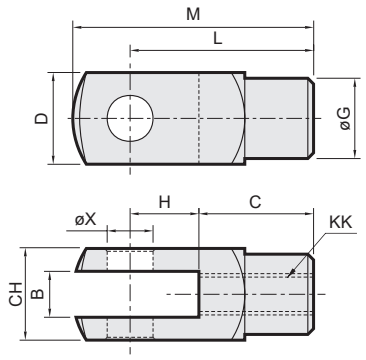
TB



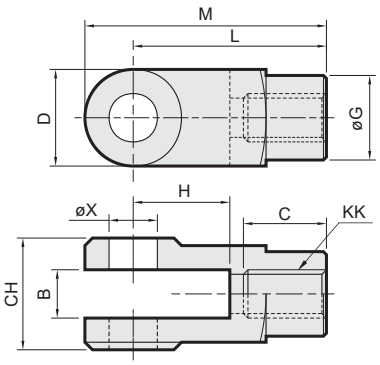
Code / Tube I.D.	A	E	TD	Without magnet		Magnet		TJ	TK	TL	TT	TU	TX
				TF	ZB	TF	ZB						
32	22	M10×1.25	12e8	77.5	120	107.5	150	42.5	22	12	50	74	47
40	24	M12×1.25	16e8	89	135	119	165	46	22	16	63	95	53
50	32	M16×1.5	16e8	100	143	130	173	43	22	16	75	107	66
63	32	M16×1.5	20e8	110	158	140	188	48	28	20	90	130	80
80	40	M20×1.5	20e8	120.5	174	160.5	214	53.5	34	20	110	150	106
100	40	M20×1.5	25e8	131	189	171	229	58	40	25	132	182	126

Y connector

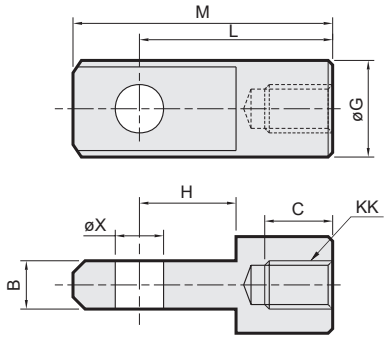
ø32~ø40



ø50~ø100



I connector



Code / Tube I.D.	B		C		CH		D		G		H		KK		L		M		X^{H9}
	Y	I	Y	I	Y	I	Y	I	Y	I	Y	I	Y	I	Y	I	Y	I	
32	$10^{+0.5}_{+0.15}$	$10^{-0.1}_{-0.2}$	20	17	19	–	19	–	ø18	ø20	20	15	M10×1.25		40	40	52	52	$ø10^{+0.04}_{0}$
40	$12^{+0.5}_{+0.15}$	$12^{-0.1}_{-0.2}$	24	21	22	–	22	–	ø20	ø24	24	18	M12×1.25		48	48	62	62	$ø12^{+0.04}_{0}$
50	$16^{+0.3}_{+0.1}$	$16^{-0.1}_{-0.3}$	28	23	32	–	32	–	ø28	ø32	32	32	M16×1.5		64	64	89	86	$ø16^{+0.04}_{0}$
63	$16^{+0.3}_{+0.1}$	$16^{-0.1}_{-0.3}$	28	23	32	–	32	–	ø28	ø32	32	32	M16×1.5		64	64	89	86	$ø16^{+0.04}_{0}$
80	$20^{+0.3}_{+0.1}$	$20^{-0.1}_{-0.3}$	33	30	45	–	40	–	ø36	ø36	40	40	M20×1.5		80	80	100	108	$ø20^{+0.05}_{0}$
100	$20^{+0.3}_{+0.1}$	$20^{-0.1}_{-0.3}$	33	30	45	–	40	–	ø36	ø36	40	40	M20×1.5		80	80	100	108	$ø20^{+0.05}_{0}$

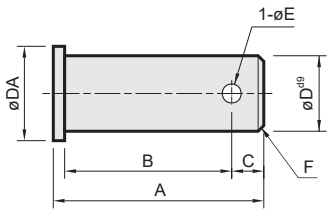
PIN

Order example

20 –PIN – MCQV – 40 – Y – P

- 20: MATERIAL RESTRICTIONS (Secondary battery)
- PIN: PIN
- 40: TUBE I.D. **32~100**
- Y: TYPE — **Y**: for Y & I connector; **CB**: for CA & CB accessory
- P: **P**: With split pin

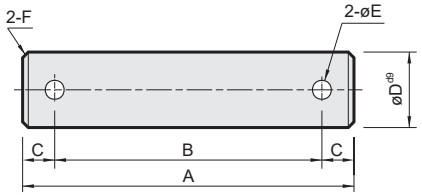
P



for Y & I connector

Code / Tube I.D.	A	B	C	D^{d9}	DA	E	F	Split pin
32	30	25	3.5	$ø10^{-0.06}_{-0.09}$	14	3.2	1	3.2×20 L
40	37	30	5	$ø12^{-0.06}_{-0.09}$	16	3.2	1	3.2×20 L
50,63	47	37	7	$ø16^{-0.05}_{-0.09}$	22	4	1	4×25 L
80,100	62	50	8	$ø20^{-0.06}_{-0.11}$	30	5	1.5	5×35 L

P



for CA & CB

Code / Tube I.D.	A	B	C	D^{d9}	E	F	Split pin
32	69	55	7	$ø10^{-0.05}_{-0.09}$	4	1.0	4×20 L
40	76	62	7	$ø12^{-0.05}_{-0.09}$	4	1.0	4×20 L
50	84	70	7	$ø12^{-0.05}_{-0.09}$	4	1.0	4×20 L
63	94	80	7	$ø16^{-0.05}_{-0.09}$	4	1.0	4×30 L
80	117	100	8.5	$ø16^{-0.05}_{-0.09}$	5	1.5	5×30 L
100	137	120	8.5	$ø20^{-0.05}_{-0.09}$	5	1.5	5×35 L

20-MCJQ series

COMPACT CYLINDER

Features

- Ultra Compact, light weight and space saving cylinder.
- Wide range of bore sizes and strokes (12mm~100mm).
- Single and double acting available.
- Ideal for use in machinery where space is limited and incorporating sensor groove which enables flush fitting of sensors.
- Sensor can be mounted on any one of three faces on 12 and 16 bore and on four faces on 20~100 bore.

Specification

Model	20-MCJQ									
Acting type	Double acting / Single acting							Double		
Tube I.D. (mm)	12	16	20	25	32	40	50	63	80	100
Port size	M5×0.8				Rc1/8		Rc1/4		Rc3/8	
Medium	Air									
Operating perssure range (MPa) Double acting	0.07~1		0.05~1							
Operating perssure range (MPa) Single acting	0.2~1		0.15~1		0.1~1			–		
Proof pressure	1.5 MPa									
Ambient temperature	-5°C~+60°C (No freezing)									
Available speed range	50~500 mm/sec									
Sensor switch (*)	RCB, RCE, RCE1, RDEP									

* RCB, RCE, RCE1, RDEP specification, please refer to page 8-8, 10, 14. RCB sensor switch only for tube I.D. ø50~100.

Single acting – Table for standard stroke

Tube I.D.	Standard stroke (mm)
ø12,16,20,25,32,40	5,10
ø50	5,10,15,20

Double acting – Table for standard stroke

Tube I.D.	Standard stroke	Long stroke (mm)
ø12,16	5,10,15,20,25,30	35,40,45,50,75,100
ø20	5,10,15,20,25,30, 35,40,45,50	75,100,125,150,175,200
ø25		75,100,125,150,175,200,250,300
ø32~80	5,10,15,20,25,30, 35,40,45,50,75,100	125,150,175,200,250,300
Tube I.D.	Standard stroke (mm)	
ø100	5,10,15,20,25,30,35,40,45,50,75,100	

- Stroke out of specification is also available.
- Please consult us if stroke out of specification.

Mounting accessories

* Only for double acting / single rod type.

20 — FAC — MCJQ — 20

- 20: MATERIAL RESTRICTIONS (Secondary battery)
- FAC: MOUNTING TYPE
- MCJQ: MODEL
- 20: TUBE I.D.

MOUNTING TYPE

	LB
	FAC
	FBC

CB — MCJQ — 20

- CB: MOUNTING TYPE
- MCJQ: MODEL
- 20: TUBE I.D.

MOUNTING TYPE

	CB
	RF

Order example

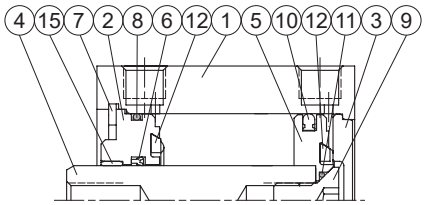
20 — MCJQ — 12 — 20 — 25 M — F — G

- 20: MATERIAL RESTRICTIONS (Secondary battery)
- MCJQ: MODEL
- 12: TUBE I.D
- 20: STYLE
  - **1**: Single rod
  - **2**: Double rod
- 25: STROKE
- M: **M**: Magnet
- F: Blank: Standard; **F**: Rear flange
- G: PORT THREAD
  - Blank: M5×0.8 (for ø12~ø25)
  - Blank: Rc thread; **G**: G thread; **NPT**: NPT thread (for ø32~ø100)

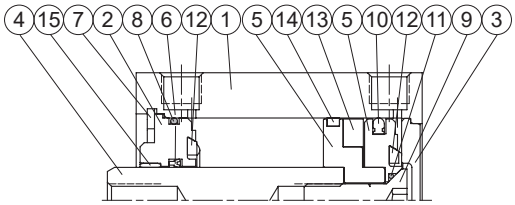
Code		Symbol	Description
1	1		Double acting / Male thread
1	2		Double acting / Female thread
1	3		Single acting / Normally extended male thread
1	4		Single acting / Normally extended female thread
1	5		Single acting / Normally returned male thread
1	6		Single acting / Normally returned female thread

2	1		Double rod / Male thread
2	2		Double rod / Female thread
2	3		Single acting / Double rod / Male thread
2	4		Single acting / Double rod / Female thread
2	7		Double rod / Adjustable male thread
2	8		Double rod / Adjustable female thread

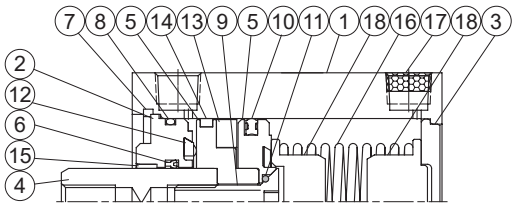
Double acting



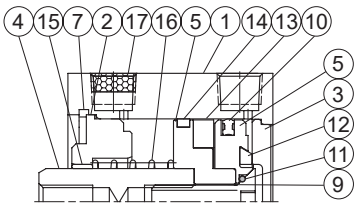
Double acting (with magnet)



Single acting Normally extended



Single acting Normally returned



Material

No.	Part name \ Tube I.D.	12	16	20	25	32	40	50	63	80	100	Note	Q'y	Component parts (inclusion)	Repair kits (inclusion)
1	Body	Aluminum alloy										Hard anodized	1		
2	Rod cover	Aluminum alloy										*2	1	●	
3	End cover	Aluminum alloy										Anodized	1	●	
4	Piston rod With magnet	Stainless steel					Carbor steel						1		
	Piston rod Without magnet	SUS	Carbor steel										1		
5	Piston	Aluminum alloy										ø12~32 anodized	1	●	
6	Rod packing	NBR											1	●	●
7	Snap ring	Stainless steel								*1			1	●	
8	Cover ring	NBR											1	●	●
9	Piston bolt	Stainless steel					SCM						1	●	
10	Piston packing	NBR											1	●	●
11	Piston gasket	NBR											1	●	●
12	Cushion packing	NBR											2	●	●
13	Magnet	Magnet											1	●	
14	Wear ring	–					Teflon						1	●	
15	Bush	–					Iron-based alloy						1	●	
16	Spring	SWP							–				1	●	
17	Silencer	Stainless steel							–				1	●	
18	Spring holder	Aluminum alloy						–					2	●	

* 1.Spring steel *2. ø12~ø32 hard anodized, ø40~ø100 anodized.

Seal kit

	Rod packing		Piston packing		Cover ring		Piston gasket
Acting type	Double acting / Normally extended	Normally retruned	Double acting	Single acting	Double acting / Normally extended	Normally retruned	Double acting Single acting
Q'y	1	0	1	1	1	0	1
12	KSYR-6	–	OPA-12	OPA-12	S-11	–	d4×w1
16	KSYR-8	–	OPA-16	OPA-16	S-14	–	d5×w1
20	KSYR-10A	–	OPA-20	OPA-20	S-18	–	d6×w1
25	KSYR-12	–	OPA-25	OPA-25	S-22,4	–	d8×w1
32	KSYR-16	–	OPA-32	OPA-32	S-28	–	S-9
40	KSYR-16	–	OPA-40	OPA-40	S-36	–	S-10
50	KSYR-20	–	OPA-50	OPA-50	S-46	–	S-16
63	KSYR-20	–	OPA-63	–	S-60	–	S-16
80	ORA-25	–	OPA-80	–	G-75	–	d20×w1
100	ORA-30	–	OPA-100	–	G-95	–	S-26

Order example

Component parts

Tube I.D.	Component parts
ø12	**20-CP-MCJQ-12(M)**
ø16	**20-CP-MCJQ-16(M)**
ø20	**20-CP-MCJQ-20(M)**
ø25	**20-CP-MCJQ-25(M)**
ø32	**20-CP-MCJQ-32(M)**
ø40	**20-CP-MCJQ-40(M)**
ø50	**20-CP-MCJQ-50(M)**
ø63	**20-CP-MCJQ-63(M)**
ø80	**20-CP-MCJQ-80(M)**
ø100	**20-CP-MCJQ-100(M)**

M: With magnet

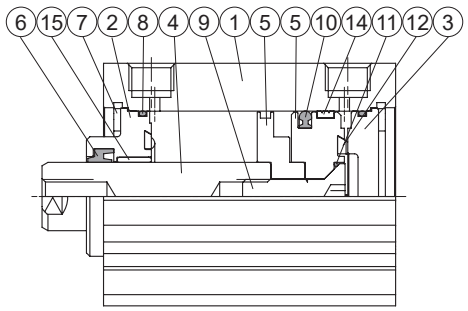
Repair kits

Tube I.D.	Repair kits
ø12	**PS-MCJQ-12**
ø16	**PS-MCJQ-16**
ø20	**PS-MCJQ-20**
ø25	**PS-MCJQ-25**
ø32	**PS-MCJQ-32**
ø40	**PS-MCJQ-40**
ø50	**PS-MCJQ-50**
ø63	**PS-MCJQ-63**
ø80	**PS-MCJQ-80**
ø100	**PS-MCJQ-100**

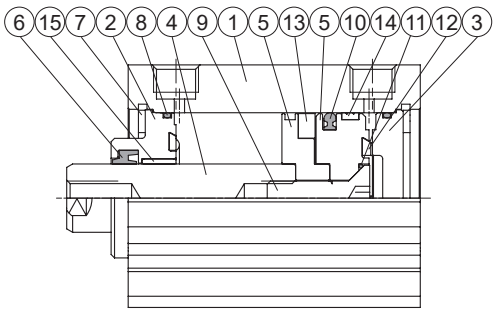
20-MCJQ Inside structure & Parts list – Single rod / Long stroke

COMPACT CYLINDER

Long stroke



Long stroke
(with magnet)



Long stroke – Material

No.	Part name \ Tube I.D.	12	16	20	25	32	40	50	63	80	Note	Q'y	Component parts (inclusion)	Repair kits (inclusion)
1	Body	Aluminum alloy									Hard anodized	1		
2	Rod cover	Aluminum alloy									*2	1	●	
3	End cover	Aluminum alloy									Anodized	1	●	
4	Piston rod With magnet	Stainless steel				Carbor steel						1		
	Piston rod Without magnet	SUS	Carbor steel									1		
5	Piston	Aluminum alloy									ø12~32 anodized	1	●	
6	Rod packing	NBR										1	●	●
7	Snap ring	Stainless steel								*1		2	●	
8	Cover ring	NBR										2	●	●
9	Piston bolt	Stainless steel				SCM						1	●	
10	Piston packing	NBR										1	●	●
11	Piston gasket	NBR										1	●	●
12	Cushion packing	NBR										2	●	●
13	Magnet	Magnet										1	●	
14	Wear ring	Teflon										1	●	
15	Bush	–				Iron-based alloy						1	●	

*1.Spring steel *2. ø12~ø32 hard anodized, ø40~ø80 anodized.

Long stroke – Seal kit

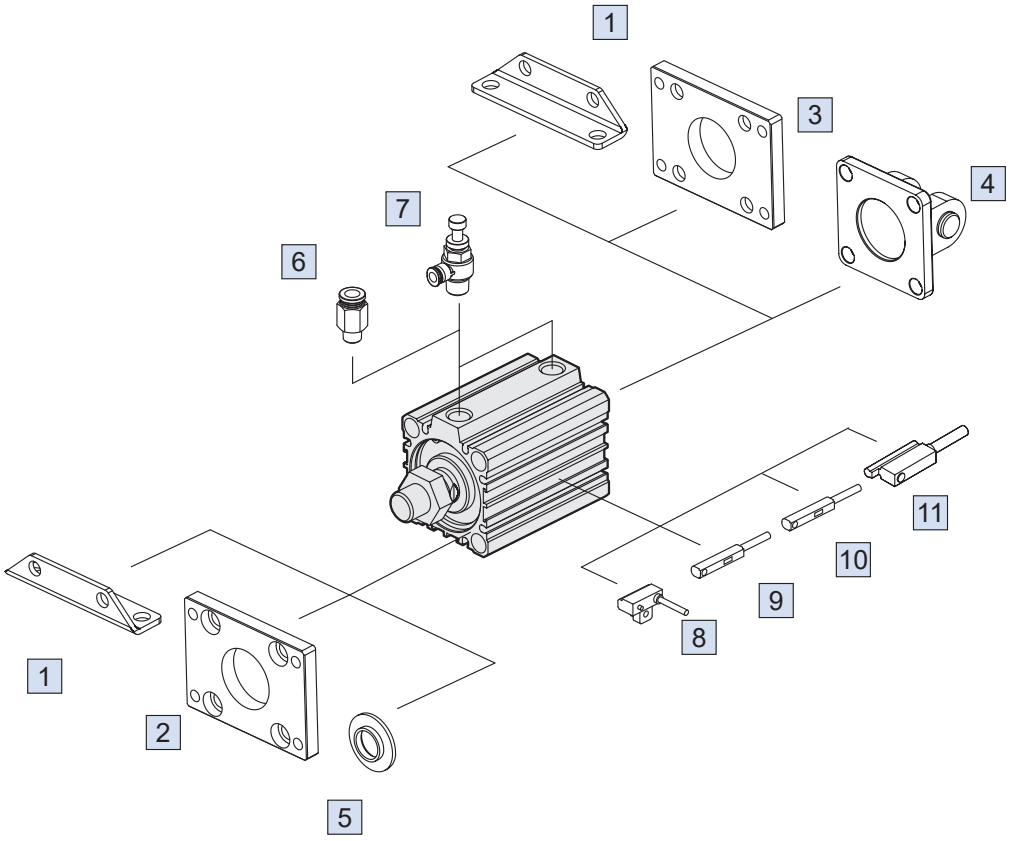
	Rod packing	Piston packing	Cover ring		Piston gasket
Acting type	Double acting				
Q'y	1	1	2		1
12	KSYR-6	OPA-12	S-11		d4×w1
16	KSYR-8	OPA-16	S-14		d5×w1
20	KSYR-10A	OPA-20	S-18		d6×w1
25	KSYR-12	OPA-25	S-22		d8×w1
32	KSYR-16	OPA-32	d28×w2		S-9
40	ORA-16	OPA-40	S-36		S-10
50	ORA-20	OPA-50	S-46		S-16
63	ORA-20	OPA-63	S-60		S-16
80	ORA-25	OPA-80	AS-41	G-75	d20×w1

Order example

Component parts / Repair kits

Tube I.D.	Component parts	Repair kits
ø12	**20-CPL-MCJQ-12(M)**	**PSL-MCJQ-12**
ø16	**20-CPL-MCJQ-16(M)**	**PSL-MCJQ-16**
ø20	**20-CPL-MCJQ-20(M)**	**PSL-MCJQ-20**
ø25	**20-CPL-MCJQ-25(M)**	**PSL-MCJQ-25**
ø32	**20-CPL-MCJQ-32(M)**	**PSL-MCJQ-32**
ø40	**20-CPL-MCJQ-40(M)**	**PSL-MCJQ-40**
ø50	**20-CPL-MCJQ-50(M)**	**PSL-MCJQ-50**
ø63	**20-CPL-MCJQ-63(M)**	**PSL-MCJQ-63**
ø80	**20-CPL-MCJQ-80(M)**	**PSL-MCJQ-80**

M: With magnet



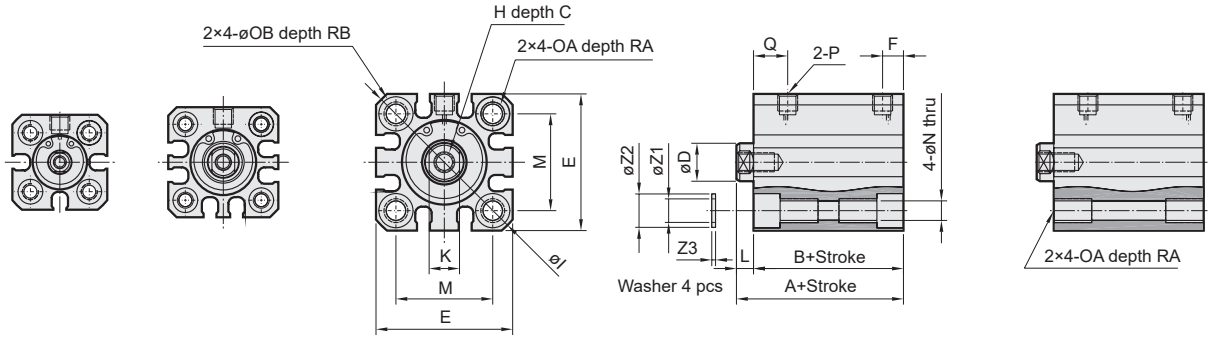
No.	Accessories	Page
1	Mounting accessories LB	3-30, 32
2	Mounting accessories FAC	3-30, 33
3	Mounting accessories FBC	3-31, 34
4	Mounting accessories CB+PIN	3-31, 35, 36
5	Mounting accessories RF	3-36
6	Fitting PC (PISCO)	4-26
7	Speed controller JSC (PISCO)	4-31

No.	Accessories	Page
8	Sensor switch RCB	4-2
9	Sensor switch RCE	4-3
10	Sensor switch RCE1	4-4
11	Sensor switch RDEP	4-7

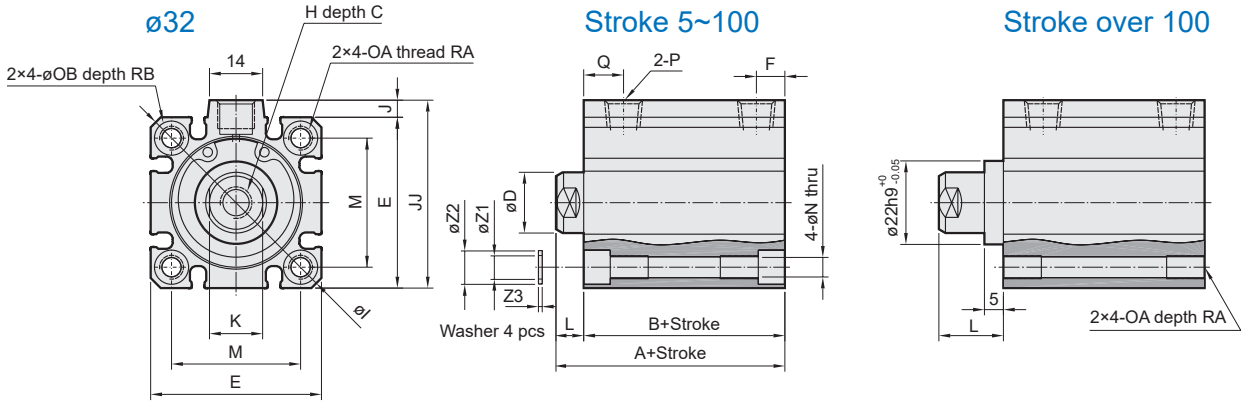
20-MCJQ Dimensions – Double acting ø12~ø32

COMPACT CYLINDER

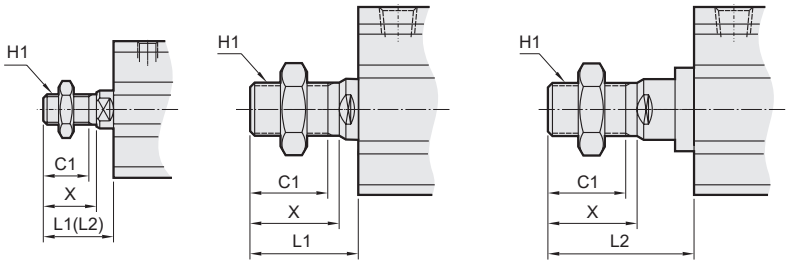
ø12 ø16 ø20, ø25 Stroke 5~100 Stroke over 100



ø32 Stroke 5~100 Stroke over 100



ø12~25 ø32 for stroke 5~100 ø32 for stroke over 100



20-MCJQ-11 male thread size

Code / Tube I.D.	C1	H1	L1	L2	X
12	9	M5×0.8	14	24	10.5
16	10	M6×1.0	15.5	25.5	12
20	12	M8×1.25	18.5	28.5	14
25	15	M10×1.25	22.5	32.5	17.5
32	20.5	M14×1.5	28.5	38.5	23.5

* L1: Standard stroke, L2: Long stroke

ø12~25

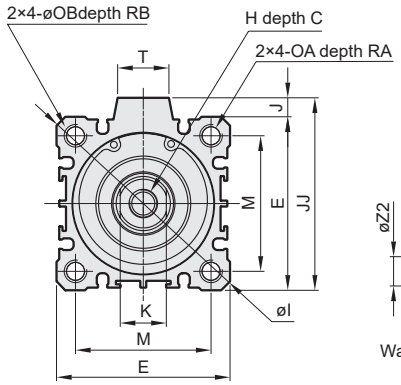
Code / Tube I.D.	Standard stroke									Long stroke					C	D	E	H	I	K	M	N	OA	OB	P	Q	RA	RB	Z1	Z2	Z3
	Stroke range	Without magnet				Magnet				Stroke range	A	B	F	L																	
		A	B	F	L	A	B	F	L																							
12	5~30	20.5	17	5	3.5	25.5	22	5	3.5	31~100	45.5	32	7.5	13.5	6	6	25	M3×0.5	32	5	15.5	3.5	M4×0.7	6.5	M5×0.8	7.5	7	4	4.2	6.3	0.5
16	5~30	20.5	17	5	3.5	25.5	22	5	3.5	31~100	45.5	32	7.5	13.5	8	8	29	M4×0.7	38	6	20	3.5	M4×0.7	6.5	M5×0.8	7.5	7	4	4.2	6.3	0.5
20	5~50	24	19.5	5.5	4.5	34	29.5	5.5	4.5	51~200	55.5	41	9	14.5	7	10	36	M5×0.8	47	8	25.5	5.4	M6×1.0	9	M5×0.8	9	10	7	6.2	8.8	1
25	5~50	27.5	22.5	5.5	5	37.5	32.5	5.5	5	51~300	59	44	11	15	12	12	40	M6×1.0	52	10	28	5.4	M6×1.0	9	M5×0.8	11	10	7	6.2	8.8	1

ø32

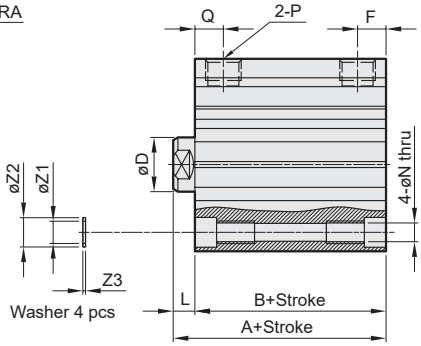
Code / Tube I.D.	Standard stroke								Long stroke						P	C	D	E	H	I	J	JJ	K	M	N	OA	OB	RA	RB	Z1	Z2	Z3
	Stroke range	Without magnet		Magnet		F	L	Q	Stroke range	A	B	F	L	Q																		
		A	B	A	B																											
32	5~50	30	23	40	33	7.5	7	10.5	101 ~300	62.5	45.5	12.5	17	12.5	Rc1/8 (*1)	13	16	45	M8×1.25	60	4.5	49.5	14	34	5.5	M6×1.0	9	10	7	6.2	8.8	1
	51~100	40	33	40	33	7.5	7	10.5																								

*1. Without magnet with stroke=5mm, P=M5×0.8, Q=11.5, F=5.5

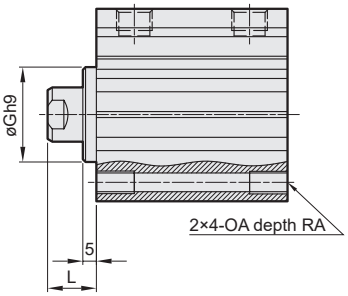
ø50~ø100



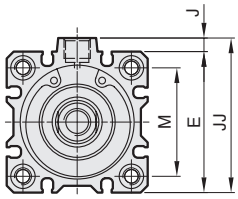
Stroke 5~100



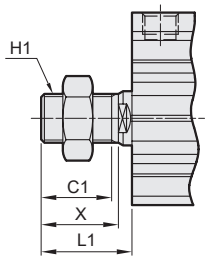
Stroke over 100



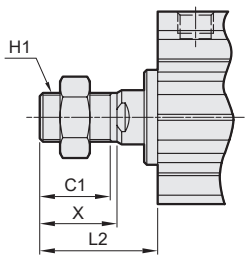
ø40



ø40~ø100 (Stroke 5~100)



ø40~ø80 (Stroke over 100)



20-MCJQ-11 male thread size

Code / Tube I.D.	C1	H1	L1	L2	X
40	20.5	M14×1.5	28.5	38.5	23.5
50	26	M18×1.5	33.5	43.5	28.5
63	26	M18×1.5	33.5	43.5	28.5
80	32.5	M22×1.5	43.5	53.5	35.5
100	32.5	M26×1.5	43.5	–	35.5

Code / Tube I.D.	Standard stroke								Long stroke					
	Stroke range	Without magnet A	Without magnet B	Magnet A	Magnet B	F	L	Q	Stroke range	A	B	F	L	Q
40	5~50	36.5	29.5	46.5	39.5	8	7	11	125~300	72	55	14	17	14
	75,100	46.5	39.5											
50	5~50	38.5	30.5	48.5	40.5	10.5	8	10.5	125~300	73.5	55.5	14	18	14
	75,100	48.5	40.5											
63	5~50	44	36	54	46	10.5	8	15	125~300	75	57	16.5	18	16.5
	75,100	54	46											
80	5~50	53.5	43.5	63.5	53.5	12.5	10	16	125~300	86	66	19	20	19
	75,100	63.5	53.5											
100	5~50	65	53	75	63	13	12	23	–					
	75,100	75	63											

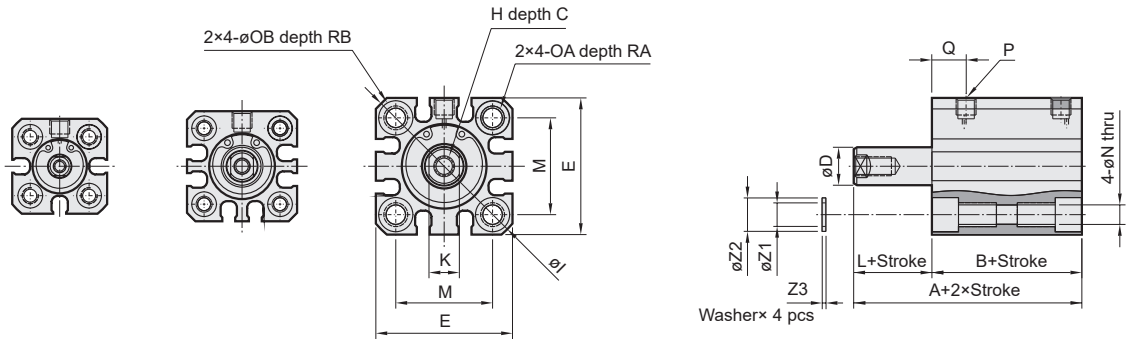
Code / Tube I.D.	C	D	E	G h9	H	I	J	JJ	K	M	N	OA	OB	P	RA	RB	T	Z1	Z2	Z3
40	13	16	52	28 $^{+0}_{-0.052}$	M8×1.25	70	5	57	14	40	5.5	M6×1.0	9	Rc1/8	10	7	14	6.2	8.8	1
50	15	20	64	35 $^{+0}_{-0.062}$	M10×1.5	86	7	71	17	50	6.6	M8×1.25	11	Rc1/4 (*1)	14	8	19	8.2	10.8	1
63	15	20	77	35 $^{+0}_{-0.062}$	M10×1.5	103	7	84	17	60	9	M10×1.5	14	Rc1/4 (*2)	18	10.5	19	10.2	13.8	1
80	21	25	98	43 $^{+0}_{-0.062}$	M16×2.0	132	6	104	22	77	11	M12×1.75	17.5	Rc3/8 (*3)	22	13.5	26	12.2	17.3	2
100	27	30	117	–	M20×2.5	156	6.5	123.5	27	94	11	M12×1.75	17.5	Rc3/8 (*3)	22	13.5	26	12.2	17.3	2

*1. Without magnet with stroke=5mm, P=Rc1/8, Q=12, F=8
*2. Without magnet with stroke=5mm, P=Rc1/8
*3. Without magnet with stroke=5mm, P=Rc1/4

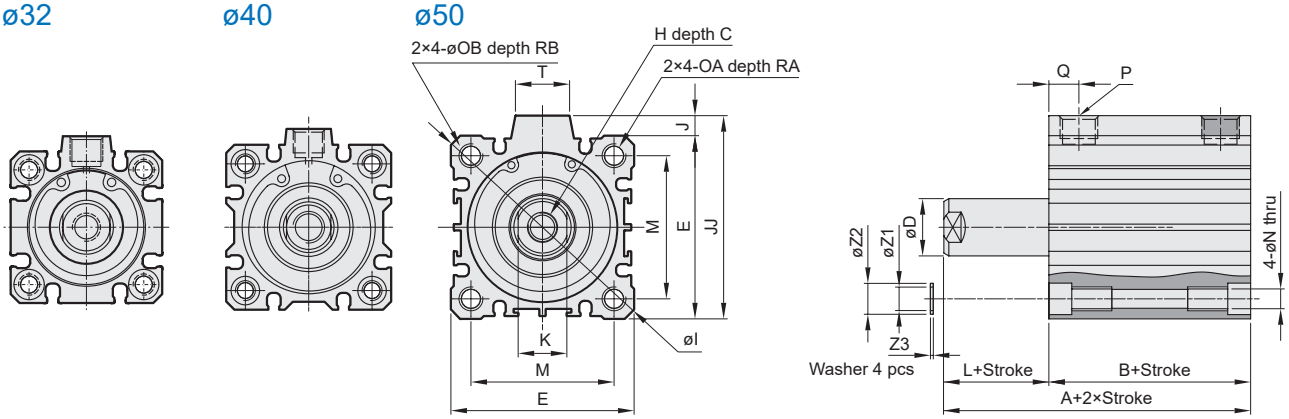
20-MCJQ Dimensions – Normally extented ø12~ø50

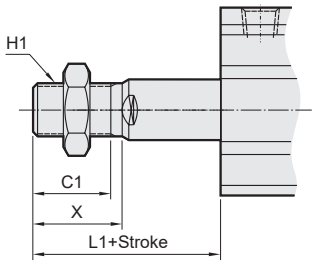
COMPACT CYLINDER

ø12 ø16 ø20, ø25



ø32 ø40 ø50





* L1: Standard stroke

20-MCJQ-13 male thread size

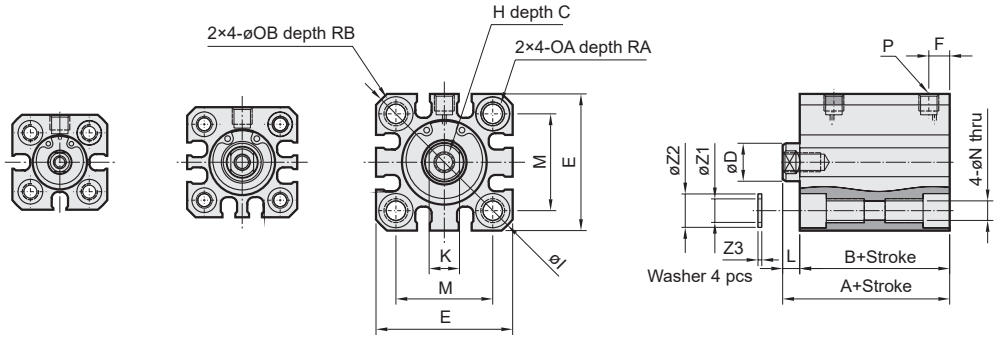
Code / Tube I.D.	C1	H1	L1	X
12	9	M5×0.8	14	10.5
16	10	M6×1.0	15.5	12
20	12	M8×1.25	18.5	14
25	15	M10×1.25	22.5	17.5
32	20.5	M14×1.5	28.5	23.5
40	20.5	M14×1.5	28.5	23.5
50	26	M18×1.5	33.5	28.5

Note: The value **B** of ø12~ø40 type is greater then double acting type.

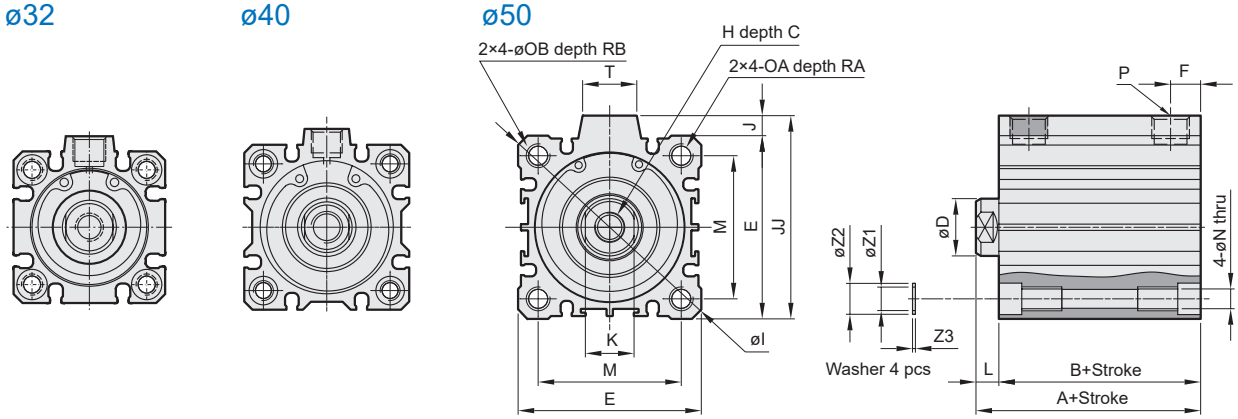
Code / Tube I.D.	Standard stroke					C	D	E	H	I	J	JJ	K	L	M	N	OA	OB	P	Q	RA	RB	T	Z1	Z2	Z3
	Stroke range	Without magnet		Magnet																						
		A	B	A	B																					
12	5,10	30.5	27	35.5	32	6	6	25	M3×0.5	32	–	–	5	3.5	15.5	3.5	M4×0.7	6.5	M5×0.8	7.5	7	4	–	4.2	6.3	0.5
16	5,10	35.5	32	40.5	37	8	8	29	M4×0.7	38	–	–	6	3.5	20	3.5	M4×0.7	6.5	M5×0.8	7.5	7	4	–	4.2	6.3	0.5
20	5,10	34	29.5	44	39.5	7	10	36	M5×0.8	47	–	–	8	4.5	25.5	5.4	M6×1.0	9	M5×0.8	9	10	7	–	6.2	8.8	1
25	5,10	47.5	42.5	57.5	52.5	12	12	40	M6×1.0	52	–	–	10	5	28	5.4	M6×1.0	9	M5×0.8	11	10	7	–	6.2	8.8	1
32	5,10	55	48	65	58	13	16	45	M8×1.25	60	4.5	49.5	14	7	34	5.5	M6×1.0	9	Rc1/8	10.5	10	7	14	6.2	8.8	1
40	5,10	61.5	54.5	71.5	64.5	13	16	52	M8×1.25	70	5	57	14	7	40	5.5	M6×1.0	9	Rc1/8	11	10	7	14	6.2	8.8	1
50	5~20	38.5	30.5	48.5	40.5	15	20	64	M10×1.5	86	7	71	17	8	50	6.5	M8×1.25	11	Rc1/4 (*1)	10.5	14	8	19	8.2	10.8	1

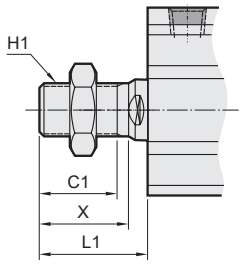
*1. Without magnet with stroke=5mm, P=Rc1/8, Q=12

ø12 ø16 ø20, ø25



ø32 ø40 ø50





* L1: Standard stroke

20-MCJQ-15 male thread size

Code / Tube I.D.	C1	H1	L1	X
12	9	M5×0.8	14	10.5
16	10	M6×1.0	15.5	12
20	12	M8×1.25	18.5	14
25	15	M10×1.25	22.5	17.5
32	20.5	M14×1.5	28.5	23.5
40	20.5	M14×1.5	28.5	23.5
50	26	M18×1.5	33.5	28.5

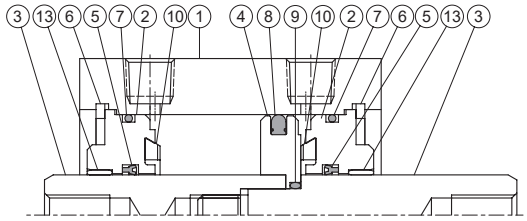
Code / Tube I.D.	Standard stroke					C	D	E	F	H	I	J	JJ	K	L	M	N	OA	OB	P	RA	RB	T	Z1	Z2	Z3
	Stroke range	Without magnet		Magnet																						
		A	B	A	B																					
12	5,10	20.5	17	25.5	22	6	6	25	5	M3×0.5	32	–	–	5	3.5	15.5	3.5	M4×0.7	6.5	M5×0.8	7	4	–	4.2	6.3	0.5
16	5,10	20.5	17	25.5	22	8	8	29	5	M4×0.7	38	–	–	6	3.5	20	3.5	M4×0.7	6.5	M5×0.8	7	4	–	4.2	6.3	0.5
20	5,10	24	19.5	34	29.5	7	10	36	5.5	M5×0.8	47	–	–	8	4.5	25.5	5.4	M6×1.0	9	M5×0.8	10	7	–	6.2	8.8	1
25	5,10	27.5	22.5	37.5	32.5	12	12	40	5.5	M6×1.0	52	–	–	10	5	28	5.4	M6×1.0	9	M5×0.8	10	7	–	6.2	8.8	1
32	5,10	30	23	40	33	13	16	45	7.5	M8×1.25	60	4.5	49.5	14	7	34	5.5	M6×1.0	9	Rc1/8 (*1)	10	7	14	6.2	8.8	1
40	5,10	36.5	29.5	46.5	39.5	13	16	52	8	M8×1.25	70	5	57	14	7	40	5.5	M6×1.0	9	Rc1/8	10	7	14	6.2	8.8	1
50	5~20	38.5	30.5	48.5	40.5	15	20	64	10.5	M10×1.5	86	7	71	17	8	50	6.5	M8×1.25	11	Rc1/4 (*2)	14	8	19	8.2	10.8	1

*1. Without magnet with stroke=5mm, P=M5×0.8, F=5.5
*2. Without magnet with stroke=5mm, P=Rc1/8, F=8

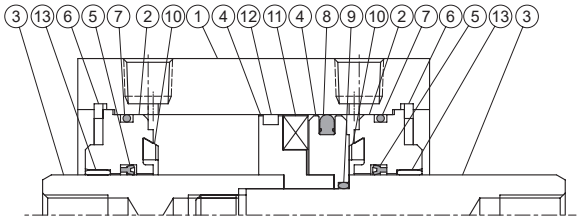
20-MCJQ Inside structure & Parts list – Double rod

COMPACT CYLINDER

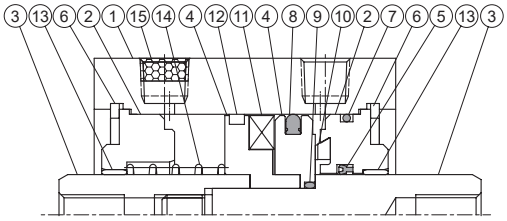
Double acting



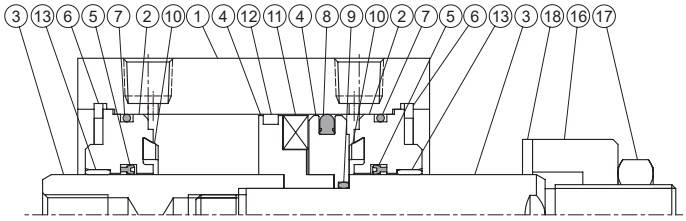
Double acting (with magnet)



Single acting



Adjustable stroke



Material

No.	Tube I.D. / Part name		12	16	20	25	32	40	50	63	80	100	Note	Q'y	Component parts (inclusion)	Repair kits (inclusion)
1	Body		Aluminum alloy										Hard anodized	1		
2	Rod cover		Aluminum alloy										*2	2	●	
3	Piston rod	With magnet	Stainless steel					Carbor steel						2		
		Without magnet	SUS					Carbor steel						2		
4	Piston		Aluminum alloy											1	●	
5	Rod packing		NBR											2	●	●
6	Snap ring		Stainless steel								*1			2	●	
7	Cover ring		NBR										*3	2	●	●
8	Piston packing		NBR											1	●	●
9	Piston gasket		NBR											1	●	●
10	Cushion packing		NBR											2	●	●
11	Magnet		Magnet											1	●	
12	Wear ring		–					Teflon						1	●	
13	Bush		–					Iron-based alloy						2	●	
14	Spring		SWP							–				1	●	
15	Silencer		Stainless steel							–				1	●	
16	Adjustble nut		Stainless steel											1	●	
17	Hexagon nut		Stainless steel											1	●	
18	Cushion packing		PU											1	●	

*1. Spring steel *2.ø12~ø32 hard anodized, ø40~ø100 anodized. *3. Single acting (Q'y=1 pc)

Seal kit

	Rod packing		Piston packing		Cover ring		Piston gasket
Acting type	Double acting	Single acting	Double acting	Single acting	Double acting	Single acting	Double acting Single acting
Q'y	2	1	1	1	2	1	1
12	KSYR-6	KSYR-6	OPA-12	OPA-12	S-11	S-11	d4×w1
16	KSYR-8	KSYR-8	OPA-16	OPA-16	S-14	S-14	d6×w1
20	KSYR-10A	KSYR-10A	OPA-20	OPA-20	S-18	S-18	d6×w1
25	KSYR-12	KSYR-12	OPA-25	OPA-25	S-22	S-22	S-9
32	KSYR-16	KSYR-16	OPA-32	OPA-32	d28×w2	d28×w2	d11×w1
40	KSYR-16	KSYR-16	OPA-40	OPA-40	S-36	S-36	S-10
50	KSYR-20	KSYR-20	OPA-50	OPA-50	S-46	S-46	S-16
63	KSYR-20	–	OPA-63	–	S-60	–	S-14
80	ORA-25	–	OPA-80	–	G-75	–	d20×w1
100	ORA-30	–	OPA-100	–	G-95	–	S-24

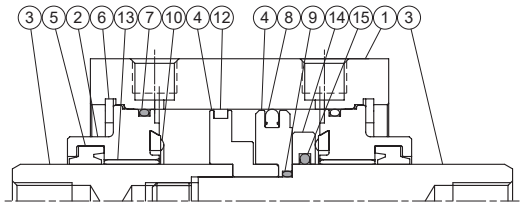
Order example

Component parts / Repair kits

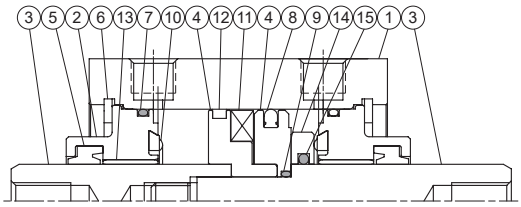
Tube I.D.	Component parts	Repair kits
ø12	**20-CP-MCJQ-2-12(M)**	**PS-MCJQ-2-12**
ø16	**20-CP-MCJQ-2-16(M)**	**PS-MCJQ-2-16**
ø20	**20-CP-MCJQ-2-20(M)**	**PS-MCJQ-2-20**
ø25	**20-CP-MCJQ-2-25(M)**	**PS-MCJQ-2-25**
ø32	**20-CP-MCJQ-2-32(M)**	**PS-MCJQ-2-32**
ø40	**20-CP-MCJQ-2-40(M)**	**PS-MCJQ-2-40**
ø50	**20-CP-MCJQ-2-50(M)**	**PS-MCJQ-2-50**
ø63	**20-CP-MCJQ-2-63(M)**	**PS-MCJQ-2-63**
ø80	**20-CP-MCJQ-2-80(M)**	**PS-MCJQ-2-80**
ø100	**20-CP-MCJQ-2-100(M)**	**PS-MCJQ-2-100**

M: With magnet

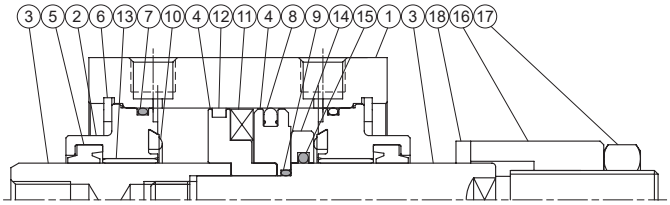
Double acting



Double acting (with magnet)



Adjustable stroke



Long stroke – Material

No.	Part name \ Tube I.D.	12	16	20	25	32	40	50	63	80	Note	Q'y	Component parts (inclusion)	Repair kits (inclusion)
1	Body	Aluminum alloy									Hard anodized	1		
2	Rod cover	Aluminum alloy									*2	2	●	
3	Piston rod – With magnet	Stainless steel					Carbor steel					2		
	Piston rod – Without magnet	SUS	Carbor steel									2		
4	Piston	Aluminum alloy										2	●	
5	Rod packing	NBR										2	●	●
6	Snap ring	Stainless steel								*1		2	●	
7	Cover ring	NBR										2	●	●
8	Piston packing	NBR										1	●	●
9	Piston gasket	NBR										1	●	●
10	Cushion packing	–	NBR									2	●	●
11	Magnet	Magnet										1	●	
12	Wear ring	–					Teflon					1	●	
13	Bush	–					Iron-based alloy					2	●	
14	Sub-piston	–	PU		Aluminum alloy							1	●	
15	Sub-piston gasket	–			NBR							1	●	●
16	Adjust nut	Stainless steel										1	●	
17	Hexagon nut	Stainless steel										1	●	
18	Cushion gasket	PU										1	●	

*1.Spring steel *2.ø12~ø32 hard anodized, ø40~ø80 anodized.

Long stroke – Seal kit

	Rod packing	Piston packing	Cover ring	Piston gasket	Sub-piston gasket
Acting type	Double acting				
Q'y	2	1	2	1	1
12	KSYR-6	OPA-12	S-11	d4×w1	–
16	KSYR-8	OPA-16	S-14	d5×w1	–
20	KSYR-10A	OPA-20	S-18	d6×w1	–
25	KSYR-12	OPA-25	S-22	S-9	–
32	KSYR-16	OPA-32	d28×w2	d11×w1	P-16
40	ORA-16	OPA-40	S-36	S-10	P-16
50	ORA-20	OPA-50	S-46	S-16	P-20
63	ORA-20	OPA-63	S-60	S-14	P-20
80	ORA-25	OPA-80	G-75	S-18	S-25

Order example

Component parts / Repair kits

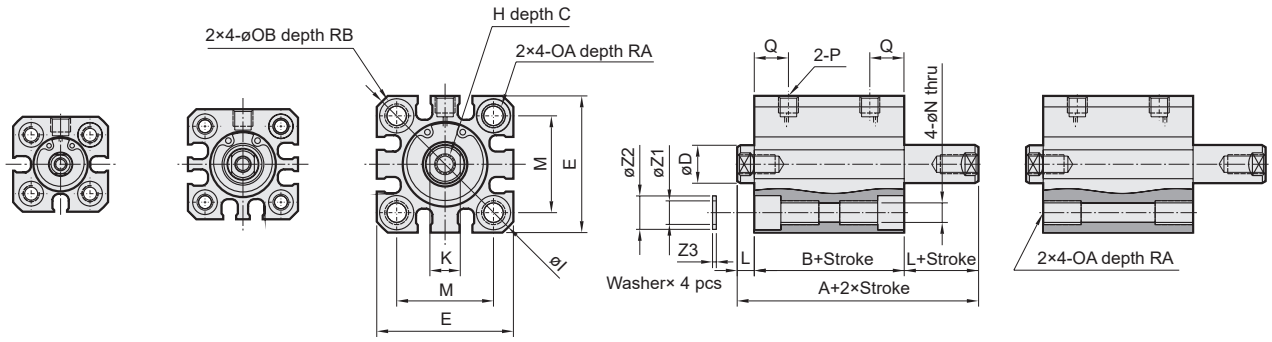
Tube I.D.	Component parts	Repair kits
ø12	**20-CPL-MCJQ-2-12(M)**	**PSL-MCJQ-2-12**
ø16	**20-CPL-MCJQ-2-16(M)**	**PSL-MCJQ-2-16**
ø20	**20-CPL-MCJQ-2-20(M)**	**PSL-MCJQ-2-20**
ø25	**20-CPL-MCJQ-2-25(M)**	**PSL-MCJQ-2-25**
ø32	**20-CPL-MCJQ-2-32(M)**	**PSL-MCJQ-2-32**
ø40	**20-CPL-MCJQ-2-40(M)**	**PSL-MCJQ-2-40**
ø50	**20-CPL-MCJQ-2-50(M)**	**PSL-MCJQ-2-50**
ø63	**20-CPL-MCJQ-2-63(M)**	**PSL-MCJQ-2-63**
ø80	**20-CPL-MCJQ-2-80(M)**	**PSL-MCJQ-2-80**

M: With magnet

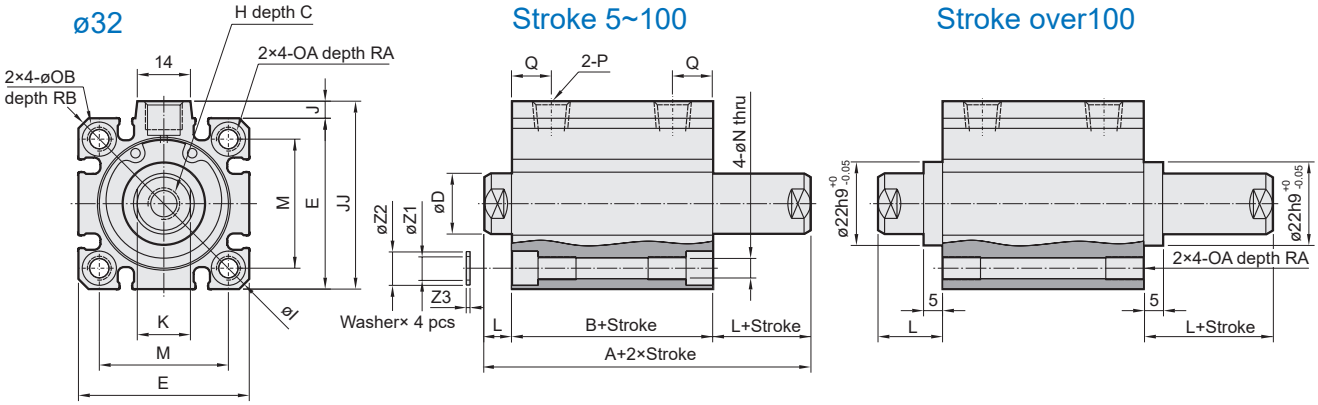
20-MCJQ Dimensions – Double acting / Double rod ø12~ø32

COMPACT CYLINDER

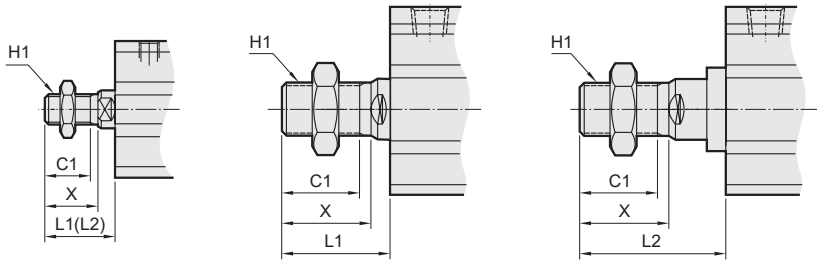
ø12 ø16 ø20, ø25 Stroke 5~100 Stroke over100



ø32 Stroke 5~100 Stroke over100



ø12~25 ø32 for stroke 5~100 ø32 for stroke over 100



* L1: Standard stroke, L2: Long stroke

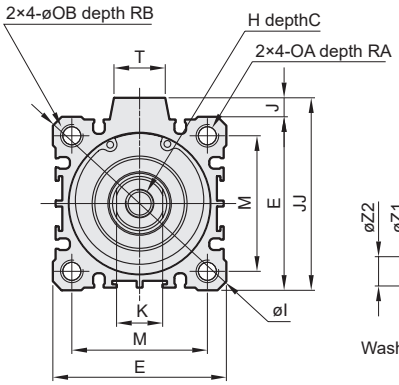
20-MCJQ-21 male thread size

Code / Tube I.D.	C1	H1	L1	L2	X
12	9	M5×0.8	14	24	10.5
16	10	M6×1.0	15.5	25.5	12
20	12	M8×1.25	18.5	28.5	14
25	15	M10×1.25	22.5	32.5	17.5
32	20.5	M14×1.5	28.5	38.5	23.5

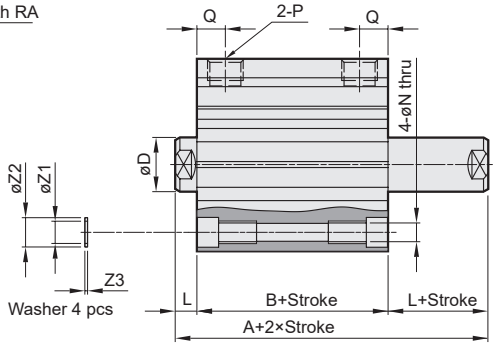
Code / Tube I.D.	Standard stroke							Long stroke				C	D	E	H	I	J	JJ	K	M	N	OA	OB	P	Q	RA	RB	Z1	Z2	Z3
	Stroke range	Without magnet			Magnet			Stroke range	A	B	L																			
		A	B	L	A	B	L																							
12	5~30	29	22	3.5	34	27	3.5	31~100	59	32	13.5	6	6	25	M3×0.5	32	–	–	5	15.5	3.5	M4×0.7	6.5	M5×0.8	7.5	7	4	4.2	6.3	0.5
16	5~30	29	22	3.5	34	27	3.5	31~100	59	32	13.5	8	8	29	M4×0.7	38	–	–	6	20	3.5	M4×0.7	6.5	M5×0.8	7.5	7	4	4.2	6.3	0.5
20	5~50	35	26	4.5	45	36	4.5	51~200	70	41	14.5	7	10	36	M5×0.8	47	–	–	8	25.5	5.4	M6×1.0	9	M5×0.8	9	10	7	6.2	8.8	1
25	5~50	39	29	5	49	39	5	51~300	74	44	15	12	12	40	M6×1.0	52	–	–	10	28	5.4	M6×1.0	9	M5×0.8	11	10	7	6.2	8.8	1
32	5~50	44.5	30.5	7	54.5	40.5	7	101~300	79.5	45.5	17	13	16	45	M8×1.25	60	4.5	49.5	14	34	5.5	M6×1.0	9	Rc1/8 (*1)	12.5	10	7	6.2	8.8	1
	51~100	54.5	40.5	7	54.5	40.5	7																							

*1. Without magnet with stroke=5mm, P=M5×0.8

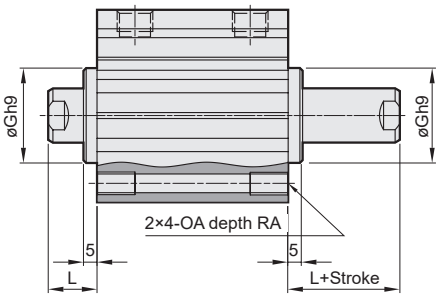
ø50~ø100



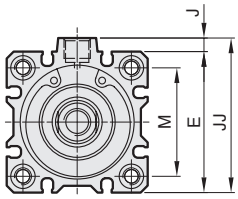
Stroke 5~100



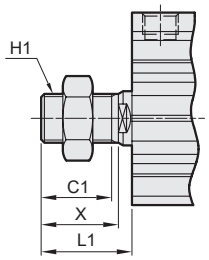
Stroke over100



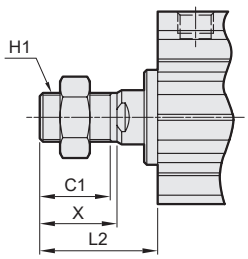
ø40



ø40~ø100 (Stroke 5~100)



ø40~ø80 (Stroke over 100)



20-MCJQ-21 male thread size

Code / Tube I.D.	C1	H1	L1	L2	X
40	20.5	M14×1.5	28.5	38.5	23.5
50	26	M18×1.5	33.5	43.5	28.5
63	26	M18×1.5	33.5	43.5	28.5
80	32.5	M22×1.5	43.5	53.5	35.5
100	32.5	M26×1.5	43.5	–	35.5

Code / Tube I.D.	Standard stroke								Long stroke					
	Stroke range	Without magnet		Magnet		F	L	Q	Stroke range	A	B	F	L	Q
		A	B	A	B									
40	5~50	36.5	29.5	46.5	39.5	8	7	11	125~300	72	55	14	17	14
	75,100	46.5	39.5											
50	5~50	38.5	30.5	48.5	40.5	10.5	8	10.5	125~300	73.5	55.5	14	18	14
	75,100	48.5	40.5											
63	5~50	44	36	54	46	10.5	8	15	125~300	75	57	16.5	18	16.5
	75,100	54	46											
80	5~50	53.5	43.5	63.5	53.5	12.5	10	16	125~300	86	66	19	20	19
	75,100	63.5	53.5											
100	5~50	65	53	75	63	13	12	23	–					
	75,100	75	63											

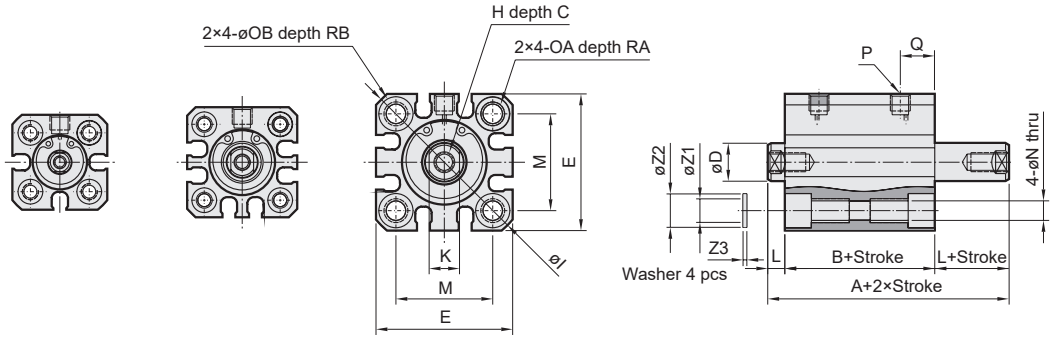
Code / Tube I.D.	C	D	E	G^{h9}	H	I	J	JJ	K	M	N	OA	OB	P	RA	RB	T	Z1	Z2	Z3
40	13	16	52	28 $^{+0}_{-0.052}$	M8×1.25	70	5	57	14	40	5.5	M6×1.0	9	Rc1/8	10	7	14	6.2	8.8	1
50	15	20	64	35 $^{+0}_{-0.062}$	M10×1.5	86	7	71	17	50	6.6	M8×1.25	11	Rc1/4	14	8	19	8.2	10.8	1
63	15	20	77	35 $^{+0}_{-0.062}$	M10×1.5	103	7	84	17	60	9	M10×1.5	14	Rc1/4 (*1)	18	10.5	19	10.2	13.8	1
80	21	25	98	43 $^{+0}_{-0.062}$	M16×2.0	132	6	104	22	77	11	M12×1.75	17.5	Rc3/8 (*2)	22	13.5	26	12.2	17.3	2
100	27	30	117	–	M20×2.5	156	6.5	123.5	27	94	11	M12×1.75	17.5	Rc3/8 (*2)	22	13.5	26	12.2	17.3	2

*1. Without magnet with stroke=5mm, P=Rc1/8
*2. Without magnet with stroke=5mm, P=Rc1/4

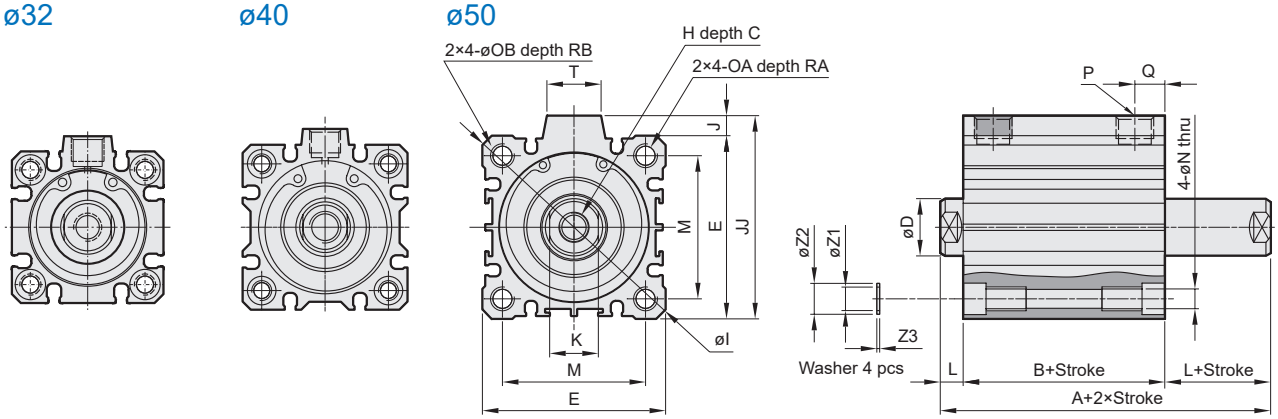
20-MCJQ Dimensions – Normally extented ø12~ø50

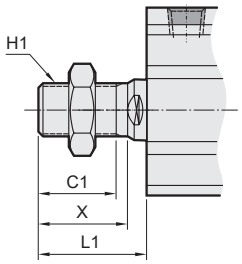
COMPACT CYLINDER

ø12 ø16 ø20, ø25



ø32 ø40 ø50





* L1: Standard stroke

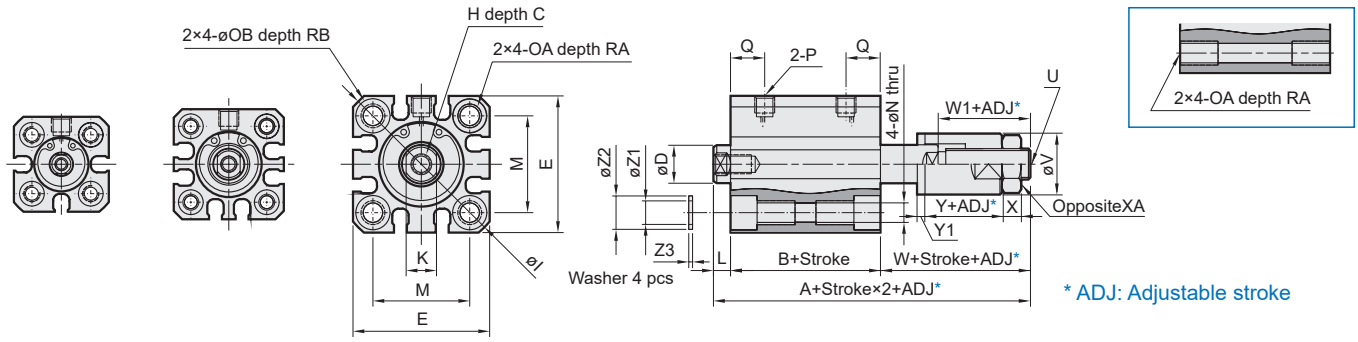
20-MCJQ-23 male thread size

Code / Tube I.D.	C1	H1	L1	X
12	9	M5×0.8	14	10.5
16	10	M6×1.0	15.5	12
20	12	M8×1.25	18.5	14
25	15	M10×1.25	22.5	17.5
32	20.5	M14×1.5	28.5	23.5
40	20.5	M14×1.5	28.5	23.5
50	26	M18×1.5	33.5	28.5

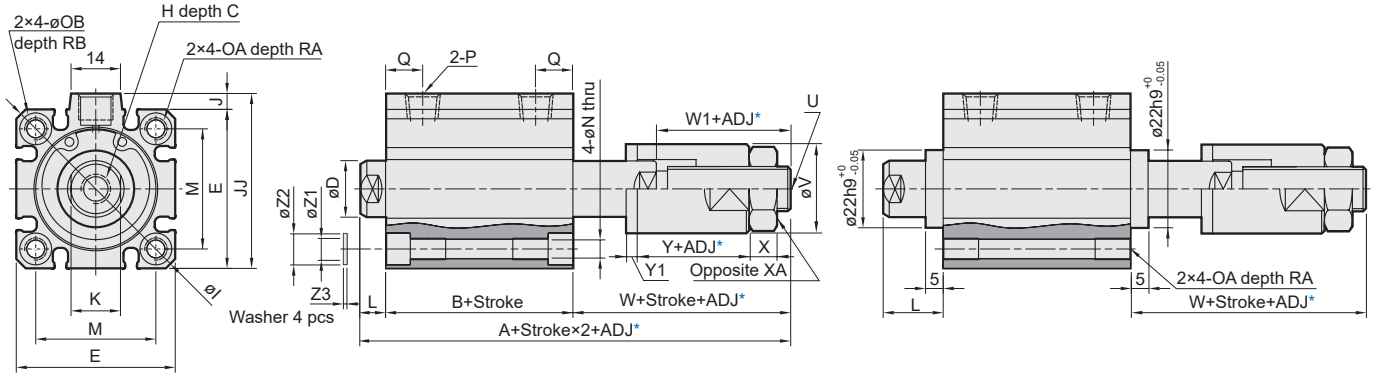
Code / Tube I.D.	Standard stroke					C	D	E	H	I	J	JJ	K	L	M	N	OA	OB	P	Q	RA	RB	T	Z1	Z2	Z3
	Stroke range	Without magnet		Magnet																						
		A	B	A	B																					
12	5,10	29	22	34	27	6	6	25	M3×0.5	32	–	–	5	3.5	15.5	3.5	M4×0.7	6.5	M5×0.8	7.5	7	4	–	4.2	6.3	0.5
16	5,10	29	22	34	27	8	8	29	M4×0.7	38	–	–	6	3.5	20	3.5	M4×0.7	6.5	M5×0.8	7.5	7	4	–	4.2	6.3	0.5
20	5,10	35	26	45	36	7	10	36	M5×0.8	47	–	–	8	4.5	25.5	5.4	M6×1.0	9	M5×0.8	9	10	7	–	6.2	8.8	1
25	5,10	39	29	49	39	12	12	40	M6×1.0	52	–	–	10	5	28	5.4	M6×1.0	9	M5×0.8	11	10	7	–	6.2	8.8	1
32	5,10	44.5	30.5	54.5	40.5	13	16	45	M8×1.25	60	4.5	49.5	14	7	34	5.5	M6×1.0	9	Rc1/8 (*1)	12.5	10	7	14	6.2	8.8	1
40	5,10	54	40	64	50	13	16	52	M8×1.25	70	5	57	14	7	40	5.5	M6×1.0	9	Rc1/8	14	10	7	14	6.2	8.8	1
50	5~20	56.5	40.5	66.5	50.5	15	20	64	M10×1.5	86	7	71	17	8	50	6.5	M8×1.25	11	Rc1/4	14	14	8	19	8.2	10.8	1

*1. Without magnet with stroke=5mm, P=M5×0.8

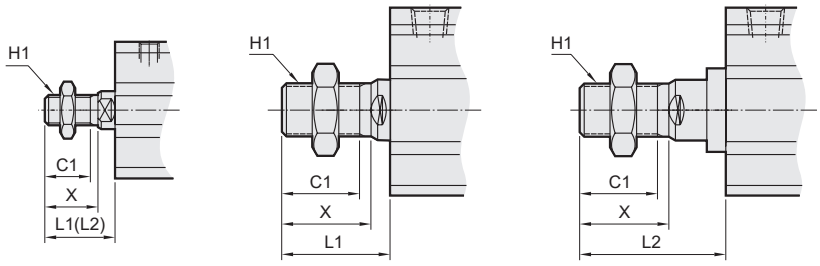
ø12 ø16 ø20, ø25 Stroke 5~100 Stroke over 100



ø32 Stroke 5~100 Stroke over 100



ø12~25 ø32 for stroke 5~100 ø32 for stroke over 100



* L1: Standard stroke, L2: Long stroke

20-MCJQ-27 male thread size

Code / Tube I.D.	C1	H1	L1	L2	X
12	9	M5×0.8	14	24	10.5
16	10	M6×1.0	15.5	25.5	12
20	12	M8×1.25	18.5	28.5	14
25	15	M10×1.25	22.5	32.5	17.5
32	20.5	M14×1.5	28.5	38.5	23.5

Code / Tube I.D.	Standard stroke						Long stroke				
	Stroke range	Without magnet		Magnet		L	W	Stroke range	A	B	L	W
		A	B	A	B							
12	5~30	45.5	22	50.5	27	3.5	20	31~100	65.5	32	13.5	20
16	5~30	49	22	54	27	3.5	23.5	31~100	69	32	13.5	23.5
20	5~50	54.3	26	64.3	36	4.5	23.8	51~200	79.3	41	14.5	23.8
25	5~50	56.5	29	66.5	39	5	22.5	51~300	81.5	44	15	22.5
32	5~50	60.9	30.5	70.9	40.5	7	23.4	101~300	91.5	45.5	17	29
	51~100	70.9	40.5									

*1. Without magnet with stroke=5mm, P=M5×0.8

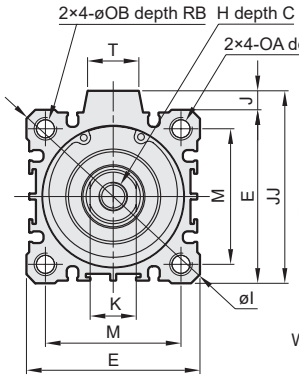
Code / Tube I.D.	C	D	E	H	I	J	JJ	K	M	N	OA	OB	P	Q
12	6	6	25	M3×0.5	32	–	–	5	15.5	3.5	M4×0.7	6.5	M5×0.8	7.5
16	8	8	29	M4×0.7	38	–	–	6	20	3.5	M4×0.7	6.5	M5×0.8	7.5
20	7	10	36	M5×0.8	47	–	–	8	25.5	5.4	M6×1.0	9	M5×0.8	9
25	12	12	40	M6×1.0	52	–	–	10	28	5.4	M6×1.0	9	M5×0.8	11
32	13	16	45	M8×1.25	60	4.5	49.5	14	34	5.5	M6×1.0	9	Rc1/8 (*1)	12.5

Code / Tube I.D.	RA	RB	U	V	W1	X	XA	Y	Y1	Z1	Z2	Z3
12	7	4	M5×0.8	12	16	4	8	13	2	4.2	6.3	0.5
16	7	4	M8×1.25	16	19	5	13	15	2	4.2	6.3	0.5
20	10	7	M8×1.25	16	19	5	13	15	2	6.2	8.8	1
25	10	7	M10×1.25	20	18	6	17	12	2	6.2	8.8	1
32	10	7	M12×1.25	30	19	7	19	12	2	6.2	8.8	1

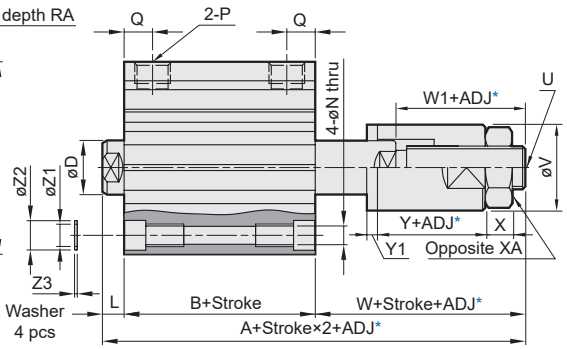
20-MCJQ Dimensions – Double rod / Adjustable stroke ø40~ø100

COMPACT CYLINDER

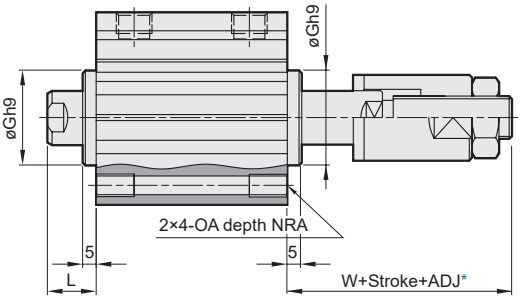
ø50~ø100



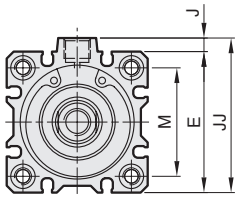
Stroke 5~100



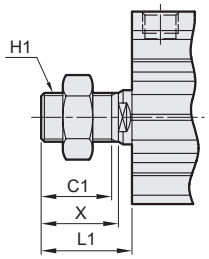
Stroke over 100



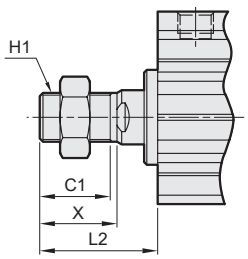
ø40



ø40~ø100 (Stroke 5~100)



ø40~ø80 (Stroke over 100)



20-MCJQ-27 male thread size

Code / Tube I.D.	C1	H1	L1	L2	X
40	20.5	M14×1.5	28.5	38.5	23.5
50	26	M18×1.5	33.5	43.5	28.5
63	26	M18×1.5	33.5	43.5	28.5
80	32.5	M22×1.5	43.5	53.5	35.5
100	32.5	M26×1.5	43.5	–	35.5

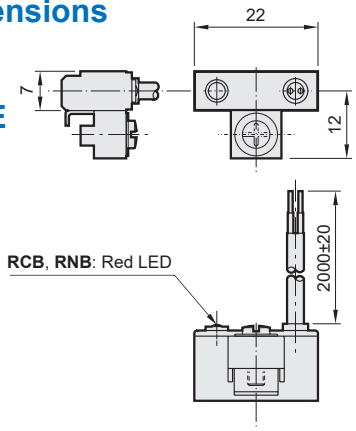
Code / Tube I.D.	Standard stroke								Long stroke					
	Stroke range	Without magnet		Magnet		L	Q	W	Stroke range	A	B	L	Q	W
		A	B	A	B									
40	5~50	71	40	81	50	7	14	24	101~300	102.5	55	17	14	30.5
	51~100	81	50											
50	5~50	75	40.5	85	50.5	8	14	26.5	101~300	105.5	55.5	18	14	32
	51~100	85	50.5											
63	5~50	80	42	90	52	8	15.5	30	101~300	110	57	18	16.5	35
	51~100	90	52											
80	5~50	100	51	110	61	10	18	39	101~300	130	66	20	19	44
	51~100	110	61											
100	5~50	111	60.5	121	70.5	12	22	38.5	–					
	51~100	121	70.5											

Code / Tube I.D.	C	D	E	G^{h9}	H	I	J	JJ	K	M	N	OA	OB	P	RA	RB	T	U	V	W1	X	XA	Y	Y1	Z1	Z2	Z3
40	13	16	52	$28^{+0}_{-0.052}$	M8×1.25	70	5	57	14	40	5.5	M6×1.0	9	Rc1/8	10	7	14	M12×1.25	30	21	7	19	12	2	6.2	8.8	1
50	15	20	64	$35^{+0}_{-0.062}$	M10×1.5	86	7	71	17	50	6.6	M8×1.25	11	Rc1/4	14	8	19	M16×1.5	40	22.5	8	24	15	2	8.2	10.8	1
63	15	20	77	$35^{+0}_{-0.062}$	M10×1.5	103	7	84	17	60	9	M10×1.5	14	Rc1/4 (*1)	18	10.5	19	M16×1.5	40	25.5	8	24	15	2	10.2	13.8	1
80	21	25	98	$43^{+0}_{-0.062}$	M16×2.0	132	6	104	22	77	11	M12×1.75	17.5	Rc3/8 (*2)	22	13.5	26	M22×1.5	50	33	13	32	20	3	12.2	17.3	2
100	27	30	117	–	M20×2.5	156	6.5	123.5	27	94	11	M12×1.75	17.5	Rc3/8 (*2)	22	13.5	26	M22×1.5	50	33	13	32	20	3	12.2	17.3	2

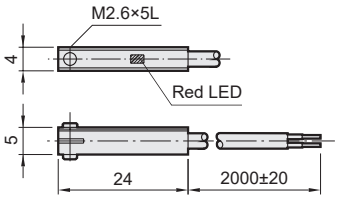
*1. Without magnet with stroke=5mm, P=Rc1/8
*2. Without magnet with stroke=5mm, P=Rc1/4

Dimensions

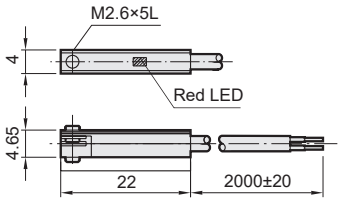
R*B
R*BE



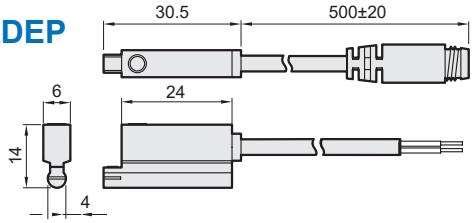
R*E
R*EE



RCE1
R*E1E

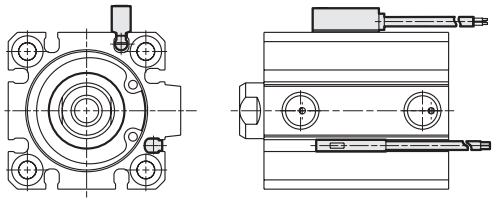


RDEP

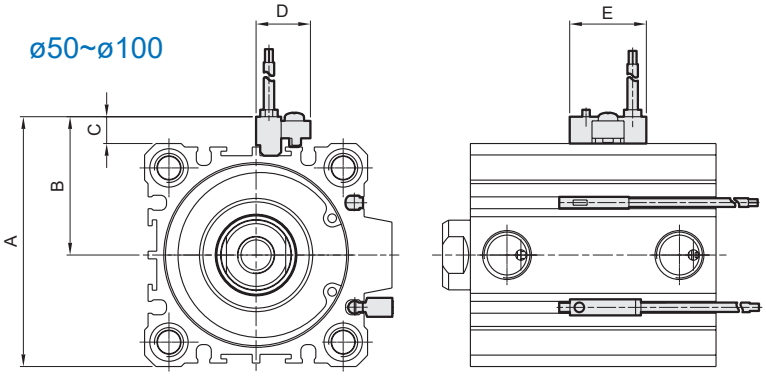


Installation of sensor switch

ø12~ø40



ø50~ø100



Code / Tube I.D.	A	B	C	D	E
50	72	40	8	16	22
63	85	46.5	8	16	22
80	106	57	8	16	22
100	125	66.5	8	16	22

Order example

RCE1 — □

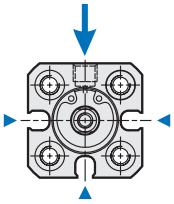
MODEL
R*B / R*BE (Refer to page 4-2)
R*E / R*EE (Refer to page 4-3)
RCE1 / R*E1E (Refer to page 4-4)
RDEP (Refer to page 4-7)

WIRE LENGTH
Blank: L=2000m
1M: L=1000m
QD: M8 3Pin connector
EQD: M8 3Pin connector

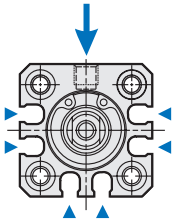
Description

▽ **RCB** switch ▼ **RCE, RCE1, RDEP switch** ↓ **Port**

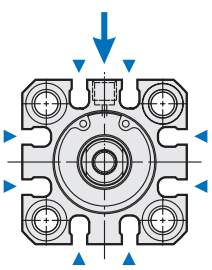
ø12



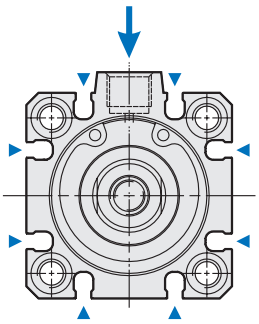
ø16



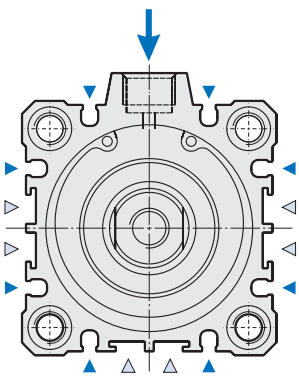
ø20, ø25



ø32, ø40



ø50~ø100

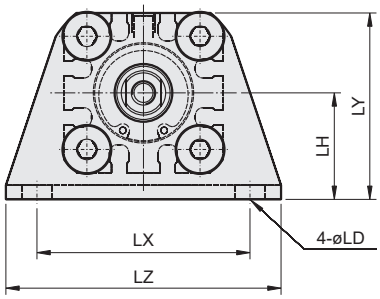


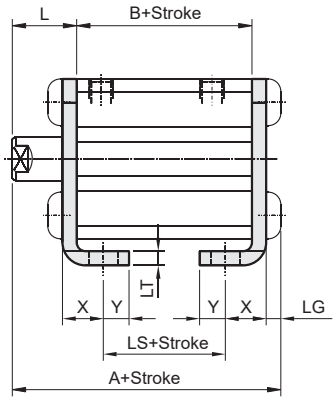
20-MCJQ Mounting accessories – Double acting / Single rod ø12~ø25

COMPACT CYLINDER

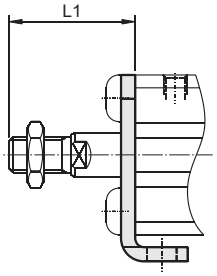
LB

Female thread





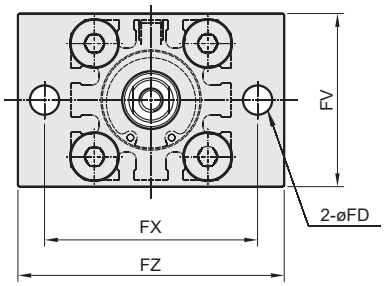
Male thread

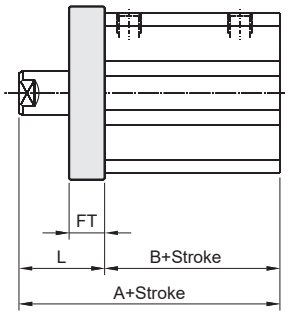


Code / Tube I.D.	Standard stroke							Long stroke				L	L1	LD	LG	LH	LT	LX	LY	LZ	X	Y
	Stroke range	Without magnet			Magnet			Stroke range	A	B	LS											
		A	B	LS	A	B	LS															
12	5~30	35.3	17	5	40.3	22	10	35~100	50.3	32	20	13.5	24	4.5	2.8	17	2	34	29.5	44	8	4.5
16	5~30	35.3	17	5	40.3	22	10	35~100	50.3	32	20	13.5	25.5	4.5	2.8	19	2	38	33.5	48	8	5
20	5~50	41.2	19.5	7.5	51.2	29.5	17.5	75~200	62.7	41	29	14.5	28.5	6.6	4	24	3.2	48	42	62	9.2	5.8
25	5~50	44.7	22.5	7.5	54.7	32.5	17.5	75~300	66.2	44	29	15	32.5	6.6	4	26	3.2	52	46	66	10.7	5.8

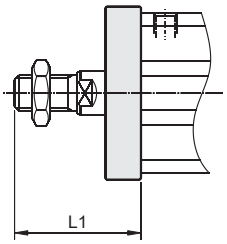
FAC

Female thread





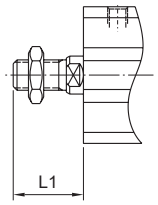
Male thread



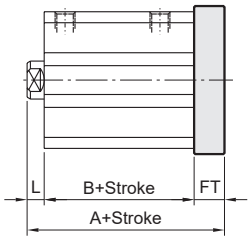
Code / Tube I.D.	Standard stroke					Long stroke			FD	FT	FV	FX	FZ	L	L1
	Stroke range	Without magnet		Magnet		Stroke range	A	B							
		A	B	A	B										
12	5~30	30.5	17	35.5	22	35~100	45.5	32	4.5	5.5	25	45	55	13.5	24
16	5~30	30.5	17	35.5	22	35~100	45.5	32	4.5	5.5	30	45	55	13.5	25.5
20	5~50	34	19.5	44	29.5	75~200	55.5	41	6.6	8	39	48	60	14.5	28.5
25	5~50	37.5	22.5	47.5	32.5	75~300	59	44	6.6	8	42	52	64	15	32.5

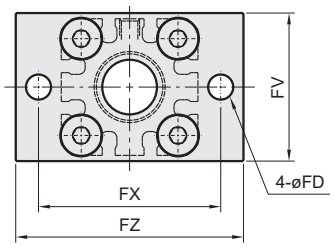
FBC

Male thread



Female thread

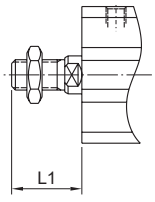




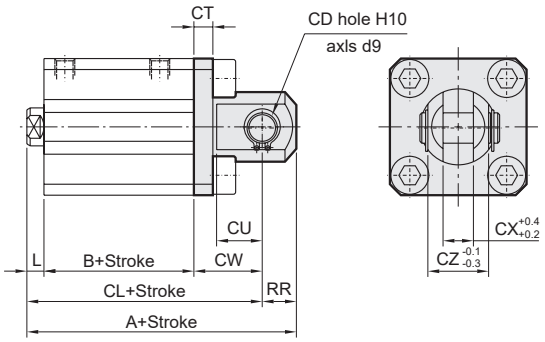
Code / Tube I.D.	Standard stroke									Long stroke					FD	FT	FV	FX	FZ
	Stroke range	Without magnet				Magnet				Stroke range	A	B	L	L1					
		A	B	L	L1	A	B	L	L1										
12	5~30	26	17	3.5	14	31	22	3.5	14	35~100	51	32	13.5	24	4.5	5.5	25	45	55
16	5~30	26	17	3.5	15.5	31	22	3.5	15.5	35~100	51	32	13.5	25.5	4.5	5.5	30	45	55
20	5~50	32	19.5	4.5	18.5	42	29.5	4.5	18.5	75~200	63.5	41	14.5	28.5	6.6	8	39	48	60
25	5~50	35.5	22.5	5	22.5	45.5	32.5	5	22.5	75~300	67	44	15	32.5	6.6	8	42	52	64

CB

Male thread



Female thread



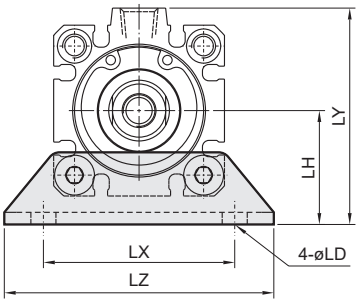
Code / Tube I.D.	Standard stroke										Long stroke						CD	CT	CU	CW	CX	CZ	RR
	Stroke range	Without magnet					Magnet				Stroke range	A	B	CL	L	L1							
		A	B	CL	L	L1	A	B	CL	L	L1													
12	5~30	40.5	17	34.5	3.5	14	45.5	22	39.5	3.5	14	35~100	65.5	32	59.5	13.5	24	5	4	7	14	5	10	6
16	5~30	41.5	17	35.5	3.5	15.5	46.5	22	40.5	3.5	15.5	35~100	66.5	32	60.5	13.5	25.5	5	4	10	15	6.5	12	6
20	5~50	51	19.5	42	4.5	18.5	61	29.5	52	4.5	18.5	75~200	82.5	41	73.5	14.5	28.5	8	5	12	18	8	16	9
25	5~50	57.5	22.5	47.5	5	22.5	67.5	32.5	57.5	5	22.5	75~300	89	44	79	15	32.5	10	5	14	20	10	20	10

20-MCJQ Mounting accessories – Double acting / Single rod ø32~ø100

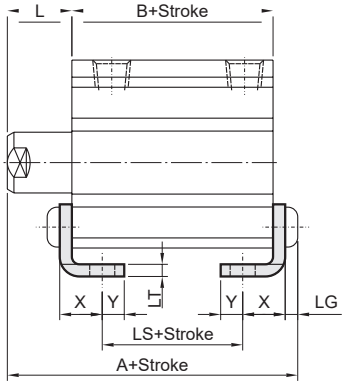
COMPACT CYLINDER

LB

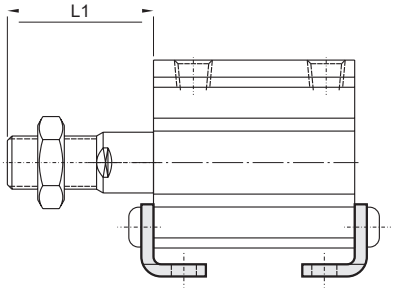
Standard stroke



Female thread

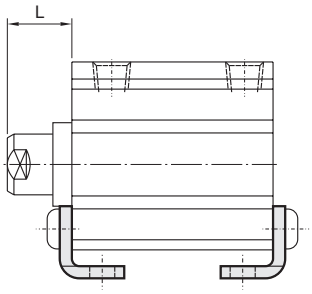


Male thread

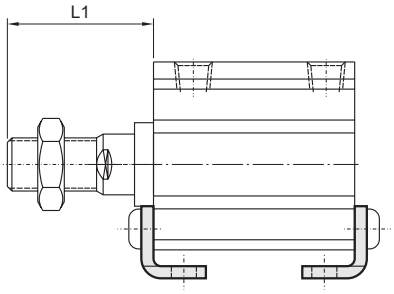


Long stroke

Female thread



Male thread

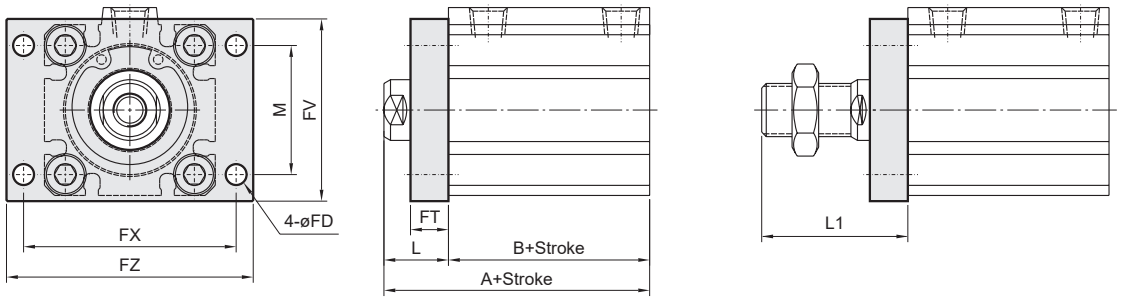


Code / Tube I.D.	Standard stroke							Long stroke				L	L1	LD	LG	LH	LT	LX	LY	LZ	X	Y
	Stroke range	Without magnet			Magnet			Stroke range	A	B	LS											
		A	B	LS	A	B	LS															
32	5~50	47.2	23	7	57.2	33	17	125~300	69.7	45.5	29.5	17	38.5	6.6	4	30	3.2	57	57	71	11.2	5.8
	75,100	57.2	33	17																		
40	5~50	53.7	29.5	13.5	63.7	39.5	23.5	125~300	79.2	55	39	17	38.5	6.6	4	33	3.2	64	64	78	11.2	7
	75,100	63.7	39.5	23.5																		
50	5~50	56.7	30.5	7.5	66.7	40.5	17.5	125~300	81.7	55.5	32.5	18	43.5	9	5	39	3.2	79	78	95	14.7	8
	75,100	66.7	40.5	17.5																		
63	5~50	62.2	36	10	72.2	46	20	125~300	83.2	57	31	18	43.5	11	5	46	3.2	95	91.5	113	16.2	9
	75,100	72.2	46	20																		
80	5~50	75	43.5	13.5	85	53.5	23.5	125~300	97.5	66	36	20	53.5	13	7	59	4.5	118	114	140	19.5	11
	75,100	85	53.5	23.5																		
100	5~50	88	53	19	98	63	29	125~300	–	–	–	22	53.5	13	7	71	6	137	136	162	23	12.5
	75,100	98	63	29																		

FAC

Female thread

Male thread

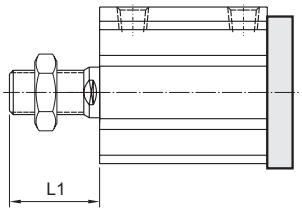


Code / Tube I.D.	Standard stroke					Long stroke			FD	FT	FV	FX	FZ	L	L1	M
	Stroke range	Without magnet		Magnet		Stroke range	A	B								
		A	B	A	B											
32	5~50	40	23	50	33	125~300	62.5	45.5	5.5	8	48	56	65	17	38.5	34
	75,100	50	33													
40	5~50	46.5	29.5	56.5	39.5	125~300	72	55	5.5	8	54	62	72	17	38.5	40
	75,100	56.5	39.5													
50	5~50	48.5	30.5	58.5	40.5	125~300	73.5	55.5	6.6	9	67	76	89	18	43.5	50
	75,100	58.5	40.5													
63	5~50	54	36	64	46	125~300	75	57	9	9	80	92	108	18	43.5	60
	75,100	64	46													
80	5~50	63.5	43.5	73.5	53.5	125~300	86	66	11	11	99	116	134	20	53.5	77
	75,100	73.5	53.5													
100	5~50	75	53	85	63	125~300	–	–	11	11	117	136	154	22	53.5	94
	75,100	85	63													

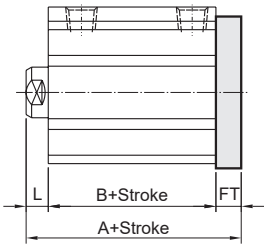
FBC

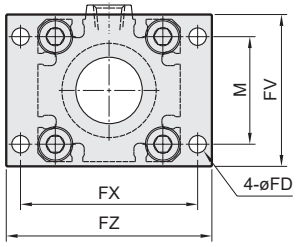
Standard stroke

Male thread



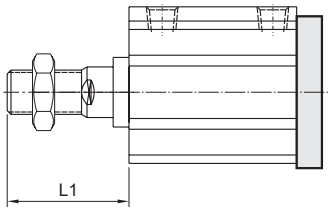
Female thread



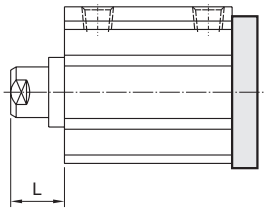


Long stroke

Male thread



Female thread

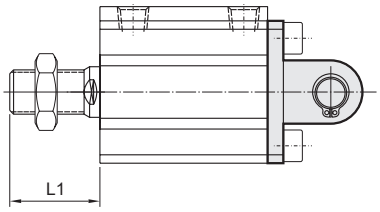


Code / Tube I.D.	Standard stroke							Long stroke					FD	FT	FV	FX	FZ	M
	Stroke range	Without magnet		Magnet		L	L1	Stroke range	A	B	L	L1						
		A	B	A	B													
32	5~50	38	23	48	33	7	28.5	125~300	70.5	45.5	17	38.5	5.5	8	48	56	65	34
	75,100	48	33															
40	5~50	44.5	29.5	54.5	39.5	7	28.5	125~300	80	55	17	38.5	5.5	8	54	62	72	40
	75,100	54.5	39.5															
50	5~50	47.5	30.5	57.5	40.5	8	33.5	125~300	82.5	55.5	18	43.5	6.6	9	67	76	89	50
	75,100	57.5	40.5															
63	5~50	53	36	63	46	8	33.5	125~300	84	57	18	43.5	9	9	80	92	108	60
	75,100	63	46															
80	5~50	64.5	43.5	74.5	53.5	10	43.5	125~300	97	66	20	53.5	11	11	99	116	134	77
	75,100	74.5	53.5															
100	5~50	76	53	86	63	12	43.5	125~300	–	–	–	–	11	11	117	136	154	94
	75,100	86	63															

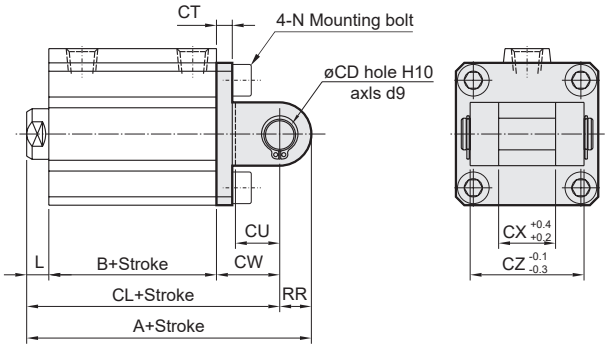
CB

Standard stroke

Male thread

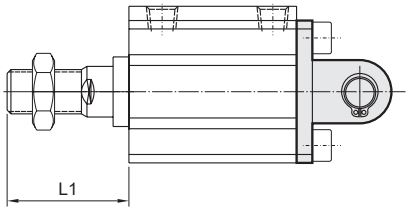


Female thread

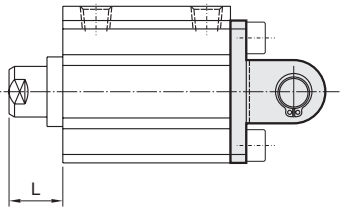


Long stroke

Male thread



Female thread

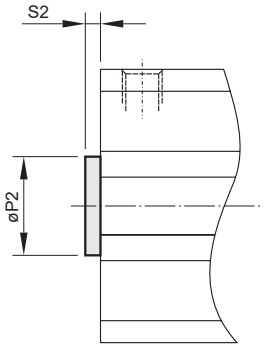


Code / Tube I.D.	Standard stroke									Long stroke						CD	CT	CU	CW	CX	CZ	N	RR
	Stroke range	Without magnet			Magnet			L	L1	Stroke range	A	B	CL	L	L1								
		A	B	CL	A	B	CL																
32	5~50	60	23	50	70	33	60	7	28.5	125~300	92.5	45.5	82.5	17	38.5	10	5	14	20	18	36	M6×1.0	10
	75,100	70	33	60																			
40	5~50	68.5	29.5	58.5	78.5	39.5	68.5	7	28.5	125~300	104	55	94	17	38.5	10	6	14	22	18	36	M6×1.0	10
	75,100	78.5	39.5	68.5																			
50	5~50	80.5	30.5	66.5	90.5	40.5	76.5	8	33.5	125~300	115.5	55.5	101.5	18	43.5	14	7	20	28	22	44	M8×1.25	14
	75,100	90.5	40.5	76.5																			
63	5~50	88	36	74	98	46	84	8	33.5	125~300	119	57	105	18	43.5	14	8	20	30	22	44	M10×1.5	14
	75,100	98	46	84																			
80	5~50	109.5	43.5	91.5	119.5	53.5	101.5	10	43.5	125~300	142	66	124	20	53.5	18	10	27	38	28	56	M12×1.75	18
	75,100	119.5	53.5	101.5																			
100	5~50	132	53	110	142	63	120	12	43.5	125~300	–	–	–	–	–	22	13	31	45	32	64	M12×1.75	22
	75,100	142	63	120																			

20-MCJQ Accessories ø12~ø100

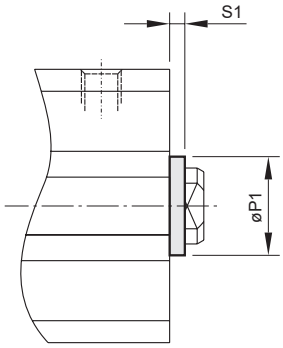
COMPACT CYLINDER

F Rear flange



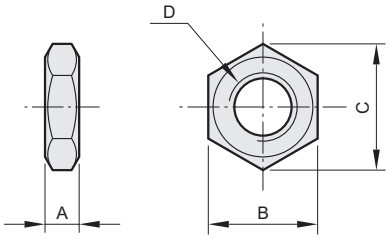
Code / Tube I.D.	P2 h9	S2
12	6	1.5
16	10	1.5
20	13	2
25	15	2
32	21	2
40	28	2
50	35	2
63	35	2
80	43	2
100	59	2

RF



Code / Tube I.D.	P1 h9	S1
12	15	1.5
16	20	1.5
20	13	2
25	15	2
32	21	2
40	28	2
50	35	2
63	35	2
80	43	2
100	59	2

Rod front nut



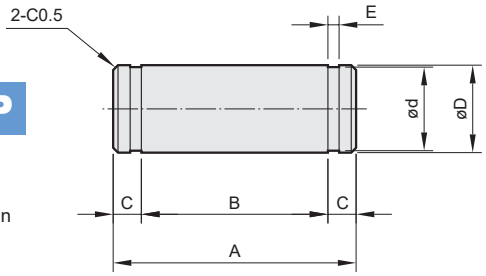
Code / Tube I.D.	A	B	C	D
12	4	8	9.2	M5×0.8
16	5	10	11.5	M6×1.0
20	5	13	15	M8×1.25
25	6	17	19.6	M10×1.25
32,40	8	22	25.4	M14×1.5
50,63	11	27	31.4	M18×1.5
80	13	32	37	M22×1.5
100	16	41	47.3	M26×1.5

Pin for CB

Order example

20 — PIN — MCJQ — 20 — CB — P

- MATERIAL RESTRICTIONS (Secondary battery)
- PIN
- TUBE I.D.: 12, 16, 20, 25, 32, 40, 50, 63, 80, 100
- TYPE: **CB**: for CB accessory
- **P**: With split pin



Code / Tube I.D.	A	B	C	øD d9	ød	E	Snap ring
12	14.6	10.2	2.2	5 -0.03 -0.06	4.8 0 -0.04	0.7 +0.10 0	STW-5
16	16.6	12.2	2.2	5 -0.03 -0.06	4.8 0 -0.04	0.7 +0.10 0	STW-5
20	21	16.2	2.4	8 -0.04 -0.08	7.6 0 -0.06	0.9 +0.10 0	STW-8
25	25.6	20.2	2.7	10 -0.04 -0.08	9.6 0 -0.06	1.15 +0.14 0	STW-10
32,40	41.6	36.2	2.7	10 -0.04 -0.08	9.6 0 -0.09	1.15 +0.14 0	STW-10
50,63	50.6	44.2	3.2	14 -0.05 -0.10	13.4 0 -0.11	1.15 +0.14 0	STW-14
80	64	56.2	3.9	18 -0.05 -0.10	17.0 0 -0.11	1.35 +0.14 0	STW-18
100	72	64.2	3.9	22 -0.07 -0.12	21.0 0 -0.21	1.35 +0.14 0	STW-22

Features

- Compact and space saving

Specification

Model	20-MCFA					
Acting type	Double acting					
Tube I.D. (mm)	6	10	16	20	25	32
Port size	M5×0.8					Rc1/8
Medium	Air					
Max. operating perssure	0.7 MPa					
Min. operating perssure (MPa)	0.12	0.06		0.05		
Proof pressure	1 MPa					
Cushion	With rubber cushion pad					
Lubrication	Not required					
Ambient temperature	-5~+60°C (No freezing)					
Available speed range	50~500 mm/sec					
Sensor switch (*)	RCE, RCE1, RDEP					

* RCE, RCE1, RDEP specification, please refer to page 8-10,14.

Table for standard stroke

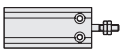
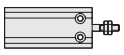
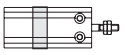
Tube I.D.	Stroke (mm)
ø6, 10, 16	5,10,15,20,25,30
ø20, 25, 32	5,10,15,20,25,30,40,50

Tightening torque

When mounting MCFA series,refer to the below table.

Model	Hexagon socket head cap screw dia.(mm)	Proper tightening toque N.m[kgf.cm]
ø6, 10	M3	1.1 [11.2] ± 10%
ø16	M4	2.5 [25.5] ± 10%
ø20, 25	M5	5.0 [51.0] ± 10%
ø32	M6	8.0 [81.6] ± 10%

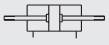
Cylinder weight

Model	Basic weight **MCFA-11**	Basic weight (magnet) **MCFA-11**	Stroke 5 mm **MCFA-11**
Tube I.D.			
ø6	20	18	3
ø10	32	31	3
ø16	42	58	6
ø20	90	118	10
ø25	161	202	17
ø32	268	330	26

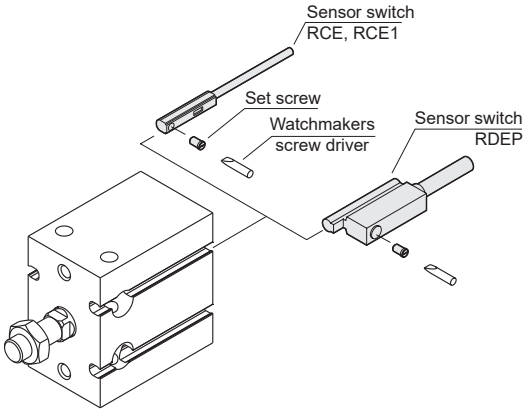
Order example

20 — MCFA — 11 — 6 — 10M — K — □

- MATERIAL RESTRICTIONS (Secondary battery)
- MODEL
- STYLE
  - **1**: Single rod
  - **2**: Double rod
- TUBE I.D.
  - 6
  - 10
  - 16
  - 20
  - 25
  - 32
- STROKE
- **M**: Magnet
- Blank: Standard
  K: Non-rotating rod
- PORT THREAD
  - Blank: M5×0.8 (for ø6~ø25)
  - Blank: Rc thread
    G: G thread
    NPT: NPT thread (for ø32)

Code		Symbol	Description
1	1		Double action / Male thread
2	1		Double rod / Male thread

Installation of sensor switch

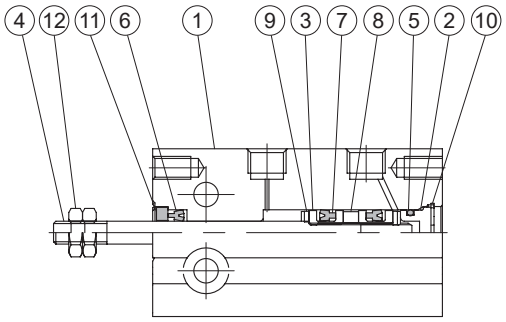


20-MCFA Inside structure & Parts list

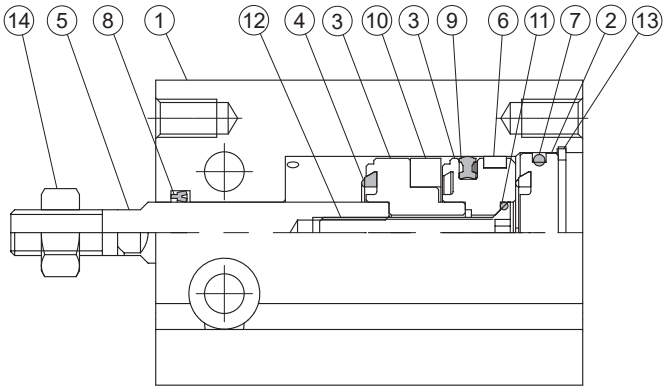
MULTI-MOUNT CYLINDER

Double acting

ø6



ø10~ ø32



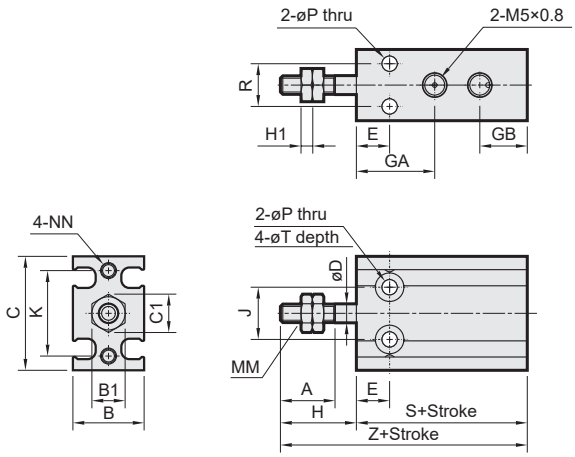
Material

No.	Tube I.D. / Part name	6	Note
1	Body	Aluminum alloy	
2	Head cover	Aluminum alloy	
3	Piston	Aluminum alloy	
4	Rod	Stainless steel	
5	Cover ring	NBR	
6	Rod packing	NBR	
7	Piston packing	NBR	
8	Magnet ring	Magnet material	for with magnet
9	Cushion packing	PU	
10	Snap ring	Spring steel	
11	Fixed ring	Aluminum alloy	
12	Rod front nut	Stainless steel	

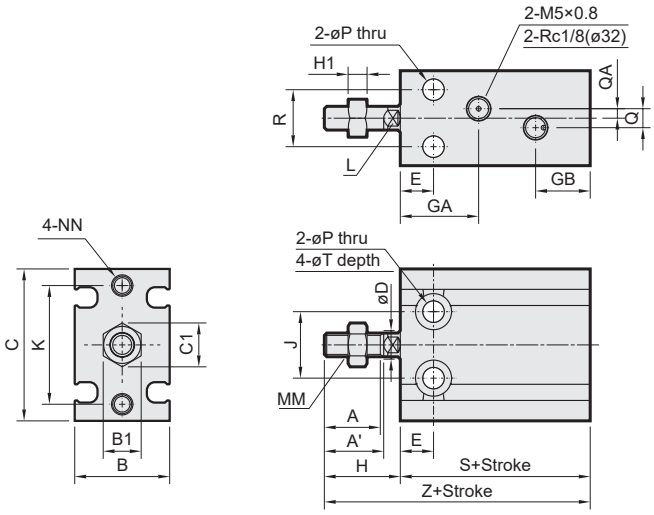
No.	Tube I.D. / Part name	10	16	20	25	32	Note
1	Body	Aluminum alloy					
2	Head cover	Aluminum alloy					
3	Piston	Aluminum alloy					
4	Cushion packing	NBR					
5	Rod	Stainless steel				*	
6	Wear ring	Teflon					
7	Cover ring	NBR					
8	Rod packing	NBR					
9	Piston packing	NBR					
10	Magnet ring	Magnet material					for with magnet
11	Piston gasket	—	NBR				
12	Piston bolt	—	SCM				for without magnet
		—	Stainless steel				for with magnet
13	Snap ring	Spring steel					
14	Rod front nut	Stainless steel					

* Medium carbon steel

ø6, ø10



ø16~ ø32



Code / Tube I.D.	A	A'	B	B1	C	C1	D	E	GA	GB	H	H1	J	K	L	MM	NN	P	Q	QA	R
6	7	–	13	5.5	22	6.4	3	7	15	10	13	1.8	10	17	–	M3×0.5	M3×0.5×5 depth	3.2	–	–	7
10	10	–	15	7	24	8.1	4	7	16.5	10	16	2.4	11	18	–	M4×0.7	M3×0.5×5 depth	3.2	–	–	9
16	11	12.5	20	8	32	9.2	6	7	16.5*	11.5	16	4	14	25	5	M5×0.8	M4×0.7×6 depth	4.5	4	2	12
20	12	14	26	10	40	11.5	8	9	19	12.5	19	5	16	30	6	M6×1.0	M5×0.8×8 depth	5.5	9	4.5	16
25	15.5	18	32	13	50	15.0	10	10	21.5	13	23	5	20	38	8	M8×1.25	M5×0.8×8 depth	5.5	9	4.5	20
32	19.5	22	40	17	62	19.6	12	11	23	12.5	27	6	24	48	10	M10×1.25	M6×1.0×9 depth	6.6	13.5	4.5	24

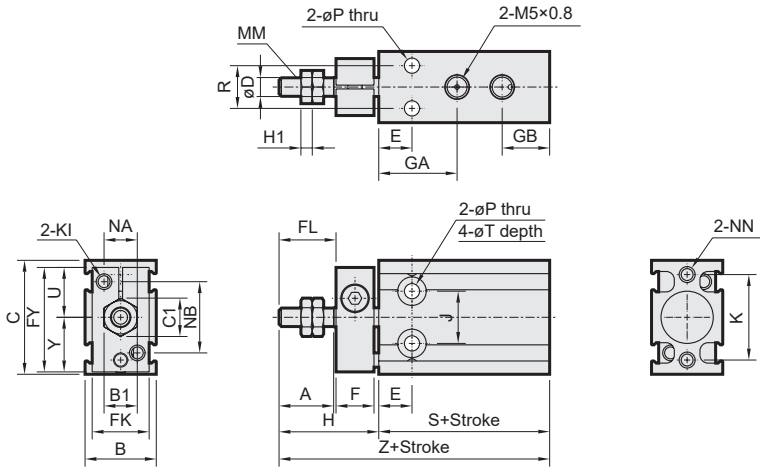
* Without magnet with stroke=5mm, GA=14.5mm.

Code / Tube I.D.	T	Without magnet		Magnet	
		S	Z	S	Z
6	6×4.8 depth	33	46	33	46
10	6×5 depth	36	52	36	52
16	7.6×6.5 depth	30	46	40	56
20	9.3×8 depth	36	55	46	65
25	9.3×9 depth	40	63	50	73
32	11×11.5 depth	42	69	52	79

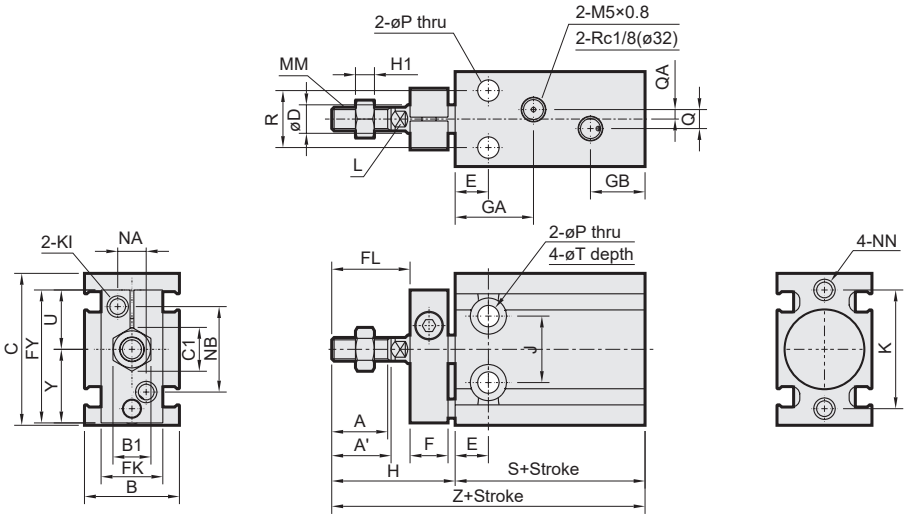
20-MCFA Non-rotating rod / Single rod ø6~ø32

MULTI-MOUNT CYLINDER

ø6, ø10



ø16~ø32

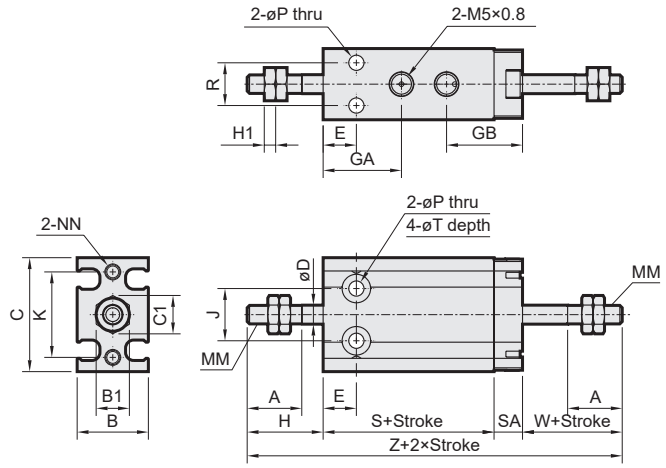


Code / Tube I.D.	A	A'	B	B1	C	C1	D	E	F	FL	FK	FY	GA	GB	H	H1	J	K	KI	L	MM	NA	NB
6	7	–	13	5.5	22	6.4	3	7	8	9	11	20.5	15	10	18	1.8	10	17	M3×0.5	–	M3×0.5	6	14
10	10	–	15	7	24	8.1	4	7	8	12	12	22	16.5	10	21	2.4	11	18	M3×0.5	–	M4×0.7	7	15
16	11	12.5	20	8	32	9.2	6	7	8	17	13	28	16.5*	11.5	26	4	14	25	M4×0.7	5	M5×0.8	6	18
20	12	14	26	10	40	11.5	8	9	8	20	16	33	19	12.5	29	5	16	30	M4×0.7	6	M6×1.0	8	20
25	15.5	18	32	13	50	15.0	10	10	10	22	20	43.5	21.5	13	33	5	20	38	M5×0.8	8	M8×1.25	10	28
32	19.5	22	40	17	62	19.6	12	11	12	29	24	51.5	23	12.5	42	6	24	48	M5×0.8	10	M10×1.25	12	32

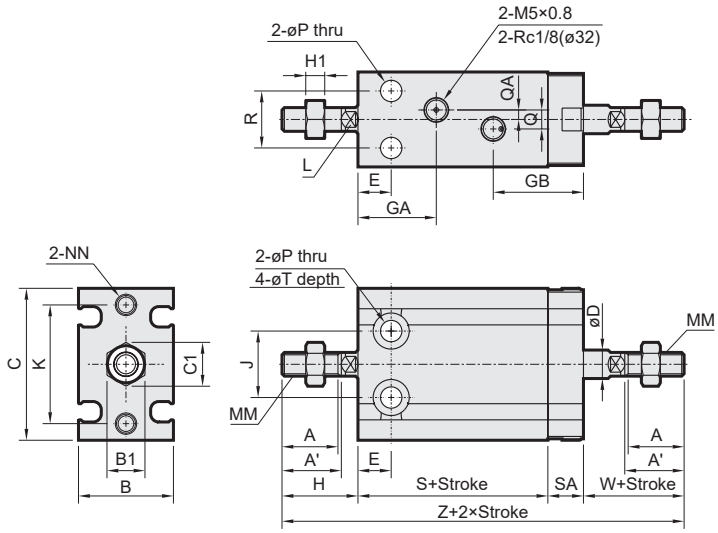
* Without magnet with stroke=5mm, GA=14.5mm.

Code / Tube I.D.	NN	P	Q	QA	R	T	U	Y	Without magnet		Magnet	
									S	Z	S	Z
6	M3×0.5×5 depth	3.2	–	–	7	6×4.8 depth	10	10.5	33	51	33	51
10	M3×0.5×5 depth	3.2	–	–	9	6×5 depth	10.5	11.5	36	57	36	57
16	M4×0.7×6 depth	4.5	4	2	12	7.6×6.5 depth	12.5	15.5	30	56	40	66
20	M5×0.8×8 depth	5.5	9	4.5	16	9.3×8 depth	13.5	19.5	36	65	46	75
25	M5×0.8×8 depth	5.5	9	4.5	20	9.3×9 depth	19	24.5	40	73	50	83
32	M6×1.0×9 depth	6.6	13.5	4.5	24	11×11.5 depth	21	30.5	42	84	52	94

ø6, ø10



ø16~ø32



Code / Tube I.D.	A	A'	B	B1	C	C1	D	E	GA	GB	H	H1	J	K	L	MM	NN	P	Q	QA	R	SA
6	7	–	13	5.5	22	6.4	3	7	15	16	13	1.8	10	17	–	M3×0.5	M3×0.5×5 depth	3.2	–	–	7	6
10	10	–	15	7	24	8.1	4	7	16.5	16	16	2.4	11	18	–	M4×0.7	M3×0.5×5 depth	3.2	–	–	9	6
16	11	12.5	20	8	32	9.2	6	7	16.5*	19	16	4	14	25	5	M5×0.8	M4×0.7×6 depth	4.5	4	2	12	7.5
20	12	14	26	10	40	11.5	8	9	19	21.5	19	5	16	30	6	M6×1.0	M5×0.8×8 depth	5.5	9	4.5	16	9
25	15.5	18	32	13	50	15.0	10	10	21.5	22	23	5	20	38	8	M8×1.25	M5×0.8×8 depth	5.5	9	4.5	20	9
32	19.5	22	40	17	62	19.6	12	11	23	22.5	27	6	24	48	10	M10×1.25	M6×1.0×9 depth	6.6	13.5	4.5	24	10

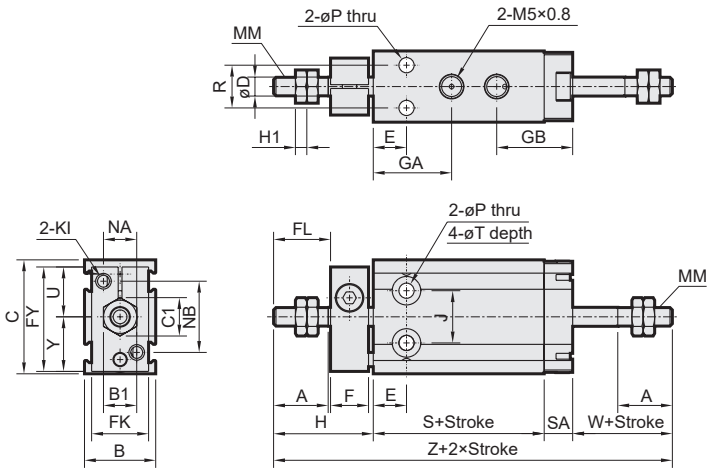
* Without magnet with stroke=5mm, GA=14.5mm.

Code / Tube I.D.	T	W	Without magnet		Without magnet	
			S	Z	S	Z
6	6×4.8 depth	13	38	70	38	70
10	6×5 depth	16	36	74	36	74
16	7.6×6.5 depth	16	30	69.5	40	79.5
20	9.3×8 depth	19	36	83	46	93
25	9.3×9 depth	23	40	95	50	105
32	11×11.5 depth	27	42	106	52	116

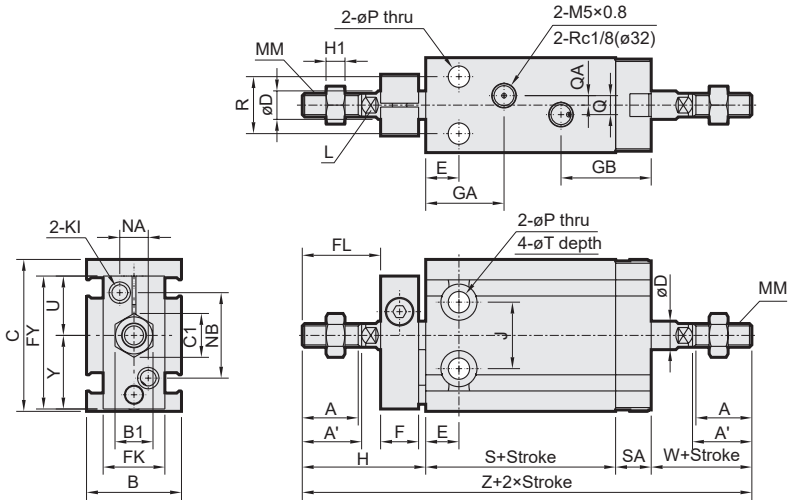
20-MCFA Non-rotating rod / Double rod ø6~ø32

MULTI-MOUNT CYLINDER

ø6, ø10



ø16~ø32



Code / Tube I.D.	A	A'	B	B1	C	C1	D	E	F	FL	FK	FY	GA	GB	H	H1	J	KI	L	MM	NA	NB	P	Q
6	7	–	13	5.5	22	6.4	3	7	8	9	11	20.5	15	16	18	1.8	10	M3×0.5	–	M3×0.5	6	14	3.2	–
10	10	–	15	7	24	8.1	4	7	8	12	12	22	16.5	16	21	2.4	11	M3×0.5	–	M4×0.7	7	15	3.2	–
16	11	12.5	20	8	32	9.2	6	7	8	17	13	28	16.5*	19	26	4	14	M4×0.7	5	M5×0.8	6	18	4.5	4
20	12	14	26	10	40	11.5	8	9	8	20	16	33	19	21.5	29	5	16	M4×0.7	6	M6×1.0	8	20	5.5	9
25	15.5	18	32	13	50	15.0	10	10	10	22	20	43.5	21.5	22	33	5	20	M5×0.8	8	M8×1.25	10	28	5.5	9
32	19.5	22	40	17	62	19.6	12	11	12	29	24	51.5	23	22.5	42	6	24	M5×0.8	10	M10×1.25	12	32	6.6	13.5

* Without magnet with stroke=5mm, GA=14.5mm.

Code / Tube I.D.	QA	R	SA	T	U	W	Y	Without magnet		Magnet	
								S	Z	S	Z
6	–	7	6	6×4.8 depth	10	13	10.5	38	75	38	75
10	–	9	6	6×5 depth	10.5	16	11.5	36	79	36	79
16	2	12	7.5	7.6×6.5 depth	12.5	16	15.5	30	79.5	40	89.5
20	4.5	16	9	9.3×8 depth	13.5	19	19.5	36	93	46	103
25	4.5	20	9	9.3×9 depth	19	23	24.5	40	105	50	115
32	4.5	24	10	11×11.5 depth	21	27	30.5	42	121	52	131

Features

- Compact and space saving.
- Flush fitting sensor.

Specification

Model		20-MCFB					
Acting type		Single / Double			Double acting		
Tube I.D. (mm)		6	8	10	12	16	20
Port size		M3×0.5					M5×0.8
Medium		Air					
Max. operating perssure		0.7 MPa					
Min. operating perssure (MPa)	Single	0.3		0.2	–		
	Double	0.15		0.1	0.07		0.05
Proof pressure		1 MPa					
Lubrication		Not required					
Ambient temperature		-5~+60°C (No freezing)					
Available speed range		50~500 mm/sec					
Sensor switch (*)		RDF, RDFV, RDGV					

* Short stroke length (4, 6, 8mm) only use RDGV.
* RDF, RDGV specification, please refer to page 4-8, 10.

Double acting – Table for standard stroke

Tube I.D.	Stroke (mm)
ø6,8	4,6,8,10,15,20,25
ø10	4,6,8,10,15,20,30
ø12,16	5,10,15,20,25,30
ø20	5,10,15,20,25,30,35,40,45,50

Single acting – Table for standard stroke

Tube I.D.	Stroke (mm)
ø6	4,6,8
ø8,10	4,6,8,10

Order example

20 — MCFB — S — 11 — 16 — 10M

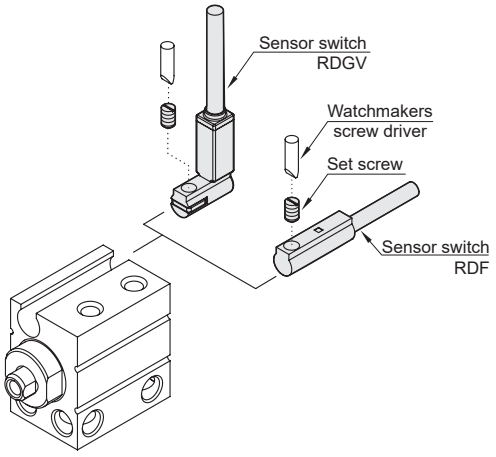
- 20: MATERIAL RESTRICTIONS (Secondary battery)
- MCFB: MODEL
- S: Blank: Both mounting; **S**: Axial mounting (Only for ø12,16,20)
- 11: **1**: Single rod
- 16: TUBE I.D.
- 10M: STROKE
- 10M: **M**: Magnet

STYLE

Code		Symbol	Description
1	1		Double acting / Male thread
1	2		Double acting / Female thread
1	5		Single acting / Normally returned male thread
1	6		Single acting / Normally returned female thread

* Single acting only for ø6,ø8,ø10.

Installation of sensor switch

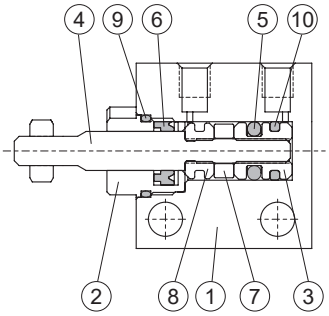


20-MCFB Inside structure & Parts list

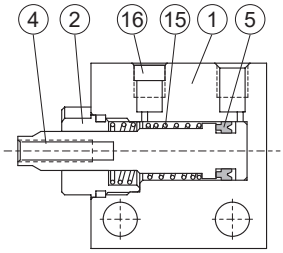
MULTI-MOUNT CYLINDER

ø6,ø8,ø10

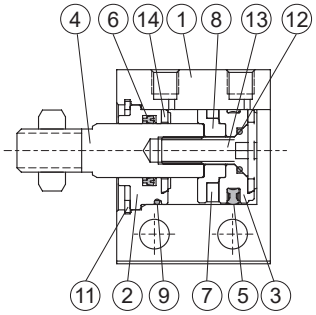
Double acting



Single acting



ø12,ø16,ø20



Material

No.	Part name	Material	Note
1	Body	Aluminum alloy	
2	Rod cover	Copper	ø12~20 use aluminum alloy
3	Piston	Aluminum alloy	
4	Piston rod	Stainless steel	
5	Piston packing	NBR	
6	Rod packing	NBR	
7	Magnet ring	Magnet material	for with magnet
8	Piston	Aluminum alloy	for with magnet
9	O-ring	NBR	
10	Wear ring	Teflon	
11	Snap ring	Spring steel	
12	O-ring	NBR	Only for ø20
13	Piston bolt	Stainless steel	Only for ø20
14	Cushion packing	PU	
15	Spring	Stainless steel	
16	Silencer	Stainless steel	

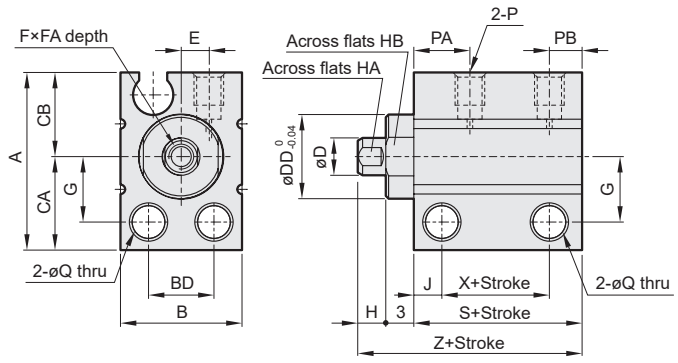
Cylinder weight

Unit: g

11: Male thread (With magnet)								**11**: Male thread (Without magnet)							
Stroke (mm)	ø6	ø8	ø10	Stroke (mm)	ø12	ø16	ø20	Stroke (mm)	ø6	ø8	ø10	Stroke (mm)	ø12	ø16	ø20
4	16	20	23	5	27	42	68	4	15	19	21	5	24	38	63
6	17	21	24	10	32	49	78	6	16	20	22	10	29	45	73
8	18	23	26	15	37	56	88	8	18	22	24	15	34	52	83
10	19	24	27	20	42	63	98	10	19	23	25	20	39	59	93
15	22	27	31	25	47	70	108	15	22	26	29	25	44	66	103
20	25	31	34	30	52	77	118	20	25	29	32	30	49	73	113
25	28	34	38	40	–	–	138	25	28	33	36	40	–	–	133
30	–	–	41	50	–	–	158	30	–	–	39	50	–	–	153

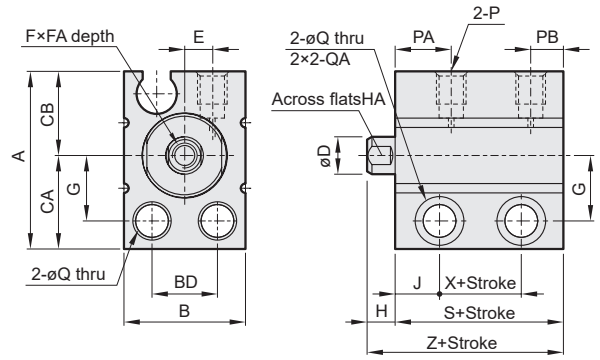
12: Male thread (With magnet)								**12**: Male thread (Without magnet)							
Stroke (mm)	ø6	ø8	ø10	Stroke (mm)	ø12	ø16	ø20	Stroke (mm)	ø6	ø8	ø10	Stroke (mm)	ø12	ø16	ø20
4	15	18	20	5	24	35	57	4	14	17	18	5	21	31	52
6	16	19	21	10	29	42	67	6	15	18	19	10	26	38	62
8	17	20	23	15	34	49	77	8	16	19	21	15	31	45	72
10	18	22	24	20	39	56	87	10	18	21	22	20	36	52	82
15	21	25	28	25	44	63	97	15	21	24	26	25	41	59	92
20	24	28	31	30	49	70	107	20	24	27	29	30	46	66	102
25	27	31	35	40	–	–	127	25	27	30	33	40	–	–	122
30	–	–	38	50	–	–	147	30	–	–	36	50	–	–	142

ø6,ø8,ø10



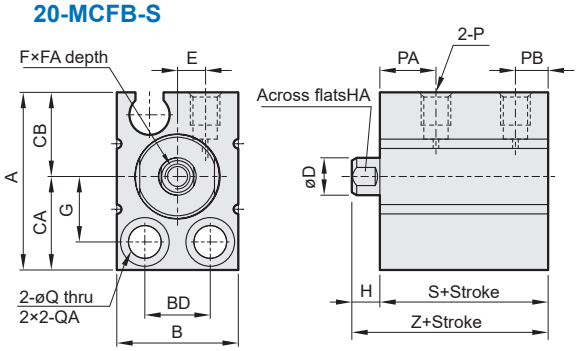
ø12,ø16,ø20

Both mounting



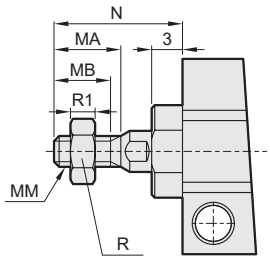
Axial mounting

20-MCFB-S

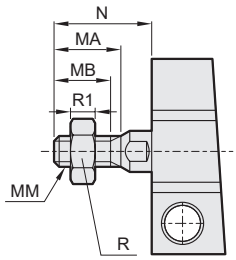


20-MCFB-11/15 male thread size

ø6,ø8,ø10



ø12,ø16,ø20



Code / Tube I.D.	MA	MB	MM	N	R	R1
6	6.5	5.5	M3×0.5	12.5	5.5	2.4
8	8.5	7	M4×0.7	14.5	7	3.2
10	10.5	9	M5×0.8	16.5	8	4
12	10.5	9	M5×0.8	14	8	4
16	12	10	M6×1.0	15.5	10	5
20	14	12	M8×1.25	18.5	13	5

Code / Tube I.D.	A	B	BD	CA	CB	D	DD	E	F	FA	G	H	HA	HB	J	P	PA	PB	Q	QA	Without magnet			Magnet		
																					X	S	Z	X	S	Z
6	19	13	7	10	9	4	9	3	M2.5×0.45	5	7	3	3.5	8	3	M3×0.5	6	3.5	3.5	–	6.5	13	19	11.5	18	24
8	21	13	7	11	10	5	11	3	M3×0.5	6	8	3	4.5	10	3	M3×0.5	6	3.5	3.5	–						
10	22	13.5	7	11.5	10.5	6	12	3.2	M3×0.5	6	8.5	3	5	11	3	M3×0.5	6	3.5	3.5	–						
12	26.5	17	8	15.5	11	6	–	3.5	M3×0.5	6	11	3.5	5	–	6	M3×0.5	7.5	4	4.4	ø7.5, 7 dp	3.5	15.5	19	7.5	19.5	23
16	29.5	21	11.5	17	12.5	8	–	5.5	M4×0.7	8	12.5	3.5	6	–	6	M3×0.5	8.5	4	4.4	ø7.5, 7 dp	4	16.5	20	8.5	21	24.5
20	36	25	13.5	21	15	10	–	7	M5×0.8	7	15.5	4.5	8	–	7	M5×0.8	9	5.5	5.5	ø9.5, 9 dp	5.5	19.5	24	9.5	23.5	28

20-MCMB series

MINIATURE CYLINDER

Features

■ Non lubrication

- Special housing and bushing enables self lubrication of piston rod.

■ High quality long service life

- Hard anodised stainless steel cylinder tubes offer a high resistance to corrosion and low internal friction.
- Cylinder mountings, available with a comprehensive range of accessories for rigid or flexible mounting.

■ Magnetic as standard

Specification

Model		20-MCMB			
Tube I.D.		20	25	32	40
Port size		Rc1/8			Rc1/4
Medium		Air			
Max. operating perssure		1 MPa			
Min. operating perssure	Double acting	0.05 MPa			
	Single acting	Extended: 0.23, Returned: 0.18 MPa			
Proof pressure		1.5 MPa			
Ambient temperature		–5~+60°C (No freezing)			
Lubricator		Not required			
Available speed range		50~500 mm/sec			
Max. allowable kinetic energy (J)	Cushion pad	0.27	0.4	0.65	1.2
	Cushion air	0.54	0.78	1.27	2.35
Sensor switch (*)		RCM			
Sensor switch (band)		BM20	BM25	BM32	BM40

Table for standard stroke

Tube I.D.	Stroke (mm)
ø20,25,32,40	25,50,75,100,125,150,200,250,300

Order example

20 — MCMB — 11 — 20 — 50 — A — N — G

- 20: MATERIAL RESTRICTIONS (Secondary battery)
- MCMB: MODEL
- 11: STYLE — **1**: Single rod, **2**: Double rod
- 20: TUBE I.D.
- 50: STROKE
- A: Blank: Cushion pad (Unadjustable), **A**: Cushion air (Adjustable)
- N: END COVER TYPE
- G: PORT THREAD — Blank: Rc thread, **G**: G thread, **NPT**: NPT thread

STYLE

Code		Symbol	Description
1	1		Double acting / Male thread
1	3		Single acting / Normally extended male thread
1	5		Single acting / Normally returned male thread
2	1		Double rod / Male thread
2	7		Double rod / Adjustable male thread

END COVER TYPE

Code	Symbol	Description
Blank		Standard type
N		End-plain
E		With pivot type

* Single acting type, please consult us.

* Order example for special specification, refer to page 0-7.

Mounting accessories

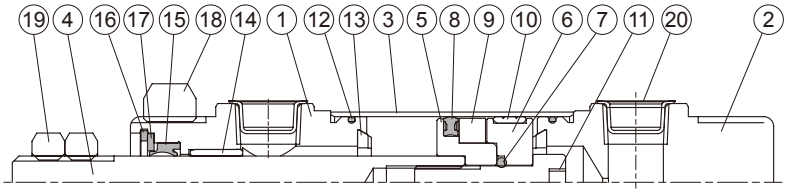
20 — LB — MCMB — 20

- 20: MATERIAL RESTRICTIONS (Secondary battery)
- LB: MOUNTING TYPE
- MCMB: MODEL
- 20: TUBE I.D.

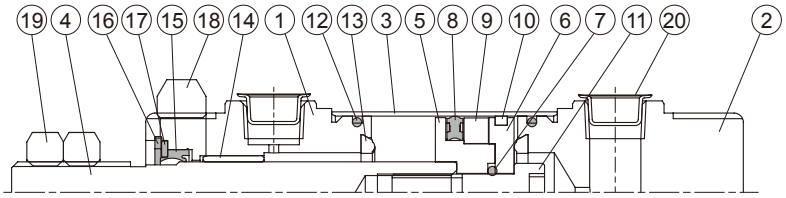
	LB
	CA
	CB
	FA
	FB
	SDB*
	TA
	TB
	Y
	I

*for end cover "E" type

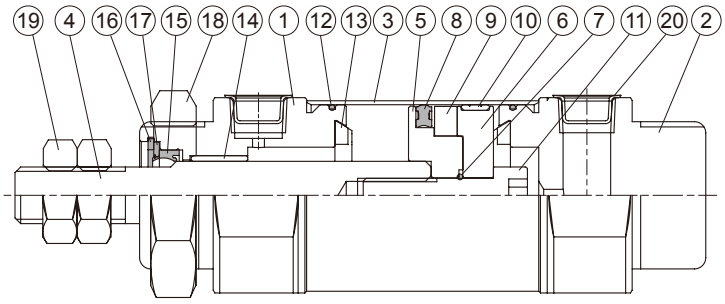
ø20

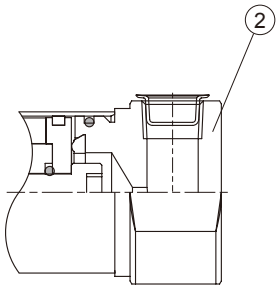


ø25

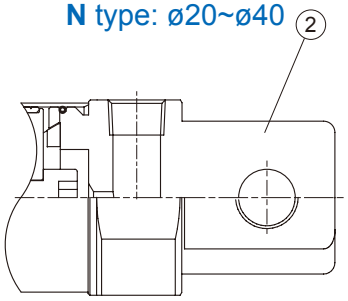


ø32, ø40





N type: ø20~ø40



E type: ø20~ø40

Material

No.	Tube I.D. / Part name	20	25	32	40	Q'y 11 type	Q'y 21 type	Component parts (inclusion) 11 type	Component parts (inclusion) 21 type	Repair kits (inclusion)
1	Rod cover	Aluminum alloy				1	2	●	●	
2	Head cover	Aluminum alloy				1	—	●		
3	Tube	Stainless steel				1	1			
4	Piston rod	Carbon steel				1	1			
5	Piston-R	Aluminum alloy				1	1	●	●	
6	Piston-H	Aluminum alloy				1	1	●	●	
7	Piston gasket	NBR				1	1	●	●	
8	Piston packing	NBR				1	1	●	●	
9	Magnet ring	Magnet material				1	1	●	●	
10	Wear ring	Teflon+Graphite				1	1	●	●	
11	Piston bolt	SCM				1	—	●		
12	Cover ring	NBR				2	2	●	●	
13	Cushion gasket	NBR				2	2	●	●	
14	Rod bush	Iron-based alloy				1	2	●	●	
15	Rod packing	NBR				1	2	●	●	●
16	Snap ring	Spring steel				1	2	●	●	
17	Washer	Carbon steel				1	2	●	●	
18	Tie nut	Carbon steel				1	2	●	●	
19	Rod front nut	Carbon steel				2	2	●	●	
20	Port plug	Plastic				2	2	●	●	

Order example

Component parts / Repair kits

Tube I.D.	Component parts	Repair kits
ø20	**20-CP-MCMB-20**	**PS-MCMB-20**
ø25	**20-CP-MCMB-25**	**PS-MCMB-25**
ø32	**20-CP-MCMB-32**	**PS-MCMB-32**
ø40	**20-CP-MCMB-40**	**PS-MCMB-40**

Non-pivot type (end-plain)

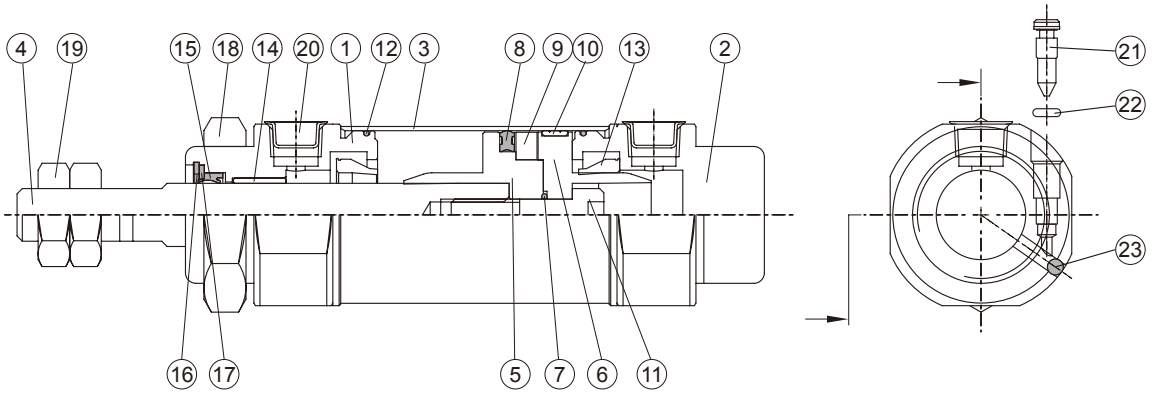
Tube I.D.	Component parts
ø20	**20-CP-MCMB-20-N**
ø25	**20-CP-MCMB-25-N**
ø32	**20-CP-MCMB-32-N**
ø40	**20-CP-MCMB-40-N**

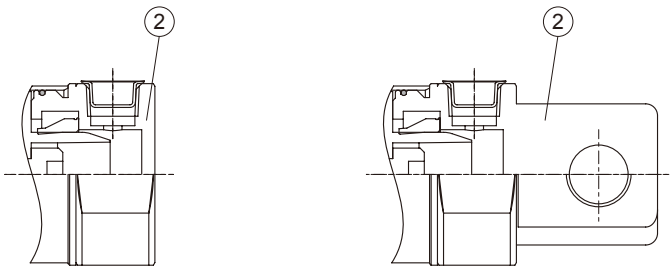
Pivot type

Tube I.D.	Component parts
ø20	**20-CP-MCMB-20-E**
ø25	**20-CP-MCMB-25-E**
ø32	**20-CP-MCMB-32-E**
ø40	**20-CP-MCMB-40-E**

20-MCMB Inside structure & Parts list – Cushion air

MINIATURE CYLINDER





N type

E type

Material

No.	Tube I.D. / Part name	20	25	32	40	Q'y 11 type	Q'y 21 type	Component parts (inclusion) 11 type	Component parts (inclusion) 21 type	Repair kits (inclusion)
1	Rod cover	Aluminum alloy				1	2	●	●	
2	Head cover	Aluminum alloy				1	—	●		
3	Tube	Stainless steel				1	1			
4	Piston rod	Carbon steel				1	1			
5	Piston-R	Aluminum alloy				1	1	●	●	
6	Piston-H	Aluminum alloy				1	1	●	●	
7	Piston gasket	NBR				1	1	●	●	
8	Piston packing	NBR				1	1	●	●	
9	Magnet ring	Magnet material				1	1	●	●	
10	Wear ring	Teflon+Graphite				1	1	●	●	
11	Piston bolt	SCM				1	—	●		
12	Cover ring	NBR				2	2	●	●	
13	Cushion packing	NBR				2	2	●	●	
14	Rod bush	Iron-based alloy				1	2	●	●	
15	Rod packing	NBR				1	2	●	●	●
16	Snap ring	Spring steel				1	2	●	●	
17	Washer	Carbon steel				1	2	●	●	
18	Tie nut	Carbon steel				1	2	●	●	
19	Rod front nut	Carbon steel				2	2	●	●	
20	Port plug	Plastic				2	2	●	●	
21	Needle valve	Stainless steel				2	2	●	●	
22	Needle vavle packing	NBR				2	2	●	●	●
23	Steel ball	Stainless steel				2	2	●	●	

Order example

Component parts / Repair kits

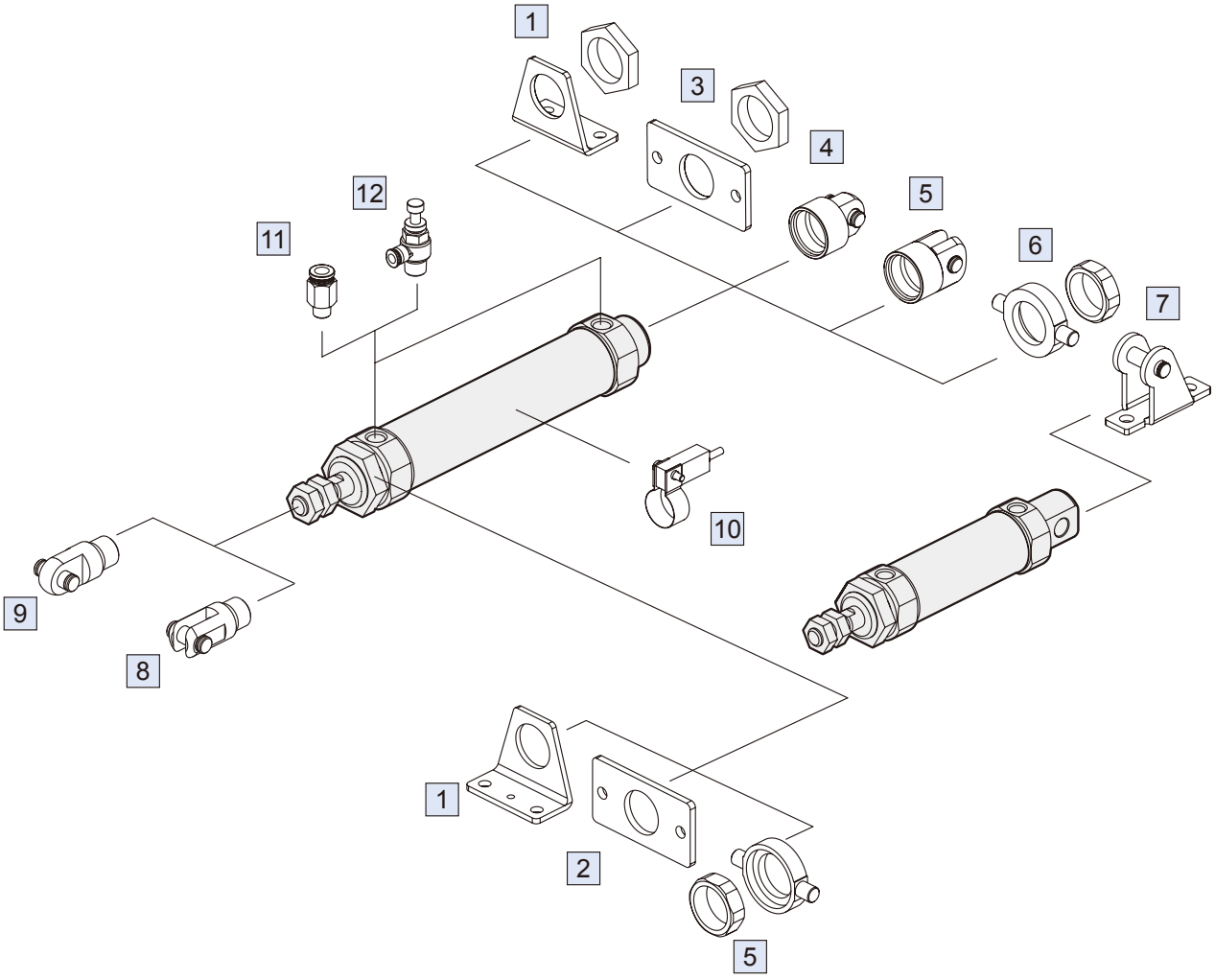
Tube I.D.	Component parts	Repair kits
ø20	**20-CP-MCMB-20A**	**PS-MCMB-20A**
ø25	**20-CP-MCMB-25A**	**PS-MCMB-25A**
ø32	**20-CP-MCMB-32A**	**PS-MCMB-32A**
ø40	**20-CP-MCMB-40A**	**PS-MCMB-40A**

Non-pivot type (end-plain)

Tube I.D.	Component parts
ø20	**20-CP-MCMB-20A-N**
ø25	**20-CP-MCMB-25A-N**
ø32	**20-CP-MCMB-32A-N**
ø40	**20-CP-MCMB-40A-N**

Pivot type

Tube I.D.	Component parts
ø20	**20-CP-MCMB-20A-E**
ø25	**20-CP-MCMB-25A-E**
ø32	**20-CP-MCMB-32A-E**
ø40	**20-CP-MCMB-40A-E**



No.	Accessories	Page
1	Mounting accessories LB	3-54
2	Mounting accessories FA	3-55
3	Mounting accessories FB	3-55
4	Mounting accessories CA+PIN	3-54, 57
5	Mounting accessories CB+PIN	3-54, 57
6	Mounting accessories TA/TB	3-56

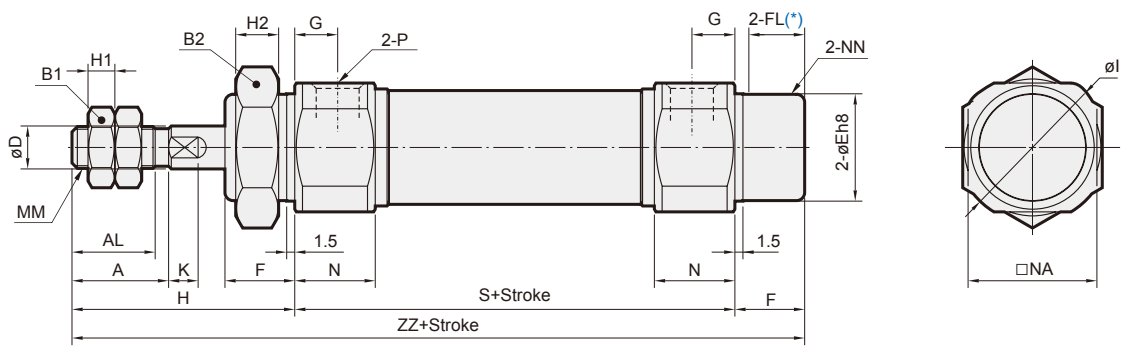
No.	Accessories	Page
7	Mounting accessories SDB+PIN (*)	3-55, 57
8	Accessories Y+PIN	3-57
9	Accessories I+PIN	3-57
10	Sensor switch RCM+BM**	4-5
11	Fitting PC (PISCO)	4-26
12	Fitting PC (PISCO)	4-31

* Only for end cover "E" type.

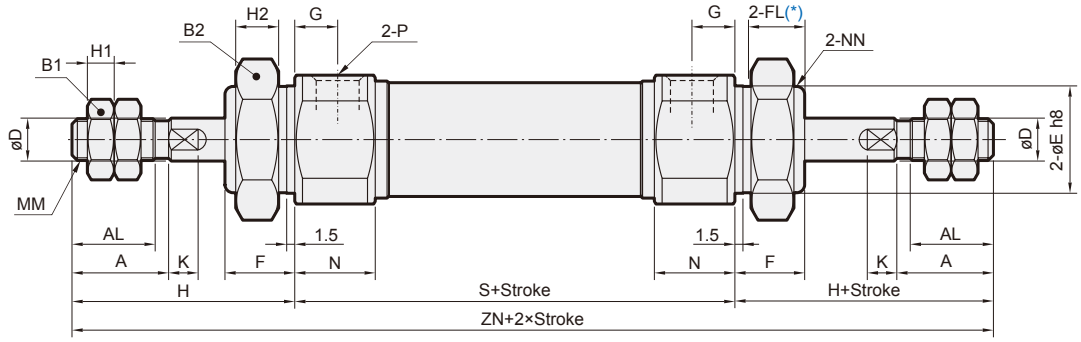
20-MCMB Dimensions – Double acting ø20~ø40

MINIATURE CYLINDER

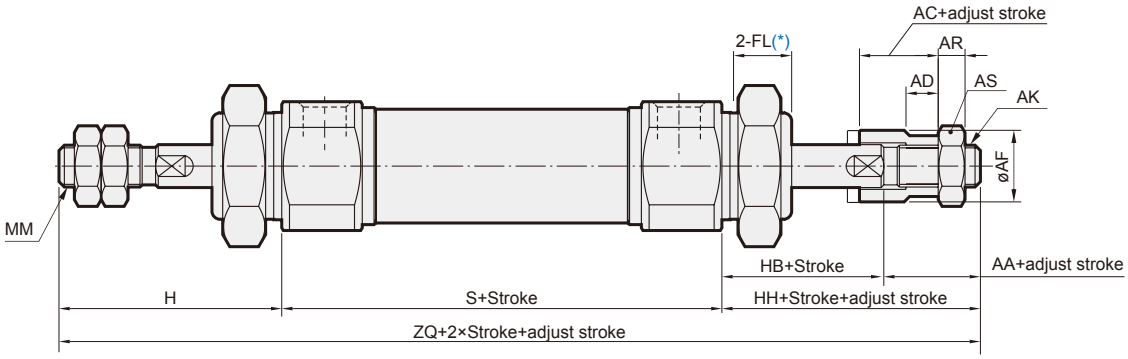
11



21



27



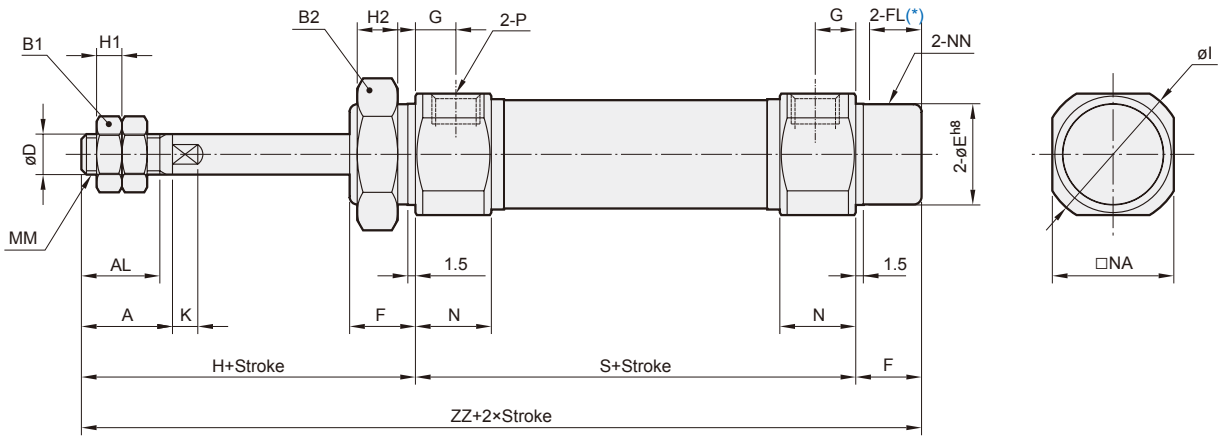
Unit: mm

Code / Tube I.D.	A	AA	AC	AD	AF	AK	AL	AR	AS	B1	B2	D	E	F	FL	G	H	H1	H2	HB	HH	I	K	MM
20	18	17.5	15	9.5	16	M8×1.25	15.5	5	13	13	26	8	20 $^{0}_{-0.03}$	13	10.5	8	41	5	8	20.5	38	28	5	M8×1.25
25	22	18.5	15	9.5	16	M8×1.25	19.5	5	13	17	32	10	26 $^{0}_{-0.03}$	13	10.5	8	45	6	8	20.5	39	33.5	5	M10×1.25
32	22	16	12	7	20	M10×1.25	19.5	6	17	17	32	12	26 $^{0}_{-0.03}$	13	10.5	8	45	6	8	20	36	37.5	5.5	M10×1.25
40	24	17	12	7	30	M12×1.25	21	7	19	22	41	14	32 $^{0}_{-0.04}$	16	13.5	11	50	8	10	23	40	46.5	7	M14×1.5

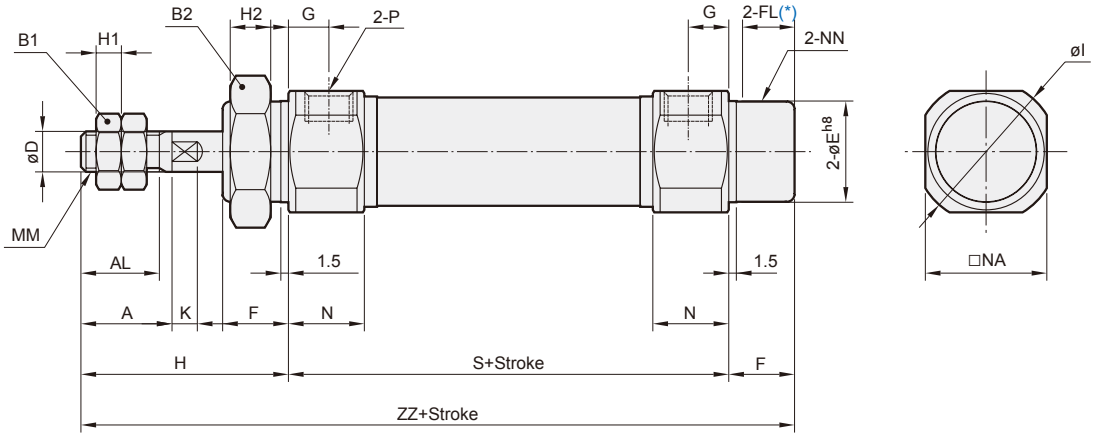
Code / Tube I.D.	N	NA	NN	P	S	ZN	ZQ	ZZ
20	15	24	M20×1.5	Rc1/8	62	144	141	116
25	15	30	M26×1.5	Rc1/8	62	152	146	120
32	15	34.5	M26×1.5	Rc1/8	64	154	145	122
40	21.5	42.5	M32×2.0	Rc1/4	88	188	178	154

* FL: Effective thread length

13



15



Code / Tube I.D.	A	AL	B1	B2	D	E	F	FL	G	H	H1	H2	I	K	MM	N	NA	NN	P
20	18	15.5	13	26	8	20 $^{0}_{-0.03}$	13	10.5	8	41	5	8	28	5	M8×1.25	15	24	M20×1.5	Rc1/8
25	22	19.5	17	32	10	26 $^{0}_{-0.03}$	13	10.5	8	45	6	8	33.5	5	M10×1.25	15	30	M26×1.5	Rc1/8
32	22	19.5	17	32	12	26 $^{0}_{-0.03}$	13	10.5	8	45	6	8	37.5	5.5	M10×1.25	15	34.5	M26×1.5	Rc1/8
40	24	21	22	41	14	32 $^{0}_{-0.04}$	16	13.5	11	50	8	10	46.5	7	M14×1.5	21.5	42.5	M32×2.0	Rc1/4

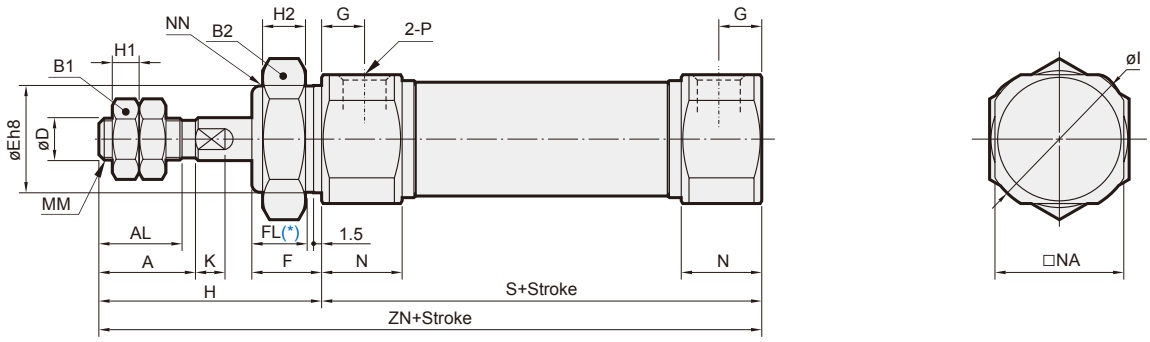
Code / Stroke / Tube I.D.	S			ZZ		
	1~50	51~100	101~150	1~50	51~100	101~150
20	87	112	137	141	166	191
25	87	112	137	145	170	195
32	89	114	139	147	172	197
40	113	138	163	179	204	229

* FL: Effective thread length

20-MCMB Dimensions – Double acting ø20~ø40

MINIATURE CYLINDER

N

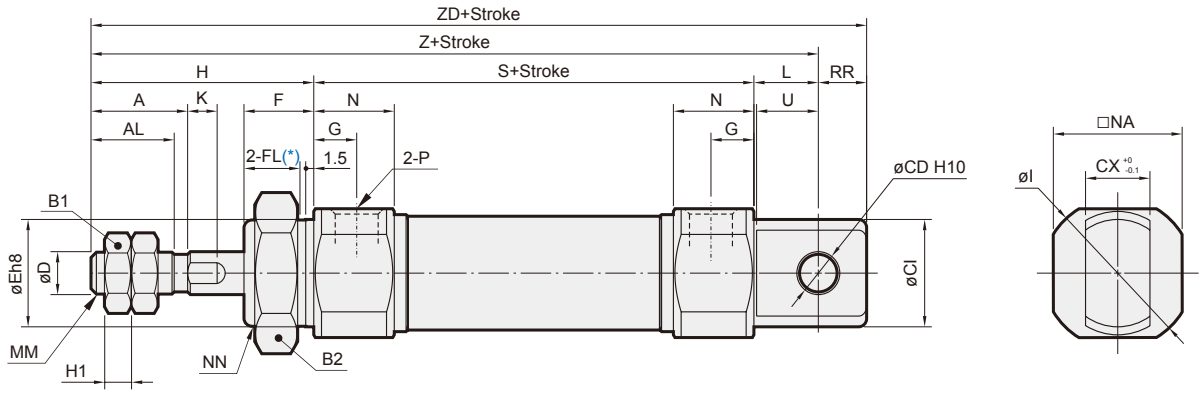


* FL: Effective thread length

Unit : mm

Code / Tube I.D.	A	AL	B1	B2	D	E	F	FL	G	H	H1	H2	I	K	MM	N	NA	NN	P	S	ZN
20	18	15.5	13	26	8	20 $^{0}_{-0.03}$	13	10.5	8	41	5	8	28	5	M8×1.25	15	24	M20×1.5	Rc1/8	62	103
25	22	19.5	17	32	10	26 $^{0}_{-0.03}$	13	10.5	8	45	6	8	33.5	5	M10×1.25	15	30	M26×1.5	Rc1/8	62	107
32	22	19.5	17	32	12	26 $^{0}_{-0.03}$	13	10.5	8	45	6	8	37.5	5.5	M10×1.25	15	34.5	M26×1.5	Rc1/8	64	109
40	24	21	22	41	14	32 $^{0}_{-0.04}$	16	13.5	11	50	8	10	46.5	7	M14×1.5	21.5	42.5	M32×2.0	Rc1/4	88	138

E

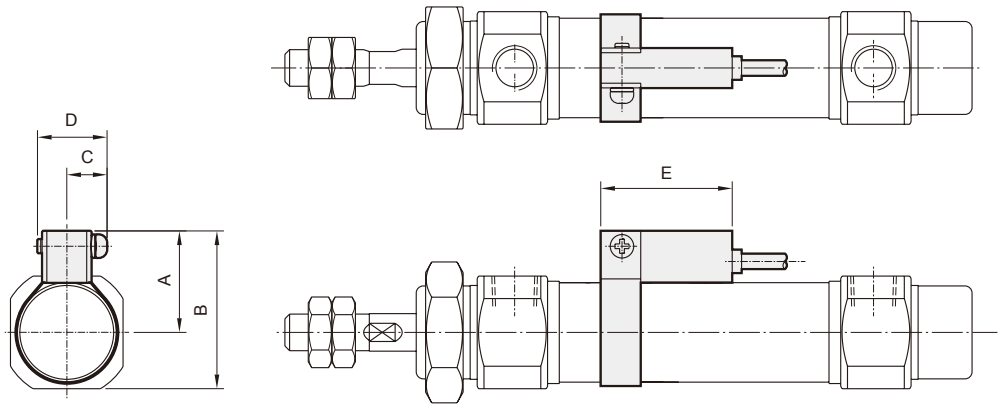


* FL: Effective thread length

Unit: mm

Code / Tube I.D.	A	AL	B1	B2	CD	CX	CI	D	E	F	FL	G	H	H1	I	K	L	MM	N	NA	NN	P	RR	S	U	Z	ZD
20	18	15.5	13	26	8	12	20	8	20 $^{0}_{-0.03}$	13	10.5	8	41	5	28	5	12	M8×1.25	15	24	M20×1.5	Rc1/8	9	62	11.5	115	124
25	22	19.5	17	32	8	12	22	10	26 $^{0}_{-0.03}$	13	10.5	8	45	6	33.5	5	12	M10×1.25	15	30	M26×1.5	Rc1/8	9	62	11.5	119	128
32	22	19.5	17	32	10	20	27	12	26 $^{0}_{-0.03}$	13	10.5	8	45	6	37.5	5.5	15	M10×1.25	15	34.5	M26×1.5	Rc1/8	12	64	14.5	124	136
40	24	21	22	41	10	20	33	14	32 $^{0}_{-0.04}$	16	13.5	11	50	8	46.5	7	15	M14×1.5	21.5	42.5	M32×2.0	Rc1/4	12	88	14.5	153	165

Sensor switch: RCM
Sensor switch band: BM**

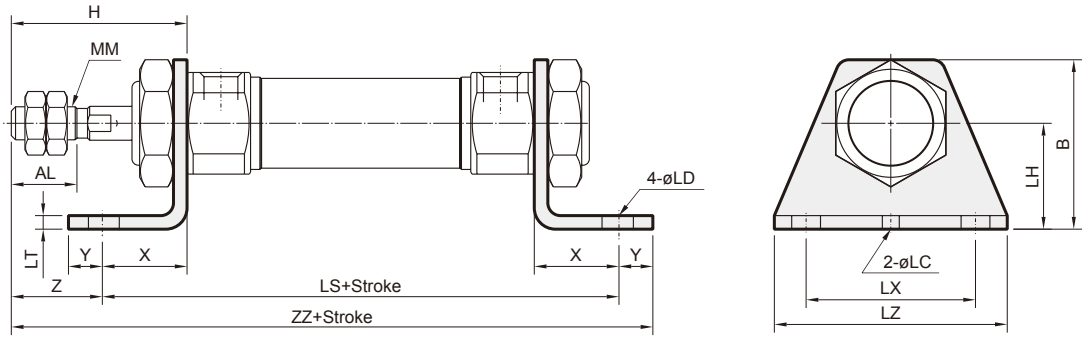


Code / Tube I.D.	A	B	C	D	E
20	22	34	10	16	28
25	25	40	10	16	28
32	28	46	10	16	28
40	32	54	10	16	28

20-MCMB Mounting accessories – Double acting ø20~ø40

MINIATURE CYLINDER

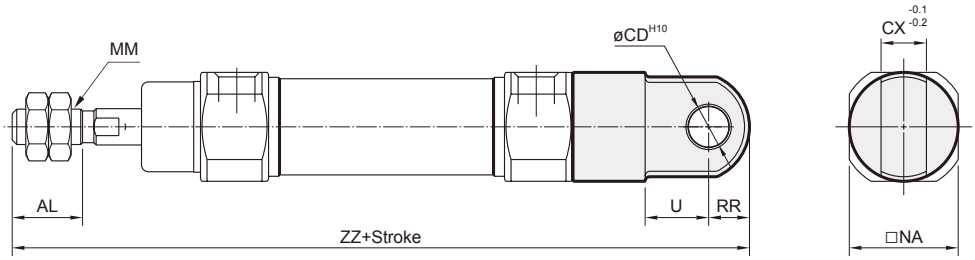
LB



Unit : mm

Code / Tube I.D.	AL	B	H	LC	LD	LH	LS	LT	LX	LZ	MM	X	Y	Z	ZZ
20	15.5	40	41	4	6.8	25	102	3.2	40	55	M8×1.25	20	8	21	131
25	19.5	47	45	4	6.8	28	102	3.2	40	55	M10×1.25	20	8	25	135
32	19.5	47	45	4	6.8	28	104	3.2	40	55	M10×1.25	20	8	25	137
40	21	54	50	4	7	30	134	3.2	55	75	M14×1.5	23	10	27	171

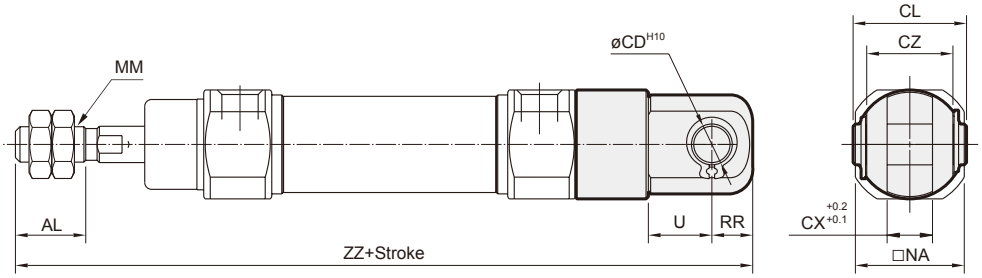
CA



Unit : mm

Code / Tube I.D.	AL	CD	CX	MM	NA	RR	U	ZZ
20	15.5	9	10	M8×1.25	24	9	14	142
25	19.5	9	10	M10×1.25	30	9	14	146
32	19.5	9	10	M10×1.25	34.5	9	14	148
40	21	10	15	M14×1.5	42.5	11	18	188

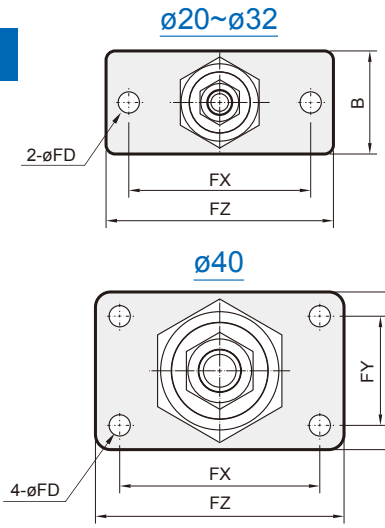
CB

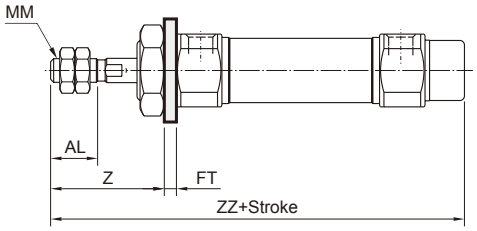


Unit : mm

Code / Tube I.D.	AL	CD	CL	CX	CZ	MM	NA	RR	U	ZZ
20	15.5	9	25	10	19	M8×1.25	24	9	14	142
25	19.5	9	25	10	19	M10×1.25	30	9	14	146
32	19.5	9	25	10	19	M10×1.25	34.5	9	14	148
40	21	10	41.2	15	30	M14×1.5	42.5	11	18	188

FA

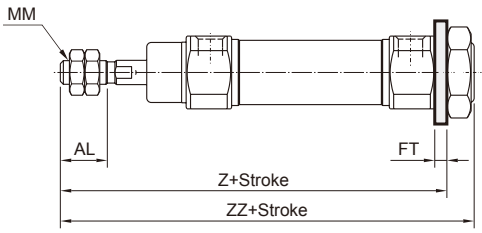


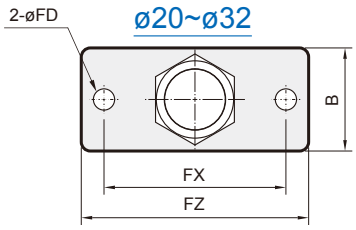


Unit : mm

Code / Tube I.D.	AL	B	FD	FT	FX	FY	FZ	MM	Z	ZZ
20	15.5	34	7	4	60	–	75	M8×1.25	37	116
25	19.5	40	7	4	60	–	75	M10×1.25	41	120
32	19.5	40	7	4	60	–	75	M10×1.25	41	122
40	21	52	7	5	66	36	82	M14×1.5	45	154

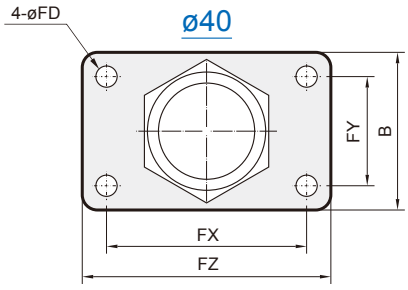
FB



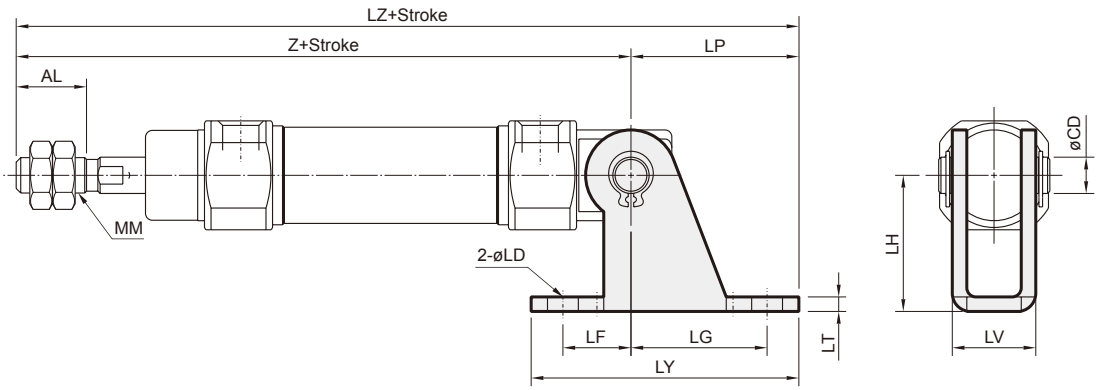


Unit : mm

Code / Tube I.D.	AL	B	FD	FT	FX	FY	FZ	MM	Z	ZZ
20	15.5	34	7	4	60	–	75	M8×1.25	107	116
25	19.5	40	7	4	60	–	75	M10×1.25	111	120
32	19.5	40	7	4	60	–	75	M10×1.25	113	122
40	21	52	7	5	66	36	82	M14×1.5	143	154



SDB



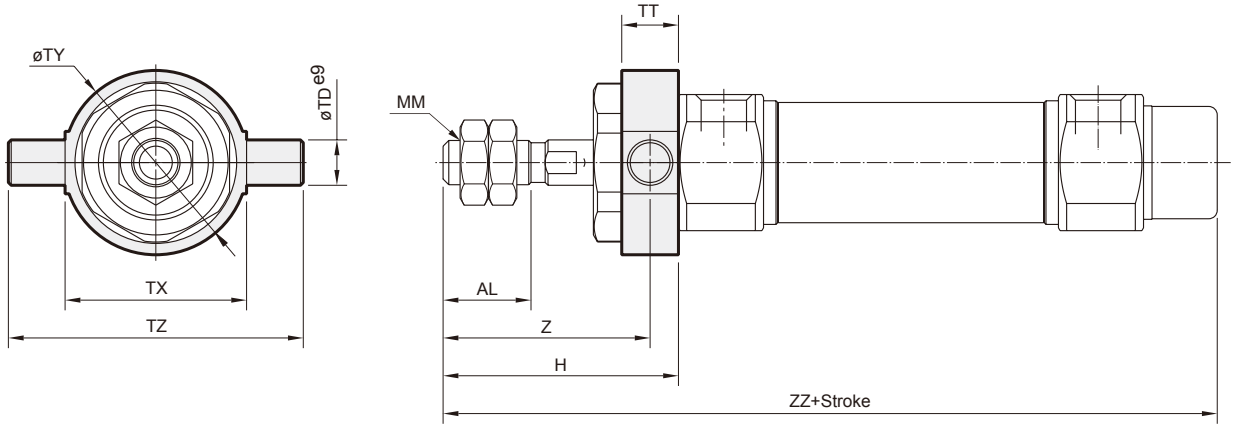
Unit : mm

Code / Tube I.D.	AL	CD	LD	LF	LG	LH	LP	LT	LV	LY	LZ	MM	N	Z
20	15.5	8	6.8	15	30	30	37	3.2	18.4	59	152	M8×1.25	15	115
25	19.5	8	6.8	15	30	30	37	3.2	18.4	59	156	M10×1.25	15	119
32	19.5	10	9	15	40	40	50	4	28	75	174	M10×1.25	15	124
40	21	10	9	15	40	40	50	4	28	75	203	M14×1.5	21.5	153

20-MCMB Mounting accessories – Double acting ø20~ø40

MINIATURE CYLINDER

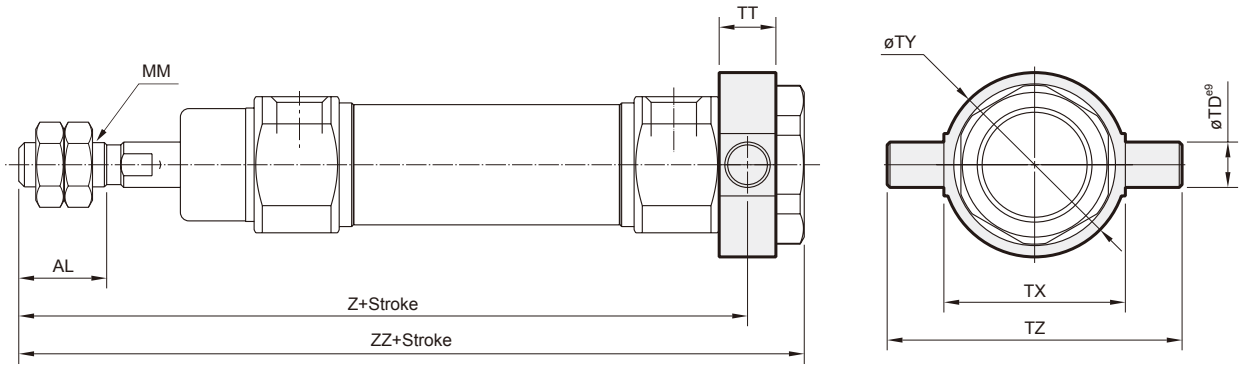
TA



Unit : mm

Code / Tube I.D.	AL	H	MM	TD	TT	TX	TY	TZ	Z	ZZ
20	15.5	41	M8×1.25	8	10	32	32.5	52	36	116
25	19.5	45	M10×1.25	9	10	40	40.5	60	40	120
32	19.5	45	M10×1.25	9	10	40	40.5	60	40	122
40	21	50	M14×1.5	10	11	53	53.5	77	44.5	154

TB

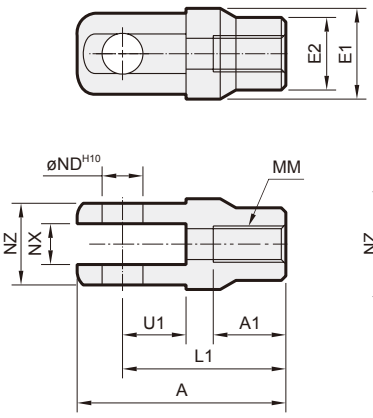


Unit : mm

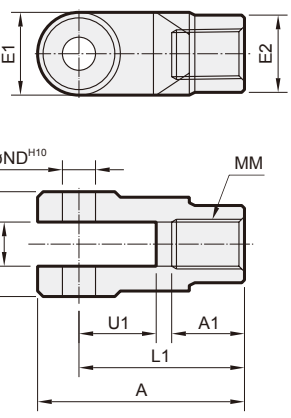
Code / Tube I.D.	AL	MM	TD	TT	TX	TY	TZ	Z	ZZ
20	15.5	M8×1.25	8	10	32	32.5	52	108	118
25	19.5	M10×1.25	9	10	40	40.5	60	112	122
32	19.5	M10×1.25	9	10	40	40.5	60	114	124
40	21	M14×1.5	10	11	53	53.5	77	143.5	154

Y connector

ø20~ø32



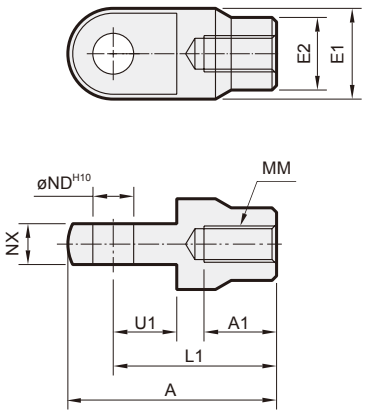
ø40



Unit : mm

Code / Tube I.D.	A	A1	E1	E2	L1	MM	ND	NX	NZ	U1
20	46	16	ø20	ø16	36	M8×1.25	9	9 $^{+0.2}_{+0.1}$	18	14
25, 32	46	16	ø20	ø16	36	M10×1.25	9	9 $^{+0.2}_{+0.1}$	18	14
40	68	25	ø26	ø24	55	M14×1.5	12	16 $^{+0.3}_{+0.1}$	38	25

I connector



Unit : mm

Code / Tube I.D.	A	A1	E1	E2	L1	MM	ND	NX	U1
20	46	16	ø20	ø16	36	M8×1.25	9	9 $^{+0.1}_{+0.2}$	14
25, 32	46	16	ø20	ø16	36	M10×1.25	9	9 $^{+0.1}_{+0.2}$	14
40	69	22	ø24	–	55	M14×1.5	12	16 $^{+0.1}_{+0.2}$	20

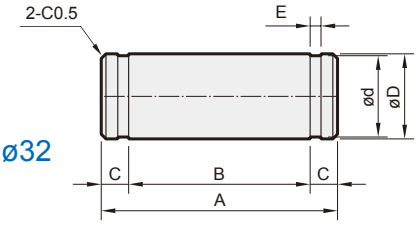
PIN

Order example

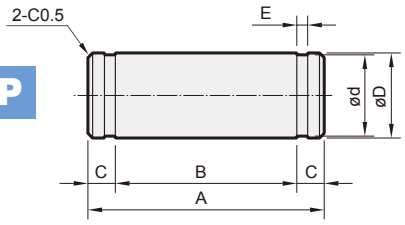
20 –PIN – MCMB – 32 – Y – P

- 20: MATERIAL RESTRICTIONS (Secondary battery)
- PIN
- MCMB: TUBE I.D.
- 32
- Y: TYPE
  - **Y**: for Y & I connector
  - **CB**: for CA & CB accessory
  - **SDB**: for SDB accessory
- P: With split pin

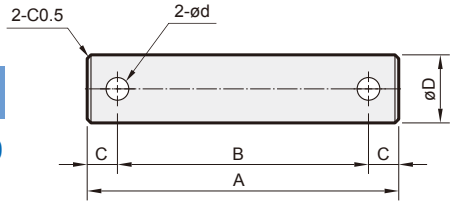
P ø20~ø32



P



P ø40



for SDB

Code / Tube I.D.	A	B	C	øD d9	ød	E	Snap ring
20~25	24.5	19.5	2.5	8 $^{-0.04}_{-0.08}$	7.6 $^{0}_{-0.06}$	0.9 $^{+0.10}_{0}$	STW-8
32~40	34	29	2.5	10 $^{-0.04}_{-0.08}$	9.6 $^{-0}_{-0.09}$	1.15 $^{+0.14}_{0}$	STW-9

for CB & Y connector

Code / Tube I.D.	A	B	C	øD d9	ød	E	Snap ring Split pin
20~32-CB, Y	25	19.2	2.9	9 $^{-0.04}_{-0.08}$	8.6 $^{0}_{-0.06}$	1.15 $^{+0.14}_{0}$	STW-9
40-CB	41.2	33.2	4	10 $^{-0.04}_{-0.08}$	3.2	–	ø3.2×20 L
40-Y	49.7	41.7	4	12 $^{-0.05}_{-0.09}$	3.2	–	ø3.2×20 L

20-MCMJ series

PEN CYLINDER

Features

- High quality long service life.
- Cylinder mountings, available with a comprehensive range of accessories for rigid or flexible mounting.

Specification

Model	20-MCMJ		
Tube I.D. (mm)	6	10	16
Port size	M5×0.8		
Medium	Air		
Max. operating perssure	0.7 MPa		
Min. operating perssure (MPa) — Single acting — normally extended	0.25	0.15	
Min. operating perssure (MPa) — Single acting — normally returned	0.2	0.15	
Min. operating perssure (MPa) — Double acting	0.12	0.06	
Proof pressure	1 MPa		
Lubrication	Not required		
Ambient temperature	–5~+60°C (No freezing)		
Available speed range	50~500 mm/sec		
Max. allowable kinetic energy (J)	0.16	0.27	0.4
Sensor switch	RCM		
Sensor switch band	BM6	BM10	BM16

Table for standard stroke

	Tube I.D.	Stroke (mm)
Single acting	ø6	15,30,45,60
	ø10	15,30,45,60
	ø16	15,30,45,60,75,100,125,150
Double acting	ø6	15,30,45,60
	ø10	15,30,45,60,75,100,125,150
	ø16	15,30,45,60,75,100,125,150,175,200

Order example

20 — MCMJ — 11 — 16 — 45M — B

- 20 — MATERIAL RESTRICTIONS (Secondary battery)
- MCMJ — MODEL
- 11 — STYLE — **1**: Single rod, **2**: Double rod
- 16 — TUBE I.D.
- 45M — STROKE
- B — END COVER TYPE — **M**: Magnet

STYLE

Code		Symbol	Description
1	1		Double acting / Male thread
1	3		Single acting / Normally extended male thread
1	5		Single acting / Normally returned male thread

END COVER TYPE

Code	Symbol	Tube I.D.
B		ø10,16
D		ø10,16
R		ø6,10,16

Tightening torque

Tube I.D.	Rod thread	Tightening torque (kgf·cm)
ø6	M3×0.5	4.79
ø10	M4×0.7	11.8
ø16	M5×0.8	22.8

* Make sure the tightening torque of rod thread does not exceed the value above.
* The tolerance of tightening torque is ±5%.

Mounting accessories

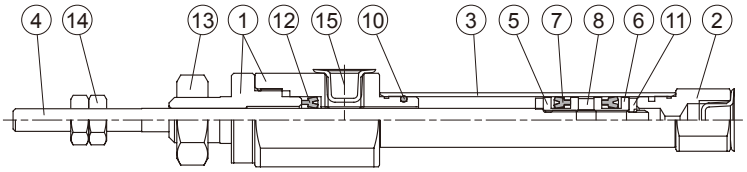
20 — FA — MCMJ — 16

- 20 — MATERIAL RESTRICTIONS (Secondary battery)
- FA — MOUNTING TYPE (*)
- MCMJ — MODEL
- 16 — TUBE I.D.

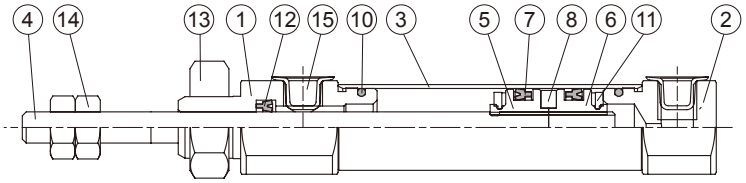
* MOUNTING TYPE

	LB
	FA
	T
	Y
	I

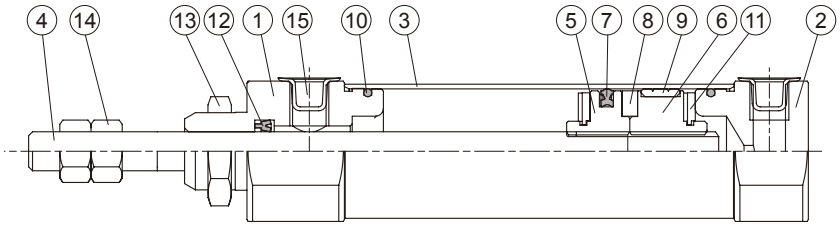
ø6

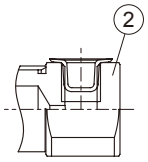


ø10

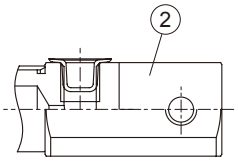


ø16

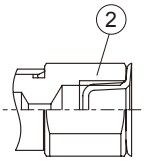




B type: ø10, ø16



D type: ø10, ø16



R type: ø6, ø10, ø16

Material

No.	Tube I.D. / Part name	6	10	16	Q'y	Component parts (inclusion)
1	Rod cover	Aluminum alloy			1	●
2	Head cover	Aluminum alloy			1	●
3	Tube	Stainless steel			1	
4	Piston rod	Stainless steel			1	
5	Piston-R	Aluminum alloy			1	●
6	Piston-H	Aluminum alloy			1	●
7	Piston packing	NBR			2*2	●
8	Magnet ring	Magnet material			1	●
9	Wear ring	–		*1	1	●
10	Cover ring	NBR			2	●
11	Cushion packing	NBR			2	●
12	Snap ring	NBR			1	●
13	Tie nut	Carbon steel			1	●
14	Rod front nut	Carbon steel			2	●
15	Port plug	Plastic			2	●

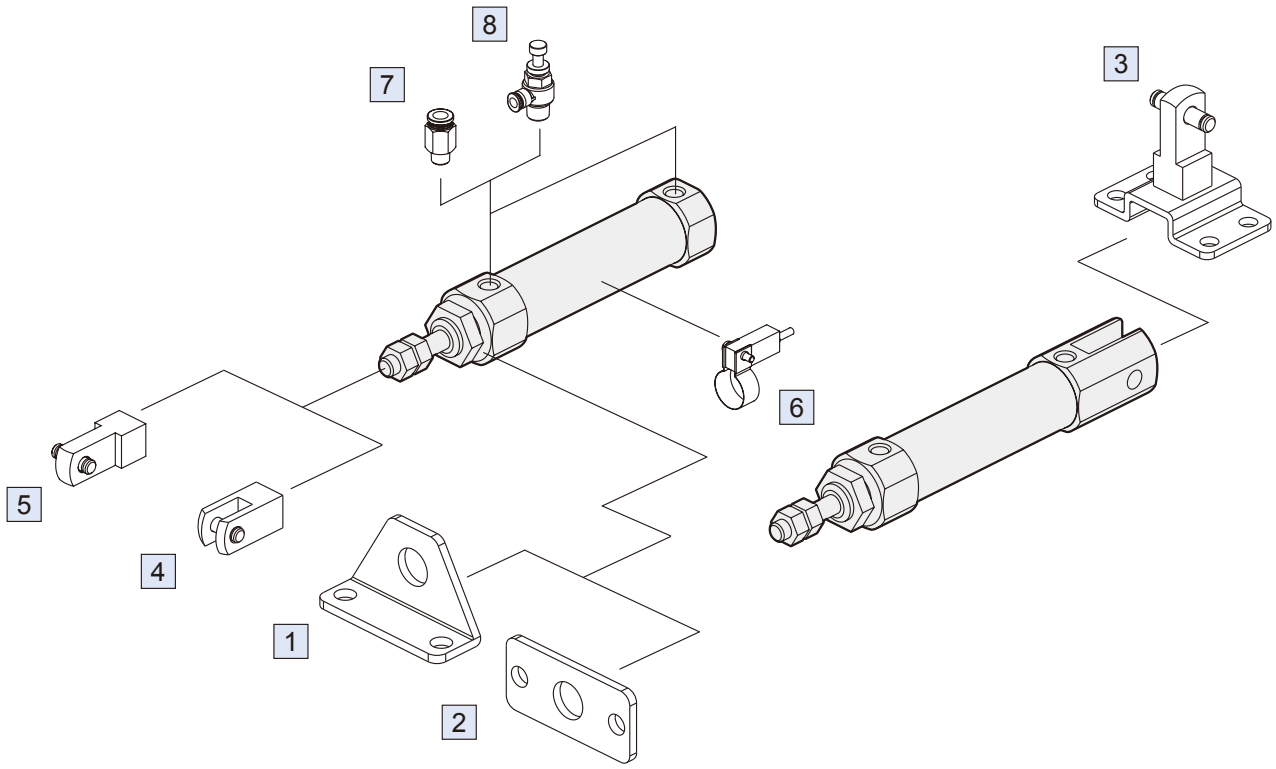
*1. Teflon+Graphite *2. Cylinder bore 6 (Required quantity: 1 pc)

Order example of Component parts

Tube I.D.	Component parts
ø6	**20-CP-MCMJ-6-R**
ø10	**20-CP-MCMJ-10-R**
	20-CP-MCMJ-10-B
	20-CP-MCMJ-10-D
ø16	**20-CP-MCMJ-16-R**
	20-CP-MCMJ-16-B
	20-CP-MCMJ-16-D

20-MCMJ Accessories

PEN CYLINDER

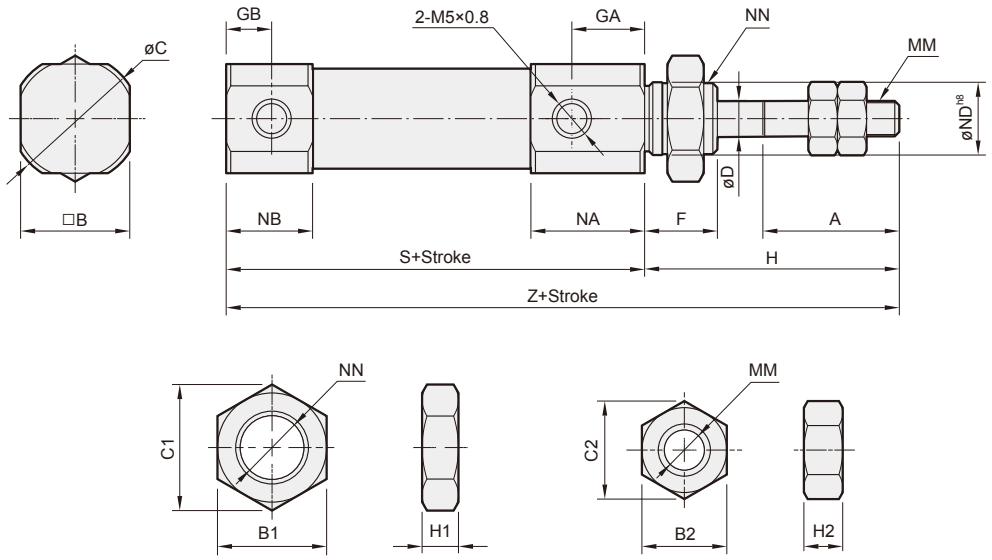


No.	Accessories	Page
1	Mounting accessories LB	3-64, 66, 68
2	Mounting accessories FA	3-65, 67, 69
3	Mounting accessories T+I+PIN (*)	3-65, 67, 69, 70
4	Accessories Y+PIN	3-70
5	Accessories I+PIN	3-70

No.	Accessories	Page
6	Sensor switch RCM+BM**	4-5
7	Fitting PC (PISCO)	4-26
8	Speed controller JSC (PISCO)	4-31

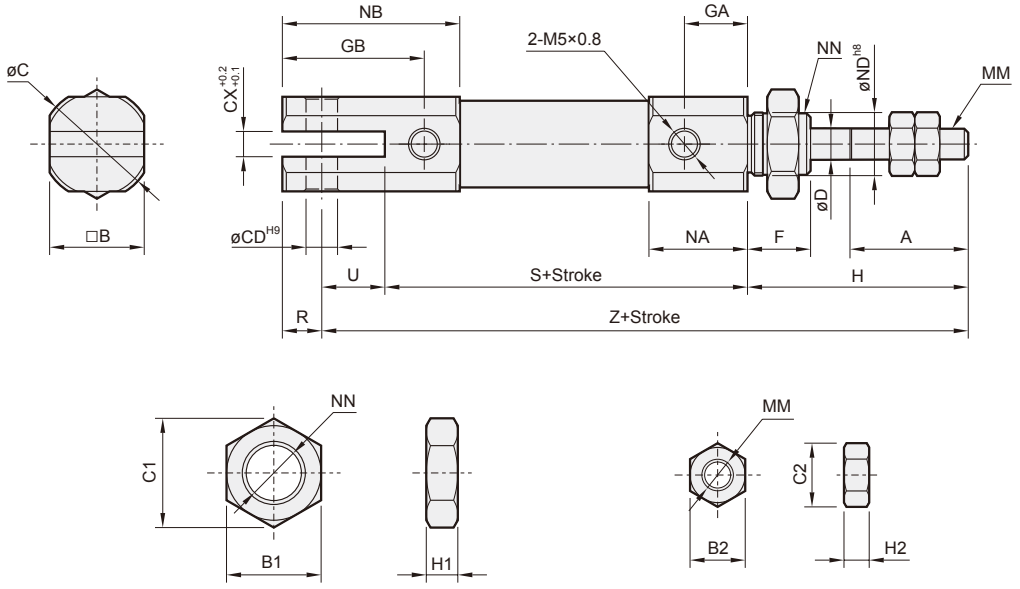
* Only for end cover "D" type.

B



Code / Tube I.D.	A	B	B1	B2	C	C1	C2	D	F	GA	GB	H	H1	H2	MM	NA	NB	ND h8	NN	S	Z
10	15	12	11	7	14	11.5	8.1	4	8	8	5	28	4	3.2	M4×0.7	12.5	9.5	8 $^{0}_{-0.022}$	M8×1.0	46	74
16	15	18	14	8	20	16.2	9.2	5	8	8	5	28	4	4	M5×0.8	12.5	9.5	10 $^{0}_{-0.022}$	M10×1.0	47	75

D



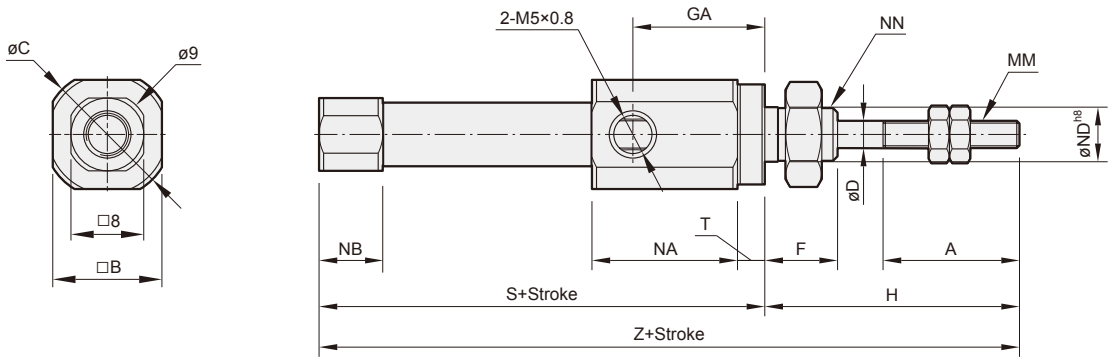
Code / Tube I.D.	A	B	B1	B2	C	CD	CX	C1	C2	D	F	GA	GB	H	H1	H2	MM	NA	NB	ND h8	NN	R	S	U	Z
10	15	12	11	7	14	3.3	3.2	12.7	8.1	4	8	8	18	28	4	3.2	M4×0.7	12.5	22.5	8 $^{0}_{-0.022}$	M8×1.0	5	46	8	82
16	15	18	14	8	20	5	6.5	16.2	9.2	5	8	8	23	28	4	4	M5×0.8	12.5	27.5	10 $^{0}_{-0.022}$	M10×1.0	8	47	10	85

20-MCMJ Dimensions – Double acting ø6~ø16

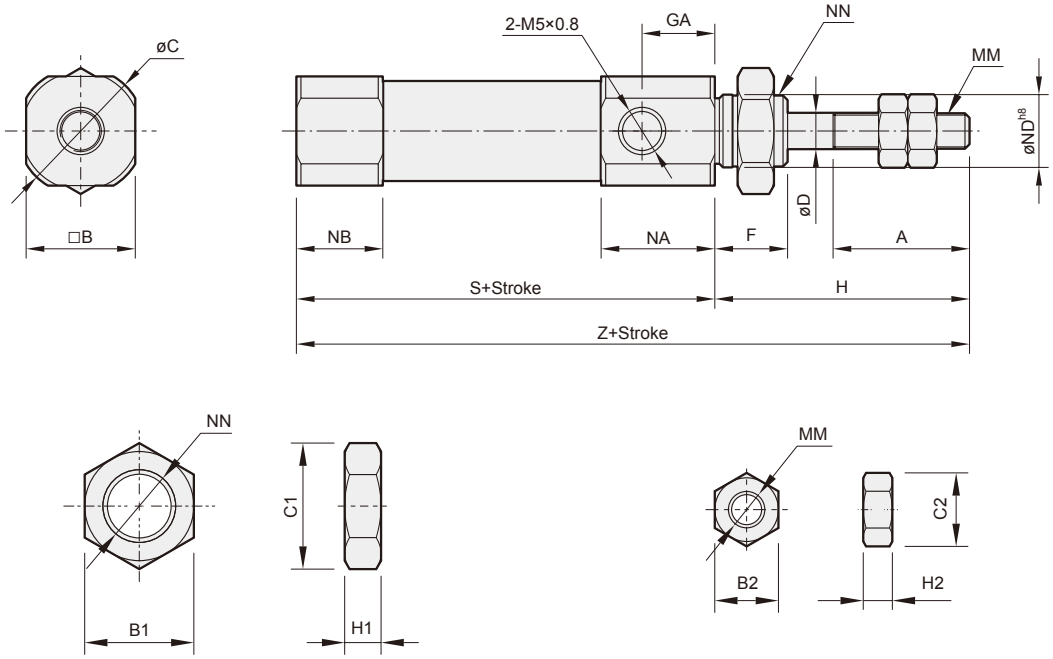
PEN CYLINDER

R

ø6

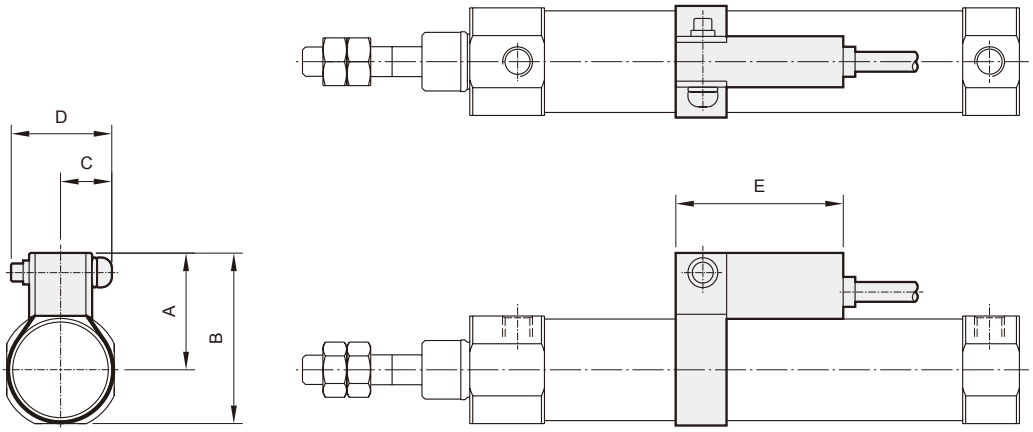


ø10~ø16



Code / Tube I.D.	A	B	B1	B2	C	C1	C2	D	F	GA	H	H1	H2	MM	NA	NB	ND^{h8}	NN	S	T	Z
6	15	12	8	5.5	14	9.2	6.4	3	8	14.5	28	4	2.4	M3×0.5	16	7	6 $^{0}_{-0.022}$	M6×1.0	49	3	77
10	15	12	11	7	14	12.7	8.1	4	8	8	28	4	3.2	M4×0.7	12.5	9.5	8 $^{0}_{-0.022}$	M8×1.0	46	–	74
16	15	18	14	8	20	16.2	9.2	5	8	8	28	4	4	M5×0.8	12.5	9.5	10 $^{0}_{-0.022}$	M10×1.0	47	–	75

Sensor switch: RCM
Sensor switch band: BM**



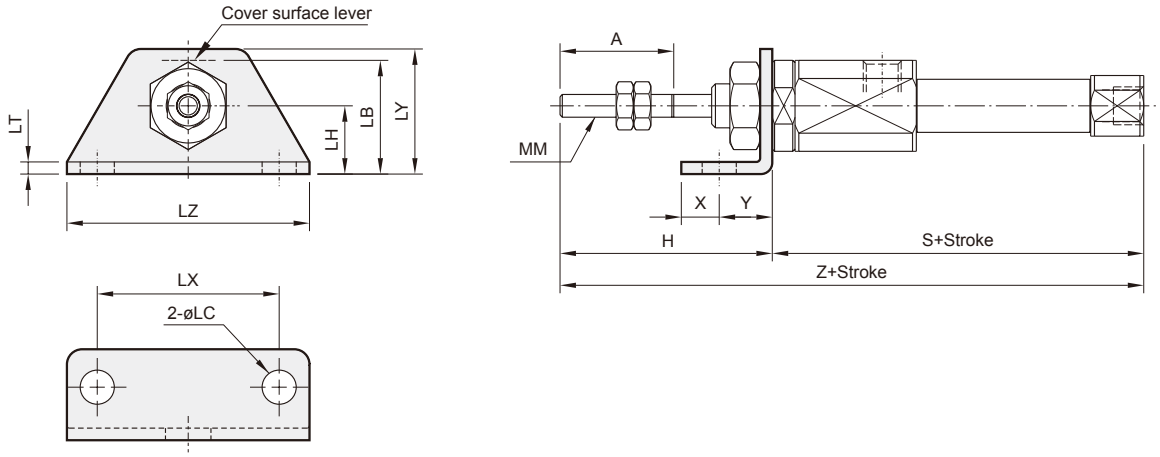
Code / Tube I.D.	A	B	C	D	E
6	15	21	10	16	28
10	17	23	10	16	28
16	20	29	10	16	28

20-MCMJ Mounting accessories – Double acting ø6~ø16

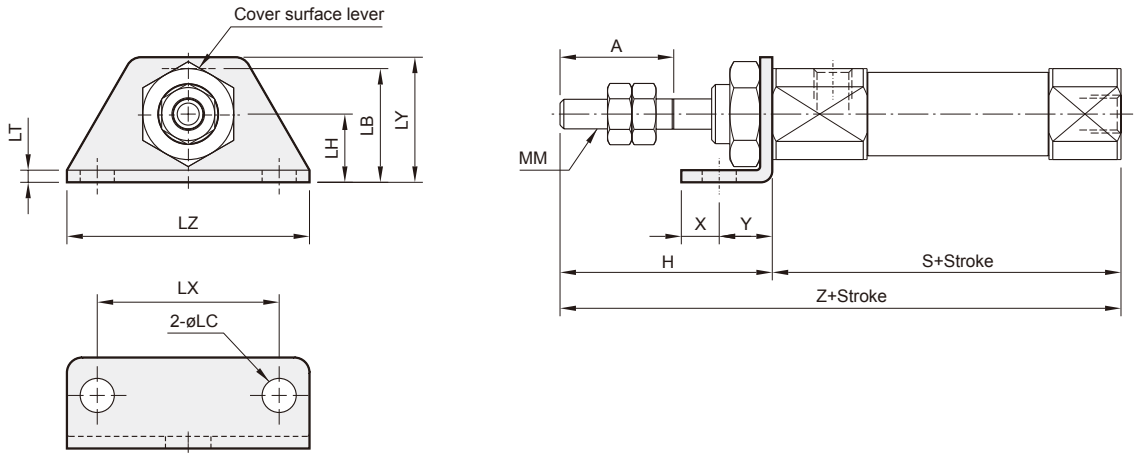
PEN CYLINDER

LB

ø6



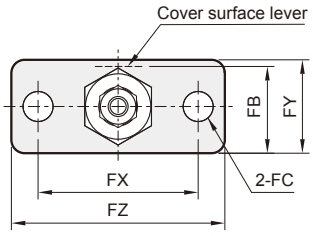
ø10, ø16

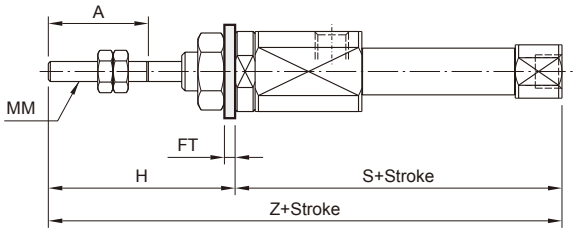


Code / Tube I.D.	A	H	LB	LC	LH	LT	LX	LY	LZ	MM	S	X	Y	Z
6	15	28	15	4.5	9	1.6	24	16.5	32	M3×0.5	49	5	7	77
10	15	28	15	4.5	9	1.6	24	16.5	32	M4×0.7	46	5	7	74
16	15	28	23	5.5	14	2.3	33	25	42	M5×0.8	47	6	9	75

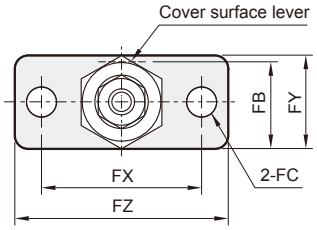
FA

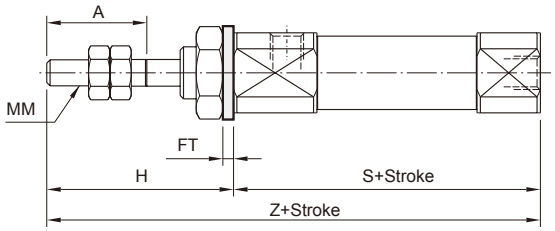
ø6





ø10, ø16

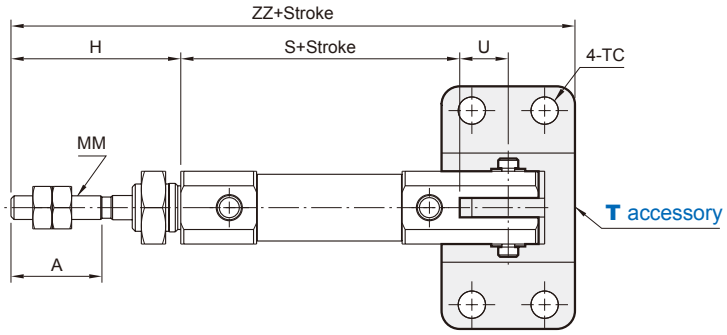


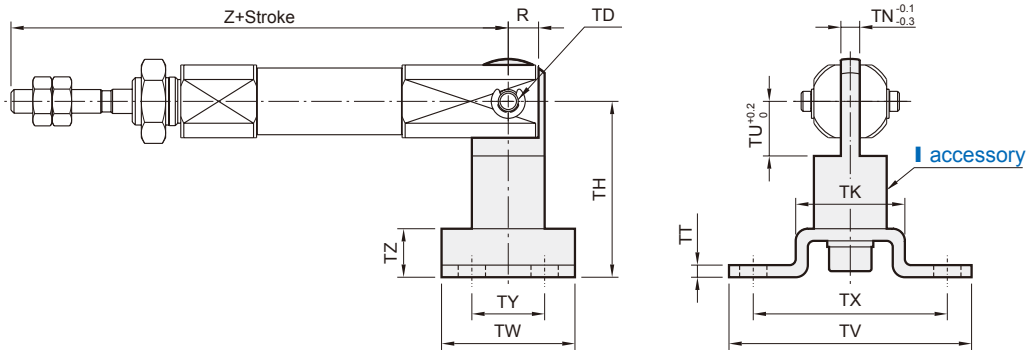


Code / Tube I.D.	A	FB	FC	FT	FX	FY	FZ	H	MM	S	Z
6	15	13	4.5	1.6	24	14	32	28	M3×0.5	49	77
10	15	13	4.5	1.6	24	14	32	28	M4×0.7	46	74
16	15	19	5.5	2.3	33	20	42	28	M5×0.8	47	75

T

I+Pin (Extra pruchase)





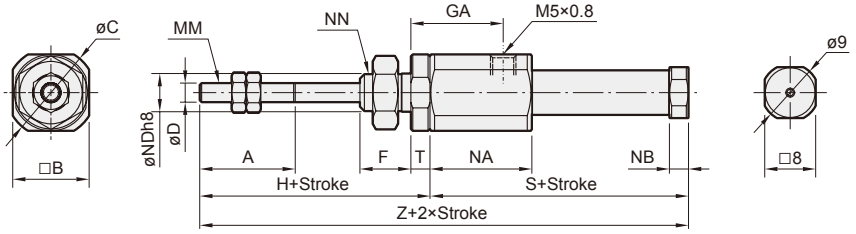
Code / Tube I.D.	A	H	MM	R	S	TC	TD H10	TH	TK	TN	TT	TU	TV	TW	TX	TY	TZ	U	Z	ZZ
10	15	28	M4×0.7	5	46	4.5	3.3 +0.048 0	29	18	3.1	2	9	40	22	32	12	8	8	8	93
16	15	28	M5×0.8	8	47	5.5	5 +0.048 0	35	20	6.4	2.3	14	48	28	38	16	10	10	10	99

20-MCMJ Dimensions – Normally extended ø6~ø16

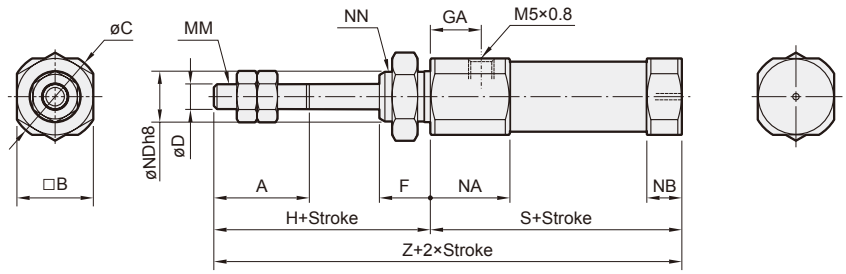
PEN CYLINDER

13

ø6



ø10, ø16



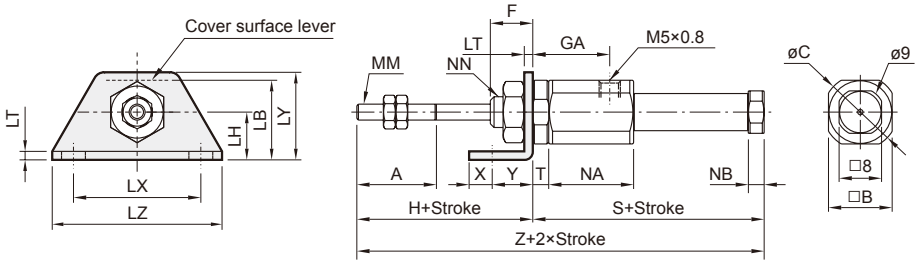
Code / Tube I.D.	A	B	C	D	F	GA	H	MM	NA	NB	ND	NN	T
6	15	12	14	3	8	14.5	28	M3×0.5	16	3	$6\ ^{0}_{-0.018}$	M6×1.0	3
10	15	12	14	4	8	8	28	M4×0.7	12.5	5.5	$8\ ^{0}_{-0.022}$	M8×1.0	–
16	15	18	20	5	8	8	28	M5×0.8	12.5	5.5	$10\ ^{0}_{-0.022}$	M10×1.0	–

* (S), (Z) ( ) indicate the size of that with magnet ring.

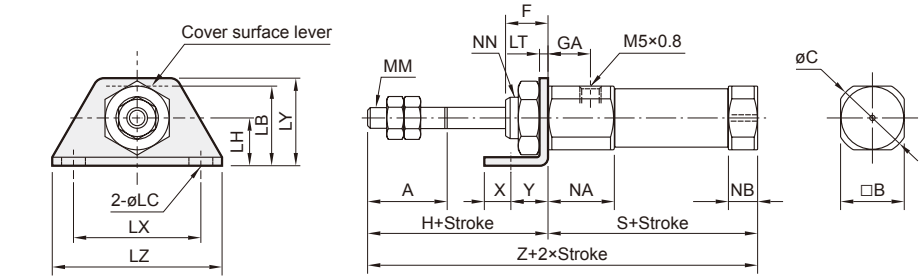
Code / Stroke / Tube I.D.	S *								Z *							
	5~15	16~30	31~45	46~60	61~75	76~100	101~125	126~150	5~15	16~30	31~45	46~60	61~75	76~100	101~125	126~150
6	46.5 (51.5)	55.5 (60.5)	59.5 (64.5)	73.5 (78.5)	–	–	–	–	74.5 (79.5)	83.5 (88.5)	87.5 (92.5)	101.5 (106.5)	–	–	–	–
10	48.5	56	68	80	–	–	–	–	76.5	84	96	108	–	–	–	–
16	48.5	57	69	81	87	111	129	141	76.5	85	97	109	115	139	157	169

LB

ø6



ø10, ø16



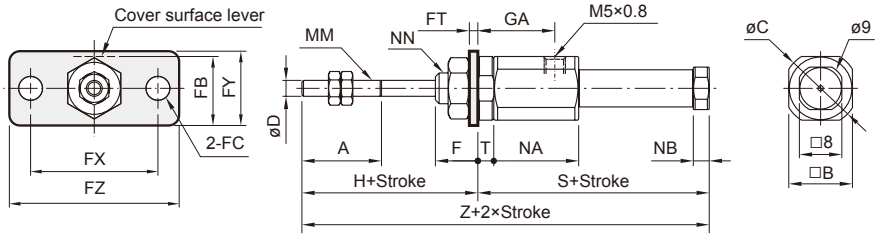
Code / Tube I.D.	A	B	C	D	F	GA	H	LB	LC	LH	LT	LX	LY	LZ	MM	NA	NB	NN	T	X	Y
6	15	12	14	3	8	14.5	28	15	4.5	9	1.6	24	16.5	32	M3×0.5	16	3	M6×1.0	3	5	7
10	15	12	14	4	8	8	28	15	4.5	9	1.6	24	16.5	32	M4×0.7	12.5	5.5	M8×1.0	–	5	7
16	15	18	20	5	8	8	28	23	5.5	14	2.3	33	25	42	M5×0.8	12.5	5.5	M10×1.0	–	6	9

Code / Stroke / Tube I.D.	S *								Z *							
	5~15	16~30	31~45	46~60	61~75	76~100	101~125	126~150	5~15	16~30	31~45	46~60	61~75	76~100	101~125	126~150
6	46.5 (51.5)	55.5 (60.5)	59.5 (64.5)	73.5 (78.5)	–	–	–	–	74.5 (79.5)	83.5 (88.5)	87.5 (92.5)	101.5 (106.5)	–	–	–	–
10	48.5	56	68	80	–	–	–	–	76.5	84	96	108	–	–	–	–
16	48.5	57	69	81	87	111	129	141	76.5	85	97	109	115	139	157	169

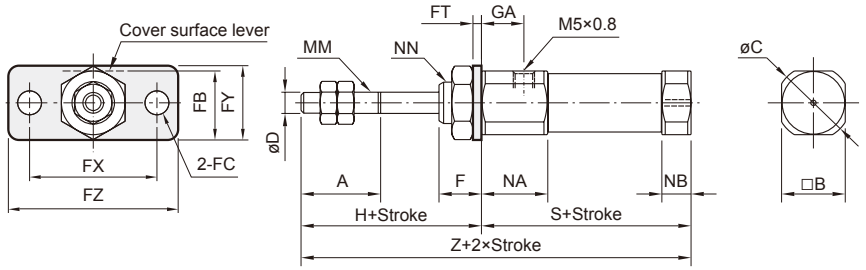
* (S), (Z) ( ) indicate the size of that with magnet ring.

FA

ø6



ø10~ø16



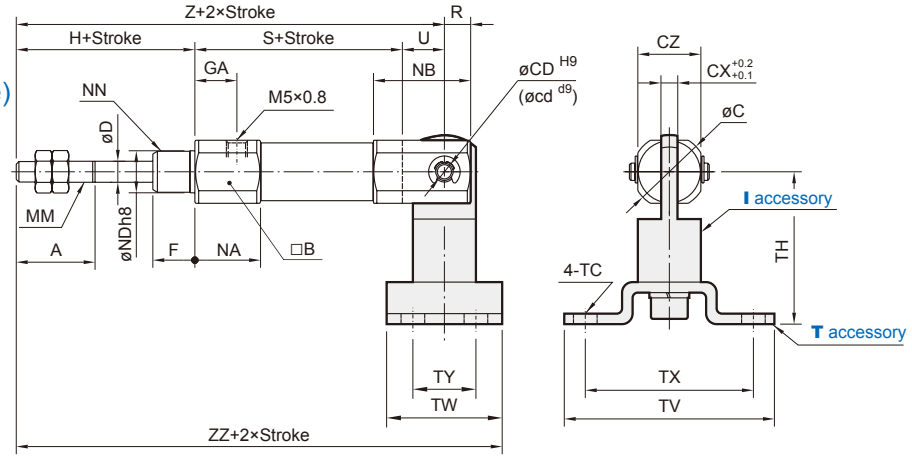
Code / Tube I.D.	A	B	C	D	F	GA	H	FB	FC	FT	FX	FY	FZ	MM	NA	NB	NN	T	X	Y
6	15	12	14	3	8	14.5	28	11	4.5	1.6	24	14	32	M3×0.5	16	3	M6×1.0	3	5	7
10	15	12	14	4	8	8	28	13	4.5	1.6	24	14	32	M4×0.7	12.5	5.5	M8×1.0	–	5	7
16	15	18	20	5	8	8	28	19	5.5	2.3	33	20	42	M5×0.8	12.5	5.5	M10×1.0	–	6	9

Code / Stroke / Tube I.D.	S *								Z *							
	5~15	16~30	31~45	46~60	61~75	76~100	101~125	126~150	5~15	16~30	31~45	46~60	61~75	76~100	101~125	126~150
6	46.5 (51.5)	55.5 (60.5)	59.5 (64.5)	73.5 (78.5)	–	–	–	–	74.5 (79.5)	83.5 (88.5)	87.5 (92.5)	101.5 (106.5)	–	–	–	–
10	48.5	56	68	80	–	–	–	–	76.5	84	96	108	–	–	–	–
16	48.5	57	69	81	87	111	129	141	76.5	85	97	109	115	139	157	169

* (S), (Z) indicate the size of that with magnet ring.

T

I+Pin (Extra pruchase)



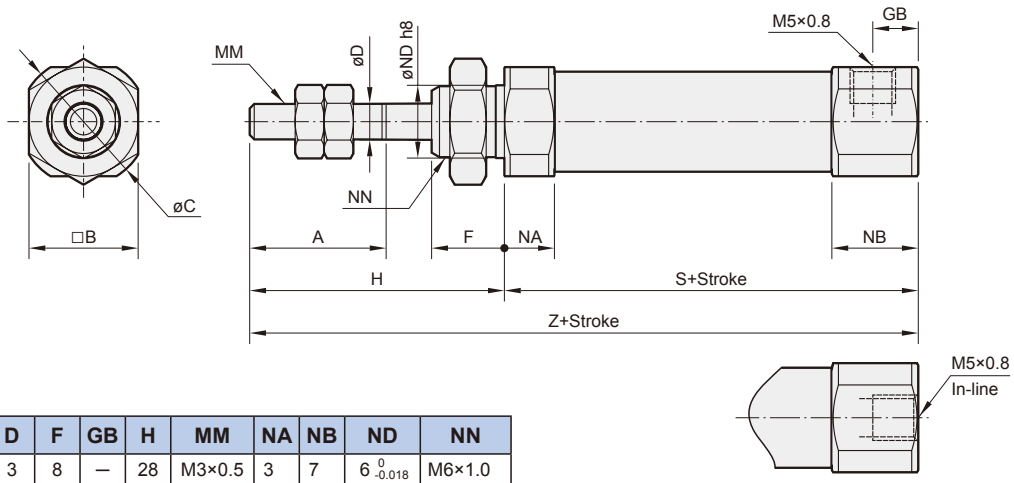
Code / Tube I.D.	A	B	C	CD (cd)	CX	CZ	D	F	GA	H	MM	NA	NB	ND	NN	R	TC	TH	TV	TW	TX	TY	U
10	15	12	14	3.3	3.2	12	4	8	8	28	M4×0.7	12.5	18.5	8 0 -0.022	M8×1.0	5	4.5	29	40	22	32	12	8
16	15	18	20	5	6.5	18	5	8	8	28	M5×0.8	12.5	23.5	10 0 -0.022	M10×1.0	8	5.5	35	48	28	38	16	10

Code / Stroke / Tube I.D.	S								Z								ZZ							
	5~15	16~30	31~45	46~60	61~75	76~100	101~125	126~150	5~15	16~30	31~45	46~60	61~75	76~100	101~125	126~150	5~15	16~30	31~45	46~60	61~75	76~100	101~125	126~150
10	48.5	56	68	80	–	–	–	–	84.5	92	104	116	–	–	–	–	95.5	103	115	127	–	–	–	–
16	48.5	57	69	81	87	111	129	141	86.5	95	107	119	125	149	167	179	100.5	109	121	133	139	163	181	193

20-MCMJ Dimensions – Normally returned ø6~ø16

PEN CYLINDER

15

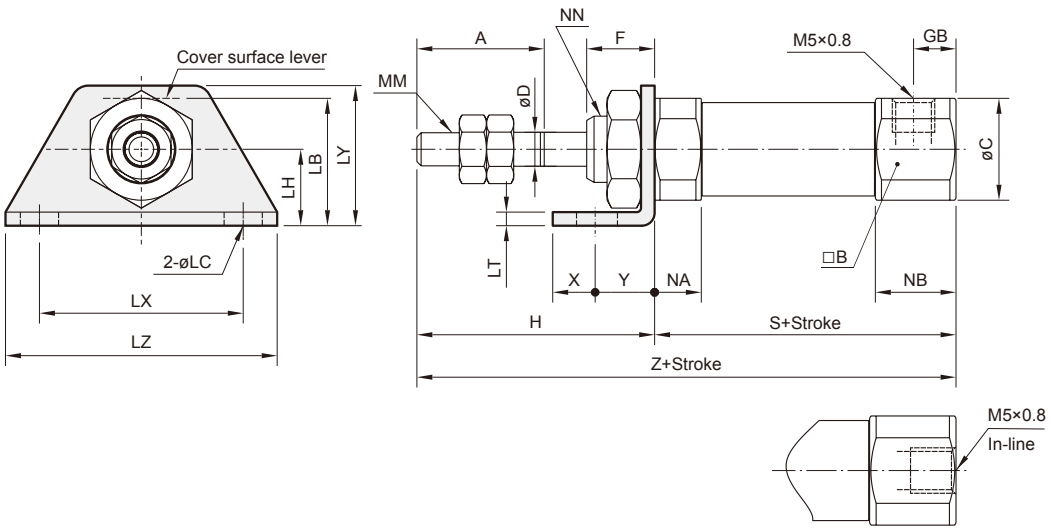


Code / Tube I.D.	A	B	C	D	F	GB	H	MM	NA	NB	ND	NN
6	15	8	9	3	8	–	28	M3×0.5	3	7	$6^{\ 0}_{-0.018}$	M6×1.0
10	15	12	14	4	8	5	28	M4×0.7	5.5	9.5	$8^{\ 0}_{-0.022}$	M8×1.0
16	15	18	20	5	8	5	28	M5×0.8	5.5	9.5	$10^{\ 0}_{-0.022}$	M10×1.0

Code / Stroke / Tube I.D.	S *								Z *							
	5~15	16~30	31~45	46~60	61~75	76~100	101~125	126~150	5~15	16~30	31~45	46~60	61~75	76~100	101~125	126~150
6	34.5 (39.5)	43.5 (48.5)	47.5 (52.5)	61.5 (66.5)	–	–	–	–	62.5 (67.5)	71.5 (76.5)	75.5 (80.5)	89.5 (94.5)	–	–	–	–
10	45.5	53	65	77	–	–	–	–	73.5	81	93	105	–	–	–	–
16	45.5	54	66	78	84	108	126	138	73.5	82	94	106	112	136	154	166

* (S), (Z) ( ) indicate the size of that with magnet ring.

LB

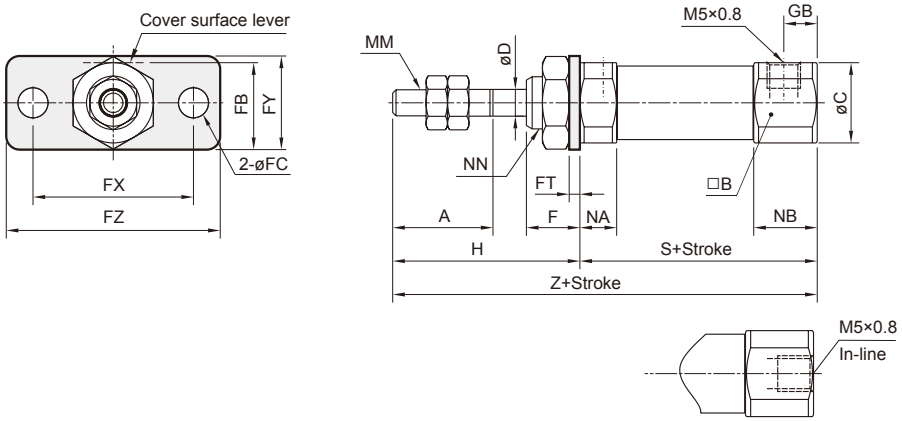


Code / Tube I.D.	A	B	C	D	F	GB	H	LB	LC	LH	LT	LX	LY	LZ	MM	NA	NB	NN	X	Y
6	15	8	9	3	8	–	28	13	4.5	9	1.6	24	16.5	32	M3×0.5	3	7	M6×1.0	5	7
10	15	12	14	4	8	5	28	15	4.5	9	1.6	24	16.5	32	M4×0.7	5.5	9.5	M8×1.0	5	7
16	15	18	20	5	8	5	28	23	5.5	14	2.3	33	25	42	M5×0.8	5.5	9.5	M10×1.0	6	9

Code / Stroke / Tube I.D.	S *								Z *							
	5~15	16~30	31~45	46~60	61~75	76~100	101~125	126~150	5~15	16~30	31~45	46~60	61~75	76~100	101~125	126~150
6	34.5 (39.5)	43.5 (48.5)	47.5 (52.5)	61.5 (66.5)	–	–	–	–	62.5 (67.5)	71.5 (76.5)	75.5 (80.5)	89.5 (94.5)	–	–	–	–
10	45.5	53	65	77	–	–	–	–	73.5	81	93	105	–	–	–	–
16	45.5	54	66	78	84	108	126	138	73.5	82	94	106	112	136	154	166

* (S), (Z) ( ) indicate the size of that with magnet ring.

FA



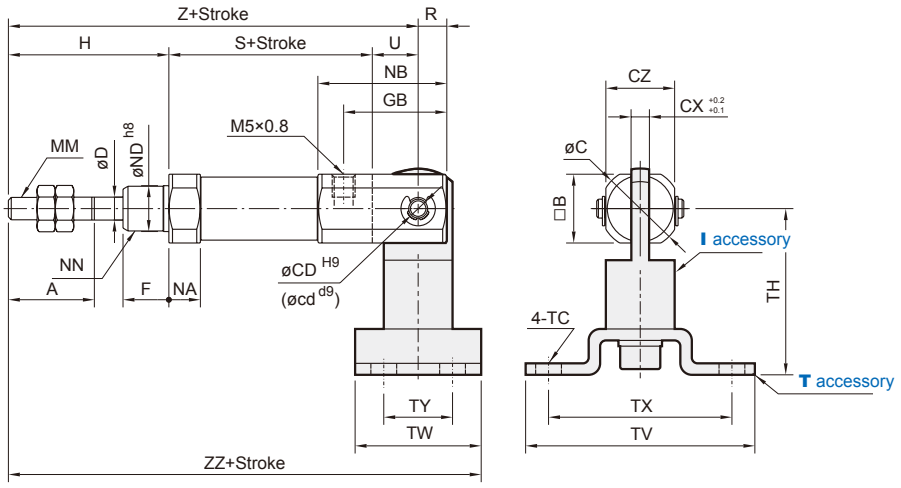
Code / Tube I.D.	A	B	C	D	F	GB	H	FB	FC	FT	FX	FY	FZ	MM	NA	NB	NN	X	Y
6	15	8	9	3	8	–	28	11	4.5	1.6	24	14	32	M3×0.5	3	7	M6×1.0	5	7
10	15	12	14	4	8	5	28	13	4.5	1.6	24	14	32	M4×0.7	5.5	9.5	M8×1.0	5	7
16	15	18	20	5	8	5	28	19	5.5	2.3	33	20	42	M5×0.8	5.5	9.5	M10×1.0	6	9

Code / Stroke / Tube I.D.	S *								Z *							
	5~15	16~30	31~45	46~60	61~75	76~100	101~125	126~150	5~15	16~30	31~45	46~60	61~75	76~100	101~125	126~150
6	34.5 (39.5)	43.5 (48.5)	47.5 (52.5)	61.5 (66.5)	–	–	–	–	62.5 (67.5)	71.5 (76.5)	75.5 (80.5)	89.5 (94.5)	–	–	–	–
10	45.5	53	65	77	–	–	–	–	73.5	81	93	105	–	–	–	–
16	45.5	54	66	78	84	108	126	138	73.5	82	94	106	112	136	154	166

* (S), (Z) ( ) indicate the size of that with magnet ring.

T

I+Pin (Extra pruchase)



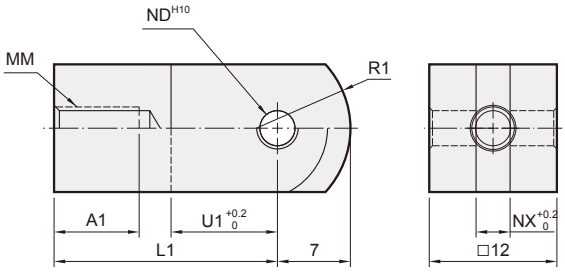
Code / Tube I.D.	A	B	C	CD (cd)	CX	CZ	D	F	GB	H	MM	NA	NB	ND	NN	R	TC	TH	TV	TW	TX	TY	U
10	15	12	14	3.3	3.2	12	4	8	18	28	M4×0.7	5.5	22.5	8 $^{0}_{-0.022}$	M8×1.0	5	4.5	29	40	22	32	12	8
16	15	18	20	5	6.5	18	5	8	23	28	M5×0.8	5.5	27.5	10 $^{0}_{-0.022}$	M10×1.0	8	5.5	35	48	28	38	16	10

Code / Stroke / Tube I.D.	S								Z								ZZ							
	5~15	16~30	31~45	46~60	61~75	76~100	101~125	126~150	5~15	16~30	31~45	46~60	61~75	76~100	101~125	126~150	5~15	16~30	31~45	46~60	61~75	76~100	101~125	126~150
10	45.5	53	65	77	–	–	–	–	81.5	89	101	113	–	–	–	–	92.5	100	112	124	–	–	–	–
16	45.5	54	66	78	84	108	126	138	83.5	92	104	116	122	146	164	176	97.5	106	118	130	136	160	178	190

20-MCMJ Accessories ø10, ø16

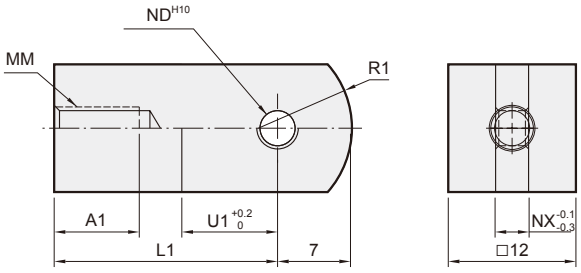
PEN CYLINDER

Y connector



Code / Tube I.D.	A1	L1	MM	ND H10	NX	R1	U1
10	8	21	M4×0.7	3.3 +0.048 0	3.2	8	10
16	11	21	M5×0.8	5 +0.048 0	6.5	12	10

I connector



Code / Tube I.D.	A1	L1	MM	ND H10	NX	R1	U1
10	8	21	M4×0.7	3.3 +0.048 0	3.1	8	9
16	8	25	M5×0.8	5 +0.048 0	6.4	12	14

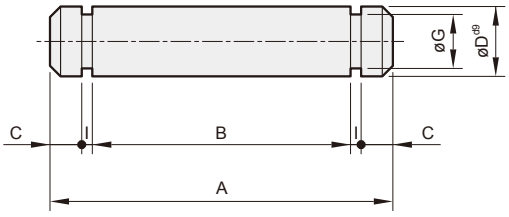
PIN

Order example

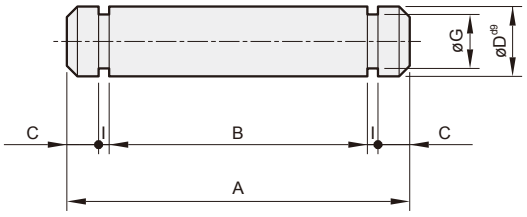
20 — PIN — MCMJ — 10 — Y — P

- 20: MATERIAL RESTRICTIONS (Secondary battery)
- PIN
- MCMJ
- 10: TUBE I.D.
- Y: TYPE — **Y**: for Y & I connector; **D**: for end cover D type
- P: **P**:With split pin

P



P



for Y & I connector

Code / Tube I.D.	A	B	C	D d9	G	I	Split pin
10	16.2	12.2	1.5	3.3 -0.03 -0.06	2.5	0.5	E-2.5
16	16.2	12.2	1.5	5 -0.03 -0.06	4	0.7	E-4

for end cover D type

Code / Tube I.D.	A	B	C	D d9	G	I	Split pin
10	15.2	12.2	1	3.3 -0.03 -0.06	2.5	0.5	E-2.5
16	22.7	18.3	1.5	5 -0.03 -0.06	4	0.7	E-4

Features

- Space saving, compact design enables simple mounting.
- Flush fitting sensor switch.

Specification

Model	20-MCMJP		
Acting type	Double acting		
Tube I.D. (mm)	6	10	16
Port size	M3×0.5		M5×0.8
Medium	Air		
Max. operating perssure	0.7 MPa		
Min. operating perssure	0.12 MPa		0.06 MPa
Proof pressure	1 MPa		
Lubrication	Not required		
Ambient temperature	–5~+60°C (No freezing)		
Available speed range	50~500 mm/sec		
Max. allowable kinetic energy	0.012J	0.025J	0.05J
Sensor switch (*)	RDF(V), RDGV		

Table for standard stroke

Unit: mm

Tube I.D.	Standard type	End-plain
ø6	5,10,15,20,25	5,10,15,20
ø10	5,10,15,20,25,30	5,10,15,20
ø16	5,10,15,20,25,30,40	5,10,15,20,25

*It can't be supplied if the stroke is out of the maximum of above table.

Order example

20 — MCMJP — 11 — 6 — 10M — E

- 20 — MATERIAL RESTRICTIONS (Secondary battery)
- MCMJP — MODEL
- 11 — STYLE — **1**: Single rod
- 6 — TUBE I.D.
- 10M — STROKE
- E — TYPE — **M**: Magnet

STYLE

Code		Symbol	Description
1	1		Double acting / Male thread
1	8		Double acting / Threadless

TYPE

Code	Symbol	Description
Blank		Standard type
E		End-plain

Mounting accessories

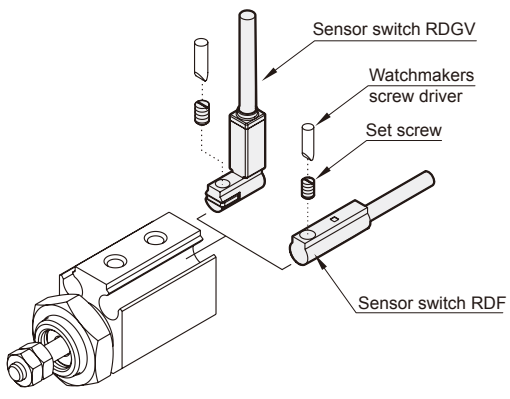
20 — FA — MCMJP — 6

- 20 — MATERIAL RESTRICTIONS (Secondary battery)
- FA — MOUNTING TYPE
- MCMJP — MODEL
- 6 — TUBE I.D.

MOUNTING TYPE

	LB
	FA
	SDB

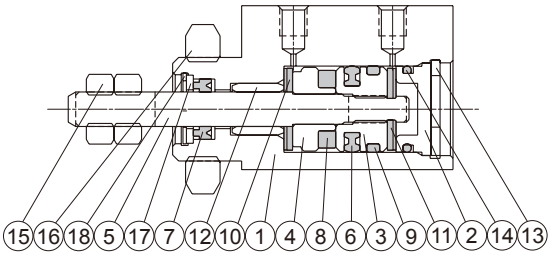
Installation of sensor switch



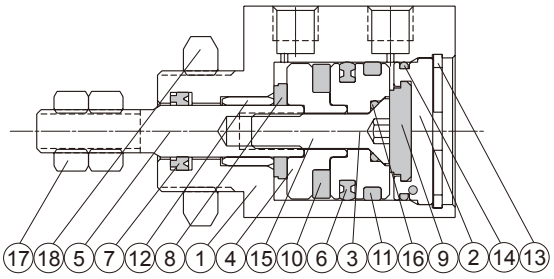
20-MCMJP Inside structure & Parts list ø6~ø16

PEN CYLINDER

ø6, ø10



ø16



Material

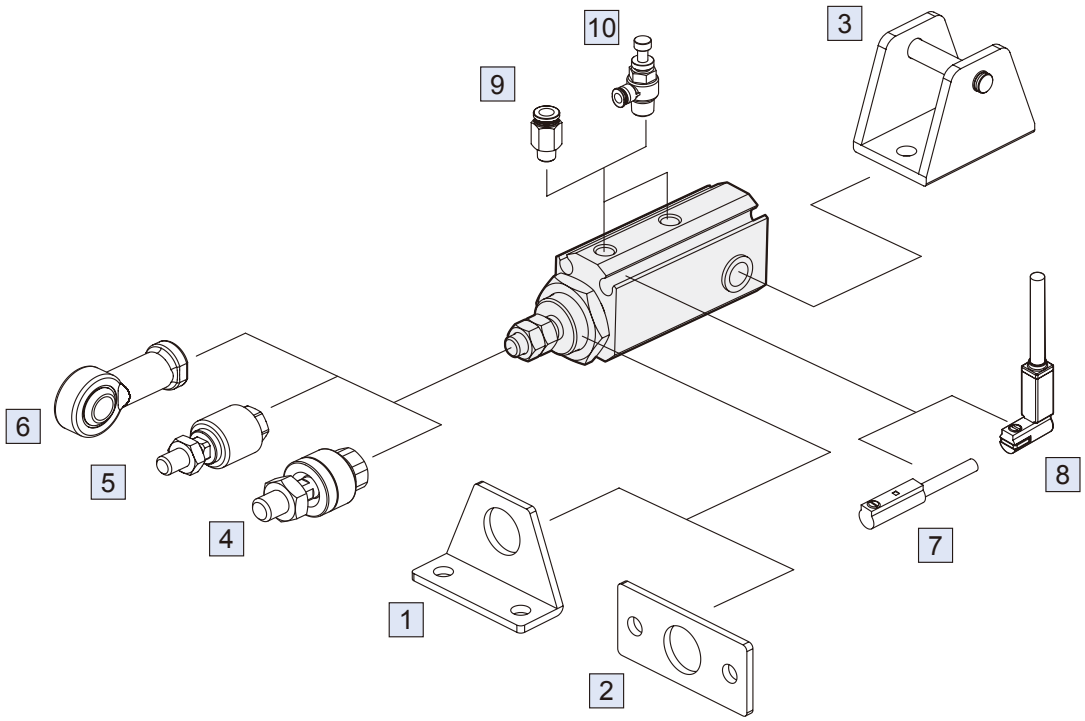
No.	Part name	Material	Note
1	Body	Aluminum alloy	
2	End cover	Aluminum alloy	
3	Piston	Aluminum alloy	
4	Piston	Aluminum alloy	for with magnet
5	Piston rod	Stainless steel	
6	Pistion packing	NBR	
7	Rod packing	NBR	
8	Magnet ring	Magnet material	for with magnet
9	Wear ring	Teflon	
10	Cushion	NBR	
11	Cushion	NBR	
12	Rod bush	Iron-based alloy	
13	Stop ring	Carbon steel	
14	Cover ring	NBR	
15	Rod front nut	Stainless steel	
16	Tie nut	Stainless steel	
17	Fixed ring	Aluminum alloy	
18	Stop ring	Carbon steel	

No.	Part name	Material	Note
1	Body	Aluminum alloy	
2	End cover	Aluminum alloy	
3	Piston	Aluminum alloy	
4	Piston	Aluminum alloy	for with magnet
5	Piston rod	Stainless steel	
6	Pistion packing	NBR	
7	Rod packing	NBR	
8	Cushion	NBR	
9	Cushion	NBR	
10	Magnet ring	Magnet material	for with magnet
11	Wear ring	Teflon	
12	Rod bush	Iron-based alloy	
13	Stop ring	Carbon steel	
14	Cover ring	NBR	
15	Piston bolt	SCM	
16	Piston gasket	NBR	
17	Rod front nut	Stainless steel	
18	Tie nut	Stainless steel	

Cylinder weight

Unit : g

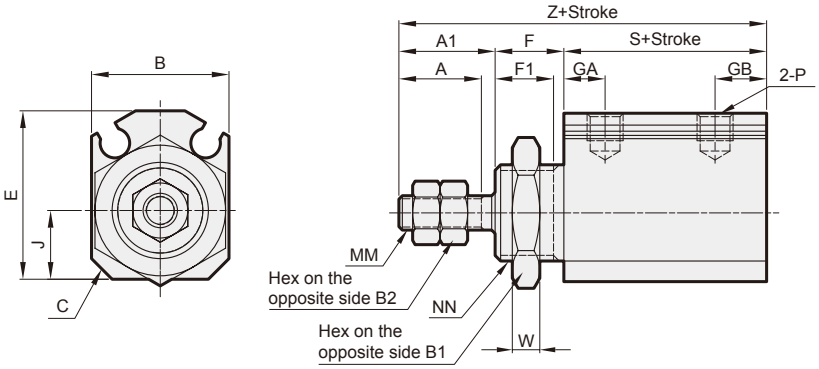
Stroke (mm)	**11**: Male thread			**18**: Threadless		
	ø6	ø10	ø16	ø6	ø10	ø16
5	19	29	46	18	28	45
10	21	31	50	20	30	49
15	24	34	54	23	33	53
20	26	36	58	25	35	57
25	29	39	62	28	38	61
30	–	41	66	–	40	65
40	–	–	74	–	–	73



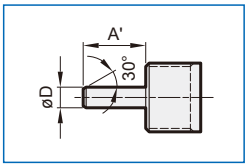
No.	Accessories	Page
1	Mounting accessories LB	3-75
2	Mounting accessories FA	3-75
3	Mounting accessories SDB+PIN	3-74, 75
4	Sensor switch RDF	4-8
5	Sensor switch RDF	4-10
6	Fitting PC (PISCO)	4-26
7	Speed controller JSC (PISCO)	4-31

20-MCMJP Dimensions ø6~ø16

PEN CYLINDER

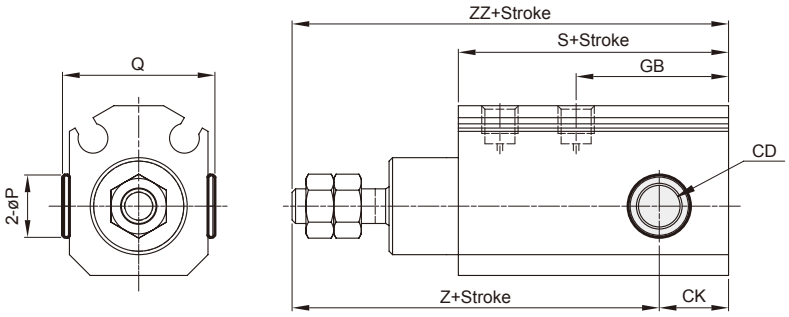


MCMJP-18



Code / Tube I.D.	A	A1	B	B1	B2	C	D	E	F	F1	GA	GB	J	MM	NN	P	W	Without magnet		Magnet	
																		S	Z	S	Z
6	7	9	14	14	5.5	2	3	16.5	8	6.5	5.5	6	6	M3×0.5	M10×1.0	M3×0.5	4	16	33	21	38
10	10	12	15	17	7	2.5	4	19	8	6.5	6	7	7	M4×0.7	M12×1.0	M3×0.5	4	19.5	39.5	24.5	44.5
16	12	14	20	19	8	3	6	24.5	10	8.5	6	7.5	10	M5×0.8	M14×1.0	M5×0.8	4	19.5	43.5	24.5	48.5

E



Code / Tube I.D.	CD	CK	GB	P	Q	Without magnet			Magnet		
						S	Z	ZZ	S	Z	ZZ
6	3 $^{+0.04}_{+0}$	4	11	—	—	21	34	38	26	39	43
10	5 $^{+0.06}_{+0}$	6.5	18	8	17	30.5	44	50.5	35.5	49	55.5
16	6 $^{+0.06}_{+0}$	10	22	9	22	34	48	58	39	53	63

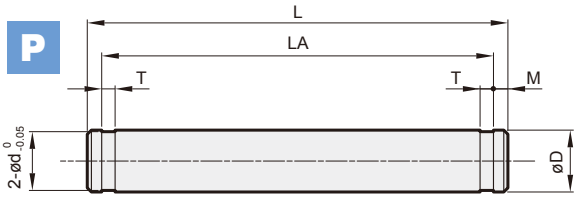
PIN

Order example

PIN — MCMJP — 10 — SDB — P

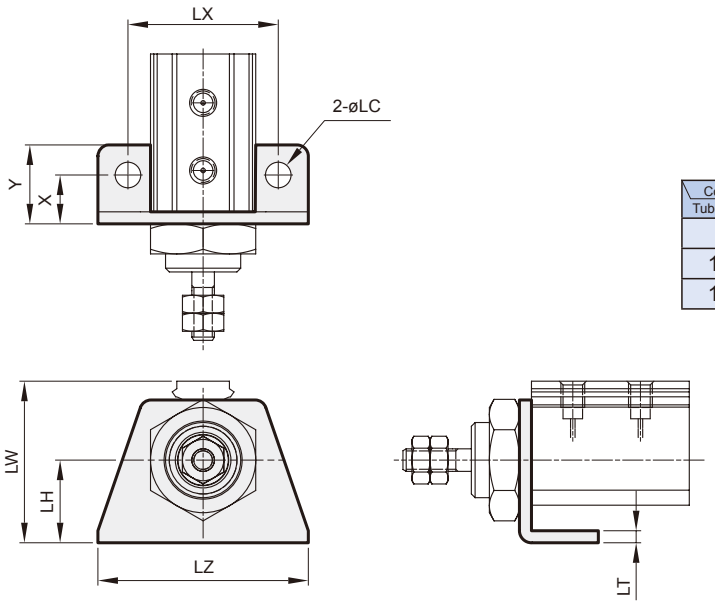
- PIN
- TUBE I.D.
- TYPE
- **P**: With split pin
- **SDB**: for SDB connector

P



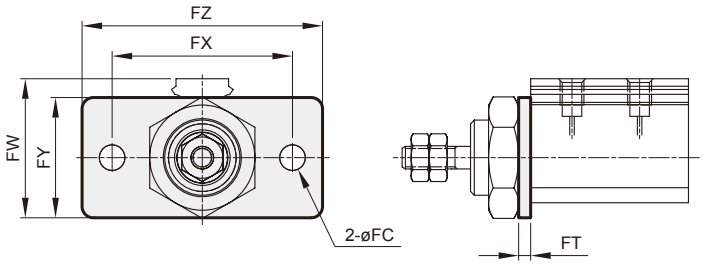
Code / Tube I.D.	D^{d9}	d	L	LA	M	T	Split pin
6	3 $^{-0.02}_{-0.05}$	2.85	20.4	19	0.7	0.5	STW-3
10	5 $^{-0.03}_{-0.06}$	4.8	23.9	21.9	1	0.7	STW-5
16	6 $^{-0.03}_{-0.06}$	5.7	31.9	29.9	1	0.8	STW-6

LB



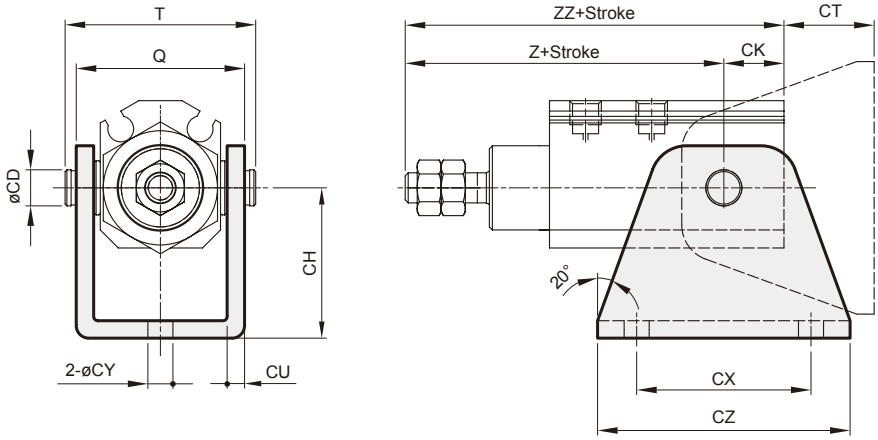
Code / Tube I.D.	LC	LH	LT	LW	LX	LZ	X	Y
6	3.4	11	1.6	21.5	20	28	6.5	10.5
10	4.5	13	1.6	25	24	33	7	12
16	5.5	18	2.3	32.5	30	43	10	16.5

FA



Code / Tube I.D.	FC	FT	FW	FX	FY	FZ
6	3.4	1.6	18.5	24	16	32
10	4.5	1.6	21	28	18	37
16	5.5	2.3	25.5	36	22	49

SDB



Code / Tube I.D.	CD	CH	CK	CT	CU	CX	CY	CZ	Q	T	Without magnet		Magnet	
											Z	ZZ	Z	ZZ
6	3	16	4	12	1.6	18	3.4	26	18.5	20.4	34	38	39	43
10	5	20	6.5	13.5	1.6	24	4.5	33	20.5	23.9	44	50.5	49	55.5
16	6	25	10	15	3	29	5.5	42	28.2	31.9	48	58	53	63

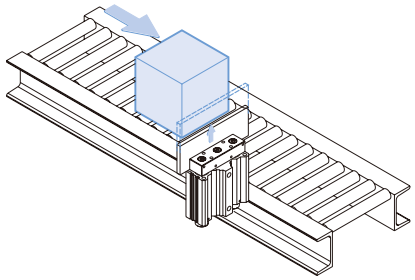
20-MCG* series Stop / Lift / Push

TWIN-GUIDE CYLINDER

Several uses

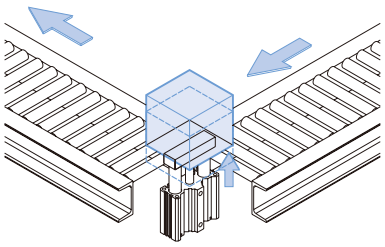
- **S**-Stopper cylinder Takes very high lateral loadings as such can stop very wide and heavy objects.
- **L**-Lift cylinder Large bearing area enables heavy off-set loads to be applied.
- **P**-Pusher cylinder Long strokes available with extremely rigid guidance, precise movement of load is possible.

S Stopper cylinder



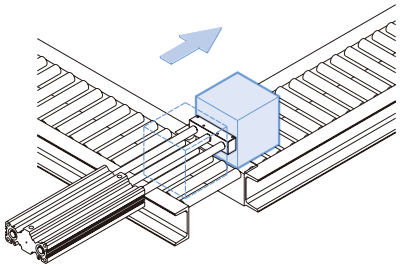
Tough type of stopping a large-load work carrier at a fixed point, and for the straggle of a number of work carriers, etc.

L Lift cylinder



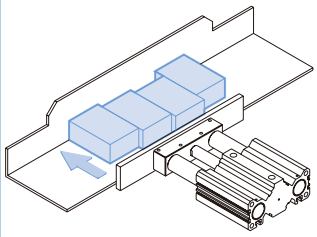
Special design which stands the large one-sided load. Lifts the work carrier at a fixed point not changing the posture.

P Pusher cylinder

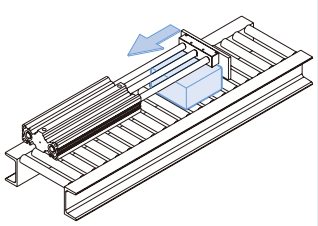


Long strokes available, the highly precise pushing work transfers and places a work carrier and changes the direction.

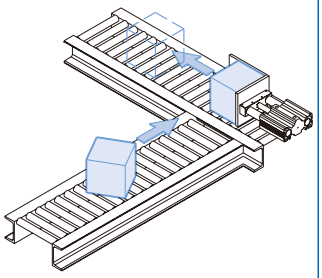
Multi-Purpose



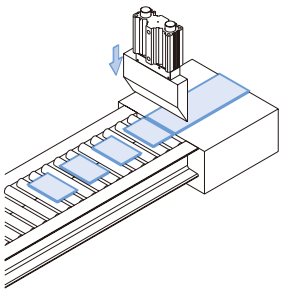
Arranges in line
Can move loads into a parallel position from different start points.



Draws in
Can move high loads consistently on the inward stroke of the cylinder.



Corrects misalignment
Repositions uneven loads.



Cuts sheets
Can be use as the power source for cutting sheets on a shearing machine.

Features

- Multi-ports as standard enabling both direction mounting.
- Non-rotating accuracy ± 0.1°
- Embedding type sensors.
- The sensor cable will be in the same direction as the piping tube if vertical type sensor switch (Angle cable) is used.
- Magnetic as standard.

Specification

Model	20-MCGS	
Acting type	Double acting	
Tube I.D. (mm)	6	10
Stroke (mm)	5, 10, 15	5, 10, 15, 20
Port size	M3×0.5	
Medium	Air	
Max. operating perssure	0.7 MPa	
Min. operating perssure	0.15 MPa	
Proof pressure	1 MPa	
Proof pressure	Not required	
Ambient temperature	–5~+60°C (No freezing)	
Available speed range	50~400 mm/sec	
Sensor switch (*)	RDGV	

* This product is not applicable for stopper purpose.

Order example

20 — MCGS — 6 — 10

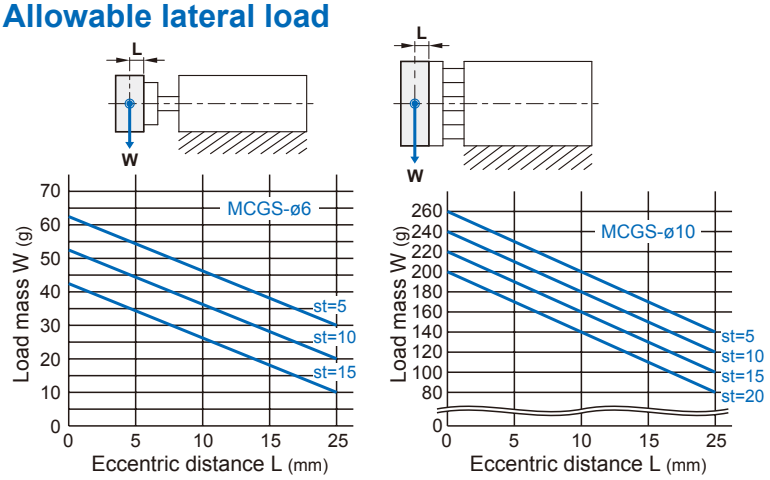
- 20: MATERIAL RESTRICTIONS (Secondary battery)
- MCGS: MODEL
- 6: TUBE I.D.
- 10: STROKE

Cylinder weight

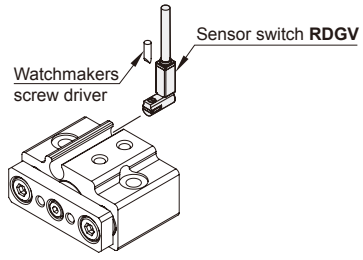
Unit : g

Tube I.D.	Stroke (mm)			
	5	10	15	20
ø6	29	34	39	–
ø10	41	49	57	65

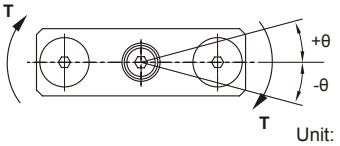
Allowable lateral load



Installation of sensor switch



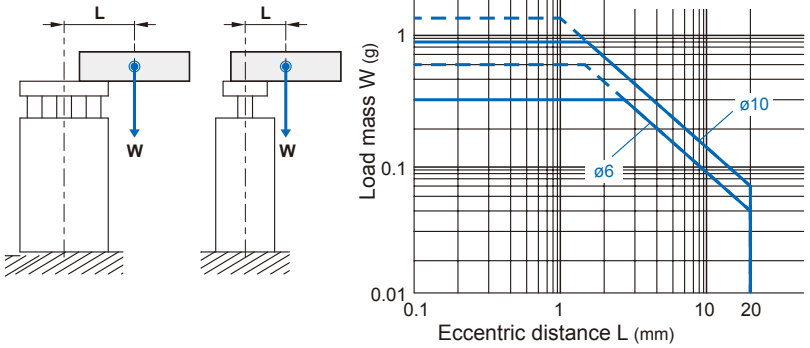
Allowable rotational torque & Non-rotating accuracy



Unit: N.m

Tube I.D.	Stroke (mm)				Non-rotating accuracy θ
	5	10	15	20	
ø6	0.9	0.7	0.6	–	±0.15°
ø10	4.7	3.9	3.3	2.8	

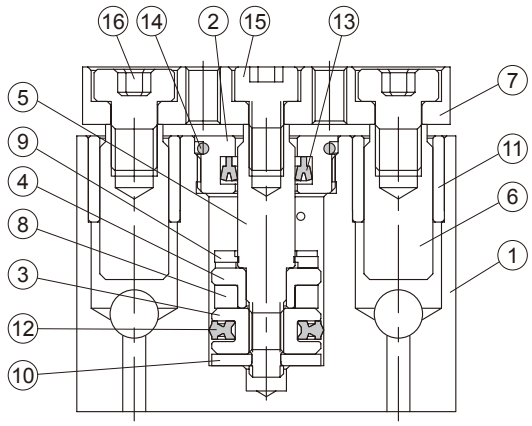
Allowable eccentric load



20-MCGS Inside structure & Parts list ø6, ø10

TWIN-GUIDE CYLINDER

Inside structure & Parts list



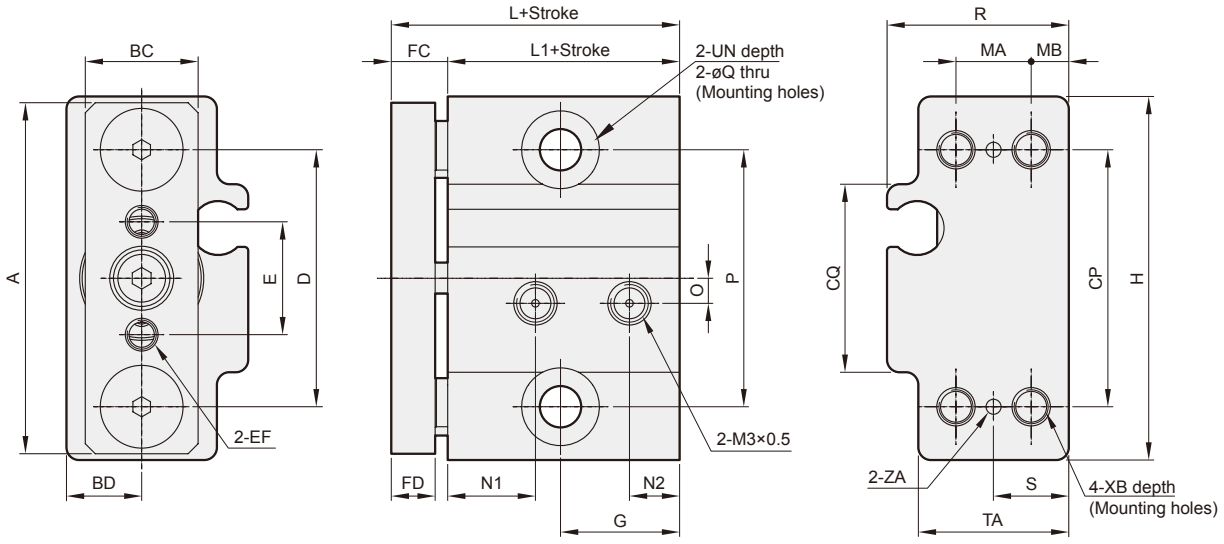
Material

No.	Part name	Material	Q'y	Repair kits (inclusion)
1	Body	Aluminum alloy	1	
2	Rod cover	Aluminum alloy	1	
3	Piston- H	Aluminum alloy	1	
4	Piston- R	Aluminum alloy	1	
5	Piston rod	Stainless steel	1	
6	Guide rod	Carbon steel	2	
7	Plate	Aluminum alloy	1	
8	Magnet ring	Magnet material	1	
9	Cushion	NBR	1	●
10	Cushion	NBR	1	●
11	Bush	Iron-based alloy	2	
12	Piston seal	NBR	1	●
13	Rod seal	NBR	1	●
14	O ring	NBR	1	●
15	Screw	Carbon steel	1	
16	Screw	Carbon steel	2	

Order example of repair kits

Tube I.D.	Repair kits
ø6	**PS-MCGS-6**
ø10	**PS-MCGS-10**

Dimensions



Code / Tube I.D.	A	BC	BD	CP	CQ	D	E	EF	FC	FD	G	H	L	L1	MA	MB	N1	N2
6	28	9	6	20.5	15	20.5	9	M2.5×0.45 thru	4.5	3.5	9.5	29	23	18.5	6	3	7	4
10	32	10	7.5	23	17.5	23	11	M3×0.5 thru	6	5	8.5	33	25	19	8	3.5	7	4.5

Code / Tube I.D.	O	P	Q	R	S	TA	UN	XB	ZA
6	2	20.5	3.3	14.5	6	12	ø6.2×0.5	M3×0.5×5	ø1.2
10	3	23	4.3	17	7.5	15	ø8×0.5	M4×0.7×5	ø2

Features

- Proven track record in manufacturing precision guided cylinders.
- Multi-Ports as standard enabling two direction mounting option.
- Flush fitting sensors.
- Flush fitting sensors.
- Magnetic as standard

Specification

Model	20-MCGS		
Acting type	Double acting		
Tube I.D. (mm)	12,16	20,25,32,40	50,63
Port size	M5×0.8	Rc1/8	Rc1/4
Medium	Air		
Operating perssure range	0.1~1 MPa		
Proof pressure	1.5 MPa		
Ambient temperature	–5~+60°C (No freezing)		
Cushion	With rubber cushion pad		
Available speed range	50~500 mm/sec		
Lubrication	Not required		
Sensor switch (*)	RCE, RCE1, RDEP		

Order example

20 — MCGS — 03 — 12 — 50 — 20 — G

- MATERIAL RESTRICTIONS (Secondary battery)
- MODEL
- PURPOSE / TYPE OF BEARING
- TUBE I.D.
- STROKE
- ADJUST STROKE (for 07, 27 type)
- PORT THREAD
  - Blank: M5×0.8 (for ø12, ø16)
  - Blank: Rc thread
  - **G**: G thread
  - **NPT**: NPT thread
  - (for ø20~ø63)

Code	Purpose / Type of bearing
03	Stop / Slide bush
07	Stop / Slide bush / Stroke adjustable
23	Push / Linear bearing (Could attach a table for the use as a lifter)
27	Push / Linear bearing / Stroke adjustable (Could attach a table for the use as a lifter)

Installation of sensor switch

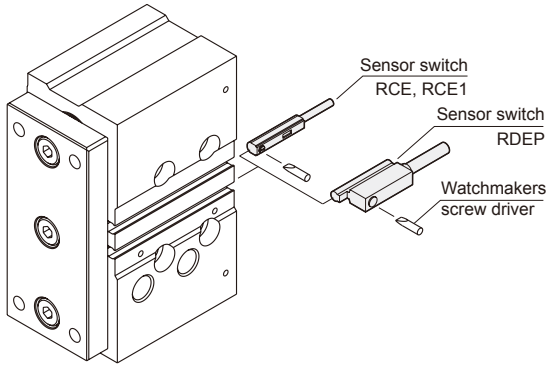


Table for standard stroke

Series variety (Bearing type)	Tube I.D.	Stroke (mm) 10	20	25	30	40	50	75	100	125	150	175	200	250	300	350	400
MCGS-03 MCGS-07 (Slide bush)	ø12	■	■		■	■	■	■	■	■	■	■	■	■			
	ø16	■	■		■	■	■	■	■	■	■	■	■	■			
	ø20		■		■	■	■	■	■	■	■	■	■	■	■	■	■
	ø25		■		■	■	■	■	■	■	■	■	■	■	■	■	■
	ø32*			■			■	■	■	■	■	■	■	■	■	■	■
	ø40			■			■	■	■	■	■	■	■	■	■	■	■
	ø50			■			■	■	■	■	■	■	■	■	■	■	■
	ø63			■			■	■	■	■	■						
MCGS-23 MCGS-27 (Linear bearing)	ø12	■	■		■	■	■	■	■	■	■	■	■	■			
	ø16	■	■		■	■	■	■	■	■	■	■	■	■			
	ø20		■		■	■	■	■	■	■	■	■	■	■	■	■	■
	ø25		■		■	■	■	■	■	■	■	■	■	■	■	■	■
	ø32*			■			■	■	■	■	■	■	■	■	■	■	■
	ø40			■			■	■	■	■	■	■	■	■	■	■	■
	ø50			■			■	■	■	■	■	■	■	■	■	■	■
	ø63			■			■	■	■	■	■						

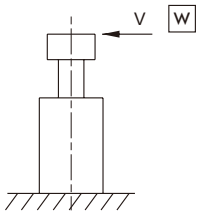
* Tube I.D. ø32: 25mm for the shortest standard stroke.

20-MCGS Capacity ø12~ø63

TWIN-GUIDE CYLINDER

Capacity graphV

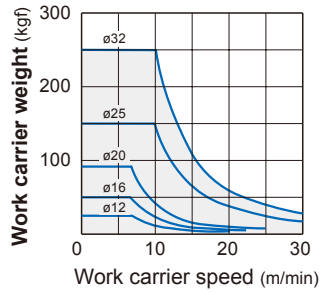
Capacity for the use as a stopper



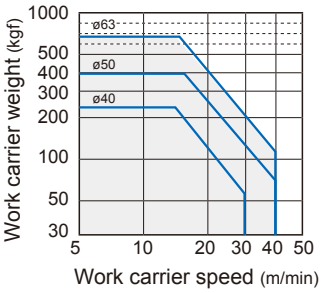
Linear bearing type is not available as a stopper.

Stop capacity

MCGS-03/07...30st ø12~ø32

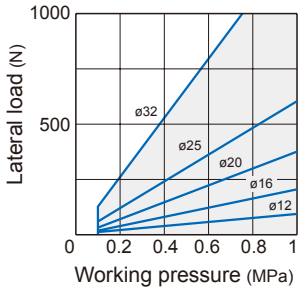


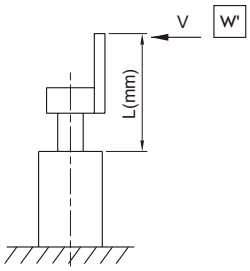
MCGS-03/07...25st ø40~ø63



Normal lateral load

MCGS-03/07...30st





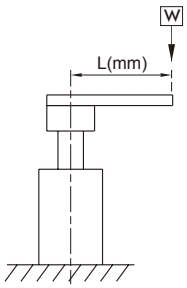
$$W = W' \times \frac{L}{\ell}$$

For the use of attaching a plate to the link bar, choose a bore size referring to the formula below.

W:The maximum weight of the work carrier in the above graph for the stopper's capacity.

Coefficients for conversion

Tube I.D.	ℓ
ø12	40
ø16	42
ø20	42
ø25	42
ø32	44
ø40	72
ø50	78
ø63	78



Capacity for the use as a lifter

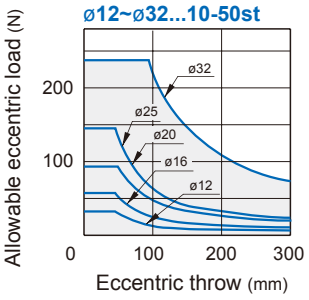
Allowable eccentricity load for the use as a lifter (at supply pressure 0.5 MPa)

Show the dynamic allowable value at L(mm) eccentricity from the center of the guide rod.

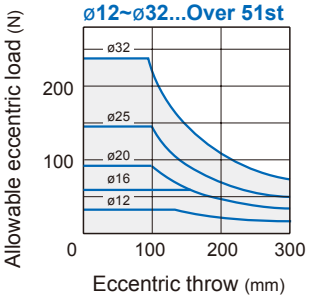
Slide bush

MCGS-03/07

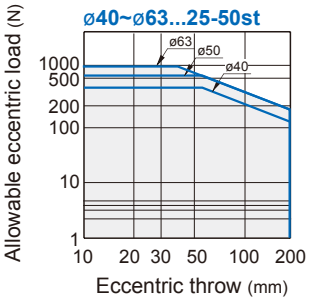
ø12~ø32...10-50st



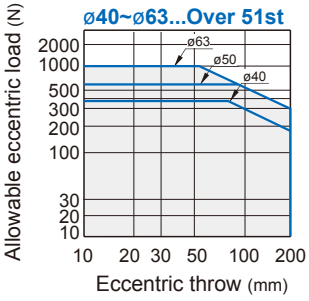
ø12~ø32...Over 51st



ø40~ø63...25-50st



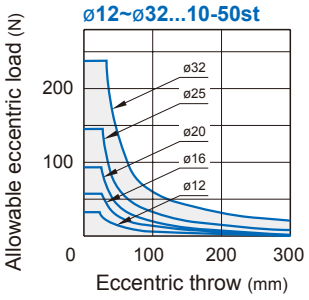
ø40~ø63...Over 51st



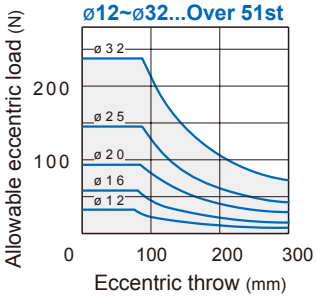
Linear bearing

MCGS-23/27

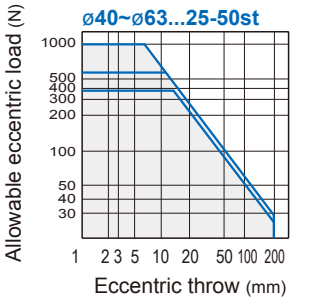
ø12~ø32...10-50st



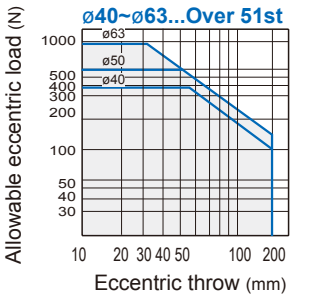
ø12~ø32...Over 51st



ø40~ø63...25-50st

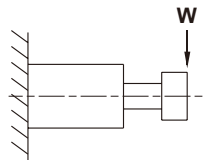


ø40~ø63...Over 51st



Capacity table

Allowable lateral load

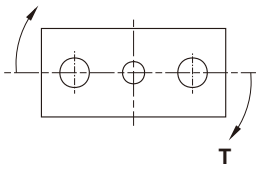


Shows the dynamic allowable value, when actuating the cylinder with lateral load W at the guide rods' top (vertical load against the guide rods).

Unit : N

Tube I.D.	Bearing type	Stroke (mm)															
		10	20	25	30	40	50	75	100	125	150	175	200	250	300	350	400
ø12	Slide bush	31	24	–	19	16	13	37	31	15	13	12	10	9	–	–	–
	Linear bearing	23	17	–	14	34	30	23	19	12	11	9	8	6	–	–	–
ø16	Slide bush	50	39	–	32	27	24	54	45	27	24	21	19	16	–	–	–
	Linear bearing	36	29	–	24	59	52	40	33	20	17	15	13	10	–	–	–
ø20	Slide bush	–	51	–	44	39	35	54	46	74	66	59	54	28	24	21	19
	Linear bearing	–	43	–	36	98	87	69	57	46	40	36	32	32	27	23	20
ø25	Slide bush	–	68	–	59	52	46	72	61	98	88	79	72	53	46	41	37
	Linear bearing	–	67	–	56	148	132	105	87	70	62	55	50	42	36	30	27
ø32	Slide bush	–	–	165	–	–	129	106	90	138	123	111	101	88	77	68	61
	Linear bearing	–	–	104	–	–	74	165	138	114	100	90	81	66	56	48	42
ø40	Slide bush	–	–	203	–	–	164	182	159	142	127	190	174	150	132	118	106
	Linear bearing	–	–	113	–	–	78	129	106	130	114	106	95	78	67	58	50
ø50	Slide bush	–	–	296	–	–	245	273	241	216	195	190	174	150	132	118	106
	Linear bearing	–	–	120	–	–	83	178	148	148	129	106	95	78	67	58	50
ø63	Slide bush	–	–	296	–	–	245	273	241	216	195	–	–	–	–	–	–
	Linear bearing	–	–	117	–	–	81	176	145	145	126	–	–	–	–	–	–

Allowable rotating torque

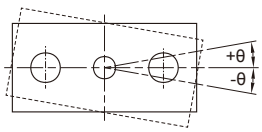


Shows the dynamic allowable value, when actuating the cylinder with a rotating torque T at the guide rods' top.

Unit : N.m

Tube I.D.	Bearing type	Stroke (mm)															
		10	20	25	30	40	50	75	100	125	150	175	200	250	300	350	400
ø12	Slide bush	0.64	0.48	–	0.39	0.32	0.28	0.75	0.63	0.15	0.13	0.12	0.11	0.09	–	–	–
	Linear bearing	0.47	0.35	–	0.29	0.71	0.62	0.40	0.38	0.13	0.11	0.09	0.08	0.07	–	–	–
ø16	Slide bush	1.14	0.90	–	0.74	0.63	0.55	1.23	1.04	0.31	0.27	0.24	0.22	0.18	–	–	–
	Linear bearing	0.84	0.66	–	0.54	1.35	1.19	0.93	1.76	0.23	0.19	0.17	0.15	0.12	–	–	–
ø20	Slide bush	–	1.14	–	1.21	1.07	0.95	1.49	1.25	2.03	1.81	1.63	1.48	0.37	0.32	0.29	0.26
	Linear bearing	–	1.19	–	0.99	2.69	2.40	1.89	1.56	1.26	1.10	0.98	0.88	0.43	0.36	0.31	0.27
ø25	Slide bush	–	2.19	–	1.88	1.65	1.47	2.31	1.94	3.15	2.80	2.52	2.30	0.85	0.74	0.66	0.59
	Linear bearing	–	2.14	–	1.79	4.74	4.22	3.36	2.78	2.25	1.98	1.76	1.59	0.68	0.57	0.49	0.42
ø32	Slide bush	–	–	6.61	–	–	5.16	4.23	3.59	5.52	4.93	4.45	4.06	1.72	1.50	1.33	1.20
	Linear bearing	–	–	4.17	–	–	2.95	6.60	5.52	4.56	4.02	3.59	3.24	1.29	1.09	0.94	0.82
ø40	Slide bush	–	–	7.00	–	–	5.66	6.27	5.48	4.87	4.38	5.21	4.79	4.13	3.63	3.23	2.92
	Linear bearing	–	–	5.24	–	–	4.25	7.19	6.33	7.81	7.11	2.93	2.61	2.16	1.83	1.58	1.39
ø50	Slide bush	–	–	13.0	–	–	10.8	12.0	10.6	9.50	8.60	5.88	5.41	4.66	4.09	3.65	3.29
	Linear bearing	–	–	7.02	–	–	5.76	12.3	10.9	11.2	10.2	3.30	2.94	2.43	2.06	1.78	1.57
ø63	Slide bush	–	–	14.7	–	–	12.1	13.5	12.0	10.7	9.69	–	–	–	–	–	–
	Linear bearing	–	–	7.77	–	–	3.35	13.7	12.2	12.5	11.4	–	–	–	–	–	–

Anti-roll accuracy



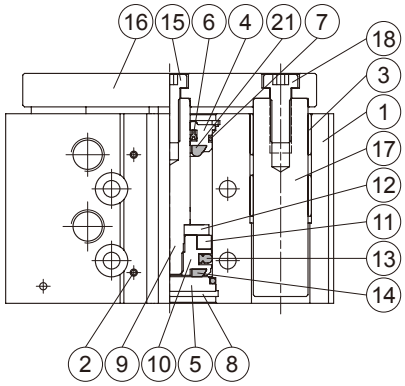
- The values are the deflection angle against the piston rod.
- Exclusive factor of the guide rods' deflection.

Tube I.D.	Bearing type	Anti-roll accuracy
		θ
ø12	Slide bush	±0.09°
	Linear bearing	±0.06°
ø16	Slide bush	±0.08°
	Linear bearing	±0.06°
ø20	Slide bush	±0.08°
	Linear bearing	±0.03°
ø25	Slide bush	±0.07°
	Linear bearing	±0.05°
ø32	Slide bush	±0.07°
	Linear bearing	±0.03°
ø40	Slide bush	±0.06°
	Linear bearing	±0.08°
ø50	Slide bush	±0.05°
	Linear bearing	±0.06°
ø63	Slide bush	±0.05°
	Linear bearing	±0.06°

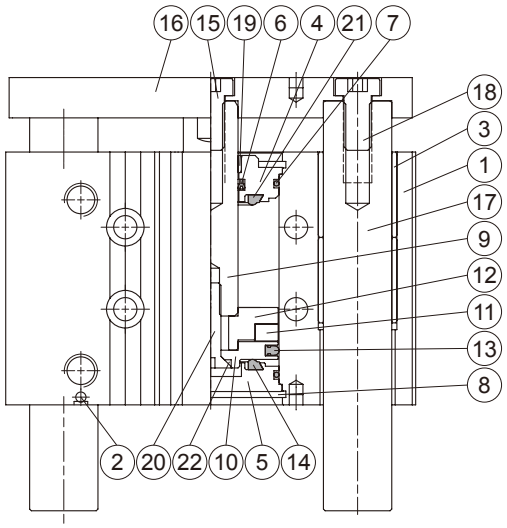
20-MCGS-03 Inside structure & Parts list

TWIN-GUIDE CYLINDER

ø12~ø32



ø40~ø63



Material

No.	Tube I.D. / Part name	12	16	20	25	32	40	50	63	Q'y	Repair kits (inclusion)
1	Body	Aluminum alloy								1	
2	Ball	Stainless steel								1	
3	Slide bush	Iron-based alloy								4	
4	Rod cover	Aluminum alloy								1	
5	Head cover	(*)	Stainless steel				Aluminum alloy			1	
6	Rod packing	NBR								1	●
7	Cover ring	NBR								2	●
8	Snap ring	Spring steel					Stainless steel			2	
9	Piston rod	Stainless steel			Carbon steel					1	
10	Piston	Aluminum alloy								1	
11	Magnet ring	Magnet material								1	
12	Magnet holder	Stainless steel					Aluminum alloy			1	
13	Piston packing	NBR								1	●
14	Head cushion	NBR								1	●
15	Bolt	SCM								1	
16	Plate	Carbon steel								1	
17	Guide rod	Carbon steel								2	
18	Screw	SCM								2	
19	Rod bush	—					Iron-based alloy			1	
20	Piston bolt	—					SCM			1	
21	Rod cushion	NBR								1	●
22	Piston gasket	—					NBR			1	●

* Aluminum alloy

Order example of repair kits

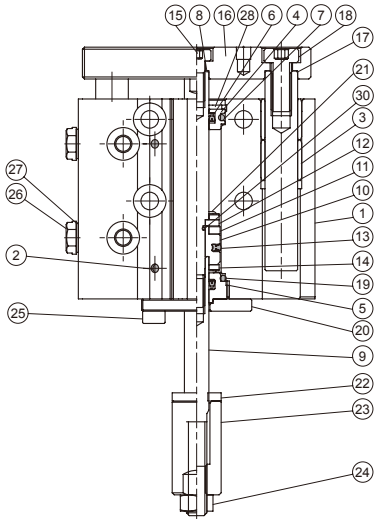
Tube I.D.	Repair kits
ø12	**PS-MCGS-12**
ø16	**PS-MCGS-16**
ø20	**PS-MCGS-20**
ø25	**PS-MCGS-25**
ø32	**PS-MCGS-32**
ø40	**PS-MCGS-40**
ø50	**PS-MCGS-50**
ø63	**PS-MCGS-63**

Cylinder weight

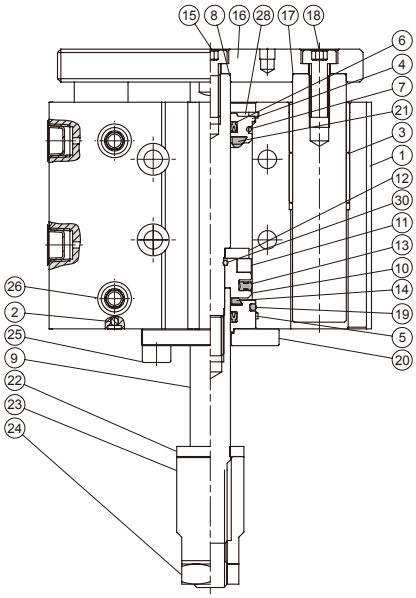
Unit : g

Model	Basic weight **MCGS-03**	Stroke 5mm **MCGS-03**
Tube I.D.		
ø12	191	21
ø16	283	28
ø20	450	45
ø25	670	63
ø32	1,210	90
ø40	1,474	88
ø50	2,540	140
ø63	3,295	151

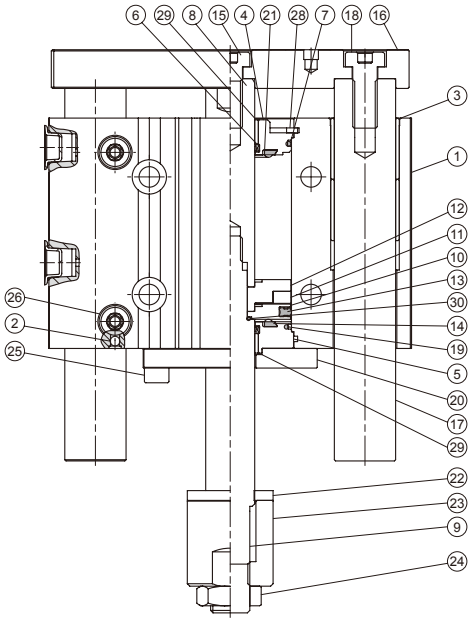
ø12~ø16



ø20~ø32



ø40~ø63



Material

No.	Tube I.D. / Part name	12	16	20	25	32	40	50	63	Q'y	Repair kits (inclusion)
1	Body	Aluminum alloy								1	
2	Ball	Stainless steel								1~3	
3	Slide bush	Iron-based alloy								4	
4	Rod cover #1	Aluminum alloy								1	
5	Rod cover #2	Aluminum alloy								1	
6	Rod packing	NBR								2	●
7	Cover ring #1	NBR								1	●
8	Piston rod #1	Stainless steel			Carbon steel					1	
9	Piston rod #2	Stainless steel			Carbon steel					1	
10	Piston	Aluminum alloy								1	
11	Magnet ring	Magnet material								1	
12	Magnet holder	Stainless steel					Aluminum alloy			1	
13	Piston packing	NBR								1	●
14	Head cushion	NBR								1	●
15	Bolt	SCM								1	
16	Plate	Carbon steel								1	
17	Guide rod	Carbon steel								2	
18	Bolt	SCM								2	
19	Cover ring #2	NBR								1	●
20	FBC board	Carbon steel								1	
21	Rod cushion	NBR								1	●
22	Gasket	PU								1	
23	Adjustable nut	Stainless steel								1	
24	Nut	Stainless steel								1	
25	Bolt	Stainless steel			SCM					2	
26	Screw	Stainless steel								2	
27	Washer	PET			—					2	
28	Snap ring	Spring steel					Stainless steel			1	
29	Bush	—					Iron-based alloy			2	
30	Piston gasket	NBR								1	●

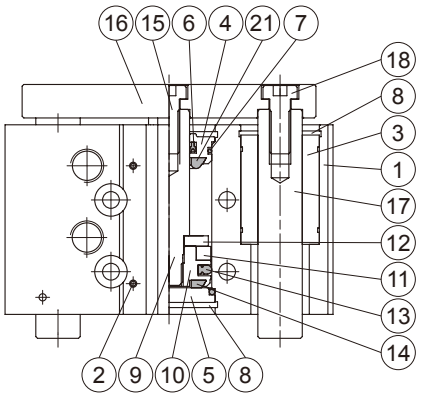
Order example of repair kits

Tube I.D.	Repair kits
ø12	**PS-MCGS-2-12**
ø16	**PS-MCGS-2-16**
ø20	**PS-MCGS-2-20**
ø25	**PS-MCGS-2-25**
ø32	**PS-MCGS-2-32**
ø40	**PS-MCGS-2-40**
ø50	**PS-MCGS-2-50**
ø63	**PS-MCGS-2-63**

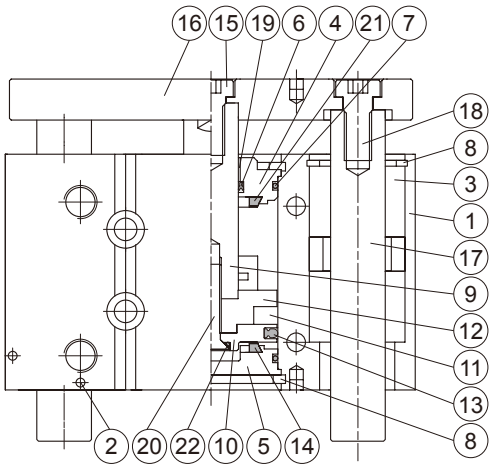
20-MCGS-23 Inside structure & Parts list

TWIN-GUIDE CYLINDER

ø12~ø32



ø40~ø63



Material

No.	Tube I.D. / Part name	12	16	20	25	32	40	50	63	Q'y	Repair kits (inclusion)
1	Body	Aluminum alloy								1	
2	Ball	Stainless steel								1	
3	Linear bearing	—								2 or 4	
4	Rod cover	Aluminum alloy								1	
5	Head cover	(*)	Stainless steel				Aluminum alloy			1	
6	Rod packing	NBR								1	●
7	Cover ring	NBR								2	●
8	Snap ring	Spring steel					Stainless steel			2	
9	Piston rod	Stainless steel			Carbon steel					1	
10	Piston	Aluminum alloy								1	
11	Magnet ring	Magnet material								1	
12	Magnet holder	Stainless steel					Aluminum alloy			1	
13	Piston packing	NBR								1	●
14	Head cushion	NBR								1	●
15	Bolt	SCM								1	
16	Plate	Carbon steel								1	
17	Guide rod	Special steel								2	
18	Screw	SCM								2	
19	Rod bush	—					Iron-based alloy			1	
20	Piston bolt	—					SCM			1	
21	Rod cushion	NBR								1	●
22	Piston gasket	—					NBR			1	●

* Aluminum alloy

Order example of repair kits

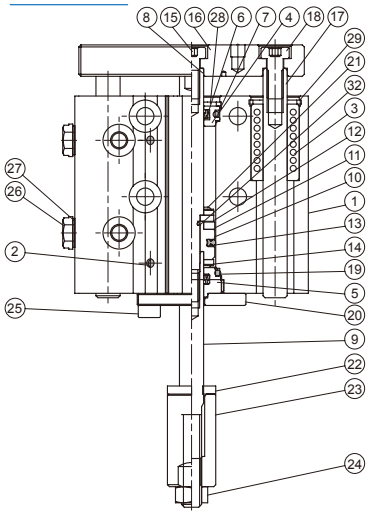
Tube I.D.	Repair kits
ø12	**PS-MCGS-12**
ø16	**PS-MCGS-16**
ø20	**PS-MCGS-20**
ø25	**PS-MCGS-25**
ø32	**PS-MCGS-32**
ø40	**PS-MCGS-40**
ø50	**PS-MCGS-50**
ø63	**PS-MCGS-63**

Cylinder weight

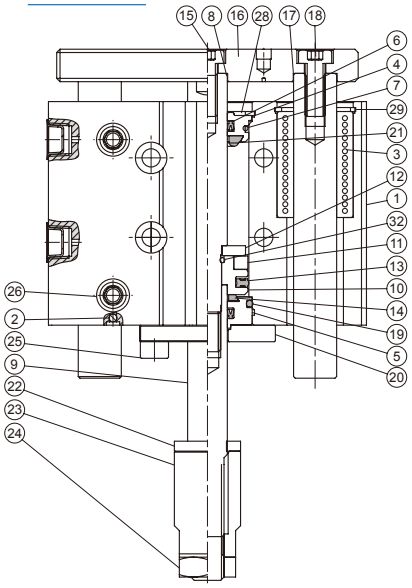
Unit : g

Model	Basic weight **MCGS-23**	Stroke 5mm **MCGS-23**
Tube I.D.		
ø12	211	18
ø16	260	30
ø20	470	45
ø25	740	60
ø32	1,170	85
ø40	1,300	98
ø50	2,360	150
ø63	3,010	168

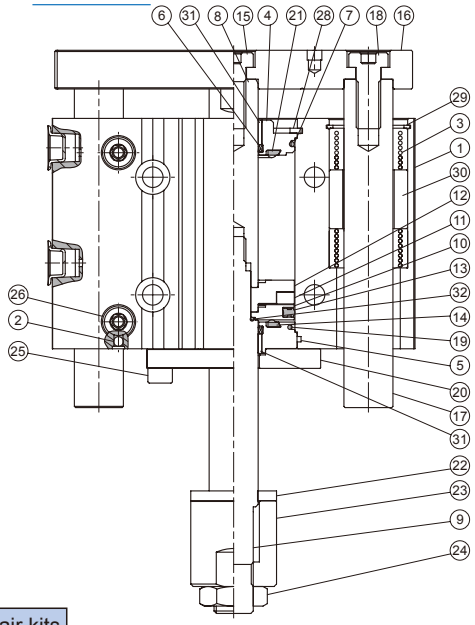
ø12~ø16



ø20~ø32



ø40~ø63



Material

No.	Tube I.D. / Part name	12	16	20	25	32	40	50	63	Q'y	Repair kits (inclusion)
1	Body	Aluminum alloy								1	
2	Ball	Stainless steel								1~3	
3	Linear bearing	—								2 or 4	
4	Rod cover #1	Aluminum alloy								1	
5	Rod cover #2	Aluminum alloy								1	
6	Rod packing	NBR								2	●
7	Cover ring #1	NBR								1	●
8	Piston rod #1	Stainless steel			Carbon steel					1	
9	Piston rod #2	Stainless steel			Carbon steel					1	
10	Piston	Aluminum alloy								1	
11	Magnet ring	Magnet material								1	
12	Magnet holder	Stainless steel					Aluminum alloy			1	
13	Piston packing	NBR								1	●
14	Head cushion	NBR								1	●
15	Bolt	SCM								1	
16	Plate	Carbon steel								1	
17	Guide rod	Special steel								2	
18	Bolt	SCM								2	
19	Cover ring #2	NBR								1	●
20	FBC board	Carbon steel								1	
21	Rod cushion	NBR								1	●
22	Gasket	PU								1	
23	Adjustable nut	Stainless steel								1	
24	Nut	Stainless steel								1	
25	Bolt	Stainless steel			SCM					2	
26	Screw	Stainless steel								2	
27	Washer	PET			—					2	
28	Snap ring #1	Spring steel					Stainless steel			1	
29	Snap ring #2	Spring steel								2	
30	Collar (*1)	Aluminum alloy			Carbon steel					2	
31	Bush	—					Iron-based alloy			2	
32	Piston gasket	NBR								1	●

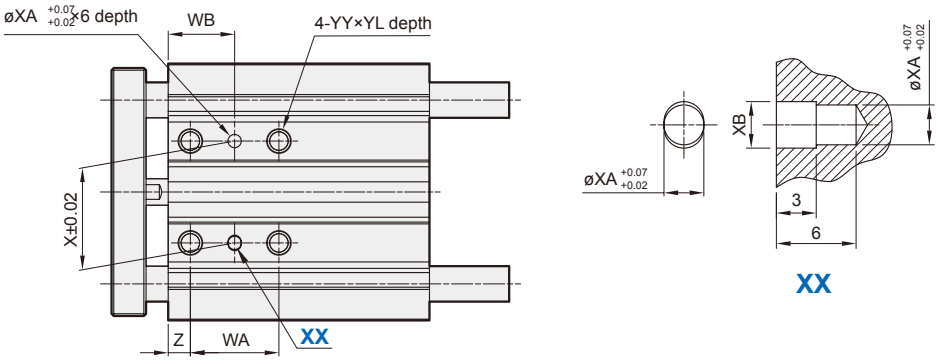
Order example of repair kits

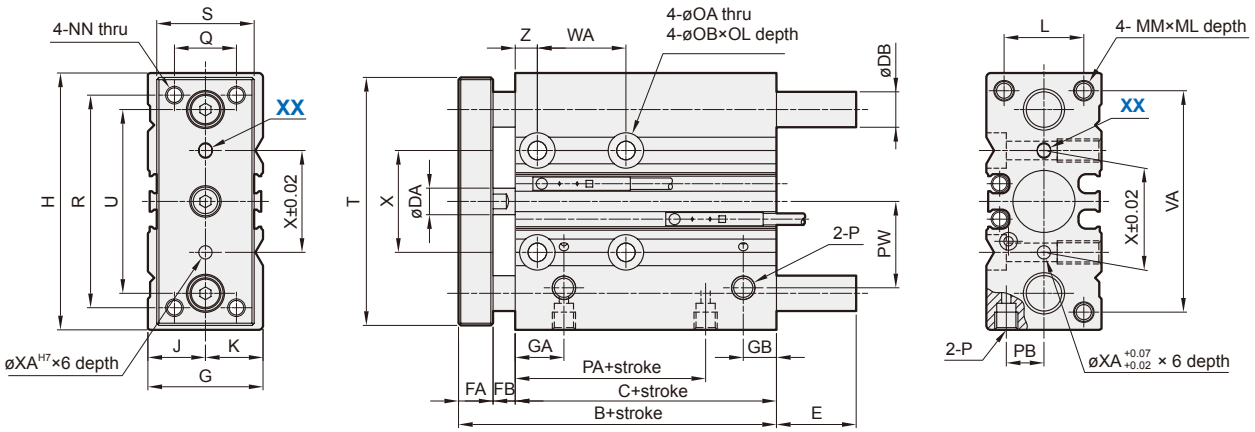
Tube I.D.	Repair kits
ø12	**PS-MCGS-2-12**
ø16	**PS-MCGS-2-16**
ø20	**PS-MCGS-2-20**
ø25	**PS-MCGS-2-25**
ø32	**PS-MCGS-2-32**
ø40	**PS-MCGS-2-40**
ø50	**PS-MCGS-2-50**
ø63	**PS-MCGS-2-63**

*1. Use for stroke 101 or more.
*2. The material changes into bronze alloy when the part thread is BSPF. (JISPF)

20-MCGS-03/23 Dimensions ø12~ø32

TWIN-GUIDE CYLINDER





20-MCGS-03 / MCGS-23

Code / Tube I.D.	B	C	DA	DB		FA	FB	G	GA	GB	H	J	K	L	MM	ML	NN	OA	OB	OL	P	PA	PB
				03 type	23 type																		
12	42	29	6	8	6	8	5	26	11	15(*1)	58	13	13	18	M4×0.7	10	M4×0.7	4.3	8.0	4.5	M5×0.8	14	8.5
16	46	33	8	10	8	8	5	30	11	18(*2)	64	15	15	22	M5×0.8	12	M5×0.8	4.3	8.0	4.5	M5×0.8	15	10.0
20	53	37	10	12	10	10	6	36	10.5	8.5	85	17	19	24	M5×0.8	13	M5×0.8	5.2	9.5	5.5	Rc1/8	12.5	11.5
25	53.5	37.5	12	16	13	10	6	42	11.5	9	96	21	21	30	M6×1.0	15	M6×1.0	5.2	9.5	5.5	Rc1/8	12.5	13.5
32	59.5	37.5	16	20	16	12	10	51	12.5	9	116	26	25	34	M8×1.25	20	M8×1.25	6.6	11.0	7.5	Rc1/8	7	16.0

Code / Tube I.D.	PW	Q	R	S	T	U	VA	X	XA	XB	YY	YL	Z
12	18	14	48	22	56	41.5	50	23	3	3.5	M5×0.8	10	5
16	19	16	54	25	62	46	56	24	3	3.5	M5×0.8	10	5
20	25	18	70	30	81	55	72	28	3	3.5	M6×1.0	12	17
25	28.5	26	78	38	91	65	82	34	4	4.5	M6×1.0	12	17
32	34	30	96	44	110	80	98	42	4	4.5	M8×1.25	16	21

Code / Tube I.D.	WA					WB				
	~39st	40~100st	125~200st	201st~300st	301st~	20~39st	40~100st	125~200st	201st~300st	301st~
12	20	40	110	200	—	15	25	60	105	—
16	24	44	110	200	—	17	27	60	105	—
20	24	44	120	200	300	29	39	77	117	167
25	24	44	120	200	300	29	39	77	117	167

Code / Tube I.D.	WA					WB				
	25~49st	50~100st	125~200st	201st~300st	301st~	25~49st	50~100st	125~200st	201~300st	301st~
32	24	48	124	200	300	33	45	83	121	171

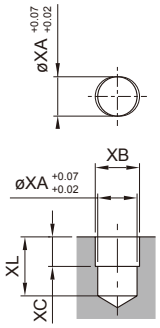
*1. When stroke length is equal to 19mm or less, GB=7.5 mm
*2. When stroke length is equal to 19mm or less, GB=9 mm

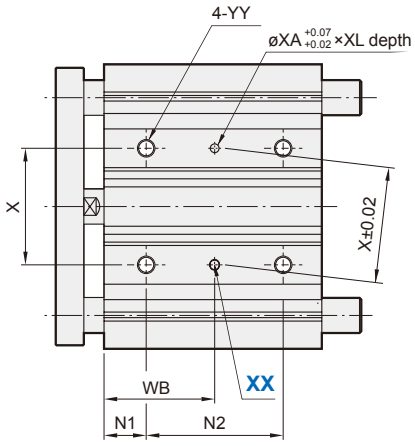
20-MCGS-03

Code / Tube I.D.	E		
	10~50st	51~100st	101st~
12	—	18.5	43
16	—	18.5	49
	10~50st	51~200st	201st~
20	—	31.5	69
25	—	31.5	68.5
32	37.5	42.5	80.5

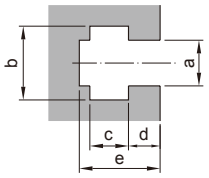
20-MCGS-23

Code / Tube I.D.	E			
	10~30st	31~100st	101st~	
12	1	13	43	
16	3	19	49	
	20~30st	31~100st	101~200st	201st~
20	10	27	51	69
25	16	32	51	68.5
32	21.5	38.5	58.5	80.5





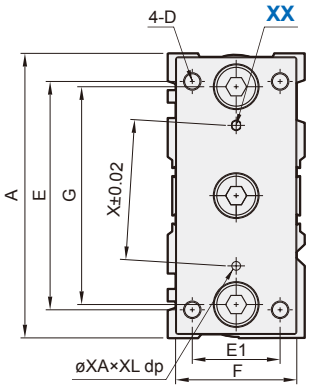
Tslot for hexagon head bolt

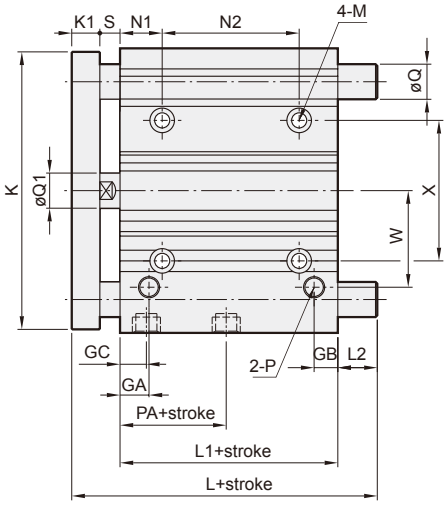


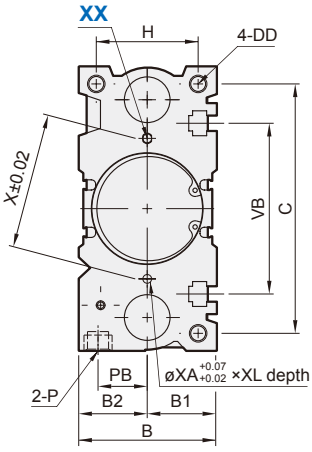
T slot for hexagon head bolt

Code / Tube I.D.	a	b	c	d	e
40	6.5	10.5	5.5	4	11
50	8.5	13.5	7.5	4.5	13.5
63	11	17.8	10	7	18.5

Back side







20-MCGS-03 / MCGS-23

Code / Tube I.D.	A	B	B1	B2	C	D	DD	E	E1	F	G	GA	GB	GC	H	K	K1	L1	M	N1	P
40	120	54	27	27	106	M8×1.25	M8×1.25×20 dp	104	30	44	86	14	10	14	40	118	12	44	ø6.6thru, ø11×7.5 dp	22	Rc1/8
50	148	64	32	32	130	M10×1.5	M10×1.5×22 dp	130	40	60	110	14	11	12	46	146	16	44	ø8.6thru, ø14×9 dp	24	Rc1/4
63	162	78	39	39	142	M10×1.5	M10×1.5×22 dp	130	50	70	124	16.5	13.5	16.5	58	158	16	49	ø8.6thru, ø14×9 dp	24	Rc1/4

Code / Tube I.D.	PA	PB	Q1	S	VB	W	X	XA	XB	XC	XL	YY	N2					WB				
													25st	50,75,100st	101st~200st	201~300st	301~400st	25st	50,75,100st	101st~200st	201~300st	301~400st
40	13	18	16	10	72	38	50	4	4.5	3	6	M8×1.25×16 dp	24	48	124	200	300	34	46	84	122	172
50	9	21.5	20	12	92	47	66	5	6	4	8	M10×1.5×20 dp	24	48	124	200	300	36	48	86	124	174
63	14	28	20	12	110	55	80	5	6	4	8	M10×1.5×20 dp	28	52	128	–	–	38	50	88	–	–

20-MCGS-03

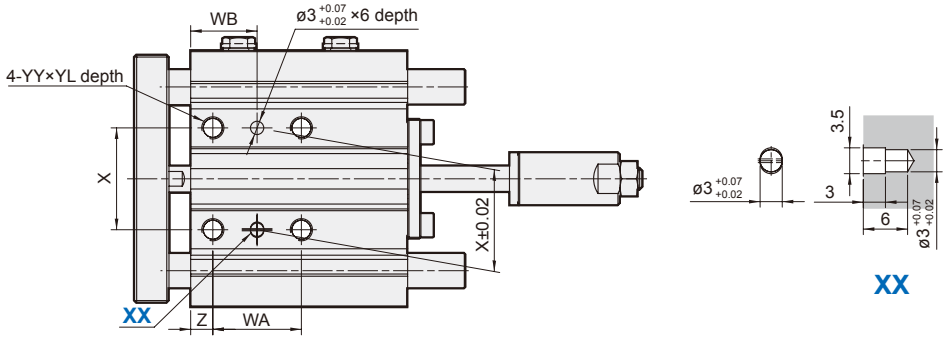
Code / Tube I.D.	L		L2			Q
	25,50st	51st~	25,50st	51~200st	201~400st	
40	97	102	31	36	63.5	ø20
50	106.5	118	34.5	46	78.5	ø25
63	106.5	118	29.5	41	–	ø25

20-MCGS-23

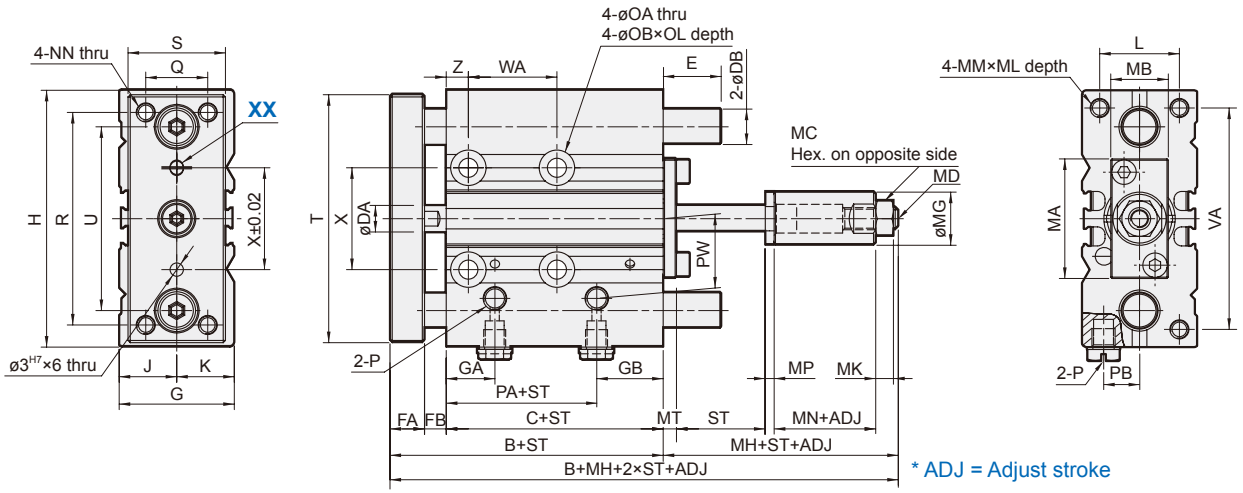
Code / Tube I.D.	L			L2				Q
	25,50st	75,100st	101st~	25,50st	75,100st	101~200st	201~400st	
40	81	98	118	15	32	52	72.5	ø16
50	93	114	134	21	42	62	87.5	ø20
63	93	114	134	16	37	57	–	ø20

20-MCGS-07/27 Dimensions ø12~ø20

TWIN-GUIDE CYLINDER



Back side



20-MCGS-07 / MCGS-27

Code / Tube I.D.	B	C	DA	DB		FA	FB	G	GA	GB	H	J	K	L	MA	MB	MC	MD	MG	MH	MK	MN	MM	ML	MP	MT
				07 type	27 type																					
12	42	29	6	8	6	8	5	26	11	15(*1)	58	13	13	18	27	13	8	M5×0.8	12	23	4	13	M4×0.7	10	2	3
16	46	33	8	10	8	8	5	30	11	18(*2)	64	15	15	22	28	16	10	M6×1.0	15	26	5	15	M5×0.8	12	2	3
20	53	37	10	12	10	10	6	36	10.5	8.5	85	17	19	24	33	22	13	M8×1.25	20	26	5	12	M5×0.8	13	3	4

Code / Tube I.D.	NN	OA	OB	OL	P	PA	PB	PW	Q	R	S	T	U	VA	X	YY	YL	Z
12	M4×0.7	4.3	8	4.5	M5×0.8	14	8.5	18	14	48	22	56	41.5	50	23	M5×0.8	10	5
16	M5×0.8	4.3	8	4.5	M5×0.8	15	10.0	19	16	54	25	62	46	56	24	M5×0.8	10	5
20	M5×0.8	5.2	9.5	5.5	Rc1/8	12.5	11.5	25	18	70	30	81	55	72	28	M6×1.0	12	17

Code / Tube I.D.	WA					WB				
	10~39st	40~100st	125~200st	201st~300st		10~39st	40~100st	125~200st	201~300st	
12	20	40	110	200		15	25	60	105	
	~39st	40~100st	125~200st	201st~300st		~39st	40~100st	125~200st	201st~300st	
16	24	44	110	200		17	27	60	105	
	~39st	40~100st	125~200st	201st~300st	301st~	~39st	40~100st	125~200st	201st~300st	301st~
20	24	44	120	200	300	29	39	77	117	167

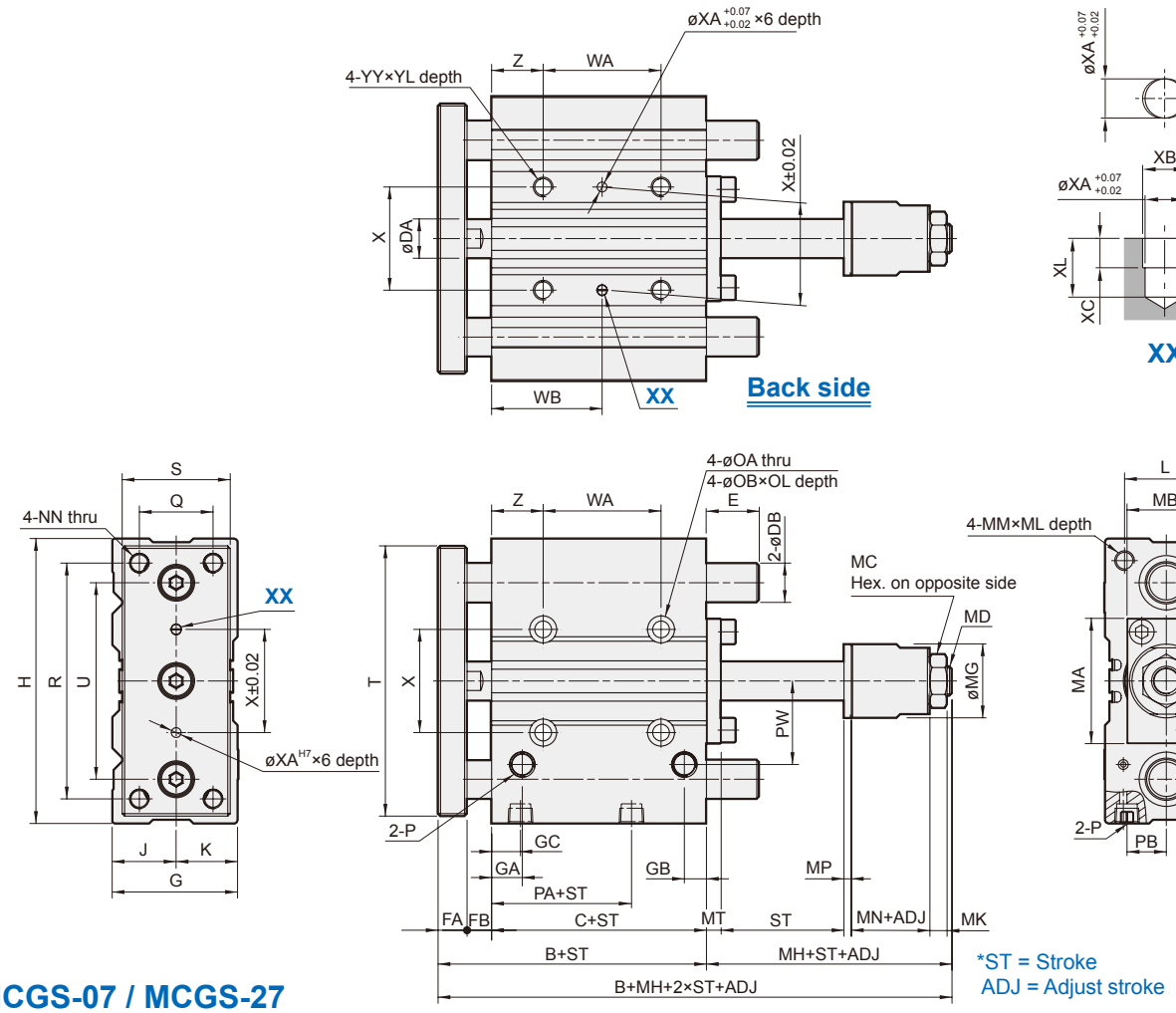
20-MCGS-07

Code / Tube I.D.	E		
	~50st	51~100st	101st~
12	0	18.5	43
	10~50st	51~100st	101st~
16	0	18.5	49
	~50st	51~200st	201st~
20	0	31.5	69

20-MCGS-27

Code / Tube I.D.	E			
	~30st	31~100st	101st~	
12	1	13	43	
	10~30st	31~100st	101st~	
16	3	19	49	
	20~30st	31~100st	101~200st	201st~
20	10	27	51	69

*1. When stroke length is equal to 19mm or less, GB=7.5 mm
*2. When stroke length is equal to 19mm or less, GB=9 mm



*ST = Stroke
ADJ = Adjust stroke

20-MCGS-07 / MCGS-27

Code / Tube I.D.	B	C	DA	DB		FA	FB	G	GA	GB	GC	H	J	K	L	MA	MB	MC	MD	MG	MH	MK	MN	MM	ML	MP	MT
				07 type	27 type																						
25	53.5	37.5	12	16	13	10	6	42	11.5	9	11.5	96	21	21	30	41	25	17	M10×1.25	20	27	6	12	M6×1.0	15	3	5
32	59.5	37.5	16	20	16	12	10	51	12.5	9	12.5	116	26	25	34	51	32	19	M12×1.25	30	30	7	12	M8×1.25	20	3	6
40	66	44	16	20	16	12	10	54	14	10	14	120	27	27	40	60	32	19	M12×1.25	30	30	7	12	M8×1.25	20	3	6
50	72	44	20	25	20	16	12	64	14	11	12	148	32	32	46	71	38	24	M16×1.5	35	38	8	15	M10×1.5	22	4	8
63	77	49	20	25	20	16	12	78	16.5	13.5	16.5	162	39	39	58	84	50	24	M16×1.5	35	38	8	15	M10×1.5	22	4	8

Code / Tube I.D.	NN	OA	OB	OL	P	PA	PB	PW	Q	R	S	T	U	VA	X	XA	XB	XC	XL	YY	YL	Z
25	M6×1.0	5.2	9.5	5.5	Rc1/8	12.5	13.5	28.5	26	78	38	91	65	82	34	4	4.5	3	6	M6×1.0	12	17
32	M8×1.25	6.6	11	7.5	Rc1/8	7	16	34	30	96	44	110	80	98	42	4	4.5	3	6	M8×1.25	16	21
40	M8×1.25	6.8	11	7.5	Rc1/8	13	18	38	30	104	44	118	86	106	50	4	4.5	3	6	M8×1.25	16	22
50	M10×1.5	8.6	14	9	Rc1/4	9	21.5	47	40	130	60	146	110	130	66	5	6	4	8	M10×1.5	20	24
63	M10×1.5	8.6	14	9	Rc1/4	14	28	55	50	130	70	158	124	142	80	5	6	4	8	M10×1.5	20	24

Code / Tube I.D.	WA						WB					
	~39st	40~100st		125~200st	201st~300st	301st~	~39st	40~100st		125~200st	201~300st	301st~
25	24	44		120	200	300	29	39		77	117	167
32	~49st	50~100st		125~200st	201st~300st	301st~	~49st	50~100st		125~200st	201st~300st	301st~
	24	48		124	200	300	33	45		83	121	171
40	~49st	50~69st	70~100st	125~200st	201st~300st	301st~	~49st	50~69st	70~100st	125~200st	201st~300st	301st~
	24	48	48	124	200	300	34	46	46	84	122	172
50	~49st	50~69st	70~100st	125~200st	201st~300st	301st~	~49st	50~69st	70~100st	125~200st	201st~300st	301st~
	24	48	48	124	200	300	36	48	48	86	124	174
63	~49st	50~100st		125st~			~49st	50~100st		125st~		
	28	52		128			38	50		88		

20-MCGS-07

Code / Tube I.D.	E		
	~50st	51~200st	201st~
25	0	31.5	68.5
32	37.5	42.5	80.5
40	31	36	63.5
50	34.5	46	78.5
63	~50st	51st~	
	29.5	41	

20-MCGS-27

Code / Tube I.D.	E			
	20~30st	31~100st	101~200st	201st~
25	16	32	51	68.5
32	20~50st	51~100st	101~200st	201st~
	21.5	38.5	58.5	80.5
40	~69st	70~100st	101~200st	201st~
	15	32	52	72.5
50	21	42	62	87.5
63	~69st	70~100st	101st~	
	16	37	57	

MCSS / 20-MCSS series

SLIDE CYLINDER

Features

- High precision combination of cylinder and linear rail.
- Flush fitting sensor groove.
- Magnetic as standard.

Specification

Model	20-MCSS		
Acting type	Double acting		
Tube I.D. (mm)	6	8, 12, 16	20, 25
Port size	M3×0.5	M5×0.8	Rc1/8
Medium	Air		
Operating pressure range	0.15~0.7 MPa		
Proof pressure	1 MPa		
Ambient temperature	–5~+60°C (No freezing)		
Lubricator	Not required		
Available speed range	50~500 mm/sec		
Cushion	Rubber bumper (Standard) Shock absorber (Option)		
Sensor switch (*)	RCE, RCE1, RDEP		

Table for standard stroke

Tube I.D.	Stroke (mm)
ø6	10, 20, 30, 40, 50
ø8	10, 20, 30, 40, 50, 75
ø12	10, 20, 30, 40, 50, 75, 100
ø16	10, 20, 30, 40, 50, 75, 100, 125
ø 20, 25	10, 20, 30, 40, 50, 75, 100, 125, 150

Order example (Stroke adjuster)

MCSS — 20 L — 50 — AS — X12 — □

- MODEL
- TUBE I.D.
  - Blank: Standard
  - **L**: Symmetric style
- STROKE
- STROKE ADJUSTER
  - Blank: Without adjuster
  - **AS**: Adjuster at extension end
  - **AT**: Adjuster at retraction end
  - **A**: Adjuster at both ends
- ADJUSTABLE RANGE
  - Blank: 5mm
  - **X11**: 15mm
  - **X12**: 25mm
  - (Only for stroke adjuster)
- PORT THREAD
  - Blank: M thread (for ø6~ø16)
  - Blank: Rc thread
  - **G**: G thread
  - **NPT**: NPT thread (for ø20,ø25)

*__X12__ (adjustable range: 25mm) is not available for MCSS-6.

Order example (Shock absorbers)

Start ordering on 2019.07.01

20 — MCSS — 20 L — 50 — BS — □

- MATERIAL RESTRICTIONS (Secondary battery)
- MODEL
- TUBE I.D.
  - Blank: Standard
  - **L**: Symmetric style
- STROKE
- SHOCK ABSORBER
  - **BS**: Absorber at extension end
  - **BT**: Absorber at retraction end
  - **B**: Absorber at both ends
  - **AB**: Adjuster at extension end+ Absorber at retraction end
  - **BA**: Absorber at extension end+ Adjuster at retraction end
- PORT THREAD
  - Blank: M thread (for ø8~ø16)
  - Blank: Rc thread
  - **G**: G thread
  - **NPT**: NPT thread (for ø20,ø25)

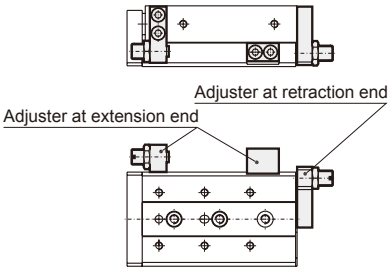
*Shock absorber is not available on series MCSS-6.

Stroke adjuster option

Stroke adjuster

- Adjustable stroke range: 0~5mm (Standard)

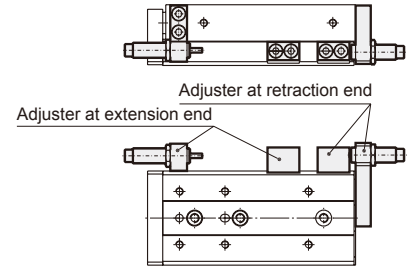
AS: Adjuster at extension end
AT: Adjuster at retraction end
A: Adjuster at both ends



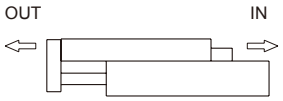
With shock absorber

- Enables adjustment of stroke.
- Absorbs the collision at stroke end and stops smoothly.

BS: Absorber at extension end
BT: Absorber at retraction end
B: Absorber at both ends



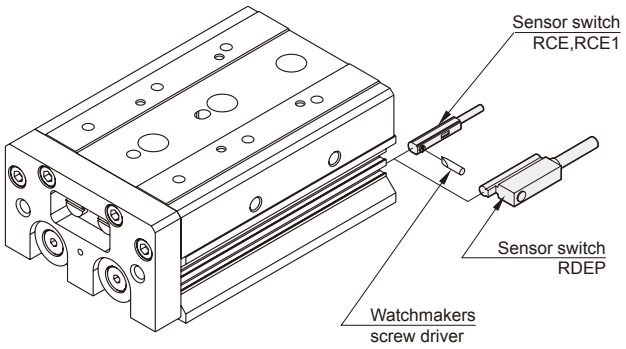
Theoretical force



Unit : N

Tube I.D. (mm)	Piston rod (mm)	Operating direction	Piston area (mm^2)	Operating pressure (MPa)					
				0.2	0.3	0.4	0.5	0.6	0.7
6	3	OUT	57	11	17	23	29	34	40
		IN	42	8	13	17	21	25	29
8	4	OUT	101	20	30	40	51	61	71
		IN	75	15	23	30	38	45	53
12	6	OUT	226	45	68	90	113	136	158
		IN	170	34	51	68	85	102	119
16	8	OUT	402	80	121	161	201	241	281
		IN	302	60	91	121	151	181	211
20	10	OUT	628	126	188	251	314	377	400
		IN	471	94	141	188	236	283	330
25	12	OUT	982	196	295	393	491	589	687
		IN	756	151	227	302	378	454	529

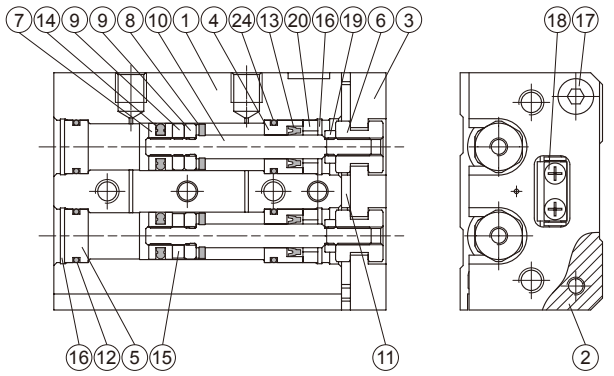
Installation of sensor switch



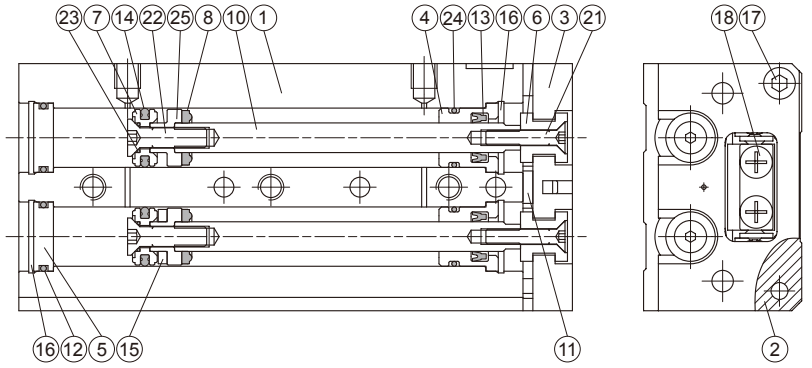
MCSS / 20-MCSS Inside structure & Parts list

SLIDE CYLINDER

ø6, ø8



ø12~ø25



Order example of repair kits

Tube I.D.	Repair kits
ø6	**PS-MCSS-6**
ø8	**PS-MCSS-8**
ø12	**PS-MCSS-12**
ø16	**PS-MCSS-16**
ø20	**PS-MCSS-20**
ø25	**PS-MCSS-25**

Material

No.	Part name \ Tube I.D.	6	8	12~25	Q'y	Repair kits (inclusion)
1	Body	Aluminum alloy			1	
2	Table	Aluminum alloy			1	
3	Plate	Aluminum alloy			1	
4	Rod cover	Aluminum alloy			2	
5	Head cover	Aluminum alloy			2	
6	Floating connector	Stainless steel			2	
7	Piston	Stainless steel		*1	2	
8	Cushion pad	NBR			2	●
9	Spacer ring	*1	*2	—	3	
10	Piston rod	Stainless steel			2	
11	End cushion	PU			1	●
12	Cover ring	NBR			2	●
13	Rod packing	NBR			2	●
14	Piston packing	NBR			2	●
15	Magnet ring	Magnet material			1	
16	Snap ring	*3	Stainless steel		4	
17	Bolt	Stainless steel			2 or 4	
18	Slide way	Bearing steel			1	
19	Nut	Stainless steel		—	2	

*1. Aluminum alloy *2. Stainless steel *3. Spring steel

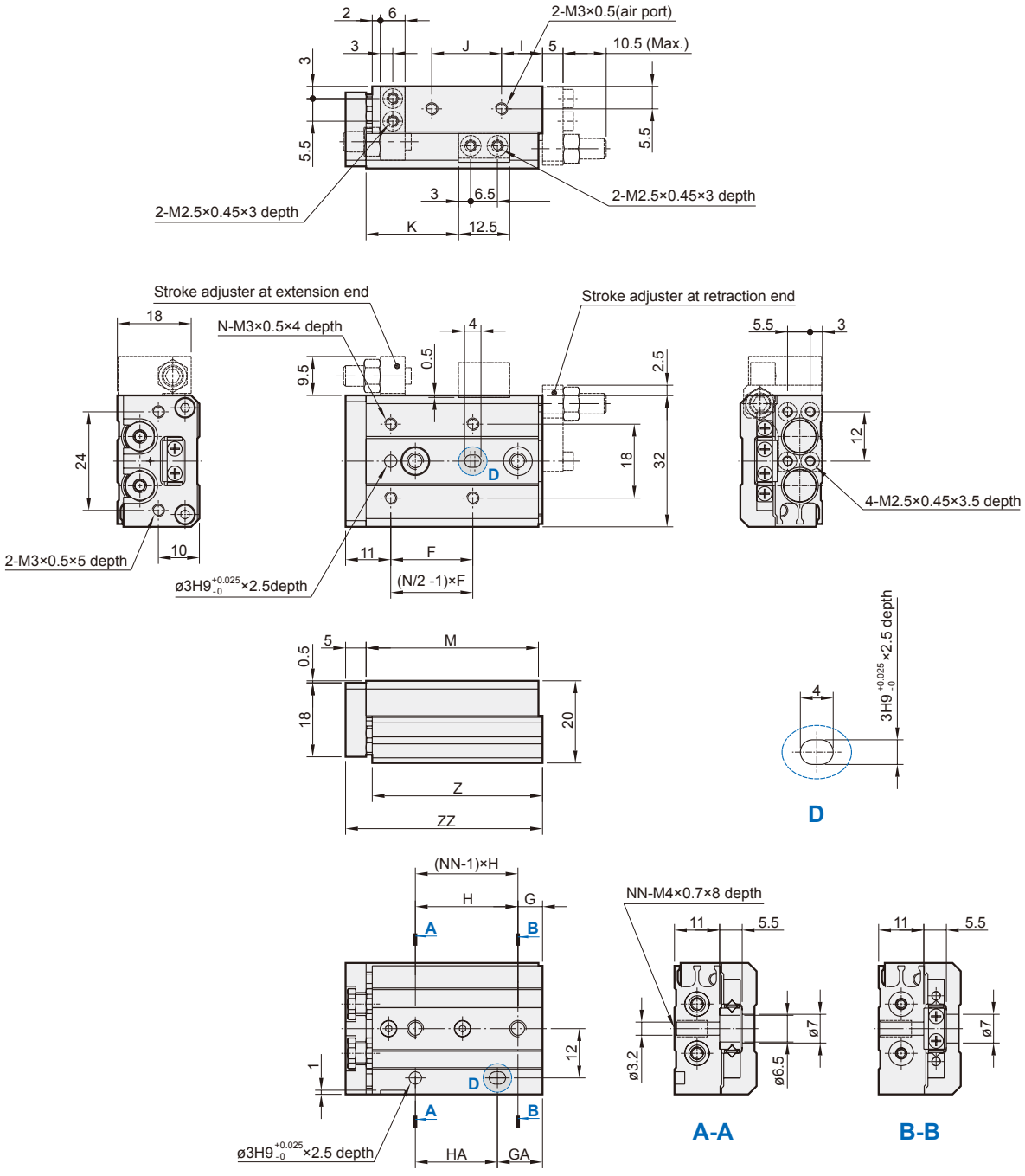
No.	Part name \ Tube I.D.	6	8	12~25	Q'y	Repair kits (inclusion)
20	Rod cover washer	Stainless steel		—	2	
21	Floating connector bolt	—		*2	2	
22	Piston screw	—		*2	2	
23	Piston gasket	—		NBR	2	●
24	Cover ring	NBR			2	●
25	Piston for magnet ring	—		*1	2	

* Item 17. Tube I.D. ø6~16 (Q'y: 2pcs); Tube I.D. ø20, 25 (Q'y: 4pcs).

Cylinder weight

Unit: g

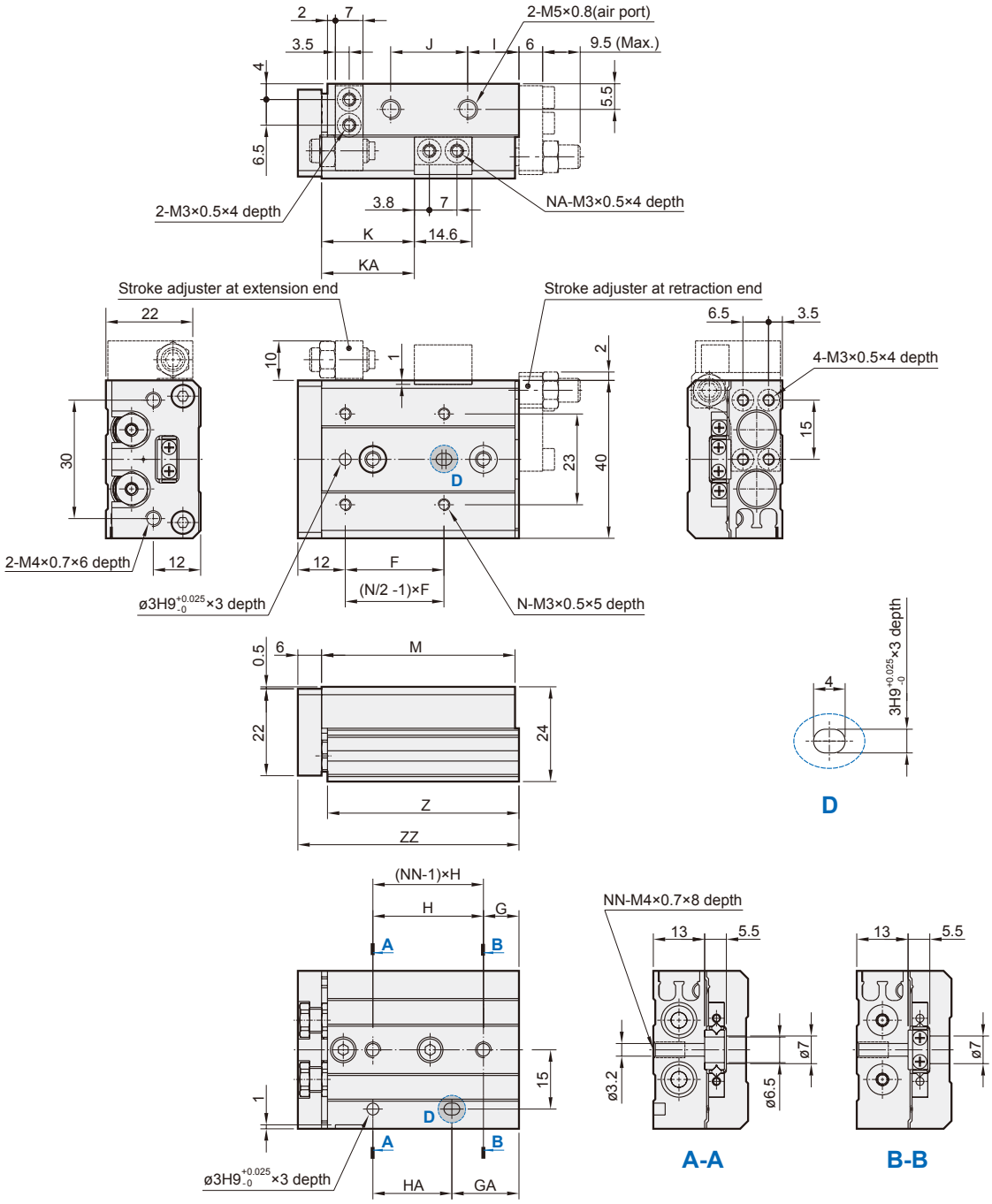
Stroke (mm)	Tube I.D. ø6	ø8	ø12	ø16	ø20	ø25
10	89	155	360	576	1050	1636
20	110	166	362	604	1060	1650
30	122	201	369	602	1092	1673
40	161	246	425	674	1145	1797
50	199	281	529	762	1320	1989
75	–	394	722	1095	1815	2713
100	–	–	960	1410	2365	3260
125	–	–	–	1702	2880	4260
150	–	–	–	–	3368	4530



Code / Stroke	F	G	GA	H	HA	I	J	K	M	N	NN	Z	ZZ
10	20	6	11	25	20	10	17	22.5	42	4	2	41.5	48
20	30	6	21	35	20	10	27	32.5	52	4	2	51.5	58
30	20	11	31	20	20	7	40	42.5	62	6	3	61.5	68
40	28	13	43	30	30	19	50	52.5	84	6	3	83.5	90
50	38	17	41	24	48	25	60	62.5	100	6	4	99.5	106

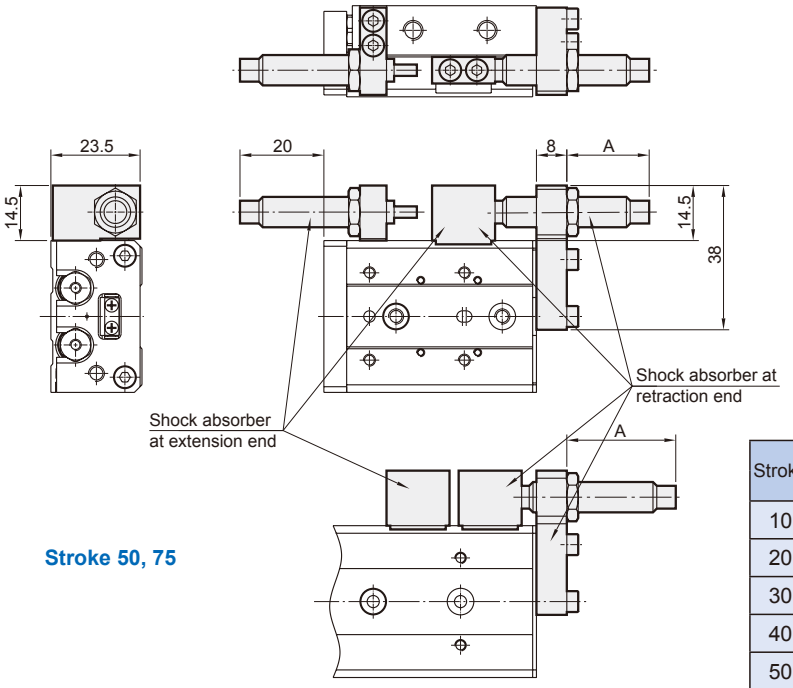
MCSS / 20-MCSS Dimensions ø8

SLIDE CYLINDER



Code / Stroke	F	G	GA	H	HA	I	J	K	KA	M	N	NA	NN	Z	ZZ
10	25	9	17	28	20	13	19.5	23.5	-	49	4	2	2	48.5	56
20	25	12	12	30	30	8.5	29	33.5	-	54	4	2	2	53.5	61
30	40	13	33	20	20	9.5	39	43.5	-	65	4	2	3	64.5	72
40	50	15	43	28	28	10.5	56	53.5	-	83	4	2	3	82.5	90
50	38	20	43	23	46	24.5	60	63.5	82.5	101	6	4	4	100.5	108
75	50	27	83	28	56	38.5	96	88.5	132.5	151	6	4	5	150.5	158

ø8



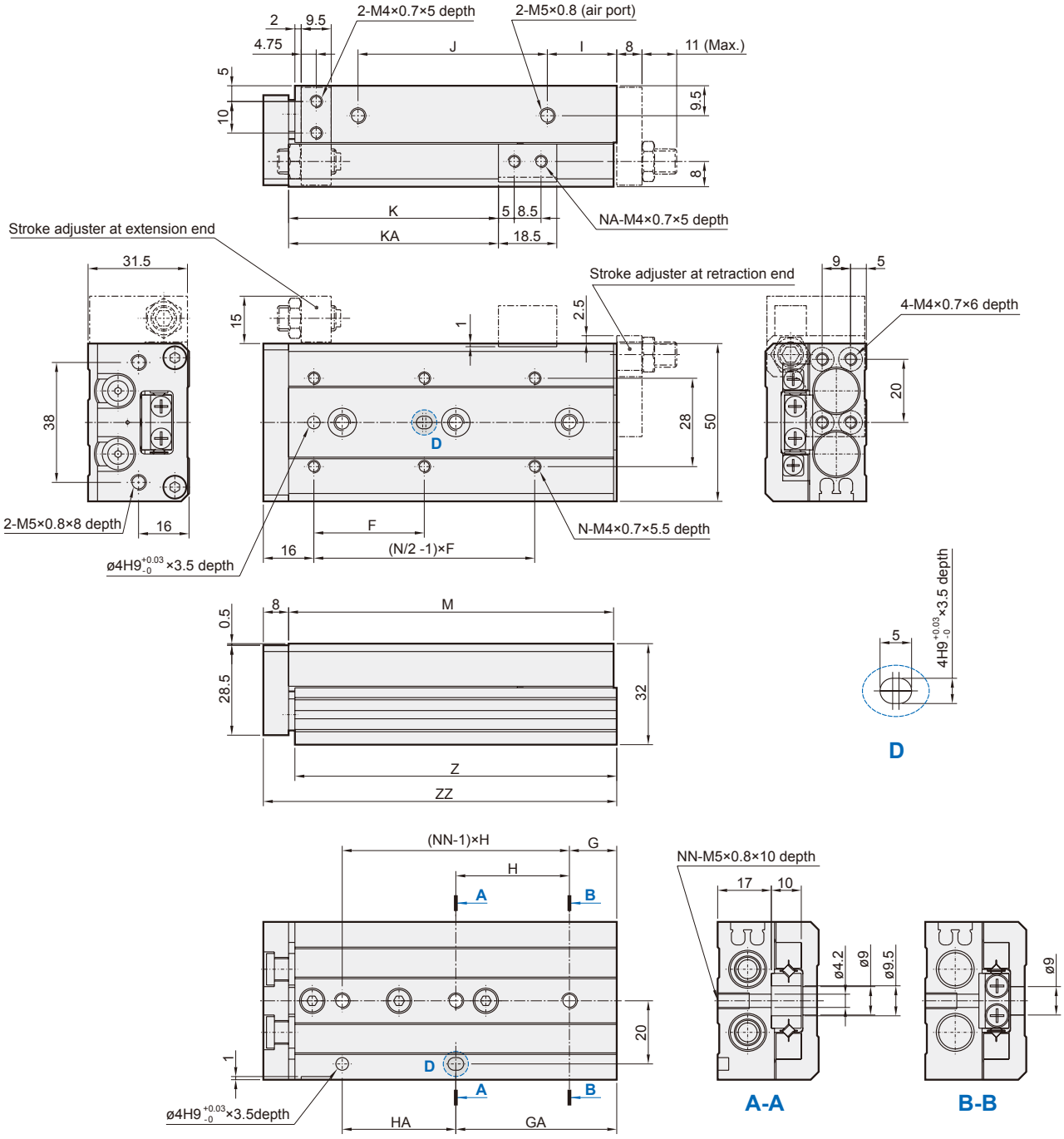
Stroke 50, 75

Stroke	Stroke adjustment range		A dimension (Retracted side mounting)
	Extending	Retracting	
10	Max. 21	11.5	20.1
20		16.1	25.1
30		15.1	24.1
40		7.1	16.1
50		18.1	27.1
75		18.1	27.1

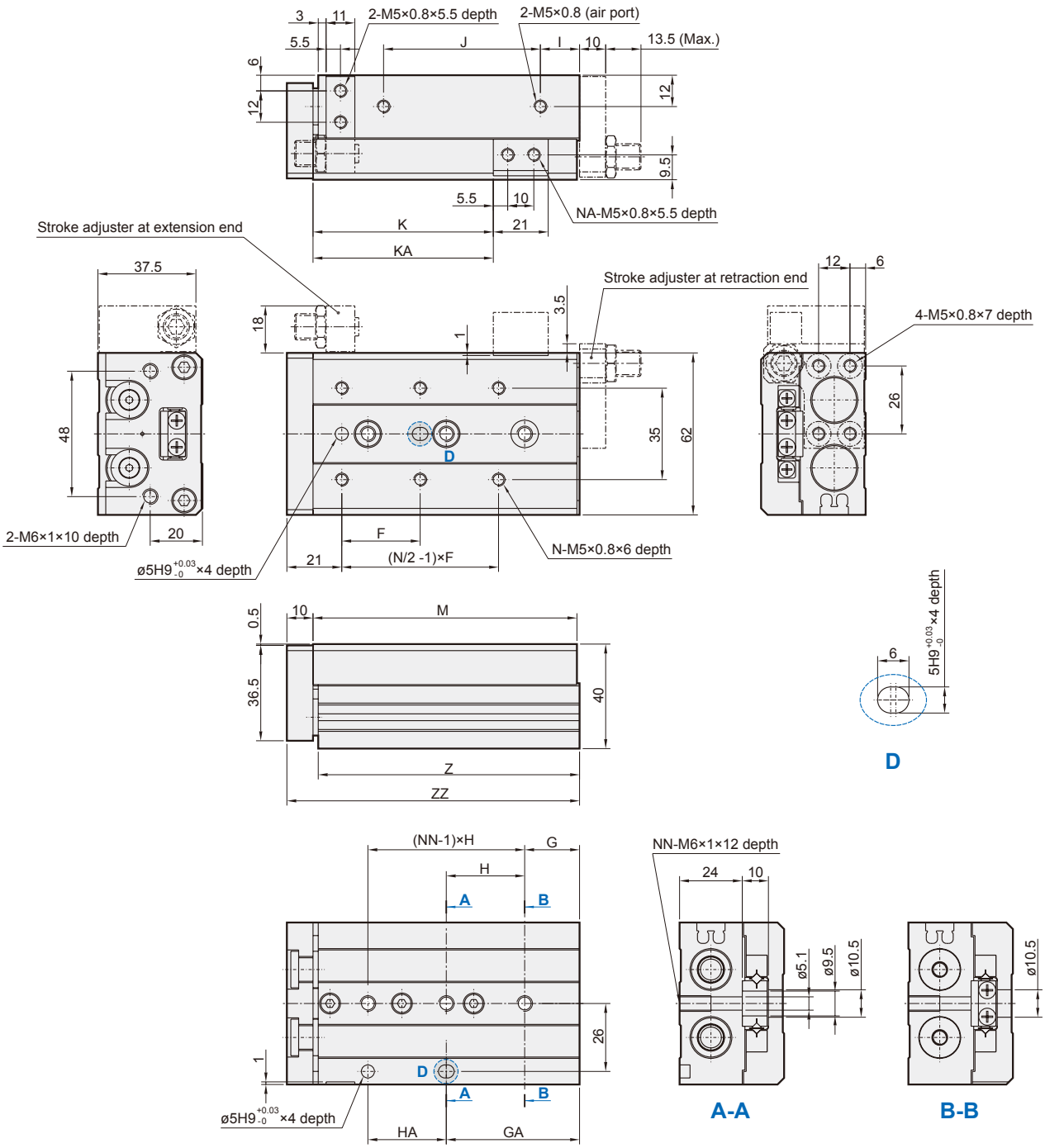
* Other dimensions not indicated are the same as the basic style.

MCSS / 20-MCSS Dimensions ø12

SLIDE CYLINDER



Code / Stroke	F	G	GA	H	HA	I	J	K	KA	M	N	NA	NN	Z	ZZ
10	35	15	15	40	40	10	40	26.5	–	71	4	2	2	70	80
20	35	15	15	40	40	10	40	36.5	–	71	4	2	2	70	80
30	35	15	15	40	40	10	40	46.5	–	71	4	2	2	70	80
40	50	17	42	25	25	10	52	56.5	–	83	4	2	3	82	92
50	35	15	51	36	36	22	60	66.5	–	103	6	2	3	102	112
75	55	25	61	36	72	43	85	91.5	125.5	149	6	4	4	148	158
100	65	35	111	38	76	52	130	116.5	179.5	203	6	4	5	202	212

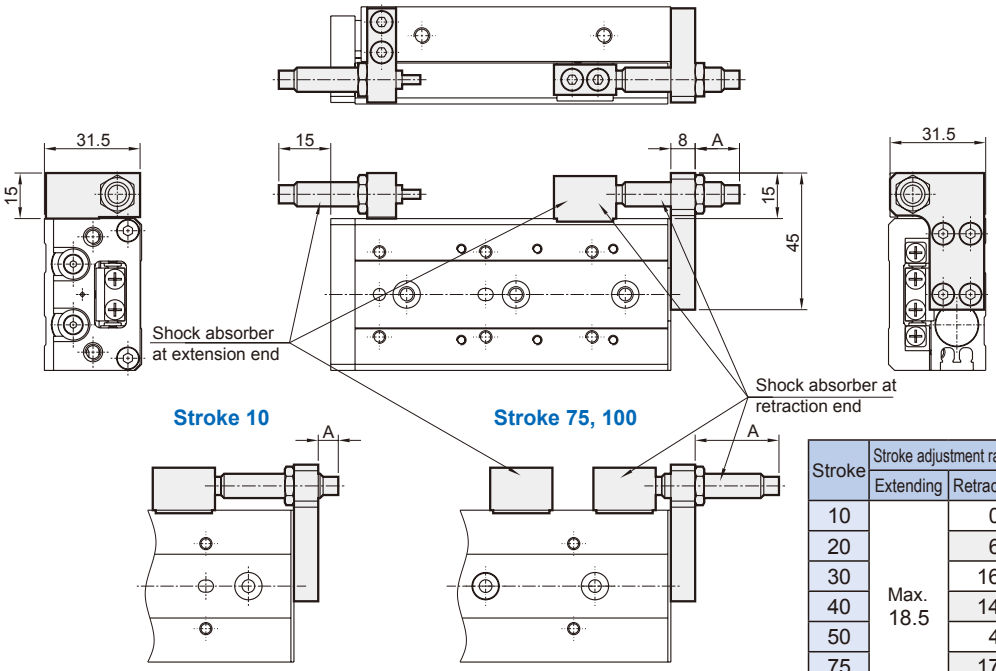


Code / Stroke	F	G	GA	H	HA	I	J	K	KA	M	N	NA	NN	Z	ZZ
10	35	16	16	40	40	10	40	29	–	76	4	2	2	75	87
20	35	16	16	40	40	10	40	39	–	76	4	2	2	75	87
30	35	16	16	40	40	10	40	49	–	76	4	2	2	75	87
40	40	16	16	50	50	10	50	59	–	86	4	2	2	85	97
50	30	21	51	30	30	15	60	69	–	101	6	2	3	100	112
75	55	26	61	35	70	40	85	94	125	151	6	4	4	150	162
100	65	39	109	35	70	55	118	119	173	199	6	4	5	198	210
125	70	19	159	35	70	68	155	144	223	249	8	4	7	248	260

20-MCSS With shock absorber ø12 ,ø16

SLIDE CYLINDER

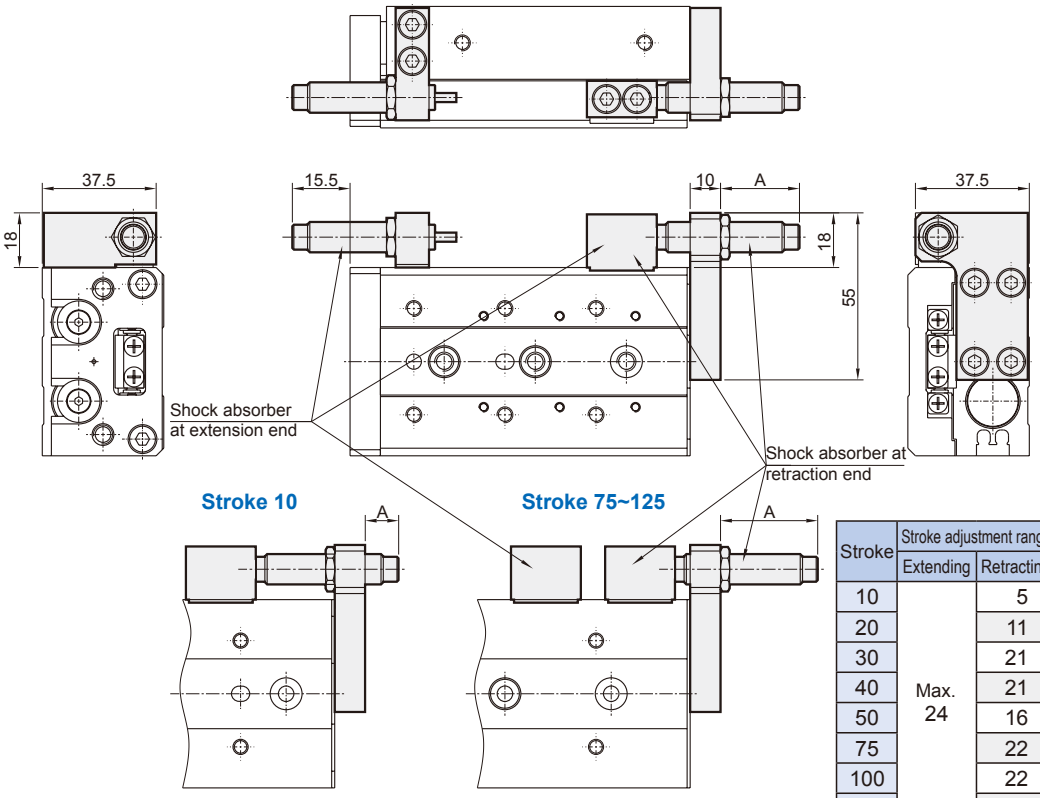
ø12



Stroke	Stroke adjustment range		A dimension (Retracted side mounting)
	Extending	Retracting	
10	Max. 18.5	0	5
20		6	15
30		16	25
40		14	23
50		4	13
75		17	26
100		17	26

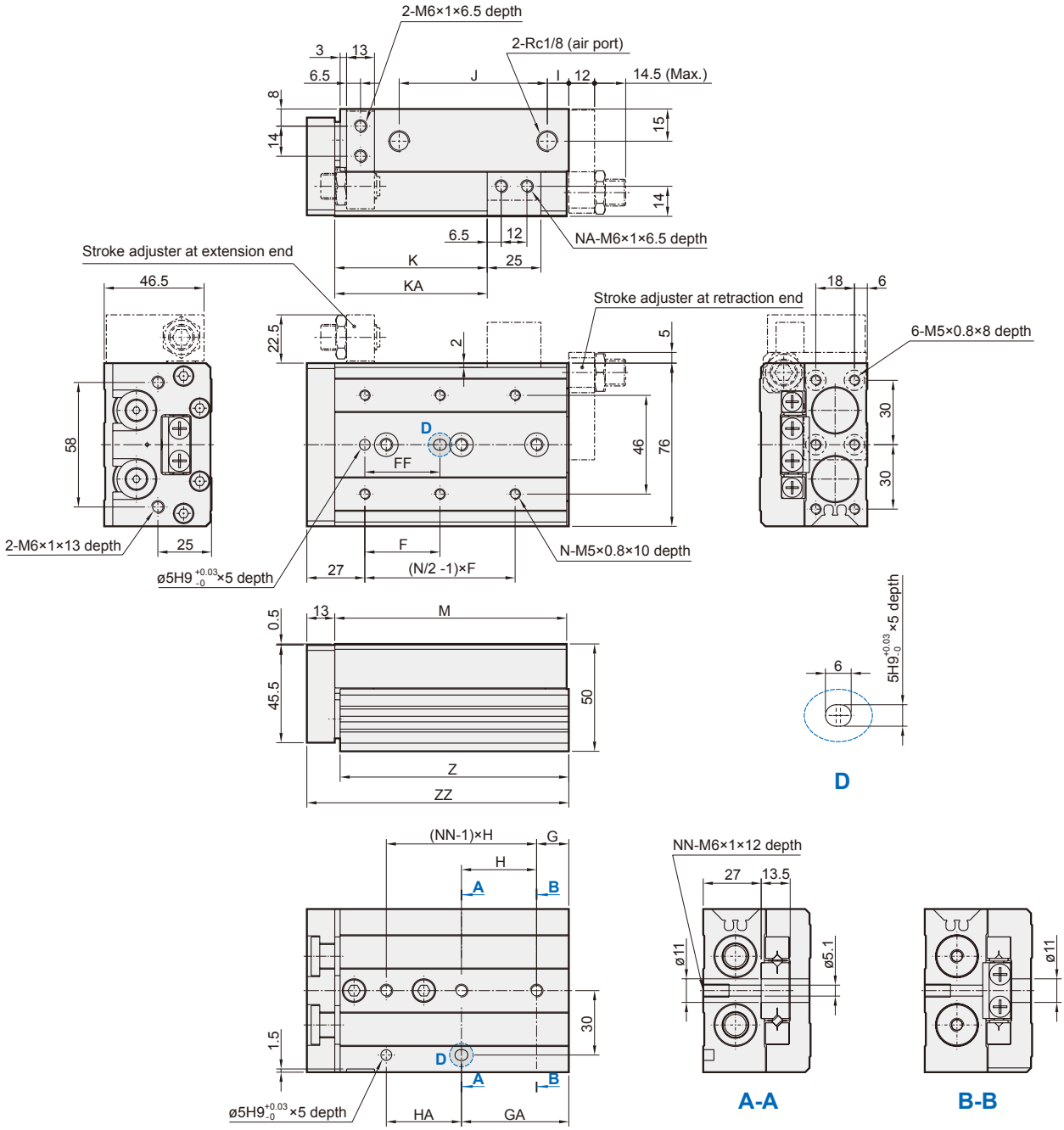
* Other dimensions not indicated are the same as the basic style.

ø16



Stroke	Stroke adjustment range		A dimension (Retracted side mounting)
	Extending	Retracting	
10	Max. 24	5	10
20		11	20
30		21	30
40		21	30
50		16	25
75		22	31
100		22	31
125		22	31

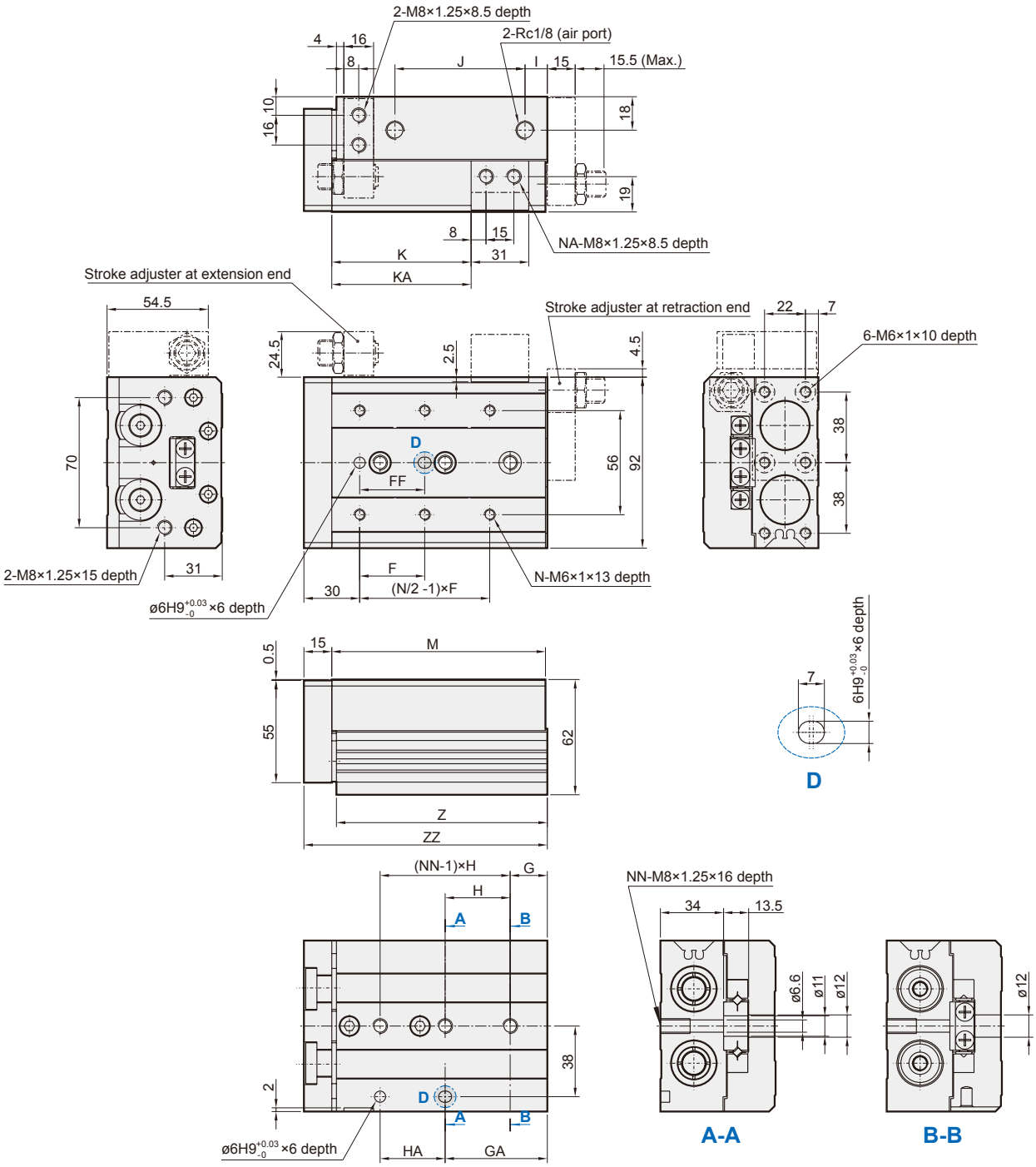
* Other dimensions not indicated are the same as the basic style.



Code / Stroke	F	FF	G	GA	H	HA	I	J	K	KA	M	N	NA	NN	Z	ZZ
10	50	40	15	25	45	35	10	44	31	-	83	4	2	2	81.5	97
20	50	40	15	25	45	35	10	44	41	-	83	4	2	2	81.5	97
30	50	40	15	25	45	35	10	44	51	-	83	4	2	2	81.5	97
40	60	50	15	35	55	35	10	54	61	-	93	4	2	2	91.5	107
50	35	35	15	50	35	35	10	69	71	-	108	6	2	3	106.5	122
75	60	60	19	54	35	70	10	108	96	-	147	6	2	4	145.5	161
100	70	70	37	107	35	70	58	113	121	169	200	6	4	5	198.5	214
125	70	70	41	155	38	76	70	155	146	223	254	8	4	6	252.5	268
150	80	80	19	195	44	88	87	190	171	275	306	8	4	7	304.5	320

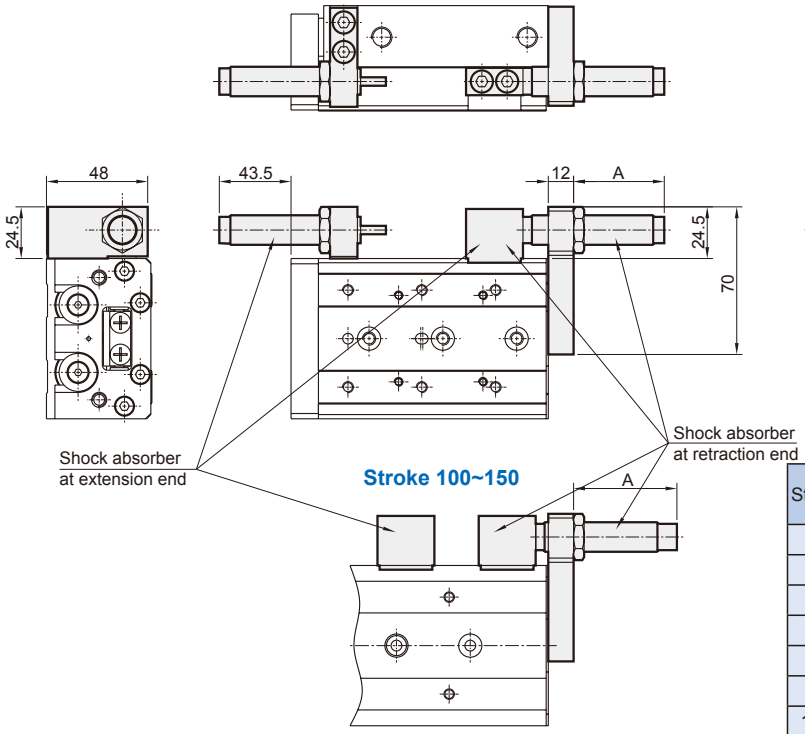
MCSS / 20-MCSS Dimensions ø25

SLIDE CYLINDER



Code / Stroke	F	FF	G	GA	H	HA	I	J	K	KA	M	N	NA	NN	Z	ZZ
10	50	40	22	22	45	45	12	47	35	-	92	4	2	2	90.5	108
20	50	40	22	22	45	45	12	47	45	-	92	4	2	2	90.5	108
30	50	40	22	22	45	45	12	47	55	-	92	4	2	2	90.5	108
40	60	50	22	22	55	55	12	57	65	-	102	4	2	2	100.5	118
50	35	35	20	55	35	35	12	70	75	-	115	6	2	3	113.5	131
75	60	60	26	61	35	70	33	90	100	-	156	6	2	4	154.5	172
100	70	70	32	102	35	70	50	114	125	162	197	6	4	5	195.5	213
125	75	75	40	154	38	76	67	155	150	218	255	8	4	6	253.5	271
150	80	80	30	190	40	80	82	180	175	258	295	8	4	7	293.5	311

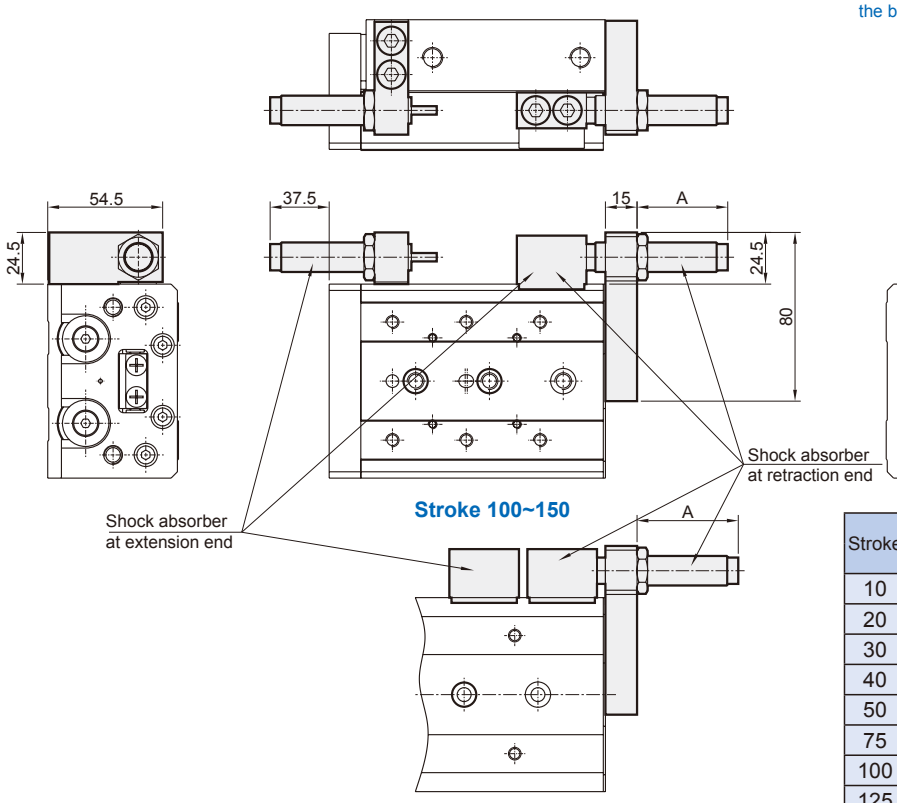
ø20



Stroke	Stroke adjustment range		A dimension (Retracted side mounting)
	Extending	Retracting	
10	Max. 40.3	15.8	28.8
20		25.8	38.8
30		35.8	48.8
40		35.8	48.8
50		30.8	43.8
75		16.8	29.8
100		36.8	49.8
125		36.8	49.8
150		36.8	49.8

* Other dimensions not indicated are the same as the basic style.

ø25



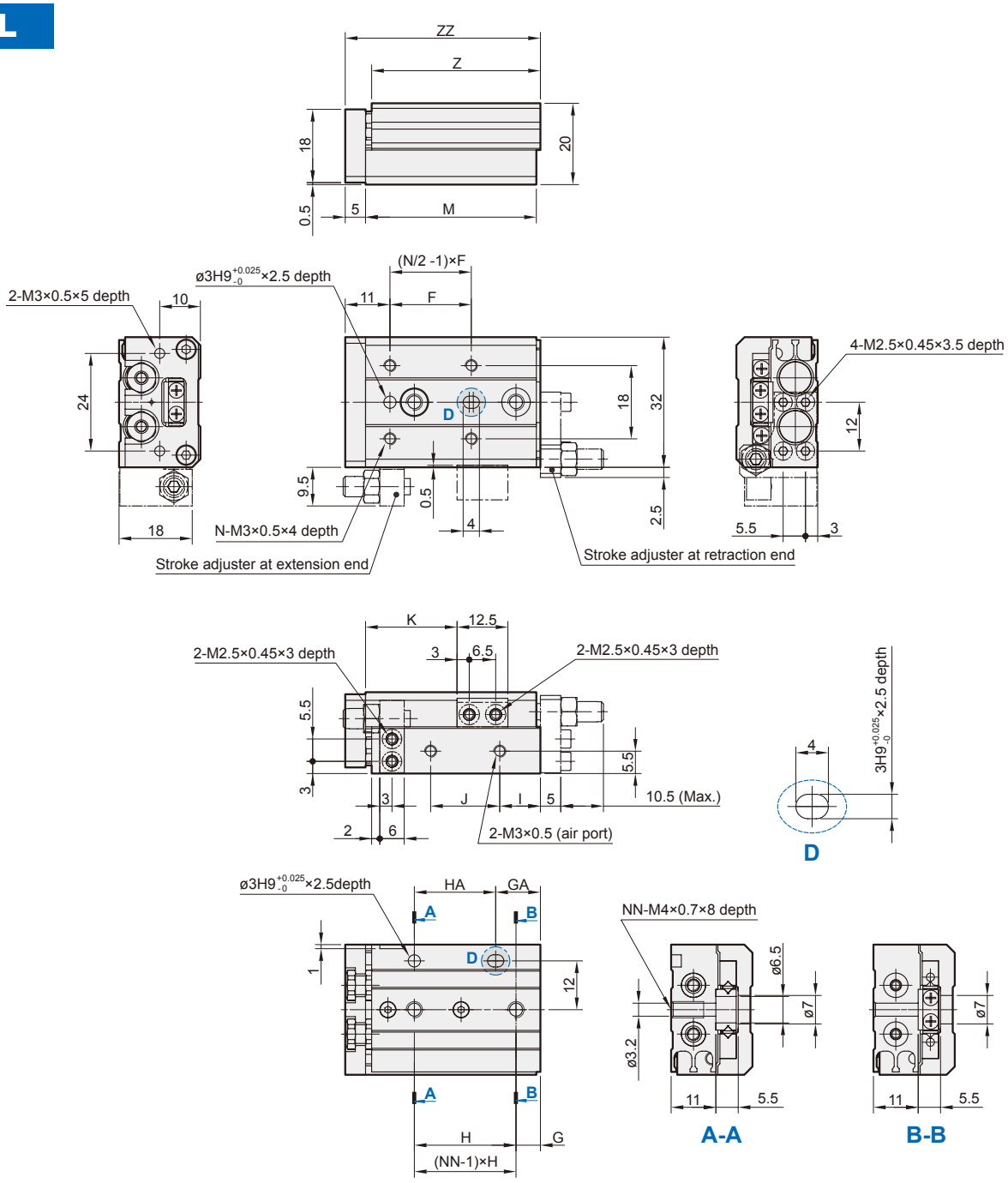
Stroke	Stroke adjustment range		A dimension (Retracted side mounting)
	Extending	Retracting	
10	Max. 36.3	12.8	26.8
20		22.8	36.8
30		32.8	46.8
40		32.8	46.8
50		29.8	43.8
75		13.8	27.8
100		34.8	48.8
125		32.8	46.8
150		32.8	46.8

* Other dimensions not indicated are the same as the basic style.

MCSS / 20-MCSS Dimensions – Symmetric style ø6

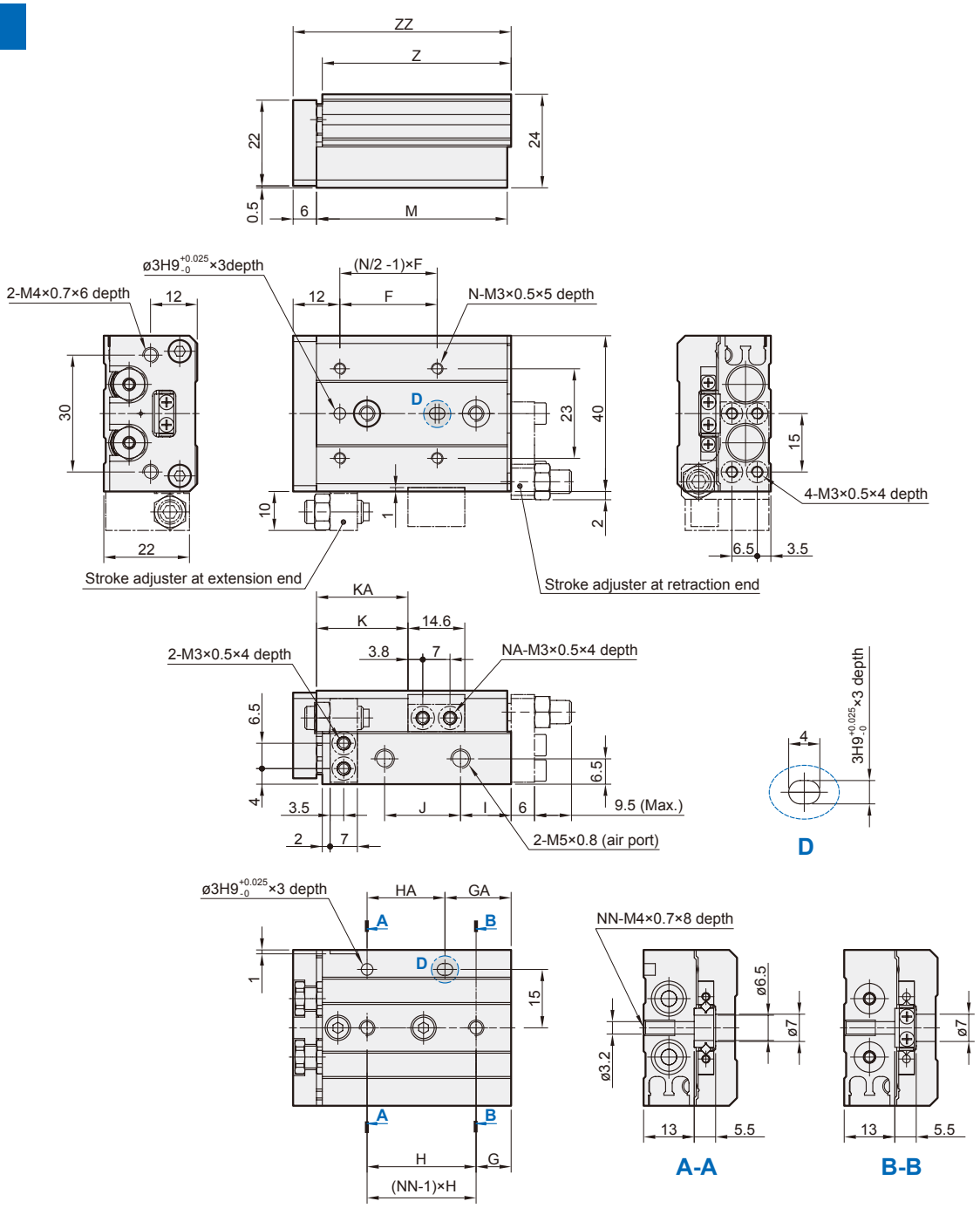
SLIDE CYLINDER

L



Code / Stroke	F	G	GA	H	HA	I	J	K	M	N	NN	Z	ZZ
10	20	6	11	25	20	10	17	22.5	42	4	2	41.5	48
20	30	6	21	35	20	10	27	32.5	52	4	2	51.5	58
30	20	11	31	20	20	7	40	42.5	62	6	3	61.5	68
40	28	13	43	30	30	19	50	52.5	84	6	3	83.5	90
50	38	17	41	24	48	25	60	62.5	100	6	4	99.5	106

L

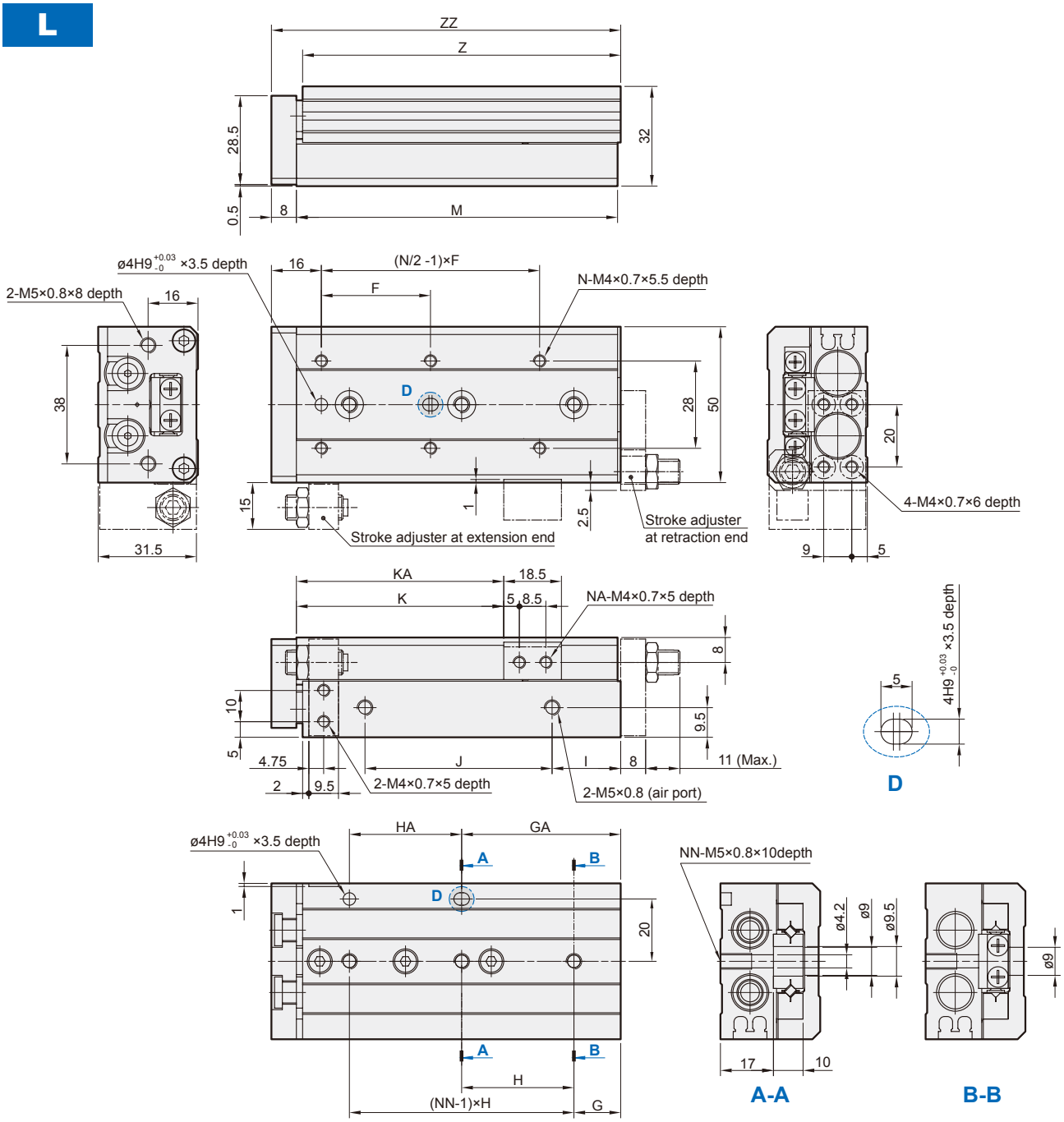


Code / Stroke	F	G	GA	H	HA	I	J	K	KA	M	N	NA	NN	Z	ZZ
10	25	9	17	28	20	13	19.5	23.5	–	49	4	2	2	48.5	56
20	25	12	12	30	30	8.5	29	33.5	–	54	4	2	2	53.5	61
30	40	13	33	20	20	9.5	39	43.5	–	65	4	2	3	64.5	72
40	50	15	43	28	28	10.5	56	53.5	–	83	4	2	3	82.5	90
50	38	20	43	23	46	24.5	60	63.5	82.5	101	6	4	4	100.5	108
75	50	27	83	28	56	38.5	96	88.5	132.5	151	6	4	5	150.5	158

MCSS / 20-MCSS Dimensions – Symmetric style ø12

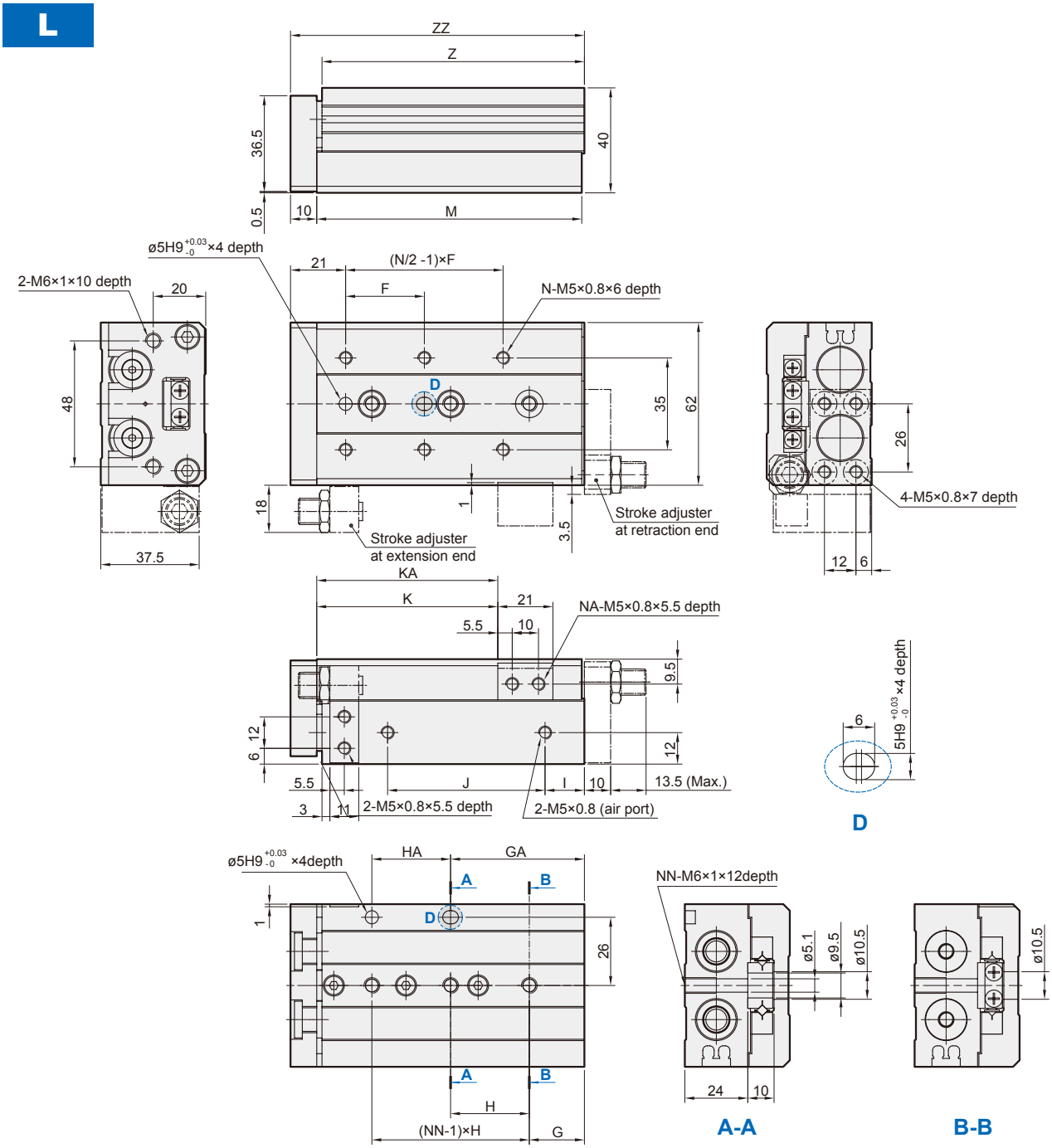
SLIDE CYLINDER

L



Code / Stroke	F	G	GA	H	HA	I	J	K	KA	M	N	NA	NN	Z	ZZ
10	35	15	15	40	40	10	40	26.5	–	71	4	2	2	70	80
20	35	15	15	40	40	10	40	36.5	–	71	4	2	2	70	80
30	35	15	15	40	40	10	40	46.5	–	71	4	2	2	70	80
40	50	17	42	25	25	10	52	56.5	–	83	4	2	3	82	92
50	35	15	51	36	36	22	60	66.5	–	103	6	2	3	102	112
75	55	25	61	36	72	43	85	91.5	125.5	149	6	4	4	148	158
100	65	35	111	38	76	52	130	116.5	179.5	203	6	4	5	202	212

L

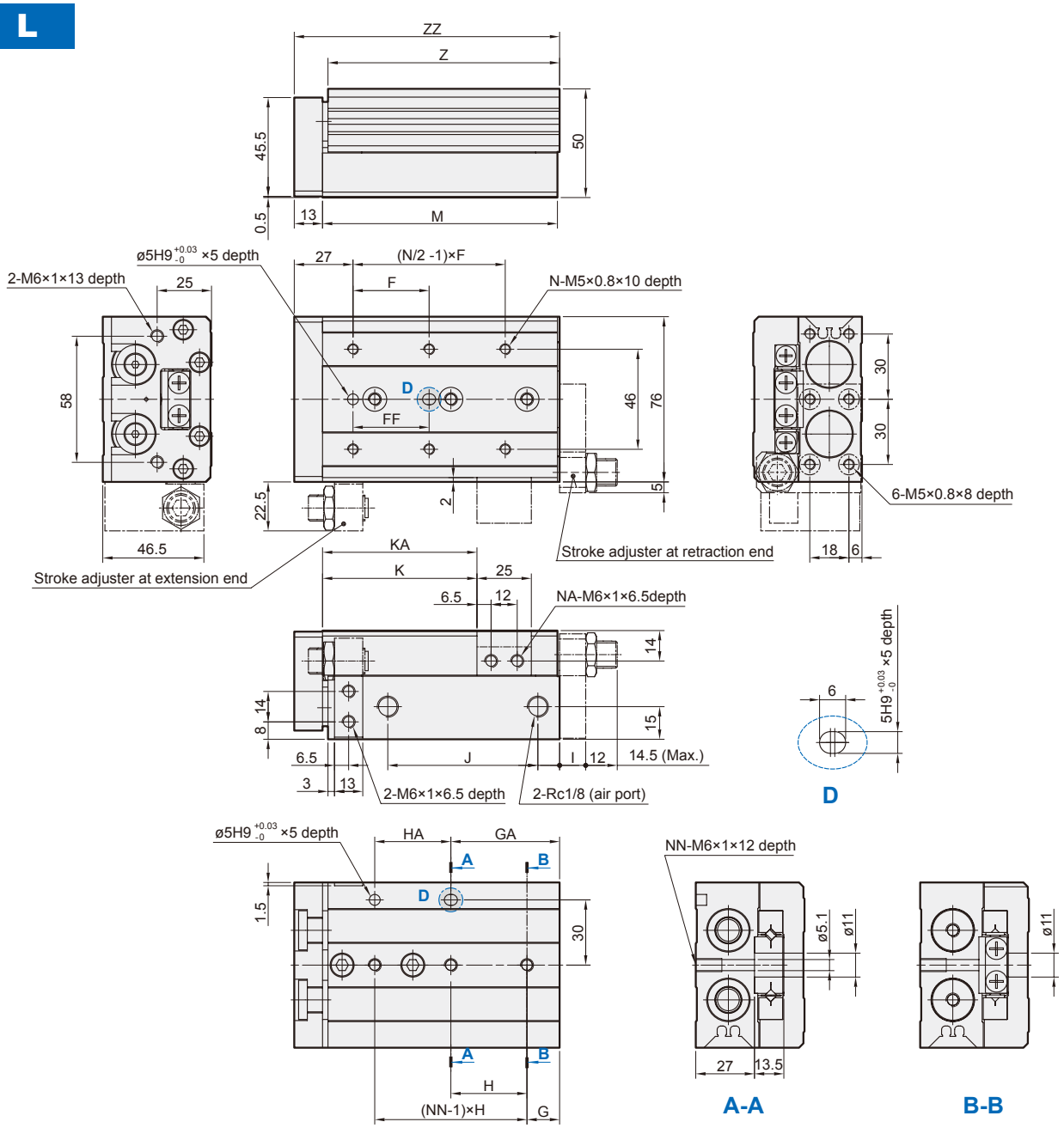


Code / Stroke	F	G	GA	H	HA	I	J	K	KA	M	N	NA	NN	Z	ZZ
10	35	16	16	40	40	10	40	29	–	76	4	2	2	75	87
20	35	16	16	40	40	10	40	39	–	76	4	2	2	75	87
30	35	16	16	40	40	10	40	49	–	76	4	2	2	75	87
40	40	16	16	50	50	10	50	59	–	86	4	2	2	85	97
50	30	21	51	30	30	15	60	69	–	101	6	2	3	100	112
75	55	26	61	35	70	40	85	94	125	151	6	4	4	150	162
100	65	39	109	35	70	55	118	119	173	199	6	4	5	198	210
125	70	19	159	35	70	68	155	144	223	249	8	4	7	248	260

MCSS / 20-MCSS Dimensions – Symmetric style ø20

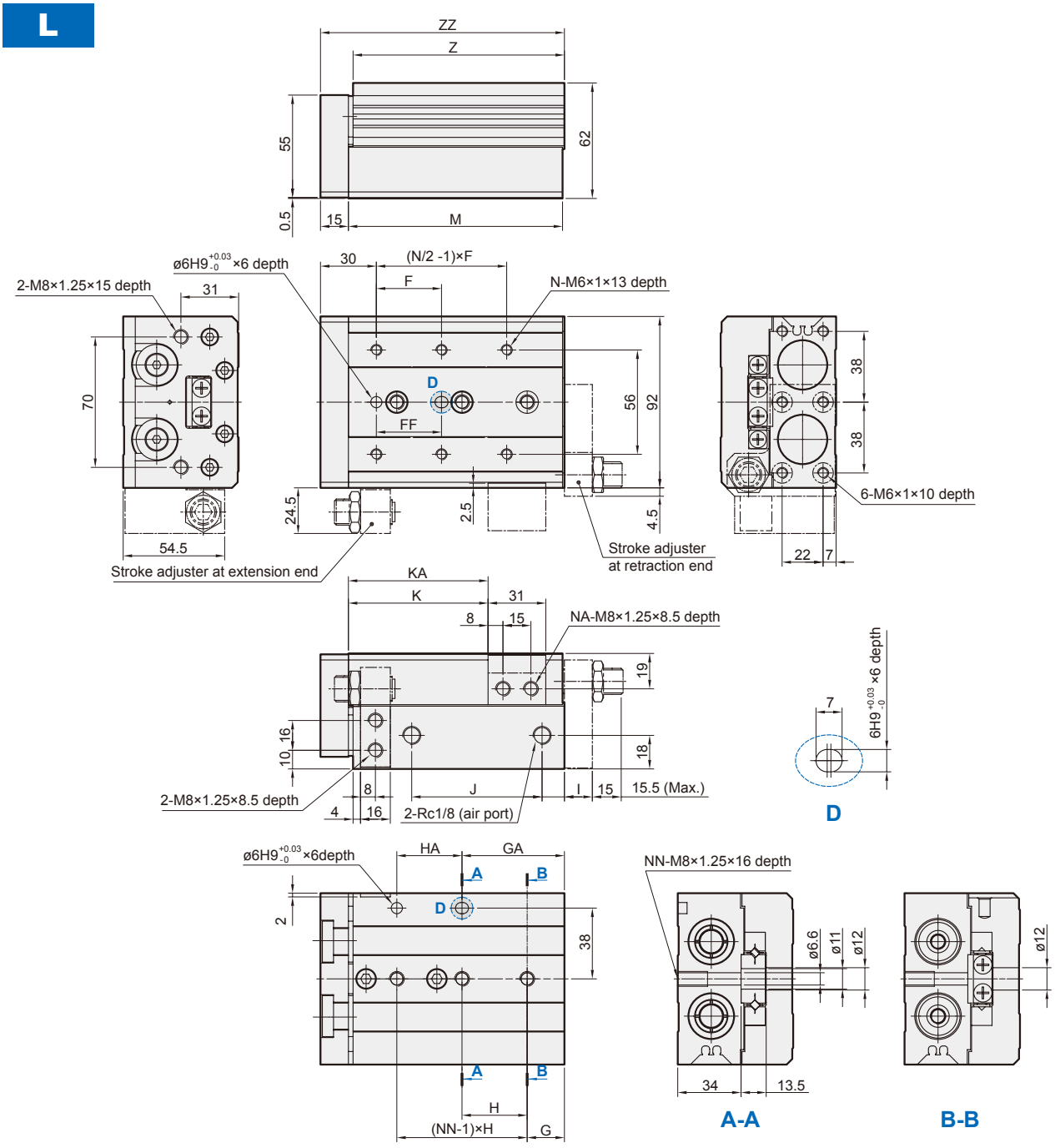
SLIDE CYLINDER

L



Code / Stroke	F	FF	G	GA	H	HA	I	J	K	KA	M	N	NA	NN	Z	ZZ
10	50	40	15	25	45	35	10	44	31	–	83	4	2	2	81.5	97
20	50	40	15	25	45	35	10	44	41	–	83	4	2	2	81.5	97
30	50	40	15	25	45	35	10	44	51	–	83	4	2	2	81.5	97
40	60	50	15	35	55	35	10	54	61	–	93	4	2	2	91.5	107
50	35	35	15	50	35	35	10	69	71	–	108	6	2	3	106.5	122
75	60	60	19	54	35	70	10	108	96	–	147	6	2	4	145.5	161
100	70	70	37	107	35	70	58	113	121	169	200	6	4	5	198.5	214
125	70	70	41	155	38	76	70	155	146	223	254	8	4	6	252.5	268
150	80	80	19	195	44	88	87	190	171	275	306	8	4	7	304.5	320

L



Code / Stroke	F	FF	G	GA	H	HA	I	J	K	KA	M	N	NA	NN	Z	ZZ
10	50	40	22	22	45	45	12	47	35	–	92	4	2	2	90.5	108
20	50	40	22	22	45	45	12	47	45	–	92	4	2	2	90.5	108
30	50	40	22	22	45	45	12	47	55	–	92	4	2	2	90.5	108
40	60	50	22	22	55	55	12	57	65	–	102	4	2	2	100.5	118
50	35	35	20	55	35	35	12	70	75	–	115	6	2	3	113.5	131
75	60	60	26	61	35	70	33	90	100	–	156	6	2	4	154.5	172
100	70	70	32	102	35	70	50	114	125	162	197	6	4	5	195.5	213
125	75	75	40	154	38	76	67	155	150	218	255	8	4	6	253.5	271
150	80	80	30	190	40	80	82	180	175	258	295	8	4	7	293.5	311

MCSS / 20-MCSS Accessories ø6~ø25

SLIDE CYLINDER

Order example of stroke adjuster

MCSS — 20 L — AS — X12

- MODEL
- TUBE I.D.
- Blank: Standard
  L: Symmetric style
- STROKE ADJUSTER
  Blank: Without adjuster
  AS: Adjuster at extension end
  AT: Adjuster at retraction end
  A: Adjuster at both ends
  A2: Adjusting bolt
- ADJUSTABLE RANGE
  (Only for stroke adjuster)
  Blank: 5mm
  X11: 15mm
  X12: 25mm

* **X12** (adjustable range: 25mm) is not available for MCSS-6.
* **X11** and **X12** are not available for shock absorber type.
* Shock absorber is not available on series MCSS-6.

Order example of Shock absorbers

Start ordering on 2019.07.01

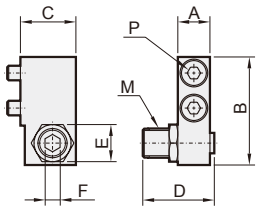
20 — MCSS — 20 L — BS

- MATERIAL RESTRICTIONS (Secondary battery)
- MODEL
- TUBE I.D.
- Blank: Standard
  L: Symmetric style
- SHOCK ABSORBERS
  BS: Absorber at extension end
  BT: Absorber at retraction end
  B: Absorber at both ends

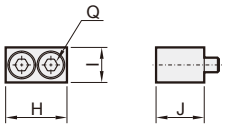
* Shock absorber is not available on series MCSS-6.
* Dimension please refer to page 3-110.

Stroke adjuster at extension end

Mounted to body



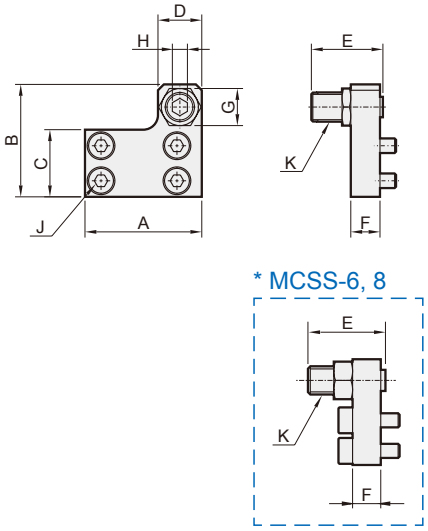
Mounted to table



Tube I.D.	Order code	Adjustable stroke range (mm)	Mounted to body								Mounted to table			
			A	B	C	D	E	F	M	P*	H	I	J	Q*
6	MCSS-6-AS	5	6	17.8	10.5	16.5	7	2.5	M5×0.8	M2.5×10	12.5	6	8.5	M2.5×8
	MCSS-6-AS-X11	15				26.5								
8	MCSS-8-AS	5	7	21.5	11	16.5	8	3	M6×1	M3×10	14.6	7	10	M3×10
	MCSS-8-AS-X11	15				26.5								
	MCSS-8-AS-X12	25				36.5								
12	MCSS-12-AS	5	9.5	31	16	20	11	4	M8×1	M4×16	18.5	10	13	M4×12
	MCSS-12-AS-X11	15				30								
	MCSS-12-AS-X12	25				40								
16	MCSS-16-AS	5	11	37	19	24.5	14	5	M10×1	M5×16	21	12	16.5	M5×16
	MCSS-16-AS-X11	15				34.5								
	MCSS-16-AS-X12	25				44.5								
20	MCSS-20-AS	5	13	45.5	24	27.5	17	6	M12×1.25	M6×20	25	13	21	M6×20
	MCSS-20-AS-X11	15				37.5								
	MCSS-20-AS-X12	25				47.5								
25	MCSS-25-AS	5	16	53.5	26.5	32.5	19	6	M14×1.5	M8×25	31	17	25.5	M8×25
	MCSS-25-AS-X11	15				42.5								
	MCSS-25-AS-X12	25				52.5								

* Size of hexagon socket head cap screws.

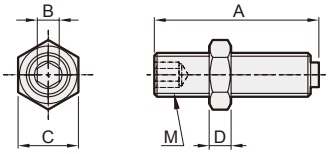
Stroke adjuster at retraction end



Tube I.D.	Order code	Adjustable stroke range (mm)	A	B	C	D	E	F	G	H	J*	K
6	MCSS-6-AT	5	21	19	10.5	8	16.5	5	7	2.5	M2.5×8	M5×0.8
	MCSS-6-AT-X11	15					26.5					
8	MCSS-8-AT	5	25	22.5	12.5	9	16.5	6	8	3	M3×10	M6×1
	MCSS-8-AT-X11	15					26.5					
	MCSS-8-AT-X12	25					36.5					
12	MCSS-12-AT	5	32	31	18.5	13	20	8	12	4	M4×8	M8×1
	MCSS-12-AT-X11	15					30					
	MCSS-12-AT-X12	25					40					
16	MCSS-16-AT	5	40	38.5	23	15	24.5	10	14	5	M5×10	M10×1
	MCSS-16-AT-X11	15					34.5					
	MCSS-16-AT-X12	25					44.5					
20	MCSS-20-AT	5	50	48	29	21	27.5	12	17	6	M5×12	M12×1.25
	MCSS-20-AT-X11	15					37.5					
	MCSS-20-AT-X12	25					47.5					
25	MCSS-25-AT	5	60	58	35	23	32.5	15	19	6	M6×16	M14×1.5
	MCSS-25-AT-X11	15					42.5					
	MCSS-25-AT-X12	25					52.5					

* Size of hexagon socket head cap screws.

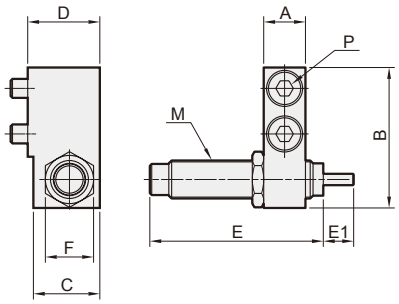
Adjusting bolt



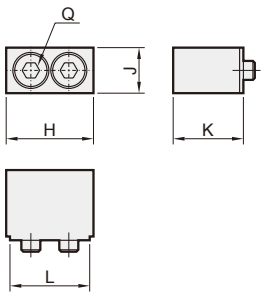
Tube I.D.	Order code	Adjustable stroke range (mm)	A	B	C	D	M
6	MCSS-6-A2	5	16.5	2.5	7	4	M5×0.8
	MCSS-6-A2-X11	15	26.5				
8	MCSS-8-A2	5	16.5	3	8	4	M6×1
	MCSS-8-A2-X11	15	26.5				
	MCSS-8-A2-X12	25	36.5				
12	MCSS-12-A2	5	20	4	11	4	M8×1
	MCSS-12-A2-X11	15	30				
	MCSS-12-A2-X12	25	40				
16	MCSS-16-A2	5	24.5	5	14	4	M10×1
	MCSS-16-A2-X11	15	34.5				
	MCSS-16-A2-X12	25	44.5				
20	MCSS-20-A2	5	27.5	6	17	5	M12×1.25
	MCSS-20-A2-X11	15	37.5				
	MCSS-20-A2-X12	25	47.5				
25	MCSS-25-A2	5	32.5	6	19	6	M14×1.5
	MCSS-25-A2-X11	15	42.5				
	MCSS-25-A2-X12	25	52.5				

Stroke adjuster at extension end

Mounted to body



Mounted to table

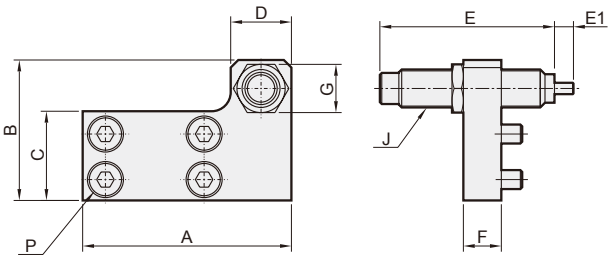


Tube I.D.	Order code	Mounted to body										Mounted to table				
		A	B	C	D	E	E1	F	M		P*	H	J	K	L	Q*
8	20-MCSS-8-BS	7	23	14	15.5	38.5	6	11	M8×1	20-MDSC-0806-3-N	M3×16	16.6	7	15.5	14.6	M3×16
12	20-MCSS-12-BS	9.5	31	14.5	16	38.5	6	11	M8×1	20-MDSC-0806-3-N	M4×16	20.5	10	15	18.5	M4×12
16	20-MCSS-16-BS	11	37	17.5	19	45.5	8	12.7	M10×1	20-MDSC-1008-3-N	M5×16	23	12	18.5	21	M5×16
20	20-MCSS-20-BS	13	45.5	23.5	26	67.5	12	19	M14×1.5	20-MDSC-1412-3-N	M6×25	27	13	25.5	25	M6×25
25	20-MCSS-25-BS	16	53.5	23.5	26.5	67.5	12	19	M14×1.5	20-MDSC-1412-3-N	M8×25	33	17	25.5	31	M8×25

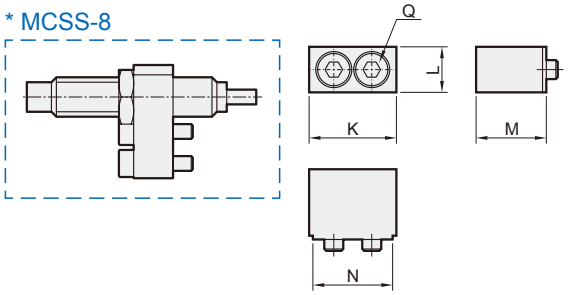
* Size of hexagon socket head cap screws.

Stroke adjuster at retraction end

Mounted to body

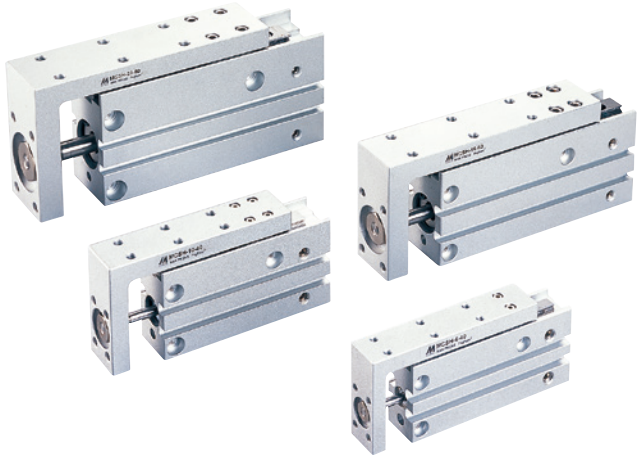


Mounted to table



Tube I.D.	Order code	Mounted to body											Mounted to table				
		A	B	C	D	E	E1	F	G	J		P*	K	L	M	N	Q*
8	20-MCSS-8-BT	38	23	12.5	14	38.5	6	8	12	M8×1	20-MDSC-0806-3-N	M3×12	16.6	7	15.5	14.6	M3×16
12	20-MCSS-12-BT	45	31	18	14	38.5	6	8	11	M8×1	20-MDSC-0806-3-N	M4×8	20.5	10	15	18.5	M4×12
16	20-MCSS-16-BT	55	37	23.5	16	45.5	8	10	12.7	M10×1	20-MDSC-1008-3-N	M5×10	23	12	18.5	21	M5×16
20	20-MCSS-20-BT	70	47	29	23	67.5	12	12	19	M14×1.5	20-MDSC-1412-3-N	M5×12	27	13	25.5	25	M6×25
25	20-MCSS-25-BT	80	54	35	23	67.5	12	15	19	M14×1.5	20-MDSC-1412-3-N	M6×16	33	17	25.5	31	M8×25

** Size of hexagon socket head cap screws.



Features

- Compact precision cylinder.
- Cylinder can take high lateral loads and is also non rotating.
- Cylinder can be mounted in 3 or 4 positions.
- Magnetic as standard.

Specification

Model	20-MCSH			
Acting type	Double acting			
Tube I.D. (mm)	6	10	16	20
Guide rail width (mm)	5	7	9	12
Port size	M5×0.8			
Medium	Air			
Min. operating pressure	0.12	0.06		0.05
Max. operating pressure	0.7 MPa			
Proof pressure	1.07 MPa			
Ambient temperature	–10~+60°C (No freezing)			
Operating speed range	50~500 mm/sec			
Allowable kinetic energy J (kgf · cm)	0.125	0.25	0.5	1.0
Lubricator	Not required			
Cushion	Rubber bumper			
Stroke length tolerance	+1.0 0			
Sensor switch (*)	RCE, RCE1, RDEP			

Order example

20 — MCSH — 10 — 60

- MATERIAL RESTRICTIONS (Secondary battery)
- MODEL
- TUBE I.D.
- STROKE

Cylinder weight

Unit: g

Stroke (mm)	Tube I.D.			
	ø6	ø10	ø16	ø20
5	62	117	216	437
10	67	125	227	455
15	76	140	247	486
20	81	148	258	505
25	91	162	279	542
30	96	170	290	560
40	111	192	323	597
50	125	215	353	656
60	140	238	386	700

Table for standard stroke

Tube I.D.	Stroke (mm)
ø6, 10, 16, 20	5, 10, 15, 20, 25, 30, 40, 50, 60

Theoretical force

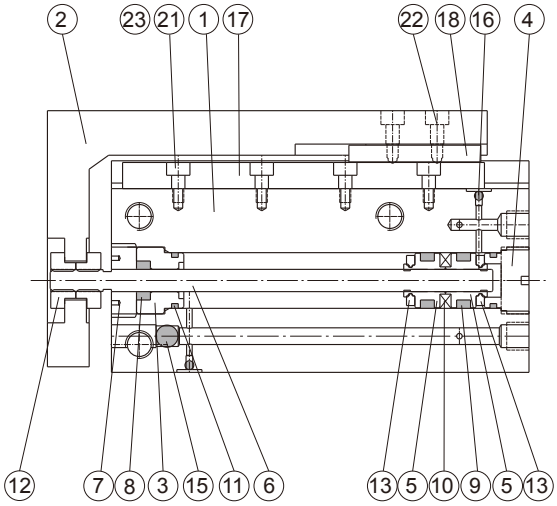
Unit: N

Tube I.D. (mm)	Piston rod (mm)	Operating direction	Piston area (mm^2)	Operating pressure (MPa)		
				0.3	0.5	0.7
6	3	OUT	28.3	8.49	14.2	19.8
		IN	21.2	6.36	10.6	14.8
10	4	OUT	78.5	23.6	39.3	55.0
		IN	66.0	19.8	33.0	46.2
16	6	OUT	201.0	60.3	101.0	141.0
		IN	172.0	51.6	86.0	121.0
20	8	OUT	314.0	94.2	157.0	220.0
		IN	264.0	79.2	132.0	185.0

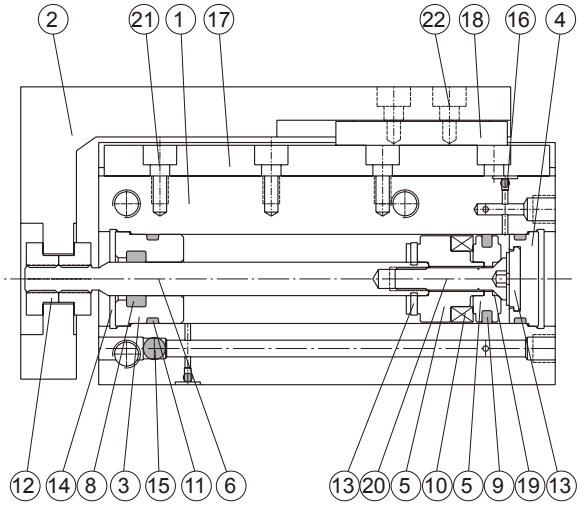
20-MCSH Inside structure & Parts list

COMPACT SLIDE CYLINDER

ø6, ø10



ø16, ø20



Material

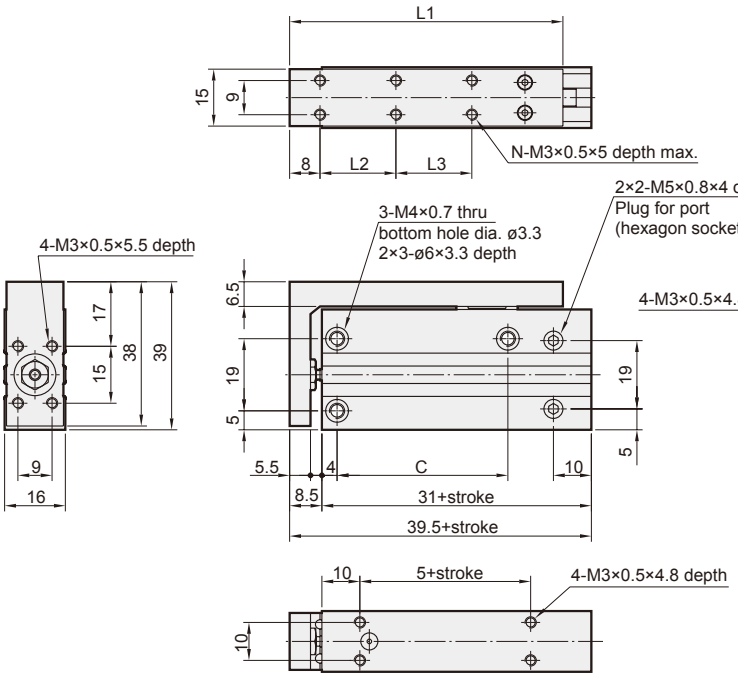
No.	Tube I.D. / Part name	6	10	16	20	Note	Q'y	Repair kits (inclusion)
1	Body	Aluminum alloy					1	
2	Table	Aluminum alloy					1	
3	Rod cover	*1	Aluminum alloy				1	
4	Head cover	Aluminum alloy					1	
5	Piston	Aluminum alloy					2	
6	Piston rod	Stainless steel					1	
7	Rod cover locker	*1		–			1	
8	Rod packing	NBR					1	●
9	Piston packing	NBR				Tube I.D.ø6,ø10 ×2, ø16,ø20 ×1	1 or 2	●
10	Magnet ring	Magnet material					1	
11	Cover ring	NBR					2	●
12	Rod front nut	Stainless steel					2	
13	Cushion packing	NBR					2	●
14	C type snap ring for hole	–		Spring steel			2	
15	Steel ball A	Stainless steel					1	
16	Steel ball B	Stainless steel					2	
17	Linear guide	Stainless steel					1	
18	Guide seat	Stainless steel					1	
19	Piston gasket	–		NBR			1	●
20	Piston bolt	–		*1			1	
21	Hexagon socket head cap screw A	Stainless steel				Tube I.D.ø10~20 (*3)	2~5	
22	Hexagon socket head cap screw B	*2	Stainless steel			Tube I.D.ø6 ×2, ø10~20×4	2 or 4	
23	Round head Phillips screw	Stainless steel				Only for tube I.D.ø6 (*3)	2~5	
24	Plug gasket	NBR					4	●

**1. Stainless steel *2. Carbon steel *3. Quantity varies depending on the stroke length.

Order example of repair kits

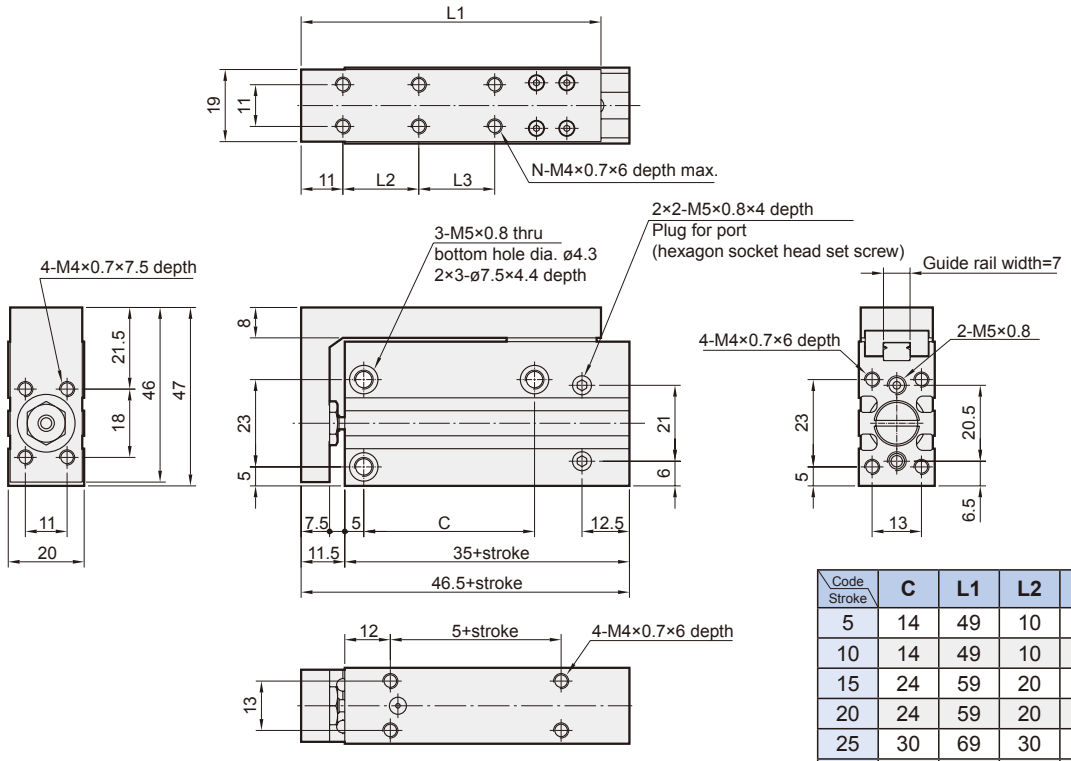
Tube I.D.	Repair kits
ø6	**PS-MCSH-6**
ø10	**PS-MCSH-10**
ø16	**PS-MCSH-16**
ø20	**PS-MCSH-20**

ø6



Code / Stroke	C	L1	L2	L3	N
5	14	42	10	–	4
10	14	42	10	–	4
15	24	52	20	–	4
20	24	52	20	–	4
25	30	62	30	–	4
30	30	62	30	–	4
40	45	72	20	20	6
50	55	82	25	25	6
60	60	92	30	30	6

ø10

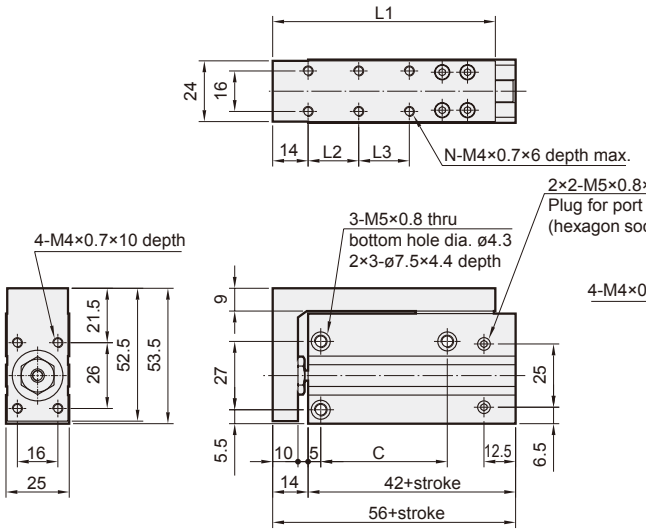


Code / Stroke	C	L1	L2	L3	N
5	14	49	10	–	4
10	14	49	10	–	4
15	24	59	20	–	4
20	24	59	20	–	4
25	30	69	30	–	4
30	30	69	30	–	4
40	45	79	20	20	6
50	55	89	25	25	6
60	60	99	30	30	6

20-MCSH Dimensions ø16, ø20

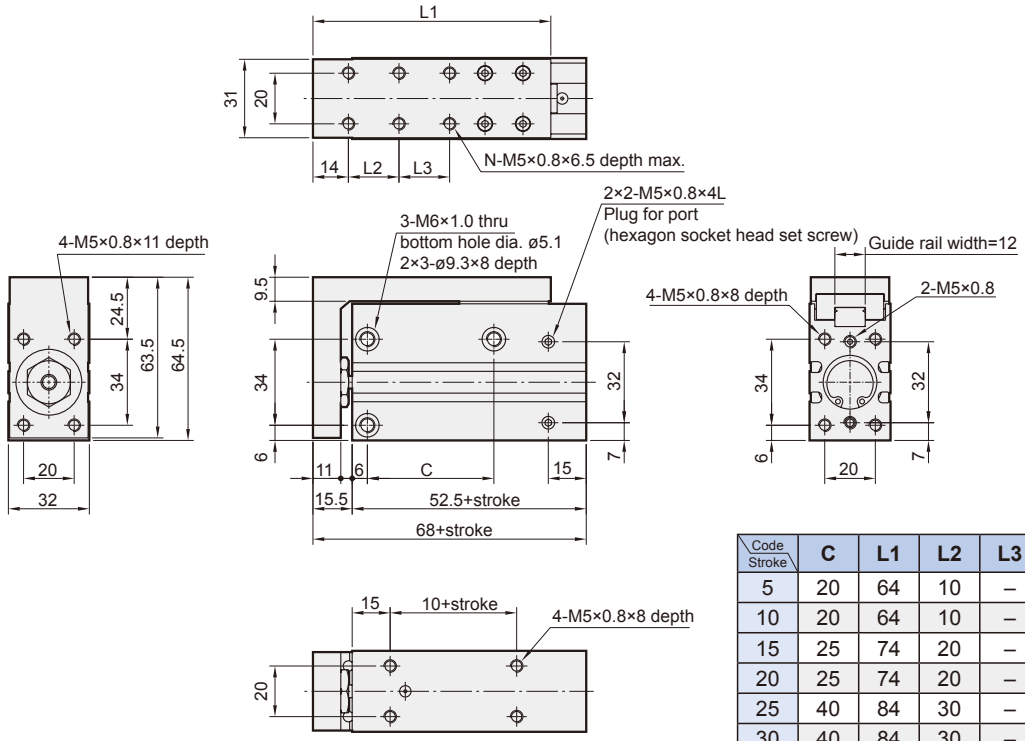
COMPACT SLIDE CYLINDER

ø16



Code / Stroke	C	L1	L2	L3	N
5	20	58	10	–	4
10	20	58	10	–	4
15	30	68	20	–	4
20	30	68	20	–	4
25	40	78	30	–	4
30	40	78	30	–	4
40	50	88	20	20	6
50	60	98	25	25	6
60	60	108	30	30	6

ø20



Code / Stroke	C	L1	L2	L3	N
5	20	64	10	–	4
10	20	64	10	–	4
15	25	74	20	–	4
20	25	74	20	–	4
25	40	84	30	–	4
30	40	84	30	–	4
40	50	94	20	20	6
50	70	104	25	25	6
60	70	114	30	30	6

- The load will create inertial forces (kinetic energy) when moving the load with Rotary Actuator. In order to stop the moving load,It is necessary to use stopper or Shock Absorbers to absorb the kinetic energy of load.
- The moving load with actuator can be distinguished as following
  1. Linear motion (air cylinder), Fig.(1)
  2. Rotation motion (rotary actuator), Fig.(2)
- Calculate the kinetic energy by using the formula in FIG.

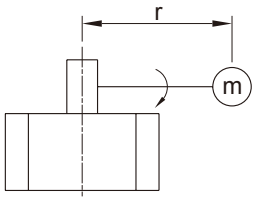
Linear motion

E : Kinetic energy
m : Load mass
V : Speed

$$E = \frac{1}{2} \cdot m \cdot V^2 ....(1)$$

Fig. (1) Linear motion

Rotation motion



E : Kinetic energy
I : Moment of inertia(=m.r^2)
ω : Speed
m : Mass
r : Radius of rotation

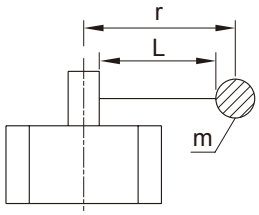
$$E = \frac{1}{2} \cdot I \cdot \omega^2 = \frac{1}{2} \cdot m \cdot r^2 \cdot \omega^2 ....(2)$$

Fig. (2) Rotation motion

- For linear motion, if the velocity V of formula (1) is constant, the kinetic energy E and mass m is proportional ; The rotation motion, formula (2) shows even the angular velocity ω and mass m is constant, kinetic energy E will also proportional with r². Therefore, even the mass is small but the rotation radius r is large, when the moment of Inertia I=m·r² is large, kinetic energy E will becomes larger, it will cause bearing damage or other accidents.
- Therefore when there is a rotation motion, the product selection should be base on moment of inertia instead of mass.

Moment of inertia

- Moment of inertia shows, it is not easy to rotate the stationary object; the same which means it is difficult to stop the rotating object.
- Rotary Actuators in the allowable kinetic energy has its limitations, it can be calculated moment of inertia to calculate minimum rotation of moment of inertia described as following.



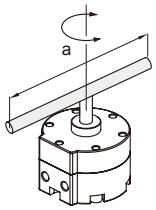
$I = m \cdot r^2$

m : Mass
r : Radius of rotation

Above figure represents the moment of inertia for the distance r from rotary shaft to mass m of the object.
The formula for moment of Inertia is not the same if the shapes of the object are different.
The following examples are the calculated on the basis of specific moment of inertia.

1. Thin shaft

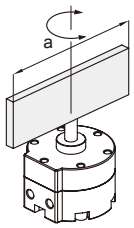
Position of rotational axis: Perpendicular to the shaft through the shaft through the center of gravity.



$I = m \cdot \frac{a^2}{12}$

2. Thin rectangular plate

Position of rotational axis: Parallel to side b and through the center of gravity.



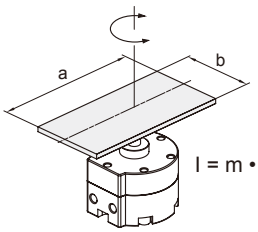
$I = m \cdot \frac{a^2}{12}$

Moment of inertia

ROTARY ACTUATOR

3. Thin rectangular plate (Including rectangular parallelepiped)

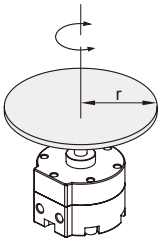
Position of rotational axis: Perpendicular to the plate through the center of gravity.



$$I = m \cdot \frac{a^2 + b^2}{12}$$

4. Round plate (Including column)

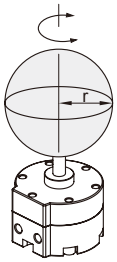
Position of rotational axis: Through the center axis.



$$I = m \cdot \frac{r^2}{2}$$

5. Solid sphere

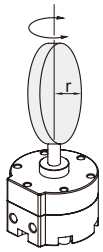
Position of rotational axis: Through the center of diameter.



$$I = m \cdot \frac{2r^2}{2}$$

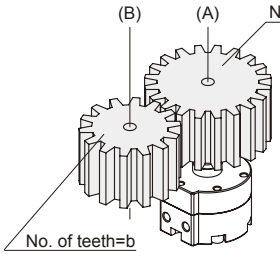
6. Thin round plate

Position of rotational axis: Through the center of diameter.



$$I = m \cdot \frac{r^2}{4}$$

7. Gear transmission



1.Find the moment of inertia I_B for the rotation of shaft (B).
2.I_B is converted to the moment of inertia I_A for the rotation of the shaft (A).

$$I_A = \left(\frac{a}{b}\right)^2 \cdot I_B$$

Use the following formula to calculate the rotation time

$$t \geq \sqrt{\frac{2 \cdot I \cdot \theta^2}{E}}$$

t : Rotation time (s)
E : Kinetic energy (J)
I : Moment of inertia (kg.m^2)
θ : Rotation angle (rad)

The meaning of this formula is the critical rotation time for not cause damage of the cylinder. Therefore the rotation time must be set on or over the t seconds calculated in above formula.

After calculated the moment of inertia by load shape, use the following formula to calculate the kinetic energy of the load.

$$E = 1/2 \cdot I \cdot \omega^2$$

E : Kinetic energy (J)
I : Moment of inertia (kg.m^2)
ω: Angle speed (rad/s)

Angle speed

$$\omega = 2\,\theta / t \ldots\ldots(1)$$
$$\omega = \theta / t \ldots\ldots(2)$$

t : Rotation time (s)
I : Moment of inertia (kg.m^2)
θ : R otation angle (rad)

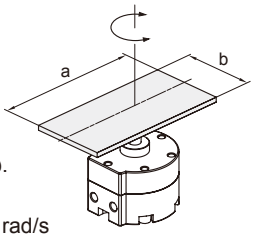
However, when the rotation time for 90° becomes longer than 2 seconds, use formula (2).

Calculation example

Load form: Cuboid
Rotation angle θ: 180°
Rotation time t: 1 s/180°

Length of a part: 0.12 m
Length of b part: 0.06 m
Mass (m) : 0.1 kg

$$I = m \cdot \frac{a^2 + b^2}{12}$$



(Step 1) Find the angle speed ω.

$$\omega = \frac{2\theta}{t} = \frac{2}{1} \times \pi = 6.28 \text{ rad/s}$$

(Step 2) Find the moment of inertia I.

$$I = m \cdot \frac{a^2 + b^2}{12}$$

$$= 0.1 \times \frac{144 \times 10^{-4} + 36 \times 10^{-4}}{12}$$

$$= 1.5 \times 10^{-4} \text{ kg.m}^2$$

(Step 3) Find the kinetic energy E.

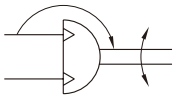
$$E = \frac{1}{2} \cdot I \cdot \omega^2 = \frac{1}{2} \times 1.5 \times 10^{-4} \times 6.28^2$$

$$= 0.002958 \text{ J}$$

Features

- Centering boss and locating hole for accurate positioning.
- Operating range of table is 0°~190° by angle adjusting screw
- Compact design using double rack and single pinion.
- Hollow shaft standard for wiring and piping.
- Possible to fit shock absorbers as stops.
- Ease of mounting with integral table.
- Magnetic as standard.

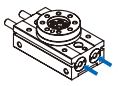
Symbol



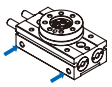
Order example

20 — MCRQ — 20R — □ — □

- 20 — MATERIAL RESTRICTIONS (Secondary battery)
- MCRQ — MODEL
- 20R — TUBE I.D.
- ANGLE ADJUSTER
  - **A**: With adjusting bolt
  - **R**: With shock absorber
  - * ø12 without shock a absorber.
- □ — PIPING TYPE(*)
  - Blank: End port



  - **E**: Front port



  - * ø12 only option.
  - * Piping port cannot be changed after delivery.
- □ — PORT THREAD
  - Blank: M5×0.8 (for ø12, ø16)
  - Blank: Rc thread
  - **G**: G thread
  - **NPT**: NPT thread (for ø20~ø40)

Specification

Model		20-MCRQ					
Acting type		Double acting					
Tube I.D. (mm)		12	16	20	25	32	40
Port size		M5×0.8		Rc1/8			
Medium		Air					
Max. operating pressure	adjusting bolt	0.7MPa	1 MPa				
	shock absorber	—	0.6 MPa (*1)				
Min. operating pressure		0.1 MPa (*2)					
Ambient temperature		0~+60°C (No freezing)					
Cushion	adjusting bolt	Rubber bumper					
	shock absorber	—	Shock absorber				
Angle adjustment range		0° to 190°(max.) (*3)					
Sensor switch (*4)	2 wire	**RDF(V)**: Non-contact					
	3 wire	**RNF(V)**: NPN, **RPF(V)**: PNP					
Weight (kg)	adjusting bolt	0.25	0.60	1.24	2.10	4.18	7.67
	shock absorber	—	0.61	1.31	2.12	4.19	7.72
Minimum rotation that will not allow decrease of energy absorption ability		—	72°	58°	69°	77°	82°

*1. The maximum operating pressure of the actuator is restricted by the maximum allowable thrust of the shock absorber.

*2. No-load conditions.

*3. Be careful if the rotation angle of a type with internal shock absorber is set below the value in the table below, the piston stroke will be smaller than the shock absorber's effective stroke, resulting in decreased energy absorption ability.

*4. RDF(V) specification, please refer to page 5-11.

Allowable kinetic energy and rotation time adjustment range

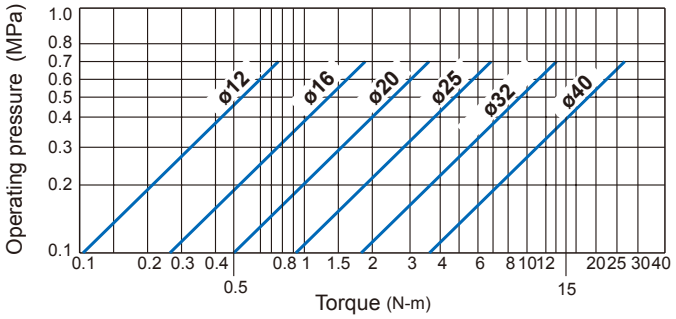
Model	Allowable kinetic energy (J)		Rotation time adjustment range for stable operation(s/90°)	
	Adjustment bolt	Internal shock adsorber	Adjustment bolt	Internal shock adsorber
MCRQ-12	0.006	—	0.2 to 1.0	—
MCRQ-16	0.007	0.039		0.2 to 0.7
MCRQ-20	0.048	0.116		
MCRQ-25	0.081	0.294		
MCRQ-32	0.32	1.6	0.2 to 2.0	0.2 to 1.0
MCRQ-40	0.53	2.9	0.2 to 2.5	

* Be careful if a type with internal absorber is used below the minimum speed, the energy absorption ability will decrease drastically.

20-MCRQ Capacity ø12~ø40

ROTARY ACTUATOR

Torque diagram

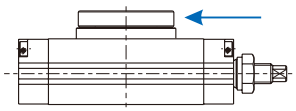
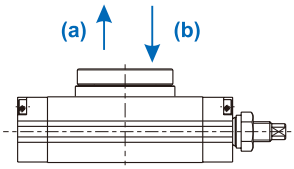
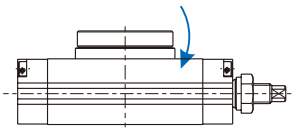


Theoretic force

Unit: N·m

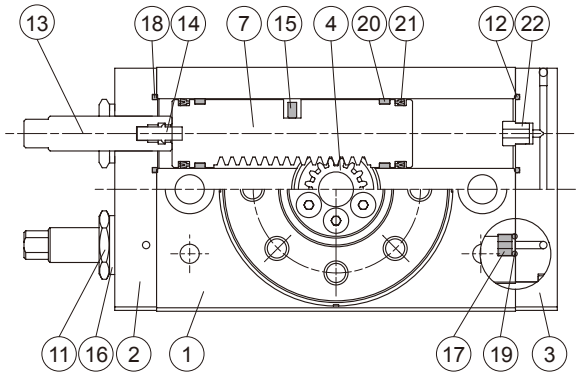
Type		20-MCRQ					
Tube I.D.		12	16	20	25	32	40
Operating pressure (MPa)	0.1	0.1	0.26	0.5	0.91	1.88	3.78
	0.2	0.21	0.52	1	1.81	3.78	7.53
	0.3	0.31	0.78	1.5	2.72	5.66	11.31
	0.4	0.41	1.04	2.01	3.62	7.56	15.09
	0.5	0.52	1.31	2.51	4.55	9.44	18.87
	0.6	0.63	1.57	3	5.45	11.32	22.62
	0.7	0.73	1.83	3.5	6.36	13.23	26.4

Allowable load

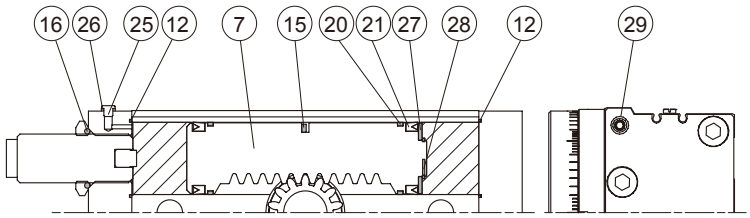
Pictures			

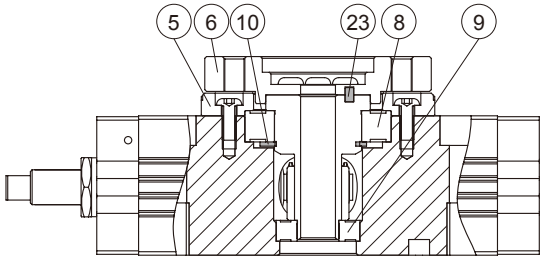
Tube I.D.	Allowable radial load (N)	Allowable thrust load (N)		Allowable moment (N.m)
		(a)	(b)	
12	54	71	71	1.5
16	78	74	78	2.4
20	196	197	363	5.3
25	314	296	451	9.7
32	390	493	708	18
40	543	740	1009	25

ø16~ø32

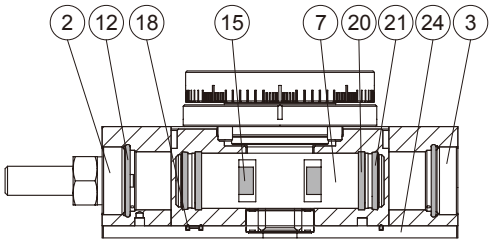


ø40





ø12



Material

No.	Part name	Material	Tube I.D. & Q'y				Repair kits (inclusion)
			12	16	20~32	40	
1	Body	Aluminum alloy	1				
2	Cover	Aluminum alloy	2		1		
3	End cover	Aluminum alloy	2		1		
4	Pinion	SCM	1				
5	Bearing retainer	Aluminum alloy	1				
6	Table	Aluminum alloy	1				
7	Piston	Stainless steel	2				
8	Rolling bearing	Bearing steel	1				
9	Rolling bearing	Bearing steel	1				
10	Snap ring	Spring steel	–		1	–	
11	Seal nut	Stainless steel	2				
12	O-ring	NBR	4		2	4	●
13	Shock absorber	Stainless steel	2				
14	Cushion pad	NBR	2				
15	Magnet	Magnet material	4		2		
16	Seal washer	*1	2				●
17	Fixed	Aluminum alloy	–	4	2	–	
18	Piston packing	NBR	1	–	2	–	●
19	O-ring	NBR	–	4	2	–	●
20	Wear ring	Complex resin	4				

*1. ø12~ø32: NBR+Stainless steel; ø40: NBR

No.	Part name	Material	Tube I.D. & Q'y				Repair kits (inclusion)
			12	16	20~32	40	
21	Piston Seal	NBR	4				●
22	Stop chunk	Aluminum alloy	–		2	–	
23	Pin *3	SCM	1				
24	Plate	Aluminum alloy	1		-		
25	Plug	Aluminum alloy	–			1	
26	Plug washer	PET	–			1	
27	Piston retainer	Aluminum alloy	–			2	
28	Piston snap ring	Spring steel	–			2	
29	Plug	Stainless steel	–			2	

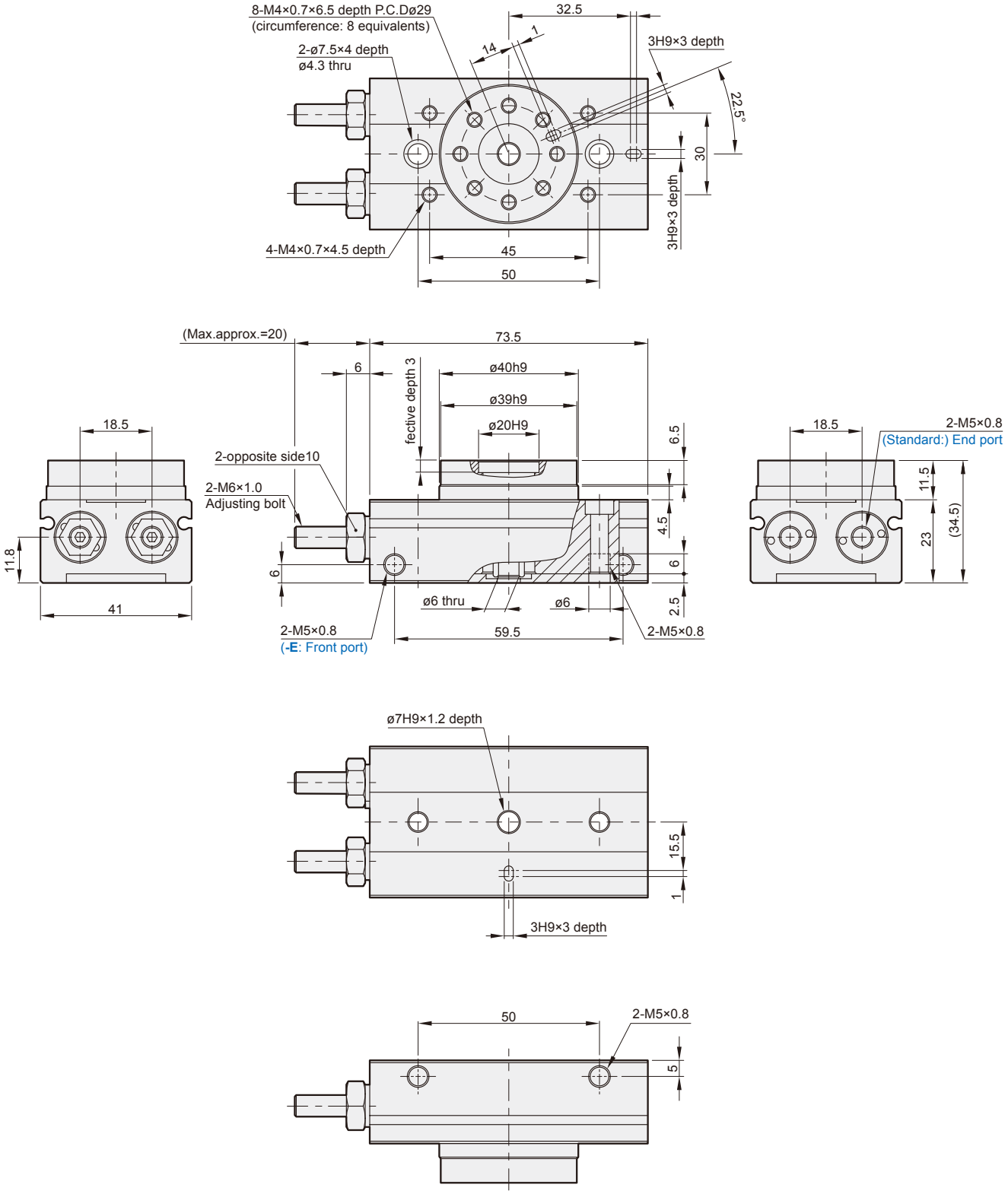
*3. ø20~ø40: Key

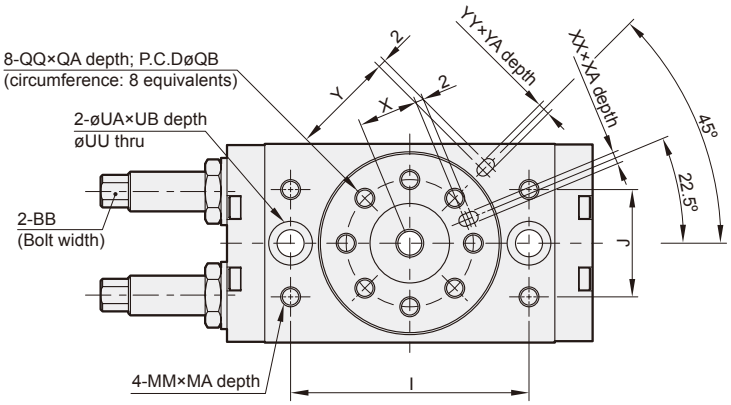
Order example of repair kits

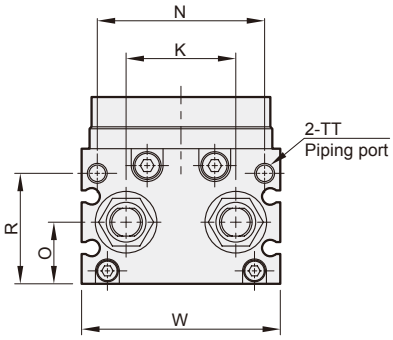
Tube I.D.	Repair kits
ø12	**PS-MCRQ-12**
ø16	**PS-MCRQ-16**
ø20	**PS-MCRQ-20**
ø25	**PS-MCRQ-25**
ø32	**PS-MCRQ-32**
ø40	**PS-MCRQ-40**

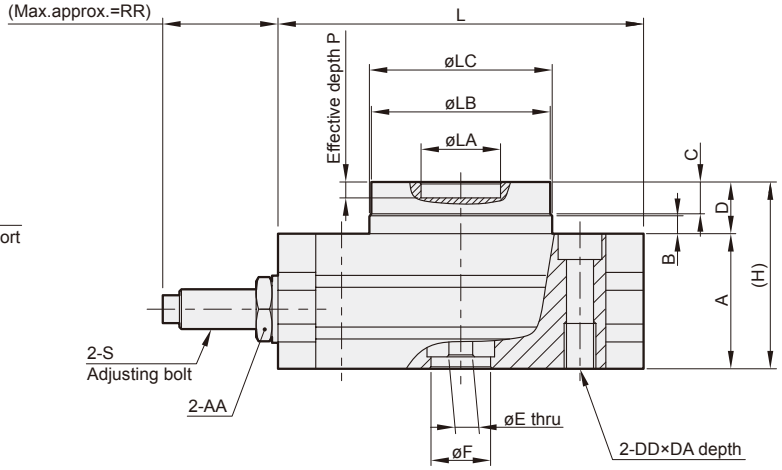
20-MCRQ Dimensions ø12

ROTARY ACTUATOR



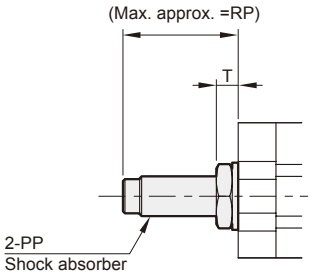


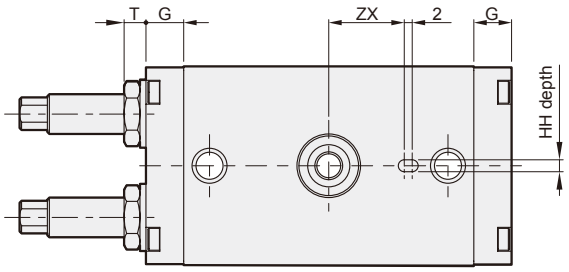




20-MCRQ-16~25R

With shock absorber





Unit: mm

Code / Tube I.D.	A	AA	B	BB	C	D	DA	DD	E	F	G	H	HH	I	J	K	L	LA	LB	LC	MA	MM	N	O
16	34	14	4.5	7	8	13	12	M8×1.25	6	15H9	9.5	47	3H9×3.5	60	27	26	92	20H9	45h9	46h9	8	M5×0.8	37	15.5
20	40	17	6.5	8	10	17	15	M10×1.5	10	22H9	12	57	4H9×4.5	84	37	32	127	32H9	65h9	67h9	8	M6×1	54	19.5
25	46	22	7.5	8	12	20	18	M12×1.75	13	26H9	15.5	66	5H9×5.5	100	50	37	152	35H9	75h9	77h9	8	M8×1.25	63	22

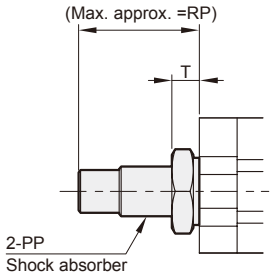
Code / Tube I.D.	P	PP	QA	QB	QQ	R	RP	RR	S	T	TT	UA	UB	UU	W	X	XA	XX	Y	YA	YY	ZX
16	4	20-MAC-1007-SUN	8	32	M5×0.8	29	36	31	M10×1.0	5.5	M5×0.8	11	6.5	6.8	50	15	3.5	3H9	27	3.5	3H9	19
20	4.5	20-MAC-1007-SUN	10	48	M6×1.0	33	30	26	M10×1.0	4.5	Rc1/8	14	8.5	8.6	70	23	4.5	4H9	39	4.5	4H9	28
25	5	20-MAC-1412-SUN-01Q	12	55	M8×1.25	37.5	42	28	M14×1.5	7.5	Rc1/8	18	10.5	10.5	80	26.5	5.5	5H9	45	5.5	5H9	33

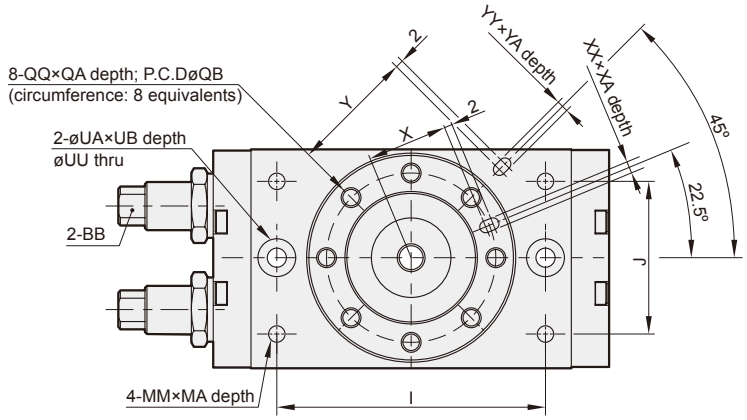
20-MCRQ Dimensions ø32, ø40

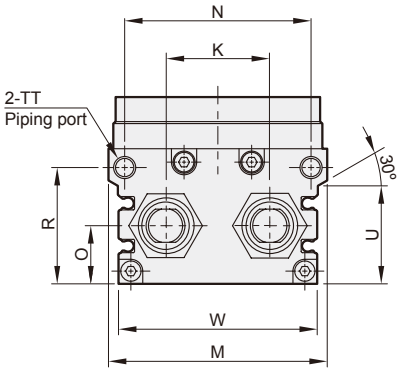
ROTARY ACTUATOR

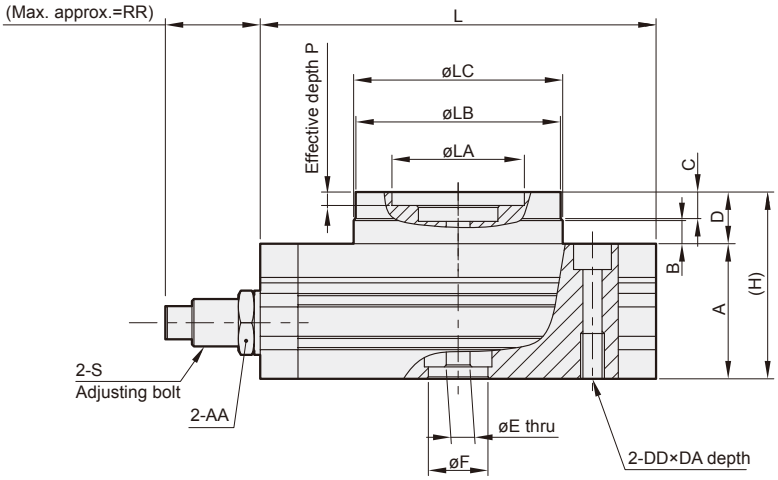
20-MCRQ-32R, 40R

With shock absorber

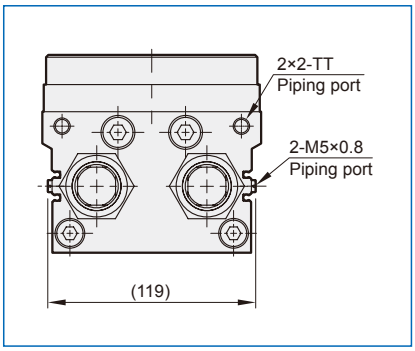


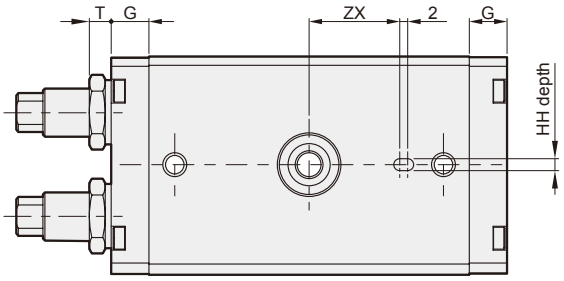






20-MCRQ-40





Unit: mm

Code / Tube I.D.	A	AA	B	BB	C	D	DA	DD	E	F	G	H	HH	I	J	K	L	LA	LB	LC	M	MA
32	59	30	12	Bolt width 12	14.5	27	18	M12×1.75	13	24H9	17	86	6H9×4.5	130	66	47	189	56H9	98h9	100h9	102	10
40	74	36	15	Bolt width 21	16.5	32	25	M16×2.0	24	32H9	24	106	8H9×6.5	150	80	60	240	64H9	116h9	118h9	120	13

Code / Tube I.D.	MM	N	O	P	PP	QA	QB	QQ	R	RP	RR	S	T	TT	U	UA	UB	UU	W
32	M8×1.25	85	27.5	6	20-MAC-2015-SUN-01Q	14.5	77	M10×1.5	50.5	42	34	M20×1.5	10.5	Rc1/8	42	18	10.5	10.5	95
40	M12×1.75	100	37	9	20-MAC-2725-SUN-01Q	16.5	90	M12×1.75	65.5	72	45	M27×1.5	7	Rc1/8	57	20	12.5	14.2	113

Code / Tube I.D.	X	XA	XX	Y	YA	YY	ZX
32	37.5	6.5	6H9	59	4.5	6H9	49
40	44	8.5	8H9	69	4.5	8H9	54

Features

- **4 to 10 times more allowable kinetic energy**
  (compared with internal shock absorber type)

- **Total length shortened**
  Longitudinal mounting space is reduced because there is no protrusion from adjustment bolts or internal shock absorbers.

Specification

Model	20-MCRQ-S		
Acting type	Double acting		
Tube I.D. (mm)	16	20	25
Port size	M5×0.8	Rc1/8	
Rotation	90°, 180°		
Medium	Air (Non-lube)		
Max. operating pressure	1 MPa (*1)		
Min. operating pressure	0.2 MPa		
Ambient temperature	0~+60°C (No freezing)		
Allowable kinetic energy (J)	0.231	1.21	1.82
Rotation time adjustment range (s/90°)	0.2~1.0 (*2)		
Cushion	Shock absorber		
Shock absorbertype	20-MDSC-0806-3N	20-MDSC-1008-3N	20-MDSC-1412-3N
Angle adjustment range	Each rotation end ± 3°		
Weight (kg) 90°	0.67	1.55	2.52
Weight (kg) 180°	0.64	1.48	2.41
Sensor switch (*3)	**RDF(V), RNF(V) / RNFE(V)** : NPN		
	RPF(V) / RPFE(V) : PNP		

*1. The maximum operating pressure of the actuator is restricted by the maximum allowable thrust of the shock absorber.

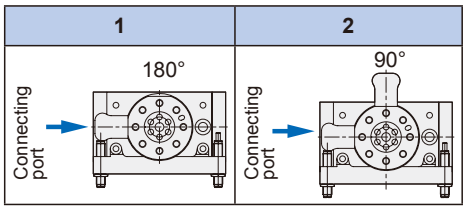
*2. For stable operation the time required for the rotary table to reach the rotation end after deceleration differs depending on the operating conditions (inertial moment of the load, rotation speed, and operating pressure), however, approximately 0.2 to 2 seconds are required.

*3. RDF specification, please refer to page 4-8.

Order example

20 —MCRQ — S — 20 — 1 — G

- 20 —MCRQ: MODEL
- S: EXTERNAL SHOCK ABSORBER
- 20: TUBE I.D.
- 1: CONNECTING PORT POSITION AND ROTATION
- G: PORT THREAD
  Blank: M5×0.8 (for ø16)
  Blank: Rc thread
  G: G thread
  NPT: NPT thread
  (for ø20, ø25)
- MATERIAL RESTRICTIONS (Secondary battery)



Auto switch type

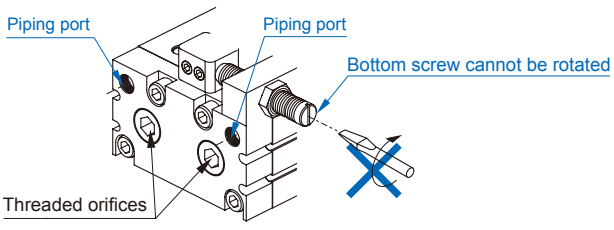
RDF × 1

- RDF: AUTO SWITCH TYPE
- 1: NUMBER of AUTO SWITCH

perpendicular		in-line		style
RDFV	**RDFEV**	**RDF**	**RDFE**	Soild state
RNFV	**RNFEV**	**RNF**	**RNFE**	NPN
RPFV	**RPFEV**	**RPF**	**RPFE**	PNP

Range of shock absorber operates

Model	Adjustment angle per rotation of angle adjustment screw	Range of angle the shock absorber operates (single side)
20-MCRQ-S-15	1.5°	12°
20-MCRQ-S-20	1.1°	9°
20-MCRQ-S-25	1.3°	11°

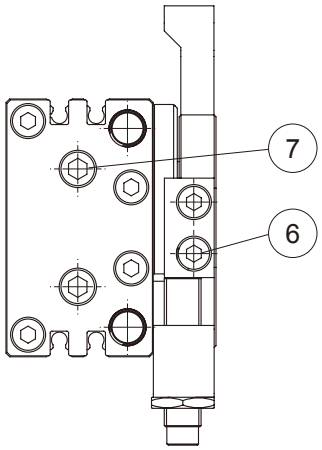


Notice for shock absorber

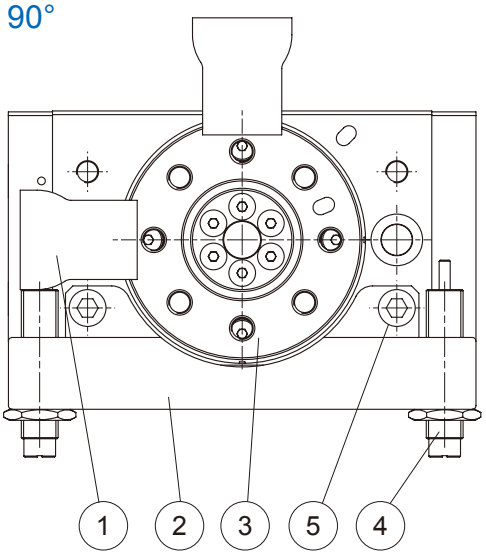
- The threaded orifices shown below are not connecting ports. Never remove the plugs as this will cause malfunction.
- Never rotate the bottom screw of the shock absorber. (It is not an adjustment screw.) This may cause oil leakage.

20-MCRQ-S Inside structure & Parts list

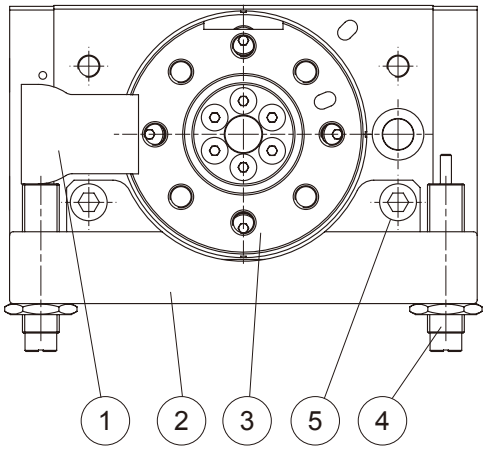
ROTARY ACTUATOR



90°



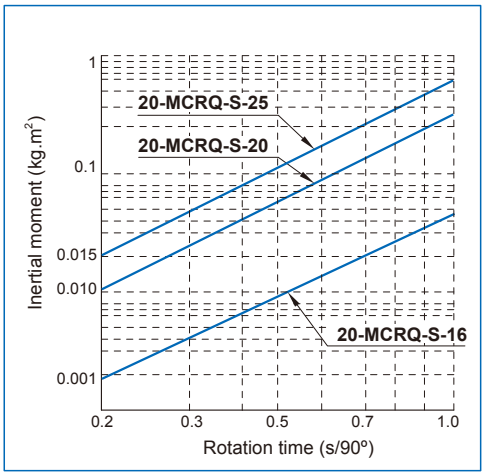
180°

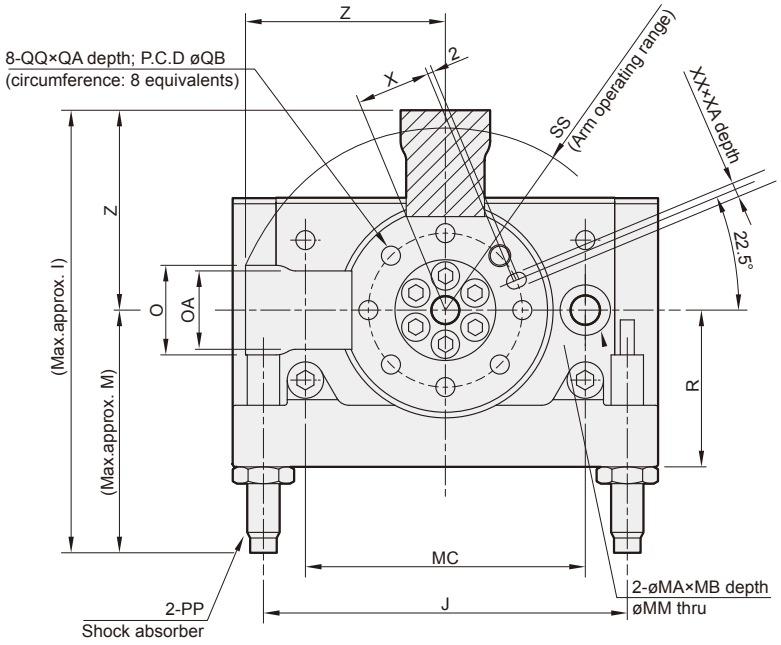


Material

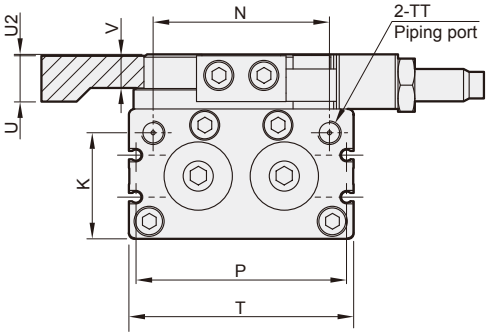
No.	Part name	Material	Rotation & Q'y	
			90°	180°
1	Fixing plate	Carbon steel	2	1
2	Cushion mount	Aluminum alloy	1	1
3	Flange table	Aluminum alloy	1	1
4	Shock absorber	–	2	2
5	Bolt	Stainless steel	2	2
6	Bolt	Stainless steel	4	2
7	Plug	Stainless steel	2	2

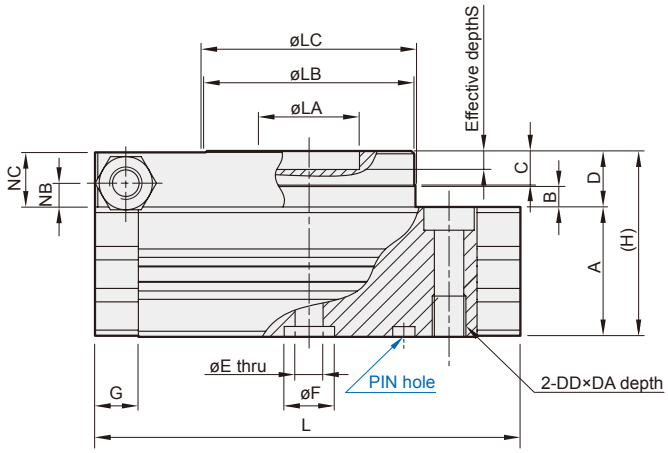
Moment of inertia



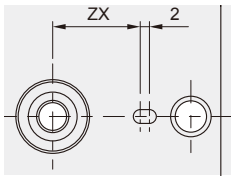


Code / Tube I.D.	PP
16	20-MDSC-0806-3N
20	20-MDSC-1008-3N
25	20-MDSC-1412-3N





PIN hole size



Code / Tube I.D.	HH	ZX
16	3H9×3.5	19
20	4H9×4.5	28
25	5H9×5.5	33

Unit: mm

Code / Tube I.D.	A	B	C	D	DA	DD	E	F	G	H	I	J	K	L	LA	LB	LC	M	MA	MB	MC
16	34	4.5	8	13	12	M8×1.25	6	15H9	9.5	47	92.8	80.6	29	92	20H9	45h9	46h9	48.5	11	6.5	60
20	40	6.5	10	17	15	M10×1.5	10	22H9	12	57	119.3	110	33	127	32H9	65h9	67h9	59	14	8.5	84
25	46	7.5	12	20	18	M12×1.75	13	26H9	15.5	66	154.8	130	37.5	152	35H9	75h9	77h9	83.3	18	10.5	100

Code / Tube I.D.	MM	N	NB	NC	O	OA	P	QA	QB	QQ	R	S	SS	T	TT	U	U2	V	X	XA	XX	Z
16	6.8	37	6	12.5	20	15.6	46.1	8	32	M5×0.8	33	4	45.4	50	M5×0.8	11.5	0.3	7.5	15	3.5	3H9	44.3
20	8.6	54	8	16.5	27	21.5	60.9	10	48	M6×1	46	4.5	61.8	70	Rc1/8	13.5	0.5	9	23	4.5	4H9	60.3
25	10.5	63	8.5	19.5	32	28	76.7	12	55	M8×1.25	54.5	5	73.3	80	Rc1/8	18	0.5	11	26.5	5.5	5H9	71.5

20-MCH* Model selection

GRIPPER

Gripper selection

- Depends on the coefficient of friction and the gripping conditions between soft fingers and work piece.

When gripping a workpiece as in the figure as shown above:

F: Gripping force of single finger (N)
n: Number of finger
μ: Coefficient of friction between the attachments and the workpiece
m: Workpiece mass (kg)
g : Gravitational acceleration (=9.8m/s^2)
a : Safe factor

the conditions under which the workpiece will not drop are,

$$n \times \mu F > m \times g$$

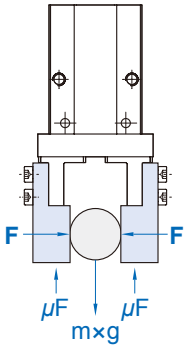
Therefore,

$$F \geq \frac{m \times g}{n \times \mu}$$

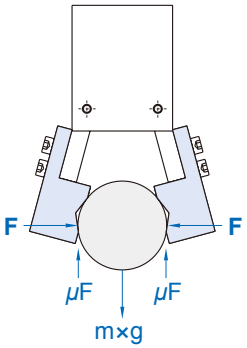
With "a" representing the extra margin, "F" is determined by the following formula:

$$F \geq \frac{m \times g}{n \times \mu} \times a$$

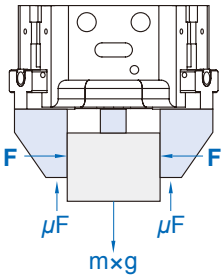
Parallel gripper (2-Finger)



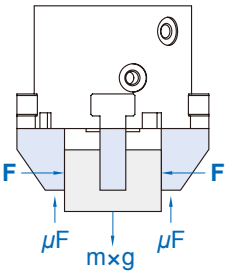
Angular gripper



Parallel gripper (3-Finger)



Parallel gripper (4-Finger)

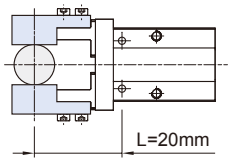


Model selection suggestions

1. For normal gripping and carrying usage, the recommended safe factor (a) is 4.
2. The value of gripping force of single finger can be found at the gripping force table.
3. The safe factor (a) have to be higher if the gripper is using with a great accelerated velocity or impaction condition.

Model selection example

In the motion process did not produce high acceleration, deceleration or impact forces, Workpiece mass: 0.3kg , Gripping method: External gripping, Operating pressure: 0.5 MPa, Coefficient of friction (*μ*): 0.1, Holding position: L=20mm (no overhang)

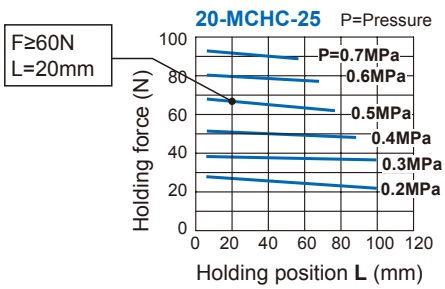


1. Based on the above formula, the required gripping force can be derived:

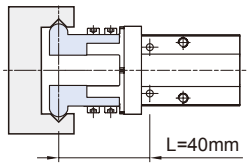
$$F \geq \frac{0.3 \times 9.8}{2 \times 0.1} \times 4$$

$$\geq 60(N)$$

2. From Effective Gripping Force Fig, Operating pressure: 0.5 MPa; Holding position: 20 mm Effective gripping force is greater than 60 (N) So selected **20-MCHC-25** grippers.



In the motion process did not produce high acceleration, deceleration or impact forces, Workpiece mass: 0.05kg , Gripping method : External gripping, Operating pressure: 0.3 MPa, Coefficient of friction (*μ*): 0.1, Holding position: L=40mm (no overhang)

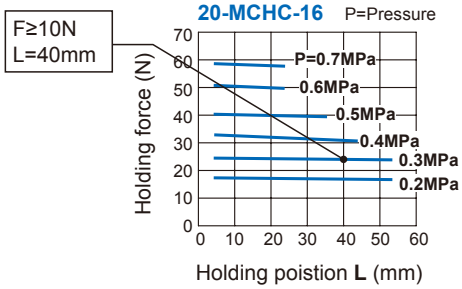


1. Based on the above formula, the required gripping force can be derived:

$$F \geq \frac{0.05 \times 9.8}{2 \times 0.1} \times 4$$

$$\geq 10(N)$$

2. From Effective Gripping Force Fig, Operating pressure: 0.3 MPa; Holding position: 40 mm Effective gripping force is greater than 10 (N) So selected **20-MCHC-16** grippers.



Features

- Hardened gripping fingers for longer service life.
- Simple structure with high stability.
- Magnetic as standard.

Specification

Model		20-MCHA				
Acting type		Double acting / Single acting (N.O.)				
Tube I.D. (mm)		12	16	20	25	32
Port size		M3×0.5	M5×0.8			
Medium		Air				
Operating pressure range	Double acting	0.15~0.7 MPa				
	Single acting	0.3~0.7	0.2~0.7 MPa			
Ambient temperature		-5~+60°C (No freezing)				
Max. frequency		180 Cycles/min				
Lubrication	Cylinder	Not required				
	Lever	Grease (Joint parts)				
Max. arm length (L) (*1)		30	40	60	70	85
Clamp / Release angle		-10~+30°				
Sensor switch (*2)		RDE, RDE-D: Non-contact				
Weight (g)		53	103	193	327	525

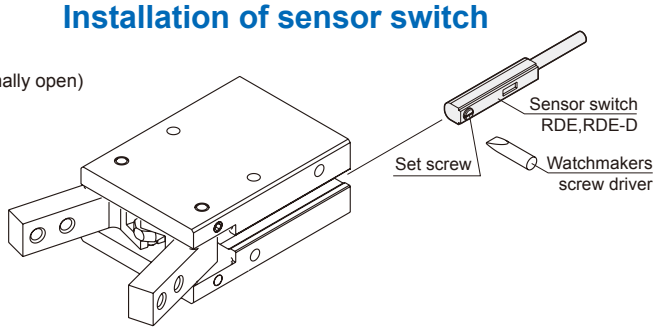
*1. L: Arm length (mm)
*2. RDE, RDE-D specification, please refer to page 4-3.

Order example

20 — MCHA — 20 — □

- MATERIAL RESTRICTIONS (Secondary battery)
- MODEL
- TUBE I.D.: **12**, **16**, **20**, **25**, **32**
- ACTING TYPE: Blank: Double acting; **S**: Single acting (Normally open)

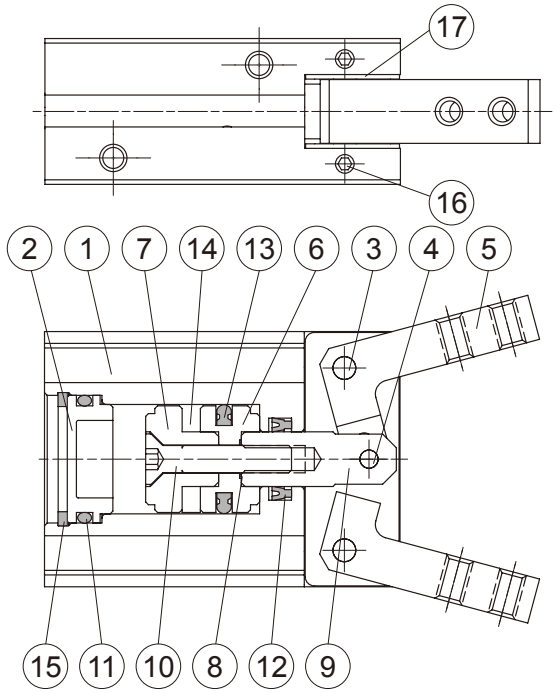
Installation of sensor switch



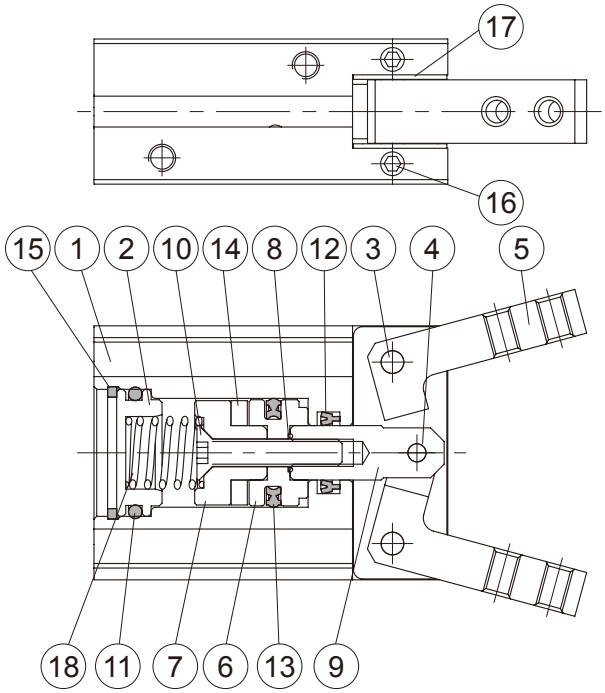
20-MCHA Inside structure & Parts list

30° ANGULAR **GRIPPER**

Double acting



Single acting Normally Open



Material

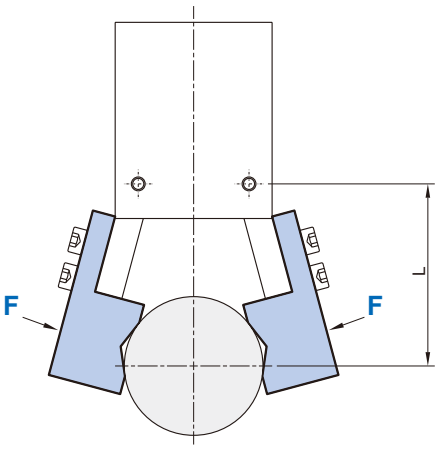
No.	Part name	Material	Q'y	Repair kits (inclusion)
1	Body	Aluminum alloy	1	
2	Head cover	Aluminum alloy	1	
3	Grip rivet	Carbon steel	2	
4	Spindle rivet	Bearing steel	1	
5	Y-finger	Medium carbon steel	2	
6	Piston-R	Aluminum alloy	1	
7	Piston-H	Aluminum alloy	1	
8	Gasket	NBR	1	●
9	Piston rod	Stainless steel	1	
10	Screw	Stainless steel	1	
11	Cover ring	NBR	1	●
12	Rod packing	NBR	1	●
13	Piston packing	NBR	1	●
14	Magnet ring	Magnet material	1	
15	Stop ring	Spring steel	1	
16	Screw	SCM	4	
17	Washer	Stainless steel	2	
18	Spring	SWB-P	1	

Order example of repair kits

Tube I.D.	Repair kits
ø12	**PS-MCHA-12**
ø16	**PS-MCHA-16**
ø20	**PS-MCHA-20**
ø25	**PS-MCHA-25**
ø32	**PS-MCHA-32**

Effective gripping force

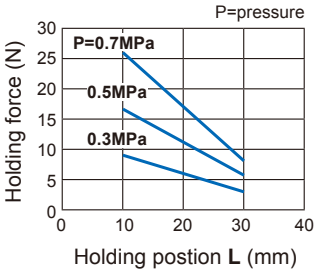
Indication of effective force.
The effective gripping force shown in the graphs to the right is expressed as F, which is the thrust of one finger, when both fingers and attachments are in full contact with the workpiece as shown in the figure below.



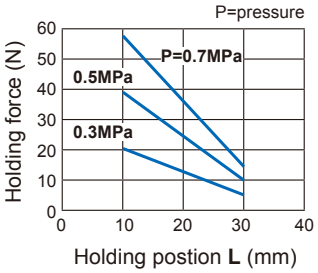
1N=0.102 kgf
1MPa=10.2 kgf/cm^2

Double acting

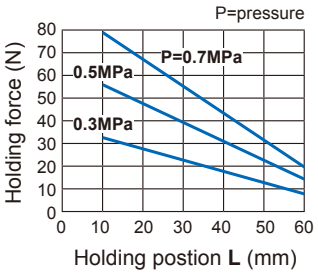
20-MCHA-12



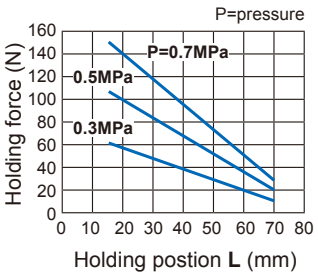
20-MCHA-16



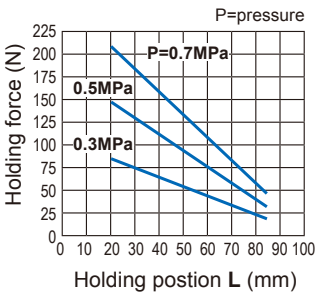
20-MCHA-20



20-MCHA-25

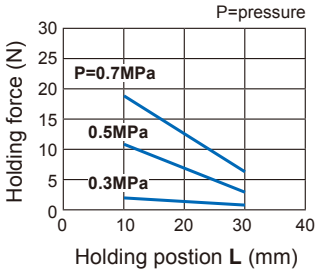


20-MCHA-32

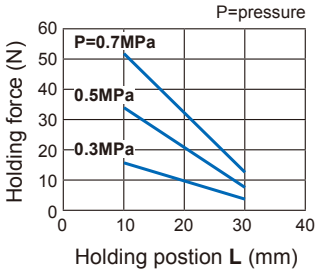


Single acting (Normally open)

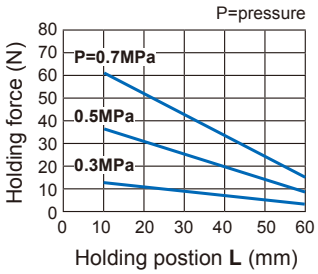
MCHA-12



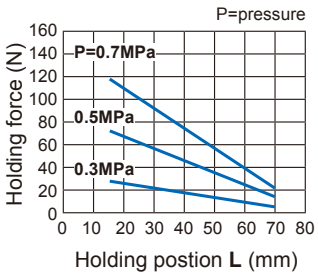
20-MCHA-16



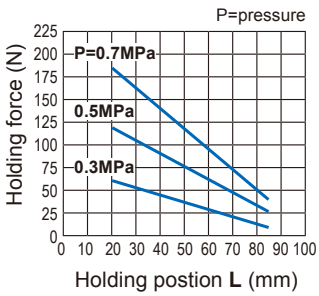
20-MCHA-20



20-MCHA-25

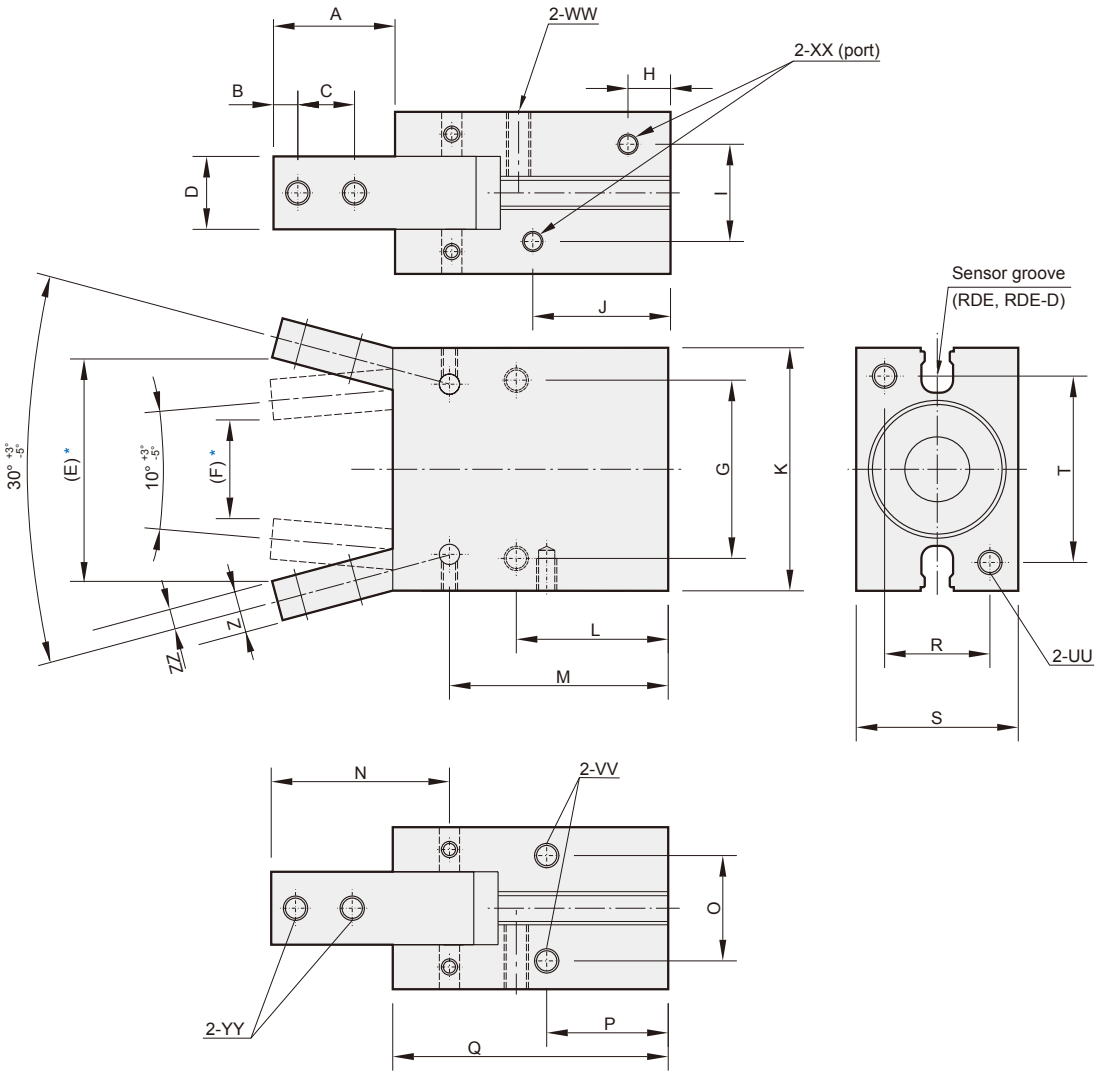


20-MCHA-32



20-MCHA Dimensions ø12~ø32

30° ANGULAR **GRIPPER**



* Reference value.

Code / Tube I.D.	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	UU	VV
12	15.4	3	6	7	26.3	9	20	7.5	10.2	23	28	20	32.9	21.5	10.2	16	39	10	16	22	M3×5 depth	M3×5 depth
16	17.5	3	8	9	31.1	14	24	7.5	12	22	34	22.5	35	25	14	18	42.5	14	22	26	M4×7 depth	M4×7 depth
20	22	4	10	12	40.1	18	30	8.0	13	25	45	25	39.5	32.5	16	19	50	16	26	35	M5×8 depth	M5×8 depth
25	26	5	12	14	47.9	21	36	8.5	18	28	52	28.5	45.5	38.5	20	21.5	58	20	32	40	M6×10 depth	M6×8 depth
32	30	6	14	18	55.1	24	44	10.5	24	34	60	37.5	54	44	26	30	68	26	40	46	M6×10 depth	M6×8 depth

Code / Tube I.D.	WW	XX	YY	Z	ZZ
12	M3×8 depth	M3×5 depth	M3	5	2.5
16	M4×11 depth	M5×5 depth	M3	6	3
20	M5×12 depth	M5×5 depth	M4	7	3.5
25	M6×16 depth	M5×5 depth	M5	9	4
32	M6×20 depth	M5×5 depth	M6	10	5

Features

- Available with comprehensive range of Tube I.D. 12 ~ 32mm.
- Highly accurate air driven device for holding work-piece.
- Magnetic as standard.

Specification

Model		20-MCHB				
Acting Type		Double Acting				
Tube I.D. (mm)		12	16	20	25	32
Port size		M3×0.5	M5×0.8			
Medium		Air				
Operating pressure range		0.15~0.7 MPa				
Ambient temperature		–5~+60°C (No freezing)				
Max. frequency		180 Cycles/min				
Lubrication	Cylinder	Not required				
	Lever	Grease (Actuation at)				
Max. arm length (L) (mm)		30	40	60	70	85
Theoretical holding (*1) force (N)	Closed side	8	24	47	75	100
	Opened side	5	18	35	60	85
Lever open / close stroke		6	8	12	14	16
Sensor switch (*2)		RDE, RDE-D: Non-contact				
Weight (g)		66	144	255	419	719

*1. Gripping point length L=30mm, Pressure=0.5 MPa.

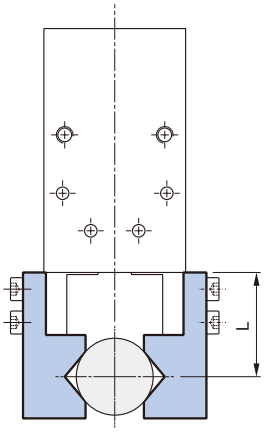
*2. RDE, RDE-D specification, please refer to page 4-3.

Order example

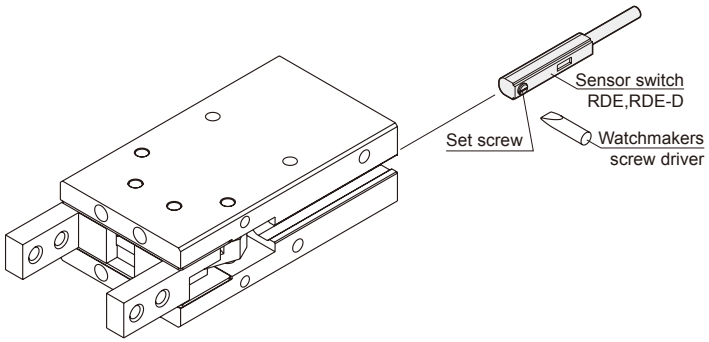
20 — MCHB — 16

- 20 — MATERIAL RESTRICTIONS (Secondary battery)
- MCHB — MODEL
- 16 — TUBE I.D.
  - 12
  - 16
  - 20
  - 25
  - 32

Length of gripping point

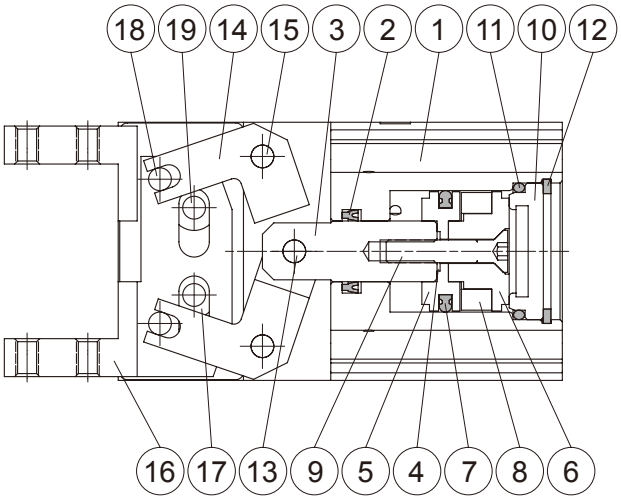


Installation of sensor switch



20-MCHB Inside structure & Parts list

PARALLEL GRIPPER (2-Finger)

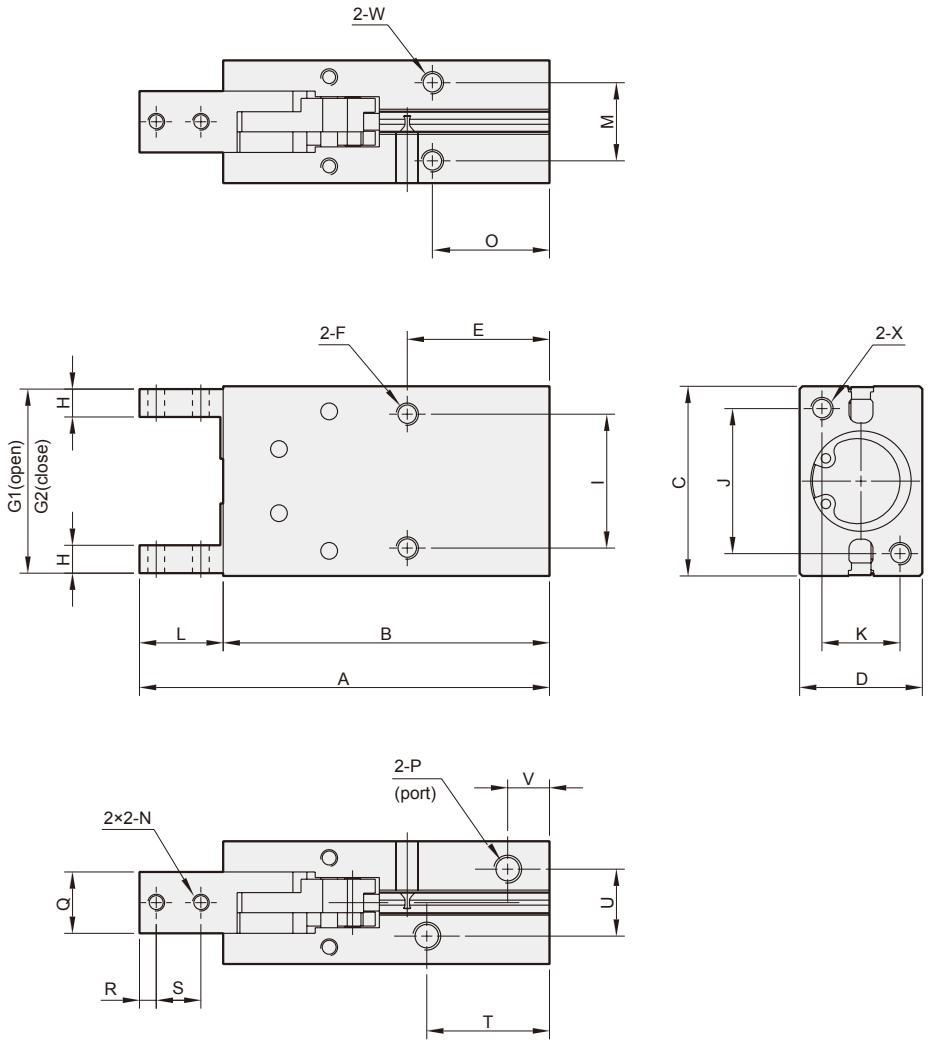


Material

No.	Part name	Material	Q'y	Repair kits (inclusion)
1	Body	Aluminum alloy	1	
2	Rod packing	NBR	1	●
3	Piston rod	Stainless steel	1	
4	Gasket	NBR	1	●
5	Piston-R	Aluminum alloy	1	
6	Piston-H	Aluminum alloy	1	
7	Piston packing	NBR	1	●
8	Magnet ring	Magnet material	1	
9	Screw	Stainless steel	1	
10	Head cover	Aluminum alloy	1	
11	Cover ring	NBR	1	●
12	Stop ring	Spring steel	1	
13	Spindle river	Bearing steel	1	
14	Grip per	Carbon steel	2	
15	Grip rivet	Carbon steel	2	
16	Grip per	Carbon steel	2	
17	Bush	Stainless steel	4	
18	Grip rivet	Bearing steel	2	
19	Grip rivet	Carbon steel	2	
20	Screw	SCM	4	
21	Screw	SCM	4	
22	Washer for grip	Stainless steel	2	

Order example of repair kits

Tube I.D.	Repair kits
ø12	**PS-MCHB-12**
ø16	**PS-MCHB-16**
ø20	**PS-MCHB-20**
ø25	**PS-MCHB-25**
ø32	**PS-MCHB-32**

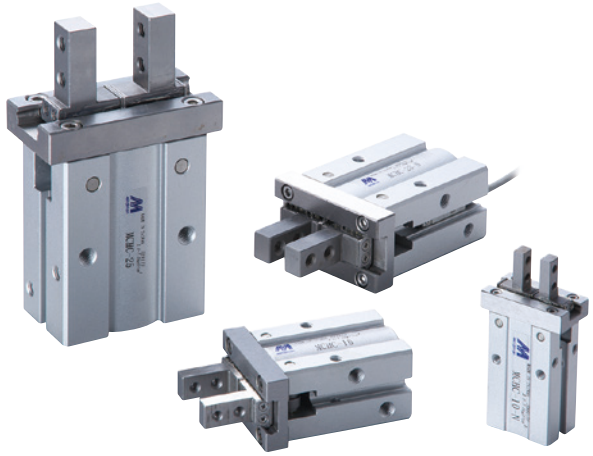


Code / Tube I.D.	A	B	C	D	E	F	G1	G2	H	I	J	K	L	M	N	O	P	Q	R	S
12	63.5	50.5	28	16	20	M3×0.5×5 depth	27	21	4	18	17	10	13	10	M3×0.5	16	M3×0.5×5 depth	7	3	6
16	73.5	58.5	34	22	25.5	M4×0.7×11 depth	33	25	5	24	26	14	15	14	M3×0.5	21	M5×0.8×5 depth	11	3	8
20	88.5	69.5	45	26	25	M5×0.8×8 depth	44	32	6	30	35	16	19	16	M4×0.7	19	M5×0.8×5 depth	12	4	10
25	102.5	78.5	52	32	28	M6×1.0×10 depth	51	37	8	36	40	20	24	20	M5×0.8	22	M5×0.8×5 depth	14	5	12
32	120.5	90.5	60	40	34	M6×1.0×10 depth	59	43	10	44	46	24	30	26	M6×1.0	26	M5×0.8×5 depth	20	7	15

Code / Tube I.D.	T	U	V	W	X
12	23	10.2	7.5	M3×0.5×5 depth	M3×0.5×5 depth
16	22	12	7.5	M4×0.7×7 depth	M4×0.7×7 depth
20	26	13	8	M5×0.8×8 depth	M5×0.8×8 depth
25	29	18	8.5	M6×1.0×10 depth	M6×1.0×10 depth
32	35	24	10.5	M6×1.0×10 depth	M6×1.0×10 depth

20-MCHC series

PARALLEL GRIPPER (2-Finger)



Features

- Integral linear guide used for high rigidity and high precision.
- The material of finger is martensitic stainless steel.
- Body thickness tolerance ±0.05mm.
- Bottom pin holes for accurate re-locating.
- Grooves on the body for sensor switch to be inserted into.
- The gripping stroke of long-stroke type is approximately double compare with standard type.
- Standard with magnet.

Specification

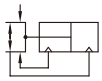
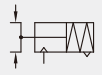
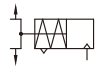
Model		20-MCHC			
Acting type		Double acting / Single acting			
Tube I.D. (mm)		10	16	20	25
Opening / Closing stroke (mm)		4	6	10	14
Port size		M3×0.5	M5×0.8		
Medium		Air			
Operating pressure range	Double acting	0.2~0.7	0.1~0.7		
	Single acting	0.35~0.7	0.25~0.7		
Ambient temperature		–10~+60°C (No freezing)			
Repeatability		± 0.01 mm			
Max. frequency		180 cycle / min			
Lubricator		Not required			
Sensor switch (*)		RDE, RDE-D: Non-contact			
Weight (g)	Double acting	55	125	250	460
	Single acting	70	145	270	490

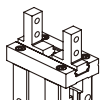
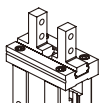
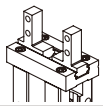
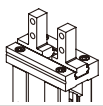
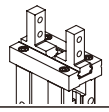
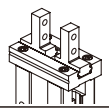
* RDE, RDE-D specification, please refer to page 4-3.

Order example

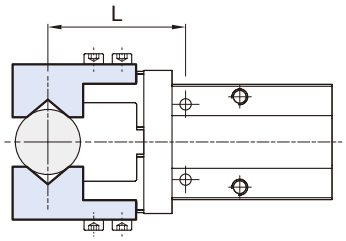
20 — MCHC — 20 — □ N

- 20 — MATERIAL RESTRICTIONS (Secondary battery)
- MCHC — MODEL
- 20 — Tube ID. **10, 16, 20, 25**
- □ — TYPE
- N — TYPE

Model	Symbol	Description
Blank		Double acting
S		Single acting / Normally open
C		Single acting / Normally closed

Blank: Standard	**N**: Flat
	
1: Side tapped mounting	**N1**: Narrow type side tapped mounting
	
2: Standard (Through hole)	**N2**: Narrow (Through hole)
	

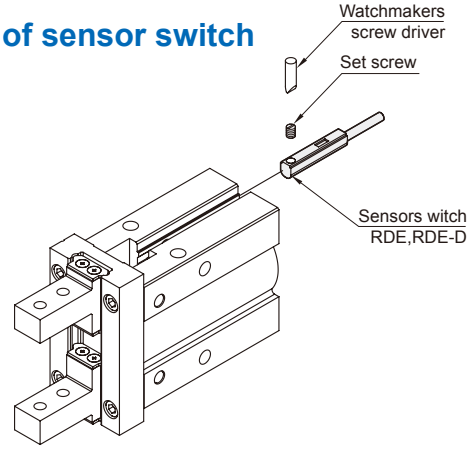
Gripping force



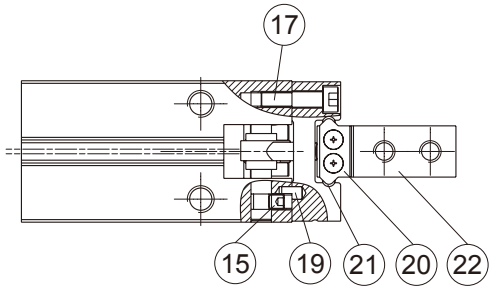
Tube I.D. (mm)		10	16	20	25
Double acting	External	11(1.1)	34(3.5)	42(4.3)	65(6.6)
	Internal	17(1.7)	45(4.6)	66(6.7)	104(10.6)
Single acting / Normally open	External	7.1(0.7)	27(2.8)	33(3.4)	45(4.6)
Single acting / Normally closed	Internal	13(1.3)	38(3.9)	57(5.8)	83(8.5)

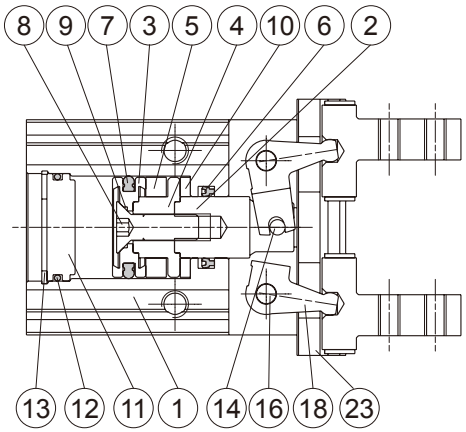
* Operation pressure 0.5 MPa, gripping length 20mm, the effective gripping force for each finger is *** N(kgf).

Installation of sensor switch

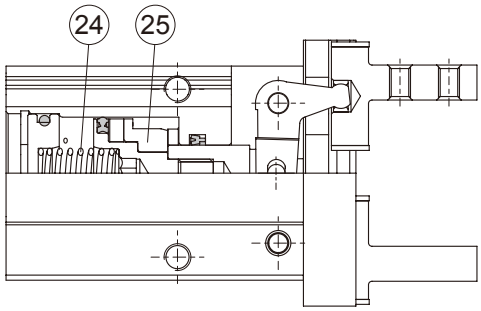


Double acting

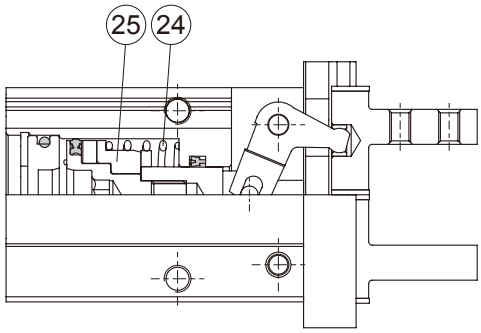




Single acting
Normally open



Single acting
Normally closed



Material

No.	Tube I.D. / Part name	10	16	20	25	Q'y	Repair kits (inclusion)
1	Body	Aluminum alloy				1	
2	Piston rod	Stainless steel				1	
3	Piston	Aluminum alloy				1	
4	Piston R	*1	Aluminum alloy			1	
5	Magnet ring	Magnet material				1	
6	Rod packing	NBR				1	●
7	Piston packing	NBR				1	●
8	Screw	—	Stainless steel			1	
9	O-ring	—	NBR			1	●
10	Cushion pad	PU				1	●
11	Head cover	Aluminum alloy				1	
12	Cover ring	NBR				1	●
13	Stop ring	*2	Stainless steel			1	
14	Spindle river	Carbon steel				1	
15	Screw	Carbon steel				4	
16	Grip rivet	Carbon steel				2	
17	Bolt	Stainless steel				4	
18	Lever	Stainless steel				2	

No.	Tube I.D. / Part name	10	16	20	25	Q'y	Repair kits (inclusion)
19	Pin	Carbon steel				2	
20	Roller stopper	Stainless steel				4	
21	Steel balls	Bearing steel				24	
22	Finger	Stainless steel				2	
23	Guide	Stainless steel				1	
24	Magnet holder	Stainless steel				1	
25	Stop ring	Stainless steel				1	

*1. Stainless steel *2. Carbon steel

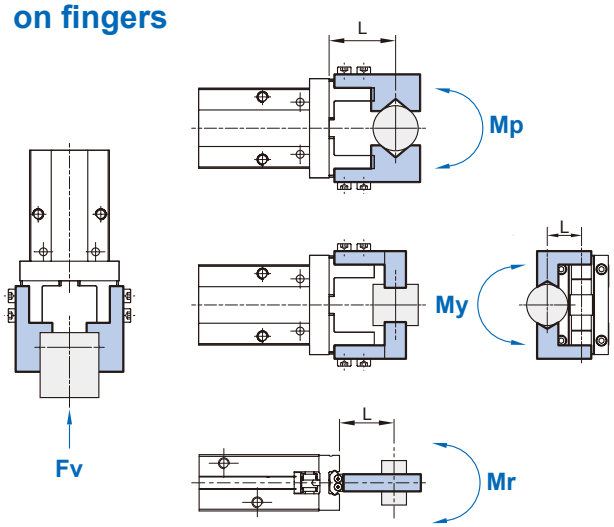
Order example of repair kits

Tube I.D.	Repair kits
ø10	**PS-MCHC-10**
ø16	**PS-MCHC-16**
ø20	**PS-MCHC-20**
ø25	**PS-MCHC-25**

20-MCHC Allowable load calculation

PARALLEL GRIPPER (2-Finger)

Confirmation of external force on fingers



L: distance to the point at which the load is applied (mm)

Tube I.D. (mm)	Allowable vertical load Fv (N)	Maximum allowable moment		
		Pitch moment Mp (N-m)	Yaw moment My (N-m)	Roll moment Mr (N-m)
10	58	0.26	0.26	0.53
16	98	0.68	0.68	1.36
20	147	1.32	1.32	2.65
25	255	1.94	1.94	3.88

* Values for load and moment in the table indicate static values.

Allowable load calculation

$$\text{Allowable load } F(N) = \frac{M(\text{maximum allowable moment})(N\cdot m)}{L(m)}$$

Example

When a static load of f=20N is operating,which applies pitch moment to point L=25mm from the **20-MCHC-16** guide.

$$\text{Allowable load } F(N) = \frac{0.68\ (N\cdot m)}{25\times10^{-3}(m)}$$

$$= 27.2\ (N)$$

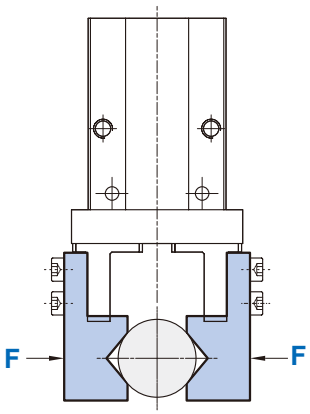
Load f=20 (N) < 27.2 (N), so can be used.

Model selection suggestions

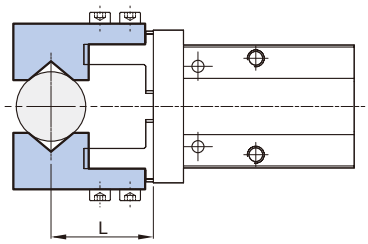
1. For normal gripping and carrying usage, the recommended safe factor (a) is 4.
2. The value of gripping force of single finger can be found at the gripping force table.
3. The safe factor (a) have to be higher if the gripper is using with a great accelerated velocity or impaction condition.

Effective gripping force (Double acting)

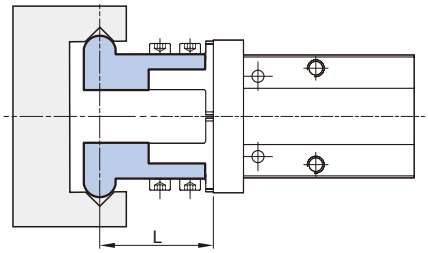
Indication of effective force.
The effective gripping force shown in the graphs to the right is expressed as F, which is the thrust of one finger, when both fingers and attachments are in full contact with the workpiece as shown in the figure below.



1N=0.102 kgf
1MPa=10.2 kgf/cm^2



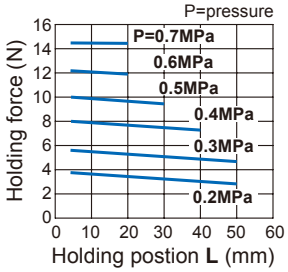
External grip



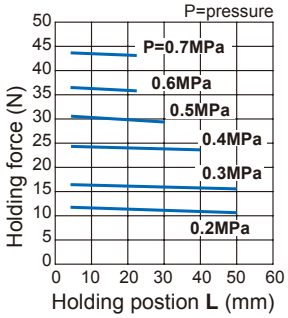
Internal grip

External gripping force

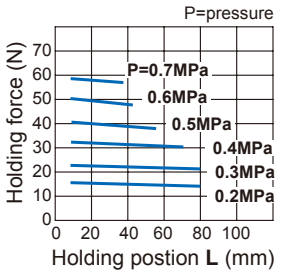
20-MCHC-10



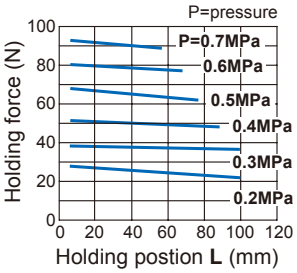
20-MCHC-16



20-MCHC-20

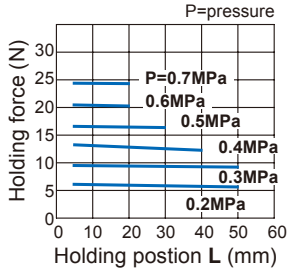


20-MCHC-25

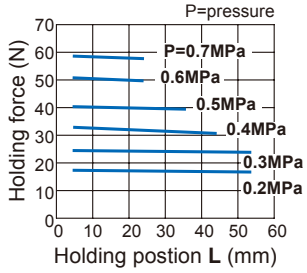


Internal gripping force

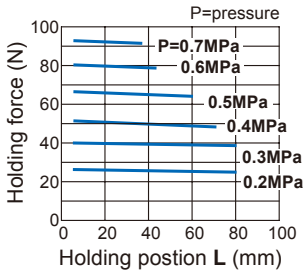
20-MCHC-10



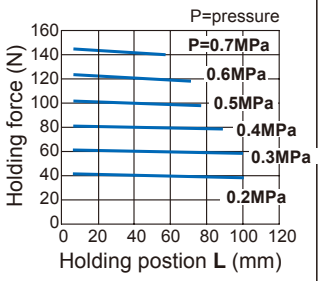
20-MCHC-16



20-MCHC-20



20-MCHC-25



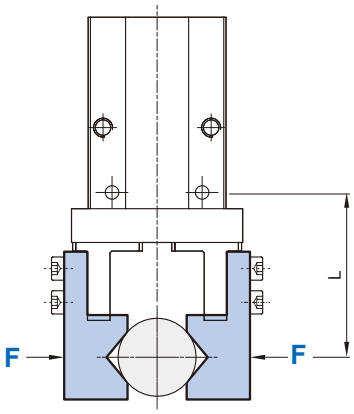
20-MCHC Capacity – Single acting

PARALLEL GRIPPER (2-Finger)

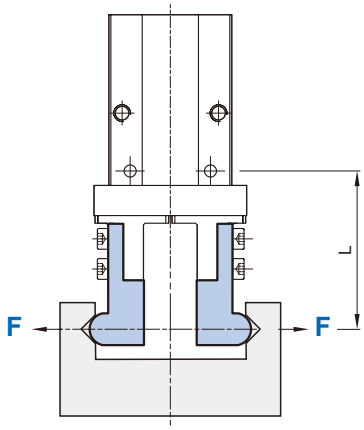
Effective gripping force (Single acting)

Indication of effective force.
The effective gripping force shown in the graphs to the right is expressed as F, which is the thrust of one finger, when both fingers and attachments are in full contact with the workpiece as shown in the figure below.

1N=0.102 kgf
1MPa=10.2 kgf/cm^2



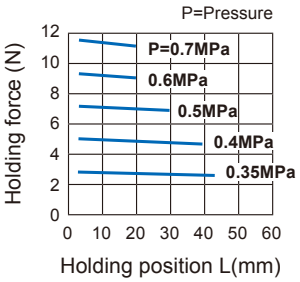
External grip
(Single acting / Normally open)



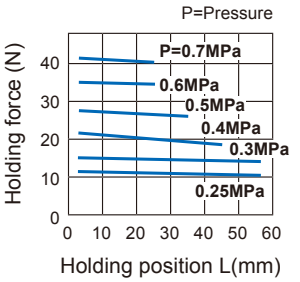
Internal grip
(Single acting / Normally closed)

External gripping force
Single acting / N.O.

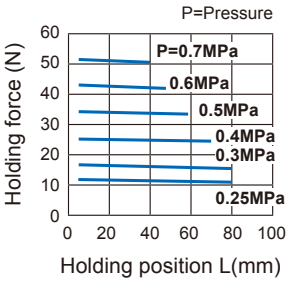
20-MCHC-10-S



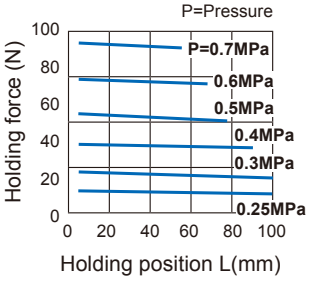
20-MCHC-16-S



20-MCHC-20-S

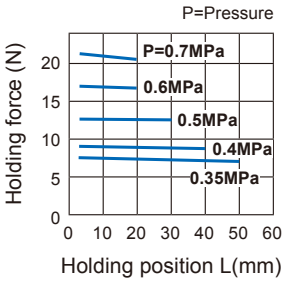


20-MCHC-25-S

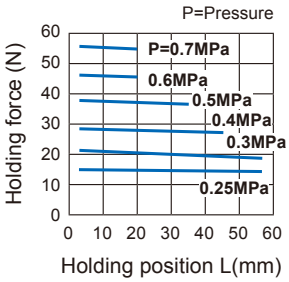


Internal gripping force
Single acting / N.C.

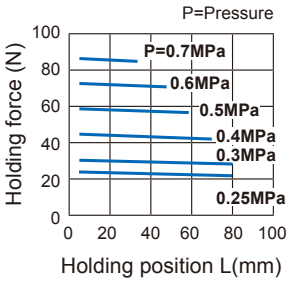
20-MCHC-10-C



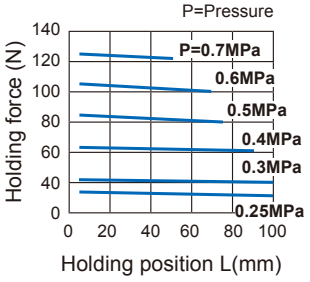
20-MCHC-16-C



20-MCHC-20-C

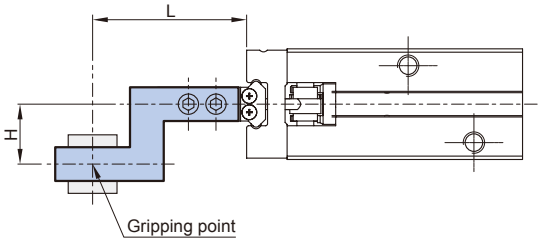


20-MCHC-25-C

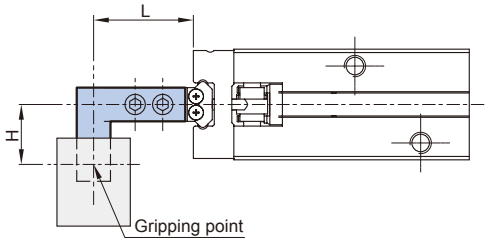


Confirmation of gripping point

- The air gripper should be operated so that the workpiece gripping point "L" and the amount of overhang "H" stay within the range shown for each operating pressure given in the graphs to the right.
- If the workpiece gripping point goes beyond the range limits, this will have an adverse effect on the life the air gripper.



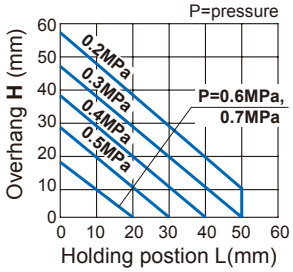
External grip



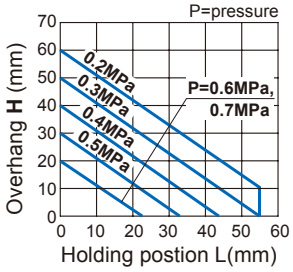
Internal grip

External gripping force

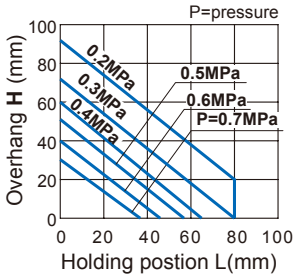
20-MCHC-10



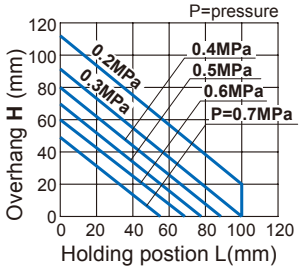
20-MCHC-16



20-MCHC-20

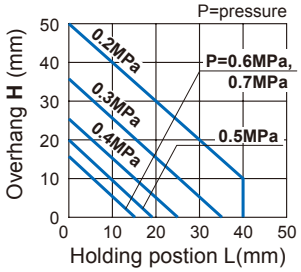


20-MCHC-25

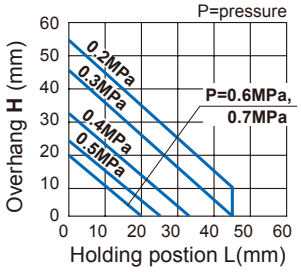


Internal gripping force

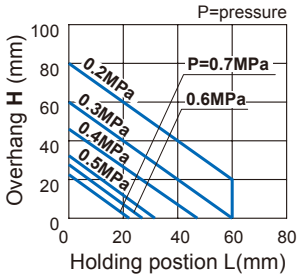
20-MCHC-10



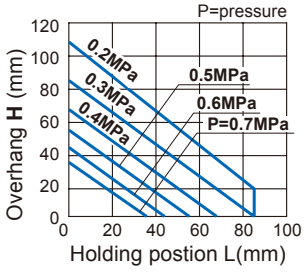
20-MCHC-16



20-MCHC-20



20-MCHC-25

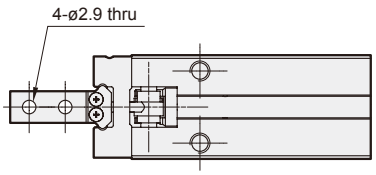


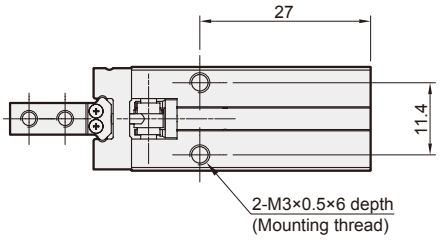
20-MCHC Dimensions ø10

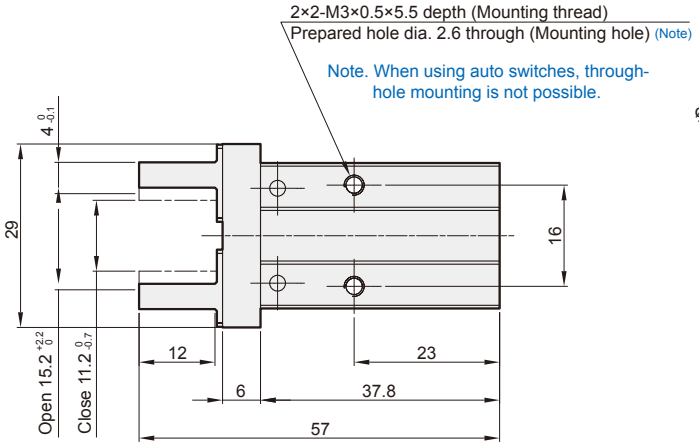
PARALLEL GRIPPER (2-Finger)

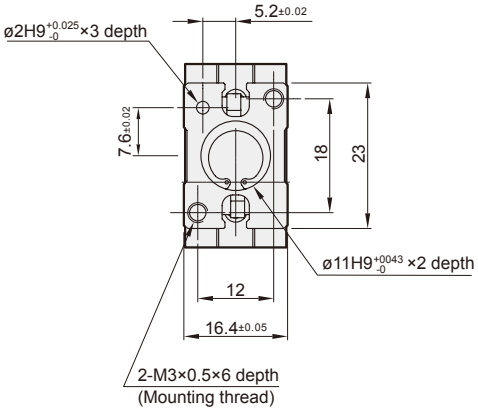
Finger position – Through hole

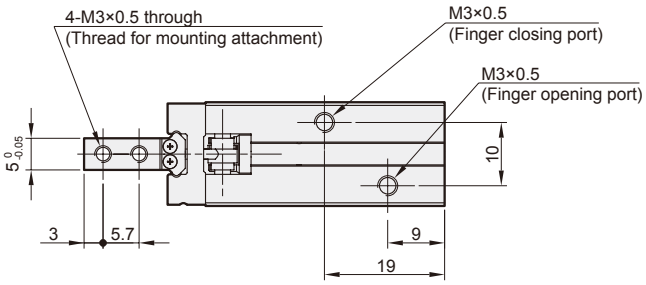
2 / N2





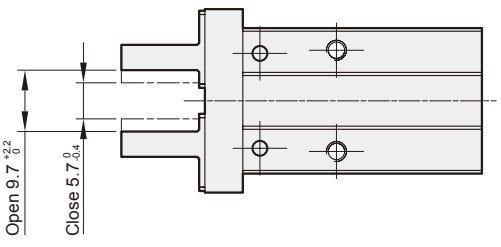






Finger position – Narrow type

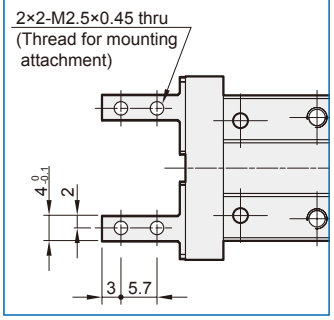
N



Finger position – Side tapped mounting

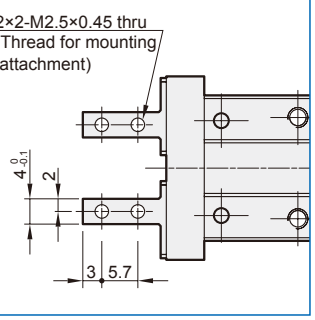
Standard

1



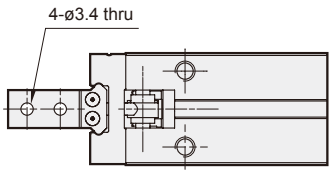
Narrow

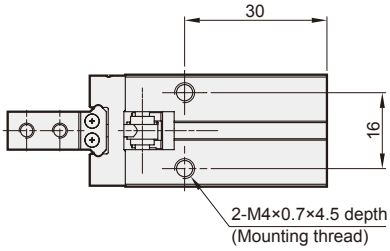
N1

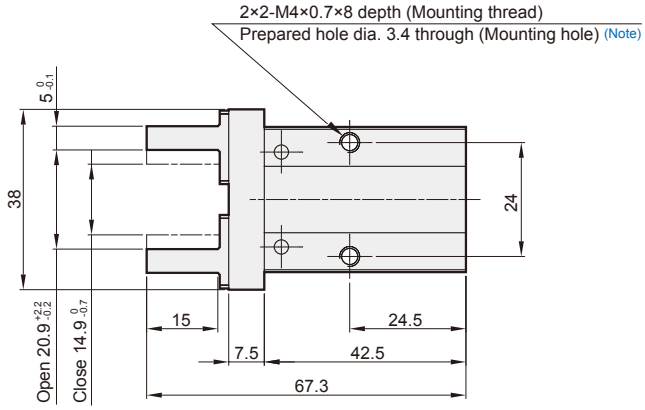


Finger position – Through hole

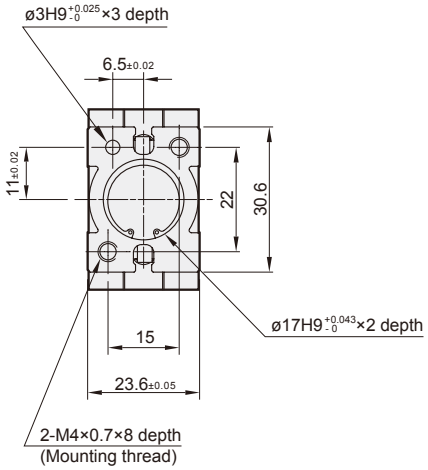
2 / N2

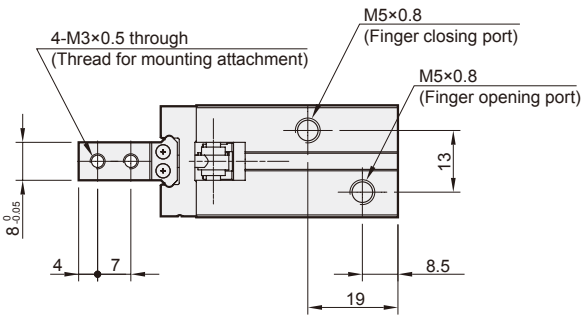






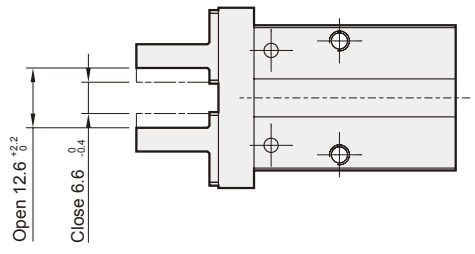
Note. Through-hole mounting is not possible when using the auto switch at the square groove.





Finger position – Narrow type

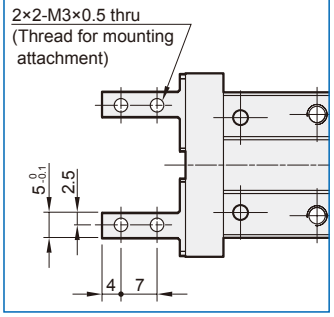
N



Finger position – Side tapped mounting

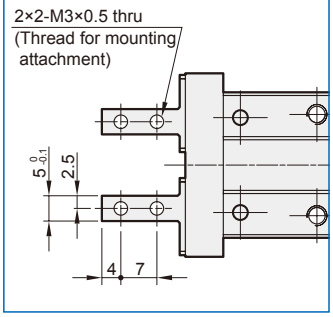
Standard

1



Narrow

N1

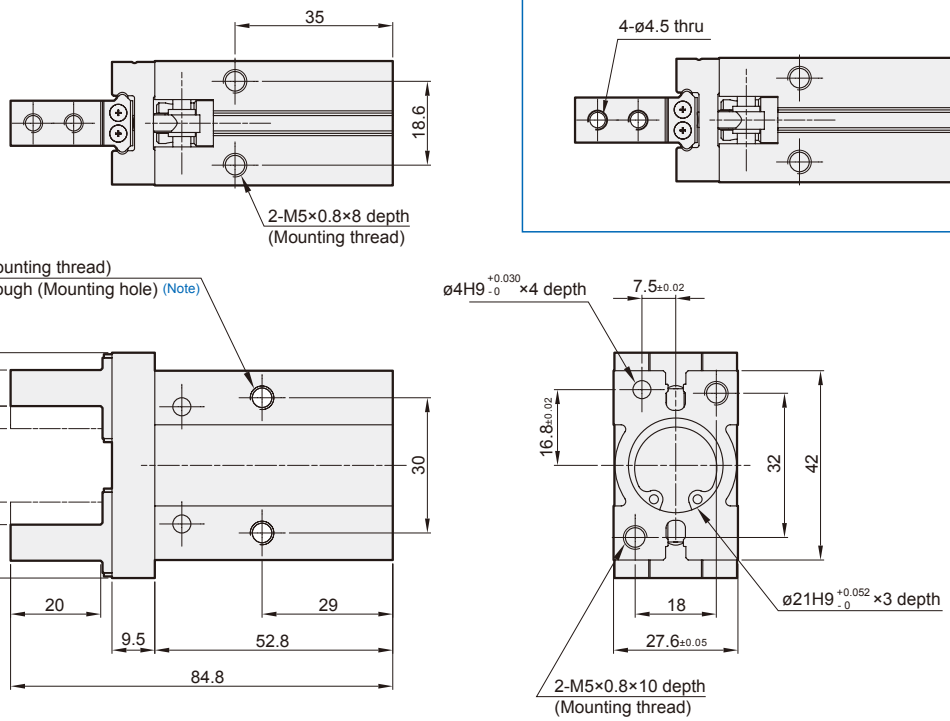


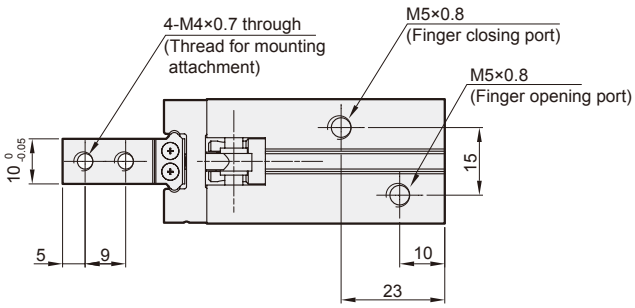
20-MCHC Dimensions ø20

PARALLEL GRIPPER (2-Finger)

Finger position – Through hole

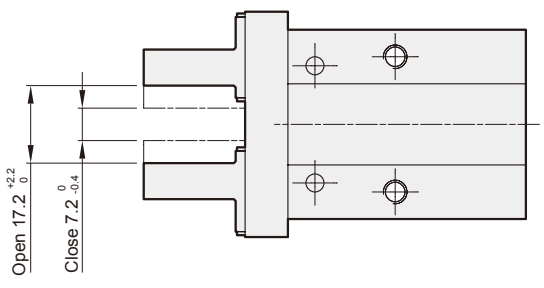
2 / N2





Finger position – Narrow type

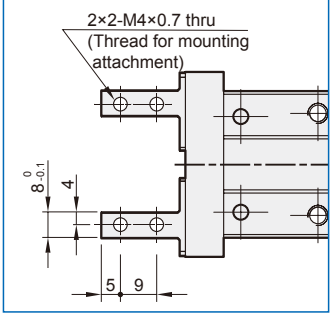
N



Finger position – Side tapped mounting

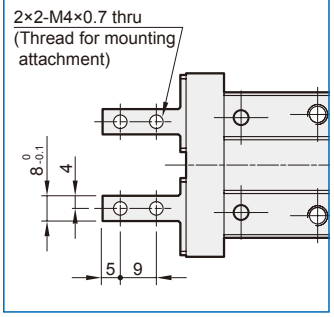
Standard

1



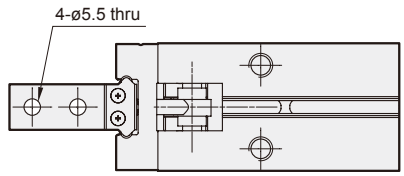
Narrow

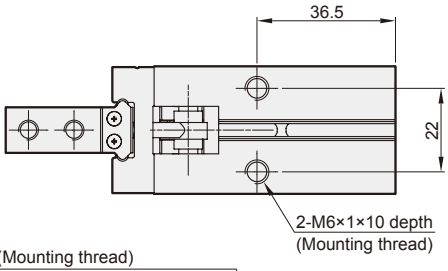
N1

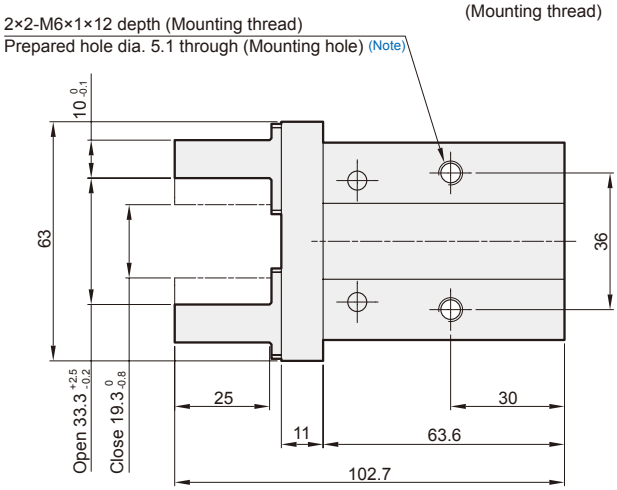


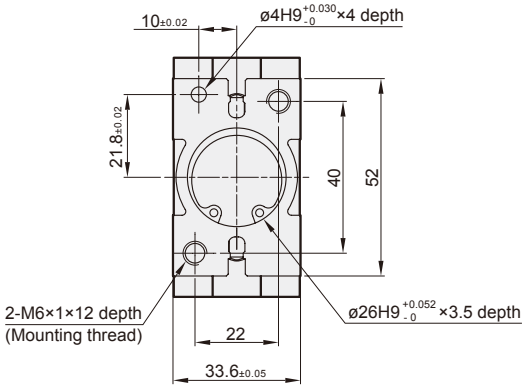
Finger position – Through hole

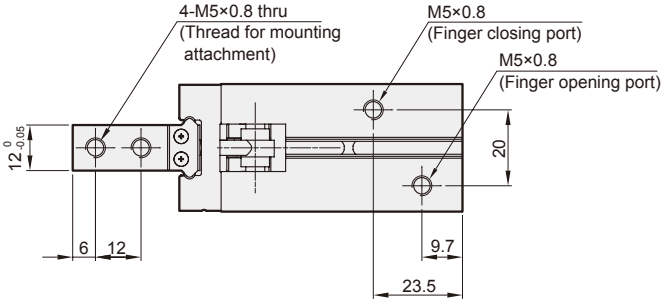
2 / N2





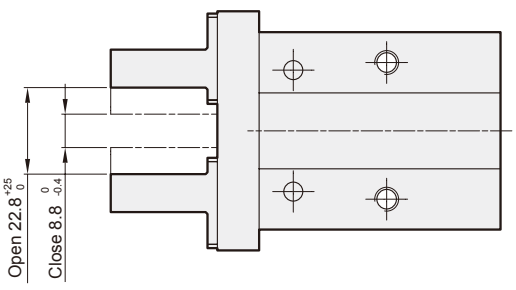






Finger position – Narrow type

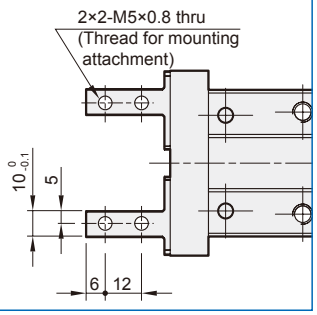
N



Finger position – Side tapped mounting

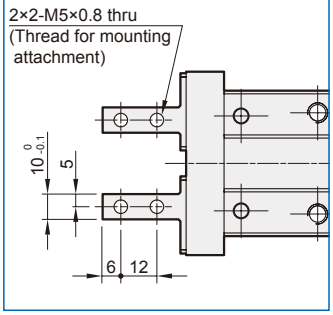
Standard

1



Narrow

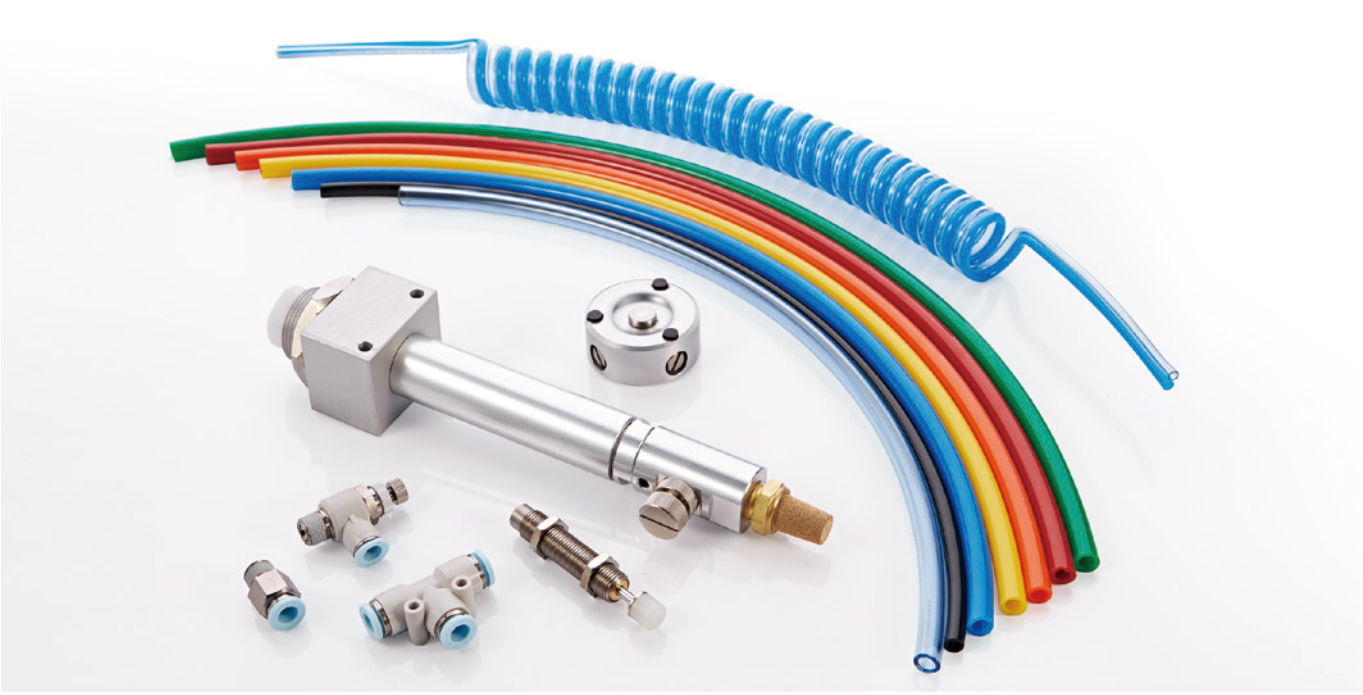
N1



MEMO

NOTE

AUXILIARY EQUIPMENT



Sensor switch

R**
- R*B / R*BE 4-2
- R*E / R*EE 4-3
- RCE1 / R*E1E 4-4
- R*M / R*ME 4-5
- RDEP 4-7
- R*F / R*FE 4-8
- R*GV 4-10

Circular connector

M8
- M83 / M84 4-11

Shock absorbers

20-MA*
- 20-MAC / 20-MAD / 20-MACD .. 4-12
- SC accessories 4-22
- Sizing formulas & Examples 4-23

PISCO® Product

Coupler

- SUS316 Stainless tube fitting 4-26
- SUS304 Stainless tube fitting 4-29

Control valve

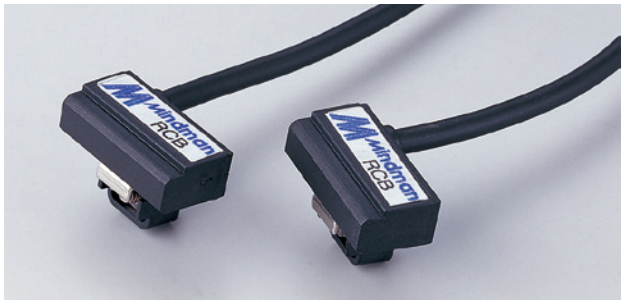
- Throttle valve (Needle valve) PP type 4-31

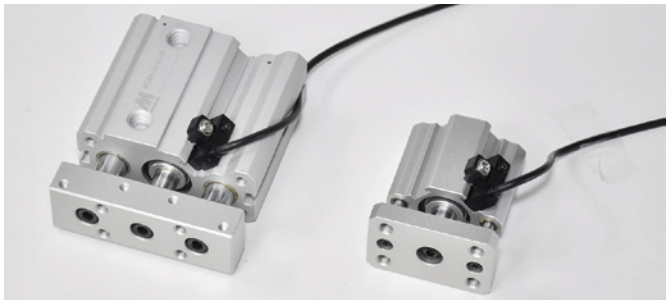
Tube

SFT/SET
- Fluororesin tube 4-32

RCB series

SENSOR SWITCH





Order example

RCB – □

MODEL

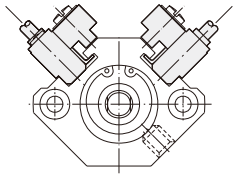
RCB: Reed switch
RDB: Non-contact
RNB: NPN
RNBE: NPN
RPB: PNP
RPBE: PNP

WIRE LENGTH

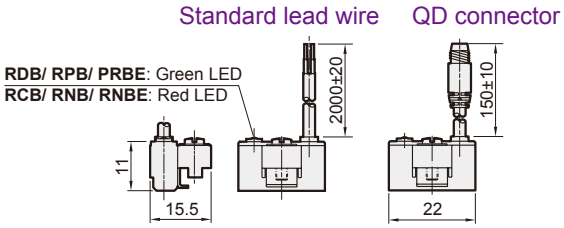
Blank: L=2000mm
1M: L=1000mm
QD: M8, 3 Pin connector
EQD: M8, 3 Pin connector

* Special order is available.

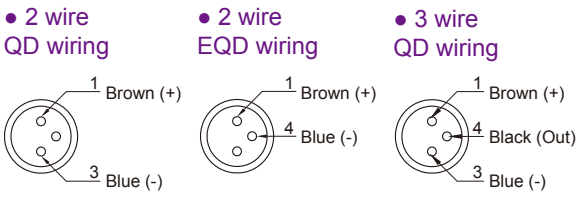
Assembling style

Cylinder type	**20-MCJQ**
Mounting clamp	

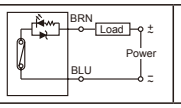
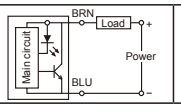
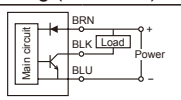
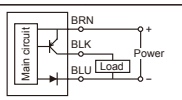
Dimension



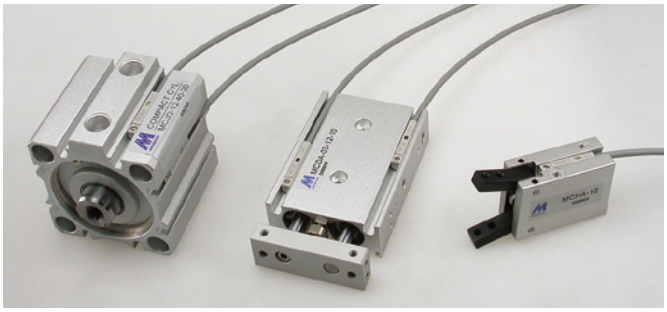
Wiring of the QD



Specification

Model	RCB	RDB	RNB	RNBE	RPB	RPBE
Wiring method	2 wire		3 wire			
Switching logic	SPST normally open	Solid state output, normally open				
Switch Type	Reed switch	Non-contact	NPN current sinking		PNP current sourcing	
Operating voltage	5~240V DC/AC	5~30V DC				
Switching current	100mA max.	50mA max.	200mA max.			
Switching rating(*1)	10W max.	1.5W max.	6W max.			
Current consumption	–		22 mA@24V DC max.	6 mA@24V DC max.	20 mA@24V DC max.	6 mA@24V DC max.
Voltage drop	3.5V max.	3.7V max.	0.5V max.			
Leakage current	–	0.1mA(40uA) max.	0.01mA max.			
Indicator	Red LED	Green LED	Red LED		Green LED	
Cable	ø3.3, 2C, PVC		ø3.3, 3C, PVC			
Temperature range	–10~+70°C (No freezing)					
Shock (*2)	30G	50G				
Vibration (*3)	9G					
Enclosure classification	IEC 60529 IP67					
Protection circuit (*4)	1	3,4				
Weight	33 g (2m cable)					
Connect diagram						

*1. Warning: Never exceed rating (watt=voltage×amperage). Permanent damage to sensor will occur.
*2. Sin wave / X.Y.Z. 3 directions / 3 times each direction / 11ms each time.
*3. Double amplitude 1.5mm / 10Hz~55Hz~10Hz(Sweep 1min) / X.Y.Z. 3 directions / 1 hour each time.
*4. 1=None / 2=Short-circuit / 3=Power source reverse polarity / 4=Surge suppression
*5. Caution for safety please refer to the page 5-3~4.



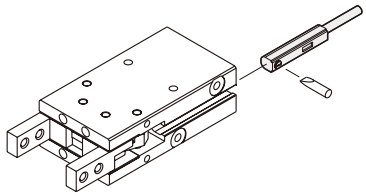
Order example
* Special order is available.

RCE — □

MODEL
RCE: Reed Switch
RDE: Non-contact
RDE-D: Non-contact, two indicators
RNE: NPN
RNEE: NPN
RPE: PNP
RPEE: PNP

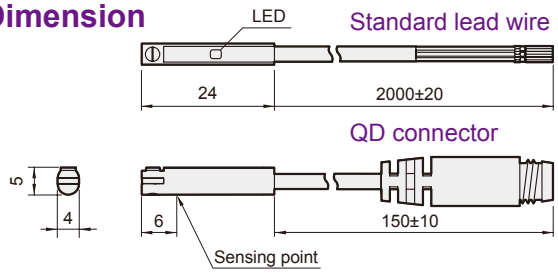
WIRE LENGTH
Blank: L=2000mm
1M: L=1000mm
QD: M8, 3 Pin connector
EQD: M8, 3 Pin connector

Assembling style

Cylinder type	**20-MCJQ, 20-MCFA, 20-MCGS, MCSS, 20-MCSS, 20-MCSH, 20-MCHA, 20-MCHB, 20-MCHC**
Mounting clamp	

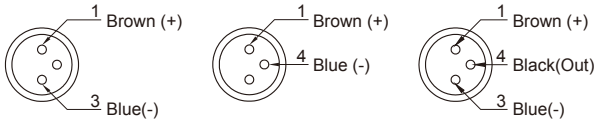
* **RDE** not applicable to **MCSS-6/8**, **20-MCSS-6/8**.

Dimension

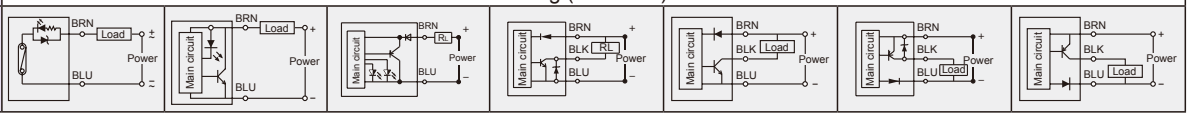


Wiring of the QD

● 2 wire QD wiring ● wire EQD wiring ● 3 wire QD wiring



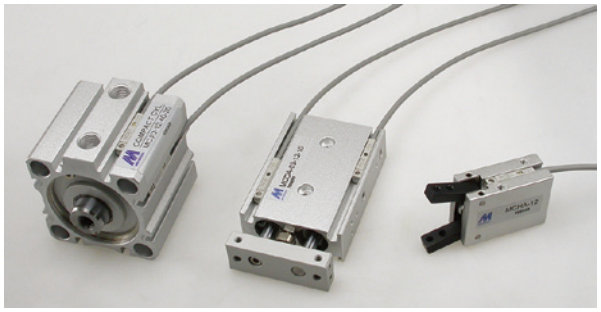
Specification

Model	RCE	RDE	RDE-D	RNE	RNEE	RPE	RPEE
Wiring method	2 wire			3 wire			
Switching logic	SPST normally open			Solid state output, normally open			
Switch Type	Reed switch	Non-contact		NPN current sinking		PNP current sourcing	
Operating voltage	5~220V DC/AC	10~28V DC		5~30V DC			
Switching current	50mA max.	50mA max.	80mA max.	50mA max.	200mA max.	50mA max.	200mA max.
Switching rating (*1)	10W max.	1.5W max.	2W max.	1.5W max.	6W max.	1.5W max.	6W max.
Current consumption	—			10 mA@24V DC max.	6 mA@24V DC max.	12 mA@24V DC max.	6 mA@24V DC max.
Voltage drop	3.5V max.		4V max.	0.5V max.		1.5V max.	0.5V max.
Leakage current	—	0.1mA max.	1mA max.	0.01mA max.			
Indicator (LED)	Red		Red/Green	Red		Green	
Cable	ø2.8,2C,PUR	ø2.8,2C,PUR		ø3, 3C, PU			
Temperature range	−10~+70°C (No freezing)						
Shock (*2)	30G	50G					
Vibration (*3)	9G						
Enclosure classification	IEC 60529 IP67						
Protection circuit (*4)	1	3,4	2,3,4	3,4			
Weight	20 g (2m cable)						
Connect diagram							

*1. Warning: Never exceed rating (watt=voltage×amperage). Permanent damage to sensor will occur.
*2. Sin wave / X.Y.Z. 3 directions / 3 times each direction / 11ms each time.
*3. Double amplitude 1.5mm / 10Hz~55Hz~10Hz(Sweep 1min) / X.Y.Z. 3 directions / 1 hour each time.
*4. 1=None / 2=Short-circuit / 3=Power source reverse polarity / 4=Surge suppression
*5. Caution for safety please refer to the page 5-3~4.

RCE1 series

SENSOR SWITCH



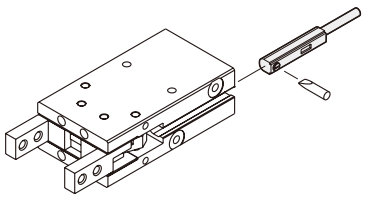
Order example

* Special order is available.

RCE1 — □

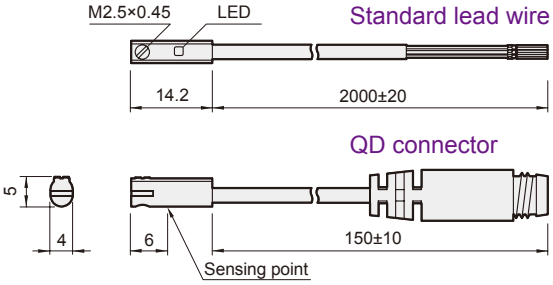
MODEL	WIRE LENGTH
RCE1: Reed Switch	Blank: L=2000mm
RDE1E: Non-contact	**1M**: L=1000mm
RNE1E: NPN	**QD**: M8, 3 Pin connector
RPE1E: PNP	**EQD**: M8, 3 Pin connector

Assembling style

Cylinder type	**20-MCJQ, 20-MCFA, 20-MCGS, MCSS, 20-MCSS, 20-MCSH, 20-MCHA, 20-MCHB, 20-MCHC**
Mounting clamp	

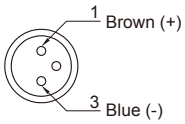
* **RDE1E** not applicable to **MCSS-6/8**, **20-MCSS-6/8**.

Dimension

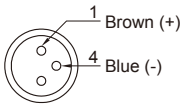


Wiring of the QD

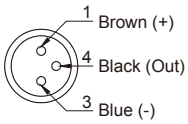
● 2 wire QD wiring



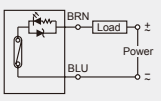
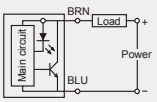
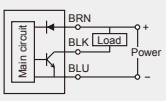
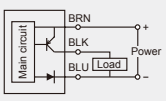
● 2 wire EQD wiring



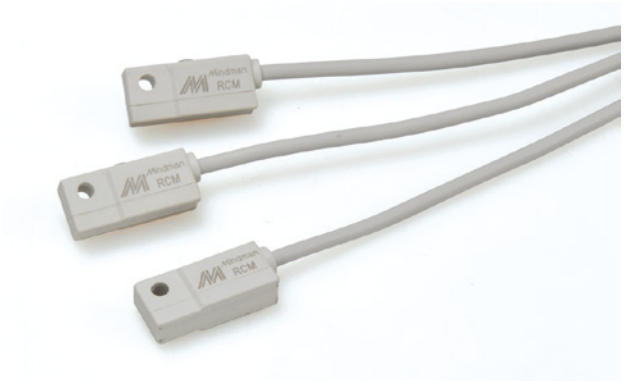
● 3 wire QD wiring



Specification

Model	RCE1	RDE1E	RNE1E	NPE1E
Wiring method	2 wire		3 wire	
Switching logic	Solid state output, normally open			
Switch Type	Reed switch	Non-contact	NPN current sinking	PNP current sourcing
Operating voltage	5~120V DC/AC	5~30V DC		
Switching current	100mA max.	50mA max.	80mA max.	
Switching rating (*1)	10W max.	1.5W max.	2.2W max.	
Current consumption	—		10 mA@24V DC max.	
Voltage drop	3.5V max.		0.5V@50mA max.	
Leakage current	—	0.1mA(40uA) max.	0.01mA max.	
Indicator (LED)	Red			
Cable	ø2.8,2C,PU	ø2.6,2C,PVC	ø2.6,3C,PVC	
Temperature range	−10~+70°C (No freezing)			
Shock (*2)	30G	50G		
Vibration (*3)	9G			
Enclosure classification	IEC 60529 IP67			
Protection circuit (*4)	1	3,4		
Weight	20 g (2m cable)			
Connect diagram				

*1. Warning: Never exceed rating (watt=voltage×amperage). Permanent damage to sensor will occur.
*2. Sin wave / X.Y.Z. 3 directions / 3 times each direction / 11ms each time.
*3. Double amplitude 1.5mm / 10Hz~55Hz~10Hz(Sweep 1min) / X.Y.Z. 3 directions / 1 hour each time.
*4. 1=None / 2=Short-circuit / 3=Power source reverse polarity / 4=Surge suppression
*5. Caution for safety please refer to the page 5-3~4.



Order example

RCM — □ — BM16

MODEL
RCM: Reed switch
RDM: Non-contact
RNM: NPN
RNME: NPN
RPM: PNP
RPME: PNP

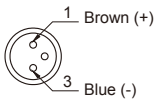
WIRE LENGTH
Blank: L=2000mm
1M: L=1000mm
QD: M8, 3 Pin connector
EQD: M8, 3 Pin connector

SWITCH BAND
BM
BMG

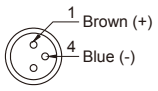
TUBE I.D.
6, 10, 16, 20, 25, 32, 40, 50, 63, 80, 100

Wiring of the QD

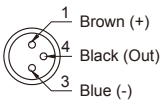
● 2 wire QD wiring



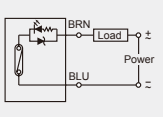
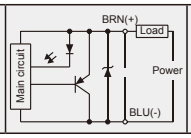
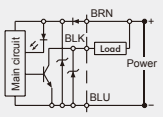
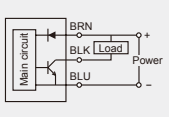
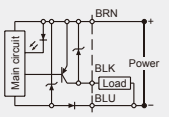
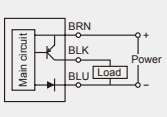
● 2 wire EQD wiring



● 3 wire QD wiring



Specification

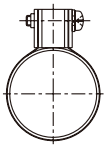
Model	RCM	RDM	RNM	RNME	RPM	RPME
Wiring method	2 wire		3 wire			
Switching logic	SPST N.O.	Solid state output, normally open				
Switch Type	Reed switch	Non-contact	NPN current sinking		PNP current sourcing	
Operating voltage	5~240V DC/AC	10~30V DC	5~28V DC	5~30V DC	5~28V DC	5~30V DC
Switching current	100mA max.	50mA max.	50mA max.	200mA max.	50mA max.	200mA max.
Switching rating (*1)	10W max.	1.5W max.	1.5W max.	6W max.	1.5W max.	6W max.
Current consumption	—		10 mA@24V DC max.	6 mA@24V DC max.	10 mA@24V DC max.	6 mA@24V DC max.
Voltage drop	3.5V max.	3.7V max.	1.5V max.	0.5V max.	1.5V max.	0.5V max.
Leakage current	—	0.1mA max.	0.01mA max.			
Indicator	Red LED				Green LED	
Cable	ø3.3, 2C, PVC		ø3.3, 3C, PVC			
Temperature range	–10~+70°C (No freezing)					
Shock (*2)	30G	50G				
Vibration (*3)	9G					
Enclosure classification	IEC 60529 IP67					
Protection circuit (*4)	1	3,4				
Weight	33 g (2m cable)					
Connect diagram						

* 1. Warning: Never exceed rating (watt=voltage×amperage). Permanent damage to sensor will occur.
* 2. Sin wave / X.Y.Z. 3 directions / 3 times each direction / 11ms each time.
* 3. Double amplitude 1.5mm/10Hz~55Hz~10Hz(Sweep 1min)/X.Y.Z. 3 directions/1 hour each time.
* 4. 1=None / 2=Short-circuit / 3=Power source reverse polarity / 4=Surge suppression.
* 5. Caution for safety please refer to page 5-3~4.

RCM Assembling style / Dimensions

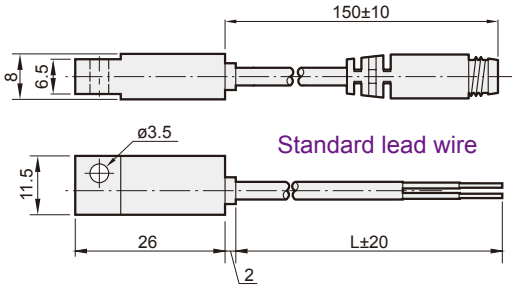
SENSOR SWITCH

Assembling style

Picture	Model / Band & Tube I.D.		20-MCMB	20-MCMJ
	BM6	6		●
	BM10	10		●
	BM16	16		●
	BM20	20	●	
	BM25	25	●	
	BM32	32	●	
	BM40	40	●	

Dimension

QD connector



Application environment

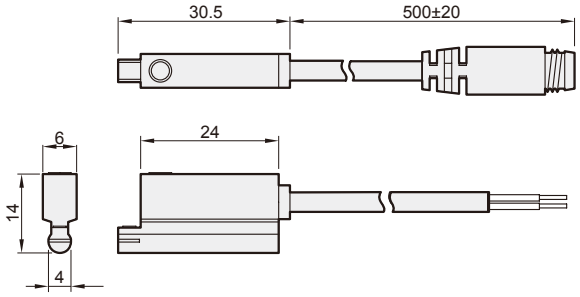
- **RDEP** can be applied in the strong magnetic field environment such as automotive manufacturing or areas near welding machine.
- When **RDEP** detects the magnetic AC field (50 or 60Hz) it will keep the status of output and will not be effected.

Order example

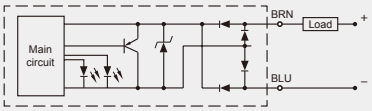
RDEP — □

MODEL: WIRE LENGTH
Blank: 3000mm
QD: M12, 4 Pin connector

Dimension



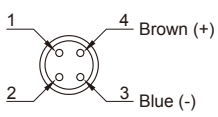
Specification

Model	RDEP
Wiring method	2 wire
Switching logic	Solid state output, normally open
Switch type	Current sourcing
Operating voltage	10~28V DC
Switching current	5~50mA max.
Switching rating (*1)	1.5W max.
Current consumption	—
Voltage drop	5V max.
Leakage current	1mA max.
Indicator (Sensing range)	Red LED: Unstable; Green LED: Stable
Cable	ø4.8, 2C, PVC
Temperature range	-10°C~+60°C (No freezing)
Shock (*2)	50G
Vibration (*3)	9G
Enclosure classification	IEC 60529 IP67
Protection circuit (*4)	3, 4
Weight	100 g (3m cable)
Connect diagram	

*1. Warning: Never exceed rating (watt=voltage×amperage). Permanent damage to sensor will occur.
*2. Sin wave / X.Y.Z. 3 directions / 3 times each direction / 11ms each time.
*3. Double amplitude 1.5mm / 10Hz~55Hz~10Hz(Sweep 1min) / X.Y.Z. 3 directions / 1 hour each time.
*4. 1=None / 2=Short-circuit / 3=Power source reverse polarity / 4=Surge suppression
*5. Caution for safety please refer to page 5-3~4 .

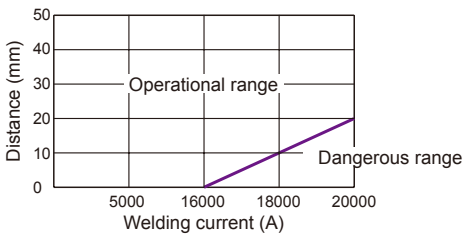
Wiring of the QD

- 2 wire

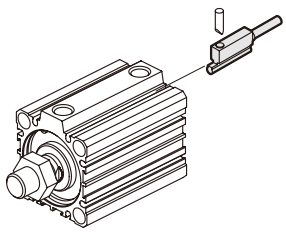


Weld-field immune

The operational distance can be 0mm between sensor and welding gun (welding conductor or cable) when the welding current less than 16000A.



Assembling style

Cylinder type	20-MCJQ, 20-MCFA, 20-MCGS, MCSS, 20-MCSS, 20-MCSH
Mounting clamp	

RDF series

SENSOR SWITCH

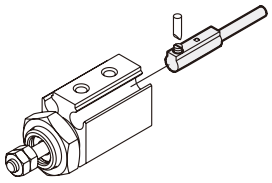
Order example

* Special order is available.

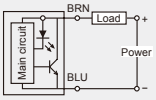
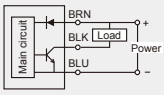
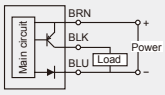
RDF V — □

- MODEL
  - **RDF**: Non-contact
  - **RDFE**: Non-contact
  - **RNF**: NPN
  - **RNFE**: NPN
  - **RPF**: PNP
  - **RPFE**: PNP
- AUTO SWITCH TYPE
  - Blank: Straight cable
  - **V**: Angle cable
- WIRE LENGTH
  - Blank: L=2000mm
  - **1M**: L=1000mm
  - **QD**: M8 3PIN connector
  - **EQD**: M8, 3 Pin connector

Assembling style

Cylinder type	20-MCFB, 20-MCMJP, 20-MCRQ, 20-MCRQ-S,
Mounting clamp	

Specification

Model	RDF	RDFE	RNF	RNFEV	RPF	RPFE
Wiring method	2 wire		3 wire			
Switching logic	Solid state output, Normally open					
Switch Type	Non-contact		NPN current sinking		PNP current sourcing	
Operating voltage	10~28V DC	5~30V DC	4.5~28V DC	5~30V DC	4.5~28V DC	5~30V DC
Switching current	4~20mA max.	50mA max.				
Contact rating(*1)	0.6W max.	1.5W max.				
Current consumption	—		10mA @24V DC max.			
Voltage drop	3.5V max.		0.5V @ 50mA max.			
Leakage current	0.8mA max.	0.1mA(40uA) max.	0.01mA max.			
Indicator	Red LED					
Cable	ø2.6, 2C, PVC		ø2.6, 3C, PVC			
Temperature range	–10~+70°C (No freezing)					
Shock (*2)	50G					
Vibration (*3)	9G					
Enclosure classification	IEC 60529 IP67					
Protection circuit (*4)	4	3, 4				
Weight	12.8 g (1m cable) / 23.8 g (2m cable)					
Connect diagram						

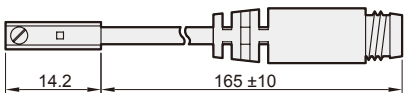
*1. Warning: Never exceed rating (watt=voltage×amperage). Permanent damage to sensor will occur.
*2. Sin wave / X.Y.Z. 3 directions / 3 times each direction / 11ms each time.
*3. Double amplitude 1.5mm / 10Hz~55Hz~10Hz(Sweep 1min) / X.Y.Z. 3 directions / 1 hour each time.
*4. 1=None / 2=Short-circuit / 3=Power source reverse polarity / 4=Surge suppression

*5. Caution for safety please refer to page 5-3~4.

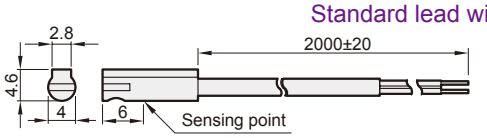
Dimension

Straight cable

QD connector

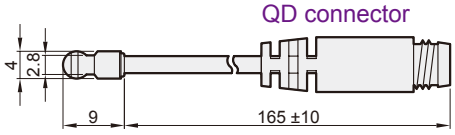


Standard lead wire

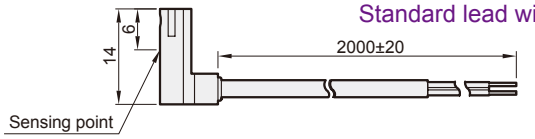


Angle cable

QD connector

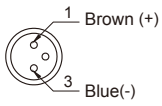


Standard lead wire

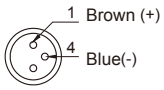


Wiring of the QD

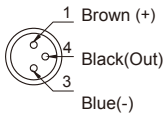
● 2 wire
QD wiring



● 2 wire
EQD wiring



● 3 wire
QD wiring



RDGV series

SENSOR SWITCH

Order example

RDGV — □

AUTO SWITCH TYPE
V: Angle cable

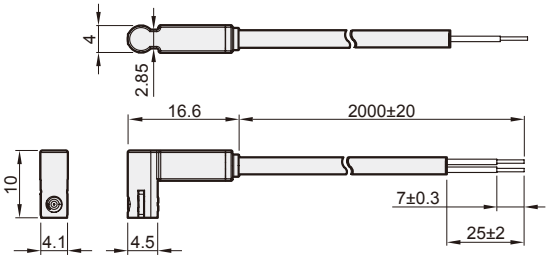
SWITCH TYPE
D: Non-contact
N: NPN
P: PNP

WIRE LENGTH
Blank: L=2000mm
1M: L=1000mm
QD: M8, 3 Pin connector
EQD: M8, 3 Pin conncetor

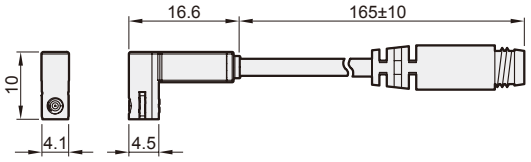
* Special order is available.

Dimension

RDGV / RNGV / RPGV

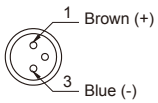


RDGV-QD / RNGV-QD / RPGV-QD

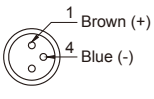


Wiring of the QD

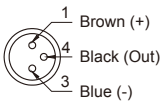
● 2 wire
QD wiring



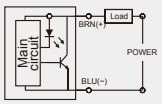
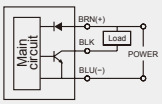
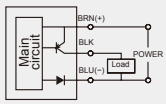
● 2 wire
EQD wiring



● 3 wire
QD wiring

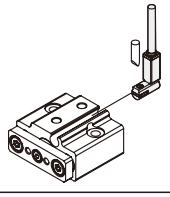


Specification

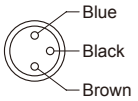
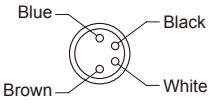
Model	RDGV	RNGV	RPGV
Wiring method	2 wire	3 wire	
Switching logic	Solid state output, Normally open		
Switch type	—	NPN current sinking	PNP current sourcing
Operating voltage	10~28V DC	5~28V DC	
Switching current	4~20mA max.	50mA max.	
Contact rating (*1)	0.6W max.	1.5W max.	
Current consumption	—	10mA @24V DC max.	
Voltage drop	3.5V max.	0.5V @ 50mA max.	
Leakage current	0.8mA max.	0.01mA max.	
Indicator	Red LED		
Cable	ø2.6, 2C, PVC	ø2.6, 3C, PVC	
Temperature range	–10°C~+70°C (No freezing)		
Shock (*2)	50G		
Vibration (*3)	9G		
Enclosure classification	IEC 60529 IP67		
Protection circuit (*4)	4	3, 4	
Weight	23 g (2m cable)		
Connect diagram			

* 1. Warning: Never exceed rating (watt=voltage×amperage). Permanent damage to sensor will occur.
* 2. Sin wave / X.Y.Z. 3 Directions / 3 Times each direction / 11ms each time.
* 3. Double amplitude 1.5mm / 10Hz~55Hz~10Hz(Sweep 1min) /X.Y.Z. 3 Directions / 1 Hour each time.
* 4. 1=None / 2=Short-circuit / 3=Power source reverse polarity / 4=Surge suppression.
* 5. Caution for safety please refer to page 10-3~4.

Assembling style

Cylinder type	20-MCFB, 20-MCMJP, 20-MCGS
Mounting clamp	

Specification

Model	M83R / M83RL		M84R / M84RL	
Female pin out				
Number of contacts	3		4	
Rated voltage	60V DC/AC			
Rated current	3A			
Contact material	Gold plated brass			
Contact bearer material	PA			
Housing material	PP			
Housing color	Black			
Cable material	ø4.5, PVC	ø4.5, PUR	ø4.5, PVC	ø4.5, PUR
Cable color	Gray	Black	Gray	Black
Temperature	-20°C~+80°C (No freezing)			
Cable conductor	24AWG			
Protection class	IEC60529 IP 67			

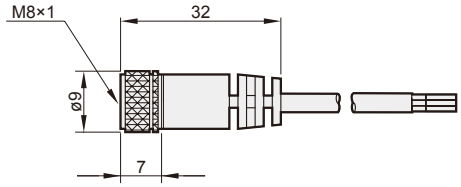
Order example

M83R — PVC — □

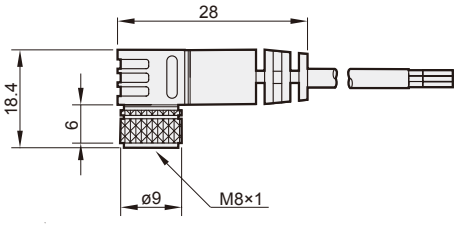
- MODEL
  - **M83**: M8, 3 Pin
  - **M84**: M8, 4 Pin
- CONNECTOR SERIES
  - **R**: Straight
  - **RL**: 90° right angle
- CABLE MATERIAL
  - **PVC**: ø4.5 PVC cable
  - **PUR**: ø4.5 PUR cable
- CABLE LENGTH
  - Blank: 2000 mm
  - **3M**: 3000 mm
  - **5M**: 5000 mm

Dimension

● Straight (M83R/ M84R)



● 90° Right angle (M83RL/ M84RL)



20-MAC / 20-MAD series

SHOCK ABSORBERS

Order example

20 — MAC — 0806 — 1 — □

- 20 — MATERIAL RESTRICTIONS (Secondary battery)
- MAC — **MAD**: Adjustable; **MAC**: Non-adjustable; **MACD**: Double cushion
- 0806 — TUBE O.D. (mm) / STROKE (mm)
- 1 — Select damping constant from graph
  - **1**: Hight impact speed
  - **2**: Medium impact speed
  - **3**: Low impact speed
  - **S**: AC-S series
  - **K**: AC-K series
- □ — Blank: With impact head; **N**: Without impact head

Why do we need shock absorbers?

The simplest method to increase productivity is to raise machine operation speed. It often accompanies with excessive vibration and noise, damage to machines and products and decreasing in machine life. Most important of all, safety has to be sacrificed to a certain degree because of large shock forces generated.

MINDMAN shock absorbers are developed to provide linear deceleration and therefore solve these problems. They can stop or change direction of moving objects smoothly and quietly without any compromising in safety. MINDMAN shock absorbers are ideal for energy absorption and are being used whenever shock forces occur.

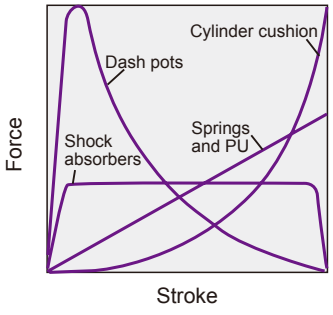
The advantages of using shock absorbers include

1. To increase production rate.
2. To extend machine life.
3. To simplify equipment design.
4. To reduce maintenance cost.
5. To reduce vibration and noise levels.

Comparison of shock absorbing of dash pots, rubber materials springs, cylinder cushion and shock absorbers

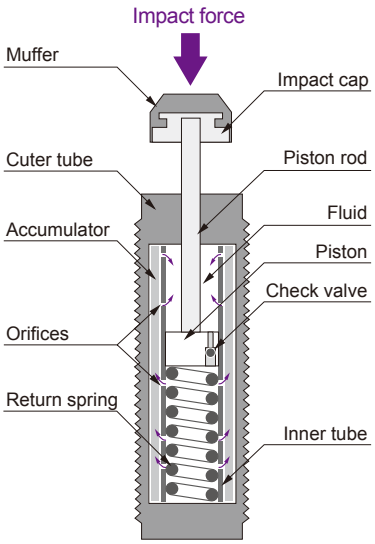
In case of MINDMAN shock absorbers compared with other buffering devices, such as spring, dash pots, air buffers, or rubber materials, resistant forces are different from one another. Only MINDMAN shock absorbers can stop a moving object smoothly and quietly from the beginning to the end of impact stroke. Figure 1 shows a scheme of comparing shock forces generated by different cushioning materials. Through special design of fluid metering system, MINDMAN shock absorbers can provide a constant resistant force or linear deceleration throughout the entire impact stroke, all the kinetic energy of the moving object is converted into heat and dissipated into the air.

Springs, air buffers and rubber materials only dissipate a small portion of the kinetic energy and store the remaining in elastic energy form. Therefore, large resistant forces and rebounding forces are inevitable near the end of the impact stroke. Without a delicate metering system, a dash pot will produce a large peak force at the beginning of the impact stroke.



Operating principles of shock absorbers

All series of MINDMAN shock absorbers are of such construction as shown in the following drawing. On impact the piston rod moves into the shock absorber and the hydraulic fluid is pushes into accumulator to produce resistant force. Owing to special spacing and sizing of orifices, the pressure in the inner tube remains constant throughout the entire impact stroke. By providing a linear deceleration, a MINDMAN shock absorber brings the impacting object to stop smoothly and quiet. At the end of the impact stroke, the return spring pushes the piston to its original piston for next cycle.



Considerations for selecting shock a absorbers

1. Moving direction. (in horizontal, free fall or rotary motion)
2. Total weight of impacting object.
3. Propelling force. (pneumatic / hydraulic cylinder, motor etc.)
4. Impact Velocity.
5. Number of impact per hour.
6. Applicable quantity of shock absorbers in impacting direction.

Functions of hydraulic shock absorbers

1. Eliminating vibration and absorbing striking energy in a short time.
2. Reducing operating noise and offering a quiet working environment.
3. Accelerating machine operation and elevating production capacity.
4. Extending machine life time and reducing after sale service.
5. Improving quailty of products.

Applications

Robots for plastic injection moulding machine, pick and place robots, feeding equipment, screen print machines, conveyors, air cylinders, vibration conveyor systems, rolling doors, medical equipment, foundry industries, rodless cylinders, package machines, machine tools, rubber/ plastic machines, woodworking machines, aircraft industries, military equipment, education researches and automotive transfer lines.

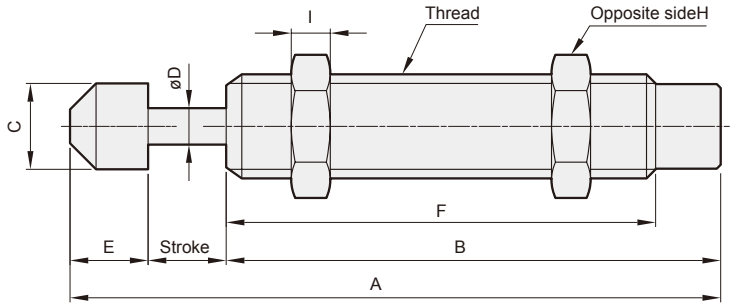
* Customer's own specification is welcome.
* The specifications are subject to change without advance notice.

20-MAC series
Mini type - M8, M10, M12

Our miniature shock absorbers 20-MAC Series- M8, M10, M12 provide great effect for shock impact and come to stop smoothly and are Ideal for light loads.

Specification

Model	Stroke (mm)	Max. Nm per cycle (Nm)	Max. Nm per hour (Nm)	Max. effective mass (kg)	Max. impact speed (m/s)	Without impact head	With impact head	Operating temp. (°C) (No freezing)	Stop collar (SC)
20-MAC-0806-1	6	2	8800	0.5	2.0	○	○	-10~+80	SC-08
20-MAC-0806-2	6	2	8800	2	1.0	○	○	-10~+80	SC-08
20-MAC-0806-3	6	2	8800	6	0.5	○	○	-10~+80	SC-08
20-MAC-1005-1	5	3	10800	1	3.0	○	○	-10~+80	SC-10
20-MAC-1005-2	5	3	10800	3	1.5	○	○	-10~+80	SC-10
20-MAC-1005-3	5	3	10800	7	0.8	○	○	-10~+80	SC-10
20-MAC-1008-1	8	4	15200	2	3.0	○	○	-10~+80	SC-10
20-MAC-1008-2	8	4	15200	4	1.5	○	○	-10~+80	SC-10
20-MAC-1008-3	8	4	15200	9	0.8	○	○	-10~+80	SC-10
20-MAC-1210-1	10	5	17640	5	3.0	○	○	-10~+80	SC-12
20-MAC-1210-2	10	5	17640	10	1.5	○	○	-10~+80	SC-12
20-MAC-1210-3	10	5	17640	30	0.8	○	○	-10~+80	SC-12



Dimensions

Model	Thread	Stroke (mm)	A	B	C	D	E	F	H	I	Weight (g)
20-MAC-0806-1	M8×1.0/0.75	6	50	38	6.6	3	6	33	11	3	11
20-MAC-0806-2	M8×1.0/0.75	6	50	38	6.6	3	6	33	11	3	11
20-MAC-0806-3	M8×1.0	6	50	38	6.6	3	6	33	11	3	11
20-MAC-1005-1	M10×1.0	5	38.7	27.7	8.6	2.8	6	22.9	12.7	3	14
20-MAC-1005-2	M10×1.0	5	38.7	27.7	8.6	2.8	6	22.9	12.7	3	14
20-MAC-1005-3	M10×1.0	5	38.7	27.7	8.6	2.8	6	22.9	12.7	3	14
20-MAC-1008-1	M10×1.0	8	57	43	8.6	3	6	38	12.7	3	20
20-MAC-1008-2	M10×1.0	8	57	43	8.6	3	6	38	12.7	3	20
20-MAC-1008-3	M10×1.0	8	57	43	8.6	3	6	38	12.7	3	20
20-MAC-1210-1	M12×1.0	10	69.5	50	10.3	3	9.5	45.5	14	4	31.5
20-MAC-1210-2	M12×1.0	10	69.5	50	10.3	3	9.5	45.5	14	4	31.5
20-MAC-1210-3	M12×1.0	10	69.5	50	10.3	3	9.5	45.5	14	4	31.5

20-MAC Self compensation

SHOCK ABSORBERS

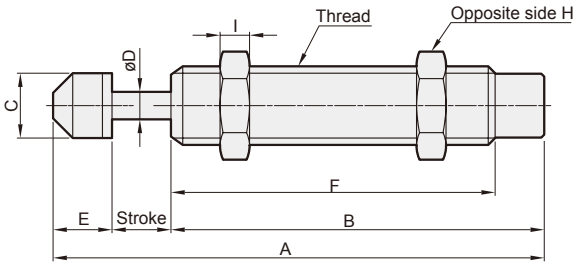
20-MAC series

Porous fixed type - M14, M20

20-MAC series is of fixed structure. Through special design and experimented oil hole and arrange method, linear deceleration on the object in motion is achieved. From high speed light load to low speed heavy load, appropriate energy can be absorbed without any adjustment. After the load is removed, reset spring will push the axie center to its original location. For 20-MAC series, it has three models of high speed, medium speed and low speed to satisfy your different needs.

Specification

Model	Stroke (mm)	Max. Nm per cycle (Nm)	Max. Nm per hour (Nm)	Max. effective mass (kg)	Max. impact speed (m/s)	Without impact head	With impact head	Operating temp. (°C) (No freezing)	Stop collar (SC)
20-MAC-1412-1	12	15	30000	8	3.0	○	○	-10~+80	SC-14
20-MAC-1412-2	12	15	30000	50	1.5	○	○	-10~+80	SC-14
20-MAC-1412-3	12	15	30000	100	0.8	○	○	-10~+80	SC-14
20-MAC-1416-1	16	20	35000	10	3.0	○	○	-10~+80	SC-14
20-MAC-1416-2	16	20	35000	70	1.5	○	○	-10~+80	SC-14
20-MAC-1416-3	16	20	35000	150	0.8	○	○	-10~+80	SC-14
20-MAC-1420-1	20	20	35000	10	3.0	○	○	-10~+80	SC-14
20-MAC-1420-2	20	20	35000	70	1.5	○	○	-10~+80	SC-14
20-MAC-1420-3	20	20	35000	150	0.8	○	○	-10~+80	SC-14
20-MAC-1425-1	25	28	37000	20	3.0	○	○	-10~+80	SC-14
20-MAC-1425-2	25	28	37000	150	1.5	○	○	-10~+80	SC-14
20-MAC-1425-3	25	28	37000	250	0.8	○	○	-10~+80	SC-14
20-MAC-2020-1	20	40	40000	30	3.5	○	○	-10~+80	SC-20
20-MAC-2020-2	20	40	40000	200	2.0	○	○	-10~+80	SC-20
20-MAC-2020-3	20	40	40000	700	1.0	○	○	-10~+80	SC-20
20-MAC-2030-1	30	50	48000	30	3.5	○	○	-10~+80	SC-20
20-MAC-2030-2	30	50	48000	200	2.0	○	○	-10~+80	SC-20
20-MAC-2030-3	30	50	48000	700	1.0	○	○	-10~+80	SC-20



Dimensions

Model	Thread	Stroke (mm)	A	B	C	D	E	F	H	I	Weight (g)
20-MAC-1412-1	M14×1.0/1.5	12	99.2	76	12	4	11.2	67	19	5	80
20-MAC-1412-2	M14×1.0/1.5	12	99.2	76	12	4	11.2	67	19	5	80
20-MAC-1412-3	M14×1.0/1.5	12	99.2	76	12	4	11.2	67	19	5	80
20-MAC-1416-1	M14×1.0/1.5	16	122.2	95	12	4	11.2	86	19	5	85
20-MAC-1416-2	M14×1.0/1.5	16	122.2	95	12	4	11.2	86	19	5	85
20-MAC-1416-3	M14×1.0/1.5	16	122.2	95	12	4	11.2	86	19	5	85
20-MAC-1420-1	M14×1.5	20	126.2	95	12	4	11.2	86	19	5	95
20-MAC-1420-2	M14×1.5	20	126.2	95	12	4	11.2	86	19	5	95
20-MAC-1420-3	M14×1.5	20	126.2	95	12	4	11.2	86	19	5	95
20-MAC-1425-1	M14×1.0/1.5	25	146.2	110	12	4	11.2	101	19	5	105
20-MAC-1425-2	M14×1.0/1.5	25	146.2	110	12	4	11.2	101	19	5	105
20-MAC-1425-3	M14×1.0/1.5	25	146.2	110	12	4	11.2	101	19	5	105
20-MAC-2020-1	M20×1.5/2.0	20	145.3	110	17.8	6	15.3	101	26	7	215
20-MAC-2020-2	M20×1.5	20	145.3	110	17.8	6	15.3	101	26	7	215
20-MAC-2020-3	M20×1.5	20	145.3	110	17.8	6	15.3	101	26	7	215
20-MAC-2030-1	M20×1.5/2.0	30	158.3	113	17.8	6	15.3	104	26	7	220
20-MAC-2030-2	M20×1.5/2.0	30	158.3	113	17.8	6	15.3	104	26	7	220
20-MAC-2030-3	M20×1.5	30	158.3	113	17.8	6	15.3	104	26	7	220

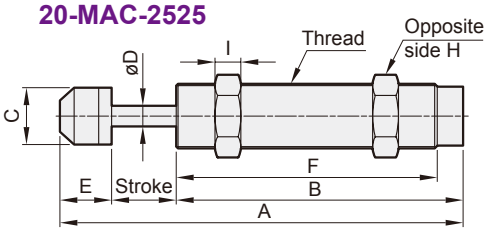
20-MAC series
Porous fixed type - M20, M25

Model M20, M25 are applicable for high impact and high effectiveness.

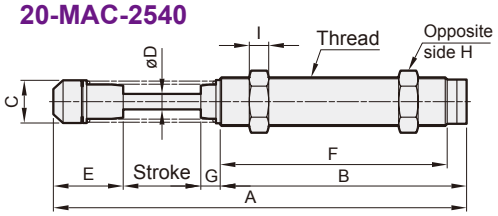
Specification

Model	Stroke (mm)	Max. Nm per cycle (Nm)	Max. Nm per hour (Nm)	Max. effective mass (kg)	Max. impact speed (m/s)	Without impact head	With impact head	Operating temp. (°C) (No freezing)	Stop collar (SC)
20-MAC-2050-1	50	60	60000	60	3.5	○	○	-10~+80	SC-20
20-MAC-2050-2	50	60	60000	400	2.0	○	○	-10~+80	SC-20
20-MAC-2050-3	50	60	60000	1200	1.0	○	○	-10~+80	SC-20
20-MAC-2525-1	25	80	54000	200	4.0	○	○	-10~+80	SC-25
20-MAC-2525-2	25	80	54000	800	2.5	○	○	-10~+80	SC-25
20-MAC-2525-3	25	80	54000	1500	1.0	○	○	-10~+80	SC-25
20-MAC-2540-1	40	120	75000	300	4.0	—	○	-10~+80	SC-25
20-MAC-2540-2	40	120	75000	1200	2.5	—	○	-10~+80	SC-25
20-MAC-2540-3	40	120	75000	2000	1.0	—	○	-10~+80	SC-25
20-MAC-2550-1	50	135	90000	200	4.0	○	○	-10~+80	SC-25
20-MAC-2550-2	50	135	90000	900	2.5	○	○	-10~+80	SC-25
20-MAC-2550-3	50	135	90000	1680	1.0	○	○	-10~+80	SC-25
20-MAC-2580-1	80	150	120000	150	4.0	○	○	-10~+80	SC-25
20-MAC-2580-2	80	150	120000	600	2.5	○	○	-10~+80	SC-25
20-MAC-2580-3	80	150	120000	1200	1.0	○	○	-10~+80	SC-25

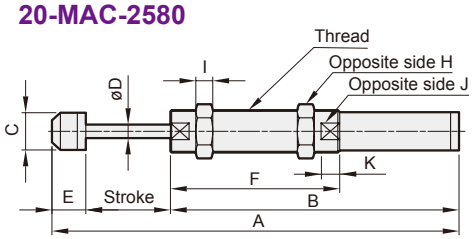
20-MAC-2050
20-MAC-2525



20-MAC-2540



20-MAC-2550
20-MAC-2580



Dimensions

Model	Thread	Stroke (mm)	A	B	C	D	E	F	G	H	I	J	K	Weight (g)
20-MAC-2050-1	M20×1.5/2.0	50	232.8	167	17.8	6	15.8	158	—	26	7	—	—	300
20-MAC-2050-2	M20×1.5	50	232.8	167	17.8	6	15.8	158	—	26	7	—	—	300
20-MAC-2050-3	M20×1.5	50	232.8	167	17.8	6	15.8	158	—	26	7	—	—	300
20-MAC-2525-1	M25×1.5/2.0	25	155	111	22	8	19	101	—	32	9	—	—	330
20-MAC-2525-2	M25×1.5/2.0	25	155	111	22	8	19	101	—	32	9	—	—	330
20-MAC-2525-3	M25×1.5/2.0	25	155	111	22	8	19	101	—	32	9	—	—	330
20-MAC-2540-1	M25×1.5/2.0	40	214	127	22	8	37	117	10	32	9	—	—	430
20-MAC-2540-2	M25×1.5/2.0	40	214	127	22	8	37	117	10	32	9	—	—	430
20-MAC-2540-3	M25×1.5/2.0	40	214	127	22	8	37	117	10	32	9	—	—	430
20-MAC-2550-1	M25×1.5/2.0	50	239.5	170.5	22	8	19	100	—	32	9	22.8	11	435
20-MAC-2550-2	M25×1.5/2.0	50	239.5	170.5	22	8	19	100	—	32	9	22.8	11	435
20-MAC-2550-3	M25×1.5/2.0	50	239.5	170.5	22	8	19	100	—	32	9	22.8	11	435
20-MAC-2580-1	M25×1.5/2.0	80	336	237	22	8	19	100	—	32	9	22.8	11	535
20-MAC-2580-2	M25×1.5/2.0	80	336	237	22	8	19	100	—	32	9	22.8	11	535
20-MAC-2580-3	M25×1.5/2.0	80	336	237	22	8	19	100	—	32	9	22.8	11	535

20-MAC Self compensation

SHOCK ABSORBERS

Specification

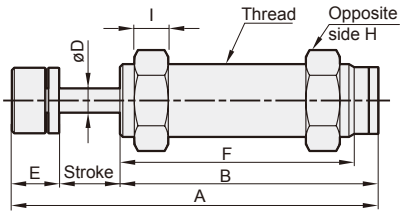
Model	Stroke (mm)	Max. Nm per cycle (Nm)	Max. Nm per hour (Nm)	Max. effective mass (kg)	Max. impact speed (m/s)	Without impact head	With impact head	Operating temp. (°C) (No freezing)	Stop collar (SC)
20-MAC-2725-1	25	80	54000	200	4.0	○	○	-10~+80	SC-27
20-MAC-2725-2	25	80	54000	800	2.5	○	○	-10~+80	SC-27
20-MAC-2725-3	25	80	54000	1500	1.0	○	○	-10~+80	SC-27
20-MAC-3025-1	25	180	60000	300	3.0	—	○	-10~+80	—
20-MAC-3025-2	25	180	60000	700	2.0	—	○	-10~+80	—
20-MAC-3025-3	25	180	60000	1300	1.0	—	○	-10~+80	—
20-MAC-3660-1	60	250	120000	400	4.0	—	○	-10~+80	SC-36
20-MAC-3660-2	60	250	120000	1500	2.5	—	○	-10~+80	SC-36
20-MAC-3660-3	60	250	120000	2400	1.0	—	○	-10~+80	SC-36

20-MAC series

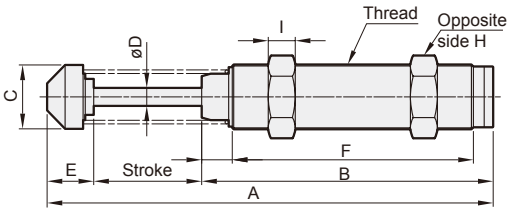
Porous fixed type - M27, M30, M36

20-MAC series is self-compensating, and ideal for energy absorption in high speed, medium speed and low speed impact. 20-MAC series can stop moving objects smoothly and quietly.

20-MAC-2725
20-MAC-3025



20-MAC-3660



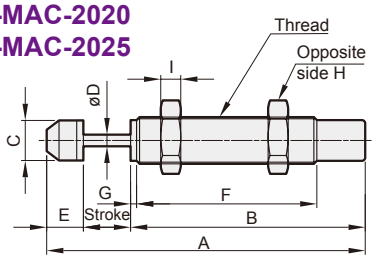
Dimensions

Model	Thread	Stroke (mm)	A	B	C	D	E	F	G	H	I	Weight (g)
20-MAC-2725-1	M27×1.5/3.0	25	155	111	22	8	19	101	—	32	9	380
20-MAC-2725-2	M27×1.5/3.0	25	155	111	22	8	19	101	—	32	9	380
20-MAC-2725-3	M27×1.5/3.0	25	155	111	22	8	19	101	—	32	9	380
20-MAC-3025-1	M30×1.5	25	151	106.5	27	10	19.5	96.5	—	36	14	950
20-MAC-3025-2	M30×1.5	25	151	106.5	27	10	19.5	96.5	—	36	14	950
20-MAC-3025-3	M30×1.5	25	151	106.5	27	10	19.5	96.5	—	36	14	950
20-MAC-3660-1	M36×1.5	60	248	162	35.5	10	26	134	17	46	15	1030
20-MAC-3660-2	M36×1.5	60	248	162	35.5	10	26	134	17	46	15	1030
20-MAC-3660-3	M36×1.5	60	248	162	35.5	10	26	134	17	46	15	1030

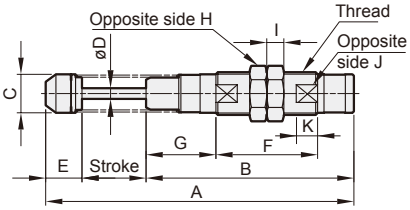
Specification

Model	Stroke (mm)	Max. Nm per cycle (Nm)	Max. Nm per hour (Nm)	Max. effective mass (kg)	Max. impact speed (m/s)	Without impact head	With impact head	Operating temp. (°C) (No freezing)	Stop collar (SC)
20-MAC-1415-6K	15	9.8	35280	30	1.0	—	○	-10~+80	SC-14
20-MAC-1415-7K	15	9.8	35280	15	1.5	—	○	-10~+80	SC-14
20-MAC-2020-2K	20	36	22000	27	2.0	—	○	-10~+80	SC-20
20-MAC-2025-2K	25	40	24200	35	2.0	—	○	-10~+80	SC-20
20-MAC-2030-5K	30	44	26460	60	1.2	—	○	-10~+80	SC-20
20-MAC-2030-6K	30	44	26460	30	1.7	—	○	-10~+80	SC-20
20-MAC-2030-7K	30	44	26460	15	2.4	—	○	-10~+80	SC-20
20-MAC-2030-8K	30	44	26460	8	2.8	—	○	-10~+80	SC-20
20-MAC-2030-16K	30	44	26460	5	4.2	—	○	-10~+80	SC-20
20-MAC-2030-18K	30	44	26460	3	6.0	—	○	-10~+80	SC-20
20-MAC-2050-10K	50	59	35280	30	2.0	—	○	-10~+80	SC-20
20-MAC-2050-11K	50	59	35280	30	2.0	—	○	-10~+80	SC-20
20-MAC-2050-12K	50	59	35280	15	2.8	—	○	-10~+80	SC-20
20-MAC-2050-13K	50	59	35280	8	3.8	—	○	-10~+80	SC-20
20-MAC-2050-16K	50	59	35280	5	5.0	—	○	-10~+80	SC-20
20-MAC-2050-17K	50	59	35280	3	6.8	—	○	-10~+80	SC-20
20-MAC-2065-2K	65	65	38300	32	2.5	—	○	-10~+80	SC-20

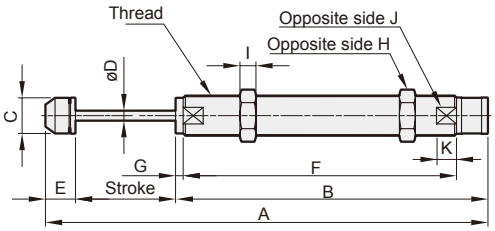
20-MAC-1415
20-MAC-2020
20-MAC-2025



20-MAC-2030



20-MAC-2050



20-MAC-K series
Porous fixed type

20-MAC-K series can effectively absorb the vibration and noise generated from high motion and can turn the kinetic energy into thermal energy and release it into the air. Therefore, in each action, it can stop the object stably can effectively. When our shock absorber is selected, disadvantage caused by bad shock absorber can be effectively solved, consequently, the machine efficiency can be enhanced, the production capacity can be increased, and the usage lifetime of the machine can be lengthened. 20-MAC-K and MACD are all appropriate for high speed impact sites, the ends of long stroke moving device, and most of them are used for robot arms.

Dimensions

Model	Thread	Stroke (mm)	A	B	C	D	E	F	G	H	I	J	K	Weight (g)
20-MAC-1415-6K	M14×1.5	15	95.6	69.4	12	4	11.2	52.7	2	19	5	—	—	80
20-MAC-1415-7K	M14×1.0/1.5	15	95.6	69.4	12	4	11.2	52.7	2	19	5	—	—	80
20-MAC-2020-2K	M20×1.5	20	128.8	93	17.8	5	15.8	74.5	3.8	26	7	—	—	170
20-MAC-2025-2K	M20×1.5	25	140.4	100	17.8	5	15.8	81	2.8	26	7	—	—	180
20-MAC-2030-5K	M20×1.5	30	133.7	86	17.8	5	17.7	48	21	26	7	18.2	10	185
20-MAC-2030-6K	M20×1.5	30	133.7	86	17.8	5	17.7	48	21	26	7	18.2	10	185
20-MAC-2030-7K	M20×1.5	30	133.7	86	17.8	5	17.7	48	21	26	7	18.2	10	185
20-MAC-2030-8K	M20×1.5	30	133.7	86	17.8	5	17.7	48	21	26	7	18.2	10	185
20-MAC-2030-16K	M20×1.5	30	146.5	97.8	17.8	5	18	48	32.8	26	7	18.2	10	205
20-MAC-2030-18K	M20×1.5	30	146.5	97.8	17.8	5	18	48	32.8	26	7	18.2	10	205
20-MAC-2050-11K	M20×1.5	50	221.8	156	17.8	5	15.8	136.5	4	26	7	18.2	10	250
20-MAC-2050-11K	M20×1.5	50	221.8	156	17.8	5	15.8	136.5	4	26	7	18.2	10	250
20-MAC-2050-12K	M20×1.5	50	221.8	156	17.8	5	15.8	136.5	4	26	7	18.2	10	250
20-MAC-2050-13K	M20×1.5	50	221.8	156	17.8	5	15.8	136.5	4	26	7	18.2	10	250
20-MAC-2050-16K	M20×1.5	50	221.8	156	17.8	5	15.8	136.5	4	26	7	18.2	10	250
20-MAC-2050-17K	M20×1.5	50	221.8	156	17.8	5	15.8	136.5	4	26	7	18.2	10	250
20-MAC-2065-2K	M20×1.5	65	267.3	186.5	17.8	6	15.8	145	3.5	26	7	—	—	275

20-MAC-S Self compensation

SHOCK ABSORBERS

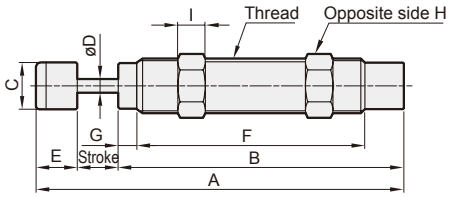
Specification

Model	Stroke (mm)	Max. Nm per cycle (Nm)	Max. Nm per hour (Nm)	Max. effective mass (kg)	Max. impact speed (m/s)	Without impact head	With impact head	Operating temp. (°C) (No freezing)	Stop collar (SC)
20-MAC-0604-S	4	0.5	720	3	0.3~1.0	○	○	-10~+80	—
20-MAC-0806-S	6	3	7000	6	0.3~2.5	○	○	-10~+80	SC-08
20-MAC-1007-S	7	6	12400	12	0.3~3.5	○	○	-10~+80	SC-10
20-MAC-1210-S	10	12	22500	22	0.3~4.0	○	○	-10~+80	SC-12
20-MAC-1412-S	12	20	33000	40	0.3~5.0	○	○	-10~+80	SC-14
20-MAC-2015-S	15	59	38000	120	0.3~5.0	○	○	-10~+80	SC-20
20-MAC-2525-S	25	80	60000	180	0.3~5.0	○	○	-10~+80	SC-25
20-MAC-2725-S	25	147	72000	270	0.3~5.0	○	○	-10~+80	SC-27

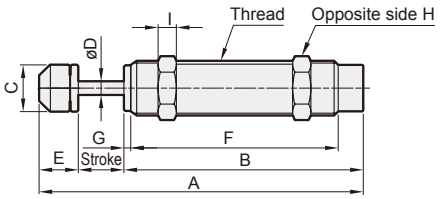
20-MAC-S series

20-MAC-S series, as compared to 20-MAC series, has smaller installation length, higher usage frequency, larger energy absorption, more secure product structure, and higher safety. It is applicable to equipment of compact size or of small space, and there is straight slot or milled edge to facilitate the installation.

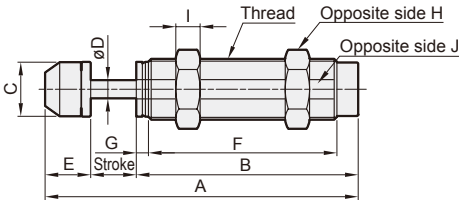
20-MAC-0604-S



20-MAC-0806-S
20-MAC-1007-S
20-MAC-1210-S

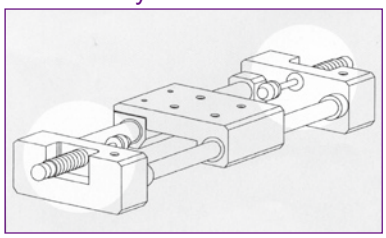


20-MAC-1412-S
20-MAC-2015-S
20-MAC-2525-S
20-MAC-2725-S

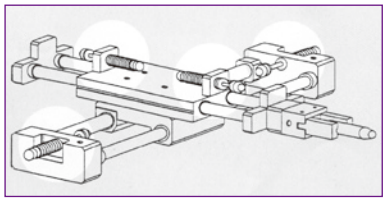


Application example

Slide unit cylinder



Slide unit



Dimensions

Model	Thread	Stroke (mm)	A	B	C	D	E	F	G	H	I	J	Weight (g)
20-MAC-0604-S	M6×0.75	4	36.5	28.5	4.5	1.8	4	22.5	1	8	3	—	4
20-MAC-0806-S	M8×1.0	6	55.2	40.6	6.6	2.9	8.6	33.6	2	11	3	—	17
20-MAC-1007-S	M10×1.0	7	62.6	47	8.6	3	8.6	39	3	12.7	3	—	28
20-MAC-1210-S	M12×1.0	10	71.3	52.5	10.3	3	8.8	44	3	14	4	—	32
20-MAC-1412-S	M14×1.5	12	90.2	67	12	4	11.2	58	4	19	5	12.1	70
20-MAC-2015-S	M20×1.5	15	103.3	73	17.8	6	15.3	62	4	26	7	18	160
20-MAC-2525-S	M25×1.5	25	136	92	22	8	19	82	—	32	9	23	295
20-MAC-2725-S	M27×1.5	25	143	99	22	8	19	86	5	32	6	25	375

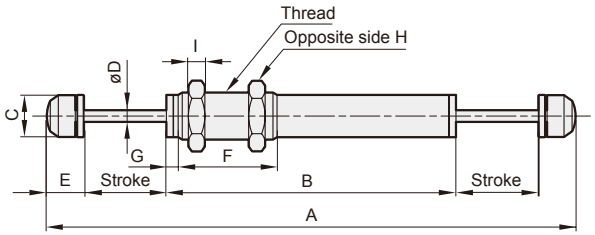
Specification

Model	Stroke (mm)	Max. Nm per cycle (Nm)	Max. Nm per hour (Nm)	Max. effective mass (kg)	Max. impact speed (m/s)	Without impact head	With impact head	Operating temp. (°C) (No freezing)	Stop collar (SC)
20-MACD-2030-1	30	45	55000	40	3.5	—	○	-10~+80	SC-20
20-MACD-2030-2	30	45	55000	80	2.0	—	○	-10~+80	SC-20
20-MACD-2030-3	30	45	55000	450	1.0	—	○	-10~+80	SC-20
20-MACD-2035-1	35	52	63000	40	3.5	—	○	-10~+80	SC-20
20-MACD-2035-2	35	52	63000	200	2.0	—	○	-10~+80	SC-20
20-MACD-2035-3	35	52	63000	450	1.0	—	○	-10~+80	SC-20
20-MACD-2050-1	50	60	68000	60	3.5	—	○	-10~+80	SC-20
20-MACD-2050-2	50	60	68000	210	2.0	—	○	-10~+80	SC-20
20-MACD-2050-3	50	60	68000	480	1.0	—	○	-10~+80	SC-20

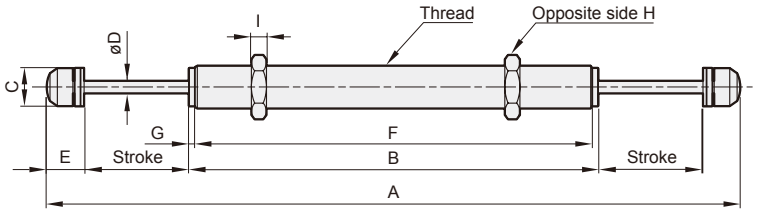
20-MACD series
Double cushion

MACD series has adopted dual-buffering structure, and different buffering effects are installed at both ends. It is applicable to high speed site and commonly used for robot arm. It can reduce the noise and vibration of the equipment to increase greatly the operation speed of the robot arm.

20-MACD-2035
20-MACD-2030



20-MACD-2050



Dimensions

Model	Thread	Stroke (mm)	A	B	C	D	E	F	G	H	I	Weight (g)
20-MACD-2030-1	M20×1.5	30	184.6	123	17.8	6	15.8	44	3	26	7	320
20-MACD-2030-2	M20×1.5	30	184.6	123	17.8	6	15.8	44	3	26	7	320
20-MACD-2030-3	M20×1.5	30	184.6	123	17.8	6	15.8	44	3	26	7	320
20-MACD-2035-1	M20×1.5	35	224.6	123	17.8	5	15.8	42	5	26	7	350
20-MACD-2035-2	M20×1.5	35	224.6	123	17.8	5	15.8	42	5	26	7	350
20-MACD-2035-3	M20×1.5	35	224.6	123	17.8	5	15.8	42	5	26	7	350
20-MACD-2050-1	M20×1.5	50	276.6	145	17.8	6	15.8	134	3	26	7	470
20-MACD-2050-2	M20×1.5	50	276.6	145	17.8	6	15.8	134	3	26	7	470
20-MACD-2050-3	M20×1.5	50	276.6	145	17.8	6	15.8	134	3	26	7	470

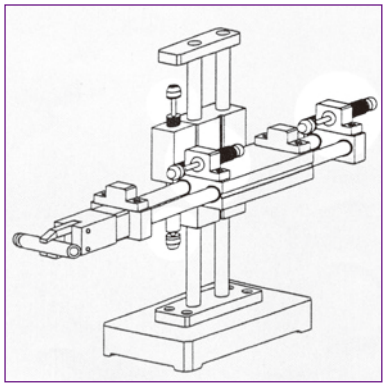
20-MAD Adjustable
SHOCK ABSORBERS

Specification

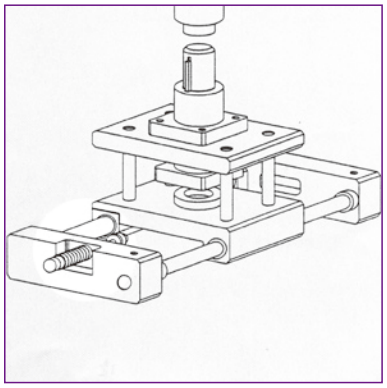
Model	Stroke (mm)	Max. Nm per cycle (Nm)	Max. Nm per hour (Nm)	Max. effective mass (kg)	Max. impact speed (m/s)	Without impact head	With impact head	Operating temp. (°C) (No freezing)	Stop collar (SC)	Flange (F)
20-MAD-1210	10	12	22000	35	3.0	○	○	-10~+80	SC-14	—
20-MAD-1410	10	20	25000	80	3.0	○	○	-10~+80	SC-14	—
20-MAD-1415	15	24	26000	100	3.0	○	○	-10~+80	SC-14	—
20-MAD-1425	25	28	27500	140	3.0	○	○	-10~+80	SC-16	—
20-MAD-1612	12	22	27500	130	3.0	○	○	-10~+80	SC-20	—
20-MAD-2016	16	28	27500	200	3.0	○	○	-10~+80	SC-20	—
20-MAD-2020	20	34	29000	298	3.5	○	○	-10~+80	SC-20	—
20-MAD-2025	25	39	30000	312	3.5	○	○	-10~+80	SC-20	—
20-MAD-2050	50	69	52000	420	3.5	○	○	-10~+80	SC-25	—
20-MAD-2525	25	85	54000	400	3.5	○	○	-10~+80	SC-25	—
20-MAD-2530	30	95	60000	480	3.5	○	○	-10~+80	SC-25	—
20-MAD-2540	40	100	80000	700	3.5	×	○	-10~+80	SC-25	—
20-MAD-2550	50	120	90000	720	4.0	○	○	-10~+80	SC-25	—
20-MAD-2580	80	150	120000	800	4.0	○	○	-10~+80	SC-27	—
20-MAD-2725	25	85	54000	400	3.5	○	○	-10~+80	—	—
20-MAD-3326	26	195	75700	1400	3.3	×	○	-10~+80	—	—
20-MAD-3352	52	385	98962	2400	3.3	×	○	-10~+80	SC-36	F36
20-MAD-3625	25	150	81000	1400	3.0	×	○	-10~+80	SC-36	F36
20-MAD-3650	50	300	100000	2400	3.0	×	○	-10~+80	—	F42
20-MAD-4225	25	260	125000	3000	3.5	×	○	-10~+80	—	F42
20-MAD-4250	50	500	150000	4000	4.5	×	○	-10~+80	—	F42
20-MAD-4275	75	750	180000	6000	4.5	×	○	-10~+80	—	F64
20-MAD-64050	50	1200	150500	12727	1.5	×	○	-10~+80	—	F64
20-MAD-64100	100	2400	200000	18181	1.5	×	○	-10~+80	—	F64
20-MAD-64150	150	3600	250000	23636	1.5	×	○	-10~+80	—	F64

Application example

Pick and place robot



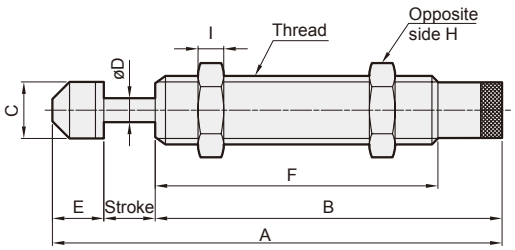
Press feed



20-MAD series

Adjustable

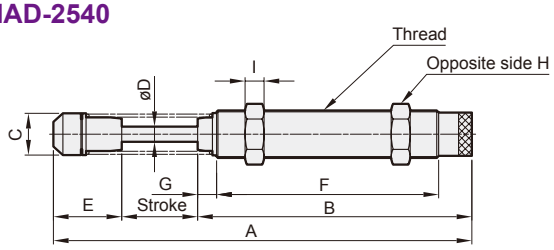
20-MAD series is of adjustable structure. When facing with different loads and different impact speeds, the adjustment knobs can be adjusted to appropriate scale to absorb perfectly the energy generated by the object. As compared to 20-MAC series 20-MAD series has higher energy absorption and wider applicable scope.



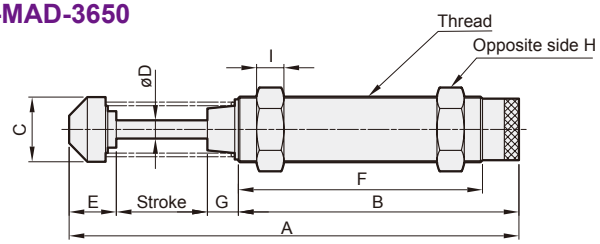
Dimensions

Model	Thread	Stroke (mm)	A	B	C	D	E	F	H	I	J	K	Weight (g)
20-MAD-1210	M12×1.0	10	90.3	71.7	10.3	3	8.6	57.3	14	4	—	—	66
20-MAD-1410	M14×1.0/1.5	10	109.7	88.5	12	4	11.2	72.5	19	5	—	—	90
20-MAD-1415	M14×1.0/1.5	15	128.2	102	12	4	11.2	86	19	5	—	—	120
20-MAD-1425	M14×1.0/1.5	25	153.2	117	12	4	11.2	101	19	5	—	—	194
20-MAD-1612	M16×1.0/1.5	12	99.0	76.5	14	4	11.2	54.9	19	6	—	—	200
20-MAD-2016	M20×1.5/2.0	16	148.3	117	17.8	6	15.3	101	26	7	—	—	230
20-MAD-2020	M20×1.5	20	152.3	117	17.8	6	15.3	101	26	7	—	—	235
20-MAD-2025	M20×1.5	25	157.3	117	17.8	6	15.3	101	26	7	—	—	240
20-MAD-2050	M20×1.5	50	239.3	174	17.8	6	15.3	158	26	7	—	—	330
20-MAD-2525	M25×1.5/2.0	25	162.5	118.5	22	8	19	101	32	9	—	—	350
20-MAD-2530	M25×1.5/2.0	30	167.5	118.5	22	8	19	101	32	9	—	—	365
20-MAD-2725	M27×1.5/3.0	25	162.5	118.5	22	8	19	101	32	9	—	—	403

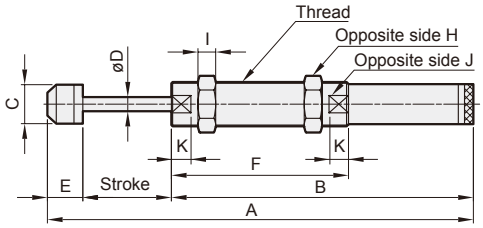
20-MAD-2540



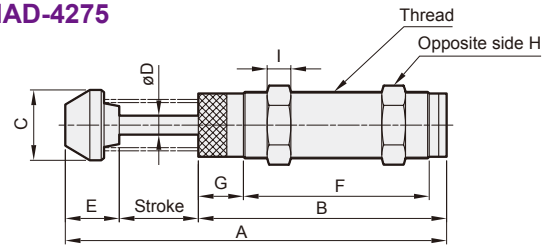
20-MAD-3625
20-MAD-3650



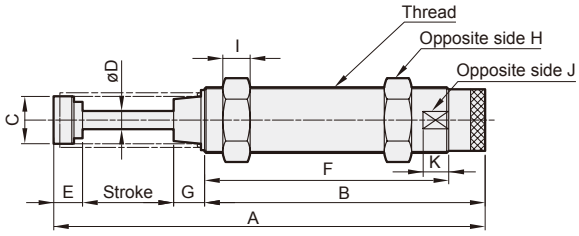
20-MAD-2550
20-MAD-2580



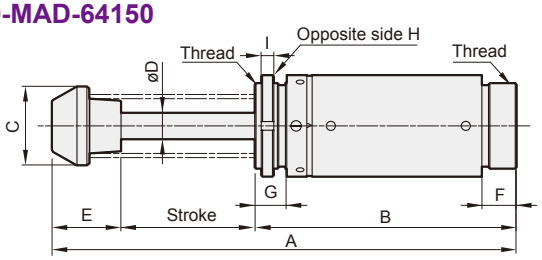
20-MAD-4225
20-MAD-4250
20-MAD-4275



20-MAD-3326
20-MAD-3352



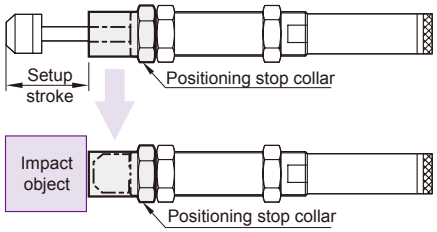
20-MAD-64050
20-MAD-64100
20-MAD-64150



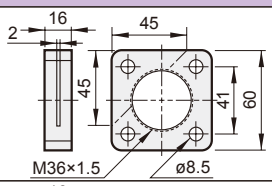
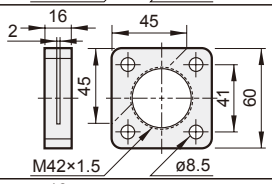
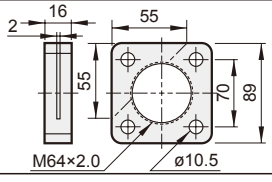
Dimensions

Model	Thread	Stroke (mm)	A	B	C	D	E	F	G	H	I	J	K	Weight (g)
20-MAD-2540	M25×1.5/2.0	40	221.5	144.5	22	8	37	117	10	32	9	—	—	455
20-MAD-2550	M25×1.5/2.0	50	247	178	22	8	19	100	—	32	9	22.8	11	455
20-MAD-2580	M25×1.5/2.0	80	343.5	244.5	22	8	19	100	—	32	9	22.8	11	585
20-MAD-3326	M33×1.5	26	150.3	110.5	28.5	10	13.8	77.9	19.1	45	11	29.7	16	482
20-MAD-3352	M33×1.5	52	217.3	151.5	28.5	10	13.8	118.7	19.1	45	11	29.7	16	708
20-MAD-3625	M36×1.5	25	184	133	35.5	10	26	103	10	46	15	—	—	955
20-MAD-3650	M36×1.5	50	247	171	35.5	10	26	134	17	46	15	—	—	1100
20-MAD-4225	M42×1.5	25	186.5	127.5	44.5	12	34	99	28.5	50	15	—	—	1280
20-MAD-4250	M42×1.5	50	241	157	44.5	12	34	117.5	28.5	50	15	—	—	1490
20-MAD-4275	M42×1.5	75	301.5	187.5	44.5	12	39	148	28.5	50	15	—	—	1710
20-MAD-64050	M64×2.0	50	247.8	146	59	20	51.8	26	24	76.2	9.4	—	—	4115
20-MAD-64100	M64×2.0	100	347.8	196	59	20	51.8	26	24	76.2	9.4	—	—	5280
20-MAD-64150	M64×2.0	150	467.8	256	59	20	61.8	26	24	76.2	9.4	—	—	6785

How to set stop collar



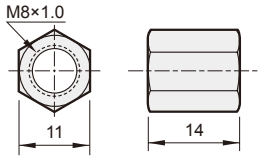
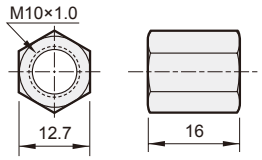
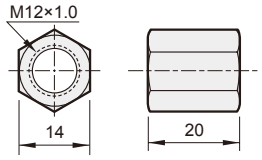
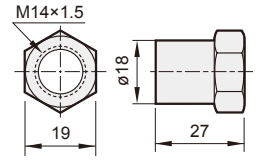
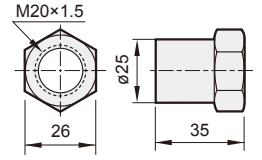
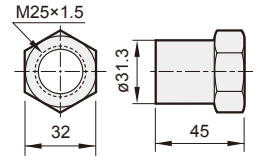
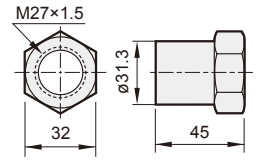
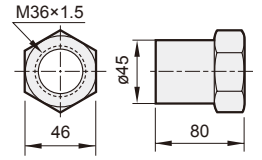
Flanges - F series

Model	Dimensions	Applicable for shock absorber model	Weight (g)
F36		20-MAC-3660 20-MAD-3625 20-MAD-3650	282
F42		20-MAD-4225 20-MAD-4250 20-MAD-4275	236
F64		20-MAD-64050 20-MAD-64100 20-MAD-64150	540

SC series – stop collars

Shock absorbers stop collars are available from M8×1.0 to M36×1.5 and suitable for shock absorbers with or Without impact head. They also can be used for adjusting and fixing position.

Optional accessories

Model	Dimensions	Applicable for shock absorber model
SC-08		20-MAC-0806
SC-10		20-MAC-1005 20-MAC-1007
SC-12		20-MAC-1210 20-MAD-1210 20-MACD-1210
SC-14		20-MAC-1412 20-MAD-1410 20-MAC-1415 20-MAD-1415 20-MAC-1416 20-MAD-1425 20-MAC-1420 20-MAC-1425
SC-20		20-MAC-2015 20-MAD-2020 20-MAC-2020 20-MAD-2025 20-MAC-2025 20-MAD-2050 20-MAC-2030 20-MACD-2030 20-MAC-2050 20-MACD-2035 20-MAC-2065 20-MACD-2050
SC-25		20-MAC-2525 20-MAD-2525 20-MAC-2540 20-MAD-2530 20-MAC-2550 20-MAD-2540 20-MAD-2550 20-MAD-2580
SC-27		20-MAC-2725 20-MAD-2725
SC-36		20-MAC-3660 20-MAD-3625 20-MAD-3650

Four parameters are required to precisely determine the dimension of shock absorbers

- Mass to be decelerated m (kg)
- Impact velocity v (m/s)
- Propelling or driving force F (N)
- Number of impact cycles per hour C (/hr)

Some useful calculation formulas

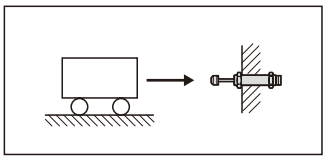
- Kinetic energy: $E_K = mv^2/2$
- Drive energy: $E_D = F \times S$
- Free fall velocity: $v = \sqrt{2g \times h}$
- Pneumatic or hydraulic cylinder driving forces.
  $F = 0.00785\ Pd^2$
- Maximum shock force (approximate).
  $Fm = 1.2\ E_T/S$
- Propelling force generated by electric motors.
  $F = 3000\ kW/v$
- Total energy absorbed per hour.
  $E_{TC} = E_T \times C$

Symbols	Unit	Description
μ		Coefficient of friction
α	(rad)	Angle of incline
θ	(rad)	Side load angle
ω	(rad/s)	Angular velocity
A	(m)	Width
B	(m)	Thickness
C	(/hr)	Impact cycles per hour
d	(mm)	Cylinder bore diameter
E_D	(Nm)	Drive energy per cycle
E_K	(Nm)	Kinetic energy per cycle
E_T	(Nm)	Total energy per cycle
E_{TC}	(Nm)	Total energy per hour
F	(N)	Propelling force
F_m	(N)	Maximum shock force
g	(m/s^2)	Acceleration due to gravity (9.81 m/s)
h	(m)	Height
HM		Arresting torque factor for motors (normally 2.5)
kW	(kW)	Electric motor power
m	(kg)	Mass to be decelerated
M_e	(kg)	Effective mass
P	(bar)	Operation pressure
R	(m)	Radius
R_s	(m)	Shock absorber mounting distance from rotation center
S	(m)	Stroke
T	(Nm)	Driving torque
t	(s)	Deceleration time
v	(m/s)	Velocity of impact mass
v_s	(m/s)	Impact velocity at shock absorber

Example 1. Horizontal impact

Application data

m = 300 kg
v = 1.0 m/s
S = 0.05 m
C = 300 /hr



Formulas and calculation

$$E_K = \frac{mv^2}{2} = \frac{300 \times 1.0^2}{2} = 150\ Nm$$

$$E_T = E_K = 150\ Nm$$

$$E_{TC} = E_T \times C = 150 \times 300 = 45000\ Nm/hr$$

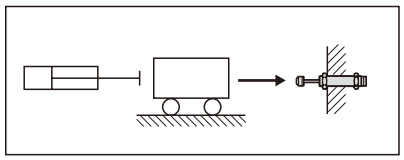
$$M_e = \frac{2E_T}{V^2} = \frac{2 \times 1.5}{1.0^2} = 300\ kg$$

Choose from sizing diagram: 20-MAD-3650 is adequate.

Example 2. Horizontal impact with propelling force

Application data

m = 300 kg
v = 1.2 m/s
S = 0.05 m
P = 40 N/cm^2
F = 1000 N
C = 500 /hr



Formulas and calculation

$$E_K = \frac{mv^2}{2} = \frac{300 \times 1.0^2}{2} = 216\ Nm$$

$$E_D = F \times S = 0.00785\ Pd^2 \times S$$

$$= 0.00785 \times 40 \times 100^2 \times 0.05 = 157\ Nm$$

$$E_T = E_K + E_D = 216+157 = 373\ Nm$$

$$E_{TC} = E_T \times C = 373 \times 300 = 111900\ Nm/hr$$

$$M_e = \frac{2E_T}{V^2} = \frac{2 \times 373}{1.2^2} = 518\ kg$$

Choose from sizing diagram: 20-MAD-4250 is adequate.

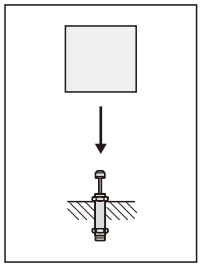
20-MAC / MAD Sizing formulas & Examples

SHOCK ABSORBERS

Example 3. Free fall impact

Application data

m = 40 kg
h = 0.4 m
S = 0.06 m
C = 200 /hr



Formulas and calculation

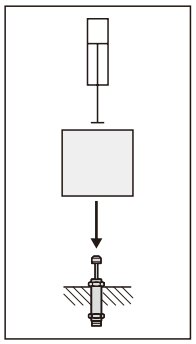
v	=	$\sqrt{2g \times h}$	= $\sqrt{2 \times 9.81 \times 0.4}$	= 2.8 m/sec	
E_K	=	$\frac{mv^2}{2}$	= $\frac{40 \times 2.8^2}{2}$	= 157 Nm	
E_D	=	$F \times S$	= $40 \times 9.81 \times 0.06$	= 23.5 Nm	
E_T	=	$E_K + E_D$	= 157 + 23.5	= 180.5 Nm	
E_{TC}	=	$E_T \times C$	= 180.5×200	= 36100 Nm/hr	
M_e	=	$\frac{2E_T}{V^2}$	= $\frac{2 \times 180.5}{2.8^2}$	= 46 kg	

Choose from sizing diagram: 20-MAC-3660-1 is adequate.

Example 4. Free fall impact with propelling

Application data

m = 40 kg
h = 0.3 m
S = 0.025 m
P = 5 bar
d = 50 mm
C = 200 /hr
v = 1.0 m/sec



Formulas and calculation

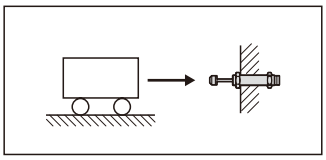
E_K	=	$\frac{mv^2}{2}$	= $\frac{40 \times 1.0^2}{2}$	= 20 Nm
E_D	=	$F \times S$	= $(mg+0.0785Pd^2) \times S$	
		= $(40 \times 9.81+0.0785 \times 5 \times 50^2) \times 0.025$		= 34.3 Nm
E_T	=	E_K+E_D	= 20+34.3	= 54.3 Nm
E_{TC}	=	$E_T \times C$	= 54.3×200	= 10860 Nm/hr
M_e	=	$\frac{2E_T}{V^2}$	= $\frac{2 \times 54.3}{1.0^2}$	= 108.6 kg

Choose from sizing diagram: 20-MAD-2525 is adequate.

Example 5. Horizontal impact with motor driving

Application data

m = 400 kg
v = 1.0 m/s
W = 1.5 kW
HM = 2.5
S = 0.075 m
C = 60 /hr



Formulas and calculation

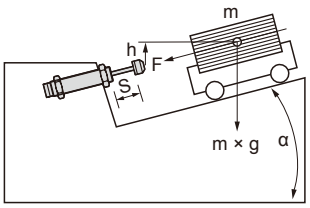
E_K	=	$\frac{mv^2}{2}$	= $\frac{300 \times 1.0^2}{2}$	= 150 Nm	
E_D	=	$F \times S$	= $\frac{kW \times HM}{v} \times S$	= $\frac{1500 \times 2.5}{1.0} \times 0.075$	= 281 Nm
E_T	=	E_K+E_D	= 200 + 281	= 481 Nm	
E_{TC}	=	$E_T \times C$	= 481×60	= 25860 Nm/hr	
M_e	=	$\frac{2E_T}{V^2}$	= $\frac{2 \times 481}{1.0^2}$	= 962 kg	

Choose from sizing diagram: 20-MAD-4275 is adequate.

Example 6. Inclined impact

Application data

m = 150 kg
h = 0.3 m
S = 0.075 m
α = 30°
C = 200 /hr



Formulas and calculation

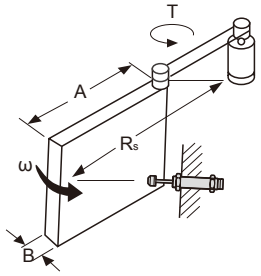
v	=	$\sqrt{2g \times h}$	= $\sqrt{2 \times 9.81 \times 0.3}$	= 2.43 m/sec
E_K	=	$\frac{mv^2}{2}$	= $\frac{150 \times 2.43^2}{2}$	= 443 Nm
E_D	=	$F \times S$	= $m \times g \times S \times \sin\alpha$	
		= $50 \times 9.81 \times 0.075 \times \sin30°$		= 55.2 Nm
E_T	=	E_K+E_D	= 433+55.2	= 498.2 Nm
E_{TC}	=	$E_T \times C$	= 498.2×200	= 99640 Nm/hr
M_e	=	$\frac{2E_T}{V^2}$	= $\frac{2 \times 498.2}{2.43^2}$	= 168.7 kg

Choose from sizing diagram: 20-MAD-4275 is adequate.

Example 7. Horizontal rotating door

Application data

m = 20 kg
ω = 2.0 rad/s
T = 20 Nm
R_S= 0.8 m
A = 1.0 m
B = 0.05 m
S = 0.016 m
C = 100 /hr



Formulas and calculation

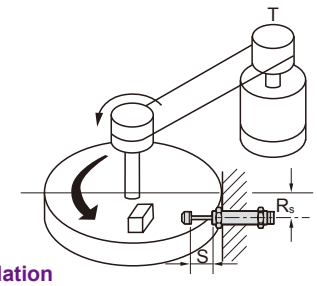
I	=	$\frac{m(4A^2+B^2)}{12}$	=	$\frac{20(4 \times 1.0^2+0.05^2)}{12}$	=	6.67 kg.m^2
E_K	=	$\frac{I\omega^2}{2}$	=	$\frac{6.67 \times 2.0^2}{2}$	=	13.34 Nm
θ	=	$\frac{s}{R_S}$	=	$\frac{0.04}{0.8}$	=	0.05 rad
E_D	=	T × θ	=	20 × 0.05	=	1.0 Nm
E_T	=	E_K+E_D	=	13.34+1.0	=	14.34 Nm
E_{TC}	=	E_T × C	=	14.34 × 100	=	1434 Nm/hr
v	=	ω × R_S	=	2.0 × 0.8	=	1.6 m/s
M_e	=	$\frac{2E_T}{V^2}$	=	$\frac{2 \times 14.34}{1.6^2}$	=	11.20 kg

Choose from sizing diagram: 20-MAD-2016 is adequate.

Example 8. Rotary index table with propelling force

Application data

m = 200 kg
ω = 1.0 rad/s
T = 100 Nm
R = 0.5 m
R_S= 0.4 m
S = 0.04 m
C = 100 /hr



Formulas and calculation

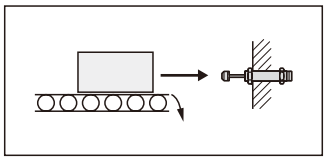
I	=	$\frac{mR^2}{2}$	=	$\frac{200 \times 0.5^2}{2}$	=	25 kg.m^2
E_K	=	$\frac{I\omega^2}{2}$	=	$\frac{25 \times 1.0^2}{2}$	=	12.5 Nm
θ	=	$\frac{s}{R_S}$	=	$\frac{0.04}{0.4}$	=	0.1 rad
E_D	=	T × θ	=	100 × 0.1	=	10 Nm
E_T	=	E_K+E_D	=	12.5+10	=	22.5 Nm
E_{TC}	=	E_T × C	=	22.5 × 50	=	1125 Nm/hr
v	=	ω × R_S	=	1.0 × 0.4	=	0.4 m/s
M_e	=	$\frac{2E_T}{V^2}$	=	$\frac{2 \times 22.5}{0.4^2}$	=	281 kg

Choose from sizing diagram: 20-MAD-2540 is adequate.

Example 9. Horizontal mass on driven rollers

Application data

m = 150 kg
v = 0.5 m/s
μ = 0.25
S = 0.02 m
C = 120 /hr



Formulas and calculation

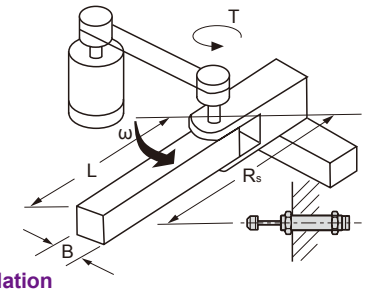
E_K	=	$\frac{mv^2}{2}$	=	$\frac{150 \times 0.5^2}{2}$	=	18.75 Nm
E_D	=	F × S = mgμ × S = 150 × 9.81 × 0.25 × 0.02 = 7.35 Nm				
E_T	=	E_K+E_D =		18.73+7.35	=	26.1 Nm
E_{TC}	=	E_T × C =		26.1 × 120	=	3132 Nm/hr
M_e	=	$\frac{2E_T}{V^2}$	=	$\frac{2 \times 26.1}{0.5^2}$	=	208.8 kg

Choose from sizing diagram: 20-MAC-2020-3 is adequate.

Example 10. Rotating beam with driving force

Application data

m = 40 kg
A = 0.5 m
B = 0.05 m
ω = 2.0 rad/s
T = 10 Nm
R_S= 0.4 m
S = 0.05 m
C = 50 /hr



Formulas and calculation

I	=	$\frac{m(4A^2+B^2)}{12}$	=	$\frac{40(4 \times 0.5^2+0.05^2)}{12}$	=	3.34 kg.m^2
E_K	=	$\frac{I\omega^2}{2}$	=	$\frac{3.34 \times 2.0^2}{2}$	=	6.7 Nm
θ	=	$\frac{s}{R_S}$	=	$\frac{0.05}{0.4}$	=	0.125 rad
E_D	=	T × θ	=	10 × 0.125	=	1.25 Nm
E_T	=	E_K+E_D	=	6.7+1.25	=	8 Nm
E_{TC}	=	E_T × C	=	8 × 50	=	400 Nm/hr
v	=	ω × R_S	=	2.0 × 0.4	=	0.8 m/s
M_e	=	$\frac{2E_T}{V^2}$	=	$\frac{2 \times 8}{0.8^2}$	=	25 kg

Choose from sizing diagram: 20-MAD-1416-2 is adequate.

SUS316 Stainless tube fitting

FITTING FOR SPECIAL ENVIRONMENTS

SUS316 Fitting

Package 1 Pc / Bag

Order example

SSC 6 — 01 — X — TP — C

1 2 3 4 5 6

❶ Model

❷ Tube dia.

Unit: mm

Code	4	6	8	10	12	16
Size	ø4	ø6	ø8	ø10	ø12	ø16

❸ Thread size

	Metric thread	Taper pipe thread			
Code	M5	01	02	03	04
Size	M5×0.8	R1/8	R1/4	R3/8	R1/2

❹ Grease option

Blank : Oil-free (fluorine coating on elastic sleeve)
X: Fluoriated synthetic grease on seal rubber (FKM)

❺ Thread sealing option

Blank : Standard (No Sealock and seal tape)
TP: Seal tape on thread

❻ Packaging option

Blank : Standard package
C: Clean-room package

Features

- Corrosion Resistance SUS316 for All Metal Parts.
- FKM for Seal Rubber.
- Oil-Free for All Parts and Compliant with Japanese Food Sanitation ActSanitation Act.
- Clean-Room Packaging Option.

Specification

Fluid medium	Air / Water/ Other chemicals*
Max. operating pressure	1.0 MPa
Max. vacuum	– 100 kPa
Operating temp. range	–15~+120°C (No freezing)

*1.Be sure to place Insert Ring into the tube edge when using water or liquid as a fluid medium.

*2.The specification above may not be applied, depending on the kind of chemicals or mixed gases used as fluid medium. Make sure to use PISCO products after verifying their suitability on the user side.

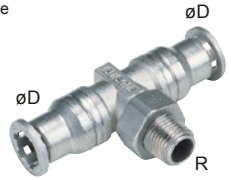
SSC

Straight

Type SSC øD-R[4][5][6]	
SSC4-M5[4][6]	SSC8-02[4][5][6]
SSC4-01[4][5][6]	SSC10-02[4][5][6]
SSC6-M5[4][6]	SSC10-03[4][5][6]
SSC6-01[4][5][6]	SSC12-03[4][5][6]
SSC6-02[4][5][6]	SSC12-04[4][5][6]
SSC8-01[4][5][6]	SSC16-04[4][5][6]

SSB

Tee



Type SSB øD-R[4][5][6]	
SSB4-M5[4][6]	SSB8-02[4][5][6]
SSB4-01[4][5][6]	SSB10-02[4][5][6]
SSB6-M5[4][6]	SSB10-03[4][5][6]
SSB6-01[4][5][6]	SSB12-03[4][5][6]
SSB6-02[4][5][6]	SSB12-04[4][5][6]
SSB8-01[4][5][6]	SSB16-04[4][5][6]

SSOC

Hex. Holed Straight

Type SSOC øD-R[4][5][6]	
SSOC4-M5[4][6]	SSOC8-02[4][5][6]
SSOC4-01[4][5][6]	SSOC10-02[4][5][6]
SSOC6-M5 [4][6]	SSOC10-03[4][5][6]
SSOC6-01[4][5][6]	SSOC12-03[4][5][6]
SSOC6-02[4][5][6]	SSOC12-04[4][5][6]
SSOC8-01[4][5][6]	SSOC16-04[4][5][6]

SSL

Elbow

Type SSL øD-R[4][5][6]	
SSL4-M5[4][6]	SSL8-02[4][5][6]
SSL4-01[4][5][6]	SSL10-02[4][5][6]
SSL6-M5[4][6]	SSL10-03[4][5][6]
SSL6-01[4][5][6]	SSL12-03[4][5][6]
SSL6-02[4][5][6]	SSL12-04[4][5][6]
SSL8-01[4][5][6]	SSL16-04[4][5][6]

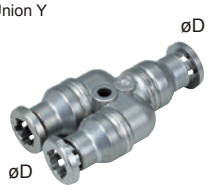
SSU

Union Straight

Type SSU øD[4][6]	
SSU4[4][6]	SSU10[4][6]
SSU6[4][6]	SSU12[4][6]
SSU8[4][6]	SSU16[4][6]

SSY

Union Y



Type SSY øD[4][6]	
SSY4[4][6]	SSY10[4][6]
SSY6[4][6]	SSY12[4][6]
SSY8[4][6]	SSY16[4][6]

SSE

Union Tee

Type SSE øD[4][6]	
SSE4[4][6]	SSE10[4][6]
SSE6[4][6]	SSE12[4][6]
SSE8[4][6]	SSE16[4][6]

SSG

Different Diam. Union Straight

Type SSG øD-R[4][6]	
SSG6-4[4][6]	SSG12-10[4][6]
SSG8-6[4][6]	SSG16-12[4][6]
SSG10-8[4][6]	

SSV

Union Elbow

Type SSV øD[4][6]	
SSV4[4][6]	SSV10[4][6]
SSV6[4][6]	SSV12[4][6]
SSV8[4][6]	SSV16[4][6]

SSM

Bulkhead Union

Type SSM øD[4][6]	
SSM4[4][6]	SSM10[4][6]
SSM6[4][6]	SSM12[4][6]
SSM8[4][6]	SSM16[4][6]

SUS316 Compression fitting

Package 1 Pc / Bag

Features

- All materials are made of SUS316, which is highly resistant to corrosion, making this series suitable for not only chemical indstries but also for airtight special environments (Medical, Semiconductor, Food, etc.).

Order example

NSC — 0640 — 01 — □

1 2 3 4

❶ Model

❷ Tube dia.

Code	0420	0425	0640	0860	1075	1080	1290	1210	1613
O.D (mm)	ø4	ø4	ø6	ø8	ø10	ø10	ø12	ø12	ø16
I.D (mm)	ø2	ø2.5	ø4	ø6	ø7.5	ø8	ø9	ø10	ø13
Code for cap nut only	4		6	8	10		12		16
Code for disc spring washer only	12		14	16	18		20		24

❸ Thread size

	Metric thread	Taper pipe thread			
Code	M5	01	02	03	04
Size	M5×0.8	R1/8	R1/4	R3/8	R1/2

❹ Thread sealing option

Blank: Standard (No Sealock and seal tape)
TP: Seal tape on thread

Specification

Fluid medium	Air / Water/ Other chemicals*
Max. operating pressure	1.0 MPa
Max. vacuum	–100 kPa
Operating temp. range	Depends on operating temp. range of tube specifications (No freezing)
Applicable tube	Polyamide tube
	Nylon tube
	Vacuum tube
	Anti-hot water tube
	Fluororesin tube

* The specification above may not be applied, depending on the kind of chemicals or mixed gases used as fluid medium. Make sure to use PISCO products after verifying their suitability on the user side.

NSC

Straight øD

R

Type NSCøD-R□	
NSC0420-01□	NSC1280-02□
NSC0420-02□	NSC1280-03□
NSC0425-01□	NSC1280-04□
NSC0425-02□	NSC1290-02□
NSC0640-01□	NSC1290-03□
NSC0640-02□	NSC1290-04□
NSC0640-03□	NSC1210-02□
NSC0850-01□	NSC1210-03□
NSC0850-02□	NSC1210-04□
NSC0850-03□	NSC1611-03□
NSC0860-01□	NSC1611-04□
NSC0860-02□	NSC1613-03□
NSC0860-03□	NSC1613-04□
NSC1065-02□	NSC1/4-01□
NSC1065-03□	NSC1/4-02□
NSC1065-04□	NSC1/4-03□
NSC1075-02□	NSC3/8-02□
NSC1075-03□	NSC3/8-03□
NSC1075-04□	NSC3/8-04□
NSC1080-02□	NSC1/2-02□
NSC1080-03□	NSC1/2-03□
NSC1080-04□	NSC1/2-04□

NSL

Elbow

øD R

Type NSLøD-R□	
NSL0420-01□	NSL1280-02□
NSL0420-02□	NSL1280-03□
NSL0425-01□	NSL1280-04□
NSL0425-02□	NSL1290-02□
NSL0640-01□	NSL1290-03□
NSL0640-02□	NSL1290-04□
NSL0640-03□	NSL1210-02□
NSL0850-01□	NSL1210-03□
NSL0850-02□	NSL1210-04□
NSL0850-03□	NSL1611-03□
NSL0860-01□	NSL1611-04□
NSL0860-02□	NSL1613-03□
NSL0860-03□	NSL1613-04□
NSL1065-02□	NSL1/4-01□
NSL1065-03□	NSL1/4-02□
NSL1065-04□	NSL1/4-03□
NSL1075-02□	NSL3/8-02□
NSL1075-03□	NSL3/8-03□
NSL1075-04□	NSL3/8-04□
NSL1080-02□	NSL1/2-02□
NSL1080-03□	NSL1/2-03□
NSL1080-04□	NSL1/2-04□

NSU

Union straight

øD

øD

Type NSUøD	
NSU0420	NSU1080
NSU0425	NSU1290
NSU0640	NSU1210
NSU0860	NSU1613
NSU1075	

NSV

Union elbow

øD øD

Type NSVøD	
NSV0420	NSV1080
NSV0425	NSV1290
NSV0640	NSV1210
NSV0860	NSV1613
NSV1075	

SUS316 Stainless tube fitting

FITTING FOR SPECIAL ENVIRONMENTS

NSMF
Bulkhead female straight

Type NSMFøD-Rc	
NSMF0420-01	NSMF1290-02
NSMF0420-02	NSMF1290-03
NSMF0425-01	NSMF1290-04
NSMF0425-02	NSMF1210-02
NSMF0640-01	NSMF1210-03
NSMF0640-02	NSMF1210-04
NSMF0640-03	NSMF1613-03
NSMF0860-01	NSMF1613-04
NSMF0860-02	NSMF1/4-01
NSMF0860-03	NSMF1/4-02
NSMF1075-01	NSMF1/4-03
NSMF1075-02	NSMF3/8-01
NSMF1075-03	NSMF3/8-02
NSMF1075-04	NSMF3/8-03
NSMF1080-01	NSMF3/8-04
NSMF1080-02	NSMF1/2-02
NSMF1080-03	NSMF1/2-03
NSMF1080-04	NSMF1/2-04

NSCF
female straight

Type NSCFøD-R	
NSCF0420-01	NSCF1290-02
NSCF0420-02	NSCF1290-03
NSCF0425-01	NSCF1290-04
NSCF0425-02	NSCF1210-02
NSCF0640-01	NSCF1210-03
NSCF0640-02	NSCF1210-04
NSCF0640-03	NSCF1613-03
NSCF0860-01	NSCF1613-04
NSCF0860-02	NSCF1/4-01
NSCF0860-03	NSCF1/4-02
NSCF1075-01	NSCF1/4-03
NSCF1075-02	NSCF3/8-01
NSCF1075-03	NSCF3/8-02
NSCF1075-04	NSCF3/8-03
NSCF1080-01	NSCF3/8-04
NSCF1080-02	NSCF1/2-02
NSCF1080-03	NSCF1/2-03
NSCF1080-04	NSCF1/2-04

NSMC
Bulkhead straight

Type NSBøD-R5	
NSMC0420-01 5	NSMC1075-04 5
NSMC0420-02 5	NSMC1080-01 5
NSMC0425-01 5	NSMC1080-02 5
NSMC0425-02 5	NSMC1080-03 5
NSMC0640-01 5	NSMC1080-04 5
NSMC0640-02 5	NSMC1290-02 5
NSMC0640-03 5	NSMC1290-03 5
NSMC0860-01 5	NSMC1290-04 5
NSMC0860-02 5	NSMC1210-02 5
NSMC0860-03 5	NSMC1210-03 5
NSMC1075-01 5	NSMC1210-04 5
NSMC1075-02 5	NSMC1613-03 5
NSMC1075-03 5	NSMC1613-04 5

NSB
Branch tee

Type NSBøD-R5	
NSB0420-01 5	NSB1075-04 5
NSB0420-02 5	NSB1080-02 5
NSB0425-01 5	NSB1080-03 5
NSB0425-02 5	NSB1080-04 5
NSB0640-01 5	NSB1290-02 5
NSB0640-02 5	NSB1290-03 5
NSB0640-03 5	NSB1290-04 5
NSB0860-01 5	NSB1210-02 5
NSB0860-02 5	NSB1210-03 5
NSB0860-03 5	NSB1210-04 5
NSB1075-02 5	NSB1613-03 5
NSB1075-03 5	NSB1613-04 5

NSP
Disc spring washer for bulkhead type

Type NSPøA	
NSP12	NSP20
NSP14	NSP22
NSP16	NSP24
NSP18	NSP27

NSD
Union straight

Type NSDøD-R5	
NSD0420-01 5	NSD1075-04 5
NSD0420-02 5	NSD1080-02 5
NSD0425-01 5	NSD1080-03 5
NSD0425-02 5	NSD1080-04 5
NSD0640-01 5	NSD1290-02 5
NSD0640-02 5	NSD1290-03 5
NSD0640-03 5	NSD1290-04 5
NSD0860-01 5	NSD1210-02 5
NSD0860-02 5	NSD1210-03 5
NSD0860-03 5	NSD1210-04 5
NSD1075-02 5	NSD1613-03 5
NSD1075-03 5	NSD1613-04 5

NSM
Bulkhead union straight

Type NSMøD	
NSM0420	NSM1080
NSM0425	NSM1290
NSM0640	NSM1210
NSM0860	NSM1613
NSM1075	

NSN
Cap nut only

Type NSNøD	
NSN4	NSN16
NSN6	NSN1/4
NSN8	NSN3/8
NSN10	NSN1/2
NSN12	

NSMFF
Bulkhead socket

Type NSMFF Rc	
NSMFF01	NSMFF03
NSMFF02	NSMFF04

NSE
Union tee

Type NSEøD	
NSE0420	NSE1290
NSE0425	NSE1210
NSE0640	NSE1613
NSE0860	NSE1/4
NSE1075	NSE3/8
NSE1080	NSE1/2

SUS304 Stainless tube fitting

FITTING FOR SPECIAL ENVIRONMENTS

mindman
Connect Your Future

Package 1 Pc / Bag

Features

■ Suitable for Strength Requirements Chemical Environment.

Order example

PC 6 — 01 SUS

1 2 3 4

❶ Model

❷ Tube dia.

Unit: mm

Code	4	6	8	10	12	16
Size	ø4	ø6	ø8	ø10	ø12	

❸ Thread size

	Metric thread		Taper pipe thread			
Code	M5	M6	01	02	03	04
Size	M5×0.8	M6×0.8	R1/8	R1/4	R3/8	R1/2

❹ Material: SUS304

Specification

Fluid medium	Air / Water*1, Others*1,2 (chemicals)
Max. operating pressure	1.0 MPa
Max. vacuum	–100 kPa
Operating temp. range	0~+60°C (No freezing)

*1. Surge pressure must be controlled lower than max. operating pressure when using water or liquid as a fluid medium.
*2. Be sure to place Insert Ring into the tube edge when using water or liquid as a fluid medium.
*3. The specification above may not be applied, depending on the kind of chemicals ormixed gases used as fluid medium. Make sure to use PISCO products after verifying their suitability on the user side.

PC
Straight

Type PC øDRSUS	
PC4-M5SUS	PC8-03SUS
PC4-M6SUS	PC10-01SUS
PC4-01SUS	PC10-02SUS
PC4-02SUS	PC10-03SUS
PC6-M5SUS	PC10-04SUS
PC6-M6SUS	PC12-02SUS
PC6-01SUS	PC12-03SUS
PC6-02SUS	PC12-04SUS
PC6-03SUS	PC16-03SUS
PC8-01SUS	PC16-04SUS
PC8-02SUS	

PL
Elbow

Type PL øD-RSUS	
PL4-M5SUS	PL8-03SUS
PL4-M6SUS	PL10-01SUS
PL4-01SUS	PL10-02SUS
PL4-02SUS	PL10-03SUS
PL6-M5SUS	PL10-04SUS
PL6-M6SUS	PL12-02SUS
PL6-01SUS	PL12-03SUS
PL6-02SUS	PL12-04SUS
PL6-03SUS	PL16-03SUS
PL8-01SUS	PL16-04SUS
PL8-02SUS	

PB
Tee

Type PB øD-RSUS	
PB4-M5SUS	PB8-03SUS
PB4-M6SUS	PB10-01SUS
PB4-01SUS	PB10-02SUS
PB4-02SUS	PB10-03SUS
PB6-M5SUS	PB10-04SUS
PB6-M6SUS	PB12-02SUS
PB6-01SUS	PB12-03SUS
PB6-02SUS	PB12-04SUS
PB6-03SUS	PB16-03SUS
PB8-01SUS	PB16-04SUS
PB8-02SUS	

PU
Union Straight

Type PU øDSUS	
PU4SUS	PU10SUS
PU6SUS	PU12SUS
PU8SUS	PU16SUS

PV
Union Elbow

Type PV øDSUS	
PV4SUS	PV10SUS
PV6SUS	PV12SUS
PV8SUS	PV16SUS

PE
Union Tee

Type PE øDSUS	
PE4SUS	PE10SUS
PE6SUS	PE12SUS
PE8SUS	PE16SUS

PAU
Union A

Type PAU øDSUS	
PAU4SUS	PAU10SUS
PAU6SUS	PAU12SUS
PAU8SUS	

PW
Different Diam. Union Y

Type PW øDSUS	
PW6-4SUS	PW10-8SUS
PW8-6SUS	PW12-10SUS

PD
Tee

Type PD øD-RSUS	
PD4-M5SUS	PD8-03SUS
PD4-M6SUS	PD10-01SUS
PD4-01SUS	PD10-02SUS
PD4-02SUS	PD10-03SUS
PD6-M5SUS	PD10-04SUS
PD6-M6SUS	PD12-02SUS
PD6-01SUS	PD12-03SUS
PD6-02SUS	PD12-04SUS
PD6-03SUS	PD16-03SUS
PD8-01SUS	PD16-04SUS
PD8-02SUS	

PKD
Branch Triple

Type PKD øD1-øD2-RSUS	
PKD6-4	PKD8-6
PKD8-4	PKD10-8

PKG
Different Diam. Triple

Type PKG øD1-øD2SUS	
PKG6-4SUS	PKG10-6SUS
PKG8-4SUS	PKG10-8SUS
PKG8-6SUS	

SUS316 Stainless tube fitting

FITTING FOR SPECIAL ENVIRONMENTS

PG

Different Diam. Socket Elbow

Type PG øDSUS	
PG6-4SUS	PG12-10SUS
PG8-6SUS	PG16-12SUS
PG10-8SUS	

PEG

Different Diam. Union Tee

Type PEG øD1-øD2SUS	
PEG6-4SUS	PEG10-8SUS
PEG8-6SUS	PEG12-10SUS

PY

Union Y

Type PY øDSUS	
PY4SUS	PY10SUS
PY6SUS	PY12SUS
PY8SUS	PY16SUS

PRX

Branch Double Y

Type PRX øD-RSUS	
PRX4-01SUS	PRX6-01SUS
PRX4-02SUS	

PRG

Different Diam. Double Y

Type PRG øD1-øD2SUS	
PRG6-4SUS	PRG8-6SUS

PVU

Tripod Union

Type PVU øDSUS	
PVU4SUS	PVU10SUS
PVU6SUS	PVU12SUS
PVU8SUS	

PX

Branch Y

Type PX øD-RSUS	
PX4-M5SUS	PX8-02SUS
PX4-M6SUS	PX8-03SUS
PX4-01SUS	PX10-01SUS
PX4-02SUS	PX10-02SUS
PX6-M5SUS	PX10-03SUS
PX6-M6SUS	PX10-04SUS
PX6-01SUS	PX12-02SUS
PX6-02SUS	PX12-03SUS
PX6-03SUS	PX12-04SUS
PX8-01SUS	

PAX

Branch Elbow

Type PAX øD-RSUS	
PAX4-M5SUS	PAX8-02SUS
PAX4-M6SUS	PAX8-03SUS
PAX4-01SUS	PAX10-01SUS
PAX4-02SUS	PAX10-02SUS
PAX6-M5SUS	PAX10-03SUS
PAX6-M6SUS	PAX10-04SUS
PAX6-01SUS	PAX12-02SUS
PAX6-02SUS	PAX12-03SUS
PAX6-03SUS	PAX12-04SUS
PAX8-01SUS	

PVX

Tripod Elbow

Type PVX øD-RSUS	
PVX4-M5SUS	PVX8-02SUS
PVX4-M6SUS	PVX8-03SUS
PVX4-01SUS	PVX10-01SUS
PVX4-02SUS	PVX10-02SUS
PVX6-M5SUS	PVX10-03SUS
PVX6-M6SUS	PVX10-04SUS
PVX6-01SUS	PVX12-02SUS
PVX6-02SUS	PVX12-03SUS
PVX6-03SUS	PVX12-04SUS
PVX8-01SUS	

PPF

Cap

Type PPF øDSUS	
PPF4SUS	PPF10SUS
PPF6SUS	PPF12SUS
PPF8SUS	

Throttle valve (Needle valve) PP type

SPEED CONTROLLER

mindman
Connect Your Future

Package 1 Pc / Bag

Order example

PJS C — 6 01 A □ □ □ □

1 2 3 4 5 6 7 8 9

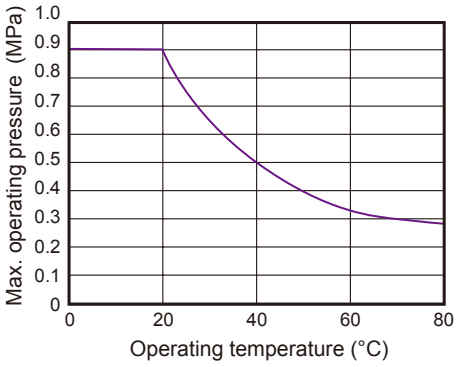
Specification

Fluid medium	Air
Operating pressure range	0.1~0.9 MPa (Low cracking pressure type 0.1~0.7 MPa)
Check valve cracking pressure	0.05 MPa (Low cracking pressure type 0.02 MPa)
Operating temp. range	0~+80°C (Seal rubber NBR: 0~+60°C) (No freezing)

Features

- PP (polypropylene) Material for Clean Environment.
- Visible Fluid by Transparent Body Color
- Clean-Room Packaging Option

Relation of Operating Temp. & Max. Operating Pressure



❶ Model

❷ Type

Code	C	U
Type	Elbow	Union Straight

❸ Tube dia.

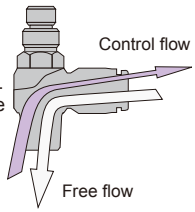
Code	4	6	8	10	12
Size	ø4	ø6	ø8	ø10	ø12

❹ Thread size

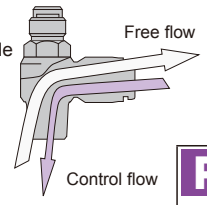
	Metric thread	Taper pipe thread			
Code	M5	01	02	03	04
Size	M5×0.8	R1/8	R1/4	R3/8	R1/2

❺ Control direction

A: Meter-out
Air from thread side is controlled. Air from tube side is not controlled and flows out from thread side.



B: Meter-in
Air from tube side is controlled. Air from thread side is not controlled and flows out from tube side



- Meter-out only for big flow.
- Throttling lock nut color
  White (Standard): Meter-out
  Black: Meter-in

❻ Check valve specification

K: Low cracking pressure type (Check valve cracking pressure: 0.02MPa, operating pressure range: 0.05~0.5MPa)

❼ Seal rubber material

Code	Blank	F	N
Material	EPDM	FKM	NBR

❽ Thread sealing option

Blank: Standard (No Sealock and seal tape)
S: Sealock on thread
TP: Seal tape on thread

❾ Packaging option

Blank: Standard package
C: Clean-room package

PJSC

Elbow

Type PJNCøD-R□□□	
PJSC4-M3□□□	PJSC8-01□□□□
PJSC4-M3□K□□	PJSC8-01□K□□□
PJSC4-M5□□□	PJSC8-02□□□□
PJSC4-M5□K□□	PJSC8-02□K□□□
PJSC4-01□□□□	PJSC8-03□□□□
PJSC4-01□K□□□	PJSC8-04□□□□
PJSC6-M5□□□	PJSC10-02□□□□
PJSC6-M5□K□□	PJSC10-02□K□□□
PJSC6-01□□□□	PJSC10-03□□□□
PJSC6-01□K□□□	PJSC10-04□□□□
PJSC6-02□□□□	PJSC12-03□□□□
PJSC6-02□K□□□	PJSC12-04□□□□
PJSC6-03□□□□	

PJSMU

Union straight

Type PJSMUøD□□	
PJSMU4□□	PJSMU12□□
PJSMU6□□	PJSMU1/4□□
PJSMU8□□	PJSMU3/8□□
PJSMU10□□	PJSMU1/2□□

Fluororesin tube

TUBE FOR SPECIAL ENVIRONMENTS

Fluororesin tube

Package 5m, 20m, 50m, 100m

SET 0640 – 20 – C – C

1 2 3 4 5

❶ Model

SFT	Fluororesin tube (PFA)
SET	Fluororesin tube (FEP)

❷ Tube dia. (O.D.× I.D.) Unit: mm

	Metric thread									Taper pipe thread		
Code	**0420**	**0425**	**0640**	**0860**	**1075**	**1080**	**1290**	**1210**	**1613**	**1/4**	**3/8**	**1/2**
O.D.	ø4	ø4	ø6	ø8	ø10	ø10	ø12	ø12	ø16	ø6.35	ø9.53	ø12.7
I.D.	ø2	ø2.5	ø4	ø6	ø7.5	ø8	ø9	ø10	ø13	ø4.57	ø6.99	ø9.56

❸ Tube length (**1613** without length 100m)
5: 5m / **20**: 20m / **50**: 50m / **100**: 100m

❹ Tube color
C: Transparent / **B**: Black (SET only)

❺ Packaging option (Cleanroom length only 5, 20m)
Blank: Standard package
C: Cleanroom package

Specification

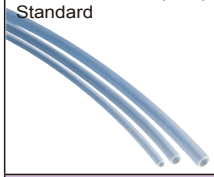
Fluid medium	Air, water*1,2,3, chemicals*4
Max. operating pressure	0.7~2.7 MPa
Operating temp. range	– 65~+260°C (No freezing)

*1. Tap water can be admitted. Please make inquiries for other types of fluid.
*2. When the fluid medium is water or liquid, limit the level of surge pressure to the maximum operating pressure or less.
*3. Please make sure to use Insert-ring (tube core protection pipe) inside a tube when using water or liquid on quick fitting joint for preventing bust-out of tube.
*4. Since these are cases where our specifications may differ from others in some respects for chemicals, mixed gas, or etc., please make inquires about the use of chemicals to the nearest sales offices.

Features

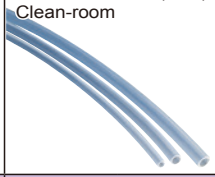
- Superior in Medicine, Heat and Weather Resistance.
- Suitable for Medical, Chemical, Food and Medicine Industries.
- Advanced Smoothness of Tube Inner Surface,Transparency and High Purity.

SFT Fluororesin tube (PFA) Standard



Type	
SFT0420-□-C	SFT1290-□-C
SFT0425-□-C	SFT1613-□-C
SFT0640-□-C	SFT1/4-□-C
SFT0860-□-C	SFT3/8-□-C
SFT1075-□-C	SFT1/2-□-C
SFT1080-□-C	

SFT CLEARN ROOM Fluororesin tube (PFA) Clean-room



Type	
SFT0420-□-C-C	SFT1080-□-C-C
SFT0425-□-C-C	FT1290-□-C-C
SFT0640-□-C-C	SFT1/4-□-C-C
SFT0860-□-C-C	SFT3/8-□-C-C
SFT1075-□-C-C	SFT1/2-□-C-C

SET Fluororesin tube (FEP) Standard

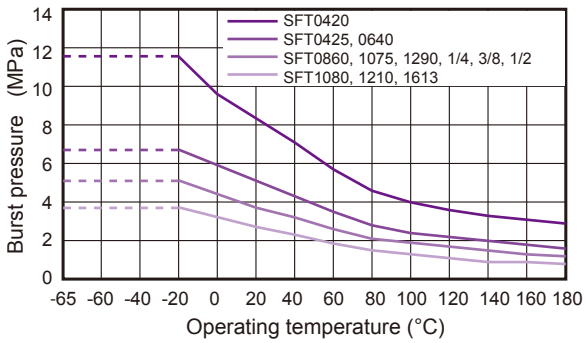
Type	
SET0420-□-C	SET1290-□-C
SET0425-□-C	SET1210-□-C
SET0640-□-C	SET1613-□-C
SET0860-□-C	SET1/4-□-C
SET1075-□-C	SET3/8-□-C
SET1080-□-C	SET1/2-□-C

SET CLEARN ROOM Fluororesin tube (FEP) Clean-room

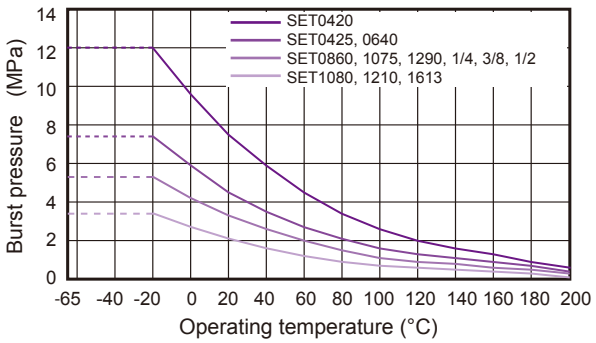
Type	
SET0420-□-□-C	SET1290-□-□-C
SET0425-□-□-C	SET1210-□-□-C
SET0640-□-□-C	SFT1/4-□-□-C
SET0860-□-□-C	SFT3/8-□-□-C
SET1075-□-□-C	SFT1/2-□-□-C
SET1080-□-□-C	

Burst Pressure Curve (Reference value)

SFT



SET



MEMO

NOTE

MEMO

NOTE

Caution for safety

⚠ ALL PRODUCTS

mindman
Connect Your Future

Before selecting model and servicing of the product, read throughly this CAUTIONS FOR SAFETY for the proper usage.

- The following cautions are for the purpose of preventing your personnel from suffering injury, by following the proper usage of the products.
- Items are classified in three categories, DANGER, WARNING, and CAUTION. All items are crucial for the safety and need to be followed without exception.

⚠ DANGER

(Applies to all products on the catalogue)

❶ Do not use any of our products for the purpose of maintenance and care of human life or body.

❷ Do not use any product in the condition or the environment other than stipulated in the specification or where the hazardous stuff exists.

❸ When installing a product, refer to the instruction manual for mounting style and fix securely (including the work carrier). Otherwise products may topple, fall, and operates out of control causing the injury of personnel.

❹ Disassembling and reassembling of products should be made by the personnel who has enough knowledge and experience.
❺ Depressurize products before disassembling or reassembling.

❻ Do not remodel the products.

⚠ WARNING

(Applies to all products on the catalogue)

❶ When servicing, keep within the working pressure range and voltage.
❷ At a place where water or oil drops and where is much dust, cover the equipment. Otherwise damage and trouble will be caused.
❸ Do not operate if the fluid or atmosphere contains the substance which may cause corrosion. Otherwise damage and trouble will be caused.
❹ Do not touch the terminal part or switches, etc. when the product is energized. It may cause the inaccurate operation and the electric shock from the short circuit and the circuit trouble.
❺ Do not stand on, use as a footing, or put things on the product. You may miss your step and fall, and the falling product may cause the injury of personnel. Also the product may get damaged causing the inaccurate operation and hazardous moves out of control.

(Pneumatic Actuator)

❶ When starting operation, pay the full attention to the cylinder's moving direction.
❷ Do not put hands where the cylinder moves.
❸ Cords such as the sensor switch's lead wire should not be damaged. Damaging, forcing, twisting tugging, winding, putting on a heavy object, and pinching will cause fire, electric shock abnormal operation by short circuit or circuit error.
❹ Use cylinder at the speed below 500mm/sec. Otherwise damage and trouble will be caused. However if the load is large and the speed is fast even below the maximum, direct impact on the cylinder must be avoided, by using the external stopper, etc.

(Pneumatic Valve. Pneumatic Accessories. Sensor Switch)

❶ Cords such as the pressure switch's lead wire, solenoid valve's power supply cord should not be damaged. Damaging, forcing, twisting, tugging, winding, putting heavy object on, and pinching will cause fire, electric shock, abnormal operation by short circuit or circuit error.
❷ Do not use filter or lubricator without a case guard.
❸ For filter and lubricator, do not use a flawed or stained case.

Caution for safety

⚠ ALL PRODUCTS

⚠ DANGER

(Applies to all products on the catalogue)

❶ If necessary, use protection glove, protection glasses, and safety shoes to secure the safety when operating products.

❷ For the easy maintenance, enough space around the product should be provided.

❸ When mounting, flush inside throughly to remove chips from piping, and seal tape, rust and dusts, in order to prevent troubles such as air leak.

❹ When screwing in the fittings, fasten with the tie torque of proper size to the connection size.

❺ Use clean air. Equip an air filter near the equipment to remove drain, dusts and etc. Periodically remove drain from the filter.

❻ Spindle oil and machine oil must not be used for lubrication, or the swelled packings will cause operation troubles.

❼ Operation below the temperature 5°C must be paid the full attention since it may cause the freezing of drain.

❽ Magnetic products such as disk card, tape, and tester must be kept away from the magnet-equipped cylinder and solenoid valve's solenoid part.

❾ When the product is no longer available for operation or needed, discard in a proper way as an industrial waste.

❿ Do not throw the product into fire. The product may explode or the toxic gas may be generated.

(Pneumatic Actuator)

❶ Products should be mounted on the plane face. Mounting on the warped face causes poor accuracy, air leak and troubles.

❷ Flaw or dent on the mounting part of the cylinder may make the uneven face.

❸ The chafing parts of piston rod and guide rod must be free from flaw or dent. Otherwise packings got damaged and air will leak.

❹ When the cylinder draws, be careful not to put yourself between the cylinder and the link bar at the top (Twin guide cylinder).

❺ Products do not need lubrication since they are initially lubricated. For lubrication, use turbine oil first class (ISO VG32) or the equivalent.

❻ Sensor switch which senses the cylinder position must not be operated in the magnetically disturbed area. It will react to the magnetism and the sensing accuracy will be disturbed.

❼ If the two switch-equipped cylinders are mounted close in parallel, a switch may react to the another cylinder's moving magnet, and effects on the sensing accuracy.

❽ Avoid the load over the switch 's allowable maximum load.

(Pneumatic Valve. Pneumatic Accessories. Sensor Switch)

❶ Flaw or dent on the mounting part of the cylinder may make the uneven face.

❷ Do not use solenoid valve, pressure switch, flow switch, on foot switch in the environment where the large electric current or the strong magnetism exist.

❸ As for solenoid valve, check in the instruction manual whether the lubrication is needed. If needed, use turbine oil first class ISO VG32 on the equivalent.

❹ In the case of double solenoid valve, do not energize both solenoids.

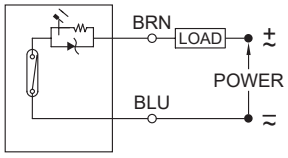
❺ Avoid the load over the switch's allowable maximum load.

Technical information

⚠ WARNING

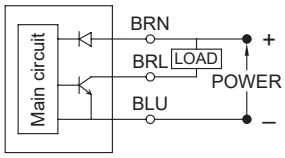
(Do not exceed specification, permanent damage to the sensor may occur.)

❶ For reed switch type sensors, polarity must also be observed for the proper functioning of LED. Connect the brown wire in series with load positive (+) and the blue wire to negative (—) of power source. If the polarity is reversed, reed switch remains functional but LED will remain in "OFF" state.

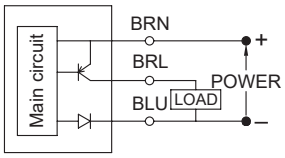


❷ For solid-state type sensors , polarity must also be observed . Connect brown wire to the positive (+) and the blue to the negative (—) of DC power source. The black wire must connect to the load only. If the black wire is accidentally connected to the power source, permanent damage to the sensor may occur.

(NPN Output)

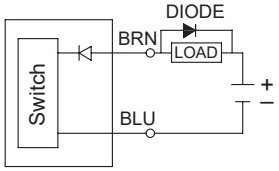


(PNP Output)

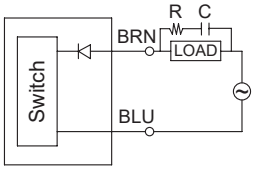


❸ An external protection circuit may be required if the reed switch is used with inductive load, such as relay or solenoid . For DC inductive load, attach an external diode parallel to the load and use R-C circuit parallel with AC inductive load as illustrated below.

DC Power



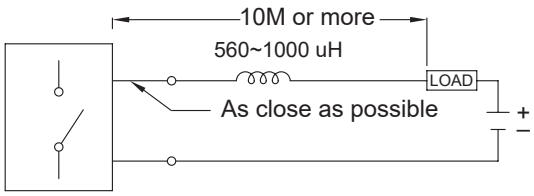
AC Power



R: 2.7KΩ
C: 0.1uf/600V

❹ Keep sensors away form stray magnetic field to prevent malfunctions.

❺ When using reed switch with capacitive load or if the lead wire length exceed 10-meter, an inductor must be installed in series with the sensor to prevent damage (Sticking effect).



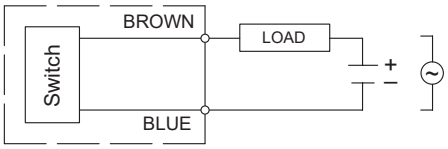
Caution for safety

⚠ SENSOR SWITCH

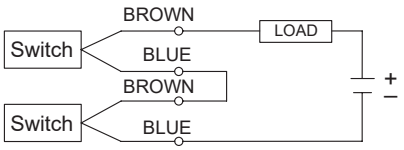
Connection method

2 wire S.W. connection

▶ General connection

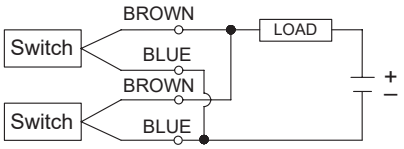


▶ Series connection (AND)



❶ When connecting 2-wire switches in series (AND), don't exceed more than two switches due to the internal voltage drop (Typical V drop=2.5~4V per switch). Excessive Voltage drop will cause non-operation of the load.

▶ Parallel connection (OR)



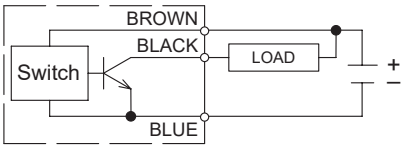
❶ When connecting non-contact 2-wire switches in parallel (OR),leakage current will increase and cause improper load operation.

❷ When connecting 2-wire reed switches in parallel(OR), possible concurrent operation will cause dim LED illumination due to lower current distribution.

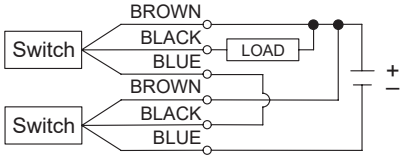
---

3 wire NPN connection

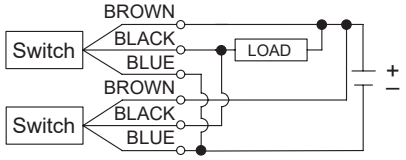
▶ General connection



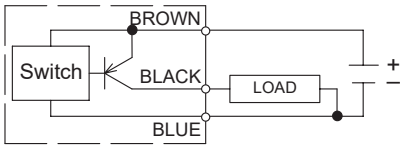
▶ Series connection (AND)

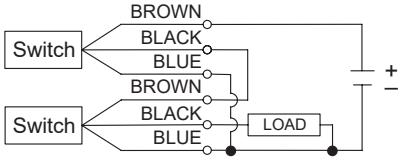


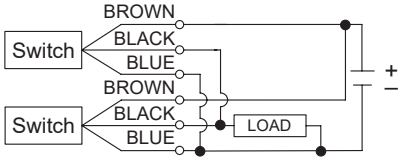
▶ Parallel connection (OR)



3 wire PNP connection







MEMO

NOTE

mindman

Connect Your Future

MEMO

NOTE

MINDMAN INDUSTRIAL CO., LTD. | OVERSEAS DEPARTMENT

No.106, Sec. 3, Chengde Rd., Datong District, Taipei City 103, Taiwan
mindman@mindman.com.tw www.mindman.com.tw
T 886-2-25914100 F 886-2-25957633 886-2-25975522

The specifications are subject to change without advence notice.

CAT. NO.: MD-DM2212-E