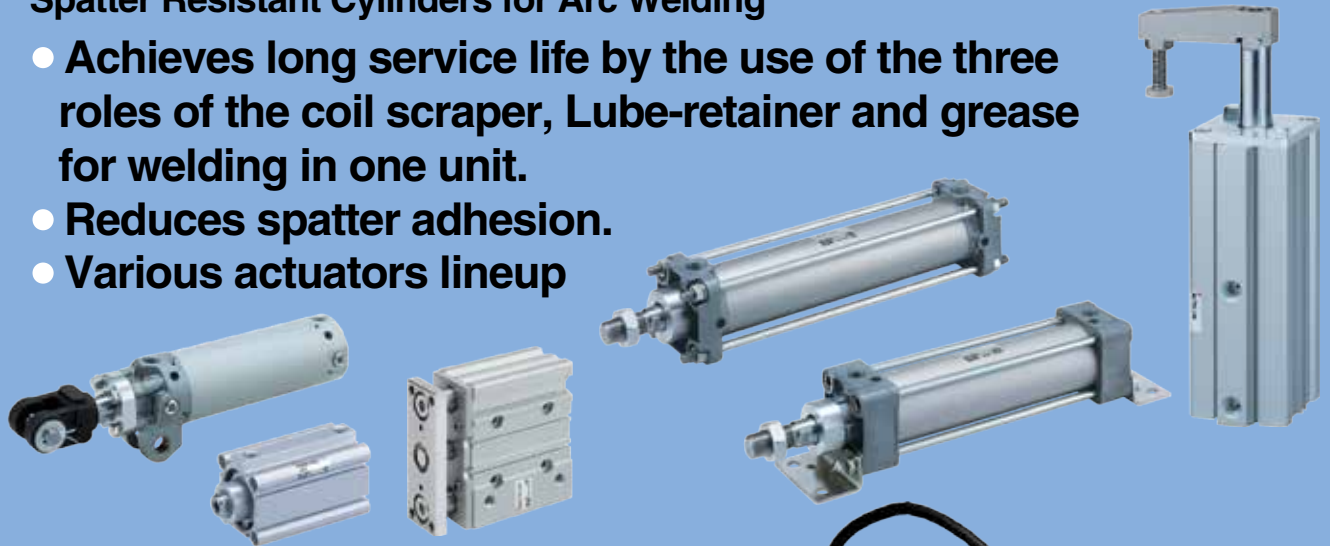


Arc Welding Process Equipment

Long Service Life

Spatter Resistant Cylinders for Arc Welding

- Achieves long service life by the use of the three roles of the coil scraper, Lube-retainer and grease for welding in one unit.
- Reduces spatter adhesion.
- Various actuators lineup



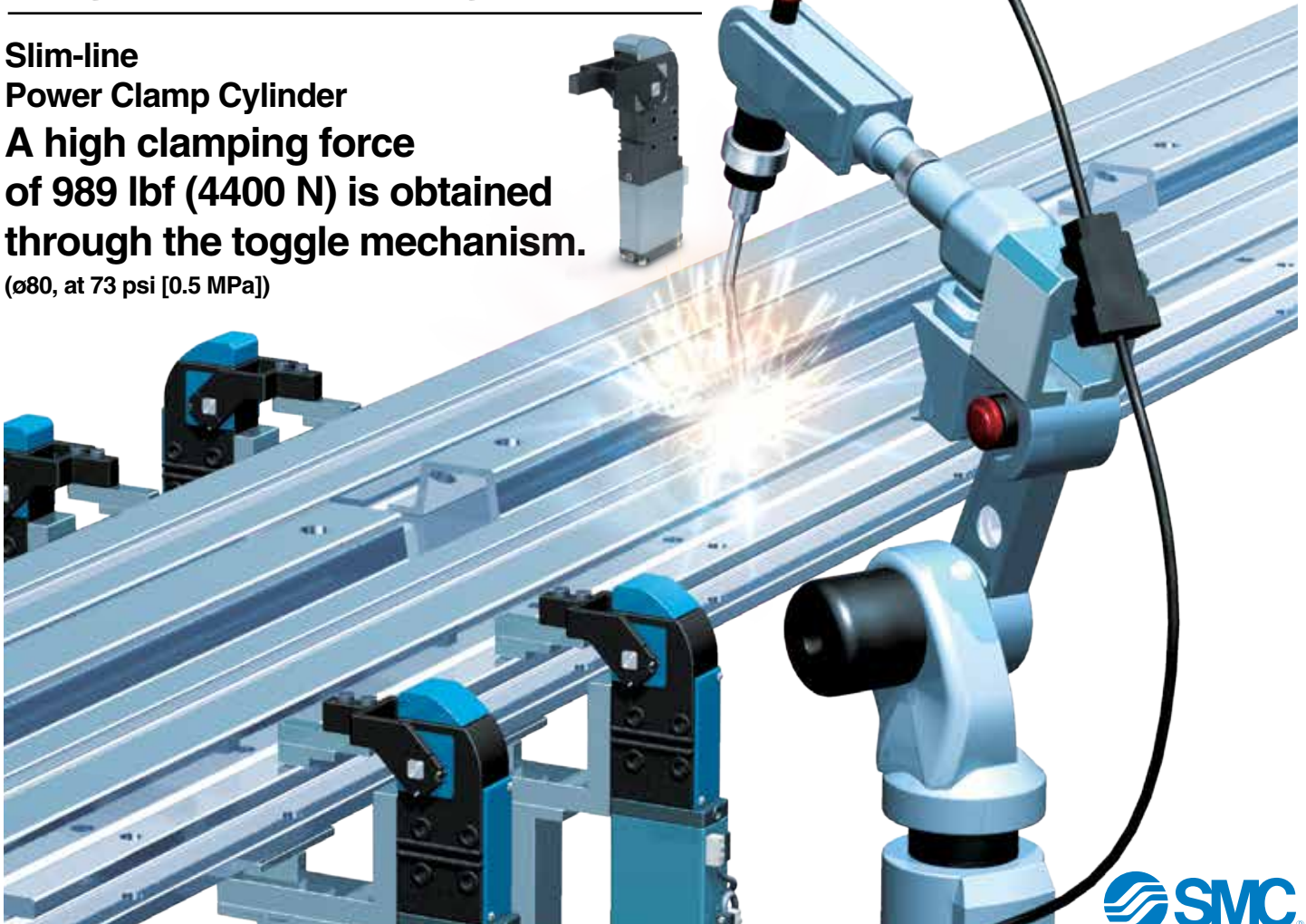
High Clamping Force

Slim-line

Power Clamp Cylinder

A high clamping force of 989 lbf (4400 N) is obtained through the toggle mechanism.

(ø80, at 73 psi [0.5 MPa])



Spatter Resistant Cylinders for Arc Welding



XC88/XC89

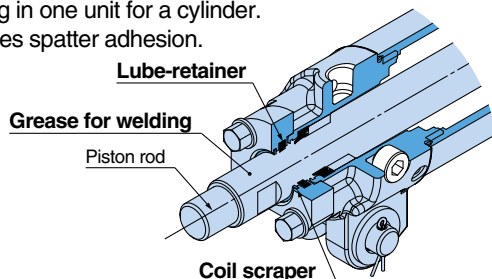
**CKG, CDQ2, CA2, MB,
MGPM, MK2T-XC88/XC89**

Page 5

Long Service Life

Spatter Resistant Cylinders for Arc Welding

- Achieves long service life by the use of the three roles of the coil scraper, Lube-retainer and grease for welding in one unit for a cylinder.
- Reduces spatter adhesion.

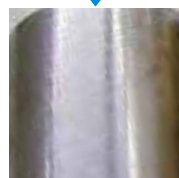


Spatter adhesion condition on piston rod (compared with coil scraper type (-XC35))

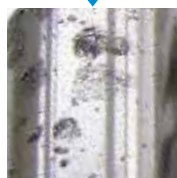


Spatter adhesion condition

After 1 operation



Spatter resistant cylinder
for arc welding



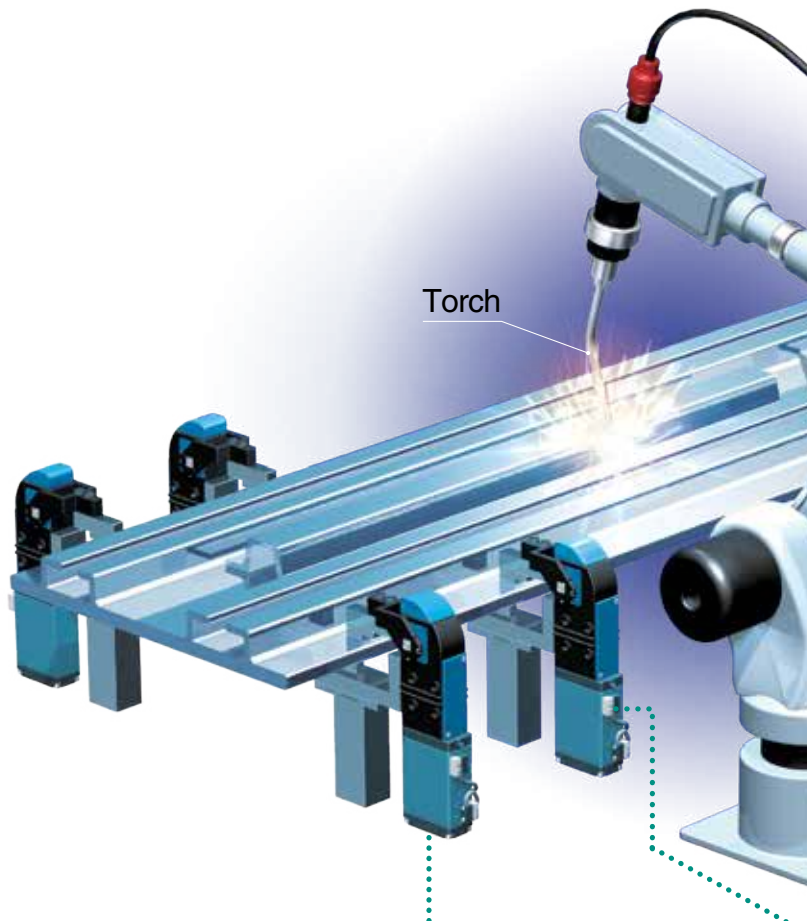
With coil scraper
(-XC35)

XC91

**CKG, CDQ2, CA2,
MB, MGPM, MK2T -XC91**

Page 6

- Improves spatter resistance by coil scraper and grease for welding (compared with coil scraper type)
- Dimensions are the same as with coil scraper type (-XC35) and mounting is interchangeable. Possible to replace cylinders in existing equipment.



Specialty Cylinders

Pin Shift Cylinder for High Precision Positioning

CKQG-X2370 **Page 66**

- Rod end deflection ± 0.1 mm or less
- Position reproducibility ± 0.1 mm



Slim-line Power Clamp Cylinder

CKZ2N-X2346

Page 73

- A high clamping force is obtained through the toggle mechanism.
- Distance accuracy from the reference hole to the lower surface of the clamp arm is assured in a range of ± 0.1 mm.
- Improved spatter resistance



Frame Clamp Cylinder

WRF100

Page 80

- High output 20,000 N at max.
- High repeatability
- Spatter cover mountable (Option)



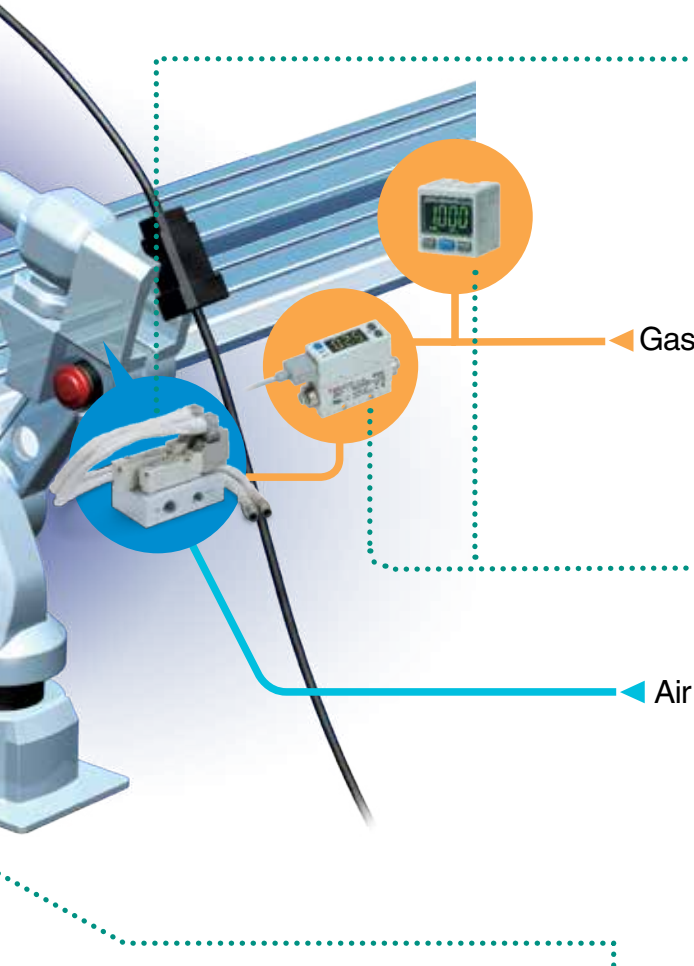
Compact Clamp Unit

**CDQ2B20-DCQ5414Q
CDQ2B32-DCR0859R**

Page 88

- Compact clamp unit based on the compact cylinder





Gas/Air Switching Valve

SS5Y7-X424-Q **Page 93**

Improved nozzle service life, reduction of the number of replacements and the tip costs

- Tip service life can be extended by blowing the air after arc welding.

Space Saving/Compact

- Shield gas valve and air blow valve are integrated.

Energy Saving Product

- Power consumption 0.5 W



Detection Switches

Digital Flow Switch **Page 95**

Series PFM7

- Allows flow rate control and value management of shielding gas.
- Compatible with argon (Ar), carbon dioxide (CO₂) and the mixed gas (Ar + CO₂)
- Flow rate range: (7, 25, 50, 100 L/min)



High-Precision Digital Pressure Switch **Page 104**

Series ISE30A

- Allows pressure control and value management of shielding gas.
- Compatible with argon (Ar), carbon dioxide (CO₂) and the mixed gas (Ar + CO₂)
- Rated pressure: -15 to 145 psi (-0.1 to 1 MPa)



Tubing/Fittings/Flow Control Equipment

FR Three-layer Polyurethane Tubing **Page 111**

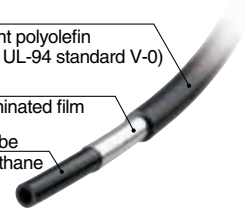
Series TRTU

- Spatter resistance is improved by installing an aluminum layer between the outer layer and inner tube. (Twice that of FR double layer polyurethane tubing)
- For general pneumatic and water piping in environments exposed to sparks from arc welding, etc.

Tubing O.D.	Color	Fluid
ø6, ø8, ø10, ø12	Black, White, Red, Blue, Yellow, Green	Air, Water

Outer layer
Flame resistant polyolefin
(Equivalent to UL-94 standard V-0)
Middle layer
Aluminum laminated film

Inner tube
Polyurethane



Metal One-touch Fittings **Page 113**

Series KQB2

- All metal except seal parts
Material Metal parts: Brass, Stainless steel
Seal parts: Special FKM
- Compact and lightweight
- Ambient temperature: 23 to 302°F (-5 to 150°C)

Application tubing O.D.		Size
Metric	ø4, ø6, ø8, ø10, ø12, ø16	M5 R-Rc-G 1/8, 1/4, 3/8, 1/2
	ø1/8, ø5/32, ø1/4, ø5/16, ø3/8, ø1/2	UNF 10-32 NPT 1/8, 1/4, 3/8, 1/2



Speed Controller: Elbow Type (Metal Body) **Page 132**

Series AS

- All metal except seal parts

Series	Port size
AS22□0 to AS42□0	M5 to 1/2



Arc Welding Process Equipment

Spatter Resistant Cylinders for Arc Welding

Clamp Cylinders

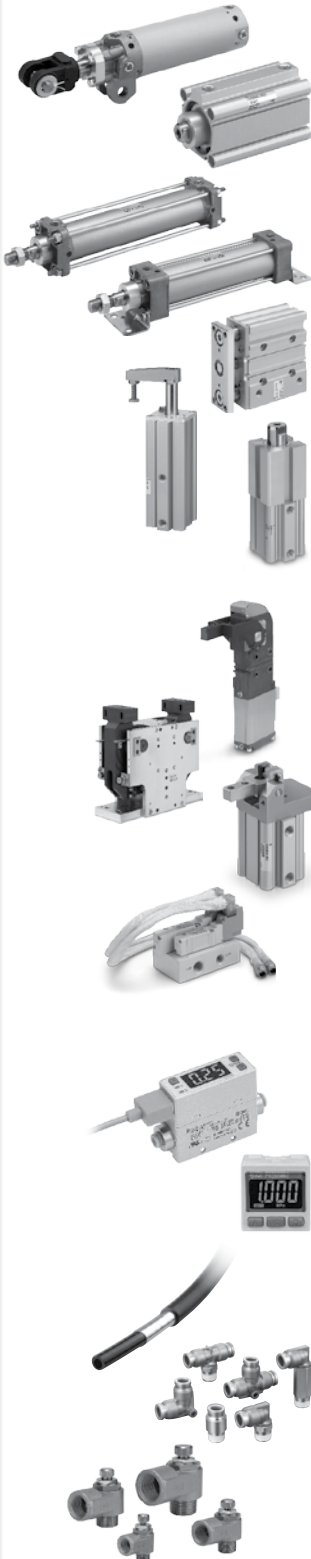
Gas/Air Switching Valve

Detection Switches

Tubing

Fittings

Speed Control Equipment



Spatter Resistant Cylinders for Arc Welding Page 5

Clamp Cylinder/CKG-XC88/XC89/XC91 Page 7

Compact Cylinder: Standard CDQ2-XC88/XC89/XC91 Page 17

Compact Cylinder: Long Stroke CDQ2-XC88/XC89 Page 27

Compact Cylinder: Anti-lateral Load CDQ2 □S-XC88/XC89 ...Page 33

Air Cylinder/CA2-XC88/XC89/XC91 Page 39

Air Cylinder/MB-XC88/XC89/XC91 Page 47

Compact Guide Cylinder/MGPM-XC88W/XC89W/XC91 Page 55

Rotary Clamp Cylinder/MK2T-XC89/XC91 Page 61

Clamp Cylinders

Pin Shift Cylinder for High Precision Positioning/CKQG-X2370 Page 66

Slim-line Power Clamp Cylinder/CKZ2N-X2346 Page 73

Frame Clamp Cylinder/WRF100 Page 80

Compact Clamp Unit/
CDQ2B20-DCQ5414Q/CDQ2B32-DCR0859R Page 88

Gas/Air Switching Valve/SS5Y7-X424-Q Page 93

Detection Switches

Digital Flow Switch
(Compatible with Argon (Ar), Carbon Dioxide (CO₂) and the Mixed Gas (Ar + CO₂))/Series PFM7 Page 95

High-Precision Digital Pressure Switch/Series ISE30APage 104

Tubing/Fittings/Speed Control Equipment Page 110

Flame Resistant FR Three-layer Polyurethane Tubing/Series TRTU Page 111

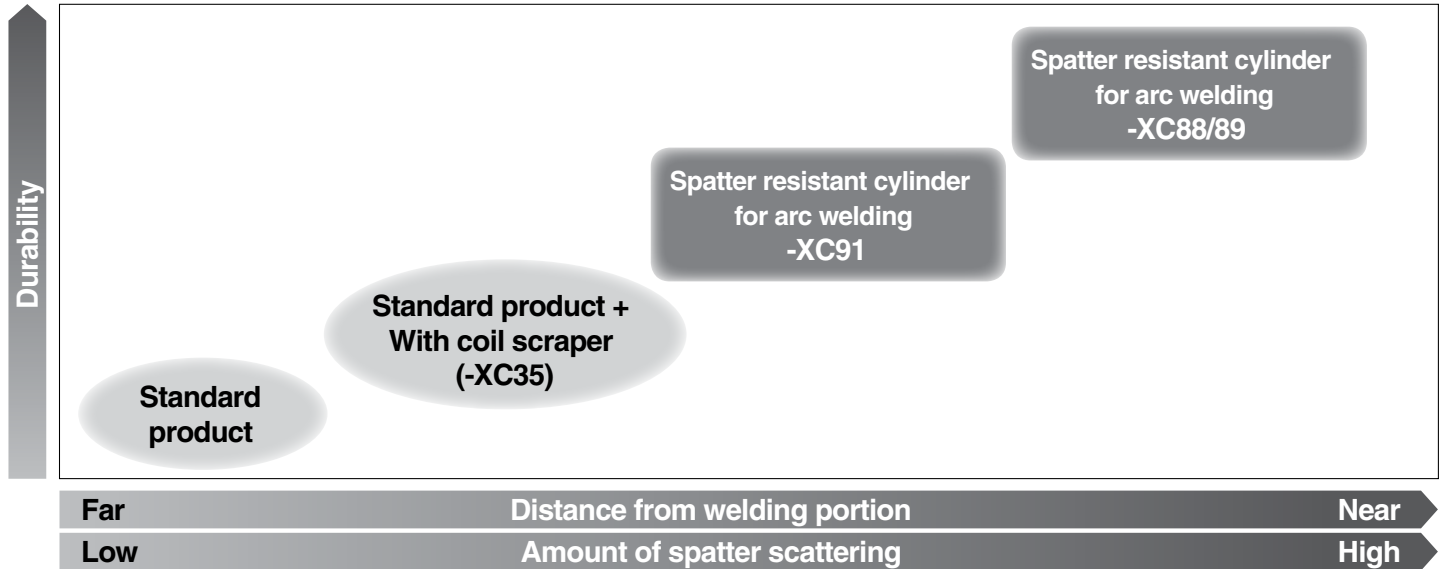
Metal One-touch Fittings/Series KQB2 Page 113

Speed Controller/Elbow Type (Metal Body)/Series AS Page 132

Spatter Resistant Cylinders for Arc Welding

CKG, CDQ2, CA2, MB, MGPM, MK2T-XC88/XC89/XC91

<Guide of Usage Range>

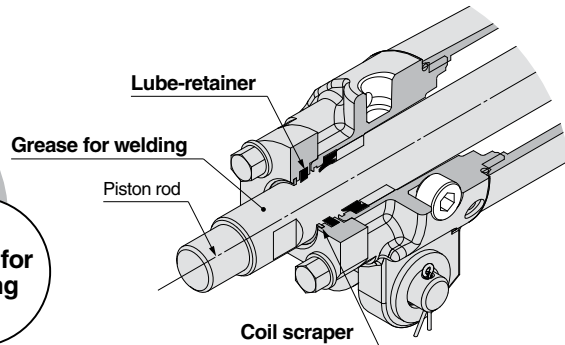
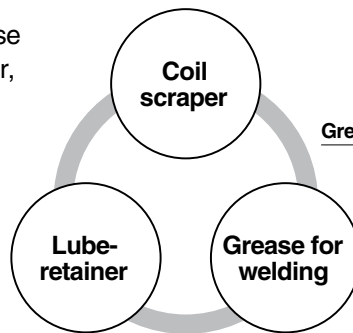


XC88/XC89

Drastically reduces spatter adhesion by the use of three roles in one unit.

Spatter Resistant Cylinders for Arc Welding

- Achieves long service life by the use of the three roles of the coil scraper, Lube-retainer and grease for welding in one unit for a cylinder.
- Reduces spatter adhesion.

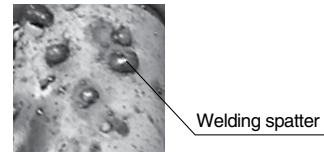


Improved cylinder durability

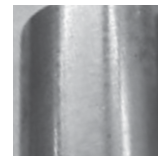
Spatter does not easily adhere to the piston rod of the spatter resistant cylinders for arc welding, which improves durability.

Spatter adhesion condition on piston rod

(compared with coil scraper type)
* Piston rod (S45C)



Surface condition after one operation



Spatter resistant cylinder for arc welding (-XC89)



With coil scraper (-XC35)

Welding Condition

Iron welding: CO₂ welding
Welding distance: 150 mm (Continuous welding distance)
Welding position: Upper part (150 mm)

XC88/XC89

Reduces cylinder maintenance labor.

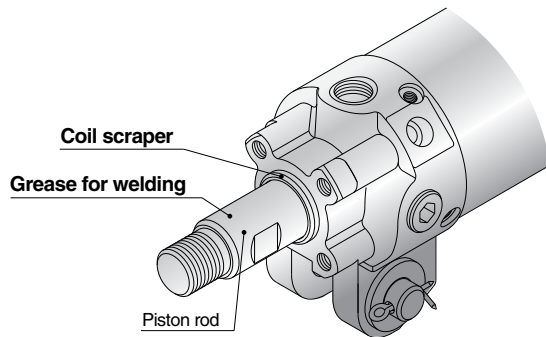
Improved durability reduces the maintenance frequency, number of replacements and man hours.

Piston rod materials can be selected for the welding conditions and environment.

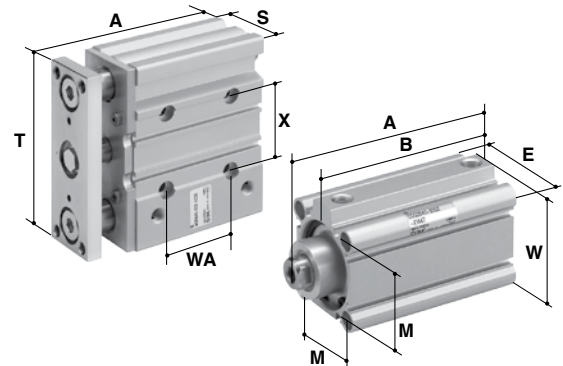
Part no.	Piston rod material		Coil scraper	Lube-retainer	Grease for welding
	S45C	Stainless steel 304			
-XC88	—	●	●	●	●
-XC89	●	—	●	●	●

XC91

Improved spatter resistance with coil scraper and welding grease



External and mounting dimensions are compatible with coil scraper type (-XC35).



* Dimension symbols are the same as those of each series.

Part no.	Piston rod material	Coil scraper	Grease for welding
	S45C		
-XC91	●	●	●
-XC35	●	●	—

Reduces cylinder maintenance labor.

Improved durability reduces the maintenance frequency, number of replacements and man hours.

Applicable Cylinders

Clamp Cylinder
CKG-XC88/XC89/XC91

Page 7



Compact Cylinder
CDQ2-XC88/XC89/XC91

Page 17



Air Cylinder
CA2-XC88/XC89/XC91

Page 39



Air Cylinder
MB-XC88/XC89/XC91

Page 47



Compact Guide Cylinder
MGPM-XC88W/XC89W/XC91

Page 55



Rotary Clamp Cylinder
Double Guide Type
MK2T-XC89/XC91

Page 61



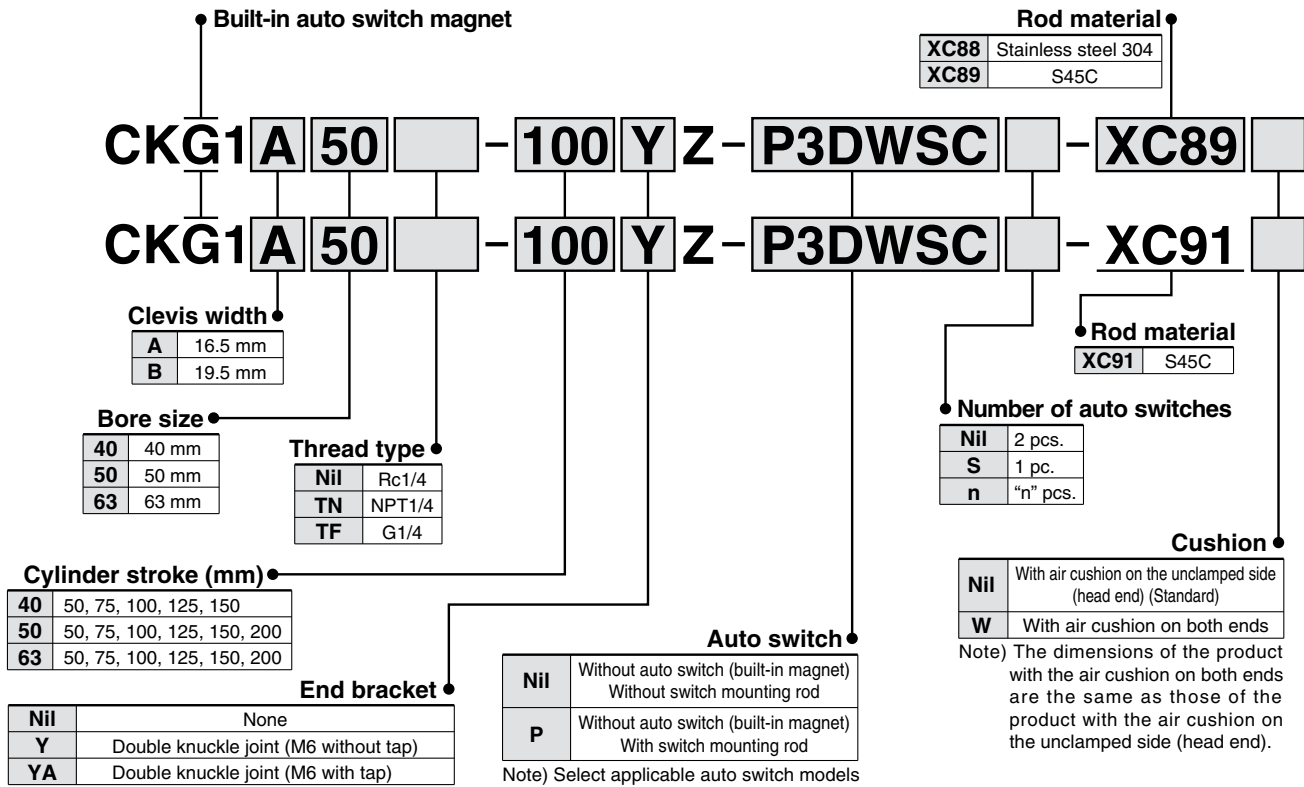
Spatter Resistant Cylinder for Arc Welding Clamp Cylinder/ Magnetic Field Resistant Auto Switch (Rod Mounting Style)

CKG1-XC88/XC89 -XC91

∅40, ∅50, ∅63



How to Order



Note) A knuckle pin, cotter pins and flat washers are provided.

Note) Select applicable auto switch models from the table below.

Made to Order

Part no.	Piston rod material (Hard chrome plated)		Coil scraper	Lube- retainer	Grease for welding
	S45C	Stainless steel 304			
-XC88	—	●	●	●	●
-XC89	●	—	●	●	●
-XC91	●	—	●	—	●

Note) Use the -XC91 in a place where the distance from the welding portion is far and the spatter scattering is minimized.

Built-in Auto Switch Magnet Cylinder Part No.

- 1) Built-in auto switch magnet type without auto switch, without switch mounting rod
Symbol for the auto switch type is "Nil" as shown below.
(Example) CKG1A50-50YZ-XC89
- 2) Built-in auto switch magnet type without auto switch, with switch mounting rod
Symbol for the auto switch type is "P" as shown below.
(Example) CKG1A50-50YZ-P-XC89

Applicable Auto Switches/Refer to the WEB catalog or the Best Pneumatics No.3 for further information on auto switches.

Type	Special function	Auto switch model	Electrical entry	Indicator light	Wiring (Pin no. in use)	Load voltage	Lead wire length	Applicable load
Solid state auto switch	Magnetic field resistant (2-color indication)	D-P3DWSC	Pre-wired connector	Yes	2-wire (3-4)	24 VDC	0.3 m	Relay, PLC
		D-P3DWSE			2-wire (1-4)			
		D-P3DW	Grommet		2-wire		0.5 m	
		D-P3DWL					3 m	
		D-P3DWZ	Pre-wired connector		2-wire (3-4)		5 m	
		D-P4DWSC					2-wire (1-4)	
		D-P4DWSE	Grommet		2-wire			
		D-P4DWL					5 m	
D-P4DWZ								

Note 1) Please contact SMC for auto switches, auto switch proper mounting positions and operating ranges other than the above.
Note 2) Refer to page 12 when ordering the auto switch mounting bracket assembly or switch mounting rod assembly.
Note 3) For the D-P3DW□, the auto switch and auto switch mounting bracket are packed together, (but not assembled).

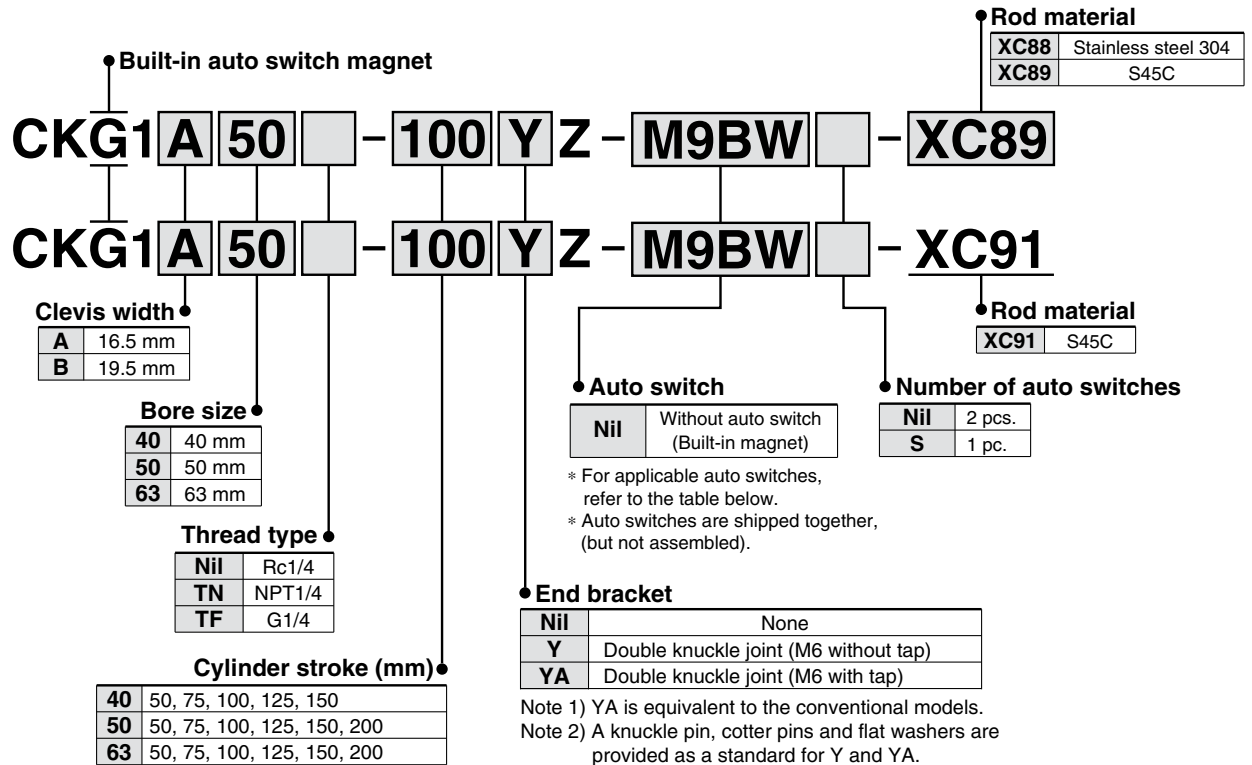
Spatter Resistant Cylinder for Arc Welding Clamp Cylinder with Standard Auto Switch (Band Mounting Style)

Series **CKG1** -XC88/XC89 -XC91

∅40, ∅50, ∅63

RoHS

How to Order



Made to Order

Part no.	Piston rod material (Hard chrome plated)		Coil scraper	Lube-retainer	Grease for welding
	S45C	Stainless steel 304			
-XC88	—	●	●	●	●
-XC89	●	—	●	●	●
-XC91	●	—	●	—	●

Note) Use the -XC91 in a place where the distance from the welding portion is far and the spatter scattering is minimized.

⚠ Caution

The standard auto switch cannot be used in a magnetic field environment. For information on our cylinders that can be fitted with a magnetic field resistant auto switch, refer to page 7.

Standard Auto Switches (Refer to the WEB catalog or the Best Pneumatics No.3 for detailed auto switch specifications.)

Applicable cylinder series	Type	Electrical entry	Indicator light	Wiring (Output)	Load voltage			Auto switch model	Lead wire length (m)				Applicable load			
					DC	5 V	AC		0.5(Nil)	1(M)	3(L)	5(Z)				
CKG1	Solid state auto switch	Grommet	Yes	2-wire	24 V	5 V	12 V	—	M9B	●	●	●	○	—	Relay, PLC	
									M9BW	●	●	●	○			
	Reed auto switch	Grommet	Yes	2-wire	24 V	12 V	100 V	100 V	200 V	A93	●	●	●			●
										B54	●	—	●			●

Note 1) Lead wire length symbol: 0.5 m..... Nil
1 m..... M
3 m..... L
5 m..... Z

Note 2) Auto switches marked with "○" are produced upon receipt of order.
Note 3) Refer to page 13 when ordering the auto switch mounting bracket assembly.

CKG1-XC88/XC89 -XC91



Specifications

Bore size (mm)	40	50	63
Fluid	Air		
Proof pressure	218 psi (1.5 MPa)		
Maximum operating pressure	145 psi (1.0 MPa)		
Minimum operating pressure	7.3 psi (0.05 MPa)		
Ambient and fluid temperature	14 to 140°F (-10°C to 60°C (No freezing))		
Piston speed	50 to 500 mm/s		
Cushion ^{Note 1)}	Unclamped side (head end): With air cushion		
Speed controller	Equipped on both ends		
Lubrication	Non-lube		
Stroke length tolerance	+1.0 0		
Mounting ^{Note 2)}	Double clevis		

Note 1) The model with air cushion on both ends (Symbol: W) is also available.

Note 2) A clevis pin, cotter pins, flat washers are equipped as a standard.

Clevis width	16.5 mm	CKG1A
	19.5 mm	CKG1B

Standard Strokes

Bore size (mm)	Standard stroke (mm)
40	50, 75, 100, 125, 150
50, 63	50, 75, 100, 125, 150, 200

End Bracket/Options

Symbol	Description		Part no.	
			Series CKG1A	Series CKG1B
Y	Double knuckle joint (A knuckle pin, cotter pins, flat washers are equipped.)	M6 without tap	CKA-Y04	CKB-Y04
YA		M6 with tap	CKA-YA04	CKB-YA04

Weight (Basic weight includes the switch mounting rod. At 0 stroke)

Unit: kg

Bore size (mm)	40	50	63
Basic weight	0.76	0.98	1.18
Additional weight per 25 mm of stroke	0.11	0.12	0.14
Double knuckle joint (A knuckle pin, cotter pins, flat washers are equipped.)	0.34		

Calculation

Example) CKG1□50-100YZ-P-XC88

- Basic weight 1.03 (ø50)
 - Additional weight 0.12/25 mm
 - Cylinder stroke 100 mm
 - Double knuckle joint 0.34 (Y)
- $$1.03 + 0.12 \times 100/25 + 0.34 = 1.85 \text{ kg}$$

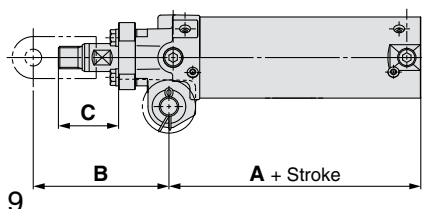
Theoretical Output

Unit: N

Bore size (mm)	Rod size (mm)	Operating direction	Piston area (mm ²)	Operating pressure (MPa)			
				0.3	0.4	0.5	0.6
40	20	OUT	1260	378	504	630	756
		IN	943	283	377	472	566
50	20	OUT	1960	588	784	980	1180
		IN	1650	495	660	825	990
63	20	OUT	3120	934	1250	1560	1870
		IN	2800	840	1120	1400	1680

1N = 0.225 lbf

Comparison of the Dimensions of Each Series



(mm)

Bore size (mm)	XC88, 89			XC91			Standard		
	A	B	C	A	B	C	A	B	C
40	78	97	43	78	97	52	78	97	52
50	78	97	43	78	97	52	78	97	52
63	78	97	43	78	97	52	78	97	52

* At 0 stroke

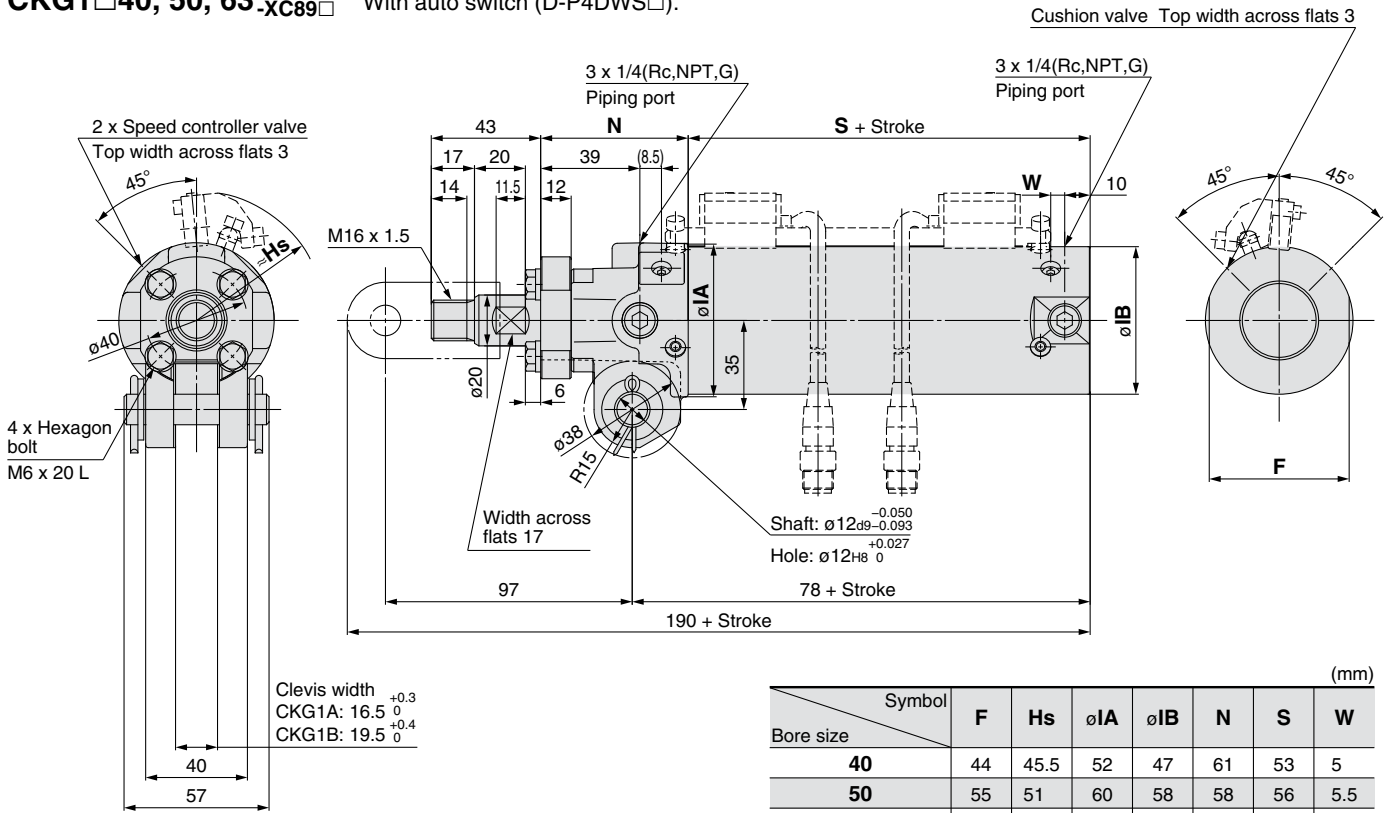


Bore Size

∅40 to ∅63

CKG1□40, 50, 63-XC88□
 XC89□

With auto switch (D-P4DWS□).

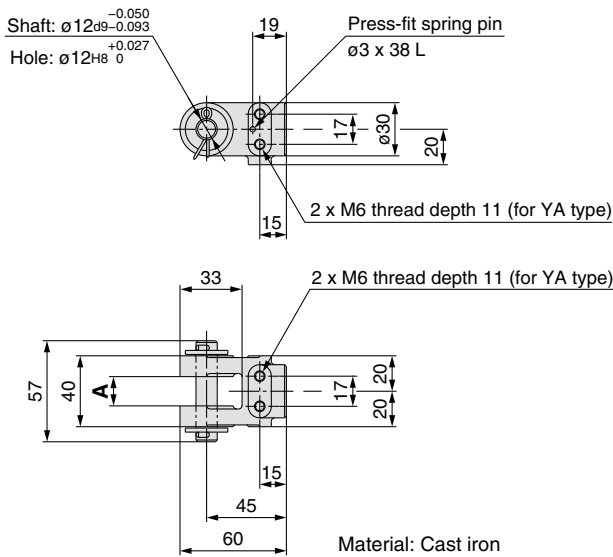


Symbol	F	Hs	∅IA	∅IB	N	S	W
Bore size							
40	44	45.5	52	47	61	53	5
50	55	51	60	58	58	56	5.5
63	69	58.5	74	72	58	56	5.5

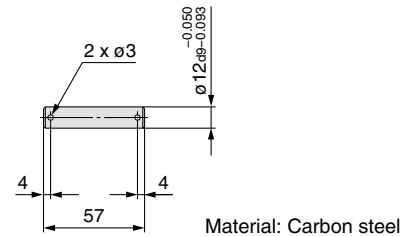
(mm)

End Bracket

Double knuckle joint



Pin



Part no.	Application
CK-P04	Knuckle pin Clevis pin

Note) Cotter pins and flat washers are attached to the pin.

Part no.	End bracket symbol	A	Applicable clamp cylinder
CKA-Y04	Y (M6 without tap)	16.5 ₀ ^{+0.3}	Series CKG1A
CKA-YA04	YA (M6 with tap)		
CKB-Y04	Y (M6 without tap)	19.5 ₀ ^{+0.4}	Series CKG1B
CKB-YA04	YA (M6 with tap)		

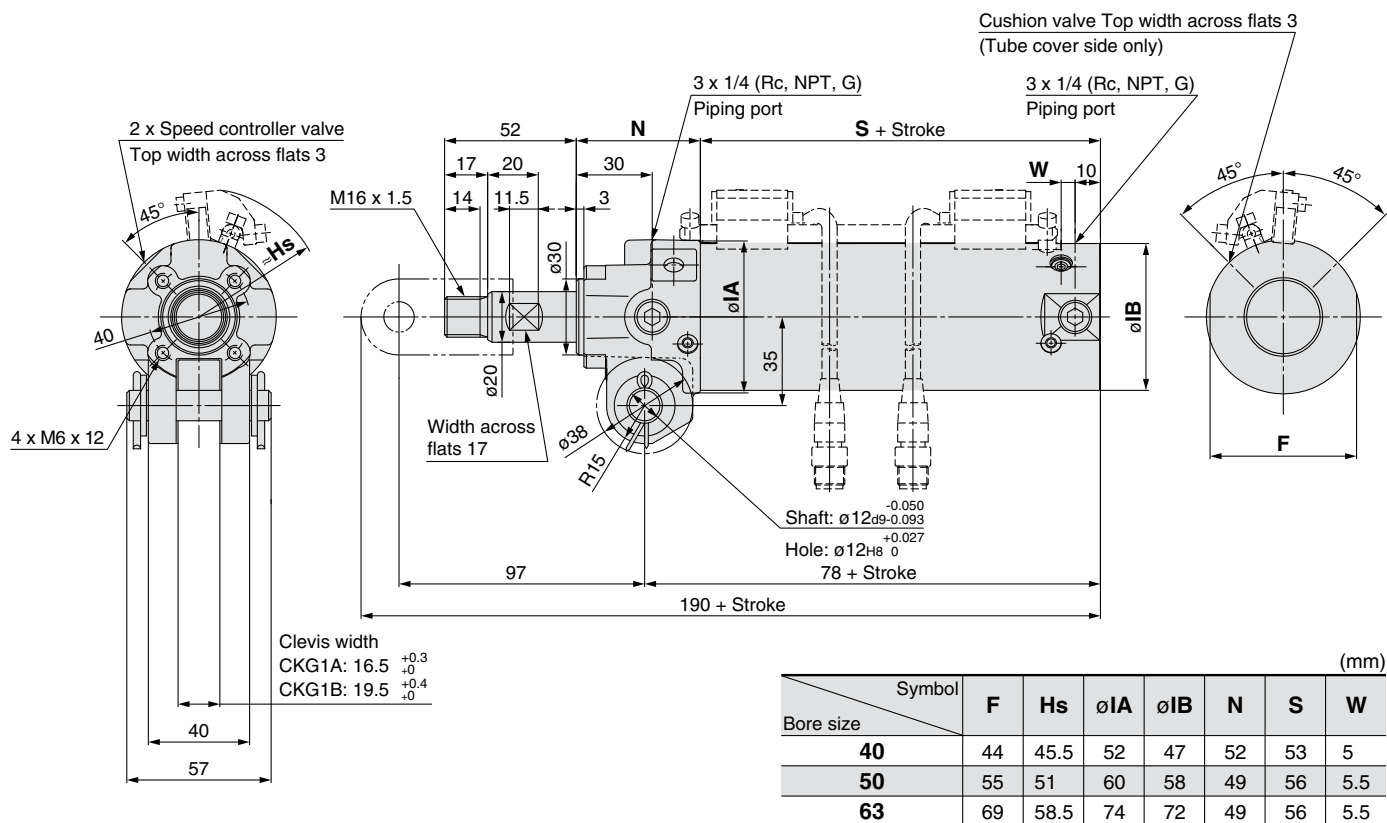
(mm)

Note 1) A knuckle pin, cotter pins, flat washers and a spring pin are attached to the double knuckle joint.

CKG1-XC91

Bore Size **Ø40 to Ø63**

CKG1□40, 50, 63-XC91□ With auto switch (D-P4DWS□).

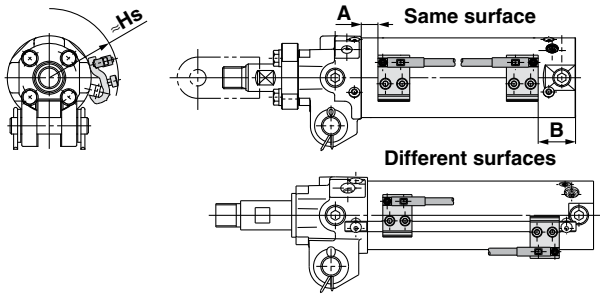


Magnetic Field Resistant Auto Switch Mounting

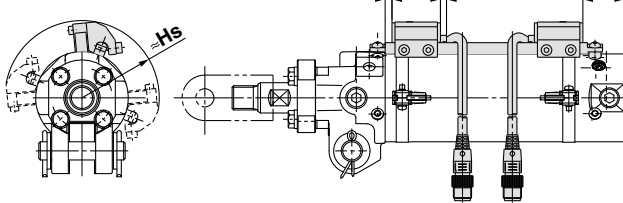
Auto Switch Proper Mounting Position (Detection at Stroke End) and Its Mounting Height

Rod mounting

D-P3DW□



D-P4DW□



Auto Switch Mounting Position and Its Height Unit: mm

Auto switch model	Symbol	Auto switch set value and its height		
		ø40	ø50	ø63
D-P3DW□	A	10.5	7	7
	B	23.5	30	30
	Hs	43.5	49.5	56.5
D-P4DW□	A	8	4.5	4.5
	B	20.5	27.5	27.5
	Hs	45.5	51	58.5

Note 1) The mounting position should be referred for reference only for the auto switch mounting position at the stroke end detection. Adjust the auto switch after confirming the operation to set actually.

Note 2) A/B dimensions are the distance from the standard position (above drawing) to the end surface of the auto switch.

Note 3) The auto switch mounting position is temporarily set at the time of shipping from our factory. Change it to the desired position in accordance to your facility.

Minimum Stroke for Auto Switch Mounting

Unit: mm

Auto switch model	With 1 pc.	With 2 pcs.	
		Different surfaces	Same surface
D-P3DW□	15	30	75
D-P4DW□	50	50	

Note) When two D-P3DW□ are mounted to the cylinder with stroke 50 mm, mount them on different surfaces.

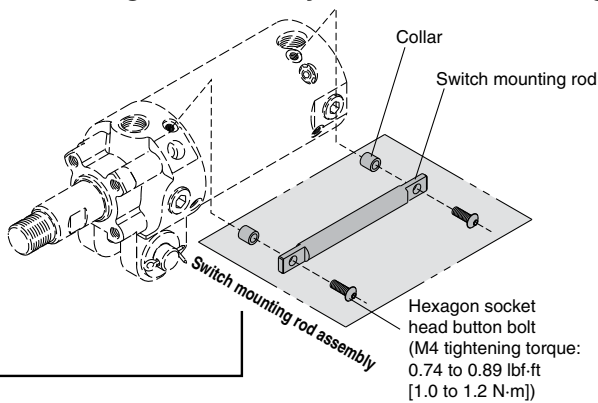
Operating Range

Unit: mm

Auto switch model	Bore size		
	40	50	63
D-P3DW□	4	5	6
D-P4DW□	4	4	4.5

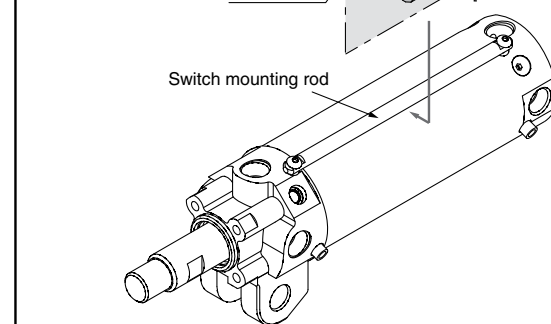
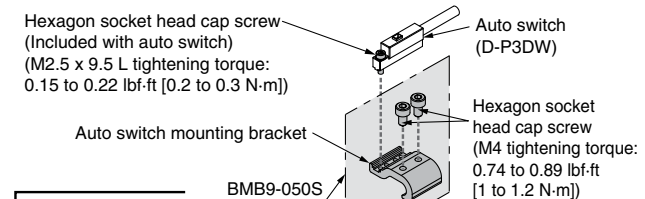
Auto Switch Mounting Bracket/Part No.

Switch mounting rod assembly/Auto switch mounting bracket assembly



• Switch Mounting Rod Assembly/Part No.

Applicable series	Applicable clamp cylinder	Part no.
Series CKG1□40/50/ 63	CKG1□40-50 CKG1□50-50/CKP1□50-50 CKG1□63-50/CKP1□63-50	CKG40-R050
	CKG1□40-75 CKG1□50-75/CKP1□50-75 CKG1□63-75/CKP1□63-75	CKG40-R075
	CKG1□40-100 CKG1□50-100/CKP1□50-100 CKG1□63-100/CKP1□63-100	CKG40-R100
	CKG1□40-125 CKG1□50-125/CKP1□50-125 CKG1□63-125/CKP1□63-125	CKG40-R125
	CKG1□40-150 CKG1□50-150/CKP1□50-150 CKG1□63-150/CKP1□63-150	CKG40-R150



• Auto Switch Mounting Bracket Assembly/Part No.

Applicable cylinder series	Applicable auto switch model	Auto switch mounting bracket part no.		
		40	50	63
Series CKG1	D-P3DW□	BMB9-050S		
	D-P4DW□	BK1T-040		

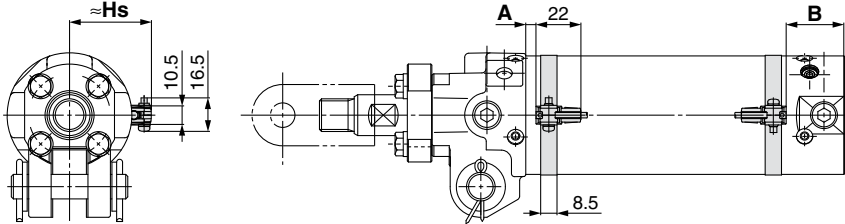
Standard Auto Switch Mounting



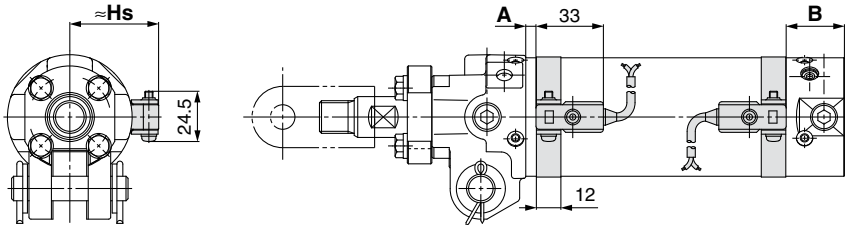
Please contact SMC for detailed dimensions, specifications and lead times.

Auto Switch Mounting Position (Detection at Stroke End) and Its Mounting Height

D-M9B/A93(W)



D-B54



Minimum Stroke for Auto Switch Mounting (mm)

Auto switch model	With 1 pc.	With 2 pcs. (Different surfaces)	With 2 pcs. (Same surface)
D-M9B	50	50	50
D-M9BW			
D-A93	50	50	75
D-B54			

Auto Switch Mounting Position and Its Height (mm)

Auto switch model	Symbol	Auto switch set value and its height		
		ø40	ø50	ø63
D-M9B D-M9BW	A	15	11.5	11.5
	B	27.5	34.5	34.5
	Hs	35.5	41	48
D-A93	A	11	7.5	7.5
	B	23.5	30.5	30.5
	Hs	35.5	41	48
D-B54	A	5.5	2	2
	B	18	25	25
	Hs	38	43.5	50.5

Note 1) The mounting position should be referred for reference only for the auto switch mounting position at the stroke end detection. Adjust the auto switch after confirming the operation to set actually.

Note 2) A/B dimensions are the distance from the standard position (above drawing) to the end surface of the auto switch.

Note 3) The auto switch mounting position is temporarily set at the time of shipping from our factory. Change it to the desired position in accordance to your facility.

⚠ Caution

As for the precautions on the auto switches, product specifications, refer to the WEB catalog or Best Pneumatics No.3.

Auto Switch Mounting Bracket Assembly/Part No.

Auto switch model	Bore size (mm)		
	ø40	ø50	ø63
D-M9B D-M9BW D-A93	Note) BMA3-040	Note) BMA3-050	Note) BMA3-063
D-B54	BA-04	BA-05	BA-06

Note) This is the set part number for the auto switch mounting band (BMA2-□□□A) and holder set (BJ5-1/switch bracket: transparent). The switch bracket (nylon) cannot be used in environments exposed to alcohol, chloroform, methylamines, hydrochloric acid and sulfuric acid, as this part will deteriorate.

Please consult with SMC regarding other chemicals.

Operating Range

Auto switch model	(mm)		
	Bore size		
	40	50	63
D-M9B	3.5	4	4
D-M9BW	5.5	6.5	7
D-A93	8	8	9
D-B54	10	10	11

* Values which include hysteresis are for guideline purpose only, they are not a guarantee (assuming approximately ±30% dispersion) and may change substantially depending on the ambient environment.

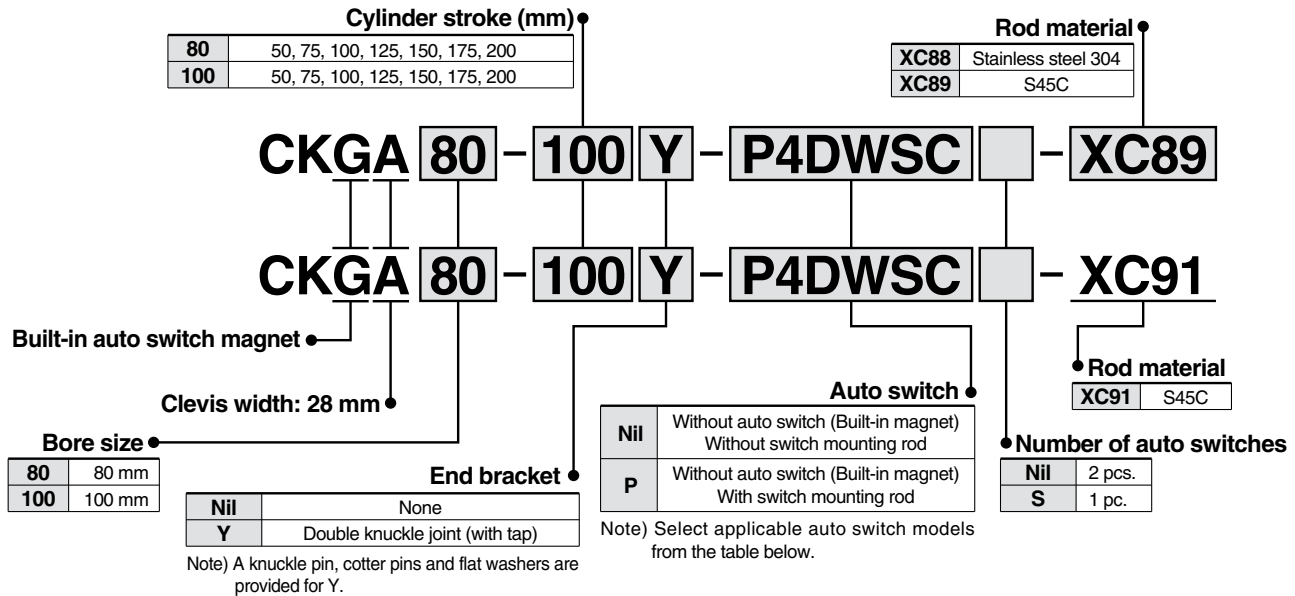
Spatter Resistant Cylinder for Arc Welding Clamp Cylinder (Rod Mounting Style)

CKGA-XC88/XC89 CKGA-XC91

∅80, ∅100

RoHS

How to Order



Made to Order

Part no.	Piston rod material (Hard chrome plated)		Coil scraper	Lube-retainer	Grease for welding
	S45C	Stainless steel 304			
-XC88	—	●	●	●	●
-XC89	●	—	●	●	●
-XC91	●	—	●	—	●

Note) Use the -XC91 in a place where the distance from the welding portion is far and the spatter scattering is minimized.

Applicable Auto Switches/Refer to the **WEB catalog** or the Best Pneumatics No.3 for further information on auto switches.

Type	Special function	Auto switch model	Electrical entry	Indicator light	Wiring (Pin no. in use)	Load voltage	Lead wire length	Applicable load
Solid state auto switch	Magnetic field resistant (2-color indication)	D-P4DWSC	Pre-wired connector	Yes	2-wire (3-4)	24 VDC	0.3 m	Relay, PLC
		D-P4DWSE			2-wire (1-4)		3 m	
		D-P4DWL	Grommet		2-wire		5 m	
		D-P4DWZ						

Note) Please contact SMC for auto switches, auto switch proper mounting positions and operating ranges other than the above.

Specifications

Bore size (mm)	80	100
Fluid	Air	
Proof pressure	218 psi (1.5 MPa)	
Maximum operating pressure	145 psi (1.0 MPa)	
Minimum operating pressure	7.3 psi (0.05 MPa)	
Ambient and fluid temperature	14 to 140°F (-10°C to 60°C) (No freezing)	
Piston speed	50 to 500 mm/s	
Cushion	With air cushion on both ends	
Speed controller	Equipped on both ends	
Lubrication	Non-lube	
Stroke length tolerance	+1.0 0	
Mounting ^{Note)}	Double clevis	

Note) A clevis pin, cotter pins and flat washers are provided.

Clevis width	28 mm	CKGA
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Built-in Auto Switch Magnet Cylinder Part No.

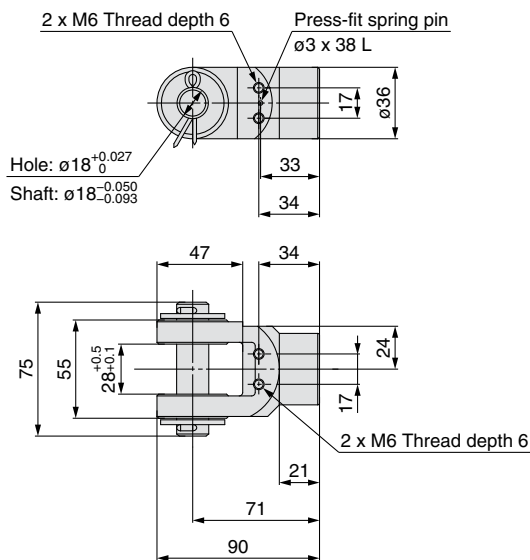
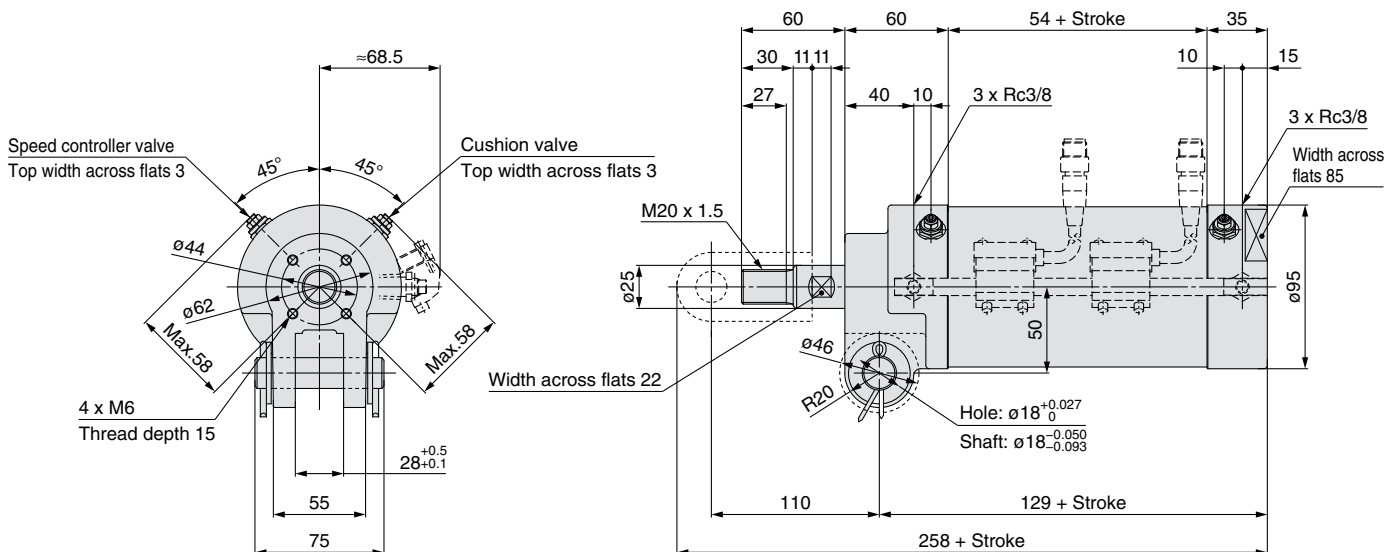
- 1) Built-in auto switch magnet type without auto switch, without switch mounting rod
Symbol for the auto switch type is "Nil" as shown below.
(Example) CKGA80-50Y-XC89
- 2) Built-in auto switch magnet type without auto switch, with switch mounting rod
Symbol for the auto switch type is "P" as shown below.
(Example) CKGA80-50Y-P-XC89

Comparison of the Dimensions of Each Series

The -XC88/XC89/XC91 and standard product have the same dimensions.

Bore Size $\varnothing 80$ to $\varnothing 100$

CKGA80-XC88/XC89 With auto switch (D-P4DWS□).
-XC91



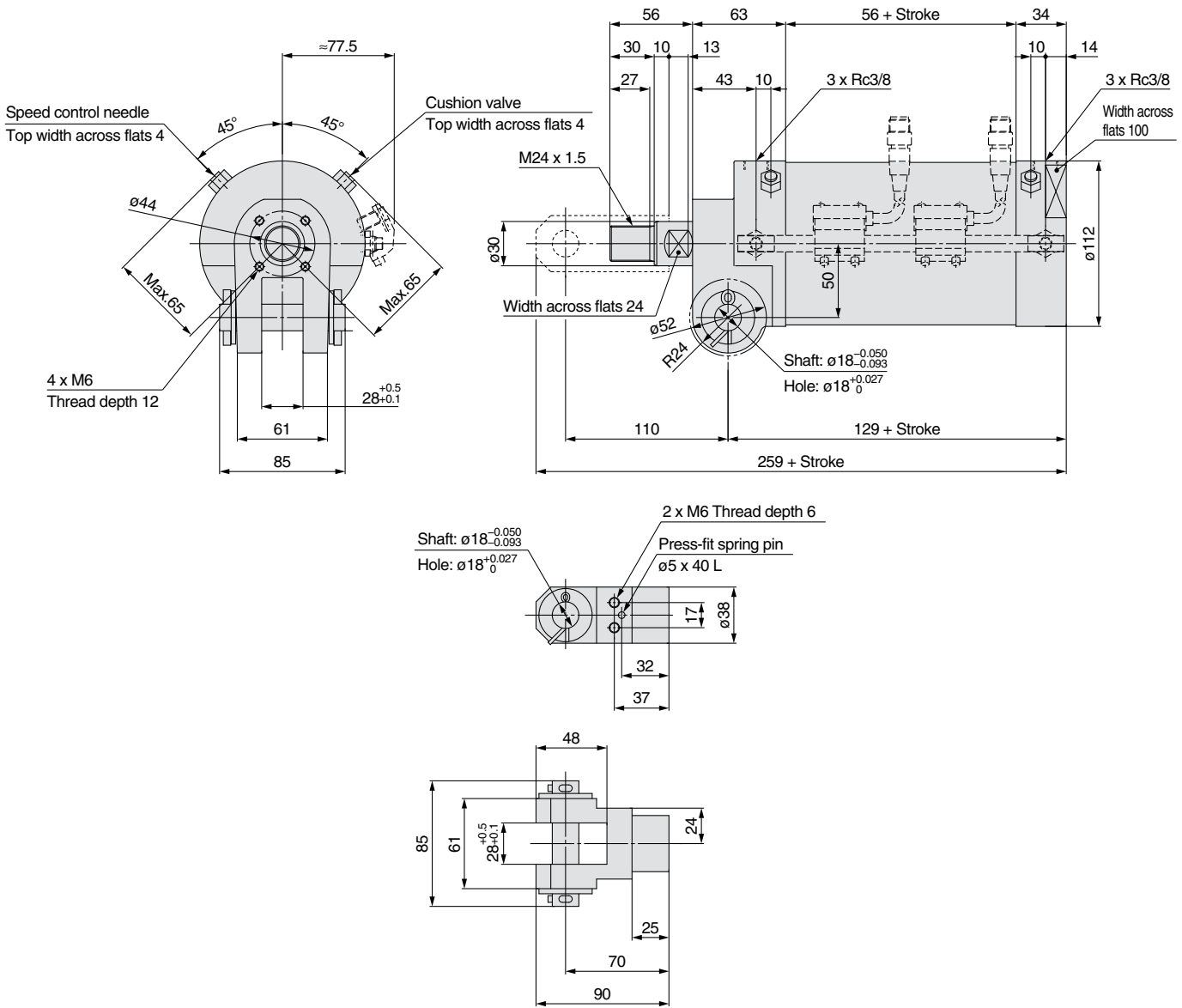
Double knuckle joint

Part No.

- **Double knuckle joint assembly part no.:**
C1K80-18-9261P-R
Pin, flat washer, cotter pin, spring pin included
- **Pin assembly part no.:**
C1K80-23-9034P-R
Pin, flat washer (2 pcs.), cotter pin (2 pcs.)
- **Tie-rod assembly part no. for auto switch mounting:**
C1K80E-B0467-050-R
Stroke
050, 075, 100, 125, 150
- **Auto switch mounting bracket (D-P4DWS□) part no.:**
BAP2-063

CKGA100 -XC88/XC89
 -XC91

With auto switch (D-P4DWS□).



Double knuckle joint

Part No.

- **Double knuckle joint assembly part no.:**
 C1KA0-18-9262P-R
 Pin, flat washer, cotter pin, spring pin included
- **Pin assembly part no.:**
 C1KA0-23-9035P-R
 Pin, flat washer (2 pcs.), cotter pin (2 pcs.)
- **Tie-rod assembly part no. for auto switch mounting:**
 CK-A0E-B4657-050-R
 Stroke
 050, 075, 100, 125, 150
- **Auto switch mounting bracket (D-P4DWS□) part no.:**
 BAP2-063

Spatter Resistant Cylinder for Arc Welding

Compact Cylinder: Standard, Double Acting, Single Rod

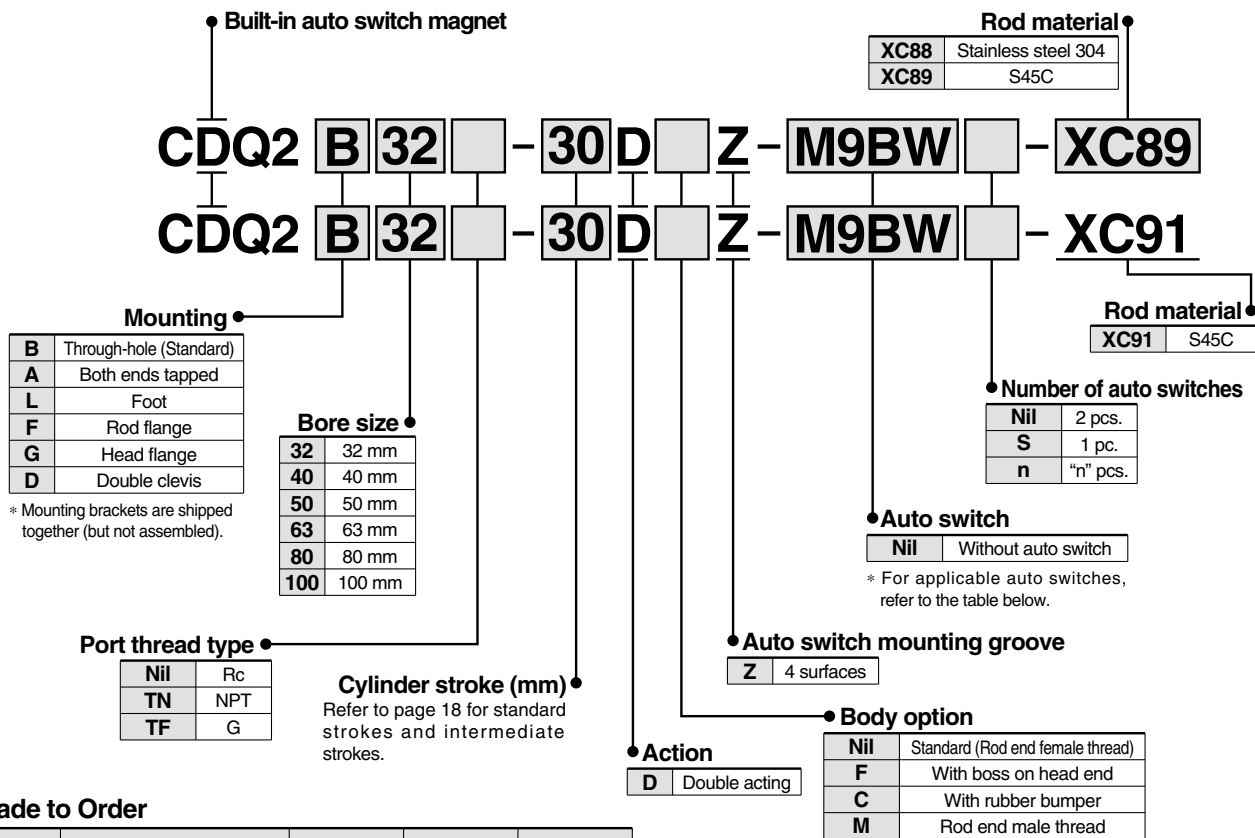
CDQ2-XC88/XC89

CDQ2-XC91

∅32, ∅40, ∅50, ∅63, ∅80, ∅100



How to Order



Made to Order

Part no.	Piston rod material (Hard chrome plated)		Coil scraper	Lube-retainer	Grease for welding
	S45C	Stainless steel 304			
-XC88	—	●	●	●	●
-XC89	●	—	●	●	●
-XC91	●	—	●	—	●

Note) Use the -XC91 in a place where the distance from the welding portion is far and the spatter scattering is minimized.

Built-in Auto Switch Magnet Cylinder Model

If a built-in auto switch magnet cylinder without an auto switch is required, there is no need to enter the symbol for the auto switch.

(Example) CDQ2L32-25DZ-XC89

Applicable Auto Switches/Refer to the WEB catalog or the Best Pneumatics No. 2 for further information on auto switches.

Type	Special function	Electrical entry	Indicator light	Wiring (Output)	Load voltage		Auto switch model		Lead wire length (m)					Pre-wired connector	Applicable load			
					DC	AC	Perpendicular	In-line	0.5 (Nil)	1 (M)	3 (L)	5 (Z)	None (N)		IC circuit	Relay, PLC		
Solid state auto switch	—	Grommet	Yes	3-wire (NPN)	24 V	5 V, 12 V	—	M9NV	M9N	●	●	●	○	—			○	IC circuit
				3-wire (PNP)				M9PV	M9P	●	●	●	○	—	○			
				2-wire				M9BV	M9B	●	●	●	○	—	○			
	3-wire (NPN)			M9NWV				M9NW	●	●	●	○	—	○	IC circuit			
	3-wire (PNP)			M9PWW				M9PW	●	●	●	○	—	○				
	2-wire			M9BWV				M9BW	●	●	●	○	—	○	—			
Magnetic field resistant (2-color indication)	2-wire (Non-polar)	—	P3DWA	●	—	●	●	—	●	—								
Reed auto switch	—	Grommet	Yes	3-wire (NPN equivalent)	24 V	5 V, 12 V	100 V or less	A96V	A96		●	—	●	—	—	—	IC circuit	Relay, PLC
				2-wire				A93V	A93	●	—	●	—	—	—	—		
				—				A90V	A90	●	—	●	—	—	—	—	IC circuit	
				—				P4DW	—	—	●	●	—	—	—	—	—	

* Lead wire length symbols: 0.5 m Nil (Example) M9NW
 1 m M (Example) M9NWM
 3 m L (Example) M9NWL
 5 m Z (Example) M9NWX

* Please contact SMC for auto switches, auto switch proper mounting positions and operating ranges other than the above.

Spatter Resistant Cylinder for Arc Welding CDQ2-XC88/XC89 Compact Cylinder: Standard, Double Acting, Single Rod CDQ2-XC91

Spatter Resistant Cylinders for Arc Welding

Clamp Cylinders

Gas/Air Switching Valve

Detection Switches

Tubing

Fittings

Speed Control Equipment

Specifications

Pneumatic type

Bore size (mm)	32	40	50	63	80	100	
Action	Double acting, Single rod						
Fluid	Air						
Proof pressure	218 psi (1.5 MPa)						
Maximum operating pressure	145 psi (1.0 MPa)						
Minimum operating pressure	7.3 psi (0.05 MPa)						
Ambient and fluid temperature	14 to 140 °F (-10 to 60°C) (No freezing)						
Lubrication	Not required (Non-lube)						
Piston speed	50 to 500 mm/s						
Allowable kinetic energy lbfft (J)	Standard	0.11 (0.15)	0.19 (0.26)	0.34 (0.46)	0.57 (0.77)	1.00 (1.36)	1.67 (2.27)
	With rubber bumper	0.21 (0.29)	0.38 (0.52)	0.67 (0.91)	1.14 (1.54)	2.00 (2.71)	3.35 (4.54)
Stroke length tolerance	+1.0 mm (Note) 0						



Note) Stroke length tolerance does not include the amount of bumper change.

Standard Strokes

Pneumatic type

Bore size	Standard stroke (mm)
32, 40	5, 10, 15, 20, 25, 30, 35, 40, 45, 50, 75, 100
50 to 100	10, 15, 20, 25, 30, 35, 40, 45, 50, 75, 100

- For long strokes exceeding the standard stroke range, refer to page 27.
- For intermediate strokes, refer below.

Mounting Brackets/Part No.

Bore size (mm)	Model	Foot ^{Note 1)}	Flange	Double clevis
32	CDQ2□□-□DZ	CQ-L032-XC35	CQ-F032-XC35	CQ-D032
40	CDQ2□□-□DZ	CQ-L040	CQ-F040	CQ-D040
50	CDQ2□□-□DZ	CQ-L050	CQ-F050	CQ-D050
63	CDQ2□□-□DZ	CQ-L063	CQ-F063	CQ-D063
80	CDQ2□□-□DZ	CQ-L080	CQ-F080	CQ-D080
100	CDQ2□□-□DZ	CQ-L100	CQ-F100	CQ-D100

- Note 1) Order two foot brackets per cylinder. (except ø32)
For ø32 type, order 1 piece per cylinder. (Part number for a set of 2 foot brackets)
- Note 2) Parts belonging to each bracket are as follows.
Foot or Flange: Body mounting bolts
Double clevis: Clevis pin, Type C retaining rings for axis, Body mounting bolts

Manufacture of Intermediate Strokes

Spacer-installed type: Standard model number

- A spacer is installed on the standard strokes.
- Available in 1 mm intervals
- A spacer is installed on tubes with a stroke longer than the specified stroke (). ◆

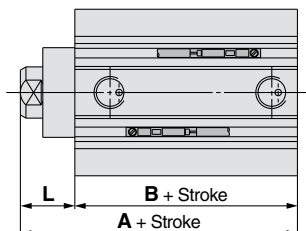
◆ : Standard stroke

Bore size (mm)	Stroke range	Type	Stroke																	
			5	10	15	20	25	30	35	40	45	50	75	100						
32, 40	1 to 99	Spacer-installed type 1	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	
50 to 100	1 to 99	Spacer-installed type 1	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	

Ordering example: ø32-57 mm stroke, with through-hole and without auto switch

Type	Spacer-installed type 1
Part no.	Standard model number
Order no.	CDQ2B32-57DZ-XC89
Ordering example Description	<ul style="list-style-type: none"> • Uses a standard stroke (75 mm) tube. • Makes 57 mm stroke with 18 mm spacer inside. • The B dimension is 108 mm.

Comparison of the Dimensions of Each Series

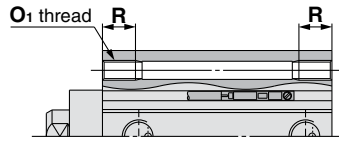


Bore size (mm)	XC88, 89			XC91			XC35			Standard		
	A	B	L	A	B	L	A	B	L	A	B	L
32	50	33	17	45	33	12	45	33	12	40	33	7
40	56.5	39.5	17	51.5	39.5	12	51.5	39.5	12	46.5	39.5	7
50	58.5	40.5	18	53.5	40.5	13	53.5	40.5	13	48.5	40.5	8
63	64	46	18	59	46	13	59	46	13	54	46	8
80	73.5	53.5	20	68.5	53.5	15	68.5	53.5	15	63.5	53.5	10
100	85	63	22	80	63	17	80	63	17	75	63	12

* At 0 stroke



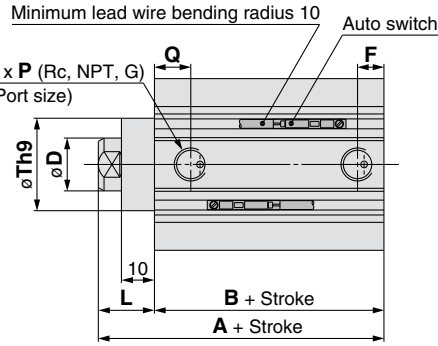
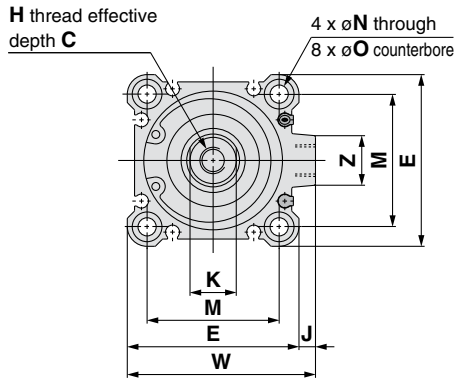
Both ends tapped: CDQ2A



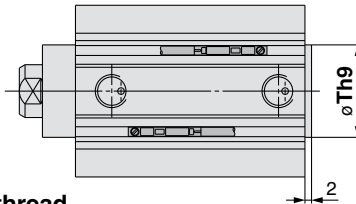
Both Ends Tapped (mm)

Bore size (mm)	O ₁	R
32	M6 x 1.0	10
40	M6 x 1.0	10
50	M8 x 1.25	14

Through-hole (Standard): CDQ2B



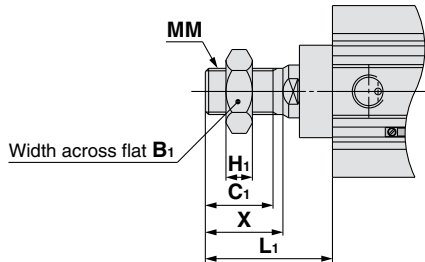
With boss on head end



With Boss on Head End (mm)

Bore size (mm)	Th9
32	21 ⁰ _{-0.052}
40	28 ⁰ _{-0.052}
50	35 ⁰ _{-0.062}

Rod end male thread



Rod End Male Thread (mm)

Bore size (mm)	B ₁	C ₁	H ₁	L ₁	MM	X
32	22	20.5	8	38.5	M14 x 1.5	23.5
40	22	20.5	8	38.5	M14 x 1.5	23.5
50	27	26	11	43.5	M18 x 1.5	28.5

Standard

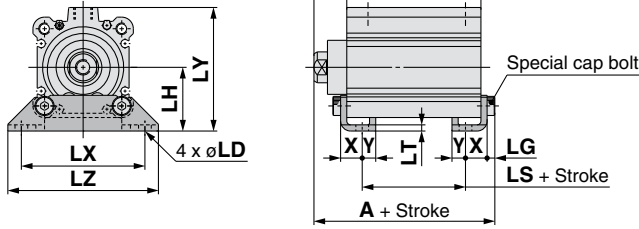
Bore size (mm)	Stroke range (mm)	A	B	C	D	E	F	H	J	K	L	M	N	O	P	Q	Th9	W	Z
32	5 to 50, 75, 100	50	33	13	16	45	7.5	M8 x 1.25	4.5	14	17	34	5.5	9 depth 7	1/8	10	23 ⁰ _{-0.052}	49.5	14
40	5 to 50, 75, 100	56.5	39.5	13	16	52	7.5	M8 x 1.25	5	14	17	40	5.5	9 depth 7	1/8	12.5	28 ⁰ _{-0.052}	57	15
50	10 to 50, 75, 100	58.5	40.5	15	20	64	10.5	M10 x 1.5	7	17	18	50	6.6	11 depth 8	1/4	10.5	35 ⁰ _{-0.062}	71	19

Note 1) The external dimensions with rubber bumper are same as those of the standard, as shown above.
* For details about the rod end nut and accessory brackets, refer to **the WEB catalog** or Best Pneumatics No.2.
Note 2) For calculation on the longitudinal dimension of intermediate strokes, refer to page 18.

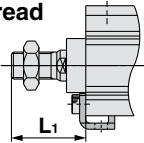
Spatter Resistant Cylinder for Arc Welding
Compact Cylinder: Standard, Double Acting, Single Rod **CDQ2-*XC88***
CDQ2-*XC89*

Spatter Resistant Cylinders
for Arc Welding

Foot: CDQ2L



Rod end male thread



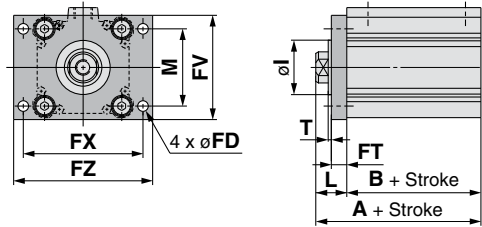
Foot

Bore size (mm)	A	B	LS	L	L ₁	LD	LG	LH	LT	LX	LY	LZ	X	Y
32	57.2	33	17	17	38.5	6.6	4	30	3.2	57	57	71	11.2	5.8
40	63.7	39.5	23.5	17	38.5	6.6	4	33	3.2	64	64	78	11.2	7
50	66.7	40.5	17.5	18	43.5	9	5	39	3.2	79	78	95	14.7	8

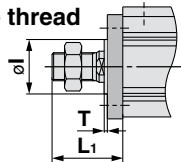
Foot bracket material: Carbon steel
Surface treatment: Nickel plating

Clamp Cylinders

Rod flange: CDQ2F



Rod end male thread



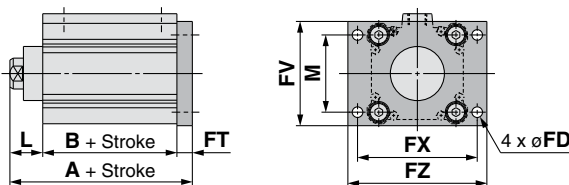
Rod Flange

Bore size (mm)	A	B	FD	FT	FV	FX	FZ	L	L ₁	M	I	T
32	50	33	5.5	8	48	56	65	17	38.5	34	23	2
40	56.5	39.5	5.5	8	54	62	72	17	38.5	40	28	2
50	58.5	40.5	6.6	9	67	76	89	18	43.5	50	35	1

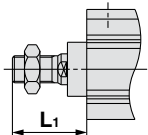
Flange bracket material: Carbon steel
Surface treatment: Nickel plating

Gas/Air Switching Valve

Head flange: CDQ2G



Rod end male thread



Head Flange

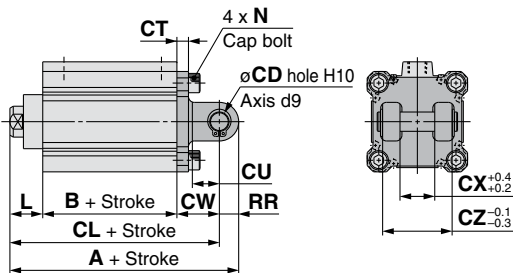
Bore size (mm)	A
32	58
40	64.5
50	67.5

(* The dimensions except A are the same as those of the rod flange.)

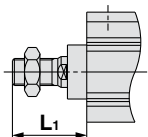
Flange bracket material: Carbon steel
Surface treatment: Nickel plating

Detection Switches

Double clevis: CDQ2D



Rod end male thread



Double Clevis

Bore size (mm)	A	B	CL	CD	CT	CU	CW	CX	CZ	L	L ₁	N	RR
32	80	33	70	10	5	14	20	18	36	17	38.5	M6 x 1.0	10
40	88.5	39.5	78.5	10	6	14	22	18	36	17	38.5	M6 x 1.0	10
50	100.5	40.5	86.5	14	7	20	28	22	44	18	43.5	M8 x 1.25	14

Double clevis bracket material: Cast iron
Surface treatment: Painted

* For details about the rod end nut and accessory brackets, refer to the WEB catalog or Best Pneumatics No.2.

* A double clevis pin and retaining rings are included.

Tubing

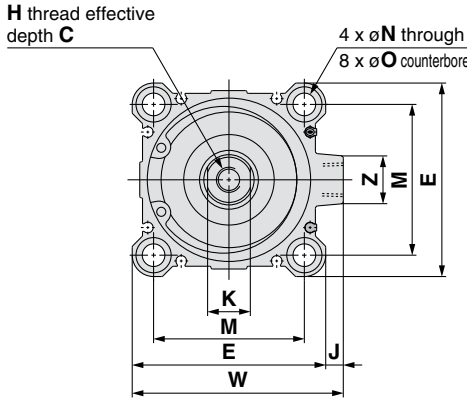
Fittings

Speed Control Equipment

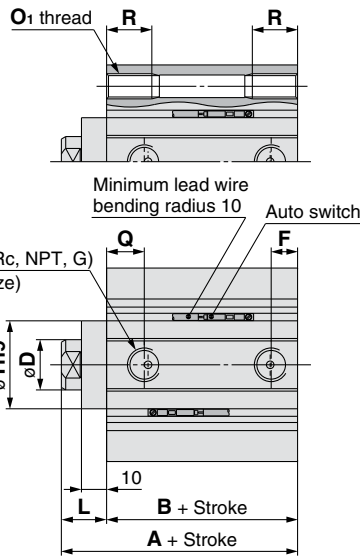
Bore Size $\varnothing 63$ to $\varnothing 100$

CDQ2 \square -XC88
-XC89

Through-hole (Standard): CDQ2B



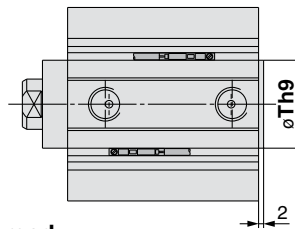
Both ends tapped: CDQ2A



Both Ends Tapped

Bore size (mm)	O ₁	R
63	M10 x 1.5	18
80	M12 x 1.75	22
100	M12 x 1.75	22

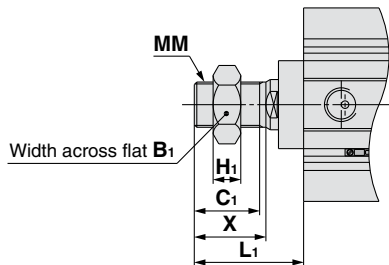
With boss on head end



With Boss on Head End

Bore size (mm)	Th9
63	35 ⁰ _{-0.062}
80	43 ⁰ _{-0.062}
100	59 ⁰ _{-0.074}

Rod end male thread



Rod End Male Thread

Bore size (mm)	B ₁	C ₁	H ₁	L ₁	MM	X
63	27	26	11	43.5	M18 x 1.5	28.5
80	32	32.5	13	53.5	M22 x 1.5	35.5
100	41	32.5	16	53.5	M26 x 1.5	35.5

Standard

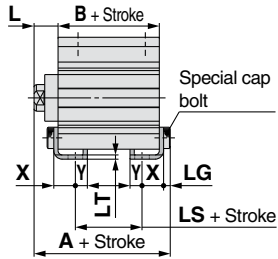
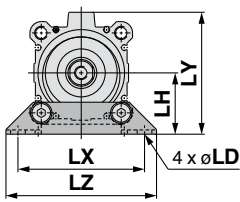
Bore size (mm)	Stroke range (mm)	A	B	C	D	E	F	H	J	K	L	M	N	O	P	Q	Th9	W	Z
63	10 to 50, 75, 100	64	46	15	20	77	10.5	M10 x 1.5	7	17	18	60	9	14 depth 10.5	1/4	15	35 ⁰ _{-0.062}	84	19
80	10 to 50, 75, 100	73.5	53.5	21	25	98	12.5	M16 x 2.0	6	22	20	77	11	17.5 depth 13.5	3/8	16	43 ⁰ _{-0.062}	104	25
100	10 to 50, 75, 100	85	63	27	30	117	13	M20 x 2.5	6.5	27	22	94	11	17.5 depth 13.5	3/8	23	59 ⁰ _{-0.074}	123.5	25

Note 1) The external dimensions with rubber bumper are same as those of the standard, as shown above.

* For details about the rod end nut and accessory brackets, refer to the WEB catalog or Best Pneumatics No.2.

Note 2) For calculation on the longitudinal dimension of intermediate strokes, refer to page 18.

Foot: CDQ2L

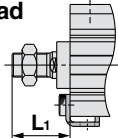


Foot

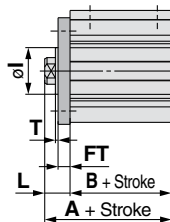
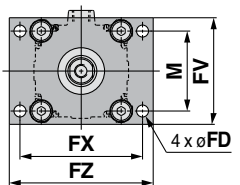
Bore size (mm)	A	B	LS	L	L ₁	LD	LG	LH	LT	LX	LY	LZ	X	Y
63	72.2	46	20	18	43.5	11	5	46	3.2	95	91.5	113	16.2	9
80	85	53.5	23.5	20	53.5	13	7	59	4.5	118	114	140	19.5	11
100	98	63	29	22	53.5	13	7	71	6	137	136	162	23	12.5

Foot bracket material: Carbon steel
Surface treatment: Nickel plating

Rod end male thread



Rod flange: CDQ2F

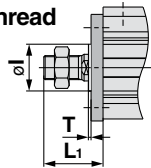


Rod Flange

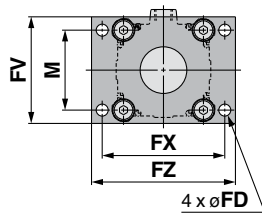
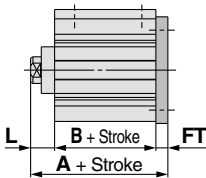
Bore size (mm)	A	B	FD	FT	FV	FX	FZ	L	L ₁	M	I	T
63	64	46	9	9	80	92	108	18	43.5	60	35	1
80	73.5	53.5	11	11	99	116	134	20	53.5	77	—	—
100	85	63	11	11	117	136	154	22	53.5	94	—	—

Flange bracket material: Carbon steel
Surface treatment: Nickel plating

Rod end male thread



Head flange: CDQ2G



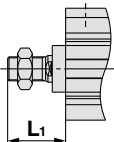
Head Flange

Bore size (mm)	A
63	73
80	84.5
100	96

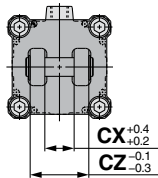
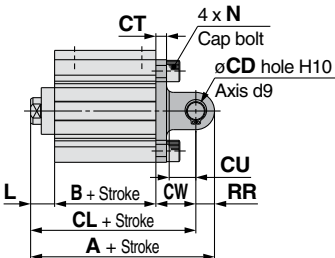
(* The dimensions except A are the same as those of the rod flange.)

Flange bracket material: Carbon steel
Surface treatment: Nickel plating

Rod end male thread



Double clevis: CDQ2D

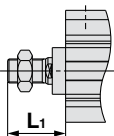


Double Clevis

Bore size (mm)	A	B	CL	CD	CT	CU	CW	CX	CZ	L	L ₁	N	RR
63	108	46	94	14	8	20	30	22	44	18	43.5	M10 x 1.5	14
80	129.5	53.5	111.5	18	10	27	38	28	56	20	53.5	M12 x 1.75	18
100	152	63	130	22	13	31	45	32	64	22	53.5	M12 x 1.75	22

Double clevis bracket material: Cast iron
Surface treatment: Painted

Rod end male thread



* For details about the rod end nut and accessory brackets, refer to the **WEB catalog** or Best Pneumatics No.2.

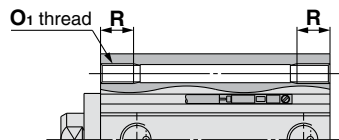
* A double clevis pin and retaining rings are included.

CDQ2-XC91

Bore Size $\varnothing 32$ to $\varnothing 50$

CDQ2□-XC91

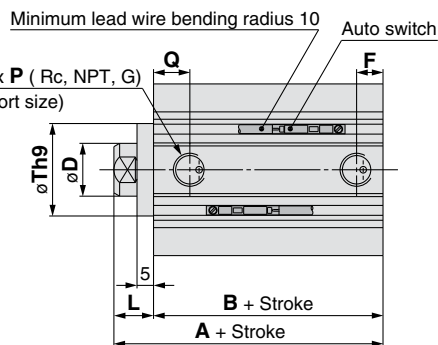
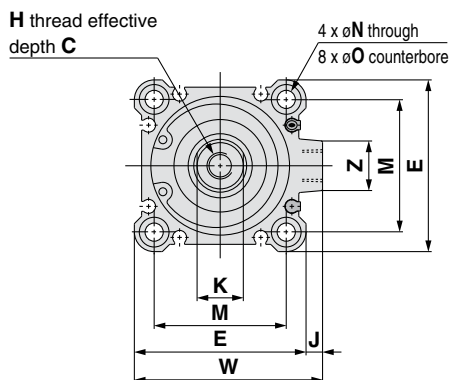
Both ends tapped: CDQ2A



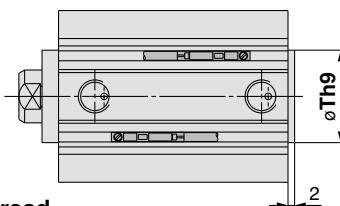
Both Ends Tapped (mm)

Bore size (mm)	O1	R
32	M6 x 1.0	10
40	M6 x 1.0	10
50	M8 x 1.25	14

Through-hole (Standard): CDQ2B



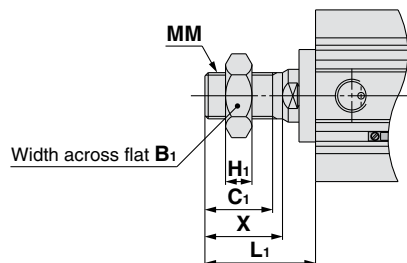
With boss on head end



With Boss on Head End (mm)

Bore size (mm)	Th9
32	21 ⁰ _{-0.052}
40	28 ⁰ _{-0.052}
50	35 ⁰ _{-0.062}

Rod end male thread



Rod End Male Thread (mm)

Bore size (mm)	B1	C1	H1	L1	MM	X
32	22	20.5	8	38.5	M14 x 1.5	23.5
40	22	20.5	8	38.5	M14 x 1.5	23.5
50	27	26	11	43.5	M18 x 1.5	28.5

Standard

Bore size (mm)	Stroke range (mm)	A	B	C	D	E	F	H	J	K	L	M	N	O	P	Q	Th9	W	Z
32	5 to 50, 75, 100	45	33	13	16	45	7.5	M8 x 1.25	4.5	14	12	34	5.5	9 depth 7	1/8	10	23 ⁰ _{-0.052}	49.5	14
40	5 to 50, 75, 100	51.5	39.5	13	16	52	7.5	M8 x 1.25	5	14	12	40	5.5	9 depth 7	1/8	12.5	28 ⁰ _{-0.052}	57	15
50	10 to 50, 75, 100	53.5	40.5	15	20	64	10.5	M10 x 1.5	7	17	13	50	6.6	11 depth 8	1/4	10.5	35 ⁰ _{-0.062}	71	19

Note 1) The external dimensions with rubber bumper are same as those of the standard, as shown above.

* For details about the rod end nut and accessory brackets, refer to the WEB catalog or Best Pneumatics No.2.

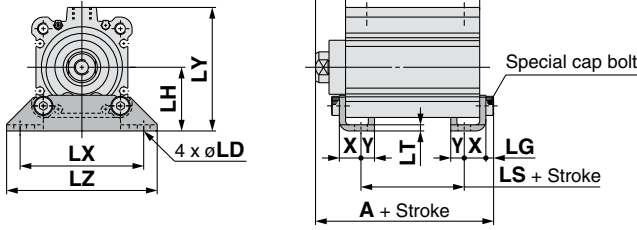
Note 2) For calculation on the longitudinal dimension of intermediate strokes, refer to page 18.

Spatter Resistant Cylinder for Arc Welding

Compact Cylinder: Standard, Double Acting, Single Rod **CDQ2-XC91**

Spatter Resistant Cylinders for Arc Welding

Foot: CDQ2L

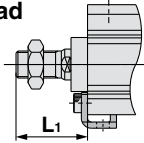


Foot

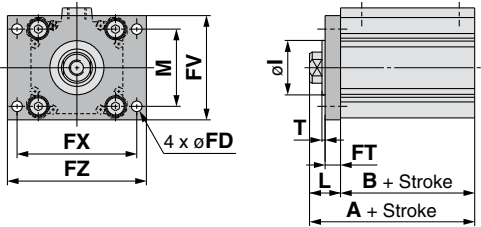
Bore size (mm)	A	B	LS	L	L ₁	LD	LG	LH	LT	LX	LY	LZ	X	Y
32	52.2	33	17	12	38.5	6.6	4	30	3.2	57	57	71	11.2	5.8
40	58.7	39.5	23.5	12	38.5	6.6	4	33	3.2	64	64	78	11.2	7
50	61.7	40.5	17.5	13	43.5	9	5	39	3.2	79	78	95	14.7	8

Foot bracket material: Carbon steel
Surface treatment: Nickel plating

Rod end male thread



Rod flange: CDQ2F

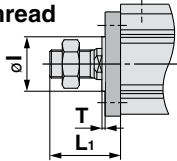


Rod Flange

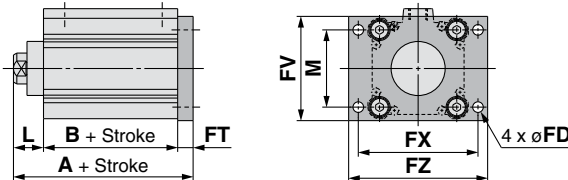
Bore size (mm)	A	B	FD	FT	FV	FX	FZ	L	L ₁	M	I	T
32	45	33	5.5	8	48	56	65	12	38.5	34	23	2
40	51.5	39.5	5.5	8	54	62	72	12	38.5	40	28	2
50	53.5	40.5	6.6	9	67	76	89	13	43.5	50	35	1

Flange bracket material: Carbon steel
Surface treatment: Nickel plating

Rod end male thread



Head flange: CDQ2G



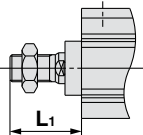
Head Flange

Bore size (mm)	A
32	53
40	59.5
50	62.5

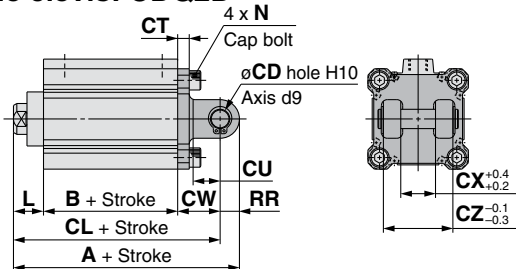
(* The dimensions except A are the same as those of the rod flange.)

Flange bracket material: Carbon steel
Surface treatment: Nickel plating

Rod end male thread



Double clevis: CDQ2D

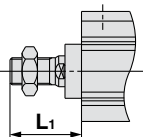


Double Clevis

Bore size (mm)	A	B	CL	CD	CT	CU	CW	CX	CZ	L	L ₁	N	RR
32	75	33	65	10	5	14	20	18	36	12	38.5	M6 x 1.0	10
40	83.5	39.5	73.5	10	6	14	22	18	36	12	38.5	M6 x 1.0	10
50	95.5	40.5	81.5	14	7	20	28	22	44	13	43.5	M8 x 1.25	14

Double clevis bracket material: Cast iron
Surface treatment: Painted

Rod end male thread



* For details about the rod end nut and accessory brackets, refer to **the WEB catalog** or Best Pneumatics No. 2.
* A double clevis pin and retaining rings are included.

Clamp Cylinders

Gas/Air Switching Valve

Detection Switches

Tubing

Fittings

Speed Control Equipment

CDQ2-XC91

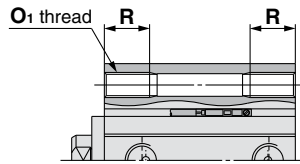
Bore Size $\varnothing 63$ to $\varnothing 100$

CDQ2□-XC91

Through-hole (Standard): CDQ2B

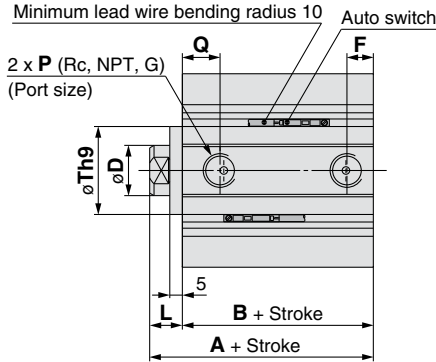
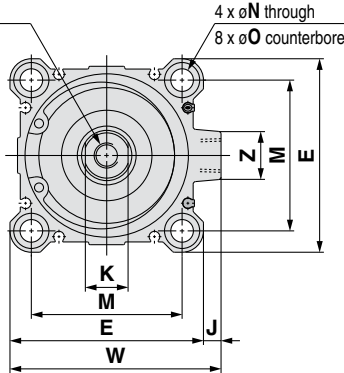
Both ends tapped: CDQ2A

Both Ends Tapped (mm)

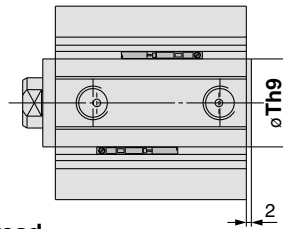


Bore size (mm)	O ₁	R
63	M10 x 1.5	18
80	M12 x 1.75	22
100	M12 x 1.75	22

H thread effective depth C



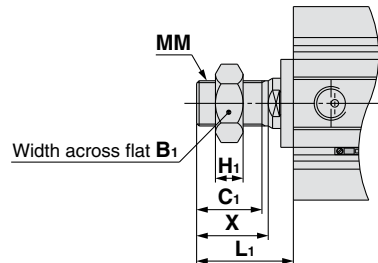
With boss on head end



With Boss on Head End (mm)

Bore size (mm)	Th9
63	35 ⁰ _{-0.062}
80	43 ⁰ _{-0.062}
100	59 ⁰ _{-0.074}

Rod end male thread



Rod End Male Thread (mm)

Bore size (mm)	B ₁	C ₁	H ₁	L ₁	MM	X
63	27	26	11	43.5	M18 x 1.5	28.5
80	32	32.5	13	53.5	M22 x 1.5	35.5
100	41	32.5	16	53.5	M26 x 1.5	35.5

Standard

(mm)

Bore size (mm)	Stroke range (mm)	A	B	C	D	E	F	H	J	K	L	M	N	O	P	Q	Th9	W	Z
63	10 to 50, 75, 100	59	46	15	20	77	10.5	M10 x 1.5	7	17	13	60	9	14 depth 10.5	1/4	15	35 ⁰ _{-0.062}	84	19
80	10 to 50, 75, 100	68.5	53.5	21	25	98	12.5	M16 x 2.0	6	22	15	77	11	17.5 depth 13.5	3/8	16	43 ⁰ _{-0.062}	104	25
100	10 to 50, 75, 100	80	63	27	30	117	13	M20 x 2.5	6.5	27	18	94	11	17.5 depth 13.5	3/8	23	59 ⁰ _{-0.074}	123.5	25

Note 1) The external dimensions with rubber bumper are same as those of the standard, as shown above.

* For details about the rod end nut and accessory brackets, refer to the WEB catalog or Best Pneumatics No.2.

Note 2) For calculation on the longitudinal dimension of intermediate strokes, refer to page 18.

Spatter Resistant Cylinder for Arc Welding

Compact Cylinder: Standard, Double Acting, Single Rod **CDQ2-XC91**

Spatter Resistant Cylinders
for Arc Welding

Clamp Cylinders

Gas/Air Switching Valve

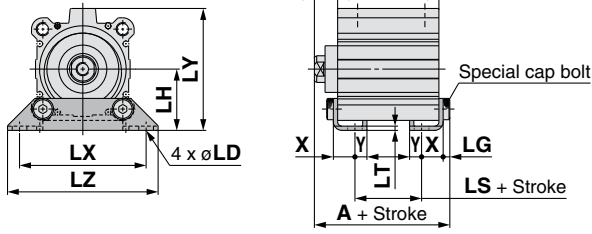
Detection Switches

Tubing

Fittings

Speed Control Equipment

Foot: CDQ2L

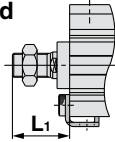


Foot

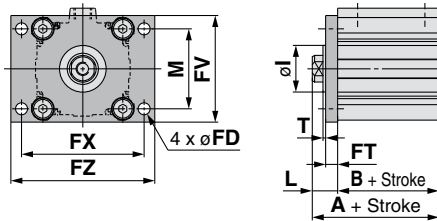
Bore size (mm)	A	B	LS	L	L ₁	LD	LG	LH	LT	LX	LY	LZ	X	Y
63	67.2	46	20	13	43.5	11	5	46	3.2	95	91.5	113	16.2	9
80	80	53.5	23.5	15	53.5	13	7	59	4.5	118	114	140	19.5	11
100	93	63	29	17	53.5	13	7	71	6	137	136	162	23	12.5

Foot bracket material: Carbon steel
Surface treatment: Nickel plating

Rod end male thread



Rod flange: CDQ2F

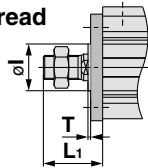


Rod Flange

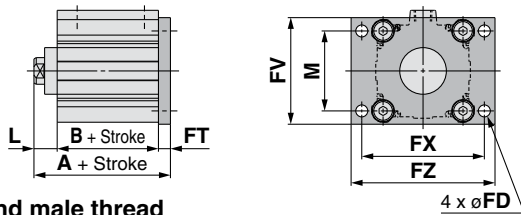
Bore size (mm)	A	B	FD	FT	FV	FX	FZ	L	L ₁	M	I	T
63	59	46	9	9	80	92	108	13	43.5	60	35	1
80	68.5	53.5	11	11	99	116	134	15	53.5	77	—	—
100	80	63	11	11	117	136	154	17	53.5	94	—	—

Flange bracket material: Carbon steel
Surface treatment: Nickel plating

Rod end male thread



Head flange: CDQ2G



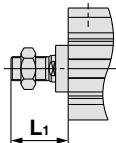
Head Flange

Bore size (mm)	A
63	68
80	79.5
100	91

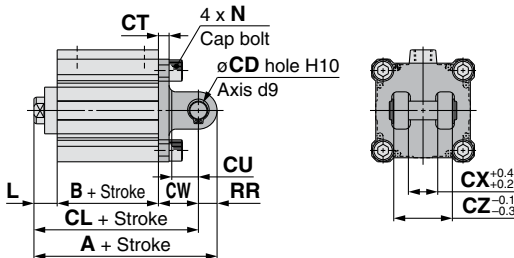
(* The dimensions except A are the same as those of the rod flange.)

Flange bracket material: Carbon steel
Surface treatment: Nickel plating

Rod end male thread



Double clevis: CDQ2D

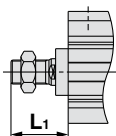


Double Clevis

Bore size (mm)	A	B	CL	CD	CT	CU	CW	CX	CZ	L	L ₁	N	RR
63	103	46	89	14	8	20	30	22	44	13	43.5	M10 x 1.5	14
80	124.5	53.5	106.5	18	10	27	38	28	56	15	53.5	M12 x 1.75	18
100	147	63	125	22	13	31	45	32	64	17	53.5	M12 x 1.75	22

Double clevis bracket material: Cast iron
Surface treatment: Painted

Rod end male thread



* For details about the rod end nut and accessory brackets, refer to the **WEB catalog** or Best Pneumatics No. 2.

* A double clevis pin and retaining rings are included.

Spatter Resistant Cylinder for Arc Welding

Compact Cylinder: Long Stroke, Double Acting, Single Rod

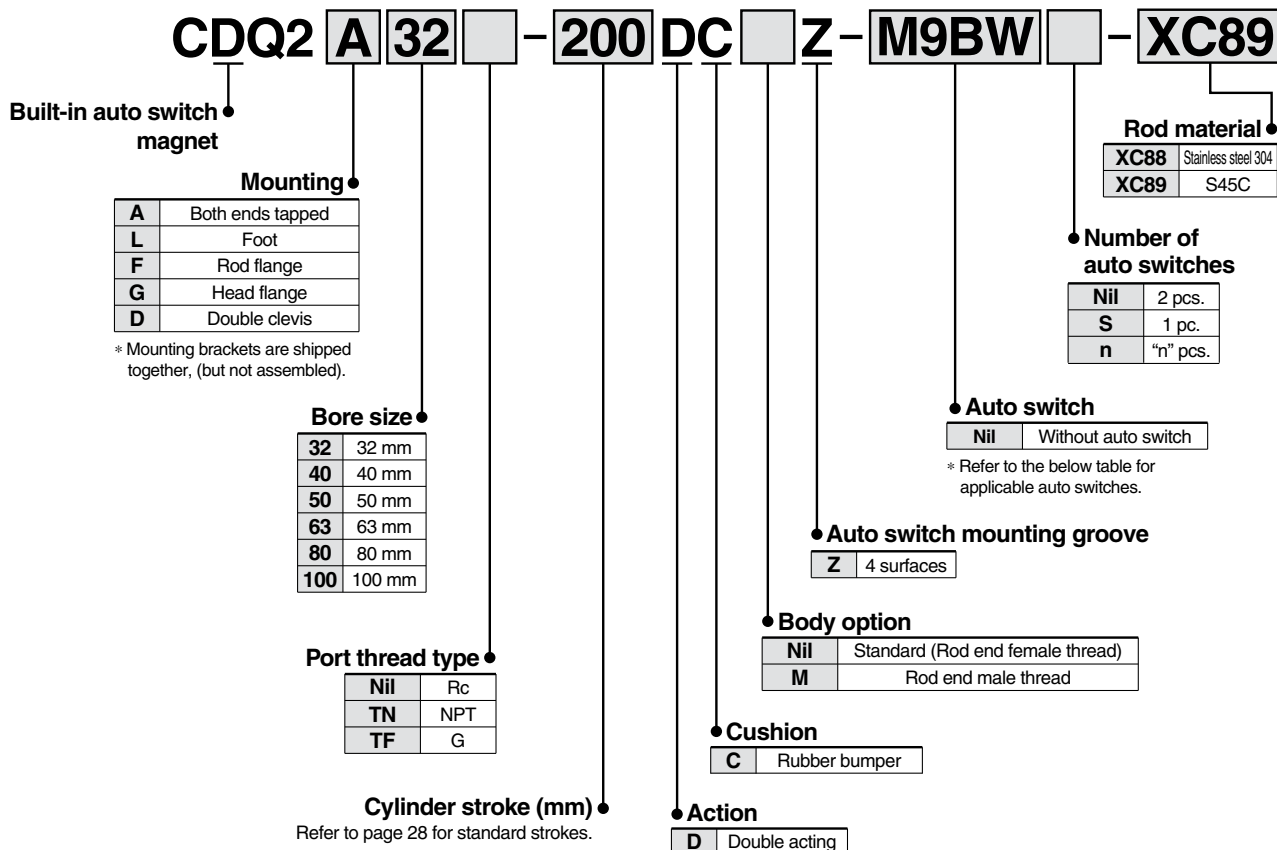
CDQ2-XC88

CDQ2-XC89

∅32, ∅40, ∅50, ∅63, ∅80, ∅100

RoHS

How to Order



Made to Order

Part no.	Piston rod material (Hard chrome plated)		Coil scraper	Lube-retainer	Grease for welding
	S45C	Stainless steel 304			
-XC88	—	●	●	●	●
-XC89	●	—	●	●	●

Built-in Auto Switch Magnet Cylinder Model

If a built-in auto switch magnet cylinder without an auto switch is required, there is no need to enter the symbol for the auto switch.

(Example) CDQ2L40-200DCZ-XC89

Applicable Auto Switches/Refer to the WEB catalog or the Best Pneumatics No. 2 for further information on auto switches.

Type	Special function	Electrical entry	Indicator light	Wiring (Output)	Load voltage		Auto switch model		Lead wire length (m)					Pre-wired connector	Applicable load					
					DC	AC	Perpendicular	In-line	0.5 (Nil)	1 (M)	3 (L)	5 (Z)	None (N)		IC circuit	Relay, PLC				
Solid state auto switch	—	Grommet	Yes	3-wire (NPN)	24 V	5 V, 12 V	—	M9NV	M9N	●	●	●	○	—	○	IC circuit	Relay, PLC			
				3-wire (PNP)				M9PV	M9P	●	●	●	○	—	○					
				2-wire				M9BV	M9B	●	●	●	○	—	○					
	Diagnostic indication (2-color indication)			3-wire (NPN)				24 V	5 V, 12 V	—	M9NWW	M9NW	●	●	●	○		—	○	IC circuit
				3-wire (PNP)							M9PWW	M9PW	●	●	●	○		—	○	
				2-wire							M9BWW	M9BW	●	●	●	○		—	○	
Magnetic field resistant (2-color indication)	2-wire (Non-polar)	—	—	—	—	—	P3DWA	●	—	●	●	—	●	—						
	—	—	—	—	—	—	P4DW	—	—	●	●	—	●	—						
Reed auto switch	—	Grommet	Yes	3-wire (NPN equivalent)	—	5 V	—	A96V	A96	●	—	●	—	—	—	IC circuit	—			
				2-wire	24 V	12 V	100 V	A93V	A93	●	—	●	—	—	—	—	Relay, PLC			
			No		5 V, 12 V	100 V or less		A90V	A90	●	—	●	—	—	—	IC circuit	Relay, PLC			

* Lead wire length symbols: 0.5 m Nil (Example) M9NW
 1 m M (Example) M9NWM
 3 m L (Example) M9NWL
 5 m Z (Example) M9NWZ

* Please contact SMC for auto switches, auto switch proper mounting positions and operating ranges other than the above.

Specifications

Bore size (mm)	32	40	50	63	80	100
Action	Double acting, Single rod					
Fluid	Air					
Proof pressure	218 psi (1.5 MPa)					
Maximum operating pressure	145 psi (1.0 MPa)					
Minimum operating pressure	7.3 psi (0.05 MPa)					
Ambient and fluid temperature	14 to 140°F (-10 to 60°C) (No freezing)					
Lubrication	Not required (Non-lube)					
Piston speed	50 to 500 mm/s					
Allowable kinetic energy lbf ft (J)	0.21 (0.29)	0.38 (0.52)	0.67 (0.91)	1.14 (1.54)	2.00 (2.71)	3.35 (4.54)
Stroke length tolerance	+1.4 mm (Note) 0					

Note) Stroke length tolerance does not include the amount of bumper change.

Standard Strokes

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

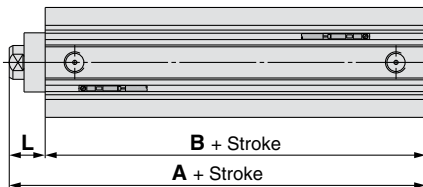
Manufacture of Intermediate Strokes

Type	A spacer is installed in the standard stroke body.	
Part no.	Refer to "How to Order" for the standard model number. (Page 27)	
Description	Strokes in 1 mm intervals are available by installing a spacer in the standard stroke cylinder.	
Stroke range	Bore size	Stroke range
	32 to 100	101 to 299
Example	Part no.: CDQ2A50-166DCZ-XC89 CDQ2A50-175DCZ-XC89 with 9 mm width spacer inside The B dimension is 235.5 mm.	

Type

Bore size (mm)		32	40	50	63	80	100		
Pneumatic	Built-in magnet for auto switch	●	●	●	●	●	●		
	Piping	Pipe thread	—	Rc1/8	Rc1/8	Rc1/4	Rc1/4	Rc3/8	Rc3/8
			TN	NPT1/8	NPT1/8	NPT1/4	NPT1/4	NPT3/8	NPT3/8
			TF	G1/8	G1/8	G1/4	G1/4	G3/8	G3/8
Rod end male thread		●	●	●	●	●	●		

Comparison of the Dimensions of Each Series



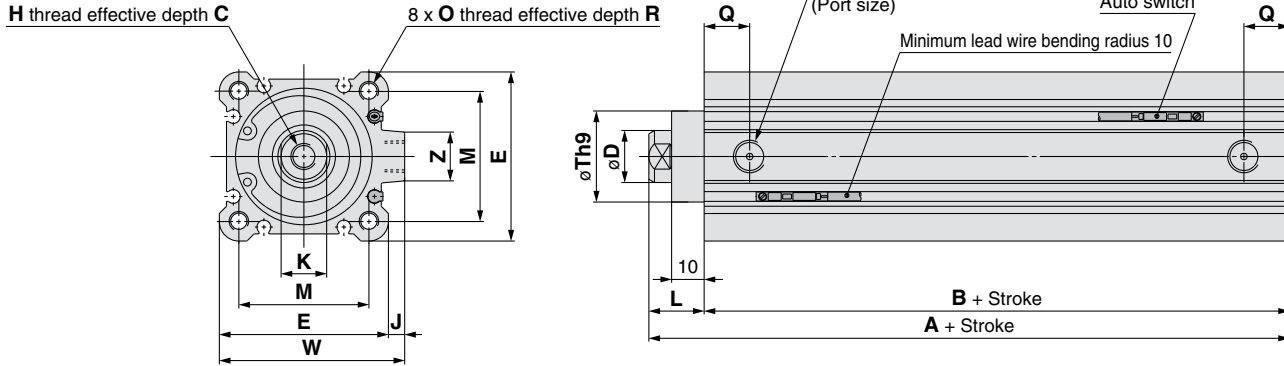
Bore size (mm)	XC88, 89			Standard		
	A	B	L	A	B	L
32	67.5	50.5	17	62.5	45.5	17
40	77	60	17	72	55	17
50	78.5	60.5	18	73.5	55.5	18
63	80	62	18	75	57	18
80	91	71	20	86	66	20
100	102.5	80.5	22	97.5	75.5	22

* At 0 stroke

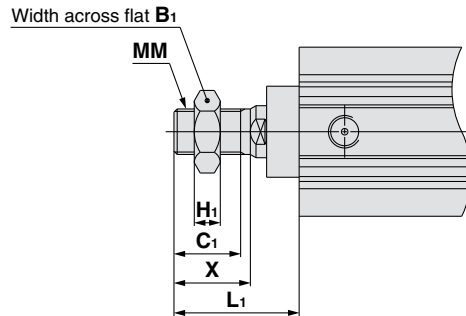
Bore Size $\varnothing 32$ to $\varnothing 50$

CDQ2 \square -XC88
-XC89

Both ends tapped: CDQ2A



Rod end male thread



Rod End Male Thread (mm)

Bore size (mm)	B ₁	C ₁	H ₁	L ₁	MM	X
32	22	20.5	8	38.5	M14 x 1.5	23.5
40	22	20.5	8	38.5	M14 x 1.5	23.5
50	27	26	11	43.5	M18 x 1.5	28.5

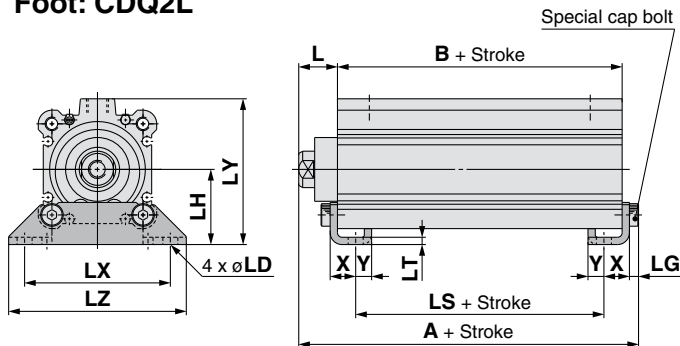
Both Ends Tapped

Bore size (mm)	Stroke range (mm)	A	B	C	D	E	H	J	K	L	M	O	P	Q	R	Th9	W	Z
32	125 to 200 Note 1) 250, 300	67.5	50.5	13	16	45	M8 x 1.25	4.5	14	17	34	M6 x 1.0	1/8	10	10	23 ⁰ _{-0.052}	49.5	14
40		77	60	13	16	52	M8 x 1.25	5	14	17	40	M6 x 1.0	1/8	12.5	10	28 ⁰ _{-0.052}	57	15
50		78.5	60.5	15	20	64	M10 x 1.5	7	17	18	50	M8 x 1.25	1/4	14	14	35 ⁰ _{-0.062}	71	19

Note 1) For 125 to 200 strokes, strokes are available in 25 mm intervals.

Note 2) For calculation on the longitudinal dimension of intermediate strokes, refer to page 18.

Foot: CDQ2L



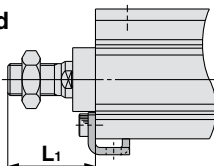
Foot (mm)

Bore size (mm)	A	B	L	L ₁	LD	LG	LH	LS	LT	LX	LY	LZ	X	Y
32	74.7	50.5	17	38.5	6.6	4	30	34.5	3.2	57	57	71	11.2	5.8
40	84.2	60	17	38.5	6.6	4	33	44	3.2	64	64	78	11.2	7
50	86.7	60.5	18	43.5	9	5	39	37.5	3.2	79	78	95	14.7	8

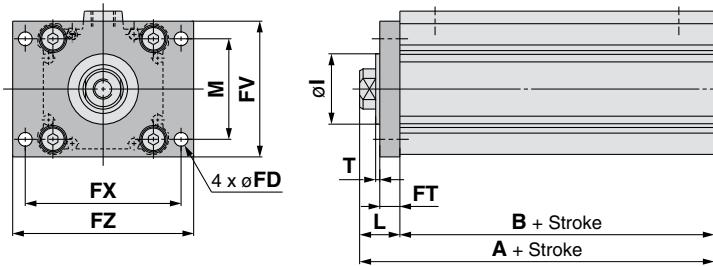
Foot bracket material: Carbon steel
Surface treatment: Nickel plating

* For details about the rod end nut and accessory brackets, refer to the **WEB catalog** or Best Pneumatics No.2.

Rod end male thread



Rod flange: CDQ2F



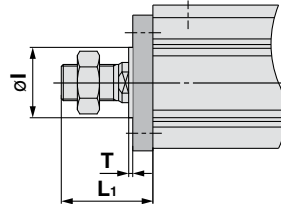
Rod Flange

Bore size (mm)	A	B	FD	FT	FV	FX	FZ	L	L ₁	M
32	67.5	50.5	5.5	8	48	56	65	17	38.5	34
40	77	60	5.5	8	54	62	72	17	38.5	40
50	78.5	60.5	6.6	9	67	76	89	18	43.5	50

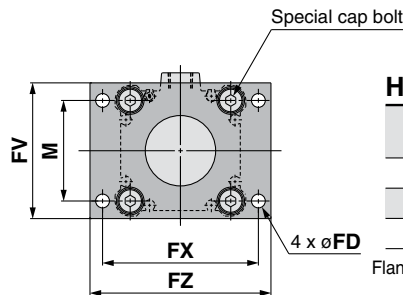
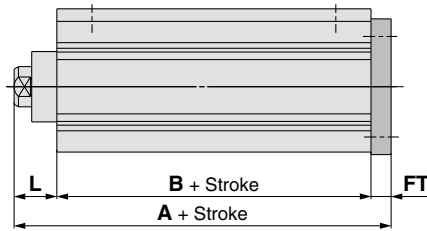
Flange bracket material: Carbon steel
Surface treatment: Nickel plating

Bore size (mm)	I	T
32	23	2
40	28	2
50	35	1

Rod end male thread



Head flange: CDQ2G



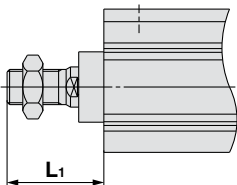
Head Flange

Bore size (mm)	A
32	75.5
40	85
50	87.5

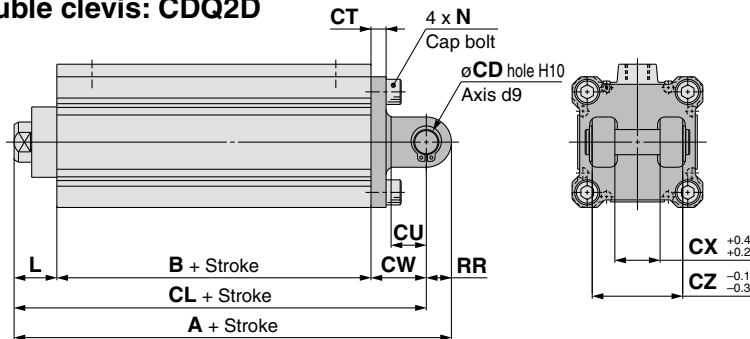
(* The dimensions except A are the same as those of the rod flange.)

Flange bracket material: Carbon steel
Surface treatment: Nickel plating

Rod end male thread



Double clevis: CDQ2D



Double Clevis

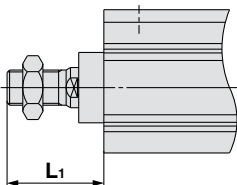
Bore size (mm)	A	B	CD	CL	CT	CU	CW	CX	CZ
32	97.5	50.5	10	87.5	5	14	20	18	36
40	109	60	10	99	6	14	22	18	36
50	120.5	60.5	14	106.5	7	20	28	22	44

Bore size (mm)	L	L ₁	N	RR
32	17	38.5	M6 x 1.0	10
40	17	38.5	M6 x 1.0	10
50	18	43.5	M8 x 1.25	14

Double clevis bracket material: Cast iron
Surface treatment: Painted

* For details about the rod end nut and accessory brackets, refer to the **WEB catalog** or Best Pneumatics No.2.
* A double clevis pin and retaining rings are included.

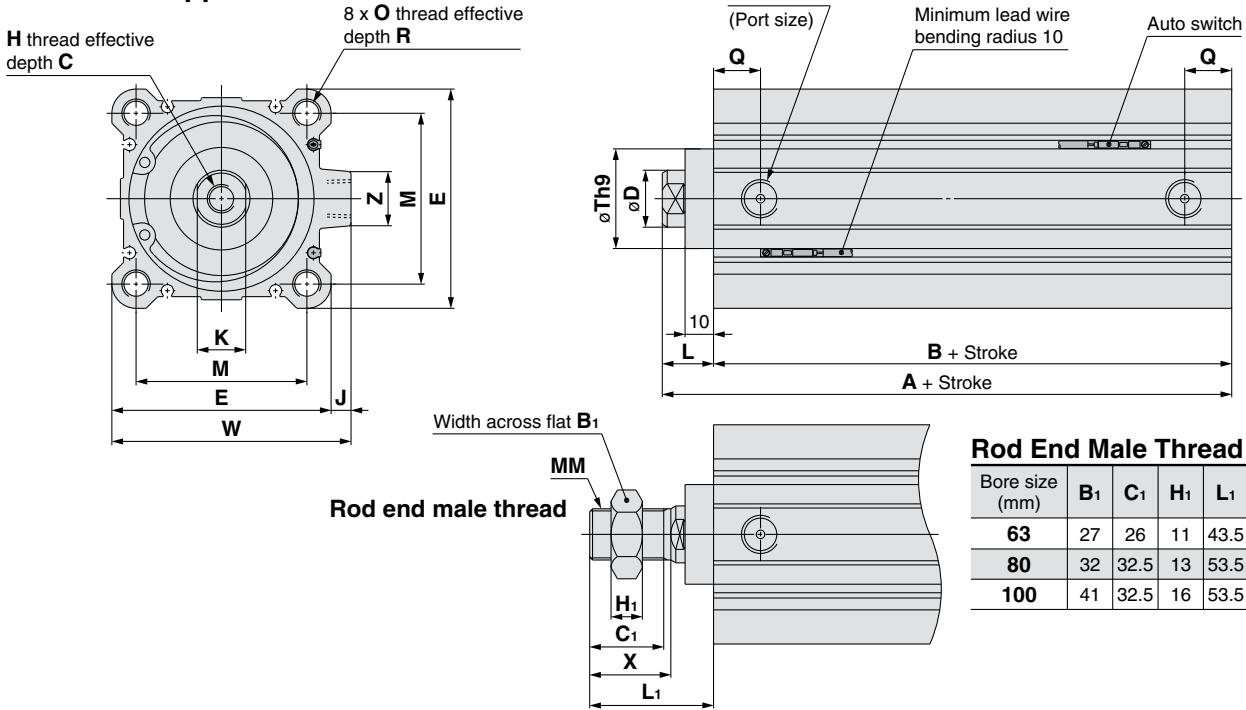
Rod end male thread



Bore Size $\varnothing 63$ to $\varnothing 100$

CDQ2□-XC88
-XC89

Both ends tapped: CDQ2A



Rod End Male Thread (mm)

Bore size (mm)	B ₁	C ₁	H ₁	L ₁	MM	X
63	27	26	11	43.5	M18 x 1.5	28.5
80	32	32.5	13	53.5	M22 x 1.5	35.5
100	41	32.5	16	53.5	M26 x 1.5	35.5

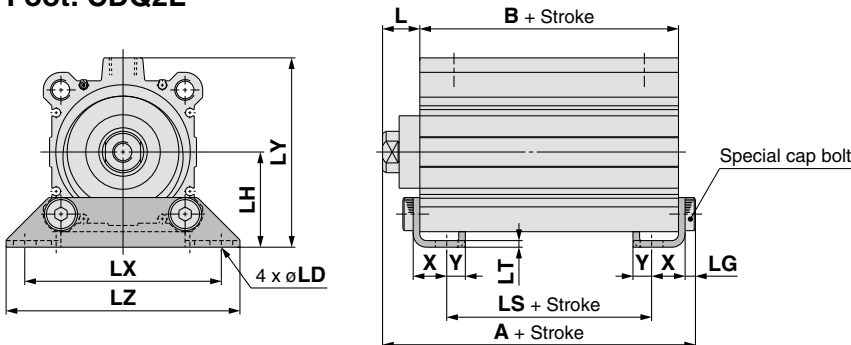
Both Ends Tapped

Bore size (mm)	Stroke range (mm)	A	B	C	D	E	H	J	K	L	M	O	P	Q	R	Th9	W	Z
63		80	62	15	20	77	M10 x 1.5	7	17	18	60	M10 x 1.5	1/4	16.5	18	35 ⁰ _{-0.062}	84	19
80	125 to 200 Note 1)	91	71	21	25	98	M16 x 2.0	6	22	20	77	M12 x 1.75	3/8	19	22	43 ⁰ _{-0.062}	104	25
100	250, 300	102.5	80.5	27	30	117	M20 x 2.5	6.5	27	22	94	M12 x 1.75	3/8	23	22	59 ⁰ _{-0.074}	123.5	25

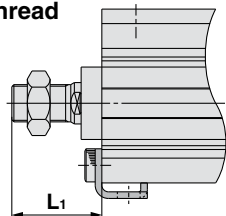
Note 1) For 125 to 200 strokes, strokes are available in 25 mm intervals.

Note 2) For calculation on the longitudinal dimension of intermediate strokes, refer to page 18.

Foot: CDQ2L



Rod end male thread



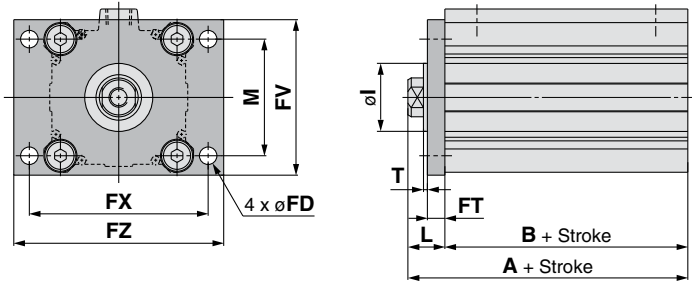
Foot

Bore size (mm)	A	B	L	L ₁	LD	LG	LH	LS	LT	LX	LY	LZ	X	Y
63	88.2	62	18	43.5	11	5	46	36	3.2	95	91.5	113	16.2	9
80	102.5	71	20	53.5	13	7	59	41	4.5	118	114	140	19.5	11
100	115.5	80.5	22	53.5	13	7	71	46.5	6	137	136	162	23	12.5

Foot bracket material: Carbon steel
Surface treatment: Nickel plating

* For details about the rod end nut and accessory brackets, refer to the **WEB catalog** or Best Pneumatics No.2.

Rod flange: CDQ2F



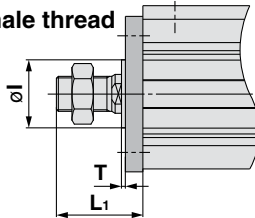
Rod Flange

Bore size (mm)	A	B	FD	FT	FV	FX	FZ	L	L ₁	M
63	80	62	9	9	80	92	108	18	43.5	60
80	91	71	11	11	99	116	134	20	53.5	77
100	102.5	80.5	11	11	117	136	154	22	53.5	94

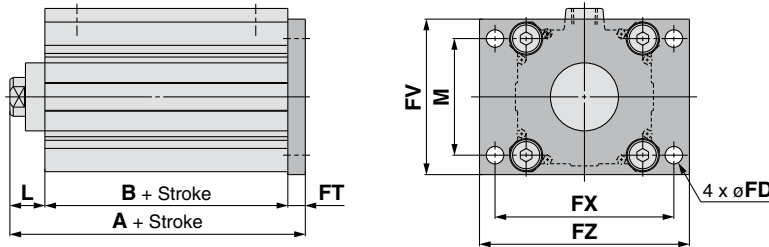
Flange bracket material: Carbon steel
Surface treatment: Nickel plating

Bore size (mm)	I	T
63	35	1
80	—	—
100	—	—

Rod end male thread



Head flange: CDQ2G



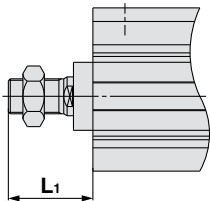
Head Flange

Bore size (mm)	A
63	89
80	102
100	113.5

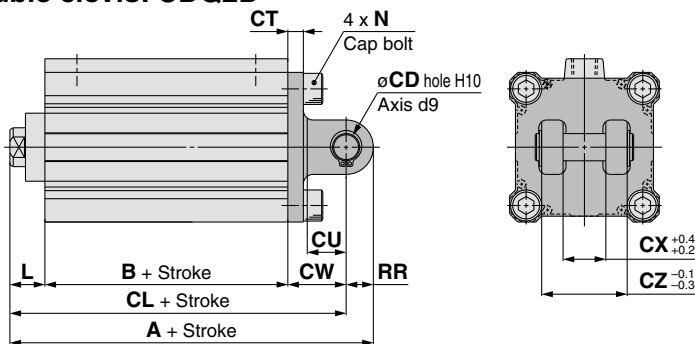
(* The dimensions except A are the same as those of the rod flange.)

Flange bracket material: Carbon steel
Surface treatment: Nickel plating

Rod end male thread



Double clevis: CDQ2D



Double Clevis

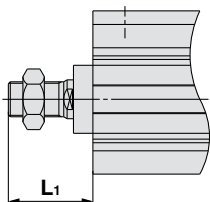
Bore size (mm)	A	B	CD	CL	CT	CU	CW	CX	CZ
63	124	62	14	110	8	20	30	22	44
80	147	71	18	129	10	27	38	28	56
100	169.5	80.5	22	147.5	13	31	45	32	64

Bore size (mm)	L	L ₁	N	RR
63	18	43.5	M10 x 1.5	14
80	20	53.5	M12 x 1.75	18
100	22	53.5	M12 x 1.75	22

Double clevis bracket material: Cast iron
Surface treatment: Nickel plating

* For details about the rod end nut and accessory brackets, refer to the **WEB catalog** or Best Pneumatics No.2.
* A double clevis pin and retaining rings are included.

Rod end male thread



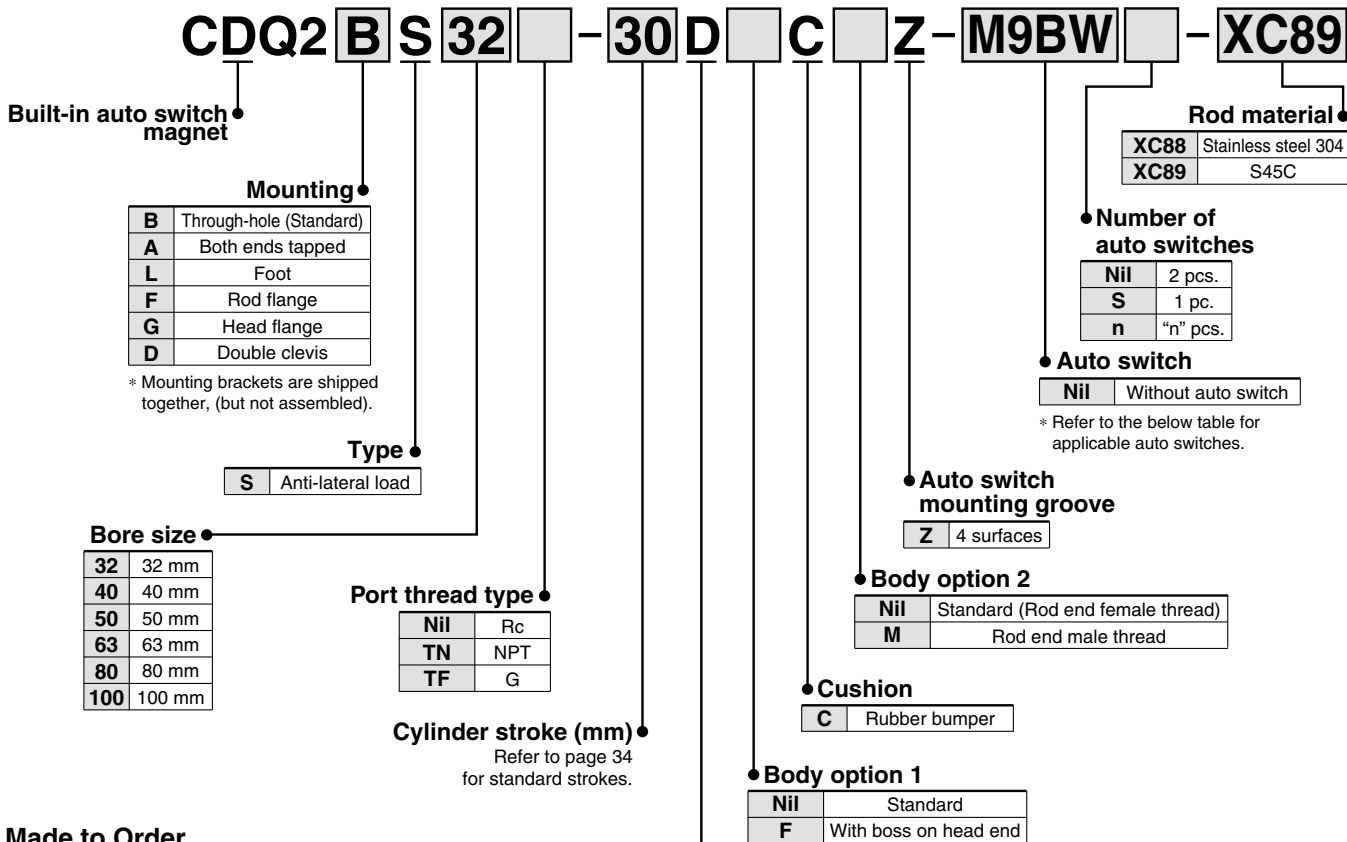
Spatter Resistant Cylinder for Arc Welding Compact Cylinder: Anti-lateral Load

CDQ2 S-XC88 S-XC89

∅32, ∅40, ∅50, ∅63, ∅80, ∅100

RoHS

How to Order



Made to Order

Part no.	Piston rod material (Hard chrome plated)		Coil scraper	Lube-retainer	Grease for welding
	S45C	Stainless steel 304			
-XC88	—	●	●	●	●
-XC89	●	—	●	●	●

Action

D	Double acting
---	---------------

Built-in Auto Switch Magnet Cylinder Model

If a built-in auto switch magnet cylinder without an auto switch is required, there is no need to enter the symbol for the auto switch.
(Example) CDQ2LS40-30DCZ-XC89

Applicable Auto Switches/Refer to the WEB catalog or the Best Pneumatics No. 2 for further information on auto switches.

Type	Special function	Electrical entry	Indicator light	Wiring (Output)	Load voltage		Auto switch model		Lead wire length (m)					Pre-wired connector	Applicable load				
					DC	AC	Perpendicular	In-line	0.5 (Nil)	1 (M)	3 (L)	5 (Z)	None (N)		IC circuit	Relay, PLC			
Solid state auto switch	—	Grommet	Yes	3-wire (NPN)	24 V	5 V, 12 V	—	M9NV	M9N	●	●	●	○	—			○	IC circuit	Relay, PLC
				3-wire (PNP)				M9PV	M9P	●	●	●	○	—	○				
				2-wire				M9BV	M9B	●	●	●	○	—	○				
	Diagnostic indication (2-color indication)			3-wire (NPN)				M9NWV	M9NW	●	●	●	○	—	○	IC circuit			
				3-wire (PNP)				M9PWV	M9PW	●	●	●	○	—	○				
				2-wire				M9BWV	M9BW	●	●	●	○	—	○				
	Magnetic field resistant (2-color indication)			2-wire (Non-polar)				—	P3DWA	●	—	●	●	—	●	—	●	—	
—		—	P4DW	—	—	●	●	—	—	—	—	—	—						
Reed auto switch	—	Grommet	Yes	3-wire (NPN equivalent)	24 V	5 V	—	A96V	A96	●	—	●	—	—	—	IC circuit	—		
				2-wire				12 V	100 V	A93V	A93	●	—	●	—	—	—	—	Relay, PLC
								5 V, 12 V	100 V or less	A90V	A90	●	—	●	—	—	—	—	IC circuit

* Lead wire length symbols: 0.5 m Nil (Example) M9NW
1 m M (Example) M9NWM
3 m L (Example) M9NWL
5 m Z (Example) M9NWZ

* Please contact SMC for auto switches, auto switch proper mounting positions and operating ranges other than the above.

Specifications

Bore size (mm)	32	40	50	63	80	100
Action	Double acting, Single rod					
Fluid	Air					
Proof pressure	218 psi (1.5 MPa)					
Maximum operating pressure	145 psi (1.0 MPa)					
Minimum operating pressure	7.3 psi (0.05 MPa)					
Ambient and fluid temperature	14 to 140°F (-10 to 60°C) (No freezing)					
Lubrication	Not required (Non-lube)					
Piston speed	50 to 500 mm/s					
Allowable kinetic energy lbf·ft (J)	0.21 (0.29)	0.38 (0.52)	0.67 (0.91)	1.14 (1.54)	2.00 (2.71)	3.35 (4.54)
Stroke length tolerance	+1.0 mm (Note) 0					

Note) Stroke length tolerance does not include the amount of dumper change.

Standard Strokes

Bore size	Standard stroke (mm)
32, 40	5, 10, 15, 20, 25, 30, 35, 40, 45, 50, 75, 100
50, 63, 80, 100	10, 15, 20, 25, 30, 35, 40, 45, 50, 75, 100

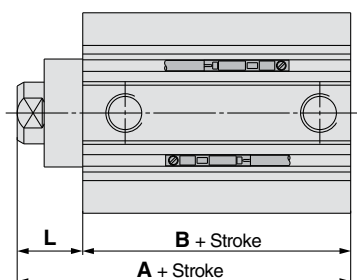
Manufacture of Intermediate Strokes

Type	A spacer is installed in the standard stroke body.	
Part no.	Refer to "How to Order" for the standard model number. (Page 33)	
Description	Strokes in 1 mm intervals are available by installing a spacer in the standard stroke cylinder.	
Stroke range	Bore size 32 to 100	Stroke range 1 to 99
Example	Part no.: CDQ2BS50-57DCZ-XC89 CDQ2BS50-75DCZ-XC89 with 18 mm width spacer inside The B dimension is 125.5 mm.	

Type

Bore size (mm)		32	40	50	63	80	100	
Pneumatic	Mounting	Through-hole (Standard)	●	●	●	●	●	
		Both ends tapped	●	●	●	●	●	
	Built-in magnet for auto switch		●	●	●	●	●	
	Piping	Pipe thread	Rc1/8	Rc1/8	Rc1/4	Rc1/4	Rc3/8	Rc3/8
			NPT1/8	NPT1/8	NPT1/4	NPT1/4	NPT3/8	NPT3/8
			G1/8	G1/8	G1/4	G1/4	G3/8	G3/8
Rod end male thread		●	●	●	●	●	●	
With rubber bumper (Standard)		●	●	●	●	●	●	
With boss on head end		●	●	●	●	●	●	

Comparison of the Dimensions of Each Series



Bore size (mm)	XC88, 89			Standard		
	A	B	L	A	B	L
32	60	43	17	50	43	17
40	66.5	49.5	17	56.5	49.5	17
50	68.5	50.5	18	58.5	50.5	18
63	74	56	18	64	56	18
80	83.5	63.5	20	73.5	63.5	20
100	95	73	22	85	73	22

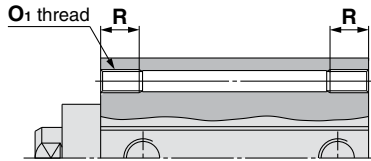
* At 0 stroke

Bore Size **∅32 to ∅50**

CDQ2□S-^{XC88}
-^{XC89}

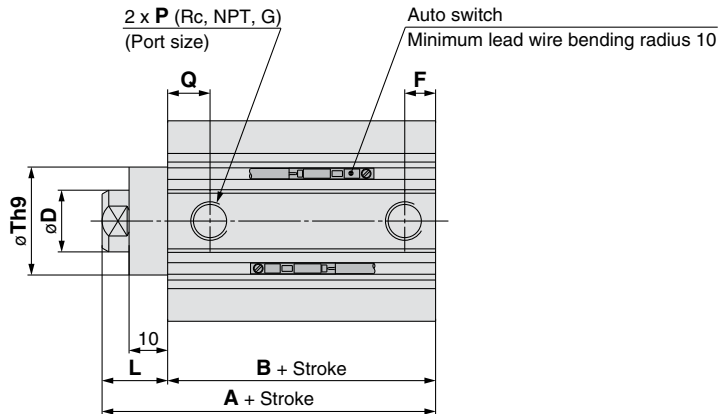
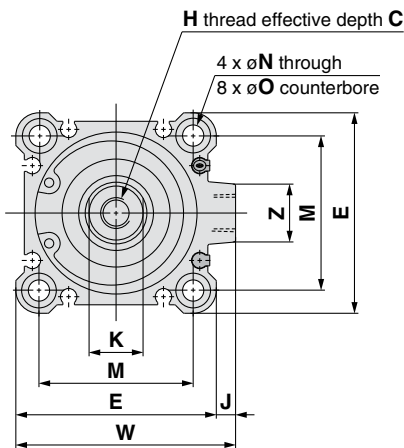
Both ends tapped: CDQ2AS

Through-hole (Standard): CDQ2BS

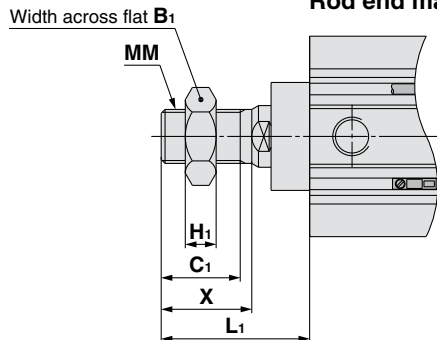


Both Ends Tapped

Bore size (mm)	O ₁	R
32	M6 x 1.0	10
40	M6 x 1.0	10
50	M8 x 1.25	14



Rod end male thread



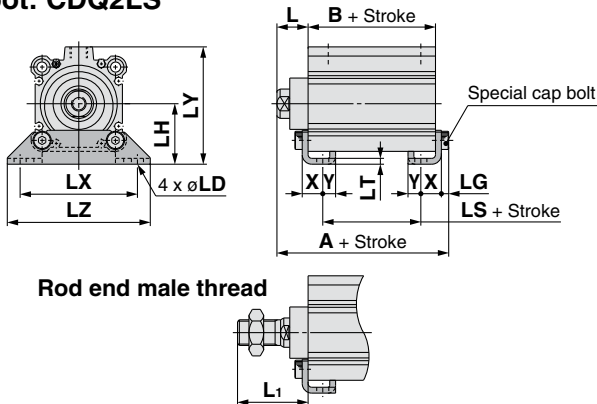
Rod End Male Thread

Bore size (mm)	B ₁	C ₁	H ₁	L ₁	MM	X
32	22	20.5	8	38.5	M14 x 1.5	23.5
40	22	20.5	8	38.5	M14 x 1.5	23.5
50	27	26	11	43.5	M18 x 1.5	28.5

The dimensions with boss on head end are equivalent to those of the CDQ2 series, double acting, single rod. Refer to page 19.

Bore size (mm)	Stroke range (mm)	A	B	C	D	E	F	H	J	K	L	M	N	O	Th9	P	Q	W	Z
32	5 to 50, 75, 100	60	43	13	16	45	7.5	M8 x 1.25	4.5	14	17	34	5.5	9 depth 7	23 ⁰ _{-0.052}	1/8	10	49.5	14
40	5 to 50, 75, 100	66.5	49.5	13	16	52	7.5	M8 x 1.25	5	14	17	40	5.5	9 depth 7	28 ⁰ _{-0.052}	1/8	12.5	57	15
50	10 to 50, 75, 100	68.5	50.5	15	20	64	10.5	M10 x 1.5	7	17	18	50	6.6	11 depth 8	35 ⁰ _{-0.062}	1/4	10.5	71	19

Foot: CDQ2LS



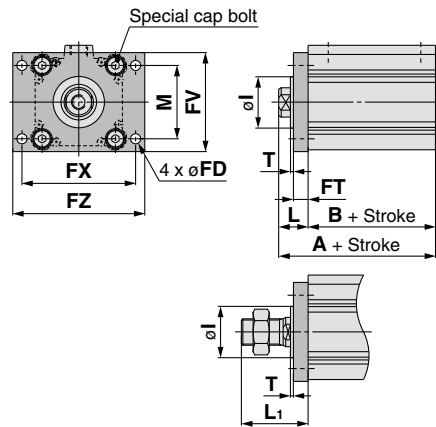
Foot

Bore size (mm)	A	B	LS	L	L ₁	LD	LG	LH	LT	LX	LY
32	67.2	43	27	17	38.5	6.6	4	30	3.2	57	57
40	73.7	49.5	33.5	17	38.5	6.6	4	33	3.2	64	64
50	76.7	50.5	27.5	18	43.5	9	5	39	3.2	79	78

Bore size (mm)	LZ	X	Y
32	71	11.2	5.8
40	78	11.2	7
50	95	14.7	8

Foot bracket material: Carbon steel
 Surface treatment: Nickel plating

Rod flange: CDQ2FS



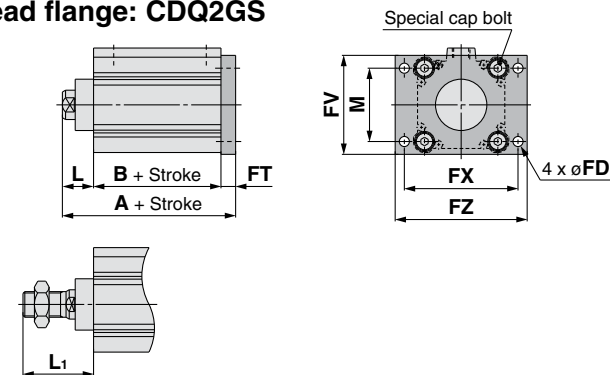
Rod Flange

Bore size (mm)	A	B	FD	FT	FV	FX	FZ	L	L ₁	M
32	60	43	5.5	8	48	56	65	17	38.5	34
40	66.5	49.5	5.5	8	54	62	72	17	38.5	40
50	68.5	50.5	6.6	9	67	76	89	18	43.5	50

Bore size (mm)	I	T
32	23	2
40	28	2
50	35	1

Foot bracket material: Carbon steel
 Surface treatment: Nickel plating

Head flange: CDQ2GS



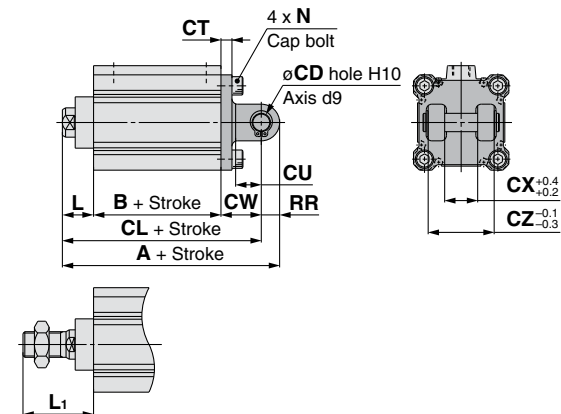
Head Flange

Bore size (mm)	A
32	68
40	74.5
50	77.5

Foot bracket material: Carbon steel
 Surface treatment: Nickel plating

(* The dimensions except A are the same as those of the rod flange.)

Double clevis: CDQ2DS



Double Clevis

Bore size (mm)	A	B	CL	CD	CT	CU	CW	CX	CZ	L	L ₁
32	90	43	80	10	5	14	20	18	36	17	38.5
40	98.5	49.5	88.5	10	6	14	22	18	36	17	38.5
50	110.5	50.5	96.5	14	7	20	28	22	44	18	43.5

Bore size (mm)	N	RR
32	M6 x 1.0	10
40	M6 x 1.0	10
50	M8 x 1.25	14

Double clevis bracket material: Cast iron
 Surface treatment: Painted

* For details about the rod end nut and accessory brackets, refer to the WEB catalog or Best Pneumatics No.2.

* A double clevis pin and retaining rings are included.

Bore Size $\varnothing 63$ to $\varnothing 100$

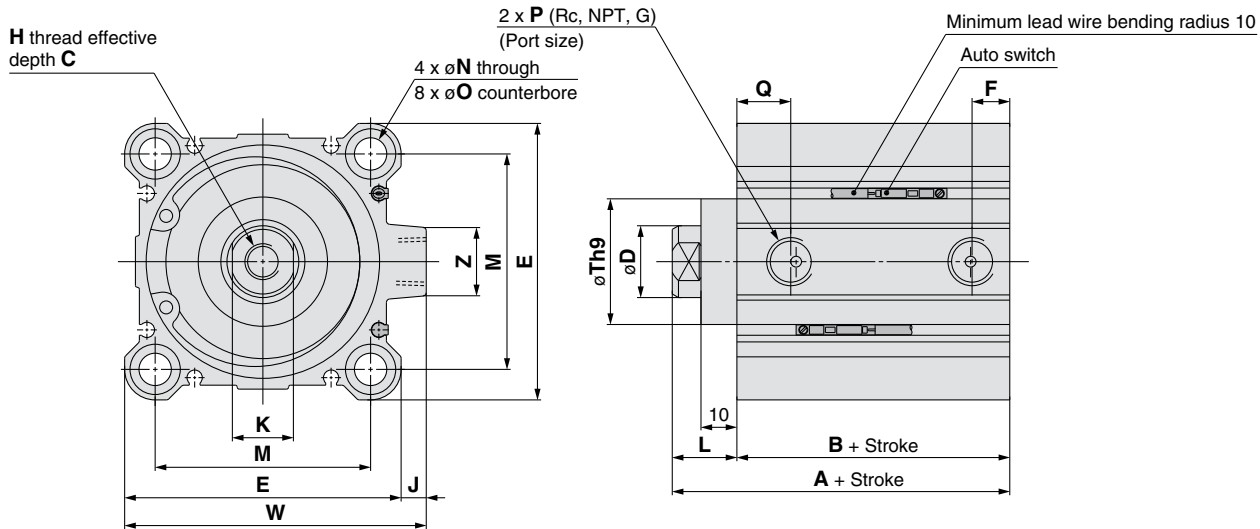
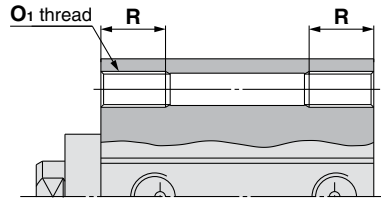
CDQ2□S-^{XC88}
-^{XC89}

Both ends tapped: CDQ2AS

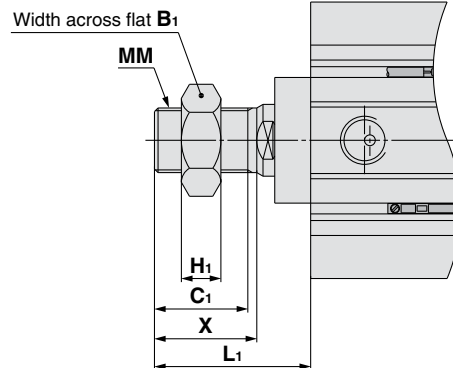
Both Ends Tapped

Bore size (mm)	O ₁	R
63	M10 x 1.5	18
80	M12 x 1.75	22
100	M12 x 1.75	22

Through-hole (Standard): CDQ2BS



Rod end male thread



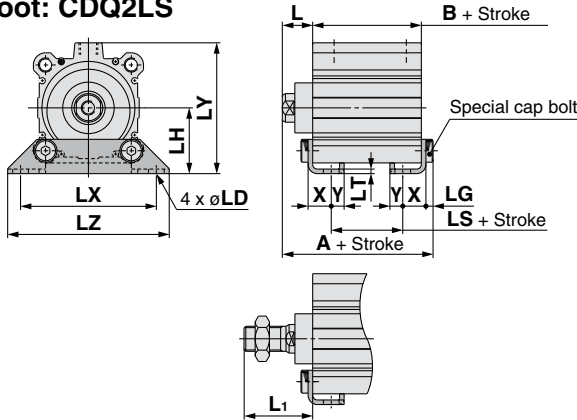
Rod End Male Thread

Bore size (mm)	B ₁	C ₁	H ₁	L ₁	MM	X
63	27	26	11	43.5	M18 x 1.5	28.5
80	32	32.5	13	53.5	M22 x 1.5	35.5
100	41	32.5	16	53.5	M26 x 1.5	35.5

The dimensions with boss on head end are equivalent to those of the CDQ2 series, double acting, single rod. Refer to page 21.

Bore size (mm)	Stroke range (mm)	A	B	C	D	E	F	H	J	K	L	M	N	O	P	Q	Th9	W	Z
63	10 to 50, 75, 100	74	56	15	20	77	10.5	M10 x 1.5	7	17	18	60	9	14 depth 10.5	1/4	15	35 ⁰ _{-0.062}	84	19
80	10 to 50, 75, 100	83.5	63.5	21	25	98	12.5	M16 x 2.0	6	22	20	77	11	17.5 depth 13.5	3/8	16	43 ⁰ _{-0.062}	104	25
100	10 to 50, 75, 100	95	73	27	30	117	13	M20 x 2.5	6.5	27	22	94	11	17.5 depth 13.5	3/8	23	59 ⁰ _{-0.074}	123.5	25

Foot: CDQ2LS



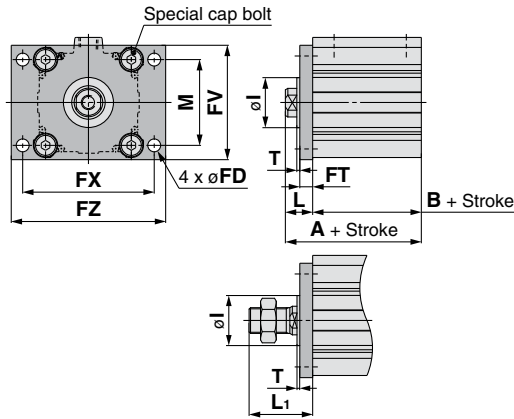
Foot

Bore size (mm)	A	B	LS	L	L ₁	LD	LG	LH	LT	LX	LY
63	82.2	56	30	18	43.5	11	5	46	3.2	95	91.5
80	95	63.5	33.5	20	53.5	13	7	59	4.5	118	114
100	108	73	39	22	53.5	13	7	71	6	137	136

Bore size (mm)	LZ	X	Y
63	113	16.2	9
80	140	19.5	11
100	162	23	12.5

Foot bracket material: Carbon steel
 Surface treatment: Nickel plating

Rod flange: CDQ2FS



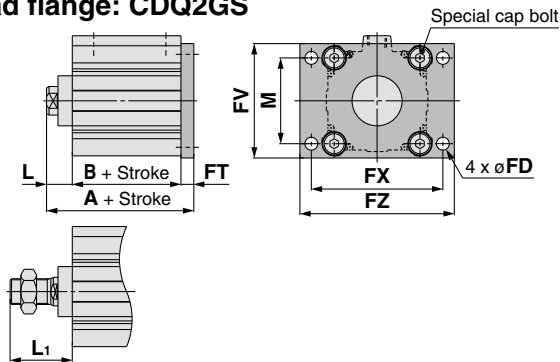
Rod Flange

Bore size (mm)	A	B	FD	FT	FV	FX	FZ	L	L ₁	M
63	74	56	9	9	80	92	108	18	43.5	60
80	83.5	63.5	11	11	99	116	134	20	53.5	77
100	95	73	11	11	117	136	154	22	53.5	94

Bore size (mm)	I	T
63	35	1
80	—	—
100	—	—

Foot bracket material: Carbon steel
 Surface treatment: Nickel plating

Head flange: CDQ2GS



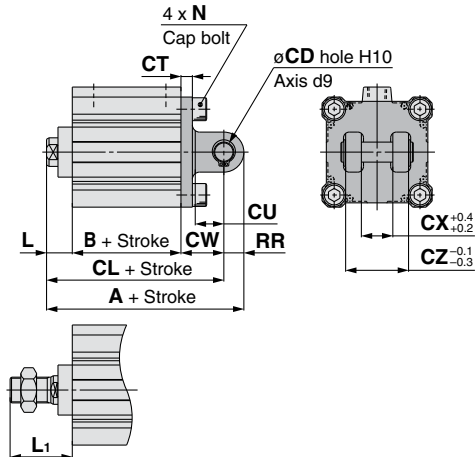
Head Flange

Bore size (mm)	A
63	83
80	94.5
100	106

Foot bracket material: Carbon steel
 Surface treatment: Nickel plating

(* The dimensions except A are the same as those of the rod flange.)

Double clevis: CDQ2DS



Double Clevis

Bore size (mm)	A	B	CL	CD	CT	CU	CW	CX	CZ	L	L ₁
63	118	56	104	14	8	20	30	22	44	18	43.5
80	139.5	63.5	121.5	18	10	27	38	28	56	20	53.5
100	162	73	140	22	13	31	45	32	64	22	53.5

Bore size (mm)	N	RR
63	M10 x 1.5	14
80	M12 x 1.75	18
100	M12 x 1.75	22

Double clevis bracket material: Cast iron
 Surface treatment: Painted

* For details about the rod end nut and accessory brackets, refer to the **WEB catalog** or Best Pneumatics No.2.
 * A double clevis pin and retaining rings are included.

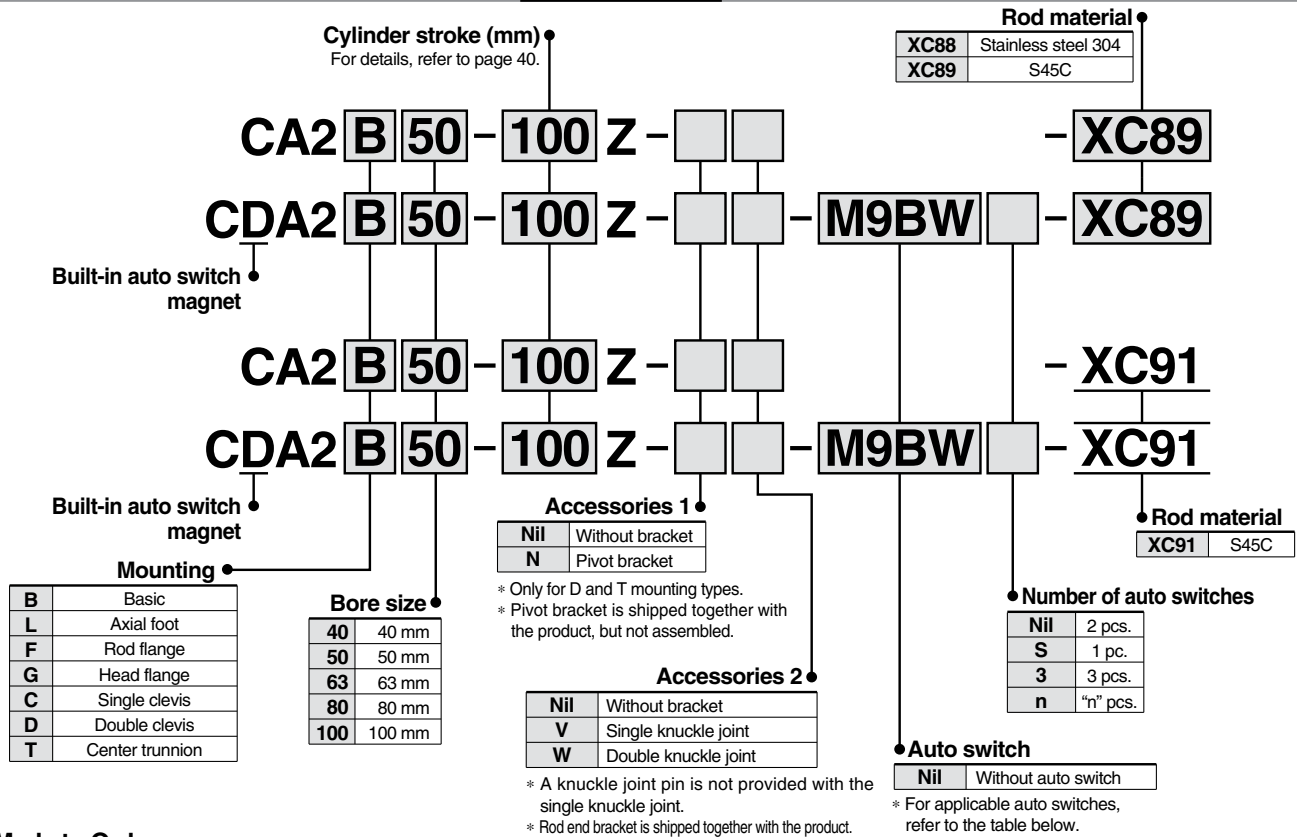
Spatter Resistant Cylinder for Arc Welding Air Cylinder: Single Rod

CA2-XC88/XC89 -XC91

∅40, ∅50, ∅63, ∅80, ∅100

RoHS

How to Order



Made to Order

Part no.	Piston rod material (Hard chrome plated)		Coil scraper	Lube- retainer	Grease for welding
	S45C	Stainless steel 304			
-XC88	—	●	●	●	●
-XC89	●	—	●	●	●
-XC91	●	—	●	—	●

Note) Use the -XC91 in a place where the distance from the welding portion is far and the spatter scattering is minimized.

Applicable Auto Switches/Refer to the WEB catalog or the Best Pneumatics No.2 for further information on auto switches.

Type	Special function	Electrical entry	Indicator light	Wiring (Output)	Load voltage		Auto switch model	Lead wire length (m)				Pre-wired connector	Applicable load			
					DC	AC		0.5 (Nil)	1 (M)	3 (L)	5 (Z)					
Solid state auto switch	—	Grommet	Yes	3-wire (NPN)	24 V	5 V, 12 V	—	M9N	●	●	●	○	○	IC circuit		
				3-wire (PNP)				M9P	●	●	●	○	○			
				2-wire				M9B	●	●	●	○	○			
				3-wire (NPN)				M9NW	●	●	●	○	○			
	Diagnostic indication (2-color indication)			3-wire (PNP)	M9PW	●	●	●	○	○	○	○	IC circuit			
				2-wire	M9BW	●	●	●	○	○						
				Magnetic field resistant (2-color indication)	2-wire (Non-polar)	P3DWA	●	—	●	●	●	●		—		
					P4DW	—	—	●	●	●	●					
Reed auto switch	—	Grommet	Yes	3-wire (NPN equivalent)	24 V	5 V	—	A96	●	—	●	—	—	IC circuit	—	
				2-wire				A93	●	—	●	●	—	—	—	Relay, PLC
								A90	●	—	●	—	—	—	—	IC circuit

* Lead wire length symbols: 0.5 m..... Nil (Example) M9NW
 1 m..... M (Example) M9NWM
 3 m..... L (Example) M9NWL
 5 m..... Z (Example) M9NWZ

* Please contact SMC for auto switches, auto switch proper mounting positions and operating ranges other than the above.

* For details about auto switches with pre-wired connector, refer to the WEB catalog or Best Pneumatics No.2.

* The D-A9□/M9□□□/P3DWA auto switches are shipped together, (but not assembled). (However, auto switch mounting brackets are assembled for the D-A9□/M9□□□ before shipment.)

Specifications



Bore size (mm)		40	50	63	80	100
Fluid		Air				
Action		Double acting				
Proof pressure		218 psi (1.5 MPa)				
Maximum operating pressure		145 psi (1.0 MPa)				
Ambient and fluid temperature		Without auto switch: 14 to 158°F (-10 to 70°C) ^{Note 1)} With auto switch: 14 to 140°F (-10 to 60°C) ^{Note 1)}				
Minimum operating pressure		7.3 psi (0.05 MPa)				
Piston speed		50 to 500 mm/s				
Cushion		Air cushion				
Stroke length tolerance		Up to 250 ^{st.} : ^{+1.0} ₀ 251 to 1000 ^{st.} : ^{+1.4} ₀				
Lubrication		Not required (Non-lube)				
Mounting		Basic, Foot, Rod flange, Head flange Single clevis, Double clevis, Center trunnion				
Allowable kinetic energy lbf ft (J) <small>Note 2)</small>	When air cushion is activated	2.1 (2.8)	3.4 (4.6)	5.8 (7.8)	12 (16)	21 (29)
	When air cushion is not activated	0.24 (0.33)	0.41 (0.56)	0.67 (0.91)	1.1 (1.50)	1.98 (2.68)

Note 1) With no freezing

Note 2) Activate the air cushion when operating the cylinder. If this is not done, the piston rod assembly or the tie-rods will be damaged when the allowable kinetic energy exceeds the values shown in the table above.

Standard Strokes

Bore size	Standard stroke ^{Note 1)}	Max. manufacturable stroke ^{Note 2)}
40	25, 50, 75, 100, 125, 150, 175, 200, 250, 300, 350, 400, 450, 500	1000
50, 63	25, 50, 75, 100, 125, 150, 175, 200, 250, 300, 350, 400, 450, 500, 600	1000
80, 100	25, 50, 75, 100, 125, 150, 175, 200, 250, 300, 350, 400, 450, 500, 600, 700	1000

Note 1) Intermediate strokes not listed above are produced upon receipt of order.

Note 2) For details about applicable maximum stroke, refer to the model selection table (**The WEB catalog** or front matter 34 of the Best Pneumatics No.2).

Minimum Stroke for Auto Switch Mounting

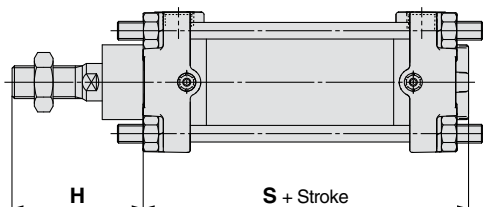
⚠ Caution

- The minimum stroke for mounting varies with the auto switch type and cylinder mounting type. In particular, the center trunnion type needs careful attention. (For details, refer to the WEB catalog or Best Pneumatics No.2.)

Accessories

Mounting		Basic	Axial foot	Rod flange	Head flange	Single clevis	Double clevis	Center trunnion
Standard	Rod end nut	●	●	●	●	●	●	●
	Clevis pin	—	—	—	—	—	●	—
Option	Single knuckle joint	●	●	●	●	●	●	●
	Double knuckle joint (With pin)	●	●	●	●	●	●	●

Comparison of the Dimensions of Each Series



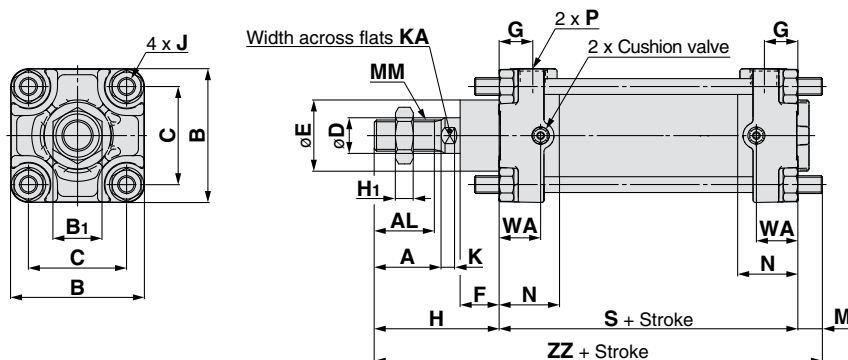
Bore size (mm)	XC88, 89		XC91		XC35		Standard	
	H	S	H	S	H	S	H	S
40	56	95	51	95	51	95	51	95
50	60	101	58	101	58	101	58	101
63	60	112	58	112	58	112	58	112
80	73	133	71	133	71	133	71	133
100	74	143	72	143	72	143	72	143

* At 0 stroke



CA2-XC88
CA2-XC89

Basic: CA2B

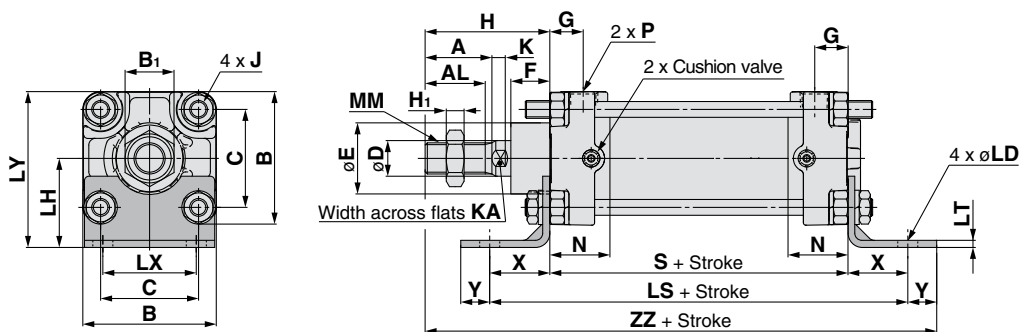


(mm)

Bore size (mm)	A	AL	B	B ₁	C	D	E	F	G	H ₁	J	K	KA	M	MM
40	30	27	60	22	44	16	32	17.5	15	8	M8 x 1.25	6	14	11	M14 x 1.5
50	35	32	70	27	52	20	40	15	17	11	M8 x 1.25	7	18	11	M18 x 1.5
63	35	32	85	27	64	20	40	15	17	11	M10 x 1.25	7	18	14	M18 x 1.5
80	40	37	102	32	78	25	52	19	21	13	M12 x 1.75	10	22	17	M22 x 1.5
100	40	37	116	41	92	30	52	19	21	16	M12 x 1.75	10	26	17	M26 x 1.5

Bore size (mm)	N	P	S	WA	H	ZZ
40	27	1/4	84	18.5	56	151
50	30	3/8	90	18.5	60	161
63	31	3/8	98	23	60	172
80	37	1/2	116	28.5	73	206
100	40	1/2	126	28.5	74	217

Axial foot: CA2L

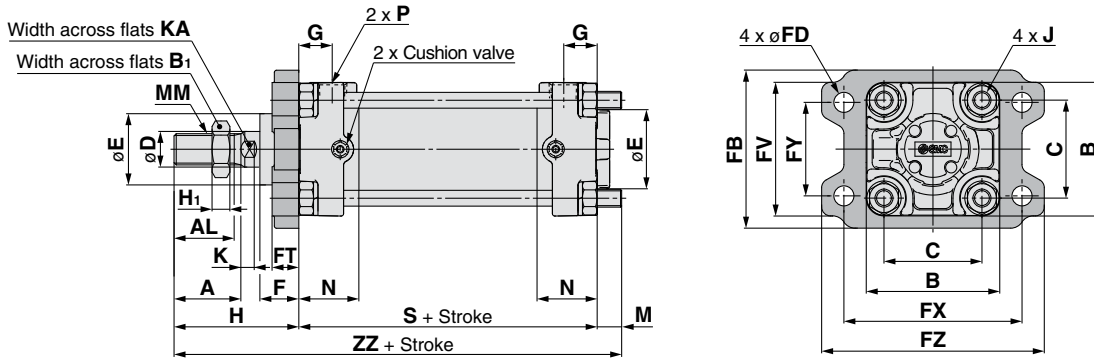


(mm)

Bore size (mm)	A	AL	B	B ₁	C	D	E	F	G	H ₁	J	K	KA	LD	LH	LS	LT	LX	LY
40	30	27	60	22	44	16	32	17.5	15	8	M8 x 1.25	6	14	9	40	138	3.2	42	70
50	35	32	70	27	52	20	40	15	17	11	M8 x 1.25	7	18	9	45	144	3.2	50	80
63	35	32	85	27	64	20	40	15	17	11	M10 x 1.25	7	18	11.5	50	166	3.2	59	93
80	40	37	102	32	78	25	52	19	21	13	M12 x 1.75	10	22	13.5	65	204	4.5	76	116
100	40	37	116	41	92	30	52	19	21	16	M12 x 1.75	10	26	13.5	75	212	6	92	133

Bore size (mm)	MM	N	P	S	X	Y	H	ZZ
40	M14 x 1.5	27	1/4	84	27	13	56	180
50	M18 x 1.5	30	3/8	90	27	13	60	190
63	M18 x 1.5	31	3/8	98	34	16	60	208
80	M22 x 1.5	37	1/2	116	44	16	73	249
100	M26 x 1.5	40	1/2	126	43	17	74	260

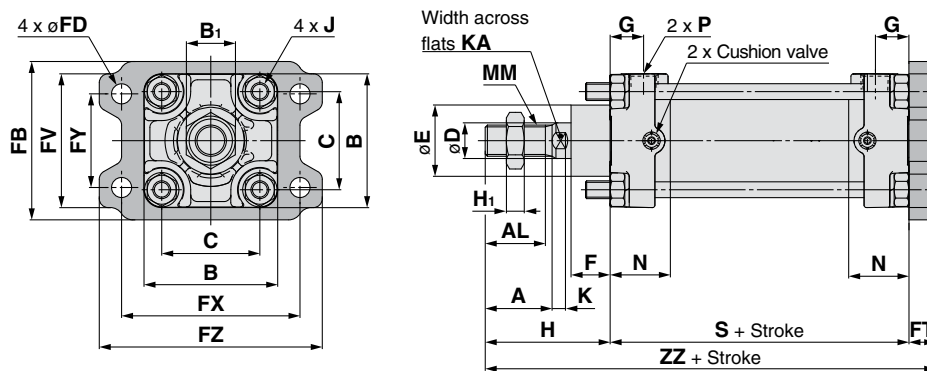
Rod flange: CA2F



Bore size (mm)	A	AL	B	B ₁	C	D	E	F	FB	FD	FT	FV	FX	FY	FZ	G	H ₁	J	K
40	30	27	60	22	44	16	32	17.5	71	9	12	60	80	42	100	15	8	M8 x 1.25	6
50	35	32	70	27	52	20	40	15	81	9	12	70	90	50	110	17	11	M8 x 1.25	7
63	35	32	85	27	64	20	40	15	101	11.5	15	86	105	59	130	17	11	M10 x 1.25	7
80	40	37	102	32	78	25	52	19	119	13.5	18	102	130	76	160	21	13	M12 x 1.75	10
100	40	37	116	41	92	30	52	19	133	13.5	18	116	150	92	180	21	16	M12 x 1.75	10

Bore size (mm)	KA	M	MM	N	P	S	H	ZZ
40	14	11	M14 x 1.5	27	1/4	84	56	151
50	18	11	M18 x 1.5	30	3/8	90	60	161
63	18	14	M18 x 1.5	31	3/8	98	60	172
80	22	17	M22 x 1.5	37	1/2	116	73	206
100	26	17	M26 x 1.5	40	1/2	126	74	217

Head flange: CA2G

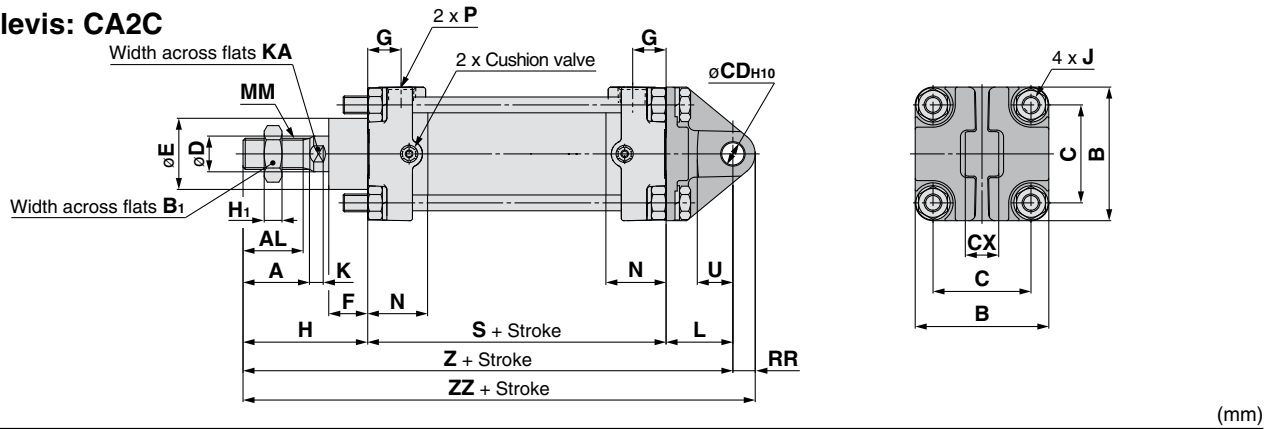


Bore size (mm)	A	AL	B	B ₁	C	D	E	F	FB	FD	FT	FV	FX	FY	FZ	G	H ₁	J
40	30	27	60	22	44	16	32	17.5	71	9	12	60	80	42	100	15	8	M8 x 1.25
50	35	32	70	27	52	20	40	15	81	9	12	70	90	50	110	17	11	M8 x 1.25
63	35	32	85	27	64	20	40	15	101	11.5	15	86	105	59	130	17	11	M10 x 1.25
80	40	37	102	32	78	25	52	19	119	13.5	18	102	130	76	160	21	13	M12 x 1.75
100	40	37	116	41	92	30	52	19	133	13.5	18	116	150	92	180	21	16	M12 x 1.75

Bore size (mm)	K	KA	MM	N	P	S	H	ZZ
40	6	14	M14 x 1.5	27	1/4	84	56	152
50	7	18	M18 x 1.5	30	3/8	90	60	162
63	7	18	M18 x 1.5	31	3/8	98	60	173
80	10	22	M22 x 1.5	37	1/2	116	73	207
100	10	26	M26 x 1.5	40	1/2	126	74	218

CA2-XC88
CA2-XC89

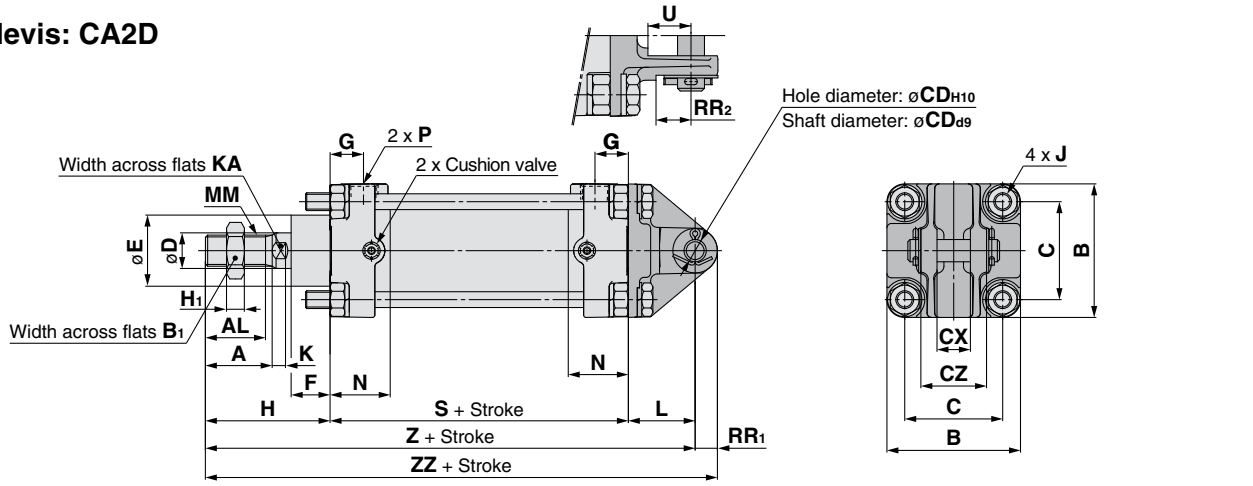
Single clevis: CA2C



Bore size (mm)	A	AL	B	B ₁	C	CD _{H10}	CX	D	E	F	G	H ₁	J	K	KA	L
40	30	27	60	22	44	10 ^{+0.058} ₀	15 ^{-0.1} _{-0.3}	16	32	17.5	15	8	M8 x 1.25	6	14	30
50	35	32	70	27	52	12 ^{+0.070} ₀	18 ^{-0.1} _{-0.3}	20	40	15	17	11	M8 x 1.25	7	18	35
63	35	32	85	27	64	16 ^{+0.070} ₀	25 ^{-0.1} _{-0.3}	20	40	15	17	11	M10 x 1.25	7	18	40
80	40	37	102	32	78	20 ^{+0.084} ₀	31.5 ^{-0.1} _{-0.3}	25	52	19	21	13	M12 x 1.75	10	22	48
100	40	37	116	41	92	25 ^{+0.084} ₀	35.5 ^{-0.1} _{-0.3}	30	52	19	21	16	M12 x 1.75	10	26	58

Bore size (mm)	MM	N	P	RR	S	U	H	Z	ZZ
40	M14 x 1.5	27	1/4	10	84	16	56	170	180
50	M18 x 1.5	30	3/8	12	90	19	60	185	197
63	M18 x 1.5	31	3/8	16	98	23	60	198	214
80	M22 x 1.5	37	1/2	20	116	28	73	237	257
100	M26 x 1.5	40	1/2	25	126	36	74	258	283

Double clevis: CA2D

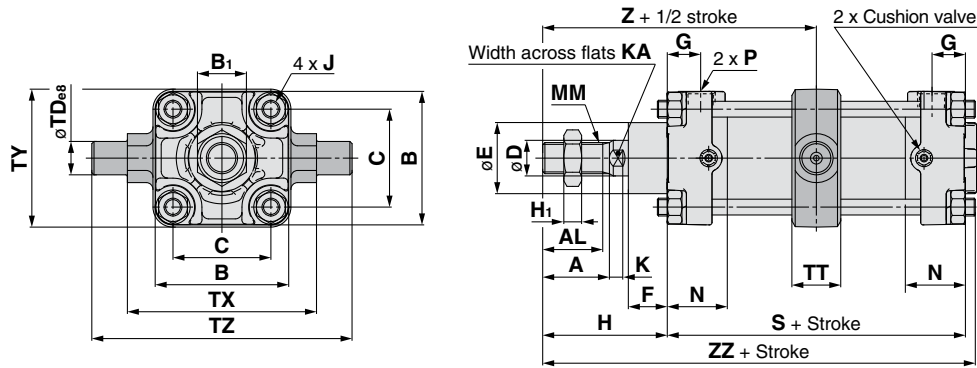


Bore size (mm)	A	AL	B	B ₁	C	CD _{H10}	CX	CZ	D	E	F	G	H ₁	J	K	KA	L
40	30	27	60	22	44	10 ^{+0.058} ₀	15 ^{+0.3} _{+0.1}	29.5	16	32	17.5	15	8	M8 x 1.25	6	14	30
50	35	32	70	27	52	12 ^{+0.070} ₀	18 ^{+0.3} _{+0.1}	38	20	40	15	17	11	M8 x 1.25	7	18	35
63	35	32	85	27	64	16 ^{+0.070} ₀	25 ^{+0.3} _{+0.1}	49	20	40	15	17	11	M10 x 1.25	7	18	40
80	40	37	102	32	78	20 ^{+0.084} ₀	31.5 ^{+0.3} _{+0.1}	61	25	52	19	21	13	M12 x 1.75	10	22	48
100	40	37	116	41	92	25 ^{+0.084} ₀	35.5 ^{+0.3} _{+0.1}	64	30	52	19	21	16	M12 x 1.75	10	26	58

Bore size (mm)	MM	N	P	RR ₁	RR ₂	S	U	H	Z	ZZ
40	M14 x 1.5	27	1/4	10	16	84	16	56	170	180
50	M18 x 1.5	30	3/8	12	19	90	19	60	185	192
63	M18 x 1.5	31	3/8	16	23	98	23	60	198	214
80	M22 x 1.5	37	1/2	20	28	116	28	73	237	257
100	M26 x 1.5	40	1/2	25	23.5	126	36	74	258	283

* A clevis pin, flat washers and split pins are included.

Center trunnion: CA2T



(mm)

Bore size (mm)	A	AL	B	B ₁	C	D	E	F	G	H ₁	J	K	KA	MM	N	P	S
40	30	27	60	22	44	16	32	17.5	15	8	M8 x 1.25	6	14	M14 x 1.5	27	1/4	84
50	35	32	70	27	52	20	40	15	17	11	M8 x 1.25	7	18	M18 x 1.5	30	3/8	90
63	35	32	85	27	64	20	40	15	17	11	M10 x 1.25	7	18	M18 x 1.5	31	3/8	98
80	40	37	102	32	78	25	52	19	21	13	M12 x 1.75	10	22	M22 x 1.5	37	1/2	116
100	40	37	116	41	92	30	52	19	21	16	M12 x 1.75	10	26	M26 x 1.5	40	1/2	126

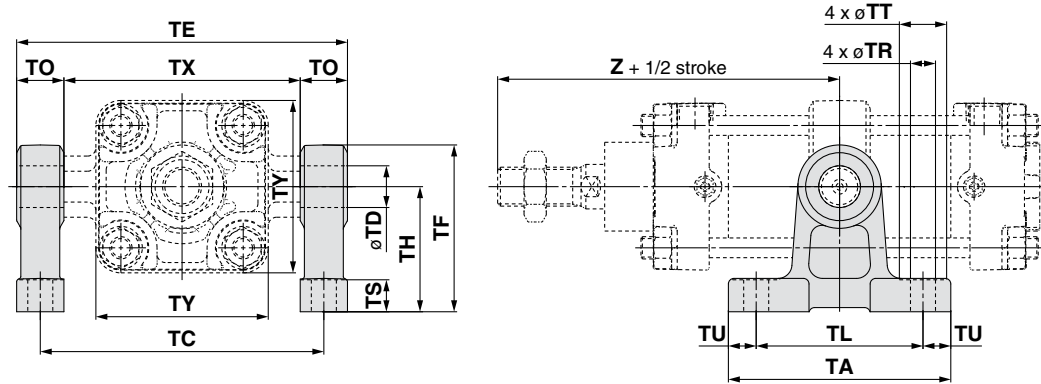
Bore size (mm)	TD _{es}	TT	TX	TY	TZ	H	Z	ZZ
40	15 ^{-0.032} _{-0.059}	22	85	62	117	56	98	145
50	15 ^{-0.032} _{-0.059}	22	95	74	127	60	105	156
63	18 ^{-0.032} _{-0.059}	28	110	90	148	60	109	164
80	25 ^{-0.040} _{-0.073}	34	140	110	192	73	131	196
100	25 ^{-0.040} _{-0.073}	40	162	130	214	74	137	208

* Do not disassemble the trunnion type, as it is extremely difficult to align the axial center of the trunnion with the axial center of the cylinder. (Refer to the WEB catalog or Best Pneumatics No.2.)

Pivot Bracket/Trunnion and Double Clevis Pivot Bracket

● Strength is the same as cylinder brackets.

Trunnion pivot bracket

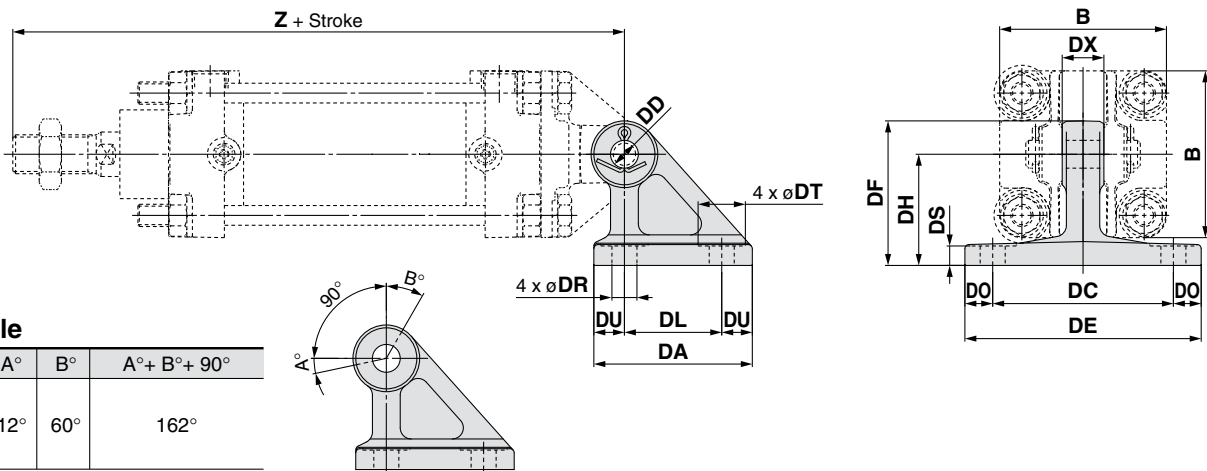


Material: Cast iron (mm)

Part no.	Bore size (mm)	TA	TL	TU	TC	TX	TE	TO	TR	TT	TS	TH	TF	TY	Z	TD-H10 (Hole)
CA2-S04	40	80	60	10	102	85	119	17	9	17	12	45	60	62	98	15 ^{+0.070} ₀
	50	80	60	10	112	95	129	17	9	17	12	45	60	74	105	15 ^{+0.070} ₀
CA2-S06	63	100	70	15	130	110	150	20	11	22	14	55	73	90	109	18 ^{+0.070} ₀
MB-S10	80	120	90	15	166	140	192	26	13.5	24	17	75	100	110	131	25 ^{+0.084} ₀
	100	120	90	15	188	162	214	26	13.5	24	17	75	100	130	137	25 ^{+0.084} ₀

* Order 2 trunnion pivot brackets per cylinder.

Double clevis pivot bracket



Rotating Angle

Bore size (mm)	A°	B°	A° + B° + 90°
40 to 100	12°	60°	162°

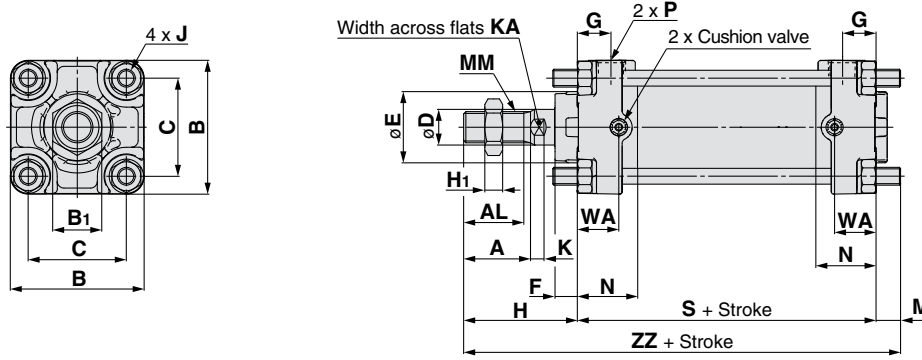
Material: Cast iron (mm)

Part no.	Bore size (mm)	DA	DL	DU	DC	DX	DE	DO	DR	DT	DS	DH	DF	B	Z	DDH10 (Hole)
CA2-B04	40	57	35	11	65	15	85	10	9	17	8	40	52	60	170	10 ^{+0.058} ₀
CA2-B05	50	57	35	11	65	18	85	10	9	17	8	40	52	70	185	12 ^{+0.070} ₀
CA2-B06	63	67	40	13.5	80	25	105	12.5	11	22	10	50	66	85	198	16 ^{+0.070} ₀
CA2-B08	80	93	60	16.5	100	31.5	130	15	13.5	24	12	65	90	102	237	20 ^{+0.084} ₀
CA2-B10	100	93	60	16.5	100	35.5	130	15	13.5	24	12	65	90	116	258	25 ^{+0.084} ₀

Bore Size $\varnothing 40$ to $\varnothing 100$

CA2B-XC91 * Dimensions are the same as the standard product (Series CA2).

Basic: CA2B



Bore size (mm)	A	AL	B	B ₁	C	D	E	F	G	H ₁	J	K	KA	M
40	30	27	60	22	44	16	32	10	15	8	M8 x 1.25	6	14	11
50	35	32	70	27	52	20	40	10	17	11	M8 x 1.25	7	18	11
63	35	32	85	27	64	20	40	10	17	11	M10 x 1.25	7	18	14
80	40	37	102	32	78	25	52	14	21	13	M12 x 1.75	10	22	17
100	40	37	116	41	92	30	52	14	21	16	M12 x 1.75	10	26	17

Bore size (mm)	MM	N	P	S	WA	H	ZZ
40	M14 x 1.5	27	1/4	84	18.5	51	146
50	M18 x 1.5	30	3/8	90	18.5	58	159
63	M18 x 1.5	31	3/8	98	23	58	170
80	M22 x 1.5	37	1/2	116	28.5	71	204
100	M26 x 1.5	40	1/2	126	28.5	72	215

Spatter Resistant Cylinders for Arc Welding

Clamp Cylinders

Gas/Air Switching Valve

Detection Switches

Tubing

Fittings

Speed Control Equipment

Spatter Resistant Cylinder for Arc Welding Air Cylinder: Single Rod

MB-XC88/XC89 MB-XC91

∅32, ∅40, ∅50, ∅63, ∅80, ∅100

RoHS

How to Order

Cylinder stroke (mm)
Refer to "Standard Strokes" on page 48.

Rod material

XC88	Stainless steel 304
XC89	S45C

Accessories 1

Nil	No bracket
N	Pivot bracket

* Only for D and T mounting types.
* Pivot bracket is shipped together with the product.

Accessories 2

Nil	No bracket
V	Single knuckle joint
W	Double knuckle joint

* A knuckle joint pin is not provided with the single knuckle joint.
* Rod end bracket is shipped together with the product.

Number of auto switches

Nil	2 pcs.
S	1 pc.
3	3 pcs.
n	"n" pcs.

Auto switch

Nil	Without auto switch
-----	---------------------

* For applicable auto switches, refer to the table below.

Bore size

32	32 mm
40	40 mm
50	50 mm
63	63 mm
80	80 mm
100	100 mm

Mounting

B	Basic
L	Axial foot
F	Rod flange
G	Head flange
C	Single clevis
D	Double clevis
T	Center trunnion

Built-in auto switch magnet

Ordering Examples:

MB B 32 - 50 Z - [] - [] - XC89

MDB B 32 - 50 Z - [] - [] - M9BW [] - XC89

MB B 32 - 50 Z - [] - [] - XC91

MDB B 32 - 50 Z - [] - [] - M9BW [] - XC91

Made to Order

Part no.	Piston rod material (Hard chrome plated)		Coil scraper	Lube-retainer	Grease for welding
	S45C	Stainless steel 304			
-XC88	—	●	●	●	●
-XC89	●	—	●	●	●
-XC91	●	—	●	—	●

Note) Use the -XC91 in a place where the distance from the welding portion is far and the spatter scattering is minimized.

Built-in Auto Switch Magnet Cylinder Model

If a built-in auto switch magnet cylinder without an auto switch is required, there is no need to enter the symbol for the auto switch.

(Example) MDBB40-100Z-XC89

Applicable Auto Switches/Refer to the WEB catalog or the Best Pneumatics No.2 for further information on auto switches.

Type	Special function	Electrical entry	Indicator light	Wiring (Output)	Load voltage		Auto switch model	Lead wire length (m)				Pre-wired connector	Applicable load		
					DC	AC		0.5 (Nil)	1 (M)	3 (L)	5 (Z)				
Solid state auto switch	—	Grommet	Yes	3-wire (NPN)	24 V	5 V, 12 V	M9N	●	●	○	○	IC circuit	Relay, PLC		
				3-wire (PNP)				●	●	○	○				
				2-wire				●	●	○	○				
	Diagnostic indication (2-color indication)			3-wire (NPN)	5 V, 12 V	M9NW	●	●	○	○	IC circuit				
				3-wire (PNP)		M9PW	●	●	○	○					
				2-wire		M9BW	●	●	○	○					
				2-wire (Non-polar)		P3DWA	●	—	●	●		●			
Magnetic field resistant (2-color indication)	—	P4DW	—	—	●	●	●	—							
	—	A96	●	—	●	—	—	IC circuit	—						
Reed auto switch	—	Grommet	No	3-wire (NPN equivalent)	24 V	5 V	A93	●	—	●	—	—	Relay, PLC		
				2-wire				100 V or less	A90	●	—	●		—	IC circuit
				—					—	—	—	—		—	

* Lead wire length symbols: 0.5 m..... Nil (Example) M9NW
1 m..... M (Example) M9NWM
3 m..... L (Example) M9NWL
5 m..... Z (Example) M9NWX

* Solid state auto switches marked with "○" are produced upon receipt of order.
* For D-P3DWA/P4DW, ∅40 to ∅100 are available.

* Please contact SMC for auto switches, auto switch proper mounting positions and operating ranges other than the above.
* The D-A9□/M9□□□/P3DWA auto switches are shipped together, (but not assembled).
(However, auto switch mounting brackets are assembled for the D-A9□/M9□□□ before shipment.)

Specifications



Bore size (mm)	32	40	50	63	80	100
Action	Double acting, Single rod					
Fluid	Air					
Proof pressure	218 psi (1.5 MPa)					
Max. operating pressure	145 psi (1.0 MPa)					
Min. operating pressure	7.3 psi (0.05 MPa)					
Ambient and fluid temperature	Without auto switch: 14 to 158°F (-10 to 70°C) (No freezing)					
	With auto switch: 14 to 140°F (-10 to 60°C) (No freezing)					
Lubrication	Not required (Non-lube)					
Operating piston speed	50 to 1000 mm/s					
Stroke length tolerance	Up to 250: $^{+1.0}_0$, 251 to 1000: $^{+1.4}_0$, 1001 to 1500: $^{+1.8}_0$					
Cushion	Air cushion					
Port size (Rc)	1/8	1/4	3/8	1/2		
Mounting	Basic, Foot, Rod flange, Head flange, Single clevis, Double clevis, Center trunnion					

Standard Strokes

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

Manufacture of intermediate strokes is possible. (Spacers are not used.) Produced upon receipt of order.

Accessories

Mounting		Basic	Axial foot	Rod flange	Head flange	Single clevis	Double clevis	Center trunnion
Standard	Rod end nut	●	●	●	●	●	●	●
	Clevis pin	—	—	—	—	—	●	—
Option	Single knuckle joint	●	●	●	●	●	●	●
	Double knuckle joint (with pin)	●	●	●	●	●	●	●

Mounting Brackets/Part No.

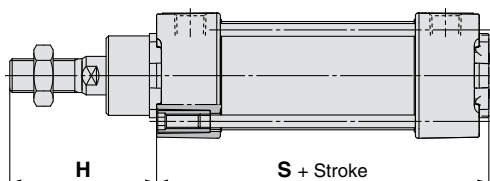
Bore size (mm)	32	40	50	63	80	100
Axial foot ^{Note 1)}	MB-L03	MB-L04	MB-L05	MB-L06	MB-L08	MB-L10
Flange	MB-F03	MB-F04	MB-F05	MB-F06	MB-F08	MB-F10
Single clevis	MB-C03	MB-C04	MB-C05	MB-C06	MB-C08	MB-C10
Double clevis	MB-D03	MB-D04	MB-D05	MB-D06	MB-D08	MB-D10

Note 1) Order two axial foot brackets per cylinder.

Note 2) Accessories for each mounting bracket are as follows:

Axial foot, flange, single clevis/body mounting bolt, double clevis/body mounting bolt, clevis pin, flat washers and split pins.

Comparison of the Dimensions of Each Series



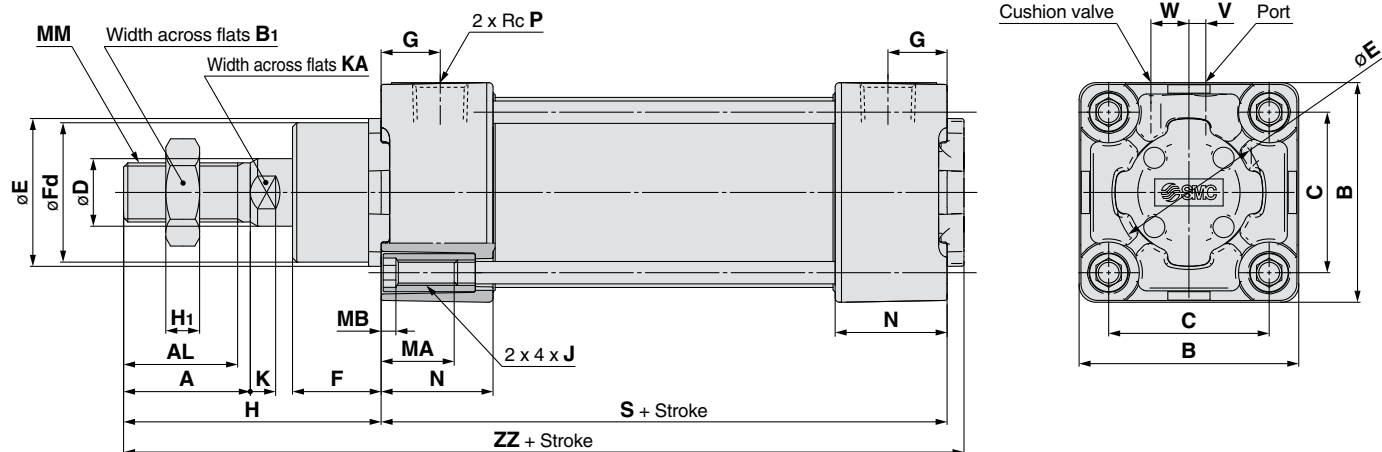
Bore size (mm)	XC88, 89		XC91		XC35		Standard	
	H	S	H	S	H	S	H	S
32	50	88	47	88	47	88	47	88
40	61	88	58	88	58	88	51	88
50	67	98	67	98	67	98	58	98
63	67	98	67	98	67	98	58	98
80	82	118	81	118	81	118	72	118
100	82	118	81	118	81	118	72	118

* At 0 stroke

Bore Size **∅32 to ∅100**

M□B□-XC88
XC89

Basic: MBB



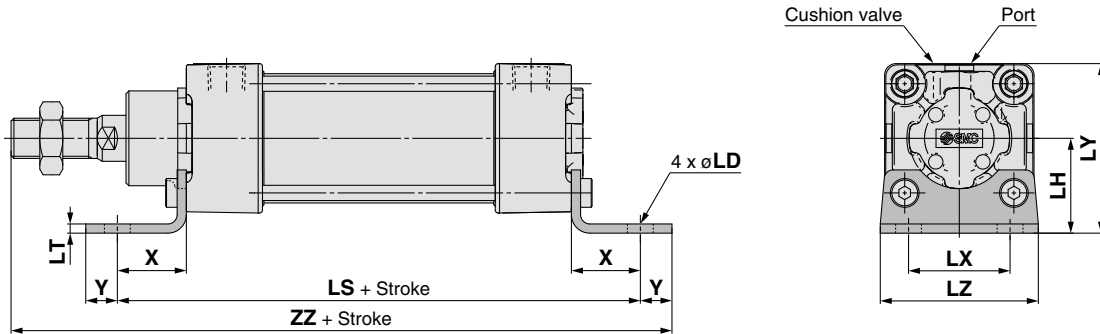
Dimensions

(mm)

Bore size (mm)	A	AL	B	B ₁	C	D	E	F	F _d	G	H	H ₁	J	K	KA	MA	MB	MM	N	P	S	V	W	ZZ
32	22	19.5	46	17	32.5	12	30	21	28	13	50	6	M6 x 1	6	10	16	4	M10 x 1.25	27	1/8	84	4	6.5	138
40	30	27	52	22	38	16	35	23.5	33	14	61	8	M6 x 1	6	14	16	4	M14 x 1.5	27	1/4	84	4	9	149
50	35	32	65	27	46.5	20	40	23	39.5	15.5	67	11	M8 x 1.25	7	18	16	4	M18 x 1.5	31.5	1/4	94	5	10.5	165
63	35	32	75	27	56.5	20	45	23	39.5	16.5	67	11	M8 x 1.25	7	18	16	4	M18 x 1.5	31.5	3/8	94	9	12	165
80	40	37	95	32	72	25	45	29	44.5	19	82	13	M10 x 1.5	10	22	16	5	M22 x 1.5	38	3/8	114	11.5	14	200
100	40	37	114	41	89	30	55	29	54	19	82	16	M10 x 1.5	10	26	16	5	M26 x 1.5	38	1/2	114	17	15	200

* Refer to Basic (B) for other dimensions.

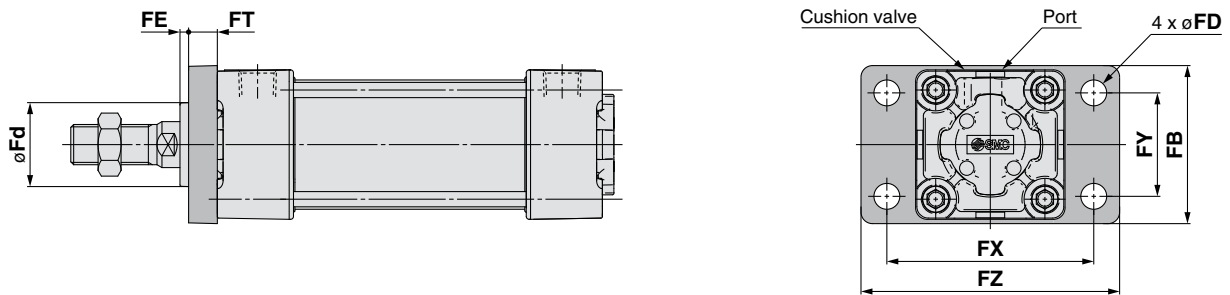
Axial foot: MBL



Axial Foot (mm)

Bore size (mm)	LD	LH	LS	LT	LX	LY	LZ	X	Y	ZZ
32	7	30	128	3.2	32	53	50	22	9	165
40	9	33	132	3.2	38	59	55	24	11	180
50	9	40	148	3.2	46	72.5	70	27	11	199
63	12	45	148	3.6	56	82.5	80	27	14	202
80	12	55	174	4.5	72	102.5	100	30	14	240
100	14	65	178	4.5	89	122	120	32	16	243

Rod flange: MBF



Rod Flange (mm)

Bore size (mm)	FB	FD	FE	FT	FX	FY	FZ	Fd
32	50	7	11	10	64	32	79	28
40	55	9	13.5	10	72	36	90	33
50	70	9	11	12	90	45	110	39.5
63	80	9	11	12	100	50	120	39.5
80	100	12	13	16	126	63	153	44.5
100	120	14	13	16	150	75	178	55

Spatter Resistant Cylinders
for Arc Welding

Clamp Cylinders

Gas/Air Switching Valve

Detection Switches

Tubing

Fittings

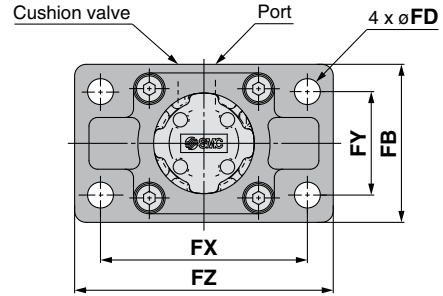
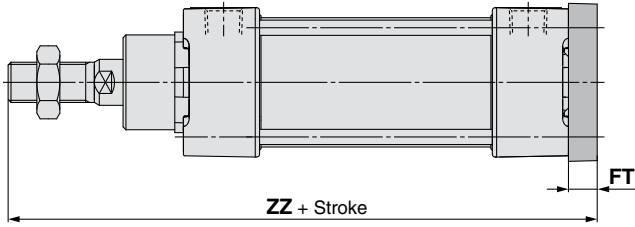
Speed Control Equipment

Bore Size $\varnothing 32$ to $\varnothing 100$

* Refer to Basic (B) for other dimensions.

M□B□-XC88
-XC89

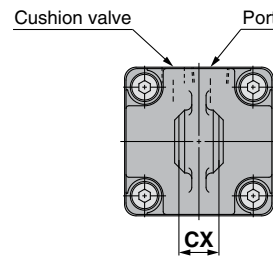
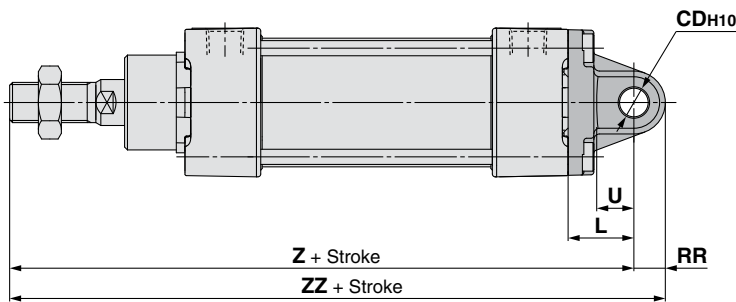
Head flange: MBG



Head Flange (mm)

Bore size (mm)	FB	FD	FT	FX	FY	FZ	ZZ
32	50	7	10	64	32	79	144
40	55	9	10	72	36	90	155
50	70	9	12	90	45	110	173
63	80	9	12	100	50	120	173
80	100	12	16	126	63	153	212
100	120	14	16	150	75	178	212

Single clevis: MBC

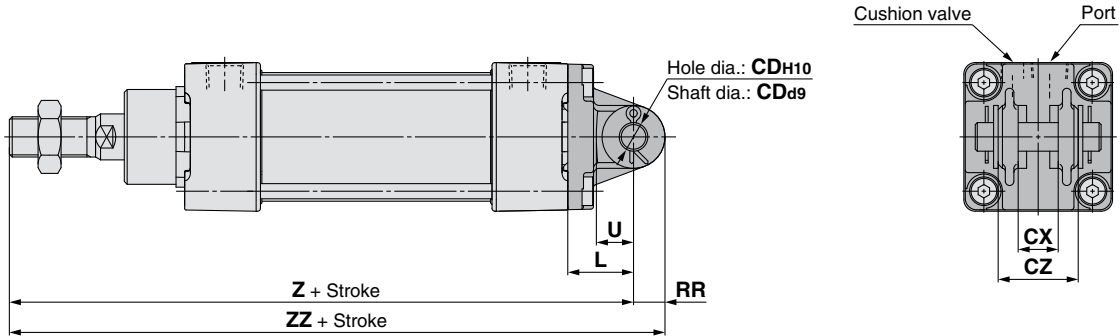


Single Clevis (mm)

Bore size (mm)	CDH10	CX	L	RR	U	Z	ZZ
32	10 ^{+0.058} ₀	14 ^{-0.1} _{-0.3}	23	10.5	13	157	167.5
40	10 ^{+0.058} ₀	14 ^{-0.1} _{-0.3}	23	11	13	168	179
50	14 ^{+0.070} ₀	20 ^{-0.1} _{-0.3}	30	15	17	191	206
63	14 ^{+0.070} ₀	20 ^{-0.1} _{-0.3}	30	15	17	191	206
80	22 ^{+0.084} ₀	30 ^{-0.1} _{-0.3}	42	23	26	238	261
100	22 ^{+0.084} ₀	30 ^{-0.1} _{-0.3}	42	23	26	238	261

* Refer to Basic (B) for other dimensions.

Double clevis: MBD

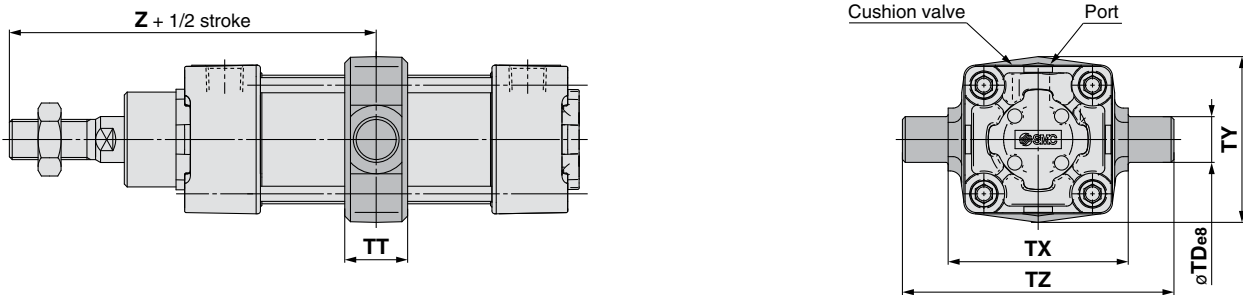


Double Clevis

(mm)

Bore size (mm)	CD _{H10}	CD _{d9}	CX	CZ	L	RR	U	Z	ZZ
32	10 ^{+0.058} ₀	10 ^{-0.040} _{-0.076}	14 ^{+0.3} _{+0.1}	28	23	10.5	13	157	167.5
40	10 ^{+0.058} ₀	10 ^{-0.040} _{-0.076}	14 ^{+0.3} _{+0.1}	28	23	11	13	168	179
50	14 ^{+0.070} ₀	14 ^{-0.050} _{-0.093}	20 ^{+0.3} _{+0.1}	40	30	15	17	191	206
63	14 ^{+0.070} ₀	14 ^{-0.050} _{-0.093}	20 ^{+0.3} _{+0.1}	40	30	15	17	191	206
80	22 ^{+0.084} ₀	22 ^{-0.065} _{-0.117}	30 ^{+0.3} _{+0.1}	60	42	23	26	238	261
100	22 ^{+0.084} ₀	22 ^{-0.065} _{-0.117}	30 ^{+0.3} _{+0.1}	60	42	23	26	238	261

Center trunnion: MBT



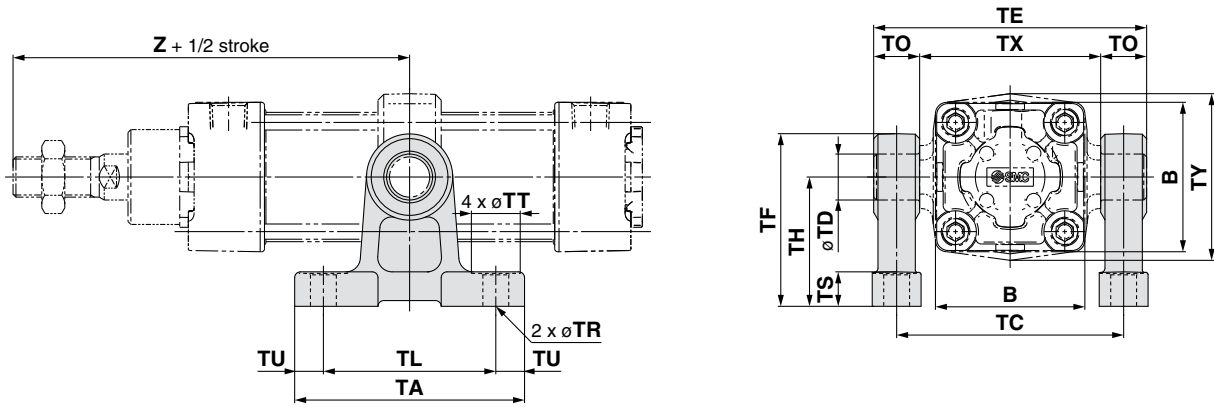
Center Trunnion

(mm)

Bore size (mm)	TD _{e8}	TT	TX	TY	TZ	Z
32	12 ^{-0.032} _{-0.059}	17	50	49	74	92
40	16 ^{-0.032} _{-0.059}	22	63	58	95	103
50	16 ^{-0.032} _{-0.059}	22	75	71	107	114
63	20 ^{-0.040} _{-0.073}	28	90	87	130	114
80	20 ^{-0.040} _{-0.073}	34	110	110	150	139
100	25 ^{-0.040} _{-0.073}	40	132	136	182	139

Pivot Bracket/Trunnion and Double Clevis Pivot Bracket

Trunnion pivot bracket

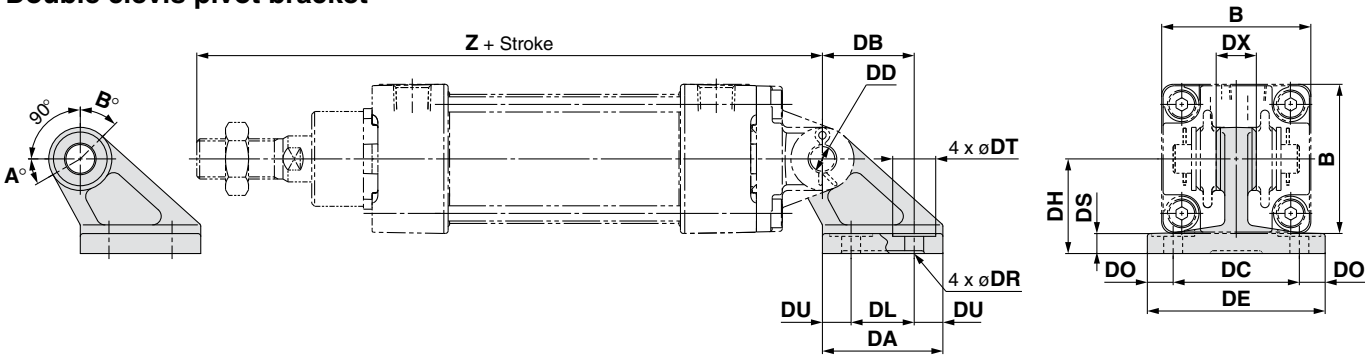


(mm)

Part no.	Bore size (mm)	B	TA	TL	TU	TC	TX	TE	TO	TR	TT	TS	TH	TF	Z	TD _{H10}
MB-S03	32	46	62	45	8.5	62	50	74	12	7	13	10	35	47	92	12 ^{+0.070} ₀
	40	52	80	60	10	80	63	97	17	9	17	12	45	60	103	16 ^{+0.070} ₀
MB-S04	50	65	80	60	10	92	75	109	17	9	17	12	45	60	114	16 ^{+0.070} ₀
	63	75	100	70	15	110	90	130	20	11	22	14	60	80	114	20 ^{+0.084} ₀
MB-S06	80	95	100	70	15	130	110	150	20	11	22	14	60	80	139	20 ^{+0.084} ₀
	100	114	120	90	15	158	132	184	26	13.5	24	17	75	100	139	25 ^{+0.084} ₀

Note) Order 2 trunnion pivot brackets per cylinder.

Double clevis pivot bracket



(mm)

Part no.	Bore size (mm)	B	DA	DB	DL	DU	DC	DX	DE	DO	DR	DT	DS	DH	Z	DD _{H10}
MB-B03	32	46	42	32	22	10	44	14	62	9	6.6	15	7	33	157	10 ^{+0.058} ₀
	40	52	42	32	22	10	44	14	62	9	6.6	15	7	33	168	10 ^{+0.058} ₀
MB-B05	50	65	53	43	30	11.5	60	20	81	10.5	9	18	8	45	191	14 ^{+0.070} ₀
	63	75	53	43	30	11.5	60	20	81	10.5	9	18	8	45	191	14 ^{+0.070} ₀
MB-B08	80	95	73	64	45	14	86	30	111	12.5	11	22	10	65	238	22 ^{+0.084} ₀
	100	114	73	64	45	14	86	30	111	12.5	11	22	10	65	238	22 ^{+0.084} ₀

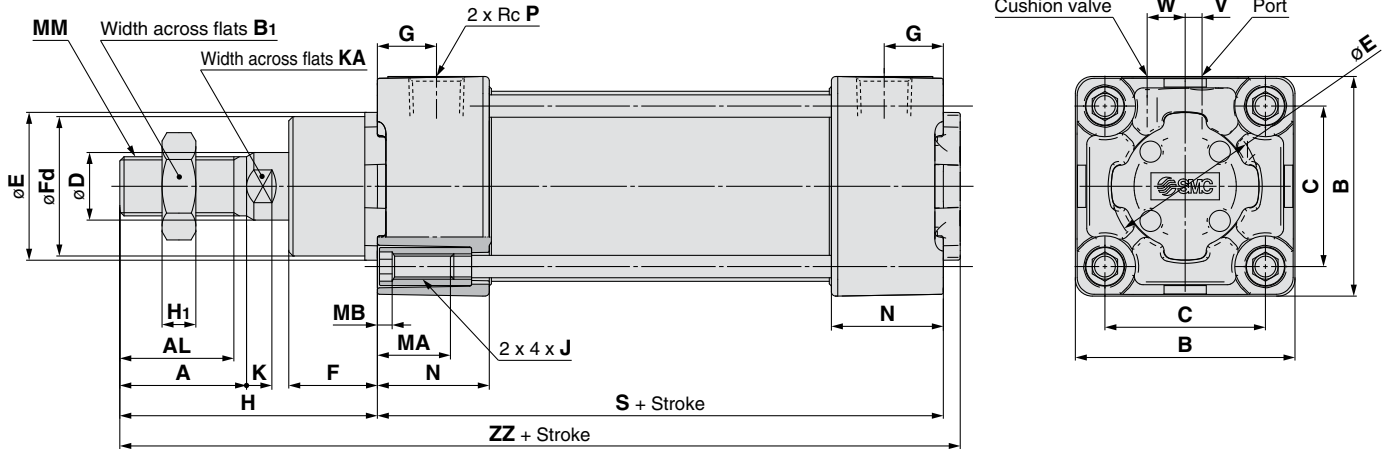
Rotating Angle

Bore size (mm)	A°	B°	A° + B° + 90°
32, 40	25°	45°	160°
50, 63	40°	60°	190°
80, 100	30°	55°	175°

Bore Size **∅32 to ∅100**

M□B□-XC91

Basic: MBB



Dimensions

(mm)

Bore size (mm)	Stroke range	A	AL	B	B ₁	C	D	E	F	F _d	G	H	H ₁	J	K	KA	MA	MB	MM	N	P	S	V	W	ZZ
32	Up to 1000	22	19.5	46	17	32.5	12	30	13	28	13	47	6	M6 x 1	6	10	16	4	M10 x 1.25	27	1/8	84	4	6.5	135
40	Up to 1000	30	27	52	22	38	16	35	13	33	14	58	8	M6 x 1	6	14	16	4	M14 x 1.5	27	1/4	84	4	9	146
50	Up to 1000	35	32	65	27	46.5	20	40	14	39.5	15.5	67	11	M8 x 1.25	7	18	16	5	M18 x 1.5	31.5	1/4	94	5	10.5	165
63	Up to 1000	35	32	75	27	56.5	20	45	14	39.5	16.5	67	11	M8 x 1.25	7	18	16	5	M18 x 1.5	31.5	3/8	94	9	12	165
80	Up to 1000	40	37	95	32	72	25	45	20	44.5	19	81	13	M10 x 1.5	10	22	16	5	M22 x 1.5	38	3/8	114	11.5	14	199
100	Up to 1000	40	37	114	41	89	30	55	20	54	19	81	16	M10 x 1.5	10	26	16	5	M26 x 1.5	38	1/2	114	17	15	199

Spatter Resistant Cylinders
for Arc Welding

Clamp Cylinders

Gas/Air Switching Valve

Detection Switches

Tubing

Fittings

Speed Control Equipment

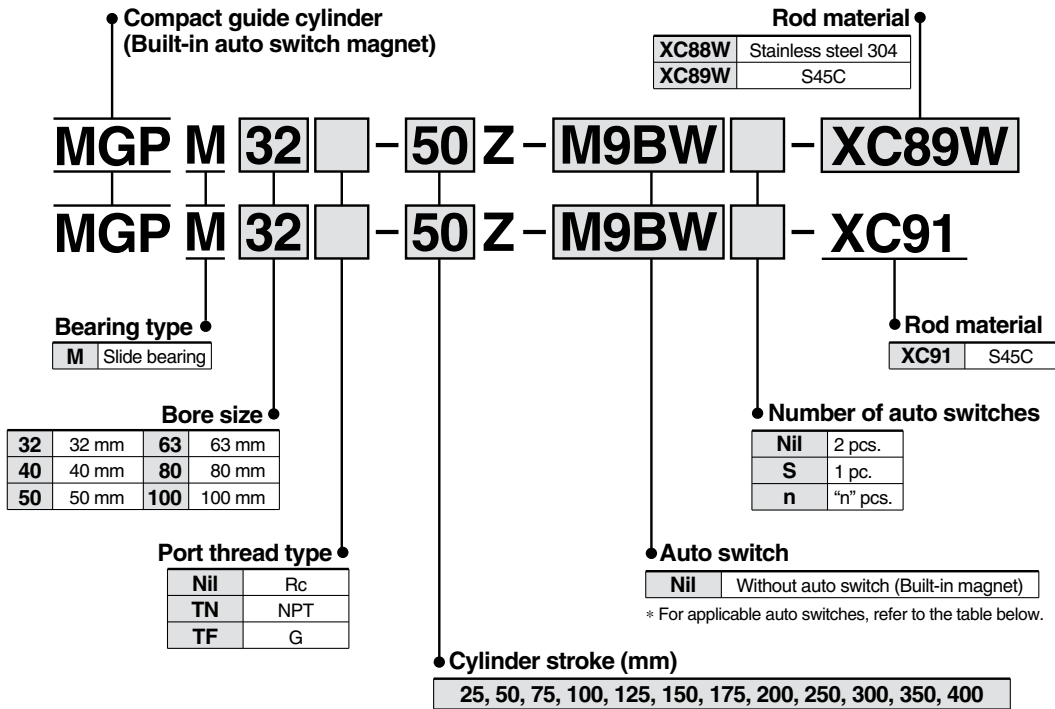
Spatter Resistant Cylinder for Arc Welding Compact Guide Cylinder

MGPM-XC88W/XC89W MGPM-XC91

∅32, ∅40, ∅50, ∅63, ∅80, ∅100

RoHS

How to Order



Made to Order

Part no.	Piston rod/Guide rod material (Hard chrome plating)		Coil scraper	Lube-retainer	Grease for welding	Scraper mechanism
	S45C	Stainless steel 304				
-XC88W	—	●	●	●	●	Both sides
-XC89W	●	—	●	●	●	Both sides
-XC91	●	—	●	●	●	Single side

Applicable Auto Switches/Refer to the WEB catalog or the Best Pneumatics No.3 for further information on auto switches.

Type	Special function	Electrical entry	Indicator light	Wiring (Output)	Load voltage		Auto switch model		Lead wire length (m)				Pre-wired connector	Applicable load				
					DC	AC	Perpendicular	In-line	0.5 (Nil)	1 (M)	3 (L)	5 (Z)						
Solid state auto switch	—	Grommet	Yes	3-wire (NPN)	24 V	5 V, 12 V	—	M9NV	M9N	●	●	●	○	○	IC circuit	Relay, PLC		
				3-wire (PNP)				M9PV	M9P	●	●	●	○	○				
				2-wire				M9BV	M9B	●	●	●	○	○				
				3-wire (NPN)				M9NWV	M9NW	●	●	●	○	○				
	Diagnostic indication (2-color indication)			3-wire (PNP)	M9PWV	M9PW	●	●	●	○	○	IC circuit						
				2-wire	M9BWW	M9BW	●	●	●	○	○		—					
	Water resistant (2-color indication)			3-wire (NPN)	M9NAV	M9NA	○	○	●	○	○	IC circuit						
				3-wire (PNP)	M9PAV	M9PA	○	○	●	○	○							
	Magnetic field resistant (2-color indication)			2-wire	M9BAV	M9BA	○	○	●	○	○	—						
				(Non-polar)	—	P3DWA	●	—	●	●	●							
—		P4DW	—		—	●	●	●										
—		—	—	—	—	—	—	—										
Reed auto switch	—	Grommet	Yes	3-wire (NPN equivalent)	24 V	5 V	—	A96V	A96	●	—	●	—	—	IC circuit	—		
				2-wire				100 V	A93V	A93	●	—	●	●	—		—	Relay, PLC
								100 V or less	A90V	A90	●	—	●	—	—		—	IC circuit

* Lead wire length symbols: 0.5 m..... Nil (Example) M9NW
1 m..... M (Example) M9NWM
3 m..... L (Example) M9NWL
5 m..... Z (Example) M9NWZ

* Solid state auto switches marked with "○" are produced upon receipt of order.
* Auto switches other than D-P3DWA/D-P4DW cannot be used under the magnetic field environment.
* Please contact SMC for auto switches, auto switch proper mounting positions and operating ranges other than the above.

* Auto switches are shipped together, (but not assembled).

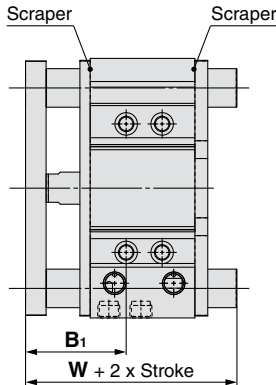
Specifications



Bore size	ø32	ø40	ø50	ø63	ø80	ø100
Action	Double acting					
Fluid	Air					
Proof pressure	218 psi (1.5 MPa)					
Maximum operating pressure	145 psi (1.0 MPa)					
Minimum operating pressure	20 psi (0.14 MPa)					
	XC88W, XC89W					
	XC91					
Ambient and fluid temperature	14 to 140°F (-10° to 60°C) (No freezing)					
Cushion	Rubber bumper on both ends					
Lubrication	Not required (Non-lube)					
Stroke length tolerance	$^{+1.5}_0$ mm					

Comparison of the Dimensions of Each Series

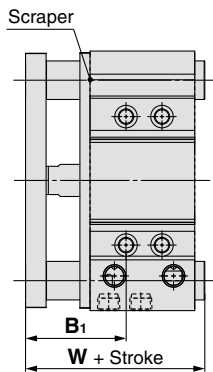
Both sides scraper



Bore size (mm)	XC88W XC89W		XC35W	
	B ₁	W	B ₁	W
32	53	82.5	53	82.5
40	54	89	54	89
50	62	95	62	95
63	62	100	62	100
80	78	120.5	78	120.5
100	61	143	61	143

* At 0 stroke

Single side scraper

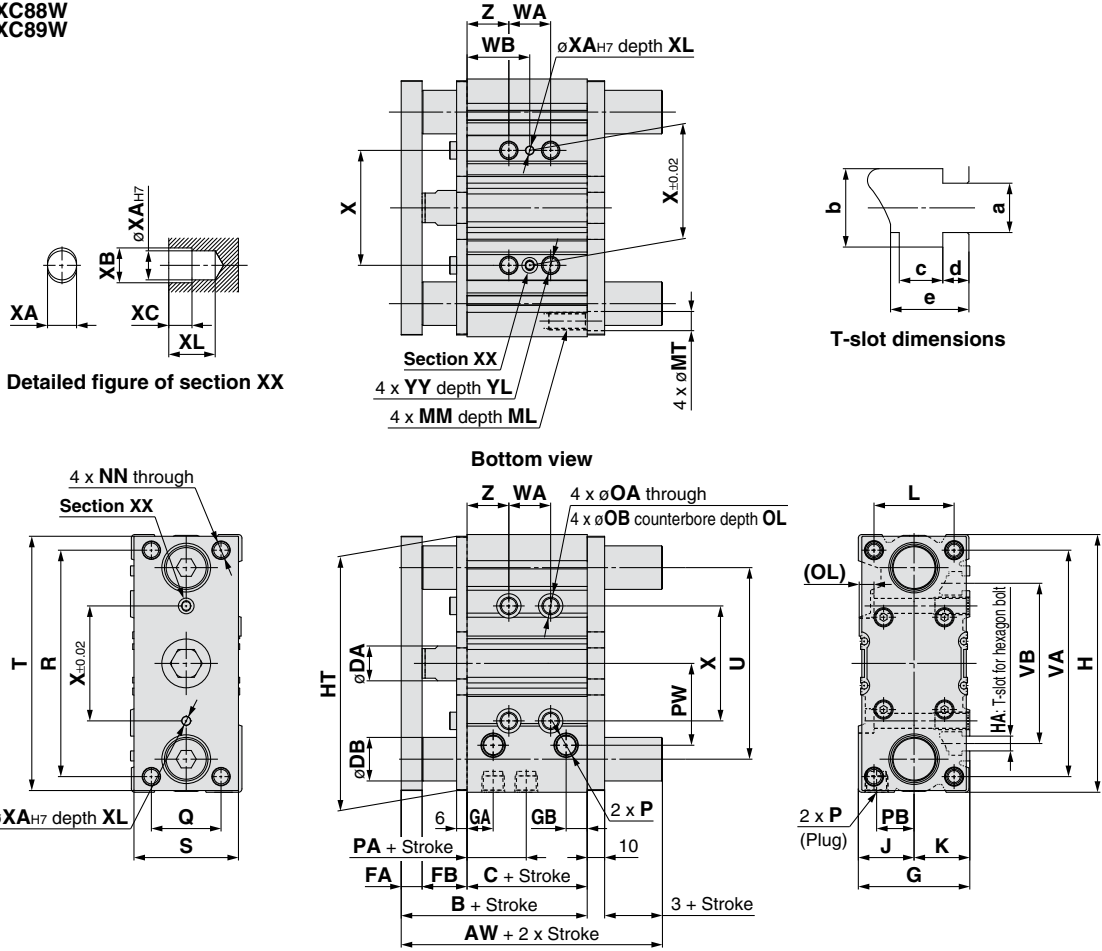


Bore size (mm)	XC91		XC35		Standard	
	B ₁	W	B ₁	W	B ₁	W
32	53	85	53	85	43	75
40	54	85	54	85	44	75
50	62	98.5	62	98.5	52	88.5
63	62	98.5	62	98.5	52	88.5
80	78	114.5	78	114.5	68	104.5
100	61	136.5	61	136.5	51	126.5

* At 0 stroke

Bore Size $\varnothing 32$ to $\varnothing 63$

MGPM \square -XC88W
-XC89W



(mm)

Bore size	Standard stroke	AW	B	C	DA	DB	FA	FB	G	GA	GB	H	HA	HT	J	K	L
32	25, 50, 75, 100, 125, 150, 175, 200, 250, 300, 350, 400	82.5	69.5	37.5	14	20	10	22	48	12	9	112	M6	110	24	24	34
40		89	76	44	14	20	10	22	54	15	12	120	M6	118	27	27	40
50		95	82	44	20	25	12	26	64	15	12	148	M8	146	32	32	46
63		100	87	49	20	25	12	26	78	15.5	13.5	162	M10	160	39	39	58

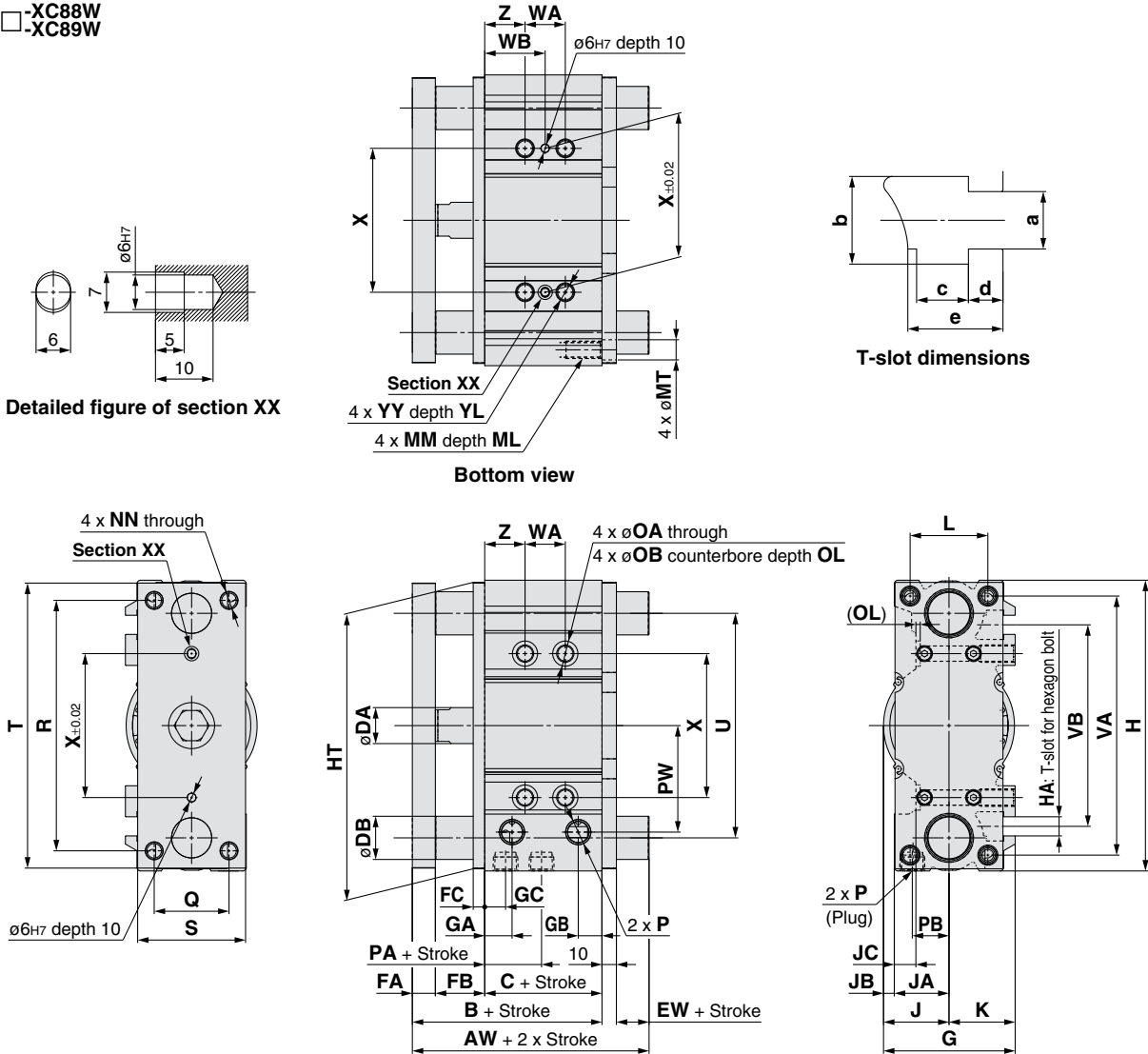
Bore size	MM	ML	MT	NN	OA	OB	OL	P			PA	PB	PW	Q	R	S	T	U
								Nil	TN	TF								
32	M8 x 1.25	20	9	M8 x 1.25	6.7	11	7.5	Rc1/8	NPT1/8	G1/8	6.5	16	35.5	30	96	44	110	78
40	M8 x 1.25	20	8.5	M8 x 1.25	6.7	11	7.5	Rc1/8	NPT1/8	G1/8	13	18	39.5	30	104	44	118	86
50	M10 x 1.5	22	11	M10 x 1.5	8.6	14	9	Rc1/4	NPT1/4	G1/4	9	21.5	47	40	130	60	146	110
63	M10 x 1.5	22	11	M10 x 1.5	8.6	—	9	Rc1/4	NPT1/4	G1/4	13	28	58	50	130	70	158	124

Bore size	VA	VB	WA					WB					X	XA	XB	XC	XL
			25 st or less	Over 25 st 100 st or less	Over 100 st 200 st or less	Over 200 st 300 st or less	Over 300 st	25 st or less	Over 25 st 100 st or less	Over 100 st 200 st or less	Over 200 st 300 st or less	Over 300 st					
32	98	63	24	48	124	200	300	33	45	83	121	171	42	4	4.5	3	6
40	106	72	24	48	124	200	300	34	46	84	122	172	50	4	4.5	3	6
50	130	92	24	48	124	200	300	36	48	86	124	174	66	5	6	4	8
63	142	110	28	52	128	200	300	38	50	88	124	174	80	5	6	4	8

Bore size	YY	YL	Z	a	b	c	d	e
32	M8 x 1.25	16	21	6.5	10.5	5.5	3.5	9.5
40	M8 x 1.25	16	22	6.5	10.5	5.5	4	11
50	M10 x 1.5	20	24	8.5	13.5	7.5	4.5	13.5
63	M10 x 1.5	20	24	11	17.8	10	7	18.5

Bore Size **ø80, ø100**

MGPM □ -XC88W
 □ -XC89W



(mm)

Bore size	Standard stroke	AW	B	C	DA	DB	EW	FA	FB	FC	G	GA	GB	GC	H	HA
80	25, 50, 75, 100, 125, 150, 175	120.5	106.5	56.5	25	30	4	16	34	8	91.5	19	16.5	14.5	202	M12
100	200, 250, 300, 350, 400	143	126	66	30	36	7	19	41	9	111.5	22.5	20.5	18	240	M14

Bore size	HT	J	JA	JB	JC	K	L	MM	ML	MT	NN	OA	OB	OL	P			PA
															Nil	TN	TF	
80	199	45.5	38	7.5	15	46	54	M12 x 1.75	25	14	M12 x 1.75	10.6	17.5	3	Rc3/8	NPT3/8	G3/8	14.5
100	236	55.5	45	10.5	10	56	62	M14 x 2	31	16	M14 x 2	12.5	20	8	Rc3/8	NPT3/8	G3/8	17.5

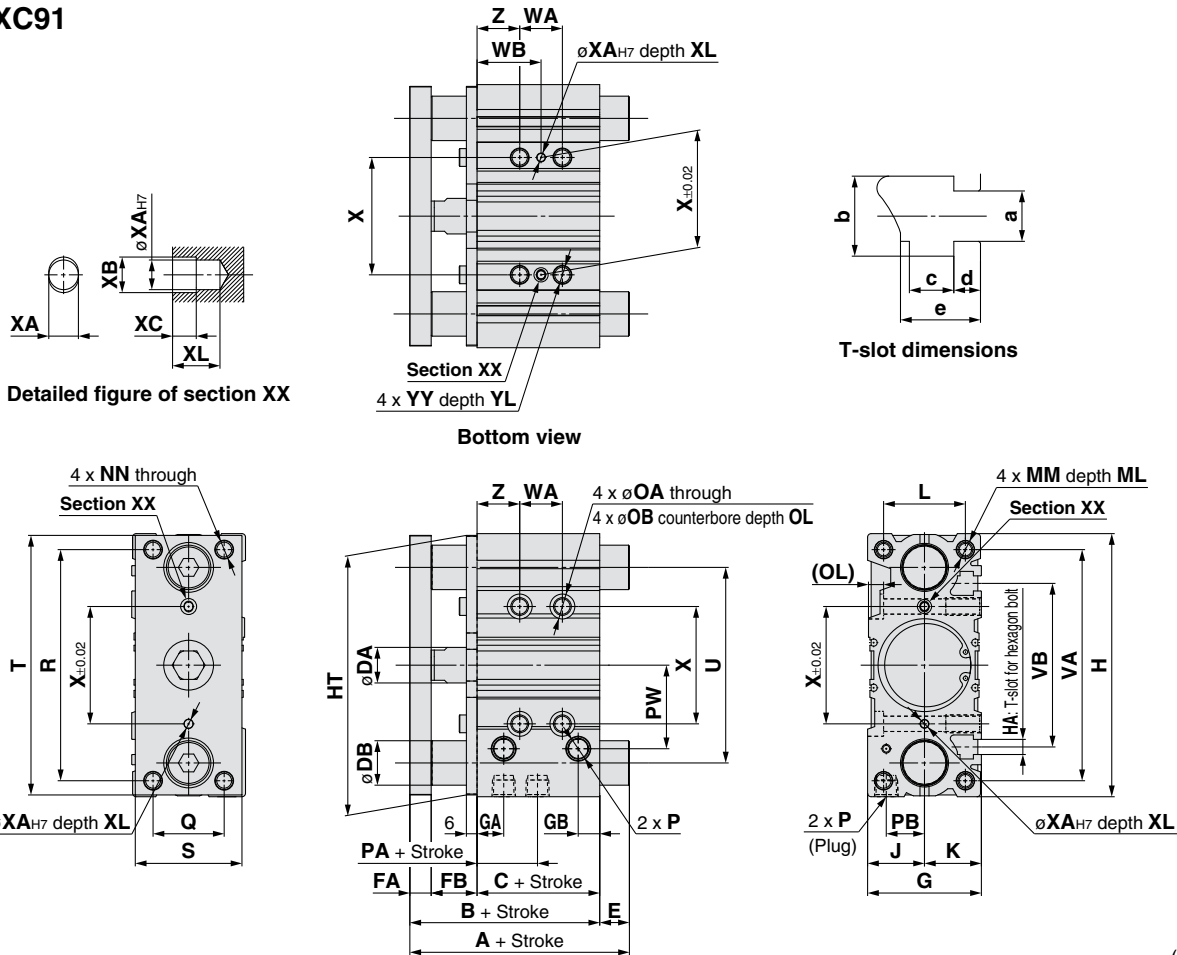
Bore size	PB	PW	Q	R	S	T	U	VA	VB	WA				
										25 st or less	Over 25 st or less	Over 100 st or less	Over 200 st or less	Over 300 st
80	25.5	74	52	174	75	198	156	180	140	28	52	128	200	300
100	32.5	89	64	210	90	236	188	210	166	48	72	148	220	320

Bore size	WB					X	YY	YL	Z	a	b	c	d	e
	25 st or less	Over 25 st or less	Over 100 st or less	Over 200 st or less	Over 300 st									
80	42	54	92	128	178	100	M12 x 1.75	24	28	13.3	20.3	12	8	22.5
100	35	47	85	121	171	124	M14 x 2	28	11	15.3	23.3	13.5	10	30

MGPM-XC91

Bore Size $\varnothing 32$ to $\varnothing 63$

MGPM□-XC91



(mm)

Bore size (mm)	Standard stroke	A			B	C	DA	DB	E			FA	FB	G	GA	GB	H
		50 st or less	Over 50 st 200 st or less	Over 200 st					50 st or less	Over 50 st 200 st or less	Over 200 st						
32	25, 50, 75, 100 125, 150, 175, 200 250, 300, 350, 400	85	103.5	139.5	69.5	37.5	14	20	15.5	34	70	10	22	48	12	9	112
40		85	103.5	139.5	76	44	14	20	9	27.5	63.5	10	22	54	15	12	120
50		98.5	119.5	160.5	82	44	20	25	16.5	37.5	78.5	12	26	64	15	12	148
63		98.5	119.5	160.5	87	49	20	25	11.5	32.5	73.5	12	26	78	15.5	13.5	162

Bore size	HA	HT	J	K	L	MM	ML	NN	OA	OB	OL	P			PA	PB	PW	Q
												Nil	TN	TF				
32	M6	110	24	24	34	M8 x 1.25	20	M8 x 1.25	6.7	11	7.5	Rc1/8	NPT1/8	G1/8	6.5	16	35.5	30
40	M6	118	27	27	40	M8 x 1.25	20	M8 x 1.25	6.7	11	7.5	Rc1/8	NPT1/8	G1/8	13	18	39.5	30
50	M8	146	32	32	46	M10 x 1.5	22	M10 x 1.5	8.6	14	9	Rc1/4	NPT1/4	G1/4	9	21.5	47	40
63	M10	160	39	39	58	M10 x 1.5	22	M10 x 1.5	8.6	—	9	Rc1/4	NPT1/4	G1/4	13	28	58	50

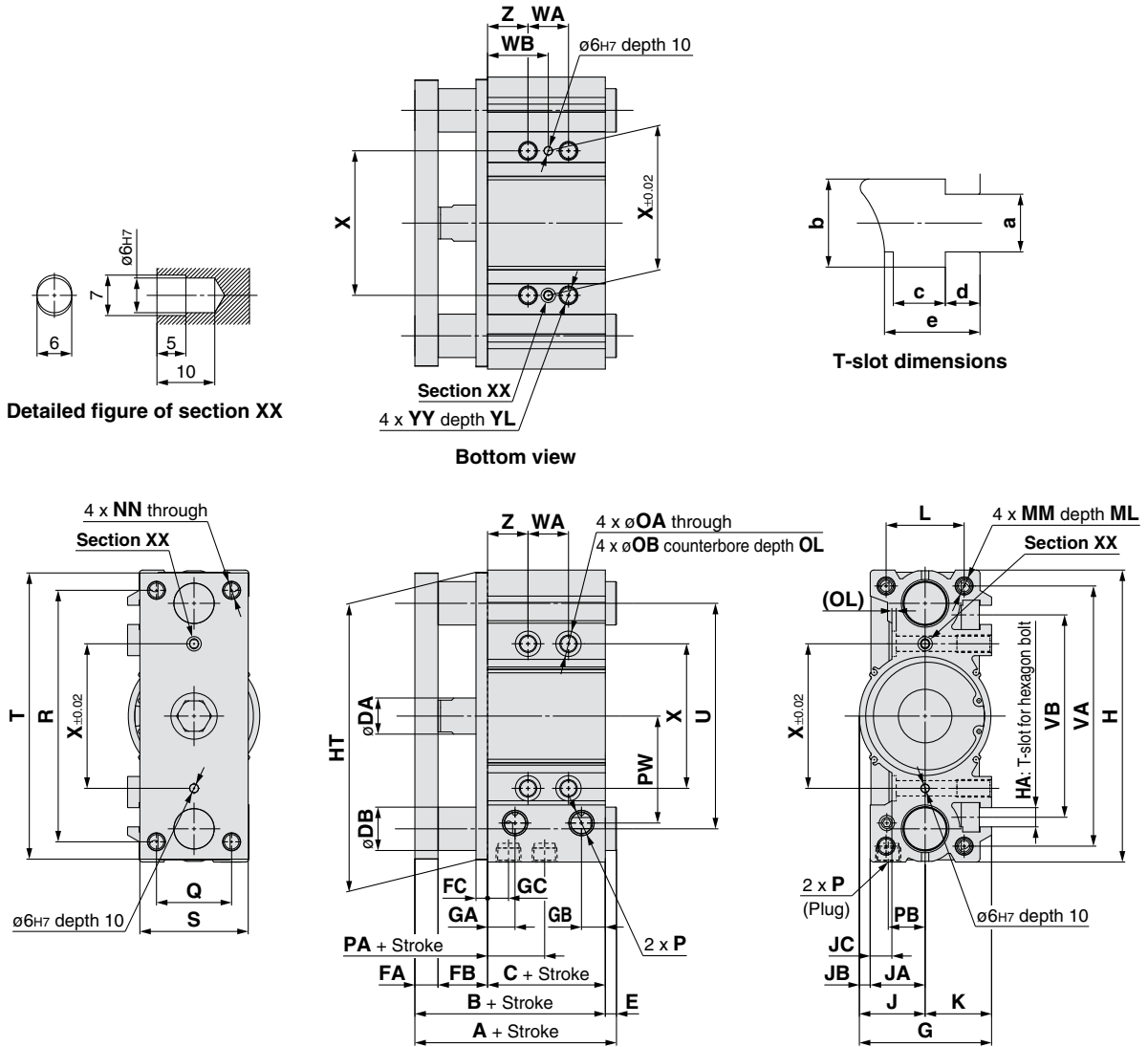
Bore size	R	S	T	U	VA	VB	WA					WB					X	XA	XB
							25 st or less	Over 25 st 100 st or less	Over 100 st 200 st or less	Over 200 st 300 st or less	Over 300 st	25 st or less	Over 25 st 100 st or less	Over 100 st 200 st or less	Over 200 st 300 st or less	Over 300 st			
32	96	44	110	78	98	63	24	48	124	200	300	33	45	83	121	171	42	4	4.5
40	104	44	118	86	106	72	24	48	124	200	300	34	46	84	122	172	50	4	4.5
50	130	60	146	110	130	92	24	48	124	200	300	36	48	86	124	174	66	5	6
63	130	70	158	124	142	110	28	52	128	200	300	38	50	88	124	174	80	5	6

Bore size	XC	XL	YY	YL	Z	a	b	c	d	e
32	3	6	M8 x 1.25	16	21	6.5	10.5	5.5	3.5	9.5
40	3	6	M8 x 1.25	16	22	6.5	10.5	5.5	4	11
50	4	8	M10 x 1.5	20	24	8.5	13.5	7.5	4.5	13.5
63	4	8	M10 x 1.5	20	24	11	17.8	10	7	18.5

Spatter Resistant Cylinder for Arc Welding **MGPM-XC91**
Compact Guide Cylinder

Bore Size **ø80, ø100**

MGPM□-XC91



Bore size	Standard stroke	A			B	C	DA	DB	E			FA	FB	FC	G
		50 st or less	Over 50 st 200 st or less	Over 200 st					50 st or less	Over 50 st 200 st or less	Over 200 st				
80	25, 50, 75, 100, 125, 150, 175,	114.5	141.5	190.5	106.5	56.5	25	30	8	35	84	16	34	8	91.5
100	200, 250, 300, 350, 400	136.5	161.5	200.5	126	66	30	36	10.5	35.5	74.5	19	41	9	111.5

Bore size	GA	GB	GC	H	HA	HT	J	JA	JB	JC	K	L	MM	ML	NN	OA	OB	OL
80	19	16.5	14.5	202	M12	199	45.5	38	7.5	15	46	54	M12 x 1.75	25	M12 x 1.75	10.6	17.5	3
100	22.5	20.5	18	240	M14	236	55.5	45	10.5	10	56	62	M14 x 2	31	M14 x 2	12.5	20	8

Bore size	P			PA	PB	PW	Q	R	S	T	U	VA	VB	WA				
	Nil	TN	TF											25 st or less	Over 25 st 100 st or less	Over 100 st 200 st or less	Over 200 st 300 st or less	Over 300 st
80	Rc3/8	NPT3/8	G3/8	14.5	25.5	74	52	174	75	198	156	180	140	28	52	128	200	300
100	Rc3/8	NPT3/8	G3/8	17.5	32.5	89	64	210	90	236	188	210	166	48	72	148	220	320

Bore size	WB					X	YY	YL	Z	a	b	c	d	e
	25 st or less	Over 25 st 100 st or less	Over 100 st 200 st or less	Over 200 st 300 st or less	Over 300 st									
80	42	54	92	128	178	100	M12 x 1.75	24	28	13.3	20.3	12	8	22.5
100	35	47	85	121	171	124	M14 x 2	28	11	15.3	23.3	13.5	10	30



Spatter Resistant Cylinders for Arc Welding

Clamp Cylinders

Gas/Air Switching Valve

Detection Switches

Tubing

Fittings

Speed Control Equipment

Spatter Resistant Cylinder for Arc Welding Rotary Clamp Cylinder: Double Guide Type

MK2T-XC89 -XC91

ø32, ø40, ø50, ø63



How to Order

Ordering Example: MK2T B 32 [] - 10 R [] - M9BW [] - XC89

Ordering Example: MK2T B 32 [] - 10 R [] - M9BW [] - XC91

Rotary clamp cylinder Double guide type (Built-in auto switch magnet)

Mounting bracket

B	Through-hole/Both ends tapped common (Standard)
G	Head flange

Bore size

32	32 mm	50	50 mm
40	40 mm	63	63 mm

Cylinder port

Nil	Rc
TN	NPT
TF	G

Clamp stroke

	Clamp stroke	Rotary stroke	Applicable bore size
10	10 mm	29 mm	ø32, ø40
20	20 mm		
20	20 mm	33 mm	ø50, ø63
50	50 mm		

Rod material

XC89	S45C
XC91	S45C

Number of auto switches

Nil	2 pcs.
S	1 pc.

Auto switch

Nil	Without auto switch (Built-in magnet)
------------	---------------------------------------

* For applicable auto switches, refer to the table below.

Body option

Nil	Standard (Female thread)
N	With arm

* Arms are included when shipped, (but not assembled).

Rotary direction (Unclamp → Clamp)

R	Clockwise
L	Counterclockwise

* Direction of rotation viewed from the rod end when the rod is retracting.

L type
During unclamping (Extension end) 85° to 95° (90°±5°)

R type
During unclamping (Extension end) 85° to 95° (90°±5°)

Clamp part Non-rotating accuracy ±0.5° to 1.0°

During clamping (Retraction end)

Note: Use the -XC91 in a place where the distance from the welding portion is far and the spatter scattering is minimized.

Made to Order

Part no.	Piston rod material (Hard chrome plating)	Coil scraper	Lube-retainer	Grease for welding
	S45C			
-XC89	●	●	●	●
-XC91	●	●	—	●

Applicable Auto Switches/Refer to the WEB catalog or the Best Pneumatics No.3 for further information on auto switches.

Type	Special function	Electrical entry	Indicator light	Wiring (Output)	Load voltage		Auto switch model		Lead wire length (m)					Pre-wired connector	Applicable load			
					DC	AC	Perpendicular	In-line	0.5 (Nil)	1 (M)	3 (L)	5 (Z)	None (N)		IC circuit	Relay, PLC		
Solid state auto switch	—	Grommet	Yes	3-wire (NPN)	24 V	5 V, 12 V	—	M9NV	M9N	●	—	●	○	—			○	IC circuit
				3-wire (PNP)				M9PV	M9P	●	—	●	○	—	○			
				2-wire				M9BV	M9B	●	—	●	○	—	○			
	Diagnostic indication (2-color indication)			3-wire (NPN)				5 V, 12 V	M9NWV	M9NW	●	●	●	○	—	○	IC circuit	
				3-wire (PNP)					M9PWV	M9PW	●	●	●	○	—	○		
	Magnetic field resistant (2-color indication)			2-wire				12 V	M9BWV	M9BW	●	●	●	○	—	○	—	
				(Non-polar)					—	P3DWA	●	—	●	●	—	●		
Reed auto switch	—	Grommet	Yes	3-wire (NPN equivalent)	24 V	5 V, 12 V	100 V or less	A96V	A96	●	—	●	—	—	—	IC circuit	—	
				2-wire				A93V	A93	●	—	●	●	—	—	—	Relay, PLC	
								A90V	A90	●	—	●	—	—	—	—	IC circuit	

* Lead wire length symbols: 0.5 m..... Nil (Example) M9NW
 1 m..... M (Example) M9NWM
 3 m..... L (Example) M9NWL
 5 m..... Z (Example) M9NWZ

* Solid state auto switches marked with "○" are produced upon receipt of order.
 ** For D-P4DW, ø40 to ø63 are available.
 ** Only D-P4DW type is assembled at the time of shipment.

* Please contact SMC for auto switches, auto switch proper mounting positions and operating ranges other than the above.

* For details about auto switches with pre-wired connector, refer to the WEB catalog or Best Pneumatics No.3.

* When D-M9□(V)/M9□W(V)/M9□A(V)/A9□(V) types are mounted on a side other than the port side, order auto switch mounting brackets separately. Refer to the WEB catalog or Best Pneumatics No.3 for details.

* Auto switches are shipped together, (but not assembled).

Spatter Resistant Cylinder for Arc Welding Rotary Clamp Cylinder: Double Guide Type **MK2T-XC89** **MK2T-XC91**

Spatter Resistant Cylinders
for Arc Welding

Clamp Cylinders

Gas/Air Switching Valve

Detection Switches

Tubing

Fittings

Speed Control Equipment

Specifications



Bore size (mm)	32	40	50	63
Action	Double acting			
Rotation angle ^{Note 1)}	90° ±5°			
Rotary direction ^{Note 2)}	Clockwise, Counterclockwise			
Rotary stroke (mm)	29		33	
Clamp stroke (mm)	10, 20		20, 50	
Theoretical clamp force lbf (N) ^{Note 3)}	67.4 (300)	118 (525)	185 (825)	292 (1300)
Fluid	Air			
Proof pressure	218 psi (1.5 MPa)			
Operating pressure range	15 to 145 psi (0.1 to 1 MPa)			
Ambient and fluid temperature	Without auto switch: 14 to 158°F (-10 to 70°C) (No freezing) With auto switch: 14 to 140°F (-10 to 60°C) (No freezing)			
Lubrication	Non-lube			
Piping port size	Rc1/8, NPT1/8, G1/8		Rc1/4, NPT1/4, G1/4	
Mounting	Through-hole/Both ends tapped common, Head end flange			
Cushion	Rubber bumper			
Stroke length tolerance	+1.0 0			
Piston speed	50 to 200 mm/s			
Non-rotating accuracy (Clamp part)	±0.5°			

Note 1) Refer to "Rotary Angle" figure in the WEB catalog or Best Pneumatics No.3.

Note 2) Direction of rotation viewed from the rod end when the piston rod is retracting.

Note 3) At 73 psi (0.5 MPa).

Theoretical Output

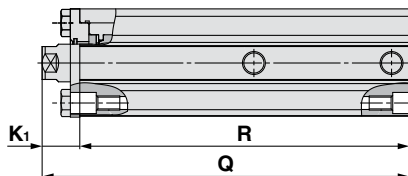
Unit: N

Bore size (mm)	Rod size (mm)	Operating direction	Piston area (cm ²)	Operating pressure (MPa)			
				0.3	0.5	0.7	1.0
32	16	R	6	182	300	418	600
		H	8	243	400	557	800
40	16	R	10.5	319	525	731	1050
		H	12.5	380	625	870	1250
50	20	R	16.5	502	825	1149	1648
		H	19.6	596	980	1365	1961
63	25	R	26	780	1300	1820	2600
		H	31.2	948	1560	2172	3121

Note) Theoretical output (N) = Pressure (MPa) x Piston area (cm²) x 100
1 N = 0.225 lbf

Operating direction
R: Rod end (Clamp)
H: Head end (Unclamp)

Comparison of the Dimensions of Each Series



Bore size (mm)	XC89			XC91			Standard		
	K ₁	Q	R	K ₁	Q	R	K ₁	Q	R
32	16	176	160	8	168	160	8	168	160
40	16.5	180.5	164	7.5	171.5	164	7.5	171.5	164
50	23.5	202.5	179	12	191	179	12	191	179
63	23	205	182	10	192	182	10	192	182

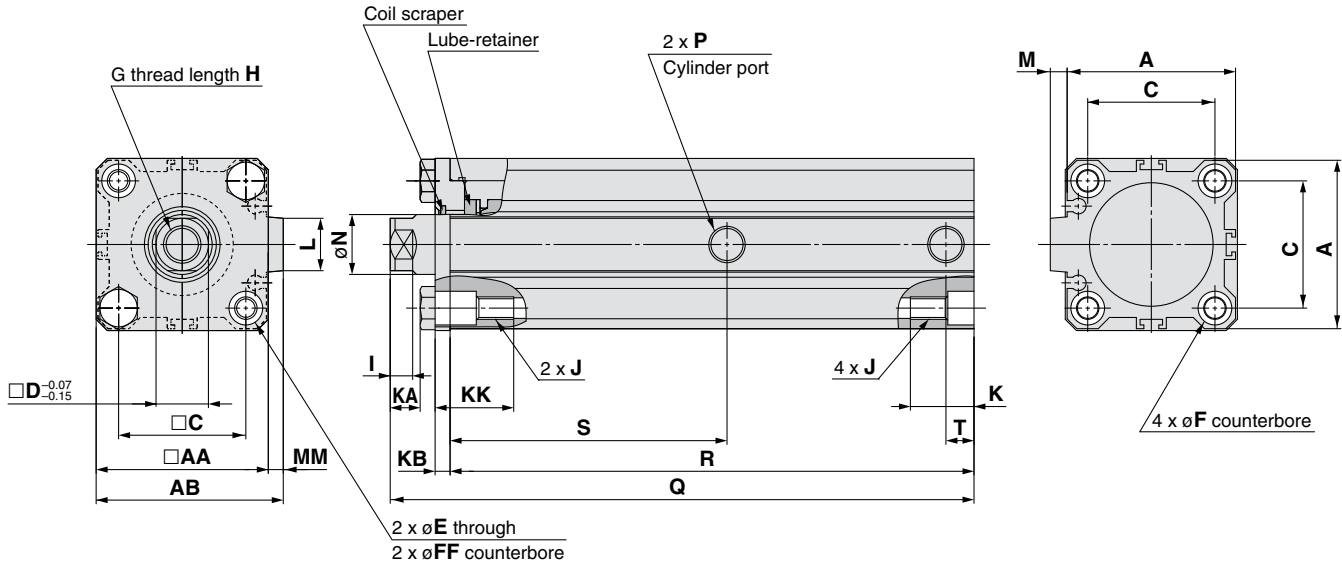
* When the clamp stroke is 20 mm

MK2T-XC89

Bore Size $\varnothing 32$ to $\varnothing 63$

MK2T□-XC89

Through-hole/Both ends tapped (Standard): MK2TB



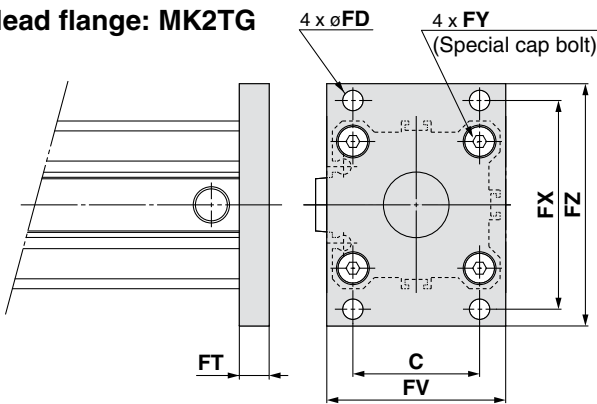
Bore size (mm)	AA	AB	A	C	D	E	FF	F	G	H	I	J	KK	K	KA	KB	L	MM	M	$\varnothing N$
32	46	50	45	34	14 ^{-0.07/-0.15}	5.5	9 depth 11	9 depth 7	M10 x 1.5	12	6	M6 x 1.0	21	17	8	4	14	4	4.5	16
40	52	57	52	40	14 ^{-0.07/-0.15}	5.5	9 depth 12	9 depth 7	M10 x 1.5	12	6	M6 x 1.0	22	17	7.5	5	14	5	5	16
50	64	71	64	50	17 ^{-0.07/-0.15}	6.6	11 depth 14	11 depth 8	M12 x 1.75	15	7	M8 x 1.25	28	22	12	6	19	7	7	20
63	77	84	77	60	22 ^{-0.07/-0.15}	9	14 depth 16.5	14 depth 10.5	M16 x 2	21	8	M10 x 1.5	34.5	28.5	10	6	19	7	7	25

Bore size (mm)	P			Clamp stroke: 10 mm				Clamp stroke: 20 mm				Clamp stroke: 50 mm			
	NII	TN	TF	Q	R	S	T	Q	R	S	T	Q	R	S	T
32	Rc1/8	NPT1/8	G1/8	156	140	74	7.5	176	160	84	7.5	—	—	—	—
40	Rc1/8	NPT1/8	G1/8	160.5	144	75	8	180.5	164	85	8	—	—	—	—
50	Rc1/4	NPT1/4	G1/4	—	—	—	—	202.5	179	91.5	12.5	266	242.5	121.5	14
63	Rc1/4	NPT1/4	G1/4	—	—	—	—	205	182	93	10.5	269	246	123	15

Note 1) The cylinder rod is retracted.

Note 2) The overall length when the rod is extended is the value that the clamp stroke and rotary stroke are added to the dimension Q.

Head flange: MK2TG

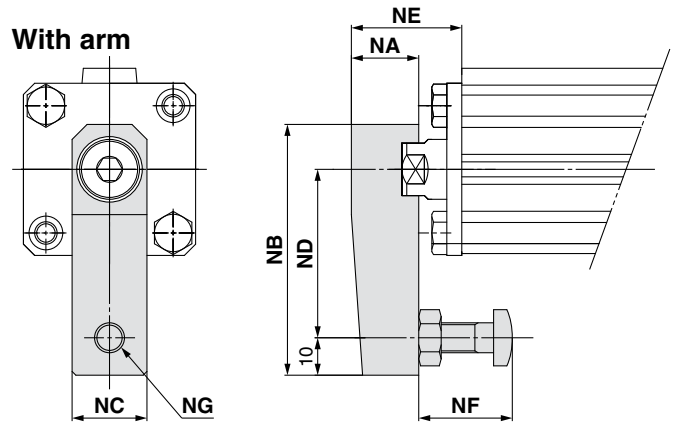


Bore size (mm)	Flange part no.	C	FD	FT	FV	FX	FY	FZ
32	MK2T-F032	34	5.5	8	48	56	M6 x 1.0	65
40	MK2T-F040	40	5.5	8	54	62	M6 x 1.0	72
50	MK2T-F050	50	6.6	9	67	76	M8 x 1.25	89
63	MK2T-F063	60	9	9	80	92	M10 x 1.5	108

* Dimensions other than the above are the same as standard.

* Accessories: hexagon socket head cap screw

With arm



Bore size (mm)	Arm part no.	NA	NB	NC	ND	NE	NF	NG
32	MK-A032Z	18	67	20	45	29.5	15 to 25	M8 x 1.25
40		18	67	20	45	30	15 to 25	M8 x 1.25
50	MK-A050Z	22	88	22	65	41	20 to 40	M10 x 1.5
63	MK2T-A063	32	91	32	65	47.5	20 to 40	M10 x 1.5

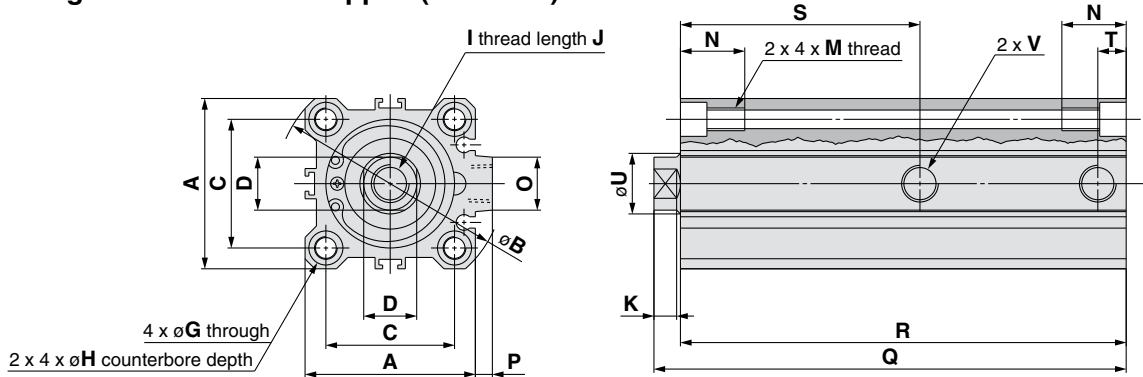
* Accessories: clamp bolt, hexagon socket head cap screw, hexagon nut, spring washer

Spatter Resistant Cylinder for Arc Welding Rotary Clamp Cylinder: Double Guide Type **MK2T-XC91**

Bore Size **Ø32 to Ø63**

MK2T□-XC91 * Dimensions are the same as the standard product (Series MK2T).

Through-hole/Both ends tapped (Standard): MK2TB



Through-hole/Both Ends Tapped Common (Standard)

(mm)

Bore size	A	ØB	C	D	G	H	I	J	K	M	N	O	P	ØU	V		
															Nil	TN	TF
32	45	60	34	14 ^{-0.07/-0.15}	5.5	9 depth 7	M10 x 1.5	12	6	M6 x 1.0	17	14	4.5	16	Rc1/8	NPT1/8	G1/8
40	52	69	40	14 ^{-0.07/-0.15}	5.5	9 depth 7	M10 x 1.5	12	6	M6 x 1.0	17	14	5	16	Rc1/8	NPT1/8	G1/8
50	64	86	50	17 ^{-0.07/-0.15}	6.6	11 depth 8	M12 x 1.75	15	7	M8 x 1.25	22	19	7	20	Rc1/4	NPT1/4	G1/4
63	77	103	60	22 ^{-0.07/-0.15}	9	14 depth 10.5	M16 x 2	21	8	M10 x 1.5	28.5	19	7	25	Rc1/4	NPT1/4	G1/4

Bore size	Clamp stroke 10 mm				Clamp stroke 20 mm				Clamp stroke 50 mm			
	Q	R	S	T	Q	R	S	T	Q	R	S	T
32	148	140	74	7.5	168	160	84	7.5	—	—	—	—
40	151.5	144	75	8	171.5	164	85	8	—	—	—	—
50	—	—	—	—	191	179	91.5	12.5	254.5	242.5	121.5	14
63	—	—	—	—	192	182	93	10.5	256	246	123	15

Spatter Resistant Cylinders
for Arc Welding

Clamp Cylinders

Gas/Air Switching Valve

Detection Switches

Tubing

Fittings

Speed Control Equipment

Pin Shift Cylinder for High Precision Positioning CKQG-X2370

Ø32, Ø40, Ø50

Spatter Resistant Cylinders
for Arc Welding

Clamp Cylinders

Gas/Air Switching Valve

Detection Switches

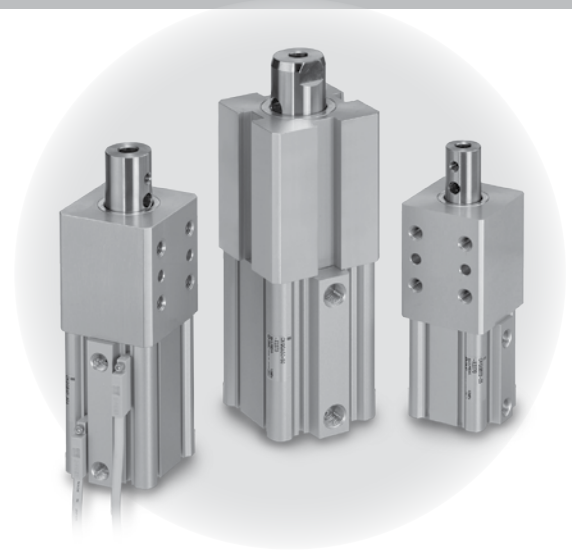
Tubing

Fittings

Speed Control Equipment

High precision

Rod end deflection ±0.1 mm or less
Rod end deflection of ±0.1 mm or less is achieved when a load is applied to the rod at its extension end.

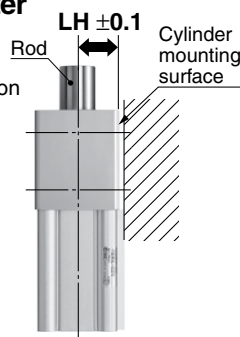


Position reproducibility

Mounting surface ↔ Rod center

Distance accuracy **±0.1 mm**

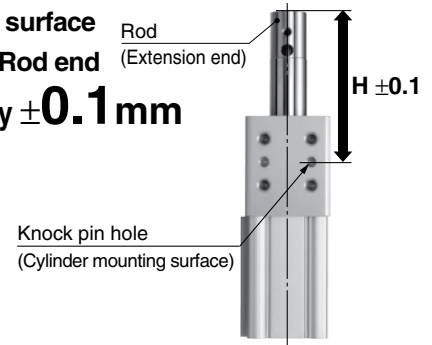
* For details, refer to "Caution on Design" on page 68.



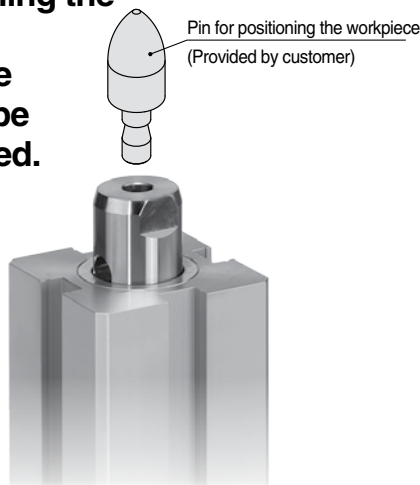
Cylinder mounting surface

knock pin hole ↔ Rod end

Distance accuracy **±0.1 mm**

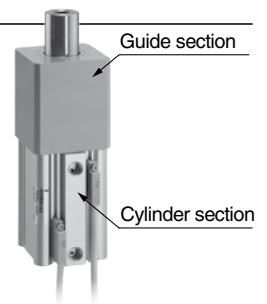


Pin for positioning the workpiece provided by the customer can be directly mounted.



Reduces labor time by integrating the cylinder and guide.

- Reduction in design labor
- Reduction in assembly labor



Magnetic field resistant auto switches are mountable.

- Solid state auto switch D-P3DWA□ /D-P4DW□



The D-P3DWA is mountable on 4 surfaces.

* The D-P4DW□ is mountable on 3 surfaces.



Built-in coil scraper

Removes welding spatters, foreign matter, cutting chips, etc. sticking to the piston rod.

Pin Shift Cylinder for High Precision Positioning

CKQG-X2370

How to Order

CKQG **D** 32 - **25** - **P3DWAL** **□** - X2370

CKQG **D** 40 - **25** **□** - **P3DWAL** **□** - X2370

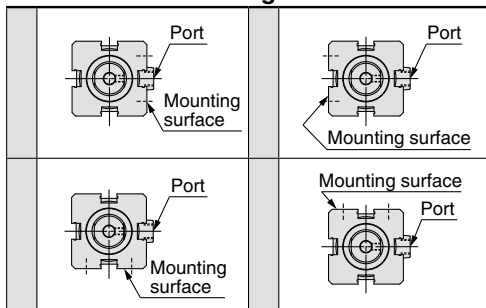
CKQG **D** 50 - **30** - **P3DWAL** **□** - X2370

Built-in auto switch magnet

Number of auto switches

Nil	2 pcs.
S	1 pc.

Mounting surface direction



Auto switch

Select applicable auto switch models from the table below.

Nil	Without auto switch (Built-in)
-----	--------------------------------

Piston rod end hole size

Nil	ø8
A	ø10

Cylinder stroke

Bore size (mm)	Stroke (mm)			
	25	30	40	50
32	○	—	○	—
40	○	—	○	—
50	—	○	—	○

Bore size

Applicable Auto Switches/Refer to the **WEB catalog** or the **Best Pneumatics No. 3** for further information on auto switches.

Type	Special function	Auto switch model	Electrical entry	Indicator light	Wiring (Pin no. in use)	Load voltage	Lead wire	
Solid state auto switch	Magnetic field resistant (2-color indication)	P3DWASC	Pre-wired connector	Yes	2-wire (3-4)	24 VDC	0.3 m	Relay, PLC
		P3DWASE			2-wire (1-4)			
		P3DWA	Grommet		2-wire		0.5 m	
		P3DWAL					3 m	
		P3DWAZ					5 m	
		P4DWSC	Pre-wired connector		2-wire (3-4)		0.3 m	
		P4DWSE			2-wire (1-4)			
		P4DWL	Grommet		2-wire		3 m	
		P4DWZ					5 m	

Pin Shift Cylinder for High Precision Positioning **CKQG-X2370**



Specifications

Model	CKQG-X2370		
Bore size (mm)	32	40	50
Maximum operating pressure	145 psi (1.0 MPa)		
Proof pressure	218 psi (1.5 MPa)		
Minimum operating pressure	29 psi (0.2 MPa)		
Ambient temperature	14 to 140°F (-10 to 60°C)		
Operating air temperature	(No freezing)		
Cushion	None		
Applicable auto switches	D-P3DWA□ D-P4DW□		

Theoretical Output

(N)

Bore size (mm)	Operating direction	Piston area (mm ²)	Operating pressure (MPa)					
			0.2	0.3	0.4	0.5	0.6	1.0
ø32	OUT	804	160	241	321	402	482	804
	IN	490	98	147	196	245	294	490
ø40	OUT	1256	251	378	502	628	753	1256
	IN	765	153	229	306	382	459	764
ø50	OUT	1964	392	589	785	982	1178	1964
	IN	1256	251	378	502	628	753	1256

1 N = 0.225 lbf

Weight

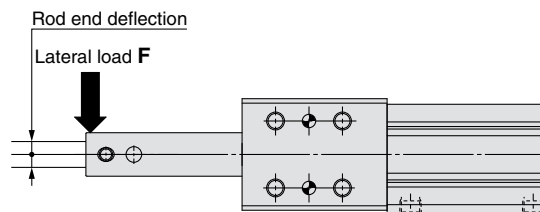
(kg)

Model	Bore size (mm)	Stroke (mm)			
		25	30	40	50
CKQG-X2370	30	0.95	—	1.02	—
	50	1.31	—	1.4	—
	25	—	2.1	—	2.3

Rod End Deflection

(mm)

Bore size (mm)	Stroke (mm)	Lateral load F (N)		
		98	196	294
50	30	±0.1 or less		
	50			
40	25			
	40			
32	25			
	40			



Caution on Design

⚠ Caution

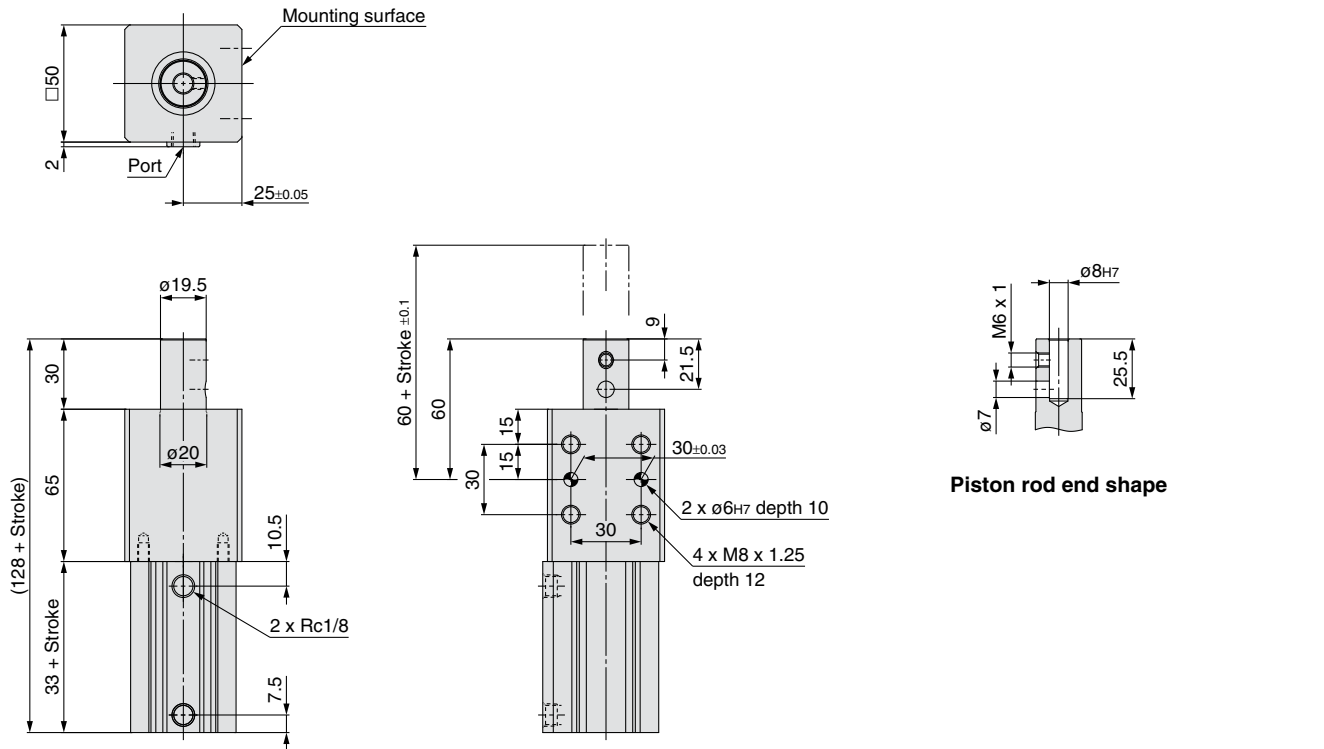
For position reproducibility, a distance accuracy of ± 0.1 mm from the mounting surface to the rod center (when the piston rod is retracted) is calculated with the root mean square method.

CKQG-X2370

Bore Size $\varnothing 32$ to $\varnothing 40$

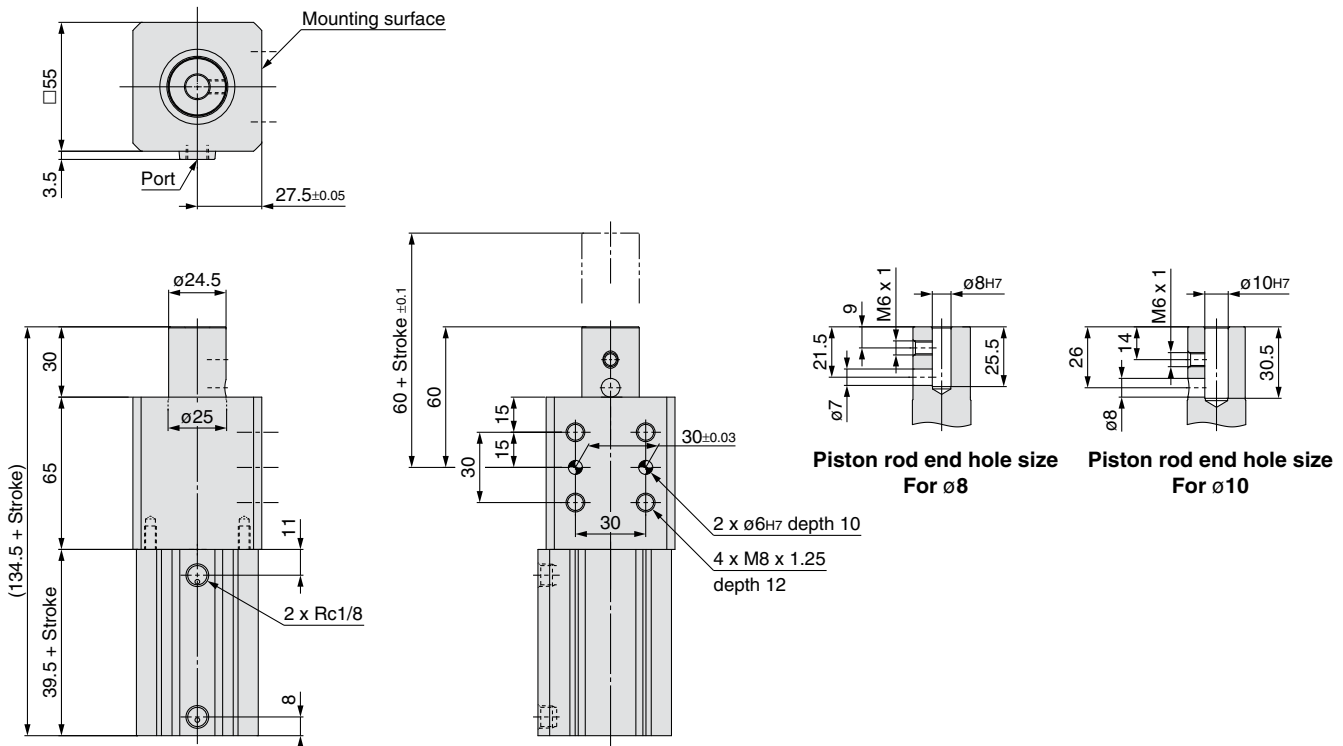
CKQG $\square 32$ -X2370

* The figures below indicate the CKQGD32- \square - \square - \square -X2370.



CKQG $\square 40$ -X2370

* The figures below indicate the CKQGD40- \square - \square - \square -X2370.

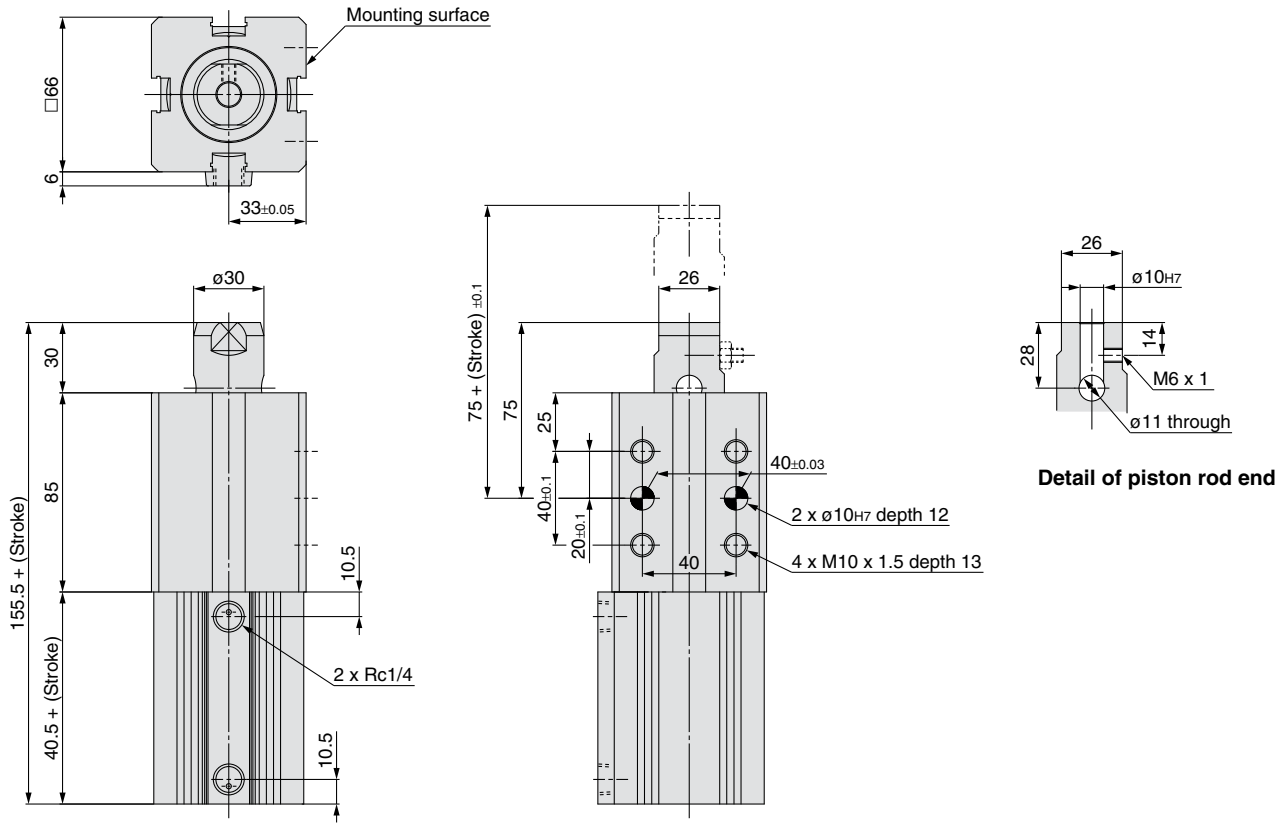


Pin Shift Cylinder for High Precision Positioning **CKQG-X2370**

Bore Size **Ø50**

CKQG□50-X2370

* The figures below indicate the CKQGD50-□-□□-X2370.



Spatter Resistant Cylinders
for Arc Welding

Clamp Cylinders

Gas/Air Switching Valve

Detection Switches

Tubing

Fittings

Speed Control Equipment

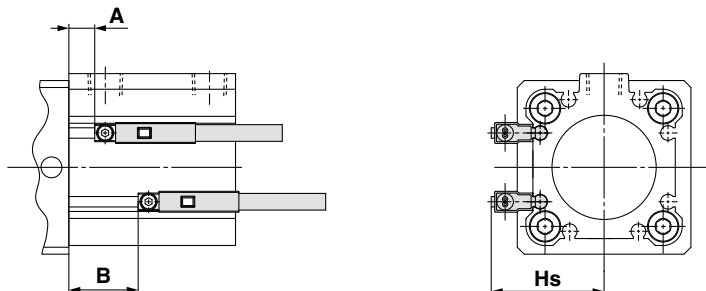
CKQG-X2370

Auto Switch Mounting

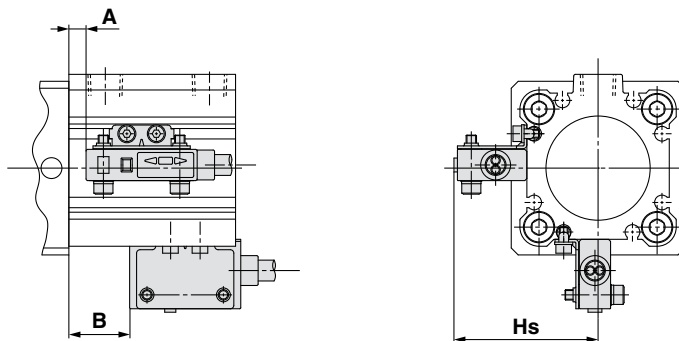
Auto Switch Proper Mounting Position (Detection at Stroke End) and Its Mounting Height

[CKQG-X2370]

D-P3DWA□



D-P4DW□



Auto Switch Proper Mounting Position

(mm)

Auto switch model Bore size	D-P3DWA□			D-P4DW□		
	A	B	Hs	A	B	Hs
32	13	13 + Stroke	34	6	6 + Stroke	41.3
40	17.5	17.5 + Stroke	37.2	10.5	10.5 + Stroke	44.6

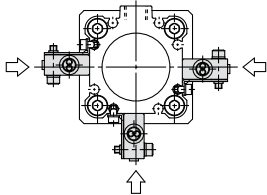
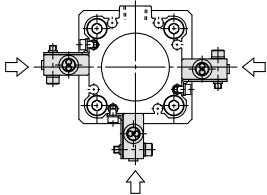
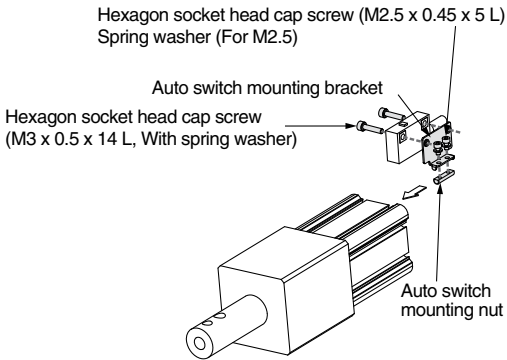
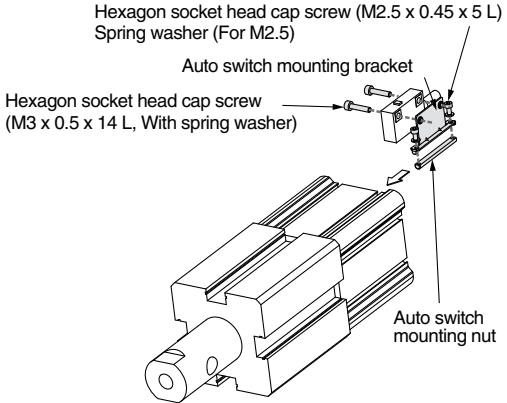
Mounting

When installing the cylinders with auto switches, pay attention to the bending radius of the auto switch lead wire.

For details, refer to **the WEB catalog** or the Best Pneumatics No. 3 and the Operation Manual.

Auto Switch Mounting Bracket Part No./Mounting Method

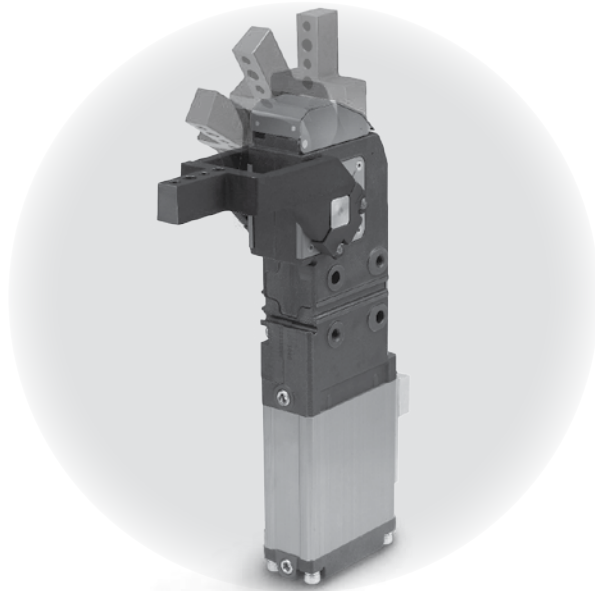
Applicable cylinder	CKQG-X2370
Applicable auto	D-P3DWA □
Bore size (mm)	ø32, ø40, ø50
Auto switch mounting bracket part no.	No mounting bracket required as the auto switch is directly mounted.
Auto switch tightening torque	0.15 to 0.22 lbf·ft (0.2 to 0.3 N·m)

Applicable cylinder		CKQG-X2370	
Applicable auto		D-P4DW □	
Bore size (mm)		ø32, ø40	ø50
Auto switch mounting bracket part no.		C2Q32-42-880NN-R	C2Q40-42-6618M-R
Auto switch mounting bracket fitting parts lineup/weight	<ul style="list-style-type: none"> Auto switch mounting bracket Auto switch mounting nut Hexagon socket head cap screw (M3 x 0.5 x 14 L, With spring washer) 	<ul style="list-style-type: none"> Hexagon socket head cap screw (M2.5 x 0.45 x 5 L) Spring washer (For M2.5) Weight = 8.5 g 	<ul style="list-style-type: none"> Auto switch mounting bracket Auto switch mounting nut Hexagon socket head cap screw (M3 x 0.5 x 14 L, With spring washer) Hexagon socket head cap screw (M2.5 x 0.45 x 5 L) Spring washer (For M2.5) Weight = 12 g
Auto switch mounting surface	Surfaces with auto switch mounting slot		Surfaces with auto switch mounting slot
			
Mounting of auto switch	<ol style="list-style-type: none"> Fix the auto switch and the auto switch mounting bracket temporarily with the hexagon socket head cap screws (M3 x 14 L). Insert the hexagon socket head cap screws (M2.5 x 5 L) into the spring washers (for M2.5), and tighten the auto switch mounting bracket and auto switch mounting nut temporarily. Insert the temporarily fixed auto switch mounting nut into the mating groove of the cylinder tube. Check the detecting position of the auto switch and fix the auto switch firmly with the hexagon socket head cap screws (M2.5 x 5 L, M3 x 14 L). <p>Note 1) The tightening torque for the hexagon socket head cap screw (M3 x 14 L) is 0.37 to 0.44 lbf·ft (0.5 to 0.6 N·m).</p> <p>Note 2) The tightening torque for the hexagon socket head cap screw (M2.5 x 5 L) is 0.18 to 0.26 lbf·ft (0.25 to 0.35 N·m).</p>		<ol style="list-style-type: none"> Fix the auto switch and the auto switch mounting bracket temporarily with the hexagon socket head cap screws (M3 x 14 L). Insert the hexagon socket head cap screws (M2.5 x 5 L) into the spring washers (for M2.5), and tighten the auto switch mounting bracket and auto switch mounting nut temporarily. Insert the temporarily fixed auto switch mounting nut into the mating groove of the cylinder tube. Check the detecting position of the auto switch and fix the auto switch firmly with the hexagon socket head cap screws (M2.5 x 5 L, M3 x 14 L). <p>Note 1) The tightening torque for the hexagon socket head cap screw (M3 x 14 L) is 0.37 to 0.44 lbf·ft (0.5 to 0.6 N·m).</p> <p>Note 2) The tightening torque for the hexagon socket head cap screw (M2.5 x 5 L) is 0.18 to 0.26 lbf·ft (0.25 to 0.35 N·m).</p>
			

Slim-line Power Clamp Cylinder

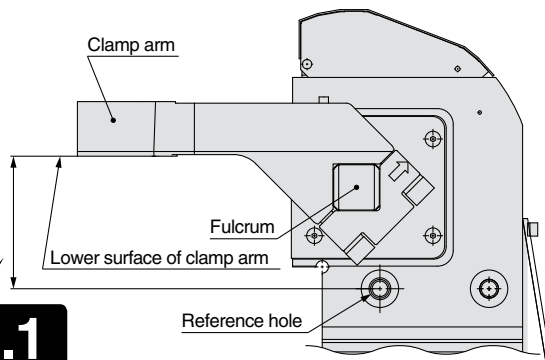
CKZ2N-X2346

∅50, ∅63, ∅80



Mounting reproducibility

- Distance accuracy from the reference hole to the lower surface of the clamp arm is assured in a range of ± 0.1 mm.
- A hard stop such as V catcher is not required.



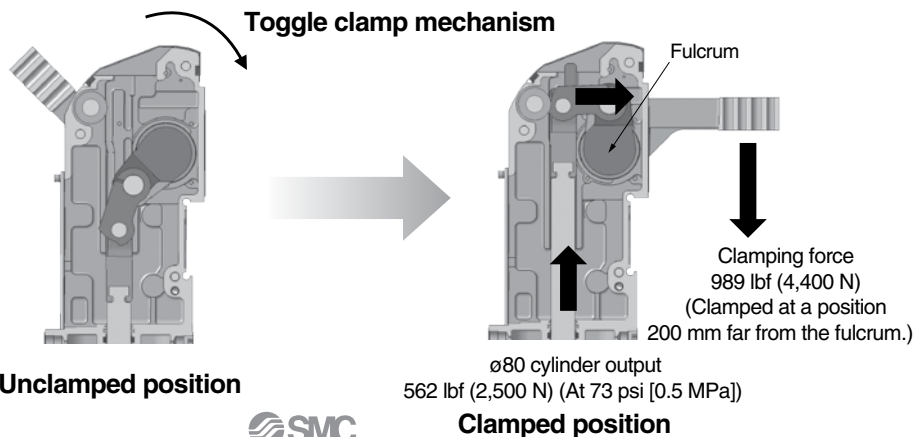
Compact

- Use of flat cylinder makes it possible to achieve the space saving.
- Torch can enter easily.



High clamping force

A high clamping force is generated through the toggle mechanism.



Slim-line Power Clamp Cylinder

CKZ2N-X2346

Ø50, Ø63, Ø80

Spatter Resistant Cylinders for Arc Welding

Clamp Cylinders

Gas/Air Switching Valve

Detection Switches

Tubing

Fittings

Speed Control Equipment



How to Order

CKZ2N **63** - **120** - **P4DWSC** - **X2346**

• **Bore size**

50	50 mm equivalent
63	63 mm equivalent
80	80 mm equivalent

• **Arm opening angle**

30	30°
45	45°
60	60°
75	75°
90	90°
105	105°
120	120°
135	135°

• **X part no.**

X2346	<ul style="list-style-type: none"> • Clamp arm (fixed on the product) accuracy adjustment spec. • Compatible with magnetic field resistant auto switch • Toggle angle: 2° short of the dead point • With metal cover
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• **Number of auto switches**

Nil	2 pcs.
S	1 pc.

• **Auto switch**

Nil	Without auto switch
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* For applicable auto switches, refer to the table below.

Maximum Clamping Moment

Unit: lbf·ft [N·m]

Equivalent bore size (mm)	Max. clamping moment					
	44 psi (0.3 MPa)	58 psi (0.4 MPa)	73 psi (0.5 MPa)	87 psi (0.6 MPa)	102 psi (0.7 MPa)	116 psi (0.8 MPa)
50	22 [100]	29 [130]	36 [160]	43 [190]	49 [220]	56 [250]
63	67 [300]	79 [350]	90 [400]	101 [450]	112 [500]	124 [550]
80	126 [560]	162 [720]	198 [880]	234 [1040]	270 [1200]	306 [1360]

Cylinder Specifications

Equivalent bore size	50	63	80
Arm opening angle	30°, 45°, 60°, 75°, 90°, 105°, 120°, 135°		
Cushion	Unclamping side rubber bumper		
Max. operating pressure	116 psi (0.8 MPa)		
Operating pressure range	44 to 116 psi (0.3 to 0.8 MPa)		
Operating temperature range	14 to 140 °F (-10 to 60°C) (No freezing)		
Operating time	1 sec. or more to clamp or unclamp		

Switch Mounting Bracket

Equivalent bore size	Set part no.
50	CKZ50-42ADCL218CL-R
63	CKZ63-42ADCL517AL-R
80	CKZ80-42ADCL518AL-R

* Screws are included with the switch mounting bracket.
* Auto switches and spatter covers should be ordered separately.

Applicable Auto Switches/Refer to the **WEB catalog** or the Best Pneumatics No. 3 for further information on auto switches.

Type	Special function	Auto switch model	Electrical entry	Indicator light	Wiring (Pin no. in use)	Load voltage	Lead wire	Applicable load	
Solid state auto switch	Magnetic field resistant (2-color indication)	D-P4DWSC	Pre-wired connector	Yes	2-wire (3-4)	24 VDC	0.3 m	Relay, PLC	
		D-P4DWSE							
		D-P4DWL	Grommet		2-wire				3 m
		D-P4DWZ							5 m

Note 1) When only one switch is provided, it is mounted on the unclamping side.

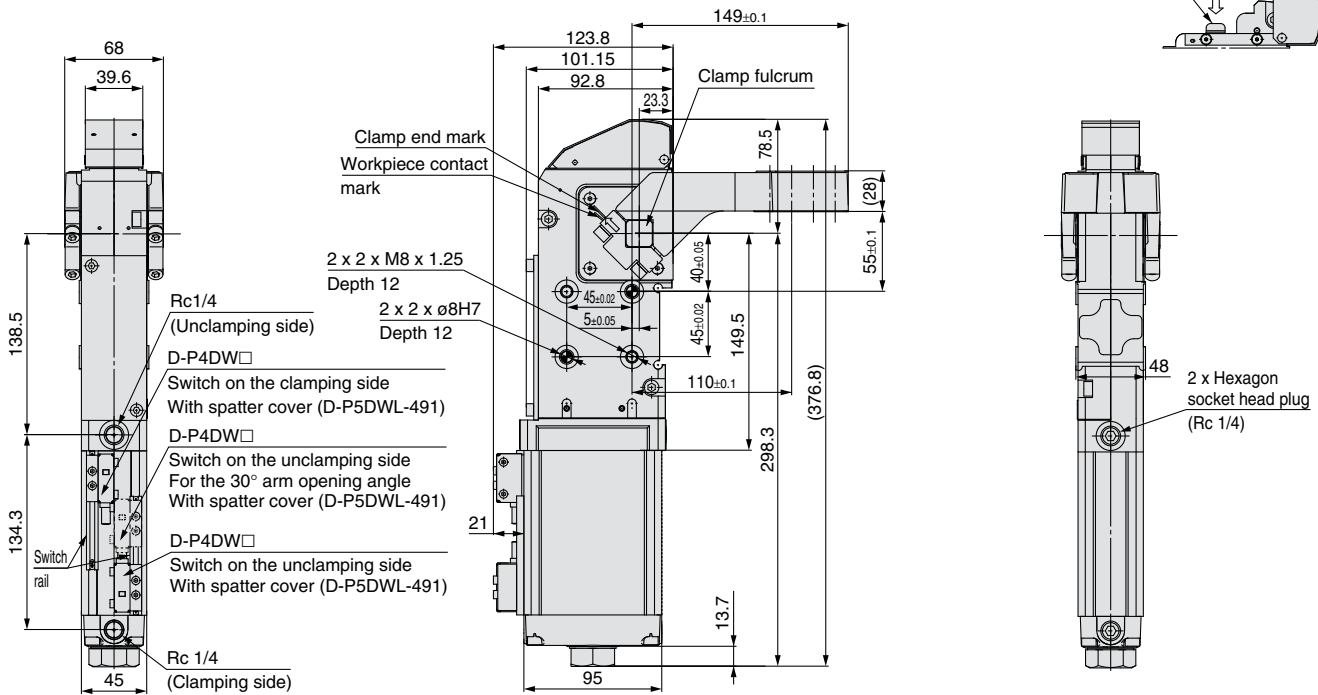
Note 2) Please contact SMC for auto switches, auto switch proper mounting positions and operating ranges other than the above.



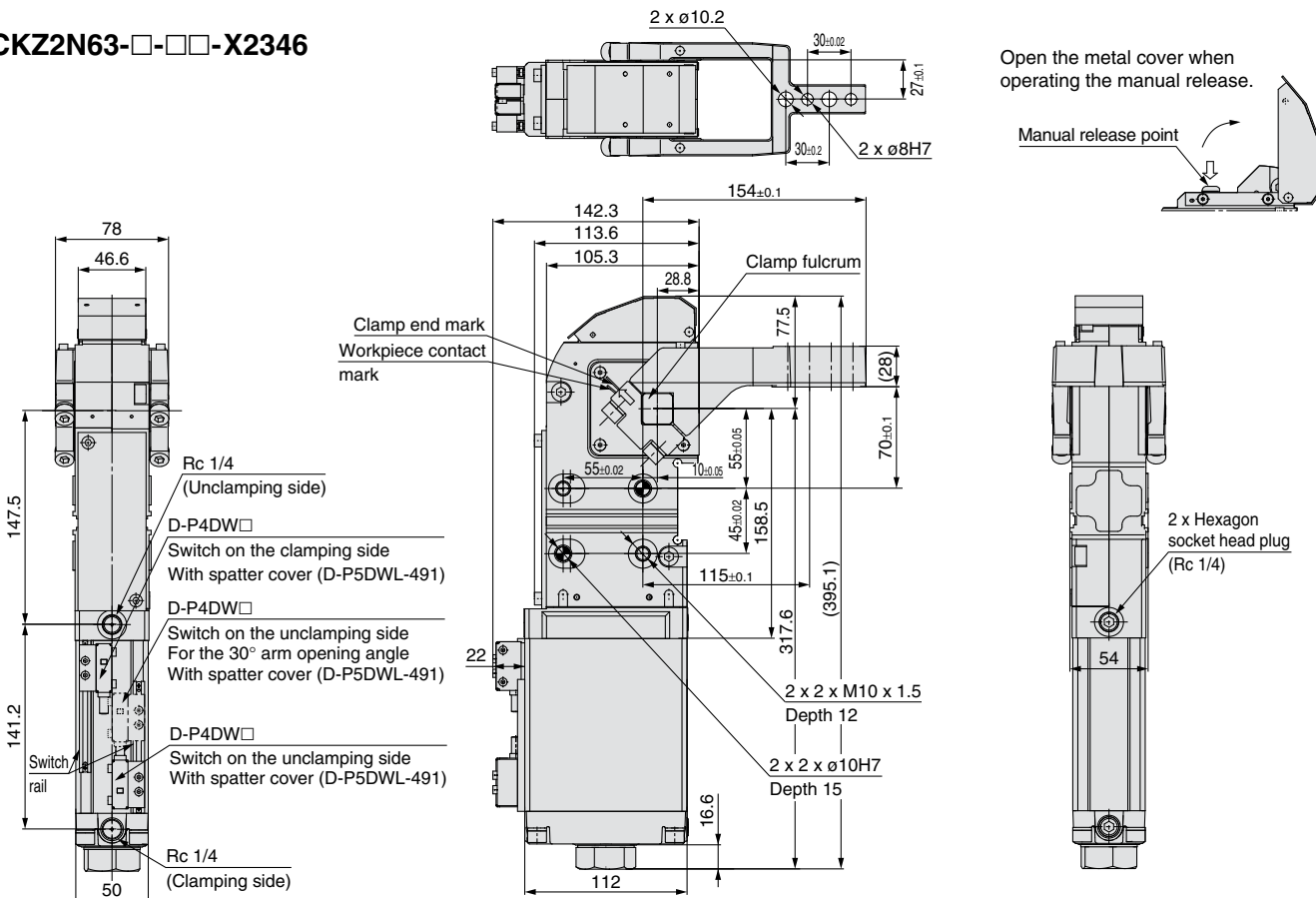
CKZ2N-X2346

Dimensions

CKZ2N50-□-□-X2346



CKZ2N63-□-□-X2346

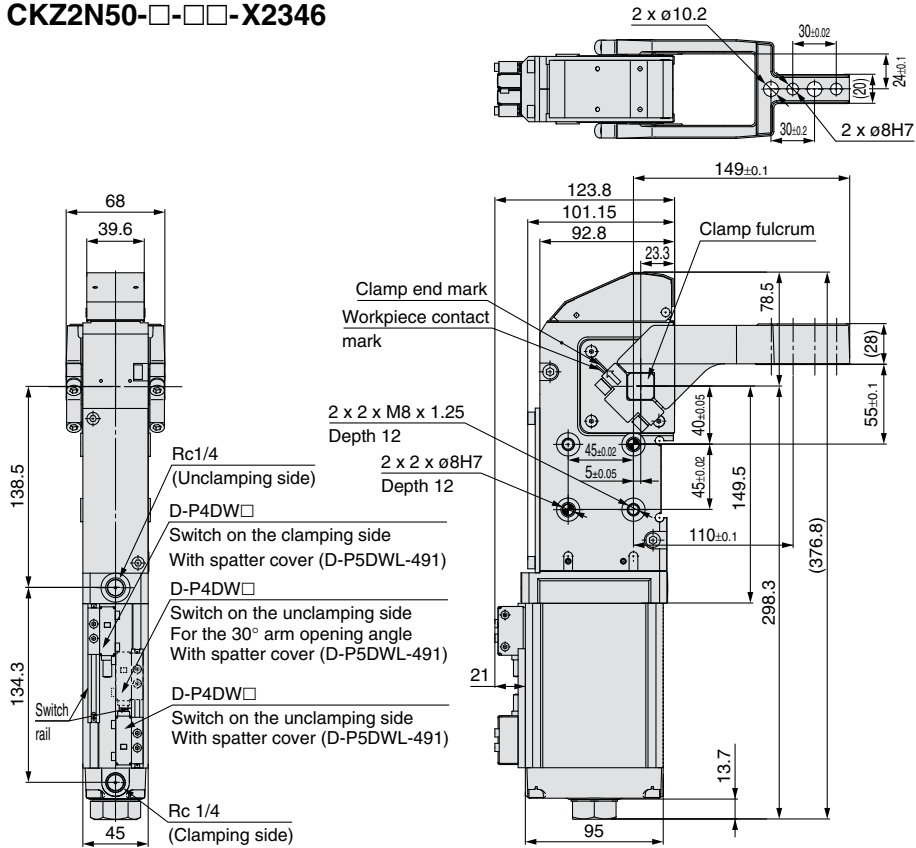


Note) For the 30° arm opening angle, the electrical entry direction of the auto switch is different.

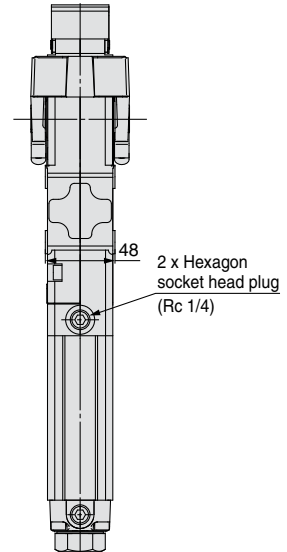
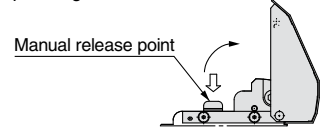
CKZ2N-X2346

Dimensions

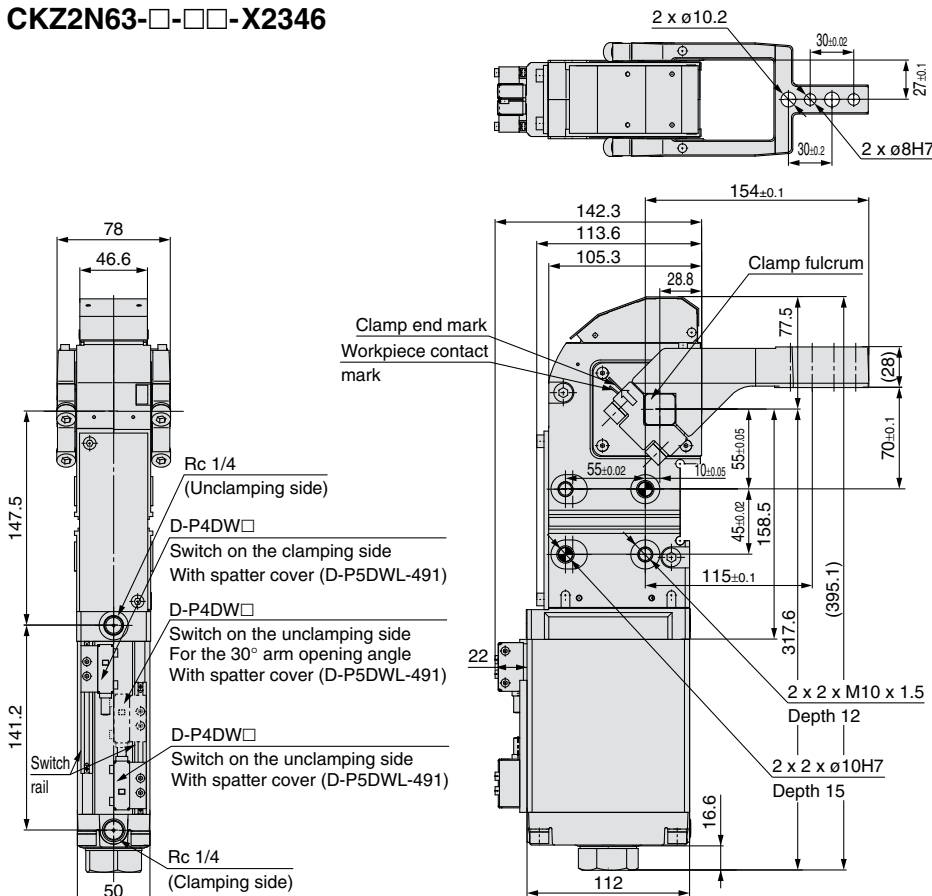
CKZ2N50-□-□-□-□- X2346



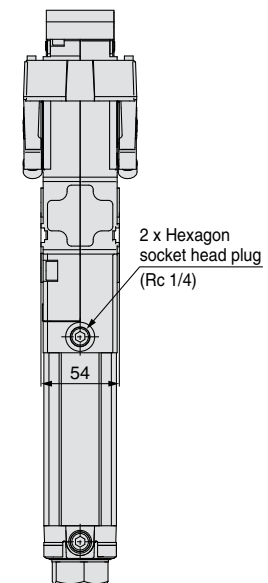
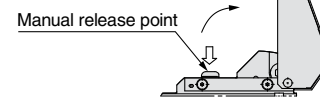
Open the metal cover when operating the manual release.



CKZ2N63-□-□-□-□- X2346



Open the metal cover when operating the manual release.



Note) For the 30 ° arm opening angle, the electrical entry direction of the auto switch is different.



Spatter Resistant Cylinders
for Arc Welding

Clamp Cylinders

Gas/Air Switching Valve

Detection Switches

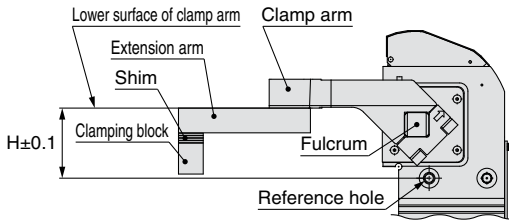
Tubing

Fittings

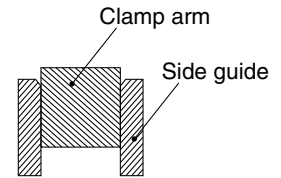
Speed Control Equipment

Slim-line Power Clamp Cylinder CKZ2N-X2346 Setup Procedure

Design and mounting

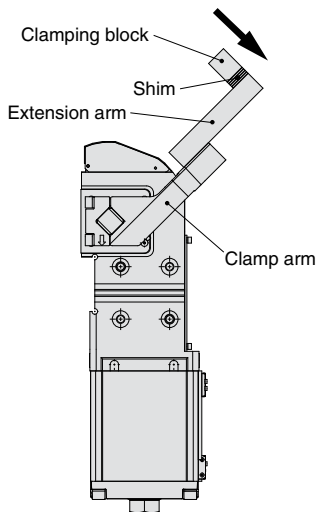


1. Since the distance accuracy from the reference hole to the lower surface of the clamp arm is ± 0.1 mm at the stroke end as shown in the figure on the left side, a hard stop is not required on the clamping side. When a clamp arm deflection lock is required, install the side guides.
2. For clamping force adjustment, be sure to install a shim around 3 mm in size.
3. Even when the clamp arm operates to the clamp end, the internal toggle mechanism does not enter the dead point (2° short of the dead point). Therefore, clamping cannot be held during air exhaust.

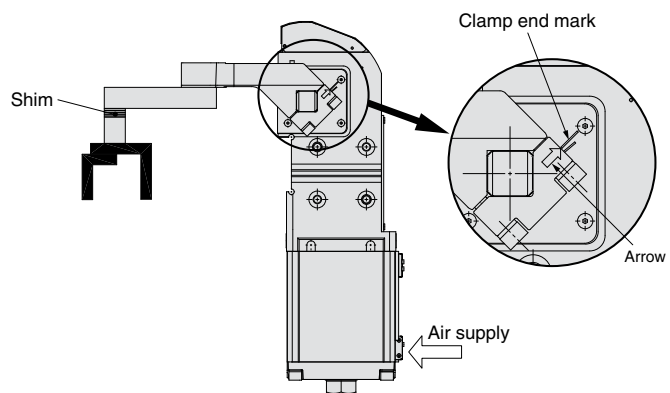


Adjustment * In this cylinder, the shim is pulled out to increase the clamping force.

Step 1 Exhaust the air to switch to the unclamped state.

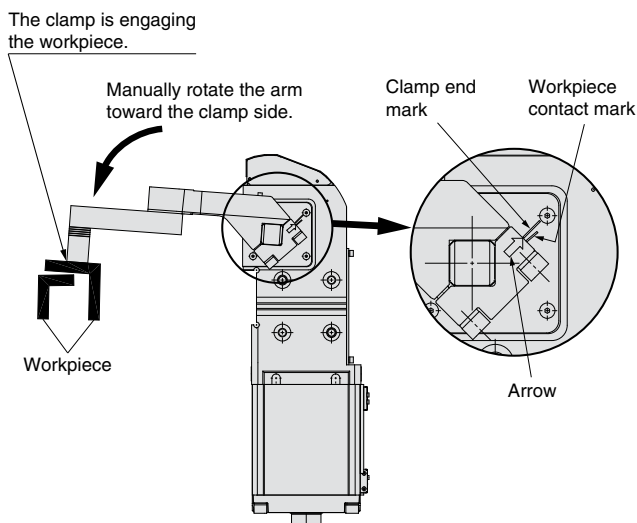


Step 3 Supply air to the clamp side and adjust with the shim so that the arrow mark is located at a position close to the clamp end mark.



Step 2 Manually place the arm on workpieces.

Adjust with the shim so that the arrow is located between the workpiece contact mark and clamp end mark.

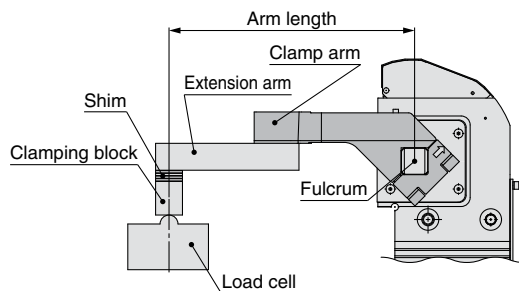


⚠ Caution

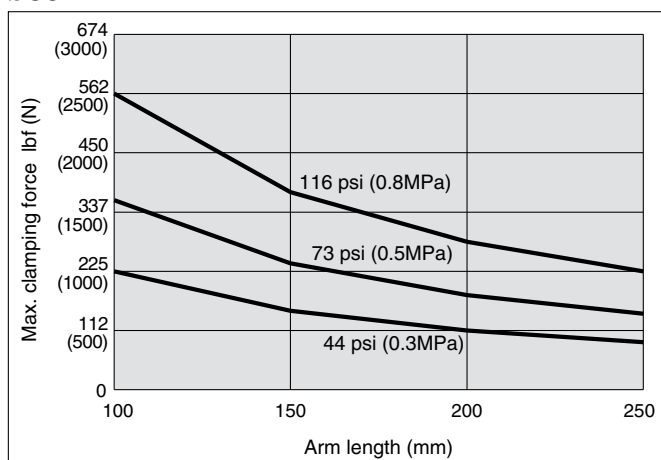
Be sure to install a speed controller and adjust it so that it takes **at least 1 second** to clamp or unclamp. (Operating the cylinder in less than 1 second may cause damage to the product.)

Clamping force characteristics

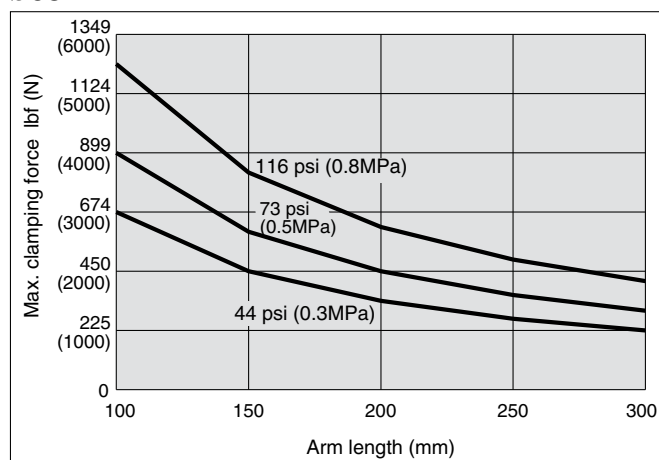
Clamping force characteristics by bore size, arm length, and operating pressure



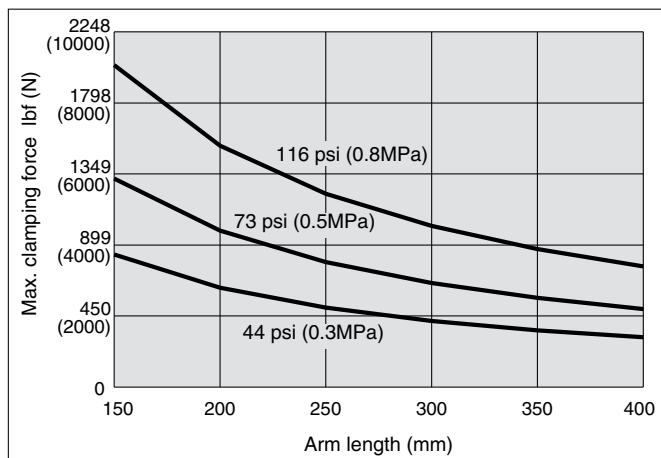
ø50



ø63

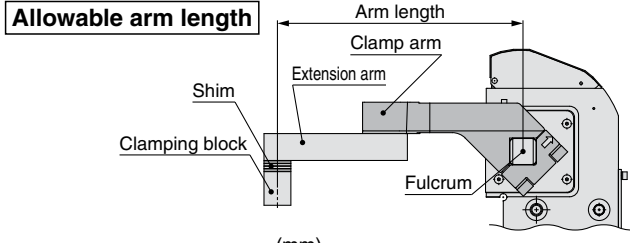


ø80

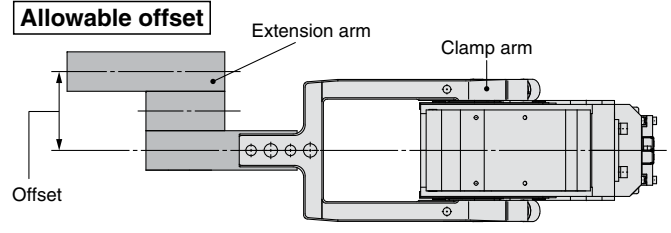


CKZ2N-X2346

Allowable arm length/Allowable offset



Bore size	Allowable arm (mm)
50	250
63	300
80	400



Bore size	Allowable offset (mm)
50	50
63	50
80	55

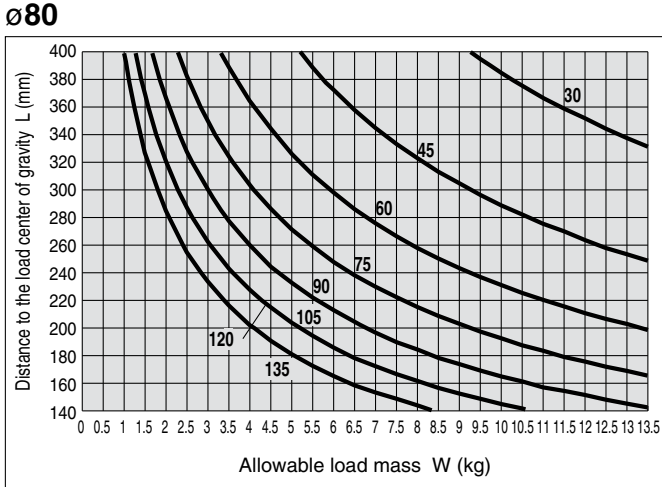
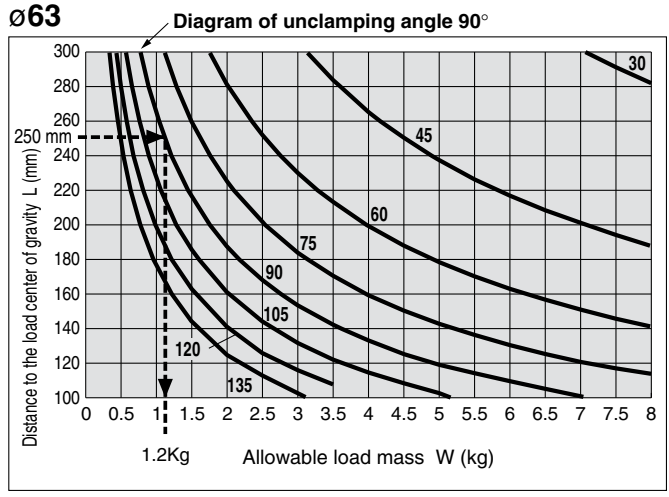
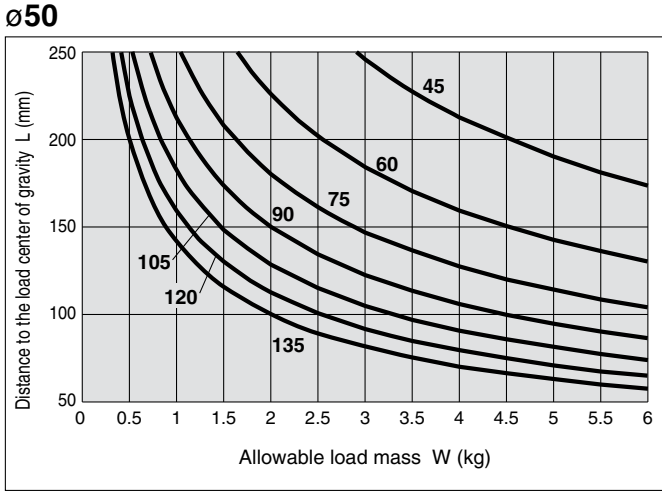
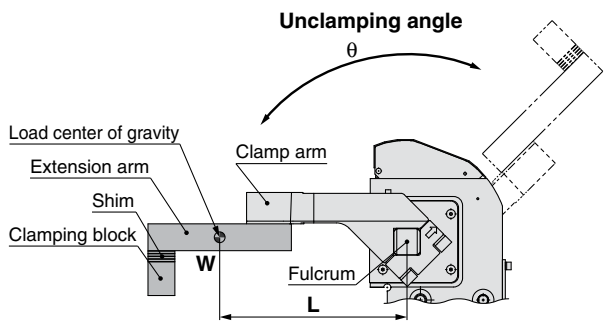
* The clamping force does not change within the allowable offset.

Allowable load mass

The allowable load mass of the extension arm and clamping block to be mounted on the clamp arm may vary depending on the unclamping angle. Be sure to use the product within the allowable values in the graphs shown below.
 * The load indicates the total weight of the extension arm and clamping block.

Calculation procedure of allowable load mass

1. Calculate the distance **L** from the fulcrum to the center of gravity of the extension arm + clamping block.
2. Check the unclamping angle of the product.
3. Obtain the allowable load mass from the graph, and use the product within the allowable range.



Calculation example For bore size 63, when the unclamping angle is 90° and the load center of gravity position of the extension arm + clamping block is 250 mm.

When the center of gravity position of the load mass of the extension arm + clamping block is 250 mm on the diagram at an unclamping angle of 90° in the size ø63 graph, the total allowable load mass of the extension arm + clamping block is to 1.2 kg.

Frame Clamp Cylinder WRF100

Spatter Resistant Cylinders
for Arc Welding

Clamp Cylinders

Gas/Air Switching Valve

Detection Switches

Tubing

Fittings

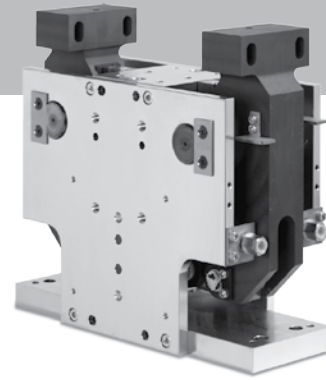
Speed Control Equipment

High output

4496 lbf (20,000 N)

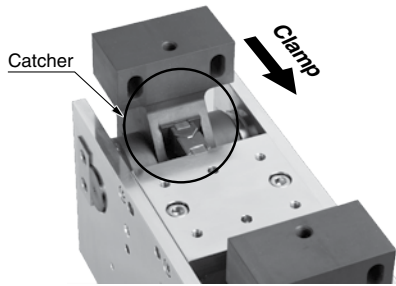
(Operating pressure: At 73 psi [0.5 MPa])

High clamping force makes it suitable for a broad range of applications



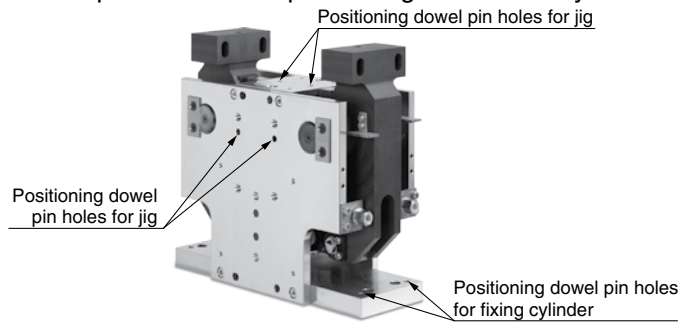
High repeatability

Catcher (detented positioning structure) is a standard feature for repeatable positioning.



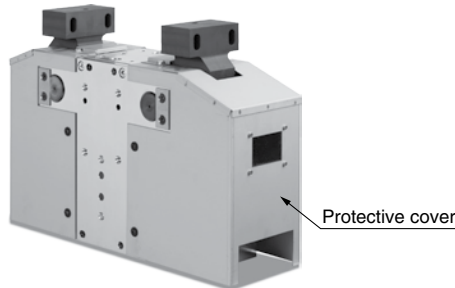
Dowel pin holes for repeatable mounting when reassembling

Allows for repeatable mount positioning in reassembly.



Optional spatter protective cover available

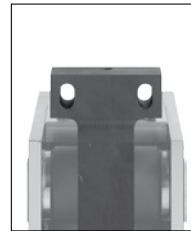
Modular structure allows easy assembly even after the cylinder is installed.



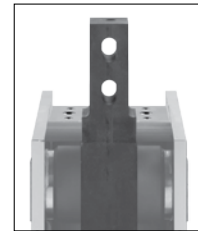
Standardized T-type arms and S-type arms

Shape selectable to meet specifications/application.

- T-type arm width: 200, 240, 270 mm
- S-type arm width: 130, 200, 240 mm



T-type arms



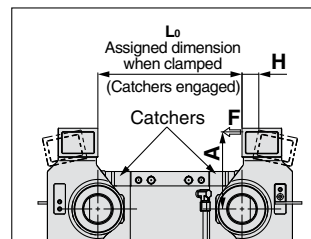
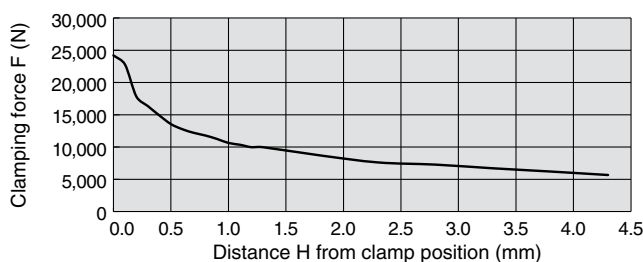
S-type arms

Clamping force characteristics

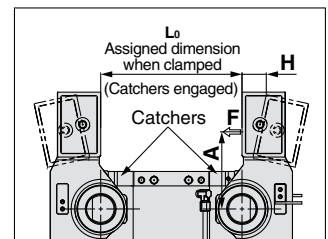
<Relationship between clamp position and clamping force>

Refer to the following graph for the relationship between a distance H from a clamp position when the mutually acting catchers are engaged and a clamping force F.

Clamping force (when 0.5 MPa supplied) 1 N = 0.225 lbf



T-type arms



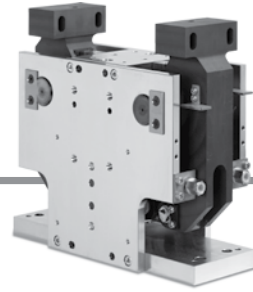
S-type arms

Generated position of clamping force F

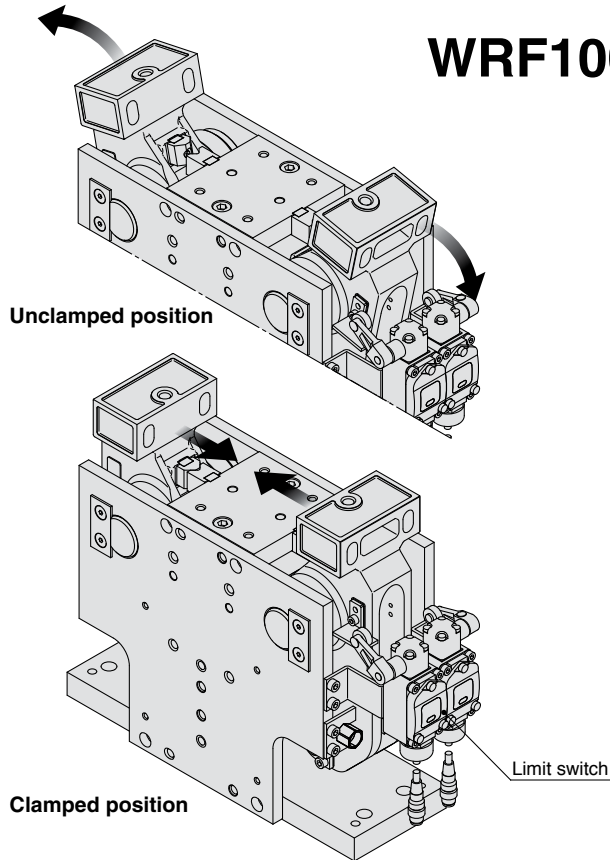
Arm type	A
T200, T240, T270	107 mm
S130, S200, S240	

Frame Clamp Cylinder WRF100

How to Order



WRF100- **T200** **C**



• Protective cover

Nil	Without cover
C	With cover

• Clamp arm

Symbol	T-type arms	Symbol	S-type arms
T200		S130	
T240		S200	
T270		S240	

Note) This product does not include the limit switch.

(The limit switch should be prepared by the customer.)

Applicable limit switches have part numbers listed on the right.

For mounting the limit switch, order the switch mounting bracket (WRF-BK) separately.

For details, refer to page 86.

<Applicable limit switches for part number>

OMRON Corp.: WLG2-LDAS-DGJS03T

Azbil Corp.: 1LS74-JWC-P025

Specifications

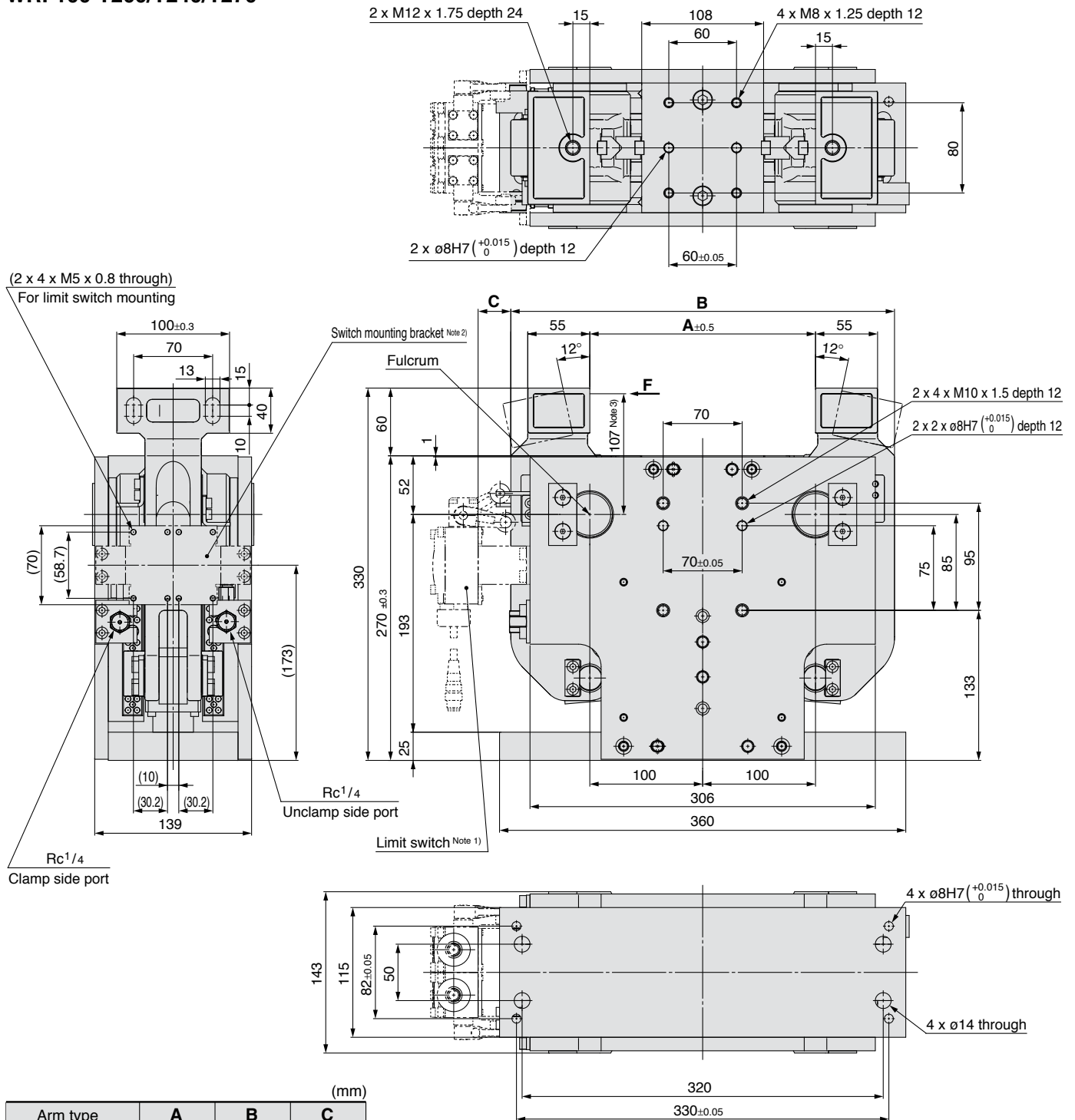
Bore size	100 mm
Stroke	48 mm
Fluid	Air
Proof pressure	116 psi (0.8 MPa)
Maximum operating pressure	73 psi (0.5 MPa)
Minimum operating pressure	29psi (0.2 MPa)
Ambient and fluid temperature	14 to 140°F (-10 to 60°C) (No freezing)
Cushion	Clamp side : None Unclamp side: Rubber bumper
Lubrication	Non-lube
Operating time	1.0 s or more (Both clamp and unclamp)
Arm opening angle	24° (12° each side)
Clamping force	4496 lbf (20,000 N) or more (At 73 psi [0.5 MPa]) ^{Note)}
Weight	47 kg (WRF100-T200)
	47 kg (WRF100-S200)

Note) For the position where the clamping force is generated, refer to the dimensions on pages 82 to 84.

Dimensions

WRF-T□/T-type clamp arms (Without cover)

WRF100-T200/T240/T270



Arm type	A	B	C
T200	200	340	29
T240	240	360	19
T270	270	380	9

(mm)

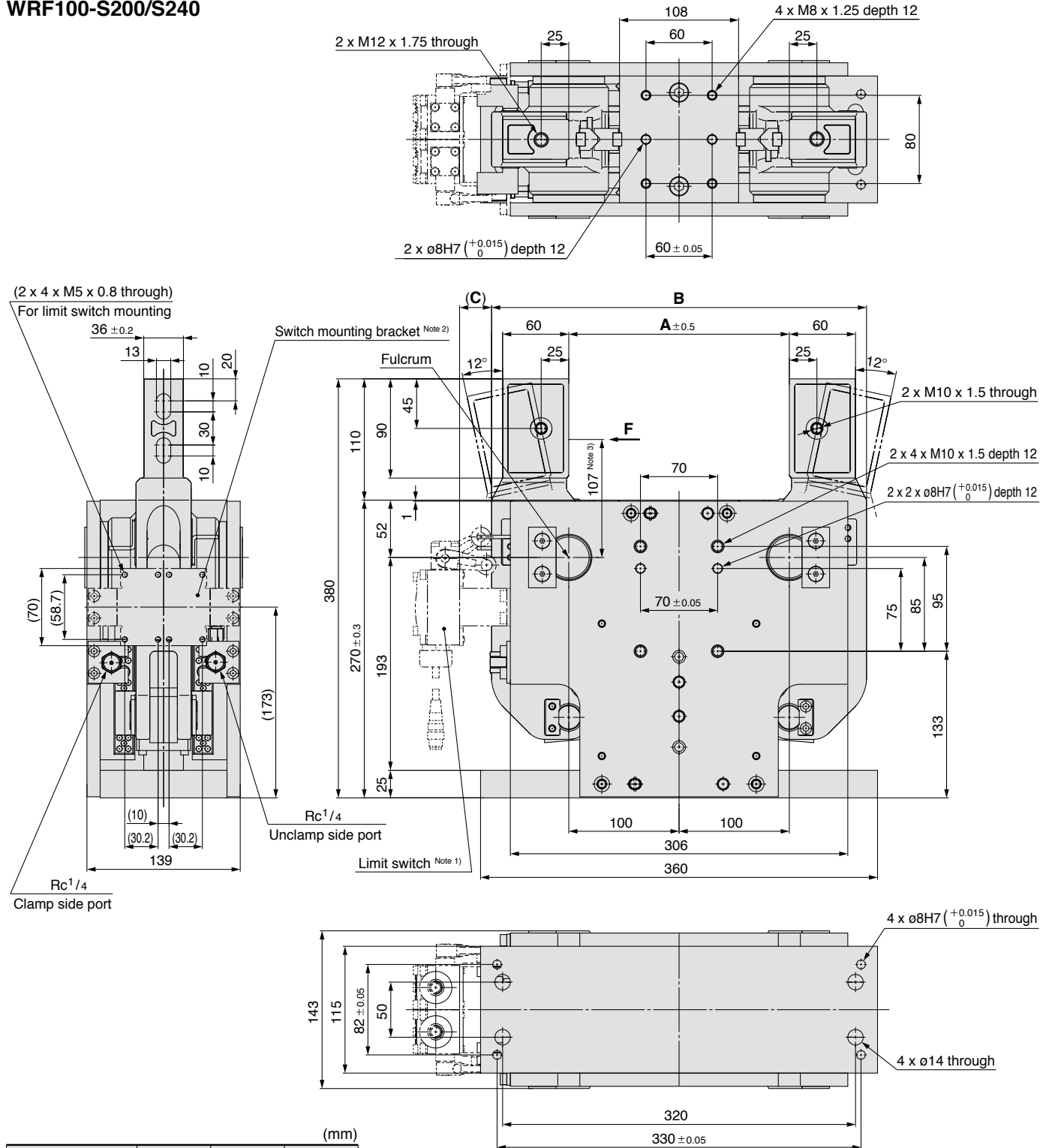
Note 1) This product does not include the limit switch.
 Note 2) For mounting the limit switch, order the switch mounting bracket (WRF-BK) separately. For details, refer to page 86.
 Note 3) The symbol F in the dimensions indicates the position where the clamping force is generated defined by the product specifications.

WRF100

Dimensions

WRF-S□/S-type clamp arms (Without cover)

WRF100-S200/S240

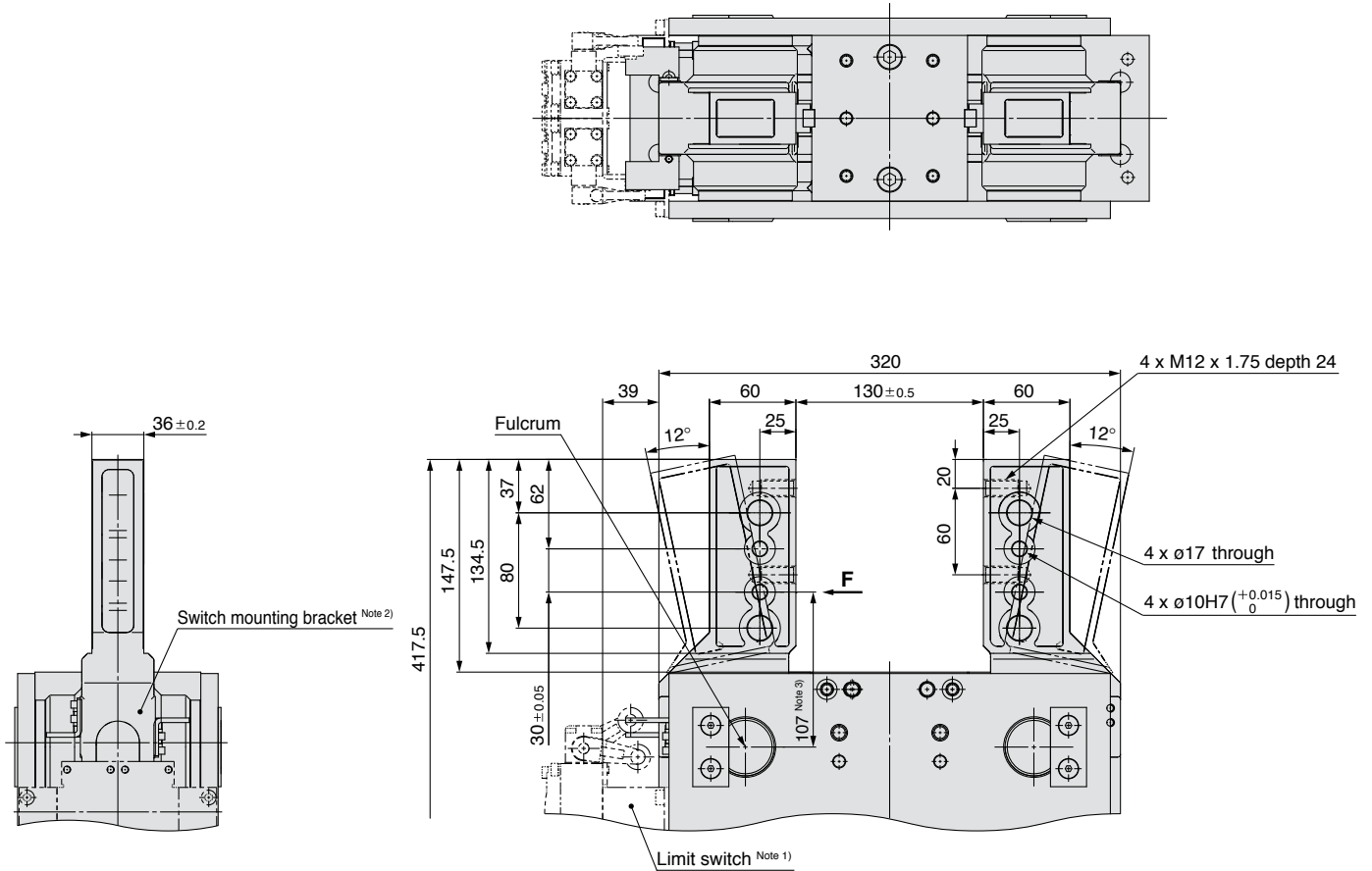


Arm type	A	B	C
S200	200	340	29
S240	240	360	19

Note 1) This product does not include the limit switch.
 Note 2) For mounting the limit switch, order the switch mounting bracket (WRF-BK) separately. For details, refer to page 86.
 Note 3) The symbol F in the dimensions indicates the position where the clamping force is generated defined by the product specifications.

WRF100-S130

* Dimensions other than those below are the same as WRF100-S200/S240 on page 83.



Note 1) This product does not include the limit switch.

Note 2) For mounting the limit switch, order the switch mounting bracket (WRF-BK) separately. For details, refer to page 86.

Note 3) The symbol F in the dimensions indicates the position where the clamping force is generated defined by the product specifications.

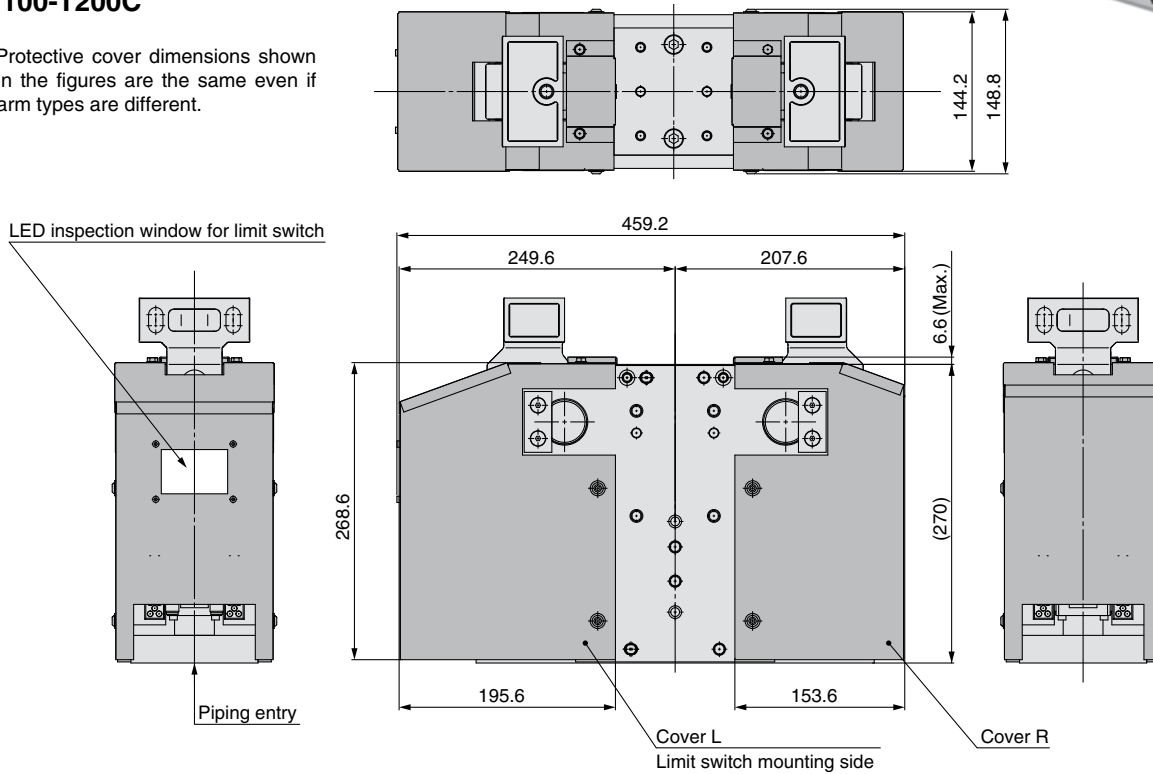
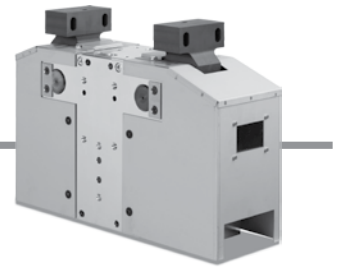
WRF100

Dimensions

WRF-S□C/With protective cover

WRF100-T200C

Note) Protective cover dimensions shown in the figures are the same even if arm types are different.



Protective Cover Kit (Option)

A protective cover can be retrofitted.

Fixing method for protective covers

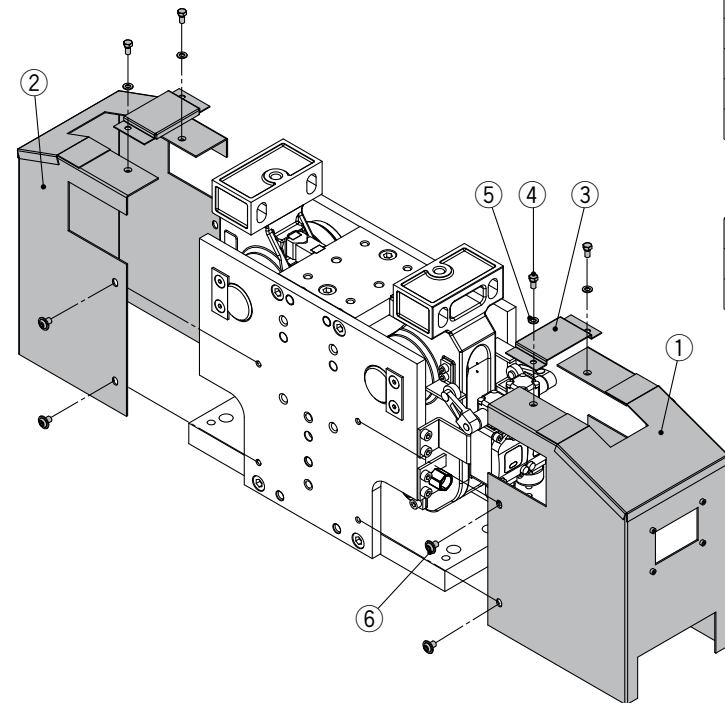
Applicable product	Kit no.	Contents
WRF100-S130	WRF-C130	① Cover L (1 pc.) ② Cover R (1 pc.) ③ Top covers (2 pcs.) ④ Hexagon head bolts (4 pcs.) ⑤ Flat washers (4 pcs.) ⑥ Cover mounting bolts (8 pcs.)
WRF100-T200	WRF-C200	
WRF100-S200		
WRF100-T240	WRF-C240	
WRF100-S240		
WRF100-T270	WRF-C270	

Tightening torque for cover mounting bolts

Location	Tightening torque lbf-ft (N·m)
④	2.21 to 2.95 (3.0 to 4.0)
⑥	3.69 to 5.16 (5.0 to 7.0)

<Mounting procedure>

- Mount the cover L (①) and cover R (②) on the cylinder body.
Mount the cover L (①) on the side where a limit switch is mounted.
- Mount the top covers (③) to the cover L (①) and cover R (②).

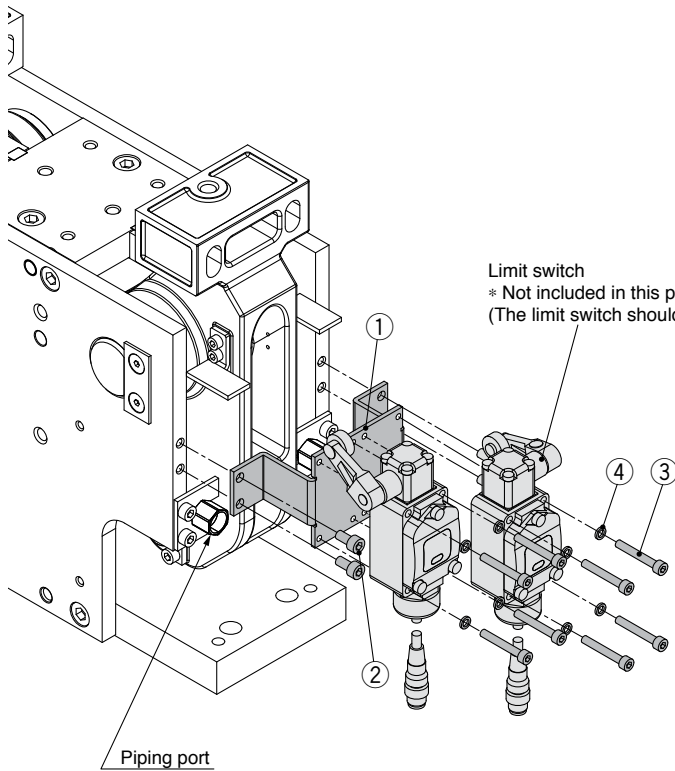


* When mounting the protective cover, confirm that all air has been exhausted from inside the cylinder.

Limit Switch Mounting Bracket (Option)

Bracket for attaching a limit switch

Fixing method for switch mounting brackets



Applicable product	Kit no.	Contents
Applicable to all types	WRF-BK	① Switch mounting bracket (1 pc.) ② Bracket mounting bolts (4 pcs.) ③ Switch mounting bolts (8 pcs.) ④ Flat washers (8 pcs.)

Tightening torque for mounting bolts of switch mounting bracket

Location	Tightening torque lbf-ft (N·m)
②	3.69 to 5.16 (5.0 to 7.0)
③	2.21 to 2.95 (3.0 to 4.0)

Note) This product does not include the limit switch. (The limit switch should be prepared by the customer.)
 Applicable limit switches have part numbers listed below.
 For mounting the limit switch, order the switch mounting bracket (WRF-BK) separately.

<Applicable limit switches for part number>
 OMRON Corp.: WLG2-LDAS-DGJS03T
 Azbil Corp.: 1LS74-JWC-P025

- *1 When mounting accessories, confirm that all air has been exhausted from inside the cylinder.
- *2 A limit switch can also be mounted on the side opposite to that with the piping port.



WRF100

Specific Product Precautions

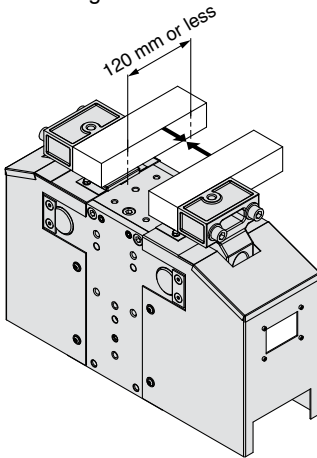
Be sure to read this before handling. Refer to page 134 for Safety Instructions. For Actuator Precautions, refer to “Handling Precautions for SMC Products” and the Operation Manual on SMC website, <http://www.smcworld.com>

Design

Warning

1. When clamping with the clamping position offset horizontally, ensure that the offset is 120 mm or less from the center of cylinder.

With a large offset, twisting forces will be applied to the cylinder. This twisting force can potentially accelerate wear and breakage of parts with the abrasion of sliding parts. In addition, changes in the force on the cylinder parts may cause dangerous movement to occur with forceful impact.



2. Affix a protective cover in places where there is a danger of personal injury.

A large gripping force is generated during clamping. If there is a possible pinching hazard, design the structure to avoid contact with the human body.

3. Securely tighten all stationary parts and connected parts so that they will not become loose. Take special care when the cylinder is installed where there is a lot of vibration, ensure that all parts remain secure.

4. Consider a possible loss of power.

Measures should be taken to protect against bodily injury and equipment damage in the event that there is a loss of power to equipment controlled by pneumatics, electricity, or hydraulics.

5. Consider emergency stops.

Design so that human injury and/or damage to machinery and equipment will not be caused when machinery is stopped by a safety device under abnormal conditions, a power outage or a manual emergency stop.

6. Consider the action when operation is restarted after an emergency stop or abnormal stop.

Design the machinery so that human injury or equipment damage will not occur upon restart of operation. When the cylinder has to be reset at the starting position, install manual safety equipment.

7. No self-locking mechanism

At air shutoff, there is no force generated to hold the workpiece. External forces will cause the workpiece to move out of place in the event that air is lost. Measures should be taken to protect against bodily injury with the hazard.

Compact Clamp Unit

CDQ2B20-DCQ5414Q
CDQ2B32-DCR0859R

∅20, ∅32

Spatter Resistant Cylinders
for Arc Welding

Clamp Cylinders

Gas/Air Switching Valve

Detection Switches

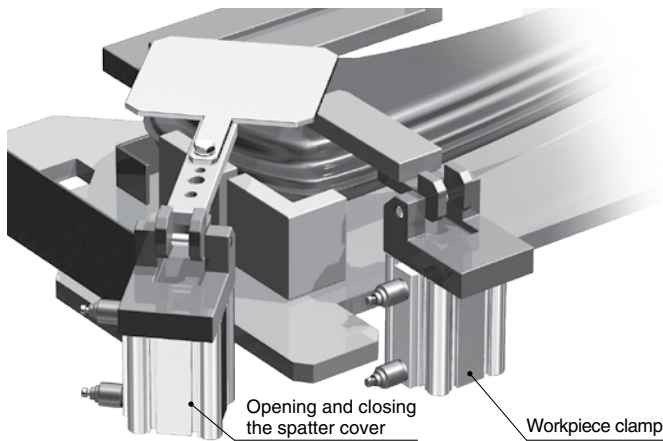
Tubing

Fittings

Speed Control Equipment

Space saving

Used to clamp the workpiece, and open or close the spatter cover of the workpiece.



Labor reduction

Reduces design and assembly labor by integrating the cylinder and clamping mechanism.

Compact

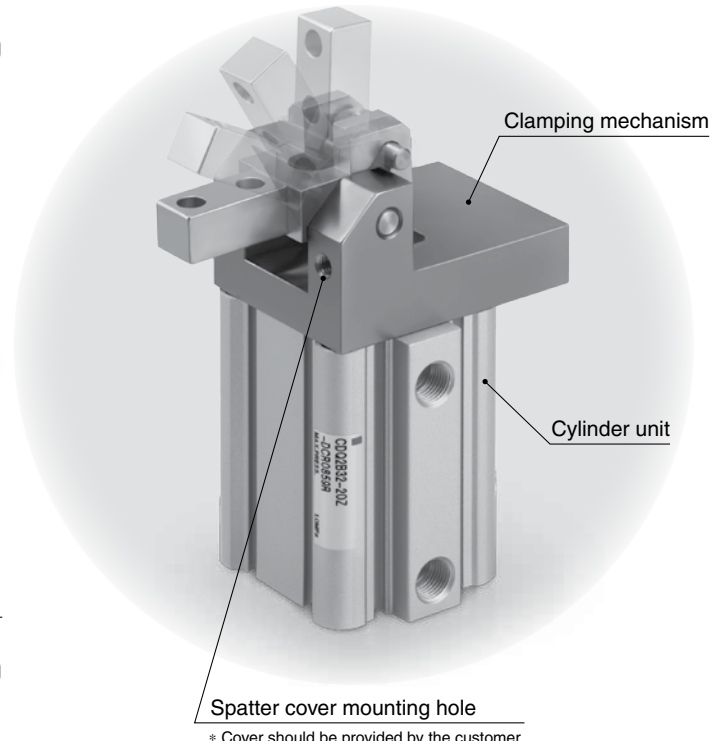
Compact clamp unit based on the compact cylinder

Clamp unit used in common

Both ∅ 20 and ∅ 32 clamp cylinders use the same clamp unit and only the clamp unit can be replaced. This contributes to reduction of spare parts.

Possible to clamp in both directions

Capable of clamping in both directions with an arm opening/closing angle of 90° or more



Compact Clamp Unit

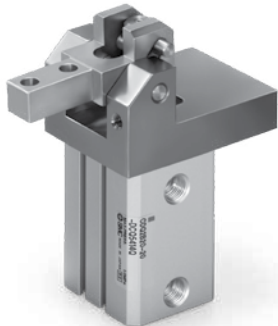
CDQ2B20-DCQ5414Q

CDQ2B32-DCR0859R

ø20, ø32

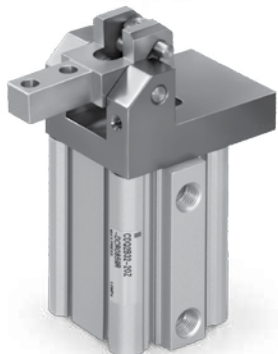


How to Order



ø20 **CDQ2B20-20-DCQ5414Q**

Built-in auto switch magnet • Bore size **20** 20 mm • Compact clamp unit



ø32 **CDQ2B32-20Z-DCR0859R**

Built-in auto switch magnet • Bore size **32** 32 mm • Compact clamp unit

Specifications

Bore size	ø20	ø32
Stroke	20 mm	
Maximum operating pressure	145 psi (1.0 MPa)	
Ambient temperature	14 to 140°F (-10 to 60°C) (No freezing)	
Cushion	Rubber bumper	
Mounting bracket	Rod flange	
Arm opening/closing angle	96°(Cylinder retracting side 5° Cylinder extending side 1°)*	

* Refer to the dimensions for details.

Clamp Unit Part No.

Clamp unit part no.	Hexagon socket head cap screw for fixing clamp unit (included)
C2Q32-42-0895R-R	M5 x 55L (For ø20)*
	M5 x 62L (For ø32)*

* Two types of hexagon socket head cap screw for fixing the unit are included. Use them in accordance with the bore size.

Applicable Auto Switches/Refer to the WEB catalog or the Best Pneumatics No. 2 for further information on auto switches.

Type	Special function	Electrical entry	Indicator light	Wiring (Output)	Load voltage		Auto switch model	Lead wire length (m)					Pre-wired connector	Applicable load		
					DC	AC		0.5 (Nil)	1 (M)	3 (L)	5 (Z)	None (N)				
Solid state auto switch	Magnetic field resistant (2-color indication)	Grommet	Yes	2-wire (Non-polar)	24 V	—	—	P3DWA	●	—	●	●	—	●	—	Relay, PLC

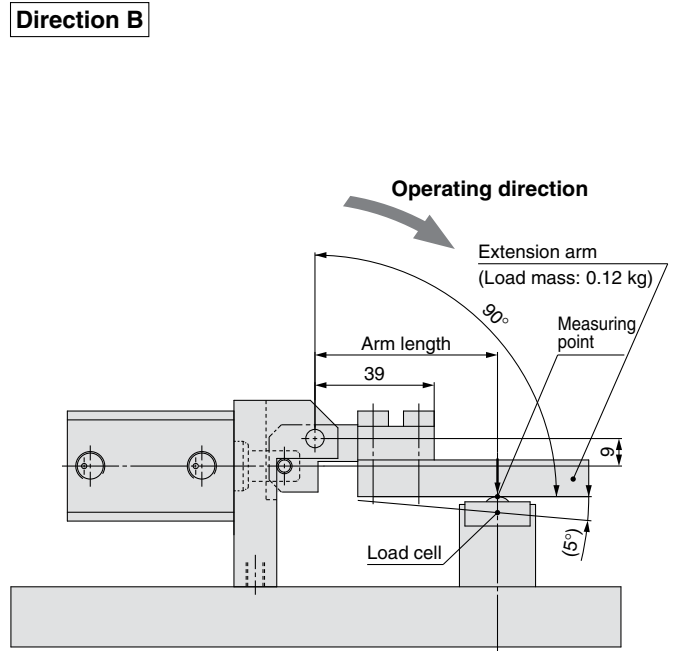
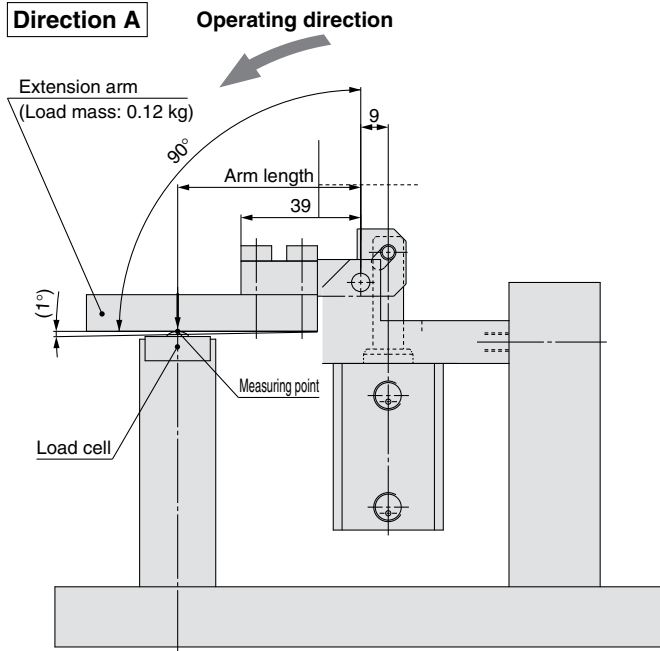
* Lead wire length symbols: 0.5 m Nil
 3 m L
 5 m Z

* Please contact SMC for auto switches, auto switch proper mounting positions and operating ranges other than the above.

* For D-P3DWA, only ø32 is available.

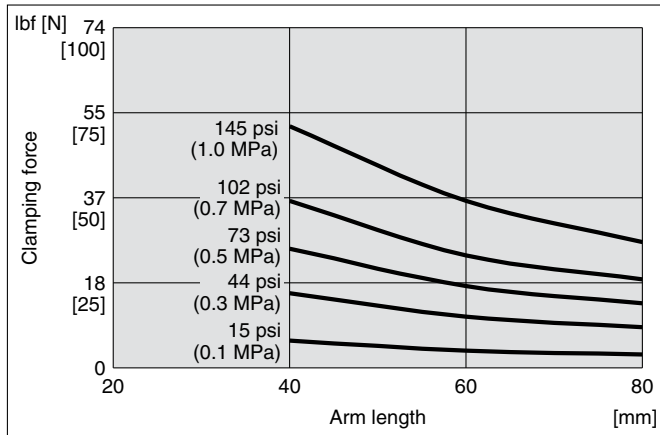
* Auto switches should be ordered separately. Please contact SMC for details.

Clamping Characteristics



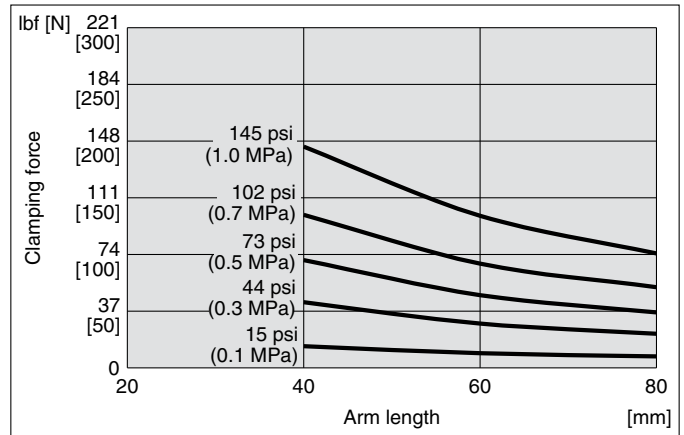
CDQ2B20-DCQ5414Q

Direction A

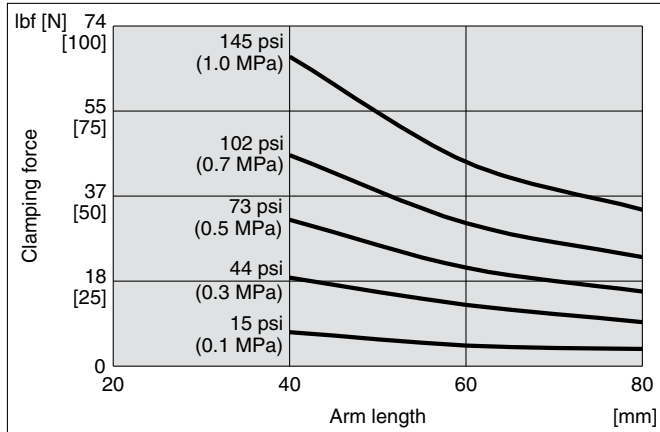


CDQ2B32-DCR0859R

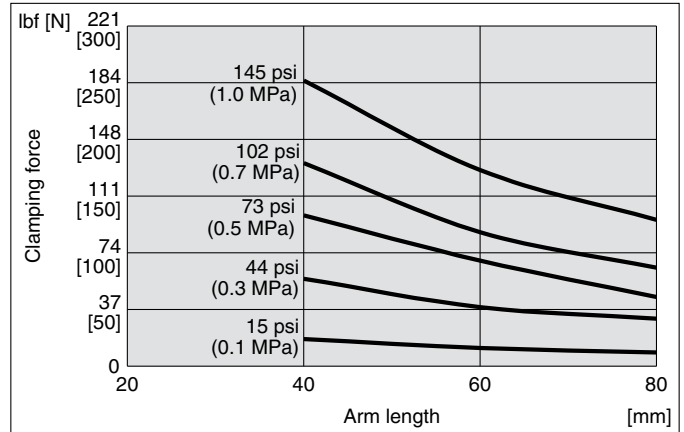
Direction A



Direction B



Direction B



Spatter Resistant Cylinders
for Arc Welding

Clamp Cylinders

Gas/Air Switching Valve

Detection Switches

Tubing

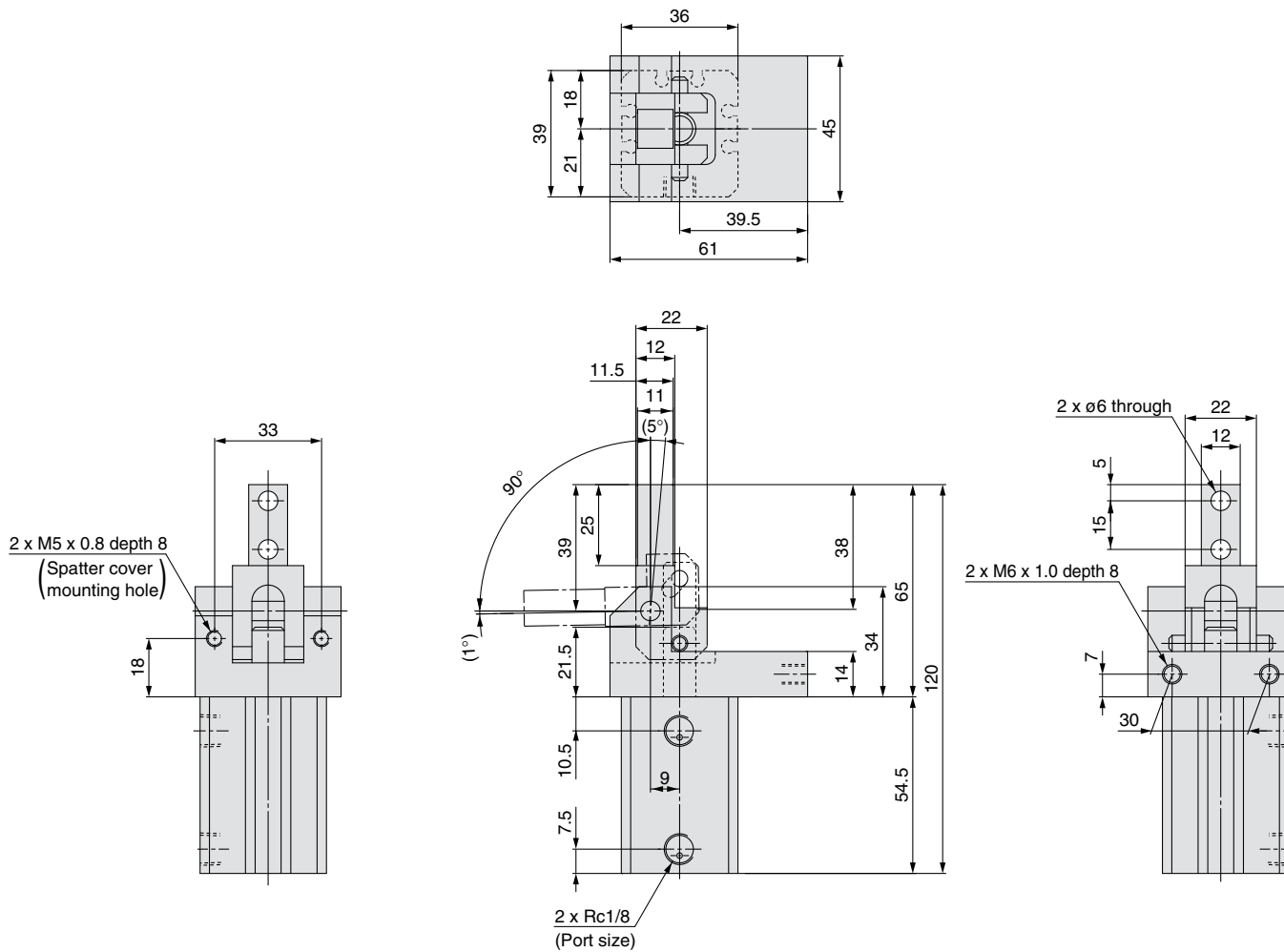
Fittings

Speed Control Equipment

CDQ2B20-DCQ5414Q

Dimensions

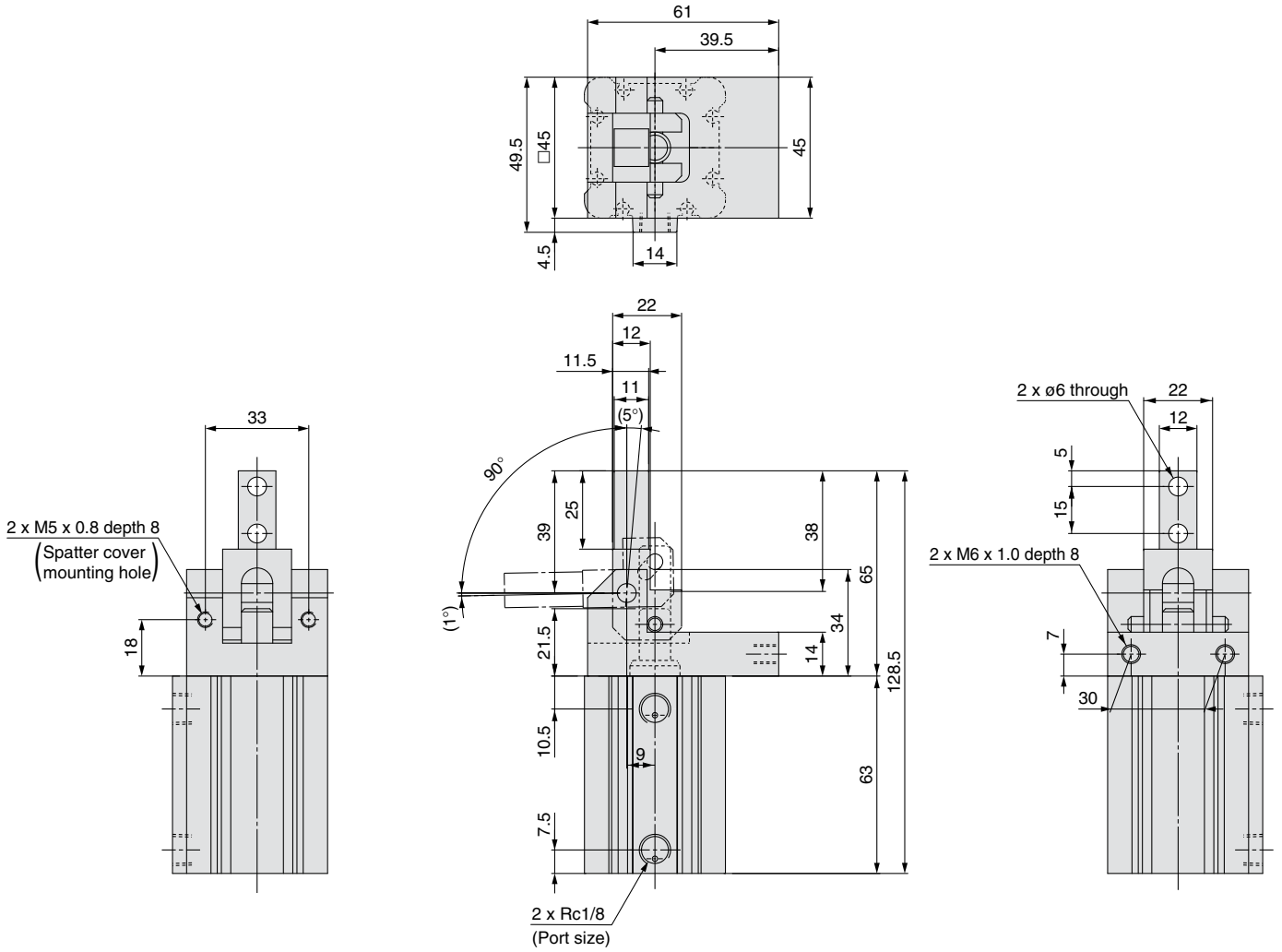
CDQ2B20-20-DCQ5414Q



Compact Clamp Unit *CDQ2B32-DCR0859R*

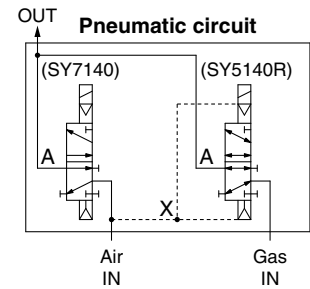
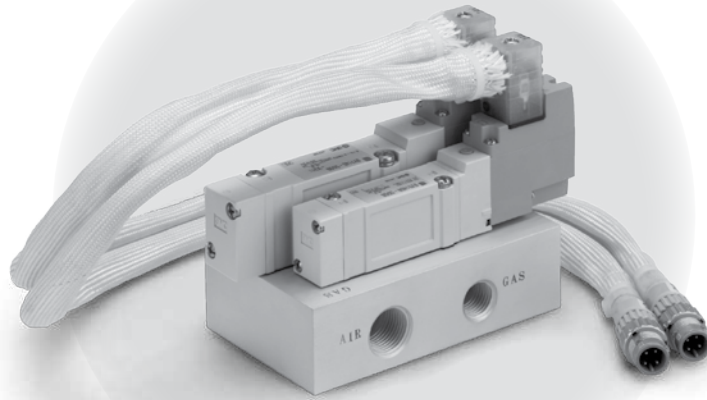
Dimensions

CDQ2B32-20Z-DCR0859R



Gas/Air Switching Valve SS5Y7-X424-Q

Shield gas valve and air blow valve are integrated.

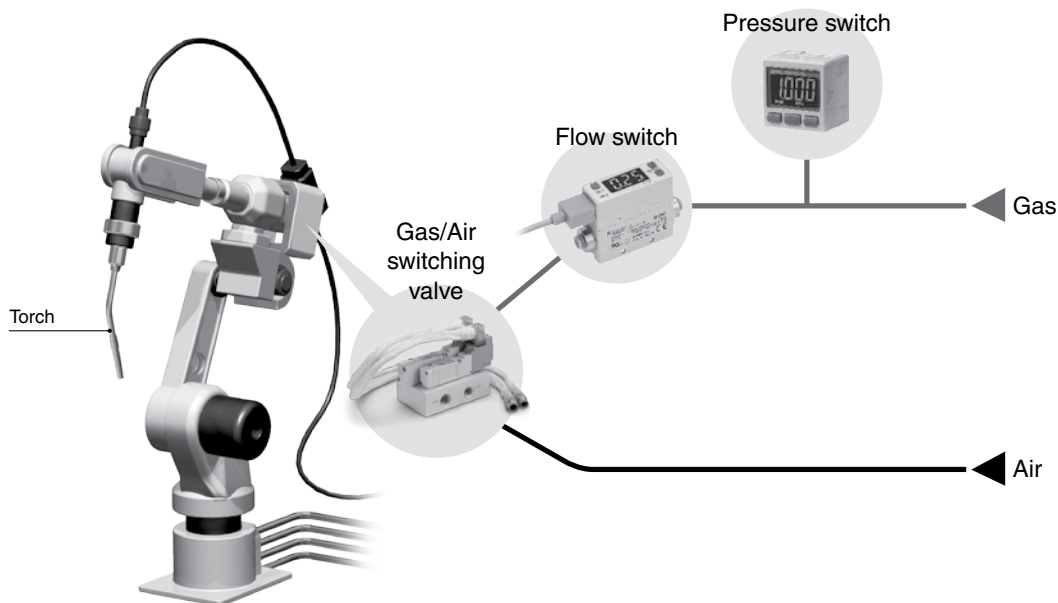


Tip service life extended

Service life can be extended by blowing the air to cool the tip after arc welding.

→ Tip service life is improved, and the number of tip replacements and the tip costs are reduced.

Space saving/Compact



Energy saving product

Power consumption **0.5 W**

Gas/Air Switching Valve

SS5Y7-X424-Q



How to Order

SS5Y7 - X424 - Q

X part no.

CE marking

X424	Gas/Air switching valve With special connector assembly (Cable: Glass fiber heat resistant cover)
-------------	--

Specifications

Fluid	SY7140-5DOS-X316-Q	Air
	SY5140R-5DOS-Q	Inert gas
Operating pressure range	SY7140-5DOS-X316-Q	36 to 102 psi (0.25 to 0.7 MPa)
	SY5140R-5DOS-Q	14.5 to 102psi (-100 kPa to 0.7 MPa)
Rated voltage		24 VDC
Power consumption		0.45 W
Allowable voltage fluctuation		±10% of rated voltage

[Special specifications]

- Special manifold air circuit. (Refer to the figure on the right.)
- With special connector assembly (Cable: Glass fiber heat resistant cover)

Note 1) Order no. "SS5Y7-X424-Q" includes the valve.

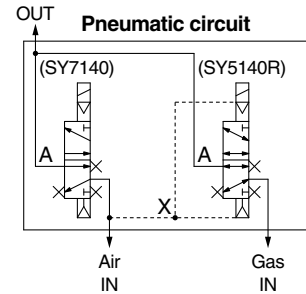
Note 2) Since SY7140 is internal pilot type, be careful not to drop the supply pressure from the minimum operating pressure.

Flow-rate Characteristics (Cv Factor)

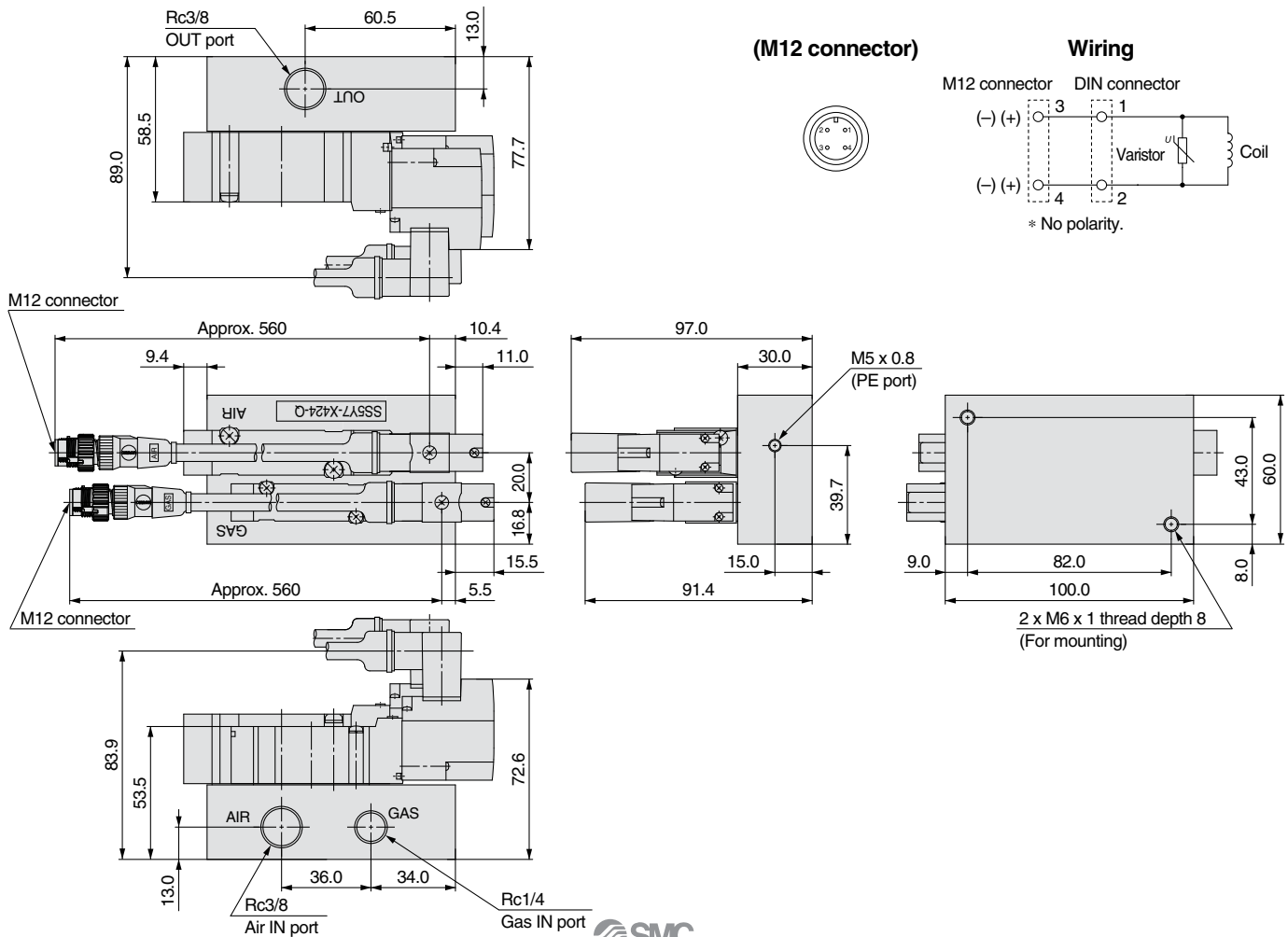
Passage	Valve	Cv
AIR→OUT	SY7140	0.63
GAS→OUT	SY5140R	0.40

Note 1) The flow-rate characteristics show the flow rates when this special base is mounted.

Note 2) The flow rate is measured by means of the discharge method.



Dimensions



Spatter Resistant Cylinders for Arc Welding

Clamp Cylinders

Gas/Air Switching Valve

Detection Switches

Tubing

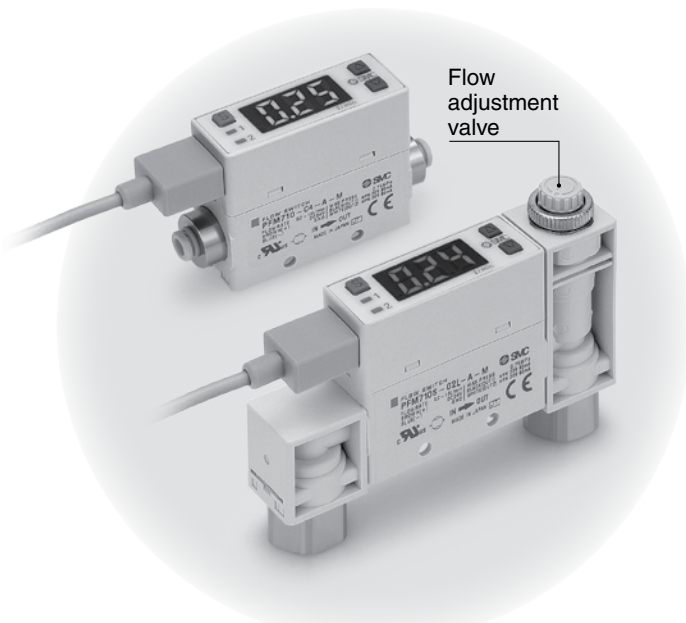
Fittings

Speed Control Equipment

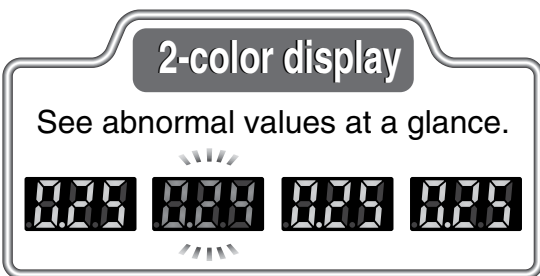
Compatible with Argon (Ar), Carbon Dioxide (CO₂) and the Mixed Gas (Ar+CO₂)

Digital Flow Switch

Series PFM7

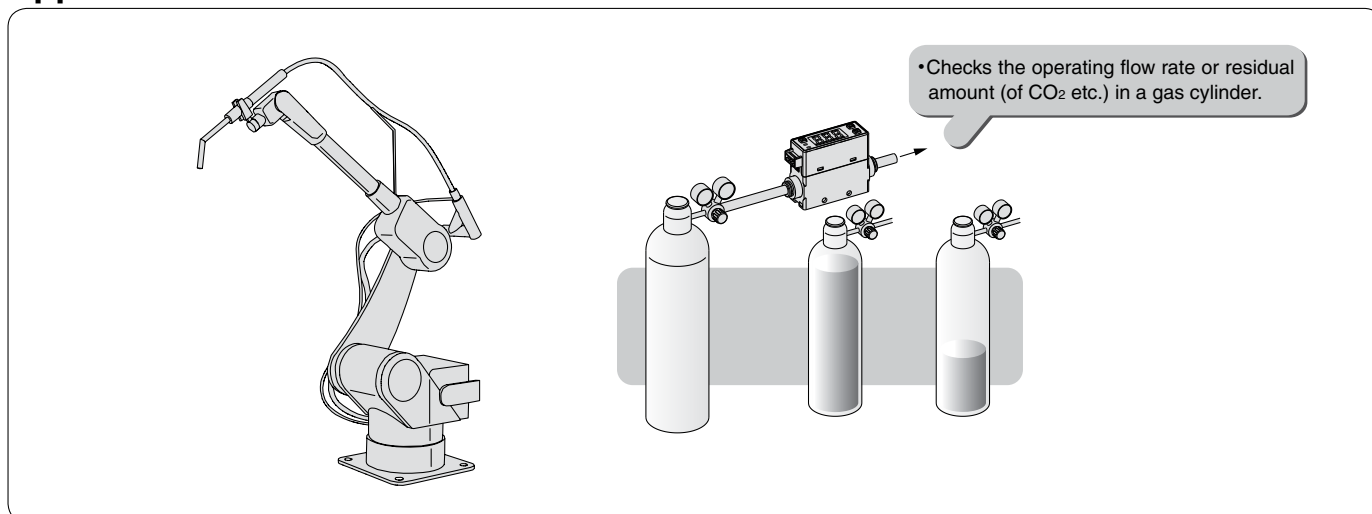


Fluid
Ar, CO₂
Ar + CO₂



- Allows flow rate control and value management of shielding gas
- Compatible with the mixed gas (Ar + Co₂) (Gas ratio can be selected with-X731.)
- Flow rate range: 10, 25, 50, 100 L/min
- Minimum unit setting: 0.01 L/min (0.1 L/min when the flow rate range is 25, 50, 100 L/min.)
- Repeatability: ±1%F.S.
- Grease-free
- Flow adjustment valve is integrated. (Reduced piping and space saving)
- Response time: Either 50 ms, 0.5 s, 1 s or 2 s can be chosen.

Applications



Comparison with Float Type Flow Meter

Spatter Resistant Cylinders for Arc Welding

Clamp Cylinders

Gas/Air Switching Valve

Detection Switches

Tubing

Fittings

Speed Control Equipment

Digital display

Indicated value depends on the viewing angle.

Not subject to pressure variations

Indicated value is the same at any installation position. (No conversion is needed.)

Indicated value depends on installation position. (Conversion is required.)

Free mounting orientation

Mounting orientation is not limited.

Vertical orientation only

With switch output and analog output

Control by sensor output

Visual control

With switch output and analog output

Without output function

A photoelectric switch, or similar, must be prepared separately.

Can detect whether greater or less than set flow rate. The flow condition can be controlled all the time.

Can only detect when float passes. Cannot detect whether greater or less than set flow rate.

ON
OFF

Less ← Flow rate → Greater

ON
OFF

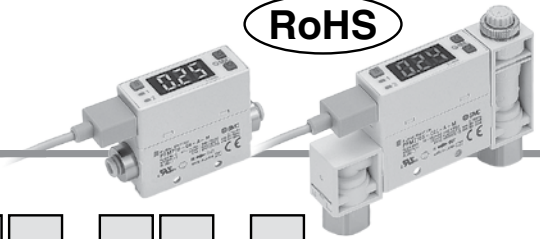
Less ← Flow rate → Greater

Accumulated flow display

Able to confirm the total air consumption per day (Max. 999999 L)
Accumulated pulse output is also equipped.

Not displayable

Compatible with Argon (Ar), Carbon Dioxide (CO₂) and the Mixed Gas (Ar + CO₂) Digital Flow Switch Series **PFM7**



How to Order

PFM7 **10** **C4** **A** **M**

Type

7	Integrated display
---	--------------------

Rated flow range (Flow rate range)

10	0.2 to 10 (5) L/min
25	0.5 to 25 (12.5) L/min
50	1 to 50 (25) L/min
11	2 to 100 (50) L/min

* (): Fluid: CO₂

* When using argon (Ar), carbon dioxide (CO₂) and the mixed gas (Ar + CO₂), refer to page 101.

Flow adjustment valve

Nil	None
S	Yes

Port size

Symbol	Description	Flow rate range			
		10	25	50	11
O1	Rc1/8	●	●	●	
O2	Rc1/4				●
N01	NPT1/8	●	●	●	
N02	NPT1/4				●
F01	G1/8	●	●	●	
F02	G1/4				●
C4	ø4 (5/32") One-touch fitting	●			
C6	ø6 One-touch fitting	●	●	●	●
C8	ø8 (5/16") One-touch fitting		●	●	●
N7	ø1/4" One-touch fitting		●	●	●

Piping entry direction

Nil	Straight
L	Bottom

* Different combinations of piping entry directions for IN and OUT side are available as made-to-order.

• **Option 2**
(Refer to page 98.)

• **Option 1**
(Refer to page 98.)

• **Made to Order**

X731 Compatible with argon (Ar) and carbon dioxide (CO₂) mixed gas
(Refer to page 101.)

• Calibration certificate

Nil	None
A	With calibration certificate

* The certificate is written in English and Japanese. Other languages are available as specials.

• Operation manual

Nil	With operation manual (Japanese and English)
N	None

• Unit specifications

M	Fixed SI unit ^{Note 1)}
Nil	With unit switching function ^{Note 2)}

Note 1) Fixed unit: Instantaneous flow rate: L/min
Accumulated flow: L

Note 2) Since the unit for Japan is fixed to SI due to new measurement law, this option is for overseas.

• Output specifications

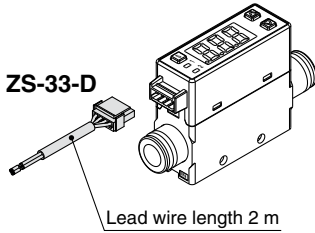
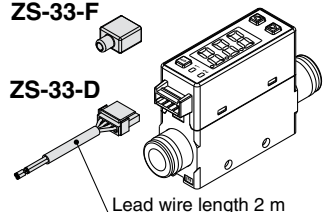
A	2 NPN outputs
B	2 PNP outputs
C	1 NPN output + Analog (1 to 5 V)
D	1 NPN output + Analog (4 to 20 mA)
E	1 PNP output + Analog (1 to 5 V)
F	1 PNP output + Analog (4 to 20 mA)
G	1 NPN output + External input ^{Note 3)}
H	1 PNP output + External input ^{Note 3)}

Note 3) User can select from accumulated value external reset, auto-shift and auto-shift zero.

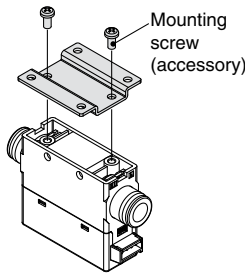
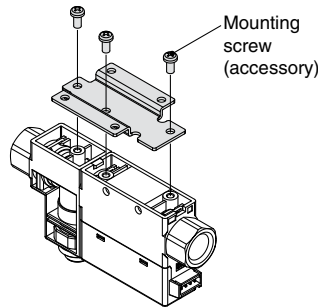
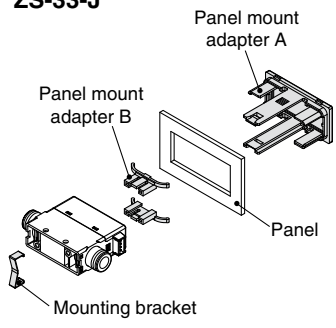
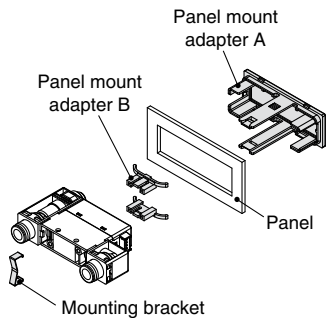
Piping Variations

	With One-touch fittings (C4, C6, C8, N7)		Female thread (O1, O2, N01, N02, F01, F02)	
	Straight (Nil)	Bottom (L)	Straight (Nil)	Bottom (L)
Without flow adjustment valve (Nil)				
With flow adjustment valve (S)				

Option 1

Nil	W	Z
With lead wire with connector (2 m)	With lead wire with connector (2 m) + Rubber cover for connector (silicon rubber)	Without lead wire with connector
 <p>ZS-33-D Lead wire length 2 m</p>	 <p>ZS-33-F ZS-33-D Lead wire length 2 m</p>	

Option 2

Nil	R	S	T
None	Bracket (For without flow adjustment valve) ZS-33-M	Bracket (For with flow adjustment valve) ZS-33-MS	Panel mount adapter (For without flow adjustment valve) ZS-33-J
	 <p>Mounting screw (accessory)</p>	 <p>Mounting screw (accessory)</p> <p>Piping direction: Cannot be mounted with bottom piping type.</p>	 <p>Panel mount adapter A Panel mount adapter B Panel Mounting bracket</p>
V			
Panel mount adapter (For with flow adjustment valve) ZS-33-JS			
 <p>Panel mount adapter A Panel mount adapter B Panel Mounting bracket</p>			

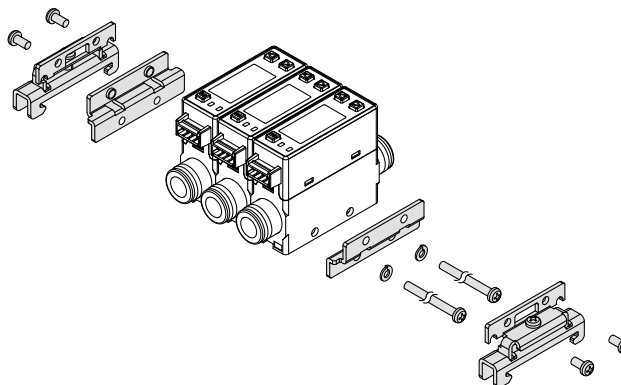
Each option is not assembled with the product, but shipped together.

DIN Rail Mounting Bracket (Order Separately)

ZS-33-R

Stations

1	1 station
2	2 stations
3	3 stations
4	4 stations
5	5 stations



- DIN rail (supplied by customers)
- Port size F02: G1/4 cannot be mounted on the DIN rail.

Series PFM7

For details about the Flow Switch Precautions, refer to "Handling Precautions for SMC Products". For details about the Specific Product Precautions, refer to the Operation Manual at SMC website.

Specifications

Model		PFM710	PFM725	PFM750	PFM711
Applicable fluid		Dry air, N ₂ , Ar, CO ₂ (Air quality grade is JIS B8392-1, 1.1.2 to 1.6.2 and ISO8573-1, 1.1.2 to 1.6.2.)			
Rated flow range <small>Note 8)</small> (Flow rate range)	Dry air, N₂, Ar	0.2 to 10 L/min	0.5 to 25 L/min	1 to 50 L/min	2 to 100 L/min
	CO₂	0.2 to 5 L/min	0.5 to 12.5 L/min	1 to 25 L/min	2 to 50 L/min
Displayable range <small>Note 1) Note 8)</small>	Dry air, N₂, Ar	0.2 to 10.5 L/min	0.5 to 26.3 L/min	1 to 52.5 L/min	2 to 105 L/min
	CO₂	0.2 to 5.2 L/min	0.5 to 13.1 L/min	1 to 26.2 L/min	2 to 52 L/min
Settable range <small>Note 1) Note 8)</small>	Dry air, N₂, Ar	0 to 10.5 L/min	0 to 26.3 L/min	0 to 52.5 L/min	0 to 105 L/min
	CO₂	0 to 5.2 L/min	0 to 13.1 L/min	0 to 26.2 L/min	0 to 52 L/min
Minimum unit setting <small>Note 2)</small>		0.01 L/min	0.1 L/min	0.1 L/min	0.1 L/min
Accumulated pulse flow rate exchange value		0.1 L/pulse	0.1 L/pulse	0.1 L/pulse	1 L/pulse
Indication unit <small>Note 3)</small>		Instantaneous flow rate L/min, CFM x 10 ⁻² Accumulated flow L, ft ³ x 10 ⁻¹			
Linearity		Display accuracy: ±3%F.S. (Fluid: Dry air) Analog output accuracy: ±5%F.S. (Fluid: Dry air)			
Repeatability		±1%F.S. (Fluid: Dry air) Analog output accuracy: ±3%F.S. (Fluid: Dry air)			
Pressure characteristics		±5%F.S. (0.35 MPa reference)			
Temperature characteristics		±2%F.S. (59 to 95°F [15 to 35°C]) ±5%F.S. (32 to 122°F [0 to 50°C])			
Operating pressure range		-14.5 to 109 psi (-100 kPa to 750 kPa)			
Rated pressure range		-10 to 109 psi (-70 kPa to 750 kPa)			
Proof pressure		145 psi (1 MPa)			
Accumulated flow range		Max. 999999 L <small>Note 4)</small>			
Switch output		NPN or PNP open collector output			
	Maximum load current	80 mA			
	Maximum applied voltage	28 VDC (at NPN output)			
	Internal voltage drop	NPN output: 1 V or less (at 80 mA) PNP output: 1.5 V or less (at 80 mA)			
	Response time	1 s (50 ms, 0.5 s, 2 s can be selected.)			
	Output protection	Short-circuit protection			
Accumulated pulse output		NPN or PNP open collector output (Same as switch output)			
Analog output <small>Note 5) Note 8)</small>	Response time	1.5 s or less (90% response)			
	Voltage output	Voltage output: 1 to 5 V Output impedance: 1 kΩ			
	Current output	Current output: 4 to 20 mA Max. load impedance: 600 Ω, Min. load impedance: 50 Ω			
Hysteresis <small>Note 6)</small>	Hysteresis mode	Variable			
	Window comparator mode	Variable			
External input		No-voltage input (Reed or Solid state) Input 30 ms or more			
Display method		3-digit, 7-segment LED 2-color display (Red/Green) Renewed cycle: 10 times/sec			
Status LED's		OUT1: Lights up when output is turned ON (Green). OUT2: Lights up when output is turned ON (Red).			
Power supply voltage		24 VDC ±10%			
Current consumption		55 mA or less			
Environment	Enclosure	IP40			
	Operating fluid temperature	32 to 122°F (0 to 50°C) (with no freezing and condensation)			
	Operating temperature range	Operating: 32 to 122°F (0 to 50°C) Stored: (32 to 140°F)-10 to 60°C (with no freezing and condensation)			
	Operating humidity range	Operating, Stored: 35 to 85%R.H. (with no condensation)			
	Withstand voltage	1000 VAC for 1 minute between terminals and housing			
	Insulation resistance	50 MΩ or more (500 VDC measured via megohmmeter) between terminals and housing			

Note 1) When the minimum unit setting 0.01 L/min is selected for 10 L/min type, the indication upper limit will be [9.99 L/min].

When the minimum unit setting 0.1 L/min is selected for 100 L/min type, the indication upper limit will be [99.9 L/min].

Note 2) User can select between 0.01 L/min and 0.1 L/min for the PFM710, and between 0.1 L/min and 1 L/min for the PFM711 respectively.

If the indication unit is selected to "CFM", the minimum unit setting cannot be changed.

At the time of shipment from the factory, the minimum unit setting is set to 0.1 L/min for the PFM710 and 1 L/min for the PFM711 respectively.

Note 3) Set to "ANR" at the time of shipment from the factory.

"ANR" is used for standard conditions: 68°F (20°C), 1 atm and 65%R.H.

"NL/min" is used for normal conditions: 32°F (0°C) and 1 atm.

When equipped with a unit switching function. (The SI unit (L/min or L) is fixed for types with no unit switching function.)

Note 4) Cleared when the power supply is turned off. Hold function can be selected. (Interval of 2 min or 5 min can be selected).

If the 5 min interval is selected, the life of the memory element (electronic part) is limited to 1 million cycles. (If energized for 24 hours, life is calculated as 5 min x 1 million = 5 million min = 9.5 years). Therefore, if using the hold function, calculate the memory life for your operating conditions, and use within this life.

Note 5) Set to 1.5 s (90%), can be changed to 100 ms.

Note 6) Set to hysteresis mode at the time of shipment from the factory. Can be changed to window comparator mode using push-buttons.

Note 7) For details about wiring and thread type, refer to the Operation Manual that can be downloaded from SMC website (<http://www.smcworld.com>).

Note 8) When using argon (Ar), carbon dioxide (CO₂) and the mixed gas (Ar + CO₂), refer to page 101.

Settable Range and Rated Flow Range

Set the flow rate within the rated flow range.

The settable rate range is the range of flow rate that can be set in the switch.

The rated flow range is the range that satisfies the switch specifications (accuracy, linearity etc.).

It is possible to set a value outside of the rated flow range if it is within the settable range, however, the specification is not guaranteed.

The flow range if using CO₂ is given in brackets.

When using argon (Ar), carbon dioxide (CO₂) and the mixed gas (Ar + CO₂), refer to page 101.

Sensor	Flow range							
	0.2 L/min	0.5 L/min	1 L/min	2 L/min	10 L/min	25 L/min	50 L/min	100 L/min
PFM710 PFM510	0.2 L/min				10 L/min (5 L/min)			
	0.2 L/min				10.5 L/min (5.2 L/min)			
	0				10.5 L/min (5.2 L/min)			
PFM725 PFM525	0.5 L/min				25 L/min (12.5 L/min)			
	0.5 L/min				26.3 L/min (13.1 L/min)			
	0				26.3 L/min (13.1 L/min)			
PFM750 PFM550	1 L/min				50 L/min (25 L/min)			
	1 L/min				52.5 L/min (26.2 L/min)			
	0				52.5 L/min (26.2 L/min)			
PFM711 PFM511			2 L/min				100 L/min (50 L/min)	
			2 L/min				105 L/min (52 L/min)	
	0						105 L/min (52 L/min)	

Rated flow range
 Displayable range
 Settable range

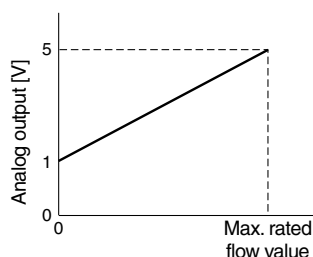
In the case of the PFM5 series, the displayable and settable ranges are the same as the PFM3 series flow monitor.

Piping Specifications/Weight

Part no.	01	02	N01	N02	F01	F02	C4	C6	C6	N7		
Port size	Rc 1/8	Rc 1/4	NPT 1/8	NPT 1/4	G1/8	G1/4	ø4 (5/32") One-touch fitting	ø6 One-touch fitting	ø8 (5/16") One-touch fitting	ø1/4" One-touch fitting		
Weight	Straight Bottom		Without orifice: 95 g Without orifice: 105 g		Straight Bottom		Without orifice: 125 g Without orifice: 135 g		Straight Bottom		Without orifice: 55 g Without orifice: 65 g	
	Straight Bottom		With orifice: 135 g With orifice: 145 g		Straight Bottom		With orifice: 165 g With orifice: 175 g		Straight Bottom		With orifice: 95 g With orifice: 105 g	
Wetted parts material	LCP, PBT, Brass (Electroless nickel plating), HNBR (+ Fluoro coated), FKM (+ Fluoro coated), Silicon, Au, Stainless steel 304											

Analog Output

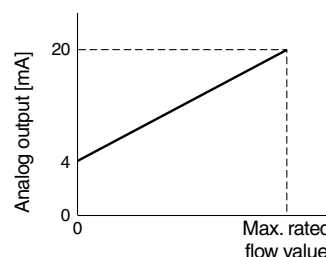
Note) Analog output at maximum rated flow rate when CO₂ is selected is 3 [V] for the voltage output type and 12 [mA] for the current output type.
Note) When using argon (Ar), carbon dioxide (CO₂) and the mixed gas (Ar + CO₂), refer to page 101.



Analog Voltage Output (1 to 5 V)

Model	Max. rated flow value [L/min]
PFM710-□-C/E	10 (5)
PFM725-□-C/E	25 (12.5)
PFM750-□-C/E	50 (25)
PFM711-□-C/E	100 (50)

* (): Fluid: CO₂



Analog Current Output (4 to 20 mA)

Model	Max. rated flow value [L/min]
PFM710-□-D/F	10 (5)
PFM725-□-D/F	25 (12.5)
PFM750-□-D/F	50 (25)
PFM711-□-D/F	100 (50)

* (): Fluid: CO₂

PFM7-X731

Digital Flow Switch

Made to Order Specifications

Please contact SMC for detailed specifications, lead times and prices.



Symbol

X731

1 Compatible with Argon (Ar) and Carbon Dioxide (CO₂) Mixed Gas

The argon-carbon dioxide gas ratio (Ar: CO₂) can be selected using the push-buttons from among the following: 92 : 8, 90 : 10, 80 : 20, 70 : 30, and 60 : 40. Dimensions are same as those of standard models.

PFM 7 - - - X731

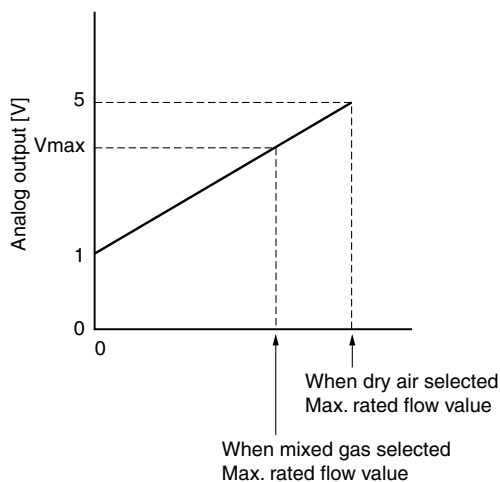
7 Integrated display

For details of How to Order, refer to page 97.

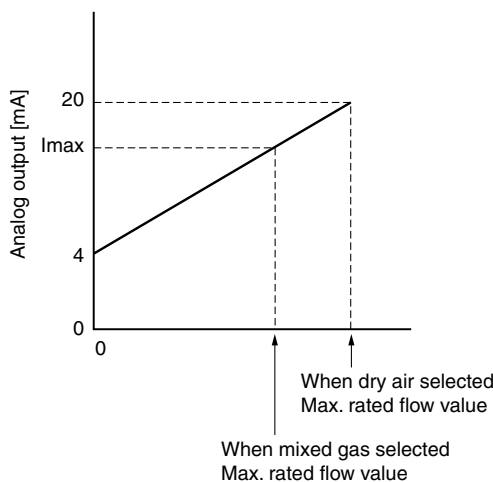
Model	Gas ratio		Rated flow range	Displayable range	Settable range	Max. analog output	
	Ar	CO ₂				Voltage (Vmax)	Current (Imax)
PFM710	92%	8%	0.2 to 7.0 L/min	0.2 to 7.4 L/min	0 to 7.4 L/min	3.80 V	15.2 mA
	90%	10%					
	80%	20%					
	70%	30%					
	60%	40%					
PFM725	92%	8%	0.5 to 25.0 L/min	0.5 to 26.3 L/min	0 to 26.3 L/min	5.00 V	20.0 mA
	90%	10%	0.5 to 20.0 L/min	0.5 to 21.0 L/min	0 to 21.0 L/min	4.20 V	16.8 mA
	80%	20%					
	70%	30%					
	60%	40%					
PFM750	92%	8%	1.0 to 50.0 L/min	1.0 to 52.5 L/min	0 to 52.5 L/min	5.00 V	20.0 mA
	90%	10%	1.0 to 40.0 L/min	1.0 to 42.0 L/min	0 to 42.0 L/min	4.20 V	16.8 mA
	80%	20%					
	70%	30%					
	60%	40%					
PFM711	92%	8%	2 to 100 L/min	2 to 105 L/min	0 to 105 L/min	5.00 V	20.0 mA
	90%	10%	2 to 90 L/min	2 to 95 L/min	0 to 95 L/min	4.60 V	18.4 mA
	80%	20%					
	70%	30%					
	60%	40%					

Output characteristics using mixed gas

Analog voltage output (1 to 5 V)

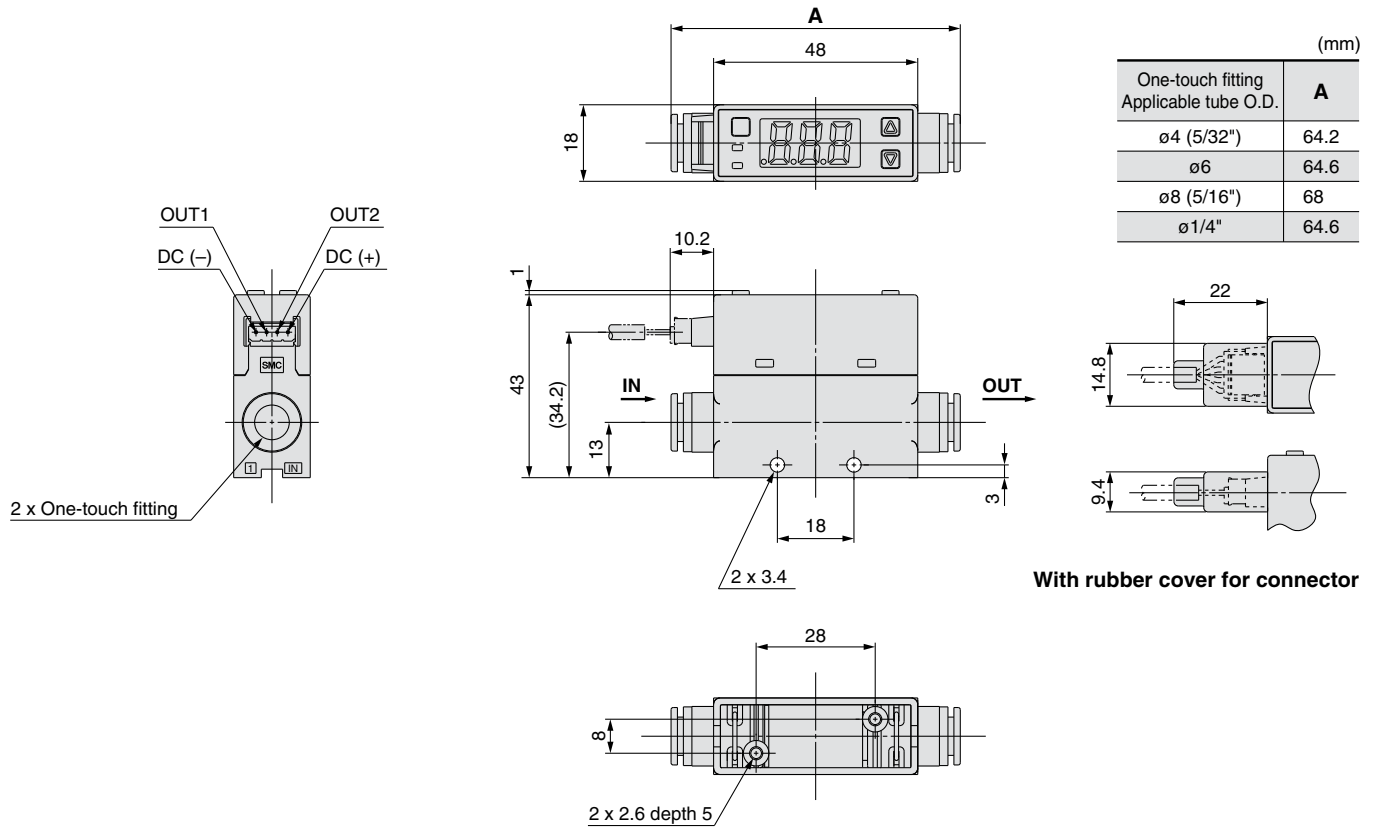


Analog current output (4 to 20 mA)

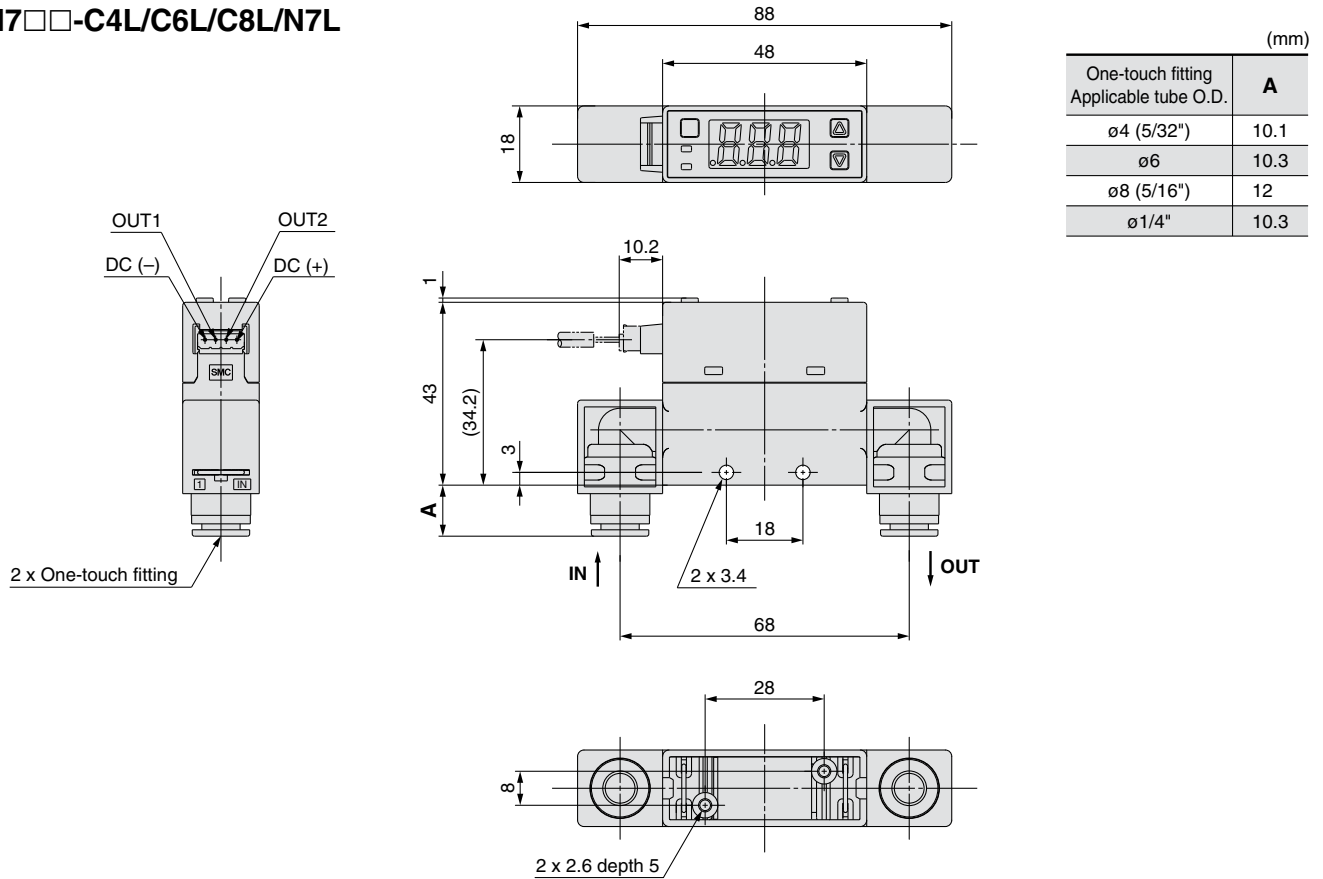


Dimensions

PFM7□□-C4/C6/C8/N7



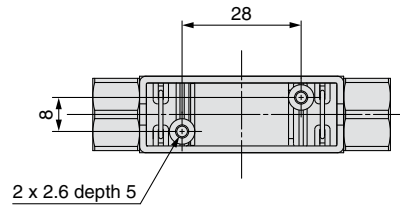
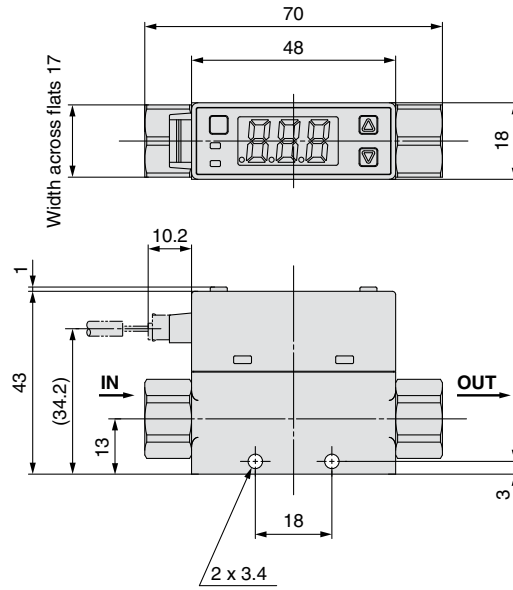
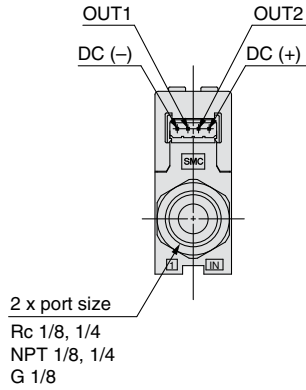
PFM7□□-C4L/C6L/C8L/N7L



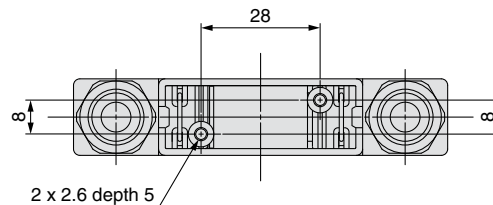
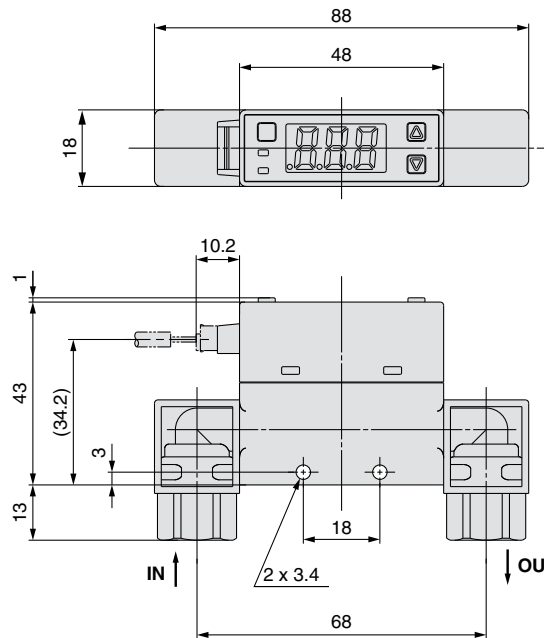
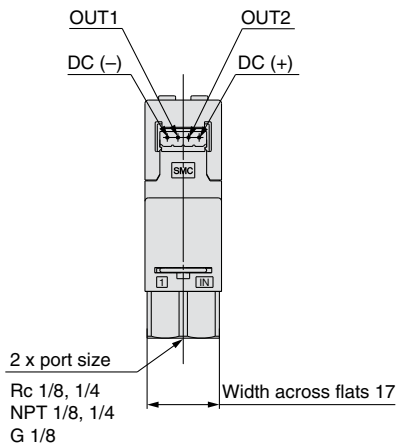
Series PFM7

Dimensions

PFM7□□-(N)01/(N)02/F01



PFM7□□-(N)01L/(N)02L/F01L



High-Precision Digital Pressure Switch

Series ISE30A



Spatter Resistant Cylinders
for Arc Welding

Clamp Cylinders

Gas/Air Switching Valve

Detection Switches

Tubing

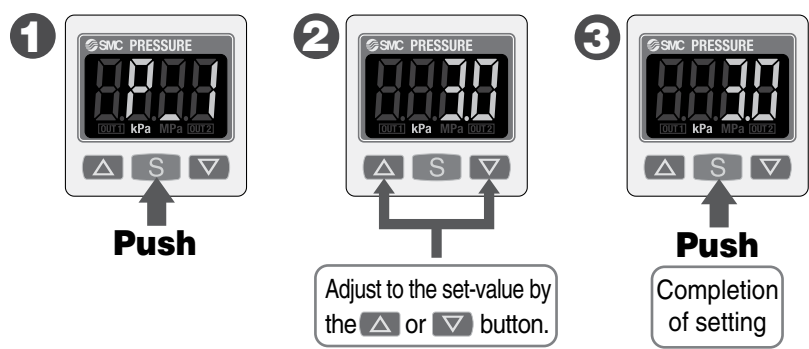
Fittings

Speed Control Equipment

Allows pressure control and value management of shielding gas

Compatible with argon (Ar), carbon dioxide (CO₂) and the mixed gas (Ar + CO₂)

3-step setting



Expanded pressure range for positive-pressure type to the vacuum range.

- Rated pressure range:
-14.5 to 145 psi
(-0.100 to 1.000 MPa)

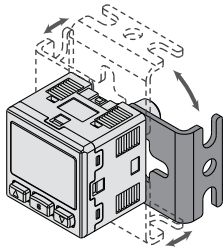
2 added outputs

- NPN or PNP open collector 2 outputs
- NPN or PNP open collector 1 output + Analog output (1 to 5 V or 4 to 20 mA)

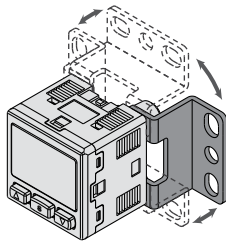
Mounting

Bracket configuration allows mounting in four orientations.

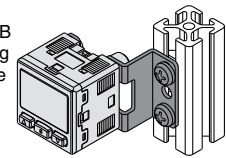
Bracket A



Bracket B/C



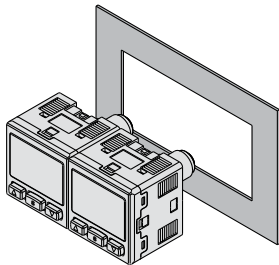
Bracket B
Mounting
example



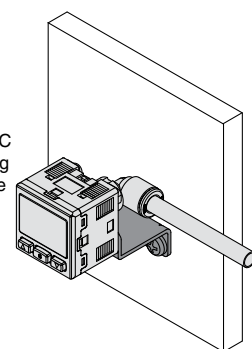
Mounting
example

Panel mount

Mountable side by side
without clearance



Bracket C
Mounting
example



One opening!

- Reduced panel fitting labor
- Space-saving

Series

Series

ISE30A (positive)



Rated pressure range

-14.5 to 145 psi (-0.100 to 1.000 MPa)
145 psi (1 MPa)
0
-14.5 psi (-0.1 MPa)
(-100 kPa)

Set pressure range

-15 to 152 psi (-0.105 to 1.050 MPa)

Withstand pressure

218 psi (1.5 MPa)

Minimum unit setting

0.145 psi (0.001 MPa)

Output

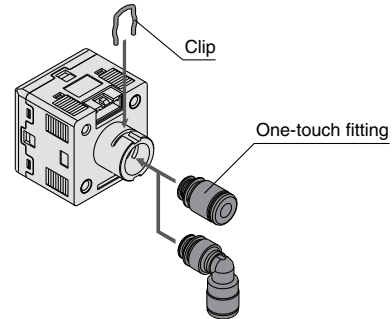
NPN or PNP open collector 1 output
NPN or PNP open collector 2 outputs
NPN or PNP open collector 1 output + Analog output (voltage or current)

Piping

R1/8, NPT1/8 (M5 female threaded)
ø4, ø6, ø5/32, ø1/4 One-touch fittings

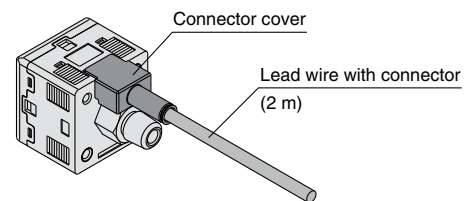
Replaceable One-touch fittings

The clip type allows easy removal of fittings.
Fitting's type and size can be changed.



Lead wire

Added the connector cover.



4-digit display

4-digit display allows easy reading of displayed values.

Example: 0.5 MPa



Series 30A
(New)



Series 30
(Conventional)

Possible to check set-value during key locking

Additional functions

◆ Secret code setting function

The key locking function keeps unauthorized persons from tampering with buttons.

◆ Power-saving function

Power consumption is reduced by turning off the monitor. (Reduce power consumption by up to 20%.)

◆ Resolution-switch function

It reduces the monitor to flicker.



1/1000

(Accuracy is not changed, only the displayed values.)



1/100

High-Precision Digital Pressure Switch

Series ISE30A



Spatter Resistant Cylinders for Arc Welding

Clamp Cylinders

Gas/Air Switching Valve

Detection Switches

Tubing

Fittings

Speed Control Equipment



How to Order

Output specifications

N	NPN open collector 1 output
P	PNP open collector 1 output
A	NPN open collector 2 outputs
B	PNP open collector 2 outputs
C*	NPN open collector 1 output + Analog voltage output
D*	NPN open collector 1 output + Analog current output
E*	PNP open collector 1 output + Analog voltage output
F*	PNP open collector 1 output + Analog current output

* Made to Order

Made to Order

Symbol	Specifications/Description
X510	For M12 4-pin pre-wired connector

Available only for output specifications "A", "B", and option 1 "G".

Option 3

Symbol	Operation manual ^(Note)	Calibration certificate ^(Note)
Nil	○	—
Y	—	—
K	○	○
T	—	○

Note) All texts in both English and Japanese.

ISE30A - 01 - N - M

Rated pressure range

ISE30A	-14.5 to 145psi (-0.1 to 1 MPa)
---------------	---------------------------------

Piping specifications

Symbol	Specifications	Image
01	R1/8 (M5 female threaded)	
N01	NPT1/8 (M5 female threaded)	
C4H	One-touch fitting ø4 mm, ø5/32 inch	Straight type
C6H	One-touch fitting ø6 mm	
N7H	One-touch fitting ø1/4 inch	Elbow type
C4L	One-touch fitting ø4 mm, ø5/32 inch	
C6L	One-touch fitting ø6 mm	
N7L	One-touch fitting ø1/4 inch	

Unit specifications

Nil	With display unit ^(Note 1) switching function
M	Fixed SI unit ^(Note 2)
P*	With display unit ^(Note 1) switching function (Initial value psi)

* Made to Order

Note 1) Under the New Measurement Law, sales of switches with the unit switching function have not been allowed for use in Japan.

Note 2) Unit: MPa

Option 1

Nil	Without lead wire	
L	Lead wire with connector (Lead wire length 2 m) ^(Note)	
G	Lead wire with connector (Lead wire length 2 m) ^(Note) With connector cover	

Note) For output types N and P, the number of core of lead wires will be 3, and for other types, it will be 4.

Option 2

Nil	None	
A1	Bracket A	
A2	Bracket B	
A3	Bracket C	
B	Panel mount adapter	
D	Panel mount adapter + Front protection cover	



Series ISE30A

For details about the Pressure Switch Precautions, refer to "Handling Precautions for SMC Products".
For details about the Specific Product Precautions, refer to the Operation Manual at SMC website.

Specifications

Model		ISE30A (Positive pressure)	
Rated pressure range		-14.5 to 145 psi (-0.100 to 1.000 MPa)	
Display/Set pressure range		-15 to 152 psi (-0.105 to 1.050 MPa)	
Withstand pressure		218 psi (1.5 MPa)	
Display/Minimum unit setting		0.15 psi (0.001 MPa)	
Applicable fluid		Air, Non-corrosive gas, Non-flammable gas	
Power supply voltage		12 to 24 VDC ±10%, Ripple (p-p) 10% or less (with power supply polarity protection)	
Current consumption		40 mA or less	
Switch output		NPN or PNP open collector 1 output, NPN or PNP open collector 2 outputs	
	Maximum load current	80 mA	
	Maximum applied voltage	28 V (at NPN output)	
	Residual voltage	1 V or less (with load current of 80 mA)	
	Response time	2.5 ms or less (with anti-chattering function: 20, 100, 500, 1000, 2000 ms)	
	Short circuit protection	Yes	
Repeatability		±0.2% F.S. ±1 digit	
Hysteresis	Hysteresis mode	Variable (0 or above) ^{Note 1)}	
	Window comparator mode		
Analog output	^{Note 2)} Voltage output	Output voltage (Rated pressure range)	0.6 to 5 V ±2.5% F.S.
		Linearity	±1% F.S.
		Output impedance	Approx. 1 kΩ
	^{Note 3)} Current output	Output current (Rated pressure range)	2.4 to 20 mA ±2.5% F.S.
		Linearity	±1% F.S.
		Load impedance	Maximum load impedance: Power supply voltage 12 V: 300 Ω, Power supply voltage 24 V: 600 Ω Minimum load impedance: 50 Ω
Display		4-digit, 7-segment, 2-color LCD (Red/Green)	
Display accuracy		±2% F.S. ±1 digit (Ambient temperature of 77 ±5.4°F [25 ±3°C])	
Indicator light		Lights up when switch output is turned ON. OUT1: Green, OUT2: Red	
Environment	Enclosure	IP40	
	Operating temperature range	Operating: 32 to 122°F (0 to 50°C), Stored: 14 to 140°F (-10 to 60°C) (No freezing or condensation)	
	Operating humidity range	Operating/Stored: 35 to 85% RH (No condensation)	
	Withstand voltage	1000 VAC for 1 minute between terminals and housing	
	Insulation resistance	50 MΩ or more (500 VDC measured via megohmmeter) between terminals and housing	
Temperature characteristics		±2% F.S. (77°F [25°C] reference)	
Lead wire ^{Note 4)}		Oilproof heavy-duty vinyl cable, 3 cores ø3.5, 2 m 4 cores Conductor area: 0.15 mm ² (AWG26), Insulator O.D.: 1.0 mm	
Standards		CE, UL/CSA (E216656), RoHS	

Note 1) If applied pressure fluctuates near the set value, set the hysteresis above the fluctuation range to prevent chattering.

Note 2) When analog voltage output is selected, analog current output cannot be used together.

Note 3) When analog current output is selected, analog voltage output cannot be used together.

Note 4) For details about wiring, refer to the Operation Manual that can be downloaded from SMC website (<http://www.smcworld.com>).

Piping Specifications

Model		01	N01	C4H	C6H	N7H	C4L	C6L	N7L
Port size		R1/8 M5 x 0.8	NPT1/8 M5 x 0.8	—	—	—	—	—	—
	One-touch fitting, Straight type	—	—	ø4 mm ø5/32 inch	ø6 mm	ø1/4 inch	—	—	—
	One-touch fitting, Elbow type	—	—	—	—	—	ø4 mm ø5/32 inch	ø6 mm	ø1/4 inch
Wetted parts material	Sensor pressure receiving area	Sensor pressure receiving area: Silicon							
	Piping port	C3602 (electroless nickel plating) O-ring: HNBR	PBT, POM, Stainless steel 304, C3604 (electroless nickel plating) O-ring: NBR						
Weight	Including lead wire with connector (3 cores, 2 m)	81 g	70 g	71 g	73 g	75 g	73 g	75 g	
	Including lead wire with connector (4 cores, 2 m)	85 g	74 g	75 g	77 g	79 g	77 g	79 g	
	Excluding lead wire with connector	43 g	32 g	33 g	35 g	37 g	35 g	37 g	

Option/Part No.

When optional parts are required separately, use the following part numbers to place an order.

Part no.	Option	Note	Part no.	Option	Note
ZS-38-A1	Bracket A	Mounting screw (with 2 pcs. of M3 x 5L)	ZS-38-4G	Lead wire with connector (with connector cover)	4 cores, for 2 outputs, 2 m
ZS-38-A2	Bracket B	Mounting screw (with 2 pcs. of M3 x 5L)	ZS-38-5L	Lead wire with a connector for copying	3 cores, copy function, 1 m
ZS-38-A3	Bracket C	Mounting screw (with 2 pcs. of M3 x 5L)	ZS-38-U	Lead wire unit with a connector for copying	Copy function (up to 10 slaves)
ZS-27-C	Panel mount adapter	Mounting screw (with 2 pcs. of M3 x 8L)	ZS-38-C4H	One-touch fittings ø4 mm straight	O-ring, one-touch clip included
ZS-27-D	Panel mount adapter + Front protection cover	Mounting screw (with 2 pcs. of M3 x 8L)	ZS-38-C6H	One-touch fittings ø6 mm straight	O-ring, one-touch clip included
ZS-27-01	Front protection cover		ZS-38-N7H	One-touch fittings ø1/4 inch straight	O-ring, one-touch clip included
ZS-38-3L	Lead wire with connector	3 cores, for 1 output, 2 m	ZS-38-C4L	One-touch fittings ø4 mm elbow	O-ring, one-touch clip included
ZS-38-4L	Lead wire with connector	4 cores, for 2 outputs, 2 m	ZS-38-C6L	One-touch fittings ø6 mm elbow	O-ring, one-touch clip included
ZS-38-3G	Lead wire with connector (with connector cover)	3 cores, for 1 output, 2 m	ZS-38-N7L	One-touch fittings ø1/4 inch elbow	O-ring, one-touch clip included

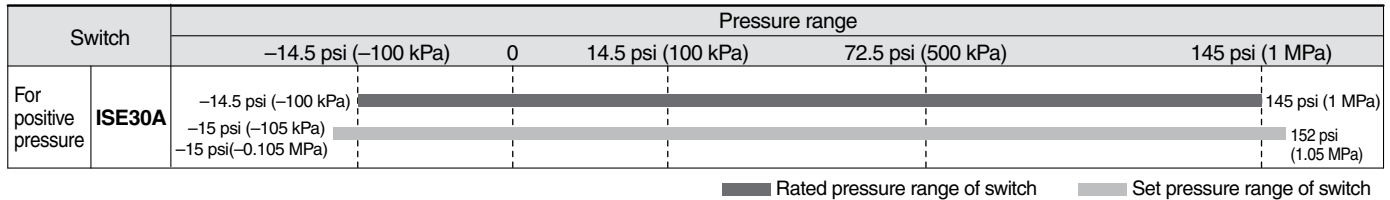
Set Pressure Range and Rated Pressure Range

Set the pressure within the rated pressure range.

The set pressure range is the range of pressure that is possible in setting.

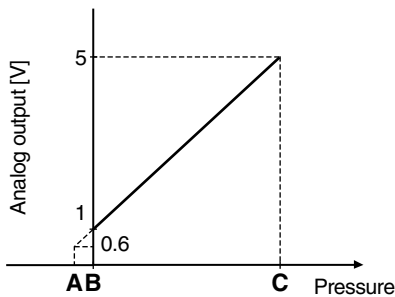
The rated pressure range is the range of pressure that satisfies the specifications (accuracy, linearity, etc.) on the switch.

Although it is possible to set a value outside the rated pressure range, the specifications will not be guaranteed even if the value stays within the set pressure range.

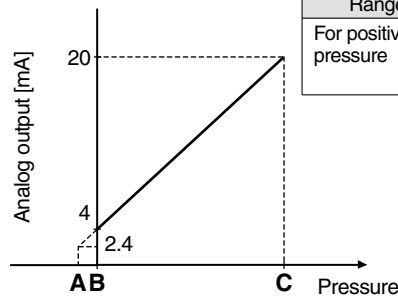


Analog Output

Voltage output



Current output



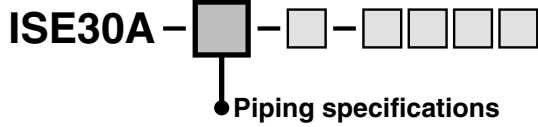
Range	Rated pressure range	A	B	C
For positive pressure	-14.5 to 145 psi (-0.100 to 1.000 MPa)	-14.5 psi (-0.1 MPa)	0	145 psi (1 MPa)

Functions (For details, refer to the WEB catalog or the Best Pneumatics No. 6.)

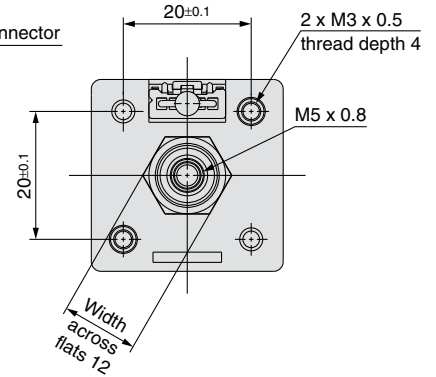
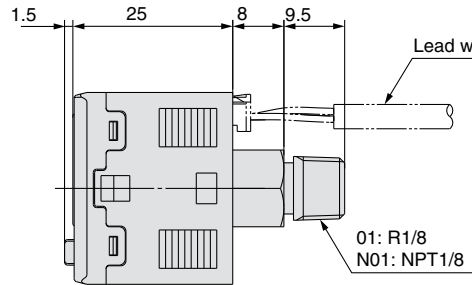
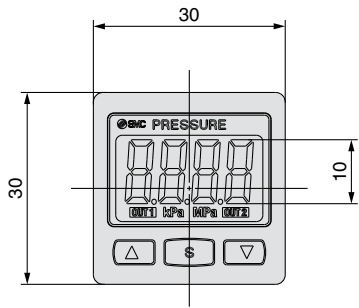
Copy function	Copies the settings of the master sensor to the slave sensors.
Auto-preset function	This function is to calculate a rough set-value automatically based on the on-going operation.
Display calibration function	Evens out deviations in the displayed value.
Peak display function	Can retain the maximum pressure value displayed during measurement.
Bottom display function	Can retain the minimum pressure value displayed during measurement.
Keylock function (Selectable secret code)	The key board can be locked to prevent any incorrect function of the operation switch.
Zero-clear function	The pressure display can be set at zero when the pressure is open to the atmosphere.
Anti-chattering function	Prevents possible malfunction due to sudden fluctuations in the primary pressure by adjusting the response time.
Unit display switching function	Can convert the display value.
Power-saving mode	Reduces power consumption.
Display resolution-switch function	Converts display resolution from the normal value of 1/1000 to 1/100. It reduces the monitor to flicker.

Series ISE30A

Dimensions

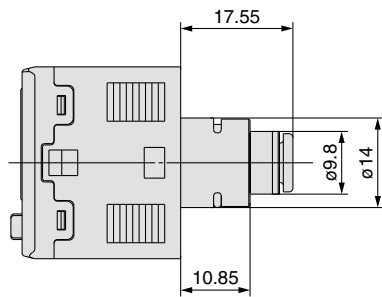


01 / N01



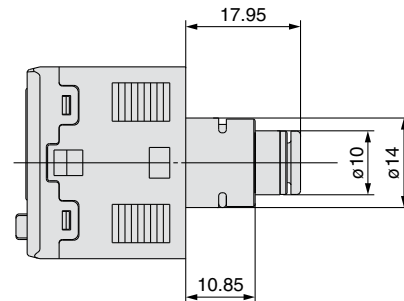
C4H

One-touch fitting $\varnothing 4$ mm
 $\varnothing 5/32$ inch straight



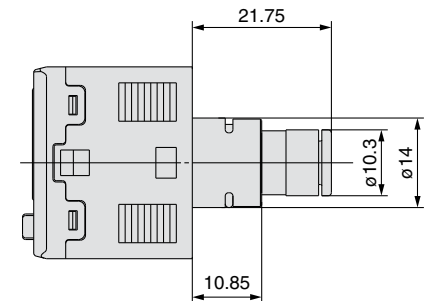
C6H

One-touch fitting $\varnothing 6$ mm
straight



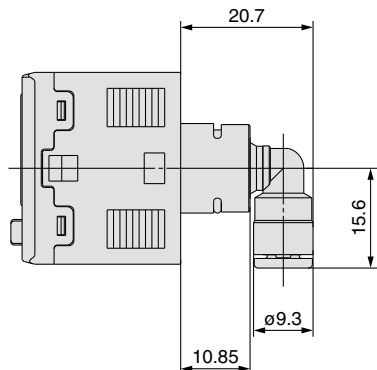
N7H

One-touch fitting $\varnothing 1/4$ inch
straight



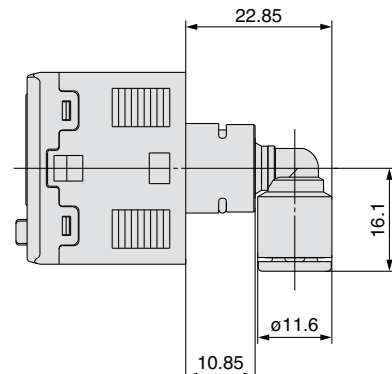
C4L

One-touch fitting $\varnothing 4$ mm
 $\varnothing 5/32$ inch elbow



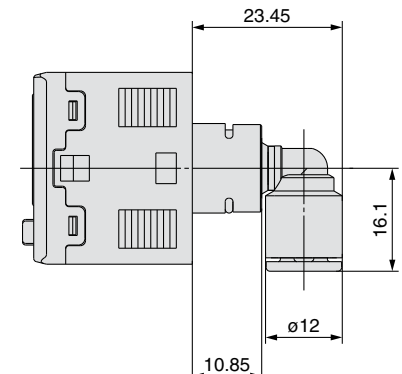
C6L

One-touch fitting $\varnothing 6$ mm
elbow



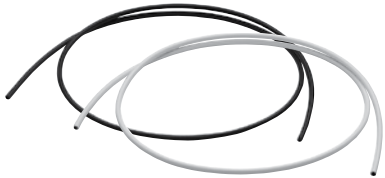
N7L

One-touch fitting $\varnothing 1/4$ inch
elbow



Tubing/Fittings/Speed Control Equipment

Piping Equipment



Flame Resistant FR Three-layer Polyurethane Tubing
Series TRTU Page 111



Metal One-touch Fittings
(Metric size, Inch size/Connection thread: M, R, Rc, UNF, NPT, G)
Series KQB2 Page 113

Speed Control Equipment



Speed Controller: Elbow Type (Metal Body)
Series AS Page 132

Flame Resistant (Equivalent to UL-94 Standard V-0) FR Three-layer Polyurethane Tubing

Series TRTU

Improved spatter resistance

RoHS

Spatter resistance is **twice** that of FR double layer polyurethane tubing TRBU series. * In SMC conditions

For general pneumatic and water piping in environments exposed to sparks from arc welding, etc.

Spatter resistance is improved by installing an aluminum layer between the outer layer and inner tube.

Three-layer design

Outer layer Flame resistant polyolefin (Equivalent to UL-94 standard V-0)

Middle layer Aluminum laminated film

Inner tube Polyurethane

6-color variations



Model

● — 20 m roll □ — 100 m reel

Model	TRTU0604	TRTU0805	TRTU1065	TRTU1208
Inner tube O.D. (mm)	6	8	10	12
Inner tube I.D. (mm)	4	5	6.5	8
Outer layer thickness (mm)	1	1	1	1
Outer layer color	Black (B)	●	●	●
	White (W)	●	●	●
	Red (R)	●	●	●
	Blue (BU)	●	●	●
	Yellow (Y)	●	●	●
	Green (G)	●	●	●

Flame Resistant (Equivalent to UL-94 Standard V-0) FR Three-layer Polyurethane Tubing Series **TRTU**

RoHS

Spatter Resistant Cylinders
for Arc Welding

Clamp Cylinders

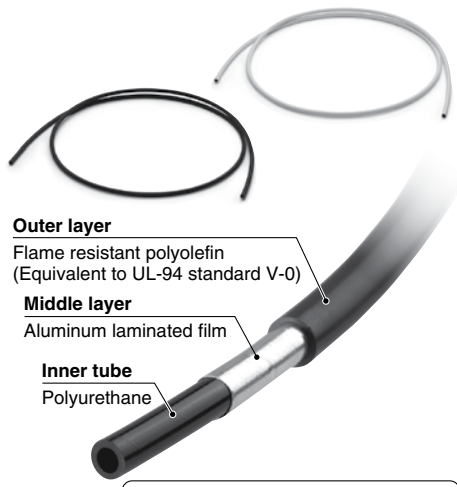
Gas/Air Switching Valve

Detection Switches

Tubing

Fittings

Speed Control Equipment



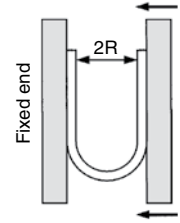
Outer layer
Flame resistant polyolefin
(Equivalent to UL-94 standard V-0)

Middle layer
Aluminum laminated film

Inner tube
Polyurethane

For general pneumatic and water piping in environments exposed to sparks from arc welding, etc.

How to measure the minimum bending radius



Bend the tube into a U shape at a temperature of 20°C. Fix one end and bend the loop gradually. Measure 2R when the deformed ratio of the tube diameter at bending reaches 5%.

Model

● — 20 m roll □ — 100 m reel

Model	TRTU0604	TRTU0805	TRTU1065	TRTU1208
Inner tube O.D. (mm)	6	8	10	12
Inner tube I.D. (mm)	4	5	6.5	8
Outer layer thickness (mm)	1	1	1	1

Outer layer color	Note 3)				
	Black (B)	●	●	●	●
	White (W)	●	●	●	●
	Red (R)	●	●	●	●
	Blue (BU)	●	●	●	●
	Yellow (Y)	●	●	●	●
Green (G)	●	●	●	●	

Specifications

Fluid ^{Note 1)}	Air, Water			
Applicable fittings	FR One-touch fittings: Series KR-W2 Metal One-touch fittings: Series KQB2			
Max. operating pressure °F (°C)	At 68 (20)	116 psi (0.8 MPa)		
	At 104 (40)	94 psi (0.65 MPa)		
	At 140 (60)	73 psi (0.5 MPa)		
Burst pressure	Refer to the burst pressure characteristics curve.			
Min. bending radius (mm) ^{Note 2)}	50	60	70	80
Ambient and fluid temperature	-4 to 140°F (-20 to 60°C), Water: 32 to 104°F (0 to 40°C) (No freezing)			
Material	Inner tube	Polyurethane		
	Middle layer	Aluminum laminated film		
	Outer layer	Polyolefin (Equivalent to UL-94 standard V-0)		

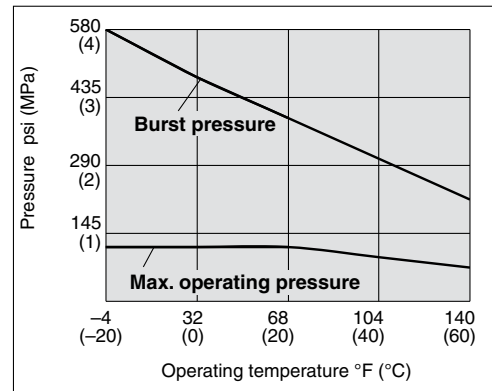
Note 1) Applicable for general industrial water. Please consult with SMC if using for the other kind of fluid. Also, the surge pressure must be under the maximum operating pressure.

If the surge pressure exceeds the maximum operating pressure, it will result in damage to fittings and tubes.

Note 2) The minimum bending radius is the representative value measured as shown in the left figure. Allow extra length when piping since the tube may be bent if used under the minimum bending radius.

Note 3) The color of all inner tubes is black.

Burst Pressure Characteristics Curve and Operating Pressure



How to Order

TRTU1065 B - 20

Tubing model

Model	Inner tube O.D. x I.D. (mm)
TRTU0604	6 x 4
TRTU0805	8 x 5
TRTU1065	10 x 6.5
TRTU1208	12 x 8

Color

Symbol	Color
B	Black
W	White
R	Red
BU	Blue
Y	Yellow
G	Green

Length per roll

Symbol	Length
20	20 m roll
100	100 m reel



Metal One-touch Fittings

Series KQB2

RoHS

Compact and lightweight

Configuration variations

17 models

○ All metal except seal parts

Fluid temperature

-23 to 302°F
(-5 to 150°C)

○ Material

Metal parts: Brass, Stainless steel

Connection thread

M, R, Rc, UNF, NPT, G

Seal parts: Special FKM

Variations

Connection thread	Applicable tubing O.D. (mm)					
	ø4	ø6	ø8	ø10	ø12	ø16
M5	●	●				
R1/8	●	●	●	●		
G1/8	●	●	●	●		
R1/4	●	●	●	●	●	
G1/4	●	●	●	●	●	
R3/8		●	●	●	●	●
G3/8		●	●	●	●	●
R1/2			●	●	●	●
G1/2			●	●	●	●
No thread	●	●	●	●	●	●

Connection thread	Applicable tubing O.D. (inch)					
	ø1/8"	ø5/32"	ø1/4"	ø5/16"	ø3/8"	ø1/2"
10-32 UNF	●	●	●			
NPT1/8	●	●	●	●	●	
NPT1/4	●	●	●	●	●	●
NPT3/8			●	●	●	●
NPT1/2				●	●	●
No thread	●	●	●	●	●	●



Variations

Male Connector **KQB2H**



Metric
R thread ... P. 116
G thread ... P. 129
Inch ... P. 123

Bulkhead Union **KQB2E**



Metric ... P. 118
Inch ... P. 125

Different Diameter Union "Y" **KQB2U**



Metric ... P. 119
Inch ... P. 126

Hexagon Socket Head Male Connector **KQB2S**



Metric
R thread ... P. 116
G thread ... P. 129
Inch ... P. 123

Union Tee **KQB2T**



Metric ... P. 118
Inch ... P. 125

Bulkhead Connector **KQB2E**



Metric
Rc thread ... P. 120
G thread ... P. 131
Inch ... P. 126

Straight Union **KQB2H**



Metric ... P. 116
Inch ... P. 123

Union "Y" **KQB2U**



Metric ... P. 118
Inch ... P. 125

Extended Male Elbow **KQB2W**



Metric
R thread ... P. 120
G thread ... P. 131
Inch ... P. 126

Male Elbow **KQB2L**



Metric
R thread ... P. 117
G thread ... P. 130
Inch ... P. 124

Different Diameter Tee **KQB2T**



Metric ... P. 119
Inch ... P. 125

Female Connector **KQB2F**



Metric
Rc thread ... P. 121
G thread ... P. 131
Inch ... P. 127

Male Branch Tee **KQB2T**



Metric
R thread ... P. 117
G thread ... P. 130
Inch ... P. 124

Plug-in Reducer **KQB2R**



Metric ... P. 119
Inch ... P. 125

Plug **KQB2P**



Metric ... P. 121
Inch ... P. 127

Union Elbow **KQB2L**



Metric ... P. 118
Inch ... P. 124

Different Diameter Straight **KQB2H**



Metric ... P. 119
Inch ... P. 126

Spatter Resistant Cylinders
for Arc Welding

Clamp Cylinders

Gas/Air Switching Valve

Detection Switches

Tubing

Fittings

Speed Control Equipment

Metal One-touch Fittings

Applicable Tubing: Metric Size, Connection Thread: M, R, Rc

Series **KQB2**

RoHS



Applicable Tubing

Tubing O.D.	ø4, ø6, ø8, ø10, ø12, ø16
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Specifications

Fluid	Air, Water
Operating pressure range ^{Note 1)}	-14.5 to 145 psi (-100 kPa to 1 MPa) ^{Note 2)}
Proof pressure	435 psi (3.0 MPa)
Ambient and fluid temperature ^{Note 3)}	23 to 302 °F (-5 to 150°C) (No freezing) ^{Note 2)}
Lubricant	Grease-free specification
Seal on the threads	With sealant

Note 1) Avoid using in a vacuum holding application such as a leak tester, since there is leakage.

Note 2) Check the operating pressure range and operating temperature range of the tubing.

Note 3) It is recommended that you use the inner sleeve in the following conditions:

- When using in an environment where the fluid temperature changes drastically.
- When using at a high temperature.

* Temperature Condition of Mounting the Inner Sleeve

Tubing	Temperature
FEP tubing/Series TH	176°F (80°C) or more
PFA tubing/Series TL	248°F (120°C) or more

Spare Parts

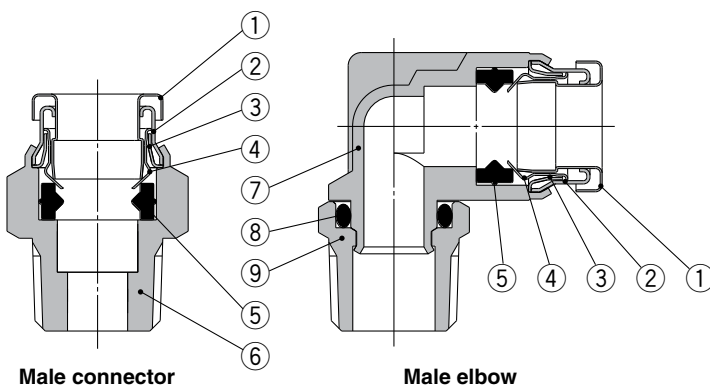
Description	Tubing O.D.	Part no.	Material
Gasket	—	M-5G3	Stainless steel 316, Special FKM
Bulkhead nut	ø4	KQB223-P01	C3604 (Electroless nickel plating)
	ø6	KQB206-P01	
	ø8	KQB208-P01	
	ø10	KQB210-P01	
	ø12	KQB212-P01	
	ø16	KQB216-P01	

Cross Reference Table of the Inner Sleeve

Tubing O.D.	Tubing material		Applicable inner sleeve	
	TH/TH (FEP)	TL/TIL (PFA)	Part no.	Length
ø4	TH0402	—	TJ-0402	18
	TH0425	—	TJ-0425	18
ø6	—	TL0403	TJ-0403	18
	TH0604	TL0604	TJ-0604	19
ø8	—	—	TJ-0805	20.5
	TH0806	TL0806	TJ-0806	20.5
ø10	—	—	TJ-1065	23
	TH1075	—	TJ-1075	23
	TH1008	TL1008	TJ-1008	24
	—	—	TJ-1008	24
ø12	—	—	TJ-1209	24
	TH1209	—	TJ-1209	24
	TH1210	TL1210	TJ-1210	24

* C2700 + Electroless nickel plating is used for the TJ series.

Construction



Component Parts

No.	Description	Material
1	Release button	Stainless steel 304
2	Guide 1	Stainless steel 304
3	Guide 2	Stainless steel 304
4	Chuck	Stainless steel 304
5	Seal	Special FKM (Fluoro coated)
6	Male connector body	C3604 (Electroless nickel plating)
7	Male elbow body	Stainless steel 316
8	O-ring	Special FKM (Fluoro coated)
9	Stud	C3604 (Electroless nickel plating)

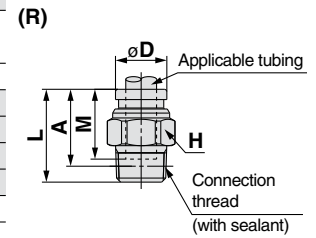
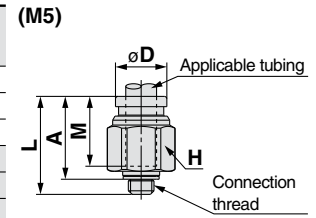
Dimensions

Male Connector: KQB2H



Applicable tubing O.D. (mm)	Connection thread R, M	Model	H (Width across flat)	Note 1) ϕD	L	A*	M	Note 2) Effective area (mm ²)	Weight (g)	
$\phi 4$	M5 x 0.8	KQB2H04-M5	10	8.7	17.1	14.1	12.6	4	5.3	
	1/8	KQB2H04-01S	10		15.3	12.2		5.6	5.6	
	1/4	KQB2H04-02S	14		20.9	16.2		17.2	17.2	
$\phi 6$	M5 x 0.8	KQB2H06-M5	12	11.1	19.1	16.1	13.6	4	8	
	1/8	KQB2H06-01S	12		18.1	15		7.3	7.3	
	1/4	KQB2H06-02S	14		20.8	16.1		13.1	15.2	
	3/8	KQB2H06-03S	17		23	17.9		28.8	28.8	
$\phi 8$	1/8	KQB2H08-01S	14	13.4	24.5	21.4	16.1	26.1	13.5	
	1/4	KQB2H08-02S	14		22.3	17.6			26	26
	3/8	KQB2H08-03S	17		23.7	18.6			26.1	19.8
$\phi 10$	1/8	KQB2H10-01S	17	16.4	25.5	22.4	17	41.5	19.8	
	1/4	KQB2H10-02S	17		27.9	23.2			22.7	22.7
	3/8	KQB2H10-03S	22		23	17.9			21.6	21.6
	1/2	KQB2H10-04S	22		28.6	22.2			53.9	53.9
$\phi 12$	1/4	KQB2H12-02S	19	18.5	30.5	25.8	18.6	58.3	28.8	
	3/8	KQB2H12-03S	19		24.7	19.6			21.5	21.5
	1/2	KQB2H12-04S	22		28.7	22.3			47	47
$\phi 16$	3/8	KQB2H16-03S	24	24.6	33.6	28.5	20.8	81	48.3	
	1/2	KQB2H16-04S	24		29.5	23.1			113	39.2

* Reference dimensions after installation of R thread
 Note 1) ϕD is maximum diameter.
 Note 2) Value of FEP tubing.
 Value of nylon tubing for $\phi 16$ only.

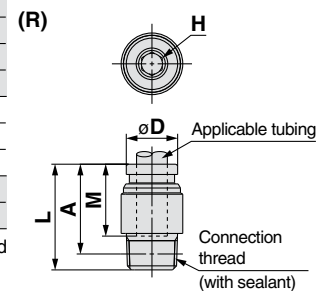
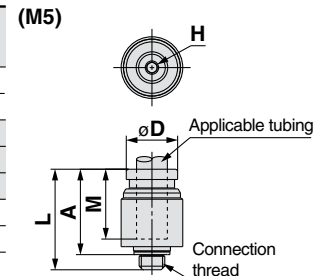


Hexagon Socket Head Male Connector: KQB2S



Applicable tubing O.D. (mm)	Connection thread R, M	Model	H (Width across flat)	Note 1) ϕD	L	A*	M	Note 2) Effective area (mm ²)	Weight (g)	
$\phi 4$	M5 x 0.8	KQB2S04-M5	2	9	17.1	14.1	12.6	4	3.9	
	1/8	KQB2S04-01S	3	10	20.4	17.3		4.1	7.9	
$\phi 6$	M5 x 0.8	KQB2S06-M5	2	12	19.6	16.6	13.6	4	7.8	
	1/8	KQB2S06-01S	4		20.6	17.5		10	9.1	
	1/4	KQB2S06-02S	14		15.9	10.7		14.7		
$\phi 8$	1/8	KQB2S08-01S	5	14	24.7	21.6	16.1	23.3	17.2	
	1/4	KQB2S08-02S	5		22.9	18.2			13	13.5
	3/8	KQB2S08-03S	6		17	23.1			18	24
$\phi 10$	1/8	KQB2S10-01S	5	17	25.6	22.5	17	39	17.2	
	1/4	KQB2S10-02S	8		27.5	22.8			20	20
	3/8	KQB2S10-03S	8		24	18.9			22	22
	1/2	KQB2S10-04S	22		17.6	39.2			39.2	
$\phi 12$	1/4	KQB2S12-02S	8	19	30.6	25.9	18.6	60	46	
	3/8	KQB2S12-03S	10		24.9	19.8			20.2	20.2
	1/2	KQB2S12-04S	10		24.9	18.5			35.3	35.3
$\phi 16$	3/8	KQB2S16-03S	10	24.6	33.2	28.1	20.8	81	43.6	
	1/2	KQB2S16-04S	12		29.4	23			113	40.3

* Reference dimensions after installation of R thread
 Note 1) ϕD is maximum diameter.
 Note 2) Value of FEP tubing.
 Value of nylon tubing for $\phi 16$ only.

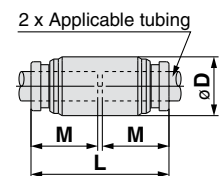


Straight Union: KQB2H



Applicable tubing O.D. (mm)	Model	ϕD Note 1)	L	M	Note 2) Effective area (mm ²)	Weight (g)
$\phi 4$	KQB2H04-00	9	26.2	12.6	5.6	6.8
$\phi 6$	KQB2H06-00	12	28.2	13.6	13.1	12
$\phi 8$	KQB2H08-00	14	33.2	16.1	26.1	17.4
$\phi 10$	KQB2H10-00	17	35	17	41.5	27.2
$\phi 12$	KQB2H12-00	19	38.2	18.6	58.3	33.7
$\phi 16$	KQB2H16-00	24.6	42.6	20.8	113	56.1

Note 1) ϕD is maximum diameter.
 Note 2) Value of FEP tubing.
 Value of nylon tubing for $\phi 16$ only.



Series KQB2

Applicable Tubing: Metric Size, Connection Thread: M, R, Rc

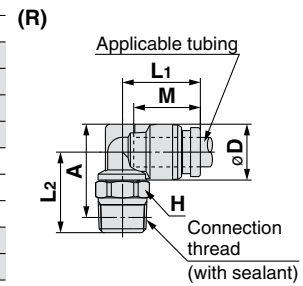
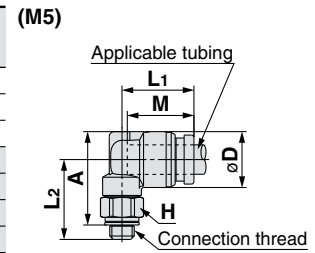
Dimensions

Male Elbow: KQB2L



Applicable tubing O.D. (mm)	Connection thread R, M	Model	H (Width across flat)	Note 1) ϕD	L1	L2	A*	M	Note 2) Effective area (mm ²)	Weight (g)
$\phi 4$	M5 x 0.8	KQB2L04-M5	8	9.1	13.7	15.2	16.8	12.6	3.5	7
	1/8	KQB2L04-01S	10		14.4	15.3	16.7		4.2	8.6
	1/4	KQB2L04-02S	14		19.1	18.9	17.5			
$\phi 6$	M5 x 0.8	KQB2L06-M5	8	11.4	14.7	16.3	19	13.6	3.5	9
	1/8	KQB2L06-01S	10		15.9	16.4			10.2	
	1/4	KQB2L06-02S	14			20.2	21.2		19.1	
	3/8	KQB2L06-03S	17		21.6	22.2	31.2			
$\phi 8$	1/8	KQB2L08-01S	12	13.7	18.6	18.3	22	16.1	21.6	14.8
	1/4	KQB2L08-02S	14		19.1	21.5	23.6		20.8	
	3/8	KQB2L08-03S	17		22.9	24.6	32.8			
$\phi 10$	1/8	KQB2L10-01S	12	16.6	20	19.7	24.9	17	21.6	20.4
	1/4	KQB2L10-02S	14		21	22.9	26.5		23.7	
	3/8	KQB2L10-03S	17			24.3	27.5	34.5		
	1/2	KQB2L10-04S	22		28.5	30.4	62.6			
$\phi 12$	1/4	KQB2L12-02S	14	18.7	22.6	24	28.6	18.6	50.2	27.4
	3/8	KQB2L12-03S	17		23.6	25.3	29.5		34.3	
	1/2	KQB2L12-04S	22			29.5	32.4		60.8	
$\phi 16$	3/8	KQB2L16-03S	19	24.6	26.3	28	34.5	20.8	71	47
	1/2	KQB2L16-04S	22		27.3	31.8	37		100	62.6

* Reference dimensions after installation of R thread
 Note 1) ϕD is maximum diameter.
 Note 2) Value of FEP tubing.
 Value of nylon tubing for $\phi 16$ only.

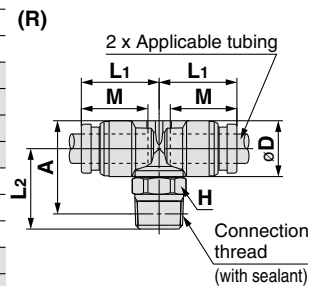
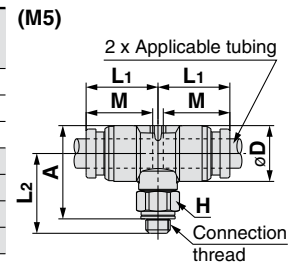


Male Branch Tee: KQB2T



Applicable tubing O.D. (mm)	Connection thread R, M	Model	H (Width across flat)	Note 1) ϕD	L1	L2	A*	M	Note 2) Effective area (mm ²)	Weight (g)
$\phi 4$	M5 x 0.8	KQB2T04-M5	8	9.1	13.7	15.2	16.8	12.6	4.5	9.1
	1/8	KQB2T04-01S	10		14.4	15.3	16.7		6	10.6
	1/4	KQB2T04-02S	14		19.1	18.9	19.4			
$\phi 6$	M5 x 0.8	KQB2T06-M5	8	11.4	14.7	16.3	19	13.6	4.5	12.1
	1/8	KQB2T06-01S	10		15.9	16.4			13.6	
	1/4	KQB2T06-02S	14			20.2	21.2		22.5	
	3/8	KQB2T06-03S	17		21.6	22.2	35			
$\phi 8$	1/8	KQB2T08-01S	12	13.7	18.6	18.3	22	16.1	26.3	20
	1/4	KQB2T08-02S	14		19.1	21.5	23.6		26.1	
	3/8	KQB2T08-03S	17		22.9	24.6	38			
$\phi 10$	1/8	KQB2T10-01S	12	16.6	20	19.7	24.9	17	40.8	28.6
	1/4	KQB2T10-02S	14		21	22.9	26.5		31.5	
	3/8	KQB2T10-03S	17			24.3	27.5	42.4		
	1/2	KQB2T10-04S	22		28.5	30.4	70.4			
$\phi 12$	1/4	KQB2T12-02S	14	18.7	22.6	24	28.6	18.6	57.2	38.1
	3/8	KQB2T12-03S	17		23.6	25.3	29.5		39.7	
	1/2	KQB2T12-04S	22			29.5	32.4		70.8	
$\phi 16$	3/8	KQB2T16-03S	19	24.6	26.3	28	34.5	20.8	71	64.4
	1/2	KQB2T16-04S	22		27.3	31.8	37		100	79

* Reference dimensions after installation of R thread
 Note 1) ϕD is maximum diameter.
 Note 2) Value of FEP tubing.
 Value of nylon tubing for $\phi 16$ only.



Metal One-touch Fittings *Series KQB2*

Applicable Tubing: Metric Size, Connection Thread: M, R, Rc

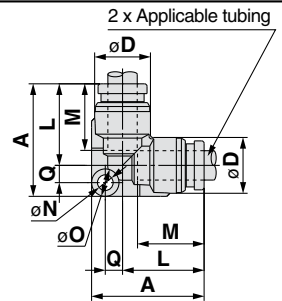
Dimensions

Union Elbow: KQB2L



Applicable tubing O.D. (mm)	Model	Note 1) ϕD	L	A	Q	M	ϕN	ϕO	Note 2) Effective area (mm ²)	Weight (g)
$\phi 4$	KQB2L04-00	9.1	14.6	20.5	3.1	12.6	3.2	5.6	4.2	7.4
$\phi 6$	KQB2L06-00	11.4	16.6	23	3.6	13.6	3.2	5.6	11.4	11
$\phi 8$	KQB2L08-00	13.7	20.1	29.1	5	16.1	4.2	8	21.6	20.2
$\phi 10$	KQB2L10-00	16.6	22	31.7	5.7	17	4.2	8	35.2	29.6
$\phi 12$	KQB2L12-00	18.7	24.6	35	6.4	18.6	4.2	8	50.2	37.1
$\phi 16$	KQB2L16-00	24.6	28.8	40.5	7.7	20.8	4.2	8	100	59.7

Note 1) ϕD is maximum diameter.
 Note 2) Value of FEP tubing.
 Value of nylon tubing for $\phi 16$ only.

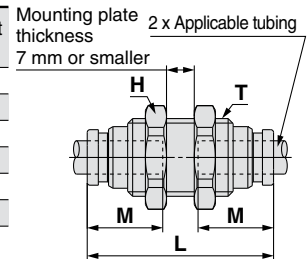


Bulkhead Union: KQB2E



Applicable tubing O.D. (mm)	Model	T (M)	H (Width across flat)	L	Mounting hole	M	Note 2) Effective area (mm ²)	Weight (g)
$\phi 4$	KQB2E04-00	M10 x 1	12	32.4	11	12.6	5.6	14.7
$\phi 6$	KQB2E06-00	M14 x 1	17	35.4	15	13.6	13.1	29.2
$\phi 8$	KQB2E08-00	M15 x 1	19	38.8	16	16.1	26.1	34.9
$\phi 10$	KQB2E10-00	M18 x 1	21	40	19	17	41.5	47.1
$\phi 12$	KQB2E12-00	M20 x 1	24	42.4	21	18.6	58.3	58.7
$\phi 16$	KQB2E16-00	M27 x 1	30	46.8	28	20.8	113	107.2

Note) Value of FEP tubing.
 Value of nylon tubing for $\phi 16$ only.

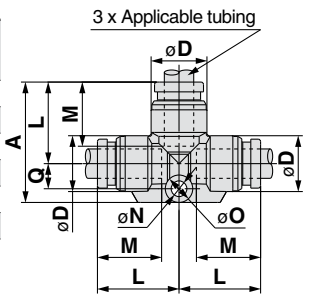


Union Tee: KQB2T



Applicable tubing O.D. (mm)	Model	Note 1) ϕD	L	A	Q	M	ϕN	ϕO	Note 2) Effective area (mm ²)	Weight (g)
$\phi 4$	KQB2T04-00	9.1	14.6	21.8	4.4	12.6	3.2	5.6	6.4	9.5
$\phi 6$	KQB2T06-00	11.4	16.6	24.6	5.2	13.6	3.2	5.6	13.4	14.2
$\phi 8$	KQB2T08-00	13.7	20.1	31.1	7	16.1	4.2	8	25.6	24.4
$\phi 10$	KQB2T10-00	16.6	22	34	8	17	4.2	8	40	36.8
$\phi 12$	KQB2T12-00	18.7	24.6	37.7	9.1	18.6	4.2	8	57.4	47
$\phi 16$	KQB2T16-00	24.6	28.8	43.4	10.6	20.8	4.2	8	100	75.5

Note 1) ϕD is maximum diameter.
 Note 2) Value of FEP tubing.
 Value of nylon tubing for $\phi 16$ only.

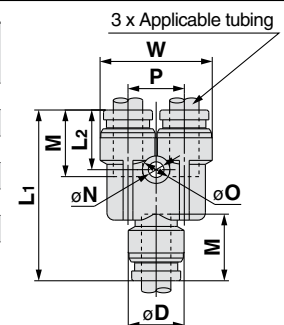


Union "Y": KQB2U



Applicable tubing O.D. (mm)	Model	Note 1) ϕD	W	L ₁	L ₂	P	M	ϕN	ϕO	Note 2) Effective area (mm ²)	Weight (g)
$\phi 4$	KQB2U04-00	9.1	18.2	30.4	11.3	9.1	12.6	3.2	5.6	4.2	11.1
$\phi 6$	KQB2U06-00	11.4	22.9	34.9	12.2	11.5	13.6	3.2	5.6	13.4	18.8
$\phi 8$	KQB2U08-00	13.7	28.3	40.1	14.1	14.6	16.1	4.2	8	25.6	29.7
$\phi 10$	KQB2U10-00	16.6	34.2	44	14.4	17.6	17	4.2	8	40	47.4
$\phi 12$	KQB2U12-00	18.7	38.5	48.4	15.8	19.8	18.6	4.2	8	57.4	62.1
$\phi 16$	KQB2U16-00	24.6	49.3	56.6	17.3	26	20.8	4.2	8	113	110.2

Note 1) ϕD is maximum diameter.
 Note 2) Value of FEP tubing.
 Value of nylon tubing for $\phi 16$ only.



Spatter Resistant Cylinders for Arc Welding

Clamp Cylinders

Gas/Air Switching Valve

Detection Switches

Tubing

Fittings

Speed Control Equipment

Series KQB2

Applicable Tubing: Metric Size, Connection Thread: M, R, Rc

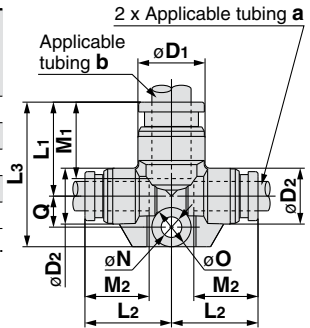
Dimensions

Different Diameter Tee: KQB2T



Applicable tubing O.D. (mm)		Model	Note 1) ϕD_1	Note 1) ϕD_2	L_1	L_2	L_3	Q	M_1	M_2	ϕN	ϕO	Note 2) Effective area (mm ²)	Weight (g)
a	b													
$\phi 4$	$\phi 6$	KQB2T04-06	11.4	9.1	15.6	15.7	22.8	4.4	13.6	12.6	3.2	5.6	7.1	11
$\phi 6$	$\phi 8$	KQB2T06-08	13.7	11.4	19.1	17.7	29.5	6.4	16.1	13.6	4.2	8	16.4	20
$\phi 8$	$\phi 10$	KQB2T08-10	16.6	13.7	21	21.2	32.1	7.1	17	16.1	4.2	8	36	29.8
$\phi 10$	$\phi 12$	KQB2T10-12	18.7	16.6	23.6	23.1	35.7	8.1	18.6	17	4.2	8	56	41.3
$\phi 12$	$\phi 16$	KQB2T12-16	24.6	18.7	26.8	26.7	39.9	9.1	20.8	18.6	4.2	8	108.5	58

Note 1) ϕD_1 , ϕD_2 are maximum diameters.
Note 2) Value of FEP tubing.

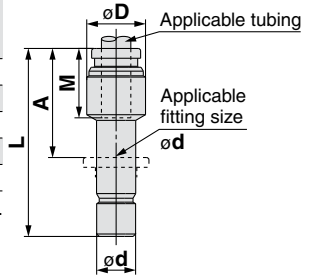


Plug-in Reducer: KQB2R



Applicable tubing O.D. (mm)	Applicable fitting size ϕd	Model	Note 1) ϕD	L	A	M	Note 2) Effective area (mm ²)	Weight (g)
$\phi 4$	$\phi 6$							
$\phi 4$	$\phi 6$	KQB2R04-06	9	34.4	20.8	12.6	5.6	7
$\phi 6$	$\phi 8$	KQB2R06-08	12	38.4	22.3	13.6	13.1	12.7
$\phi 8$	$\phi 10$	KQB2R08-10	14	41.9	24.9	16.1	26.1	19.2
$\phi 10$	$\phi 12$	KQB2R10-12	17	44.8	26.2	17	41.5	27.8
$\phi 12$	$\phi 16$	KQB2R12-16	19	42.9	22.1	18.6	58.3	37.2

Note 1) ϕD is maximum diameter.
Note 2) Value of FEP tubing.

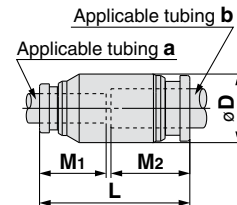


Different Diameter Straight: KQB2H



Applicable tubing O.D. (mm)		Model	ϕD Note 1)	L	M_1	M_2	Note 2) Effective area (mm ²)	Weight (g)
a	b							
$\phi 4$	$\phi 6$	KQB2H04-06	12	27.2	12.6	13.6	5.6	12.1
$\phi 6$	$\phi 8$	KQB2H06-08	14	30.7	13.6	16.1	13.1	17.1
$\phi 8$	$\phi 10$	KQB2H08-10	17	34.1	16.1	17	26.1	27.2
$\phi 10$	$\phi 12$	KQB2H10-12	19	36.6	17	18.6	41.5	34.8
$\phi 12$	$\phi 16$	KQB2H12-16	24.6	40.4	18.6	20.8	58.3	57.3

Note 1) ϕD is maximum diameter.
Note 2) Value of FEP tubing.

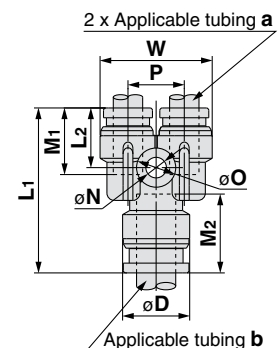


Different Diameter Union "Y": KQB2U



Applicable tubing O.D. (mm)		Model	Note 1) ϕD	L_1	L_2	P	W	M_1	M_2	ϕN	ϕO	Note 2) Effective area (mm ²)	Weight (g)
a	b												
$\phi 4$	$\phi 6$	KQB2U04-06	11.4	29.3	11.2	9.1	18.2	12.6	13.6	3.2	5.6	4.2	11.9
$\phi 6$	$\phi 8$	KQB2U06-08	13.7	33.7	12.2	11.5	22.9	13.6	16.1	4.2	8	13.4	19.3
$\phi 8$	$\phi 10$	KQB2U08-10	16.6	38.3	13.8	14.6	28.3	16.1	17	4.2	8	25.6	32
$\phi 10$	$\phi 12$	KQB2U10-12	18.7	43	14	17.6	34.2	17	18.6	4.2	8	40	47.6
$\phi 12$	$\phi 16$	KQB2U12-16	24.6	47.4	15.6	19.8	38.5	18.6	20.8	4.2	8	57.4	67.6

Note 1) ϕD is maximum diameter.
Note 2) Value of FEP tubing.

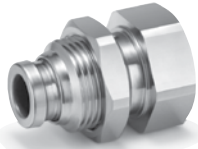


Metal One-touch Fittings *Series KQB2*

Applicable Tubing: Metric Size, Connection Thread: M, R, Rc

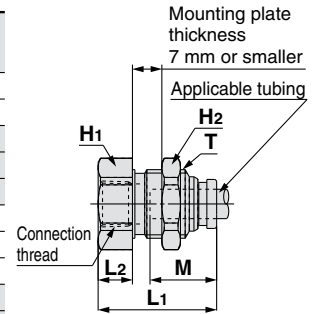
Dimensions

Bulkhead Connector: KQB2E



Applicable tubing O.D. (mm)	Connection thread Rc	Model	T (M)	Width across flat		L1	L2	Mounting hole	M	Note 1) Effective area (mm ²)	Weight (g)
				H1	H2						
ø4	1/8	KQB2E04-01	M10 x 1	14	12	25.8	9.7	11	12.6	5.6	16.9
	1/4	KQB2E04-02		17		30.9	14.8				27.1
ø6	1/8	KQB2E06-01	M14 x 1	17	17	24.2	6.1	15	13.6	13.1	25
	1/4	KQB2E06-02				31.6	13.5				33.2
	3/8	KQB2E06-03				33	14.9				34.8
ø8	1/8	KQB2E08-01	M15 x 1	17	19	26.3	6.9	16	16.1	26.1	28.7
	1/4	KQB2E08-02				32.4	13				34.2
	3/8	KQB2E08-03				34	14.6				35.9
ø10	1/4	KQB2E10-02	M18 x 1	19	21	31.6	11.6	19	17	41.5	44
	3/8	KQB2E10-03				33.6	13.6				40.2
ø12	3/8	KQB2E12-03	M20 x 1	21	24	34	12.8	21	18.6	58.3	52
	1/2	KQB2E12-04		24		39.6	18.4				62.5
ø16	3/8	KQB2E16-03	M27 x 1	29	30	35.3	11.2	28	20.8	96	111
	1/2	KQB2E16-04				40.6	16.5				113

Note 1) Value of FEP tubing.
Value of nylon tubing for ø16 only.

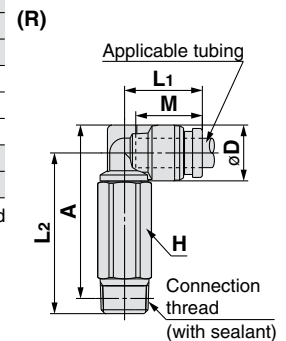
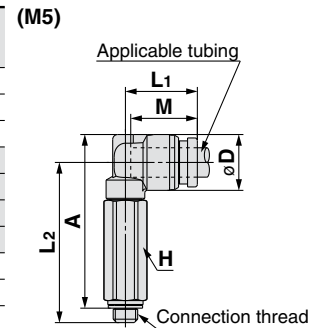


Extended Male Elbow: KQB2W



Applicable tubing O.D. (mm)	Connection thread R, M	Model	H (Width across flat)	Note 1) øD	L1	L2	A*	M	Note 2) Effective area (mm ²)	Weight (g)	
											ø4
ø4	1/8	KQB2W04-01S	10	14.4	31.7	33.1	4	16.2			
	1/4	KQB2W04-02S	14	35.5	35.3	35.6					
ø6	M5 x 0.8	KQB2W06-M5	8	11.4	14.7	32.7	35.4	13.6	3	16	
	1/8	KQB2W06-01S	10		32.8	17.8					
	1/4	KQB2W06-02S	14		36.6	37.6			37.2		
ø6	3/8	KQB2W06-03S	17	38	38.6	60.3					
	1/8	KQB2W08-01S	12	13.7	18.6	37	40.7	16.1	20.5	28.9	
	1/4	KQB2W08-02S	14		40.2	42.3	39.2				
3/8	KQB2W08-03S	17	19.1		41.6	43.3	63.7				
ø8	1/4	KQB2W10-02S	14	16.6	21	46.6	50.2	17	33.5	42.1	
	3/8	KQB2W10-03S	17			45.9	49.1			64.5	
	1/2	KQB2W10-04S	22			50.1	52			123	
ø10	1/4	KQB2W12-02S	14	18.7	23.6	22.6	47.7	52.3	18.6	47.7	46
	3/8	KQB2W12-03S	17			49	53.2	58.2			
	1/2	KQB2W12-04S	22			53.2	56.1	118			
ø16	3/8	KQB2W16-03S	19	24.6	27.3	26.3	57.6	64.1	20.8	71	89.6
	1/2	KQB2W16-04S	22			61.4	66.6	100			116

* Reference dimensions after installation of R thread
Note 1) øD is maximum diameter.
Note 2) Value of FEP tubing.
Value of nylon tubing for ø16 only.



Spatter Resistant Cylinders
for Arc Welding

Clamp Cylinders

Gas/Air Switching Valve

Detection Switches

Tubing

Fittings

Speed Control Equipment

Series KQB2

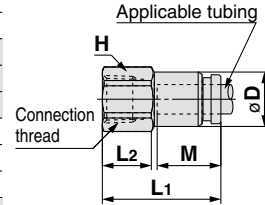
Applicable Tubing: Metric Size, Connection Thread: M, R, Rc

Dimensions

Female Connector: KQB2F



Applicable tubing O.D. (mm)	Connection thread Rc	Model	H (Width across flat)	Note 1) ϕD	L1	L2	M	Note 2) Effective area (mm ²)	Weight (g)
$\phi 4$	1/8	KQB2F04-01	12	8.7	23.7	9.8	12.6	5.6	9.7
	1/4	KQB2F04-02	17		28.7	13.2			22.7
$\phi 6$	1/8	KQB2F06-01	12	11.1	24.2	10	13.6	13.1	11.1
	1/4	KQB2F06-02	17		29.2	13.4			24.3
	3/8	KQB2F06-03	19		30.6	14.2			25.8
$\phi 8$	1/8	KQB2F08-01	14	13.4	26.3	9.6	16.1	26.1	17.1
	1/4	KQB2F08-02	17		31.3	13.7			26.8
	3/8	KQB2F08-03	19		32.7	14.4			28.4
$\phi 10$	1/4	KQB2F10-02	17	16.4	31.6	13.9	17	41.5	30.3
	3/8	KQB2F10-03	19		33	14.7			32
$\phi 12$	1/4	KQB2F12-02	19	18.5	32.6	13.3	18.6	58.3	39.4
	3/8	KQB2F12-03			34	14.7			33.9
	1/2	KQB2F12-04	24		39.3	18.4			52.9
$\phi 16$	3/8	KQB2F16-03	24	24.6	35.3	13.5	20.8	81	62.8
	1/2	KQB2F16-04			40.6	18.8		113	59.9



Note 1) ϕD is maximum diameter.

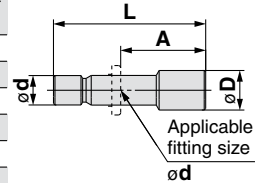
Note 2) Value of FEP tubing.

Value of nylon tubing for $\phi 16$ only.

Plug: KQB2P



Applicable fitting size ϕd	Model	ϕD	L	A	Weight (g)
$\phi 4$	KQB2P-04	6	29.6	17	4.3
$\phi 6$	KQB2P-06	8	30.8	17.2	9
$\phi 8$	KQB2P-08	10	33.7	17.6	16.3
$\phi 10$	KQB2P-10	12	34.6	17.6	25.4
$\phi 12$	KQB2P-12	14	36.5	17.9	37.8
$\phi 16$	KQB2P-16	18	38.6	17.8	69.2



Metal One-touch Fittings

Applicable Tubing: Inch Size, Connection Thread: UNF, NPT

Series **KQB2**

RoHS

Spatter Resistant Cylinders
for Arc Welding

Clamp Cylinders

Gas/Air Switching Valve

Detection Switches

Tubing

Fittings

Speed Control Equipment



Applicable Tubing

Tubing O.D.	$\phi 1/8"$, $\phi 5/32"$, $\phi 1/4"$, $\phi 5/16"$, $\phi 3/8"$, $\phi 1/2"$
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Specifications

Fluid	Air, Water
Operating pressure range ^{Note 1)}	-14.5 to 145 psi (-100 kPa to 1 MPa) ^{Note 2)}
Proof pressure	435 psi (3.0 MPa)
Ambient and fluid temperature ^{Note 3)}	23 to 302 °F (-5 to 150°C) (No freezing) ^{Note 2)}
Lubricant	Grease-free specification
Seal on the threads	With sealant

Note 1) Avoid using in a vacuum holding application such as a leak tester, since there is leakage.

Note 2) Check the operating pressure range and operating temperature range of the tubing.

Note 3) It is recommended that you use the inner sleeve in the following conditions (Except $\phi 1/8"$):

- When using in an environment where the fluid temperature changes drastically.
- When using at a high temperature.

* Temperature Condition of Mounting the Inner Sleeve

Tubing	Temperature
FEP tubing/Series TH	176°F (80°C) or more
Super PFA tubing/Series TL	248°F (120°C) or more

Spare Parts

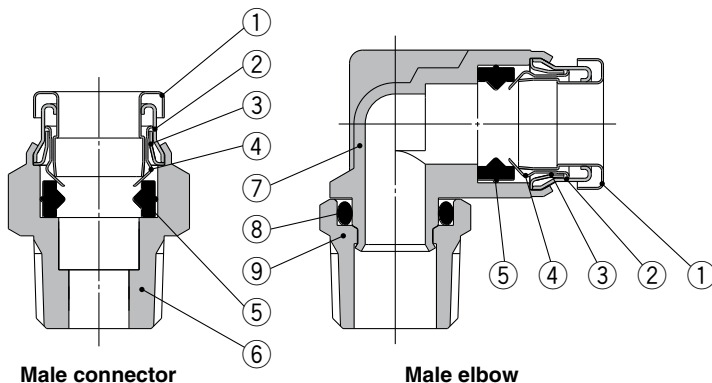
Description	Tubing O.D.	Part no.	Material
Gasket	—	M-5G3	Stainless steel 316, Special FKM
Bulkhead nut	$\phi 1/8"$ $\phi 5/32"$	KQB201-P01	C3604 (Electroless nickel plating)
	$\phi 1/4"$	KQB207-P01	
	$\phi 5/16"$	KQB209-P01	
	$\phi 3/8"$	KQB211-P01	
	$\phi 1/2"$	KQB213-P01	

Cross Reference Table of the Inner Sleeve

Tubing O.D.	Tubing material		Applicable inner sleeve	
	TH/THI (FEP)	TL/TIL (Super PFA)	Part no.	Length
$\phi 5/32"$	TH0402	—	TJ-0402	18
	TH0425	—	TJ-0425	18
	—	TL0403	TJ-0403	18
$\phi 1/4"$	TIHB07	TIL07	TJ-0604	19
	TIHA07	—	TJ-0746	19
$\phi 5/16"$	TH0806	TL0806	TJ-0806	20.5
$\phi 3/8"$	TIHB11	TIL11	TJ-1065	23
	TIHA11	—	TJ-1107	23
$\phi 1/2"$	TIH13	TIL13	TJ-1395	24

* C2700 + Electroless nickel plating is used for the TJ series.

Construction



Component Parts

No.	Description	Material
1	Release button	Stainless steel 304
2	Guide 1	Stainless steel 304
3	Guide 2	Stainless steel 304
4	Chuck	Stainless steel 304
5	Seal	Special FKM (Fluoro coated)
6	Male connector body	C3604 (Electroless nickel plating)
7	Male elbow body	Stainless steel 316
8	O-ring	Special FKM (Fluoro coated)
9	Stud	C3604 (Electroless nickel plating)

Series KQB2

Applicable Tubing: Inch Size, Connection Thread: UNF, NPT

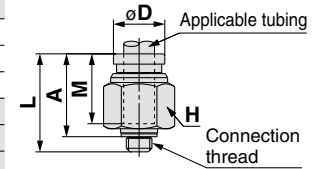
Dimensions

Male Connector: KQB2H

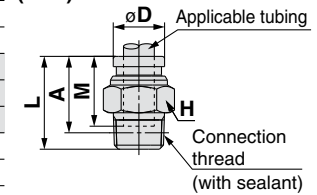


Applicable tubing O.D. (inch)	Connection thread UNF, NPT	Model	H (Width across flat)	Note 1) ϕD	L	A*	M	Note 2) Effective area (mm ²)	Weight (g)
$\phi 1/8$ "	10-32UNF	KQB2H01-32	8	8	16.5	13.5	12	3	3.5
	1/8	KQB2H01-N01S	11.11		17.1	13.9			7.9
	1/4	KQB2H01-N02S	14.29		20.9	16.5			18
$\phi 5/32$ "	10-32UNF	KQB2H03-32	11.11	8.7	17.1	14.1	12.6	4	6.5
	1/8	KQB2H03-N01S			17	13.8			7.4
	1/4	KQB2H03-N02S			20.9	16.5			17.5
$\phi 1/4$ "	10-32UNF	KQB2H07-32	12.7	11.2	19	16	13.5	4	9
	1/8	KQB2H07-N01S			20	16.8			9.8
	1/4	KQB2H07-N02S			20.6	16.2			15.1
	3/8	KQB2H07-N03S			23.8	19.1			31
$\phi 5/16$ "	1/8	KQB2H09-N01S	14.29	13.4	24.2	21	16.1	26.1	13.8
	1/4	KQB2H09-N02S			23.1	18.7			14.9
	3/8	KQB2H09-N03S			24.6	19.9			28.3
$\phi 3/8$ "	1/8	KQB2H11-N01S	17.46	16	25	21.8	16.6	26.1	21.5
	1/4	KQB2H11-N02S			26.3	21.9			22.3
	3/8	KQB2H11-N03S			23.6	18.9			24.4
	1/2	KQB2H11-N04S			28.3	21.9			55
$\phi 1/2$ "	1/4	KQB2H13-N02S	22.23	19.3	30.5	26.1	18.5	58.3	39.4
	3/8	KQB2H13-N03S			28.4	23.7			36.8
	1/2	KQB2H13-N04S			22	22			46.1

(10-32UNF)



(NPT)



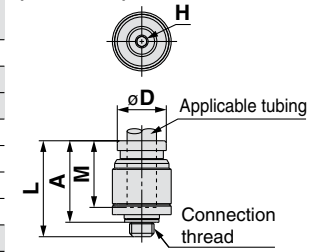
* Reference dimensions after installation of NPT thread
 Note 1) ϕD is maximum diameter.
 Note 2) Value of FEP tubing.

Hexagon Socket Head Male Connector: KQB2S

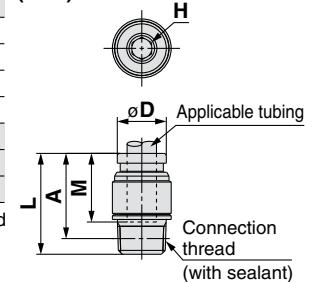


Applicable tubing O.D. (inch)	Connection thread UNF, NPT	Model	H (Width across flat)	Note 1) ϕD	L	A*	M	Note 2) Effective area (mm ²)	Weight (g)
$\phi 1/8$ "	10-32UNF	KQB2S01-32	2	9	16.5	13.5	12	3	3.9
$\phi 5/32$ "	10-32UNF	KQB2S03-32	2	9	17.1	14.1	12.6	4	3.9
	1/8	KQB2S03-N01S	2.78	11	21.4	18.2		4.1	8.9
$\phi 1/4$ "	10-32UNF	KQB2S07-32	2	12	19.5	16.5	13.5	4	7.5
	1/8	KQB2S07-N01S	4.76	14	20.5	17.3		10	8.5
	1/4	KQB2S07-N02S			21.5	16.8		10.7	14.1
	3/8	KQB2S07-N03S			18	16.8		23.8	
1/8	KQB2S09-N01S	5.56			14	24.7	21.5	17.2	12.6
$\phi 5/16$ "	1/4	KQB2S09-N02S	6.35	18	23.1	18.7	16.1	23.3	13.4
	3/8	KQB2S09-N03S			18.4	24.7			24.7
	1/8	KQB2S11-N01S			5.56	17			25.2
$\phi 3/8$ "	1/4	KQB2S11-N02S	6.35	18	27.1	22.7	16.6	39	22.2
	3/8	KQB2S11-N03S			23.6	18.9			25
	1/2	KQB2S11-N04S			22	17.2			40.6
	1/4	KQB2S13-N02S			8	20			30.5
3/8	KQB2S13-N03S	9.53	20	29.4	24.7	30.4			
1/2	KQB2S13-N04S	22	25.5	19.1	36.5				

(10-32UNF)



(NPT)



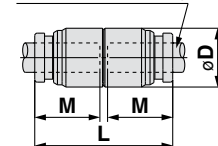
* Reference dimensions after installation of NPT thread
 Note 1) ϕD is maximum diameter.
 Note 2) Value of FEP tubing.

Straight Union: KQB2H



Applicable tubing O.D. (inch)	Model	ϕD Note 1)	L	M	Note 2) Effective area (mm ²)	Weight (g)
$\phi 1/8$ "	KQB2H01-00	9	25	12	3.4	6.8
$\phi 5/32$ "	KQB2H03-00	9	26.2	12.6	5.6	6.8
$\phi 1/4$ "	KQB2H07-00	12	28	13.5	13.1	11.5
$\phi 5/16$ "	KQB2H09-00	14	33.2	16.1	26.1	17.4
$\phi 3/8$ "	KQB2H11-00	16	34.2	16.6	41.5	23.7
$\phi 1/2$ "	KQB2H13-00	20	38	18.5	58.3	37

2 x Applicable tubing



Note 1) ϕD is maximum diameter.
 Note 2) Value of FEP tubing.

Metal One-touch Fittings *Series KQB2*

Applicable Tubing: Inch Size, Connection Thread: UNF, NPT

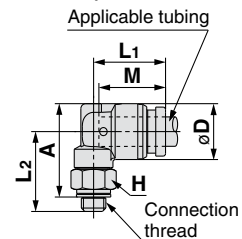
Dimensions

Male Elbow: KQB2L

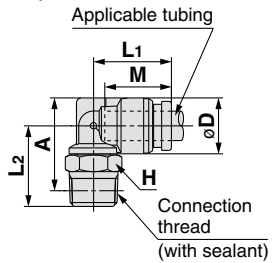
Applicable tubing O.D. (inch)	Connection thread UNF, NPT	Model	H (Width across flat)	Note 1) ϕD	L1	L2	A*	M	Note 2) Effective area (mm ²)	Weight (g)
$\phi 1/8"$	10-32UNF	KQB2L01-32	8	8.3	13.1	14.8	16	12	2.6	6.5
	1/8	KQB2L01-N01S	11.11		13.6	14.9	15.8		3	8.8
	1/4	KQB2L01-N02S	14.29		18.7	18.4	17.7			
$\phi 5/32"$	10-32UNF	KQB2L03-32	8	9.1	13.7	15.2	16.8	12.6	3.5	7
	1/8	KQB2L03-N01S	11.11		14.4	15.3	16.6		4.2	9.7
	1/4	KQB2L03-N02S	14.29		19.1	19.2	18.5			
$\phi 1/4"$	10-32UNF	KQB2L07-32	8	11.7	14.7	16.5	19.3	13.5	3.5	9.1
	1/8	KQB2L07-N01S	11.11		15.9	16.6	19.2		11.4	11.4
	1/4	KQB2L07-N02S	14.29		20.4	21.8	20.3		20.3	
	3/8	KQB2L07-N03S	17.46		22.2	23.3	33.7			
$\phi 5/16"$	10-32UNF	KQB2L09-32	8	13.7	18.6	18.3	21.9	16.1	21.6	15.8
	1/8	KQB2L09-N01S	11.11		19.1	21.5	23.9		21.9	
	1/4	KQB2L09-N02S	14.29		23.3	25.4	35			
$\phi 3/8"$	10-32UNF	KQB2L11-32	8	16	20	19.4	24.2	16.6	21.6	20.5
	1/8	KQB2L11-N01S	11.11		22.6	26.2	23.9			
	1/4	KQB2L11-N02S	14.29		24.4	27.7	35.8			
	3/8	KQB2L11-N03S	17.46		28.2	29.8	63.1			
$\phi 1/2"$	10-32UNF	KQB2L13-32	8	19.6	22.7	24.4	29.8	18.5	50.2	30.1
	3/8	KQB2L13-N03S	17.46		23.7	26.1	31.2		37.9	
	1/2	KQB2L13-N04S	22.23		29.9	33.3	63.8			



(10-32UNF)



(NPT)



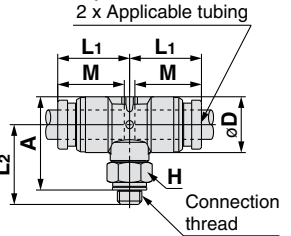
* Reference dimensions after installation of NPT thread
 Note 1) ϕD is maximum diameter.
 Note 2) Value of FEP tubing.

Male Branch Tee: KQB2T

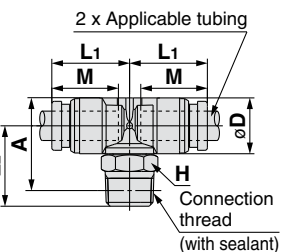
Applicable tubing O.D. (inch)	Connection thread UNF, NPT	Model	H (Width across flat)	Note 1) ϕD	L1	L2	A*	M	Note 2) Effective area (mm ²)	Weight (g)
$\phi 1/8"$	10-32UNF	KQB2T01-32	8	8.3	13.1	14.8	16	12	3.2	8.2
	1/8	KQB2T01-N01S	11.11		13.6	14.9	15.8		3.4	10.6
	1/4	KQB2T01-N02S	14.29		18.7	18.4	19.5			
$\phi 5/32"$	10-32UNF	KQB2T03-32	8	9.1	13.7	15.2	16.8	12.6	4.5	9.1
	1/8	KQB2T03-N01S	11.11		14.4	15.3	16.6		6	11.6
	1/4	KQB2T03-N02S	14.29		19.1	19.2	20.5			
$\phi 1/4"$	10-32UNF	KQB2T07-32	8	11.7	14.7	16.5	19.3	13.5	4.5	12.3
	1/8	KQB2T07-N01S	11.11		15.9	16.6	19.2		13.9	14.9
	1/4	KQB2T07-N02S	14.29		20.4	21.8	23.8			
	3/8	KQB2T07-N03S	17.46		22.2	23.3	37.1			
$\phi 5/16"$	10-32UNF	KQB2T09-32	8	13.7	18.6	18.3	21.9	16.1	26.3	21.2
	1/8	KQB2T09-N01S	11.11		19.1	21.5	23.9		27.1	
	1/4	KQB2T09-N02S	14.29		23.3	25.4	40.3			
$\phi 3/8"$	10-32UNF	KQB2T11-32	8	16	20	19.4	24.2	16.6	40.8	28.1
	1/8	KQB2T11-N01S	11.11		22.6	26.2	31.1			
	1/4	KQB2T11-N02S	14.29		24.4	27.7	43.1			
	3/8	KQB2T11-N03S	17.46		28.2	29.8	70.4			
$\phi 1/2"$	10-32UNF	KQB2T13-32	8	19.6	22.7	24.4	29.8	18.5	57.2	41.8
	3/8	KQB2T13-N03S	17.46		23.7	26.1	31.2		49	
	1/2	KQB2T13-N04S	22.23		29.9	33.3	74.9			



(10-32UNF)



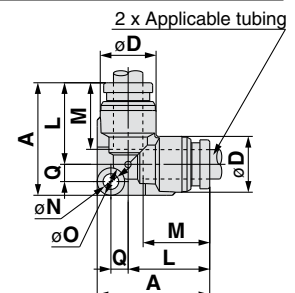
(NPT)



* Reference dimensions after installation of NPT thread
 Note 1) ϕD is maximum diameter.
 Note 2) Value of FEP tubing.

Union Elbow: KQB2L

Applicable tubing O.D. (inch)	Model	Note 1) ϕD	L	A	Q	M	ϕN	ϕO	Note 2) Effective area (mm ²)	Weight (g)
$\phi 1/8"$	KQB2L01-00	8.3	13.6	19.3	2.9	12	3.2	5.6	3	6.3
$\phi 5/32"$	KQB2L03-00	9.1	14.6	20.5	3.1	12.6	3.2	5.6	4.2	7.4
$\phi 1/4"$	KQB2L07-00	11.7	16.7	23.2	3.7	13.5	3.2	5.6	11.4	11.5
$\phi 5/16"$	KQB2L09-00	13.7	20.1	29.1	5	16.1	4.2	8	21.6	20.2
$\phi 3/8"$	KQB2L11-00	16	21.4	31.1	5.7	16.6	4.2	8	35.2	28.2
$\phi 1/2"$	KQB2L13-00	19.6	24.9	35.3	6.4	18.5	4.2	8	50.2	41.7



Note 1) ϕD is maximum diameter.
 Note 2) Value of FEP tubing.



Spatter Resistant Cylinders for Arc Welding

Clamp Cylinders

Gas/Air Switching Valve

Detection Switches

Tubing

Fittings

Speed Control Equipment

Series KQB2

Applicable Tubing: Inch Size, Connection Thread: UNF, NPT

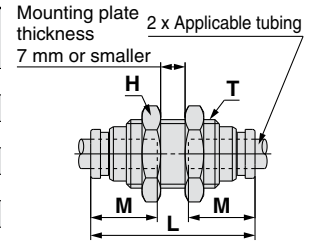
Dimensions

Bulkhead Union: KQB2E



Applicable tubing O.D. (inch)	Model	T (UNF)	H (Width across flat)	L	Mounting hole	M	Note 2) Effective area (mm ²)	Weight (g)
ø1/8"	KQB2E01-00	7/16-20UNF	14.29	34.2	12.5	12	3.4	21.8
ø5/32"	KQB2E03-00	7/16-20UNF	14.29	34.4	12.5	12.6	5.6	21.6
ø1/4"	KQB2E07-00	1/2-20UNF	17.46	36.2	14	13.5	13.1	30.2
ø5/16"	KQB2E09-00	5/8-18UNF	22.23	41.2	17	16.1	26.1	43.9
ø3/8"	KQB2E11-00	3/4-16UNF	22.23	42.4	20.5	16.6	41.5	64.2
ø1/2"	KQB2E13-00	7/8-14UNF	25.4	47	23.5	18.5	58.3	94.2

Note) Value of FEP tubing.

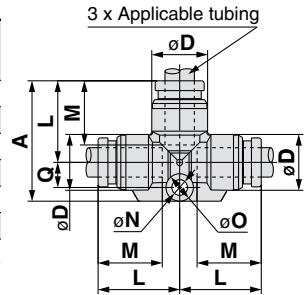


Union Tee: KQB2T



Applicable tubing O.D. (inch)	Model	Note 1) øD	L	A	Q	M	øN	øO	Note 2) Effective area (mm ²)	Weight (g)
ø1/8"	KQB2T01-00	8.3	13.6	20.5	4.1	12	3.2	5.6	3.4	7.9
ø5/32"	KQB2T03-00	9.1	14.6	21.8	4.4	12.6	3.2	5.6	6.4	9.5
ø1/4"	KQB2T07-00	11.7	16.7	24.7	5.2	13.5	3.2	5.6	13.4	14.7
ø5/16"	KQB2T09-00	13.7	20.1	31.1	7	16.1	4.2	8	25.6	24.4
ø3/8"	KQB2T11-00	16	21.4	33.4	8	16.6	4.2	8	40	34.7
ø1/2"	KQB2T13-00	19.6	24.9	37.9	9	18.5	4.2	8	57.4	52.3

Note 1) øD is maximum diameter.
Note 2) Value of FEP tubing.

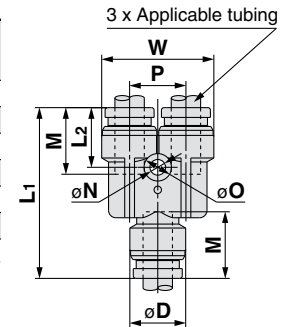


Union "Y": KQB2U



Applicable tubing O.D. (inch)	Model	Note 1) øD	W	L1	L2	P	M	øN	øO	Note 2) Effective area (mm ²)	Weight (g)
ø1/8"	KQB2U01-00	8.3	16.4	29	11	8.1	12	3.2	5.6	3.4	9.2
ø5/32"	KQB2U03-00	9.1	18.2	30.4	11.3	9.1	12.6	3.2	5.6	4.2	11.1
ø1/4"	KQB2U07-00	11.7	23.9	34.5	12.1	12.2	13.5	3.2	5.6	13.4	19.6
ø5/16"	KQB2U09-00	13.7	28.3	40.1	14.1	14.6	16.1	4.2	8	25.6	29.7
ø3/8"	KQB2U11-00	16	33.2	42.2	14	17.2	16.6	4.2	8	40	43.1
ø1/2"	KQB2U13-00	19.6	40.2	47.3	15.8	20.6	18.5	4.2	8	57.4	66.4

Note 1) øD is maximum diameter.
Note 2) Value of FEP tubing.

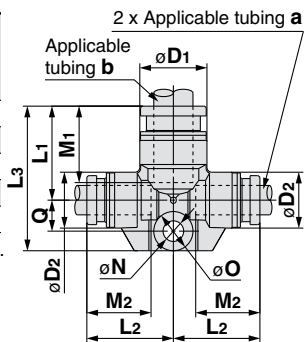


Different Diameter Tee: KQB2T



Applicable tubing O.D. (inch)	Model	Note 1) øD1	Note 1) øD2	L1	L2	L3	Q	M1	M2	øN	øO	Note 2) Effective area (mm ²)	Weight (g)
ø1/8" ø5/32"	KQB2T01-03	9.1	8.3	14.2	14.1	21.1	4.1	12.6	12	3.2	5.6	3.8	8.5
ø5/32" ø1/4"	KQB2T03-07	11.7	9.1	15.5	15.9	22.7	4.4	13.5	12.6	3.2	5.6	7.1	11.7
ø1/4" ø5/16"	KQB2T07-09	13.7	11.7	19.3	17.6	29.6	6.3	16.1	13.5	4.2	8	16.4	20.2
ø5/16" ø3/8"	KQB2T09-11	16	13.7	20.6	21	31.7	7.1	16.6	16.1	4.2	8	36	28.9
ø3/8" ø1/2"	KQB2T11-13	19.6	16	23.3	23	35.4	8.1	18.5	16.6	4.2	8	56	41.8

Note 1) øD1, øD2 are maximum diameters.
Note 2) Value of FEP tubing.

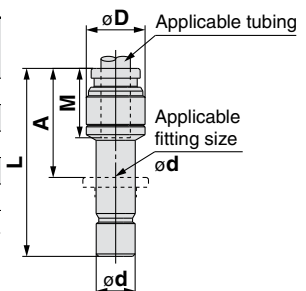


Plug-in Reducer: KQB2R



Applicable tubing O.D. (inch)	Applicable fitting size ød	Model	Note 1) øD	L	A	M	Note 2) Effective area (mm ²)	Weight (g)
ø1/8"	ø5/32"	KQB2R01-03	9	32.9	20.3	12	3.4	4.9
ø5/32"	ø1/4"	KQB2R03-07	9	33.7	20.2	12.6	5.6	7.4
ø1/4"	ø5/16"	KQB2R07-09	12	38.4	22.3	13.5	13.1	12.5
ø5/16"	ø3/8"	KQB2R09-11	14	41.6	25	16.1	26.1	17.7
ø3/8"	ø1/2"	KQB2R11-13	17	39.8	21.3	16.6	41.5	24.7

Note 1) øD is maximum diameter.
Note 2) Value of FEP tubing.



Metal One-touch Fittings *Series KQB2*

Applicable Tubing: Inch Size, Connection Thread: UNF, NPT

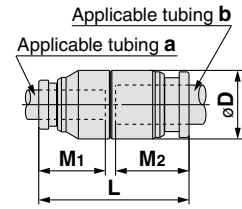
Dimensions

Different Diameter Straight: KQB2H



Applicable tubing O.D. (inch)		Model	øD Note 1)	L	M ₁	M ₂	Note 2) Effective area (mm ²)	Weight (g)
a	b							
ø1/8"	ø5/32"	KQB2H01-03	9	25.6	12	12.6	3.4	6.8
ø5/32"	ø1/4"	KQB2H03-07	12	27.1	12.6	13.5	5.6	11.9
ø1/4"	ø5/16"	KQB2H07-09	14	30.6	13.5	16.1	13.1	16.8
ø5/16"	ø3/8"	KQB2H09-11	16	33.7	16.1	16.6	26.1	23.9
ø3/8"	ø1/2"	KQB2H11-13	20	36.1	16.6	18.5	41.5	38.8

Note 1) øD is maximum diameter.
Note 2) Value of FEP tubing.

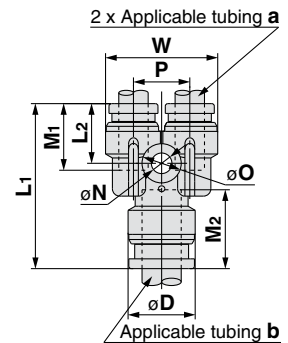


Different Diameter Union "Y": KQB2U

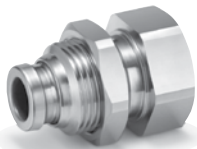


Applicable tubing O.D. (inch)		Model	Note 1) øD	L ₁	L ₂	P	W	M ₁	M ₂	øN	øO	Note 2) Effective area (mm ²)	Weight (g)
a	b												
ø1/8"	ø5/32"	KQB2U01-03	9.1	27	10.8	8.1	16.4	12	12.6	3.2	5.6	3.2	8.5
ø5/32"	ø1/4"	KQB2U03-07	11.7	28.8	11.4	9.1	18.2	12.6	13.5	3.2	5.6	4.2	11.8
ø1/4"	ø5/16"	KQB2U07-09	13.7	33.8	12	12.2	23.9	13.5	16.1	4.2	8	13.4	20
ø5/16"	ø3/8"	KQB2U09-11	16	38.3	13.8	14.6	28.3	16.1	16.6	4.2	8	25.6	31
ø3/8"	ø1/2"	KQB2U11-13	19.6	40.5	13.7	17.2	33.2	16.6	18.5	4.2	8	40	45

Note 1) øD is maximum diameter.
Note 2) Value of FEP tubing.

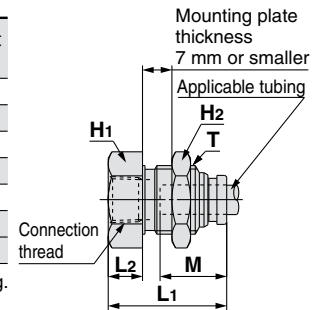


Bulkhead Connector: KQB2E



Applicable tubing O.D. (inch)	Connection thread NPT	Model	T (UNF)	Width across flat		L ₁	L ₂	Mounting hole	M	Note 2) Effective area (mm ²)	Weight (g)
				H ₁	H ₂						
ø1/8"	1/4	KQB2E01-N02	7/16-20UNF	17.46	14.29	32.8	15.3	12.5	12	3.4	34.1
ø5/32"	1/4	KQB2E03-N02	7/16-20UNF	17.46	14.29	32.6	15.3	12.5	12.6	5.6	33.5
ø1/4"	1/4	KQB2E07-N02	1/2-20UNF	17.46	17.46	33.1	14.8	14	13.5	13.1	36.5
ø5/16"	3/8	KQB2E09-N03	5/8-18UNF	22.23	22.23	35.8	15.1	17	16.1	26.1	56.1
ø3/8"	3/8	KQB2E11-N03	3/4-16UNF	22.23	22.23	35.2	13.7	20.5	16.6	41.5	62.9
ø1/2"	3/8	KQB2E13-N03	7/8-14UNF	23.81	25.4	34.6	11	23.5	18.5	58.3	76.6
	1/2	KQB2E13-N04				42.2	18.6				80.2

Note 2) Value of FEP tubing.

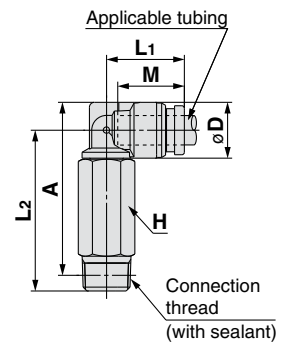


Extended Male Elbow: KQB2W



Applicable tubing O.D. (inch)	Connection thread NPT	Model	H (Width across flat)	Note 1) øD	L ₁	L ₂	A*	M	Note 2) Effective area (mm ²)	Weight (g)
	1/4	KQB2W01-N02S	14.29	35.4	35.1	37.3				
ø5/32"	1/8	KQB2W03-N01S	11.11	9.1	14.4	32	33.3	12.6	4	20.3
	1/4	KQB2W03-N02S	14.29			35.8	35.9			38.2
ø1/4"	1/8	KQB2W07-N01S	11.11	11.7	15.9	33.3	35.9	13.5	10.9	22.1
	1/4	KQB2W07-N02S	14.29			37.1	38.5			39.9
	3/8	KQB2W07-N03S	17.46			38.9	40			65.6
ø5/16"	1/8	KQB2W09-N01S	12.7	13.7	18.6	34.7	38.3	16.1	20.5	30.4
	1/4	KQB2W09-N02S	14.29			40.2	42.6			41.6
	3/8	KQB2W09-N03S	17.46			42	44.1			68.5
ø3/8"	1/4	KQB2W11-N02S	14.29	16	21	47.2	50.8	16.6	33.5	44.9
	3/8	KQB2W11-N03S	17.46			45.4	48.7			67.8
	1/2	KQB2W11-N04S	22.23			49.2	50.8			124.2
ø1/2"	1/4	KQB2W13-N02S	14.29	19.6	23.7	49	54.4	18.5	47.7	51.1
	3/8	KQB2W13-N03S	17.46			50.7	55.8			66
	1/2	KQB2W13-N04S	22.23			54.5	57.9			125.9

* Reference dimensions after installation of NPT thread.
Note 1) øD is maximum diameter.
Note 2) Value of FEP tubing.



Spatter Resistant Cylinders for Arc Welding

Clamp Cylinders

Gas/Air Switching Valve

Detection Switches

Tubing

Fittings

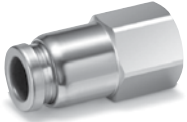
Speed Control Equipment

Series KQB2

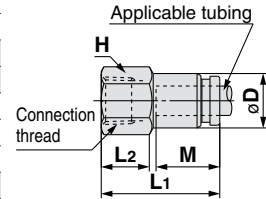
Applicable Tubing: Inch Size, Connection Thread: UNF, NPT

Dimensions

Female Connector: KQB2F



Applicable tubing O.D. (inch)	Connection thread NPT	Model	H (Width across flat)	Note 1) ϕD	L1	L2	M	Note 2) Effective area (mm ²)	Weight (g)
$\phi 1/8$ "	1/8	KQB2F01-N01	12.7	8	24.1	10.4	12	3.4	11.3
	1/4	KQB2F01-N02	17.46		29.1	13.7			25.4
$\phi 5/32$ "	1/8	KQB2F03-N01	12.7	8.7	24.6	10.5	12.6	5.6	11.8
	1/4	KQB2F03-N02	17.46		29.6	13.8			25.9
$\phi 1/4$ "	1/8	KQB2F07-N01	12.7	11.2	25	10.7	13.5	13.1	13
	1/4	KQB2F07-N02	17.46		30	14.1			27.5
	3/8	KQB2F07-N03	22.23		31.2	14.6			41.1
$\phi 5/16$ "	1/8	KQB2F09-N01	14.29	13.4	27.2	10.3	16.1	26.1	18.8
	1/4	KQB2F09-N02	17.46		32.2	14.3			30.1
	3/8	KQB2F09-N03	22.23		33.4	14.8			44
$\phi 3/8$ "	1/4	KQB2F11-N02	17.46	16	32.1	14.4	16.6	41.5	32.9
	3/8	KQB2F11-N03	22.23		33.3	14.9			47
	1/2	KQB2F11-N04	23.81		38.6	18.6			50.4
$\phi 1/2$ "	3/8	KQB2F13-N03	22.23	19.3	34.6	14.7	18.5	58.3	51.3
	1/2	KQB2F13-N04	23.81		39.9	18.8			55.1

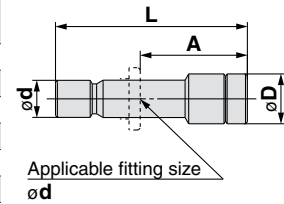


Note 1) ϕD is maximum diameter.
Note 2) Value of FEP tubing.

Plug: KQB2P



Applicable fitting size ϕd	Model	ϕD	L	A	Weight (g)
$\phi 1/8$ "	KQB2P-01	5	28.9	16.9	2.8
$\phi 5/32$ "	KQB2P-03	6	29.6	17	4.3
$\phi 1/4$ "	KQB2P-07	8	30.3	16.8	9.4
$\phi 5/16$ "	KQB2P-09	10	33.7	17.6	16.3
$\phi 3/8$ "	KQB2P-11	11	34.1	17.5	22.2
$\phi 1/2$ "	KQB2P-13	14	36.4	17.9	40.7



Metal One-touch Fittings

Applicable Tubing: Metric Size, Connection Thread: G*

* Conforming to ISO16030

Series KQB2



Spatter Resistant Cylinders for Arc Welding

Clamp Cylinders

Gas/Air Switching Valve

Detection Switches

Tubing

Fittings

Speed Control Equipment



Applicable Tubing

Tubing O.D.	ø4, ø6, ø8, ø10, ø12, ø16
-------------	---------------------------

Specifications

Fluid	Air, Water
Operating pressure range ^{Note 1)}	-14.5 to 145 psi (-100 kPa to 1 MPa) ^{Note 2)}
Proof pressure	435 psi (3.0 MPa)
Ambient and fluid temperature ^{Note 3)}	23 to 302 °F (-5 to 150°C) (No freezing) ^{Note 2)}
Lubricant	Grease-free specification
Seal on the threads	O-ring seal

Note 1) Avoid using in a vacuum holding application such as a leak tester, since there is leakage.

Note 2) Check the operating pressure range and operating temperature range of the tubing.

Note 3) It is recommended that you use the inner sleeve in the following conditions:

- When using in an environment where the fluid temperature changes drastically.
- When using at a high temperature.

* Temperature Condition of Mounting the Inner Sleeve

Tubing	Temperature
FEP tubing/Series TH	176°F (80°C) or more
Super PFA tubing/Series TL	248°F (120°C) or more

Spare Parts

Description	Tubing O.D.	Part no.	Material
Bulkhead nut	ø4	KQB223-P01	C3604 (Electroless nickel plating)
	ø6	KQB206-P01	
	ø8	KQB208-P01	
	ø10	KQB210-P01	
	ø12	KQB212-P01	
	ø16	KQB216-P01	

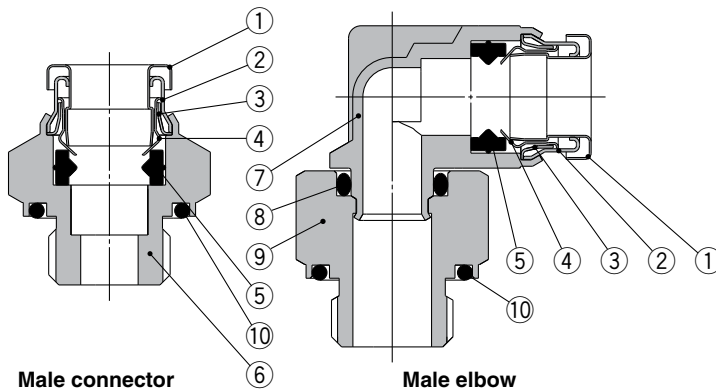
Description	Thread size	Part no.	Material
G thread O-ring	G1/8	KQB2-G01	Special FKM (Fluoro coated)
	G1/4	KQB2-G02	
	G3/8	KQB2-G03	
	G1/2	KQB2-G04	

Cross Reference Table of the Inner Sleeve

Tubing O.D.	Tubing material			Applicable inner sleeve	
	TUS (Soft polyurethane)	TH/THI (FEP)	TL/TIL (Super PFA)	Part no.	Length
ø4	—	TH0402	—	TJ-0402	18
	TUS0425	TH0425	—	TJ-0425	18
	—	—	TL0403	TJ-0403	18
ø6	TUS0604	TH0604	TL0604	TJ-0604	19
	TUS0805	—	—	TJ-0805	20.5
	—	TH0806	TL0806	TJ-0806	20.5
ø10	TUS1065	—	—	TJ-1065	23
	—	TH1075	—	TJ-1075	23
	—	TH1008	TL1008	TJ-1008	23
ø12	TUS1208	—	—	TJ-1008	24
	—	TH1209	—	TJ-1209	24
	—	TH1210	TL1210	TJ-1210	24

* C2700 + Electroless nickel plating is used for the TJ series.

Construction



Component Parts

No.	Description	Material
1	Release button	Stainless steel 304
2	Guide 1	Stainless steel 304
3	Guide 2	Stainless steel 304
4	Chuck	Stainless steel 304
5	Seal	Special FKM (Fluoro coated)
6	Male connector body	C3604 (Electroless nickel plating)
7	Male elbow body	Stainless steel 316
8	O-ring	Special FKM (Fluoro coated)
9	Stud	C3604 (Electroless nickel plating)
10	G thread O-ring	Special FKM (Fluoro coated)



Series KQB2

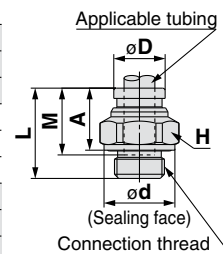
Applicable Tubing: Metric Size, Connection Thread: G

Dimensions

Male Connector: KQB2H



Applicable tubing O.D. (mm)	Connection thread G	Model	H (Width across flat)	Note 1) ϕD	ϕd	L	A	M	Note 2) Effective area (mm ²)	Weight (g)
$\phi 4$	1/8	KQB2H04-G01	14	8.7	13.8	16.6	11.1	12.6	5.6	9.2
	1/4	KQB2H04-G02	19		17.8	20.6	14.1			23.6
$\phi 6$	1/8	KQB2H06-G01	14	11.1	13.8	17.6	12.1	13.6	13.1	8.9
	1/4	KQB2H06-G02	19		17.8	20.5	14			21.6
	3/8	KQB2H06-G03	22		21.8	23.4	15.9			38.3
$\phi 8$	1/8	KQB2H08-G01	14	13.4	13.8	23.9	18.4	16.1	26.1	13.2
	1/4	KQB2H08-G02	19		17.8	21.2	14.7			19.1
	3/8	KQB2H08-G03	22		21.8	24	16.5			35.2
$\phi 10$	1/8	KQB2H10-G01	17	16.4	13.8	25.1	19.6	17	41.5	19.9
	1/4	KQB2H10-G02	19		17.8	24.9	18.4			24.8
	3/8	KQB2H10-G03	22		21.8	23.3	15.8			30.9
	1/2	KQB2H10-G04	27		26.5	27.7	18.7			64.4
$\phi 12$	1/4	KQB2H12-G02	19	18.5	17.8	27.7	21.2	18.6	58.3	26.3
	3/8	KQB2H12-G03	22		21.8	23.5	16			25.5
	1/2	KQB2H12-G04	27		26.5	27.9	18.9			58
$\phi 16$	3/8	KQB2H16-G03	24	24.6	21.8	31.3	23.8	20.8	113	44.5
	1/2	KQB2H16-G04	27		26.5	27.3	18.3			43

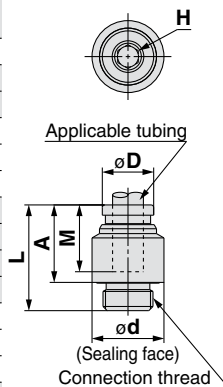


Note 1) ϕD is maximum diameter.
 Note 2) Value of FEP tubing.
 Value of nylon tubing for $\phi 16$ only.

Hexagon Socket Head Male Connector: KQB2S



Applicable tubing O.D. (mm)	Connection thread G	Model	H (Width across flat)	Note 1) ϕD	ϕd	L	A	M	Note 2) Effective area (mm ²)	Weight (g)
$\phi 4$	1/8	KQB2S04-G01	3	14	14	20.4	14.9	12.6	4.1	13.5
$\phi 6$	1/8	KQB2S06-G01	4	14	14	20.6	15.1	13.6	10	12.1
	1/4	KQB2S06-G02		18	18		14.1		10.7	19.9
$\phi 8$	1/8	KQB2S08-G01	5	14	14	23.9	18.4	16.1	17.2	12.5
	1/4	KQB2S08-G02	6	18	18	22.9	16.4		23.3	20.1
	3/8	KQB2S08-G03		22	22	23.1	15.6		31.1	
$\phi 10$	1/8	KQB2S10-G01	5	17	14	25.1	19.6	17	17.2	18.5
	1/4	KQB2S10-G02	8	18	18	24.9	18.4		39	20.4
	3/8	KQB2S10-G03		22	22	24	16.5		31.2	
	1/2	KQB2S10-G04		27	26.5	15	45.3			
1/4	KQB2S12-G02	8		19	18	27.7	21.2	46	23.6	
$\phi 12$	3/8	KQB2S12-G03	10	22	22	24.9	17.4	18.6	60	27.4
	1/2	KQB2S12-G04		27	26.5		15.9		42.6	
	3/8	KQB2S16-G03		10	24.6		22		31.3	23.8
$\phi 16$	1/2	KQB2S16-G04	12	27	26.5	27.8	18.8	20.8	113	42.9



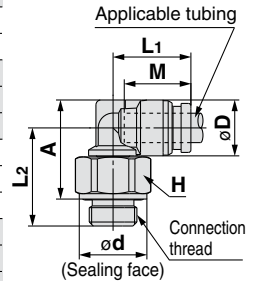
Note 1) ϕD is maximum diameter.
 Note 2) Value of FEP tubing.
 Value of nylon tubing for $\phi 16$ only.

Dimensions

Male Elbow: KQB2L



Applicable tubing O.D. (mm)	Connection thread G	Model	H (Width across flat)	Note 1) ϕD	ϕd	L1	L2	A	M	Note 2) Effective area (mm ²)	Weight (g)
$\phi 4$	1/8	KQB2L04-G01	14	9.1	13.8	14.4	18.9	17.9	12.6	4.2	15.6
	1/4	KQB2L04-G02	19		17.8		22.3	20.3			33
$\phi 6$	1/8	KQB2L06-G01	14	11.4	13.8	15.9	20	20.2	13.6	11.4	17.2
	1/4	KQB2L06-G02	19		17.8		23.4	22.6			34.6
	3/8	KQB2L06-G03	22		21.8		25.9	24.1			54.5
$\phi 8$	1/8	KQB2L08-G01	14	13.7	13.8	18.6	21.3	22.6	16.1	21.6	20.2
	1/4	KQB2L08-G02	19		17.8		24.7	25			36
	3/8	KQB2L08-G03	22		21.8		27.2	26.5			55.6
$\phi 10$	1/8	KQB2L10-G01	14	16.6	13.8	20	22.7	25.5	17	35.2	25.7
	1/4	KQB2L10-G02	19		17.8		26.1	27.9			38.2
	3/8	KQB2L10-G03	22		21.8		28.6	29.4			56.2
	1/2	KQB2L10-G04	27		26.5		32.6	31.9			97.9
$\phi 12$	1/4	KQB2L12-G02	19	18.7	17.8	22.6	27.2	30	18.6	50.2	41.9
	3/8	KQB2L12-G03	22		21.8		29.6	31.4			54.3
	1/2	KQB2L12-G04	27		26.5		33.6	33.9			94.6
$\phi 16$	3/8	KQB2L16-G03	22	24.6	21.8	26.3	32.4	36.5	20.8	71	64.7
	1/2	KQB2L16-G04	27		26.5		27.3	36.4			39

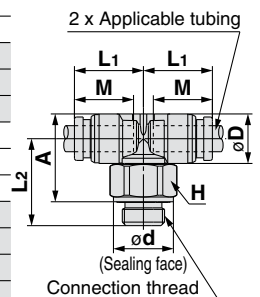


Note 1) ϕD is maximum diameter.
 Note 2) Value of FEP tubing.
 Value of nylon tubing for $\phi 16$ only.

Male Branch Tee: KQB2T



Applicable tubing O.D. (mm)	Connection thread G	Model	H (Width across flat)	Note 1) ϕD	ϕd	L1	L2	A	M	Note 2) Effective area (mm ²)	Weight (g)
$\phi 4$	1/8	KQB2T04-G01	14	9.1	13.8	14.4	18.9	17.9	12.6	6	17.5
	1/4	KQB2T04-G02	19		17.8		22.3	20.3			34.9
$\phi 6$	1/8	KQB2T06-G01	14	11.4	13.8	15.9	20	20.2	13.6	13.9	21
	1/4	KQB2T06-G02	19		17.8		23.4	22.6			38
	3/8	KQB2T06-G03	22		21.8		25.9	24.1			57.9
$\phi 8$	1/8	KQB2T08-G01	14	13.7	13.8	18.6	21.3	22.6	16.1	26.3	25.6
	1/4	KQB2T08-G02	19		17.8		24.7	25			41.2
	3/8	KQB2T08-G03	22		21.8		27.2	26.5			60.8
$\phi 10$	1/8	KQB2T10-G01	14	16.6	13.8	20	22.7	25.5	17	40.8	34
	1/4	KQB2T10-G02	19		17.8		26.1	27.9			46
	3/8	KQB2T10-G03	22		21.8		28.6	29.4			64
	1/2	KQB2T10-G04	27		26.5		32.6	31.9			105.8
$\phi 12$	1/4	KQB2T12-G02	19	18.7	17.8	22.6	27.2	30	18.6	57.2	53
	3/8	KQB2T12-G03	22		21.8		29.6	31.4			54.3
	1/2	KQB2T12-G04	27		26.5		33.6	33.9			105
$\phi 16$	3/8	KQB2T16-G03	22	24.6	21.8	26.3	32.4	36.5	20.8	71	82.2
	1/2	KQB2T16-G04	27		26.5		27.3	36.4			39



Note 1) ϕD is maximum diameter.
 Note 2) Value of FEP tubing.
 Value of nylon tubing for $\phi 16$ only.

Series KQB2

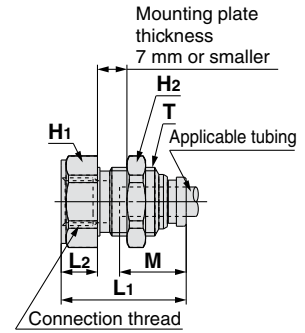
Applicable Tubing: Metric Size, Connection Thread: G

Dimensions

Bulkhead Connector: KQB2E



Applicable tubing O.D. (mm)	Connection thread G	Model	T (M)	Width across flat		L1	L2	Mounting hole	M	Note) Effective area (mm ²)	Weight (g)		
				H1	H2								
ø4	1/8	KQB2E04-G01	M10 x 1	17	12	27.1	11	11	12.6	5.6	25.1		
	1/4	KQB2E04-G02		19							32.7	16.6	36.9
ø6	1/8	KQB2E06-G01	M14 x 1	17	17	25.5	7.4	15	13.6	13.1	26.8		
	1/4	KQB2E06-G02		19							33.5	15.4	42.7
	3/8	KQB2E06-G03		24							35	16.9	62
ø8	1/8	KQB2E08-G01	M15 x 1	17	19	27.6	8.2	16	16.1	26.1	30.4		
	1/4	KQB2E08-G02		19							34.5	15.1	43.9
	3/8	KQB2E08-G03		24							36	16.6	66.2
ø10	1/4	KQB2E10-G02	M18 x 1	19	21	33.5	13.5	19	17	41.5	46.8		
	3/8	KQB2E10-G03		24							35.6	15.6	65.4
ø12	3/8	KQB2E12-G03	M20 x 1	24	24	35.9	14.7	21	18.6	58.3	119.2		
	1/2	KQB2E12-G04		27							42.2	21	91.9
ø16	3/8	KQB2E16-G03	M27 x 1	29	30	37.2	13.1	28	20.8	96	118.2		
	1/2	KQB2E16-G04								43.1	19	113	128.7

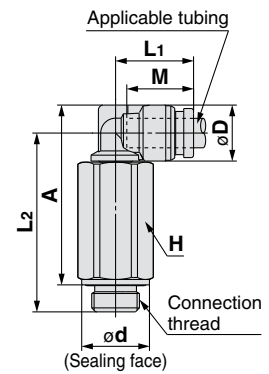


Note) Value of FEP tubing.
Value of nylon tubing for ø16 only.

Extended Male Union: KQB2W



Applicable tubing O.D. (mm)	Connection thread G	Model	H (Width across flat)	Note 1) øD	ød	L1	L2	A	M	Note 2) Effective area (mm ²)	Weight (g)			
ø4	1/8	KQB2W04-G01	14	9.1	13.8	14.4	35.3	34.3	12.6	4	34.5			
	1/4	KQB2W04-G02	19								17.8	38.7	36.7	70.6
ø6	1/8	KQB2W06-G01	14	11.4	17.8	15.9	39.8	39	13.6	10.9	36.1			
	1/4	KQB2W06-G02	19								21.8	42.3	40.5	72.2
	3/8	KQB2W06-G03	22								21.8	42.3	40.5	106.7
ø8	1/8	KQB2W08-G01	14	13.7	17.8	19.1	43.4	43.7	16.1	20.5	41.3			
	1/4	KQB2W08-G02	19								21.8	45.9	45.2	76.7
	3/8	KQB2W08-G03	22								21.8	45.9	45.2	112.9
ø10	1/4	KQB2W10-G02	19	16.6	21.8	21	50.2	51	17	33.5	84.8			
	3/8	KQB2W10-G03	22								26.5	54.2	53.5	116.6
	1/2	KQB2W10-G04	27								26.5	54.2	53.5	196.6
ø12	1/4	KQB2W12-G02	19	18.7	21.8	23.6	50.9	53.7	18.6	47.7	88.7			
	3/8	KQB2W12-G03	22								26.5	57.3	57.6	111.6
ø16	3/8	KQB2W16-G03	22	24.6	21.8	26.3	62	66.1	20.8	71	133.6			
	1/2	KQB2W16-G04	27							26.5	27.3	66	68.6	100

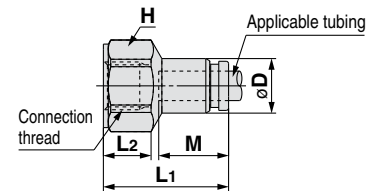


Note 1) øD is maximum diameter.
Note 2) Value of FEP tubing.
Value of nylon tubing for ø16 only.

Female Connector: KQB2F



Applicable tubing O.D. (mm)	Connection thread G	Model	H (Width across flat)	Note 1) øD	L1	L2	M	Note 2) Effective area (mm ²)	Weight (g)		
ø4	1/8	KQB2F04-G01	17	8.7	25	9.5	12.6	5.6	21		
	1/4	KQB2F04-G02	19						30.6	14.5	32
ø6	1/8	KQB2F06-G01	17	11.1	25.5	9.7	13.6	13.1	22.6		
	1/4	KQB2F06-G02	19						31.1	14.7	33
	3/8	KQB2F06-G03	24						32.6	14.6	51.1
ø8	1/8	KQB2F08-G01	17	13.4	27.6	10	16.1	26.1	25.1		
	1/4	KQB2F08-G02	19						33.2	14.9	36.3
	3/8	KQB2F08-G03	24						34.6	14.7	53.8
ø10	1/4	KQB2F10-G02	19	16.4	33.5	15.2	17	41.5	39.9		
	3/8	KQB2F10-G03	24						34.9	15	57.7
ø12	1/4	KQB2F12-G02	19	18.5	34.5	15.2	18.6	58.3	41.8		
	3/8	KQB2F12-G03	24						41.8	19.9	59.7
ø16	3/8	KQB2F16-G03	24	24.6	37.2	15.4	20.8	81	66.6		
	1/2	KQB2F16-G04	27					43.1	20.4	113	89.1



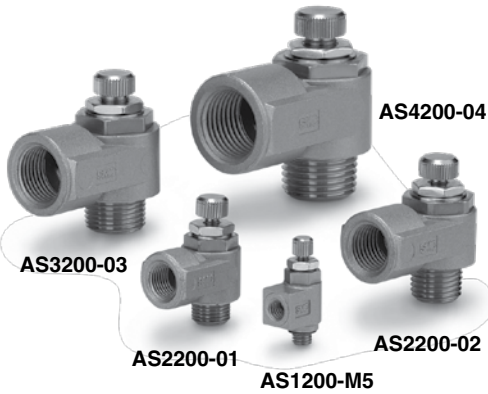
Note 1) øD is maximum diameter.
Note 2) Value of FEP tubing.
Value of nylon tubing for ø16 only.

Speed Controller Elbow Type (Metal Body)

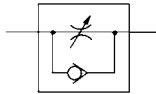
Series AS

RoHS

○ All metal except seal parts



Symbol



Specifications

Specifications	Model	AS12□0-M5	AS22□0-01	AS22□0-02	AS32□0-03	AS42□0-04
Port size		M5 x 0.8	1/8	1/4	3/8	1/2
Fluid		Air				
Proof pressure		218 psi (1.5 MPa)				
Max. operating pressure		145 psi (1 MPa)				
Min. operating pressure		15 psi (0.1 MPa)				
Ambient and fluid temperature		23 to 140°F (-5 to 60°C) (No freezing)				
Option		Round lock nut	With seal, Round lock nut			
Weight (g)		10	29	64	106	181
Controlled flow	Flow rate scfm [(L/min) (ANR)]	3.7 [105]	8.1 [230]	16 [460]	32 [920]	60 [1700]
	Free flow					
Critical pressure ratio	Sonic conductance dm ³ /(s-bar)	0.32	0.7	1.4	2.8	5.2
	Controlled flow	0.2	0.25	0.3	0.25	0.25
Free flow	Free flow	0.4	0.2	0.3	0.2	0.3

Note 1) Flow rate values are measured at 73 psi (0.5 MPa) and 68°F (20°C).

Note 2) Distinction between meter-out/meter-in types by appearance.

Those are distinguished by the lock nut. The meter-out type is zinc chromated (the round lock nut is electroless nickel plated), while the meter-in type is black zinc chromate plated.

How to Order

AS 2 2 0 0 - □ 01 - S - □

Body size

1	M5 standard
2	1/8, 1/4 standard
3	3/8 standard
4	1/2 standard

Type

2	Direct cylinder elbow type
---	----------------------------

Control type

0	Meter-out
1	Meter-in

Thread type

Symbol	Cylinder side	Tube side
	Nil	R
Metric thread (M5)		
N	NPT	
F	G*	

* Male thread comes with R thread.

Lock nut option

Nil	Hexagon lock nut
J	Round lock nut

Option

Nil	None
S	With seal

Note) M5 size: S (with seal) is not necessary.

Port size

Symbol	Port size	Applicable series
M5	M5 x 0.8	AS12□0-M5
01	1/8	AS22□0-01
02	1/4	AS22□0-02
03	3/8	AS32□0-03
04	1/2	AS42□0-04

Spatter Resistant Cylinders
for Arc Welding

Clamp Cylinders

Gas/Air Switching Valve

Detection Switches

Tubing

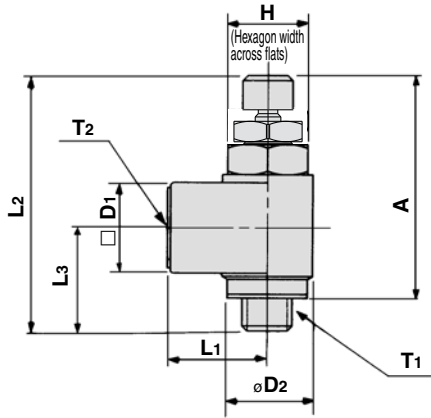
Fittings

Speed Control Equipment

Series AS

Dimensions

AS12□0-M5



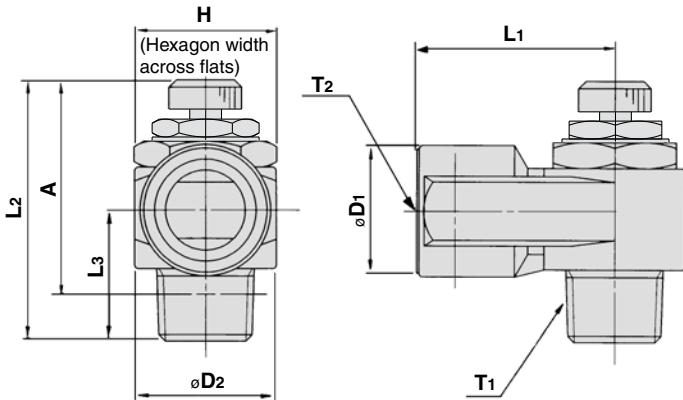
Dimensions

Model	T1	T2	H	L1	L2		L3	D1	D2	A ^{Note 1)}	
					Max.	Min.				Max.	Min.
AS12□0-M5	M5 x 0.8	M5 x 0.8	8	10	28.3	25.5	10.3	9	9	25	22.2

Note 1) Reference thread dimensions after installation

Note 2) L2: Reference dimensions

AS22□0/32□0/42□0



Dimensions

Model	T1	T2	Note 1) H	L1	L2		L3	D1	D2	A ^{Note 2)}	
					Max.	Min.				Max.	Min.
AS22□0-01	1/8	1/8	12 (12.7)	18	35.5	30.5	13.2	14.3	14.6	32.4	27.4
AS22□0-02	1/4	1/4	17 (17.5)	27.2	40.3	35.3	17.5	18	19.5	34.8	29.8
AS32□0-03	3/8	3/8	19	30	45.8	40.8	19.7	22.5	24.3	40.6	35.6
AS42□0-04	1/2	1/2	24 (23.8)	38.5	54.7	49.7	25.8	27.5	28.5	47.4	42.4


Note 1) () are the dimensions of "NPT" thread.


Note 2) Reference thread dimensions after installation


Note 3) L2: Reference dimensions

Safety Instructions

These safety instructions are intended to prevent hazardous situations and/or equipment damage. These instructions indicate the level of potential hazard with the labels of “**Caution**,” “**Warning**” or “**Danger**.” They are all important notes for safety and must be followed in addition to International Standards (ISO/IEC)*1), and other safety regulations.

 **Caution:** **Caution** indicates a hazard with a low level of risk which, if not avoided, could result in minor or moderate injury.

 **Warning:** **Warning** indicates a hazard with a medium level of risk which, if not avoided, could result in death or serious injury.

 **Danger:** **Danger** indicates a hazard with a high level of risk which, if not avoided, will result in death or serious injury.

*1) ISO 4414: Pneumatic fluid power – General rules relating to systems.
ISO 4413: Hydraulic fluid power – General rules relating to systems.
IEC 60204-1: Safety of machinery – Electrical equipment of machines.
(Part 1: General requirements)
ISO 10218-1: Manipulating industrial robots – Safety.
etc.

Warning

1. The compatibility of the product is the responsibility of the person who designs the equipment or decides its specifications.

Since the product specified here is used under various operating conditions, its compatibility with specific equipment must be decided by the person who designs the equipment or decides its specifications based on necessary analysis and test results. The expected performance and safety assurance of the equipment will be the responsibility of the person who has determined its compatibility with the product. This person should also continuously review all specifications of the product referring to its latest catalog information, with a view to giving due consideration to any possibility of equipment failure when configuring the equipment.

2. Only personnel with appropriate training should operate machinery and equipment.

The product specified here may become unsafe if handled incorrectly. The assembly, operation and maintenance of machines or equipment including our products must be performed by an operator who is appropriately trained and experienced.

3. Do not service or attempt to remove product and machinery/equipment until safety is confirmed.

1. The inspection and maintenance of machinery/equipment should only be performed after measures to prevent falling or runaway of the driven objects have been confirmed.
2. When the product is to be removed, confirm that the safety measures as mentioned above are implemented and the power from any appropriate source is cut, and read and understand the specific product precautions of all relevant products carefully.
3. Before machinery/equipment is restarted, take measures to prevent unexpected operation and malfunction.

4. Contact SMC beforehand and take special consideration of safety measures if the product is to be used in any of the following conditions.

1. Conditions and environments outside of the given specifications, or use outdoors or in a place exposed to direct sunlight.
2. Installation on equipment in conjunction with atomic energy, railways, air navigation, space, shipping, vehicles, military, medical treatment, combustion and recreation, or equipment in contact with food and beverages, emergency stop circuits, clutch and brake circuits in press applications, safety equipment or other applications unsuitable for the standard specifications described in the product catalog.
3. An application which could have negative effects on people, property, or animals requiring special safety analysis.
4. Use in an interlock circuit, which requires the provision of double interlock for possible failure by using a mechanical protective function, and periodical checks to confirm proper operation.

Caution

1. The product is provided for use in manufacturing industries.

The product herein described is basically provided for peaceful use in manufacturing industries.

If considering using the product in other industries, consult SMC beforehand and exchange specifications or a contract if necessary.

If anything is unclear, contact your nearest sales branch.

Limited warranty and Disclaimer/ Compliance Requirements

The product used is subject to the following “Limited warranty and Disclaimer” and “Compliance Requirements”.

Read and accept them before using the product.

Limited warranty and Disclaimer

1. The warranty period of the product is 1 year in service or 1.5 years after the product is delivered, whichever is first.*2)

Also, the product may have specified durability, running distance or replacement parts. Please consult your nearest sales branch.

2. For any failure or damage reported within the warranty period which is clearly our responsibility, a replacement product or necessary parts will be provided.

This limited warranty applies only to our product independently, and not to any other damage incurred due to the failure of the product.

3. Prior to using SMC products, please read and understand the warranty terms and disclaimers noted in the specified catalog for the particular products.

*2) **Vacuum pads are excluded from this 1 year warranty.**

A vacuum pad is a consumable part, so it is warranted for a year after it is delivered. Also, even within the warranty period, the wear of a product due to the use of the vacuum pad or failure due to the deterioration of rubber material are not covered by the limited warranty.

Compliance Requirements

1. The use of SMC products with production equipment for the manufacture of weapons of mass destruction (WMD) or any other weapon is strictly prohibited.

2. The exports of SMC products or technology from one country to another are governed by the relevant security laws and regulations of the countries involved in the transaction. Prior to the shipment of a SMC product to another country, assure that all local rules governing that export are known and followed.

Caution

SMC products are not intended for use as instruments for legal metrology.

Measurement instruments that SMC manufactures or sells have not been qualified by type approval tests relevant to the metrology (measurement) laws of each country. Therefore, SMC products cannot be used for business or certification ordained by the metrology (measurement) laws of each country.

Safety Instructions

Be sure to read “Handling Precautions for SMC Products” (M-E03-3) before using.

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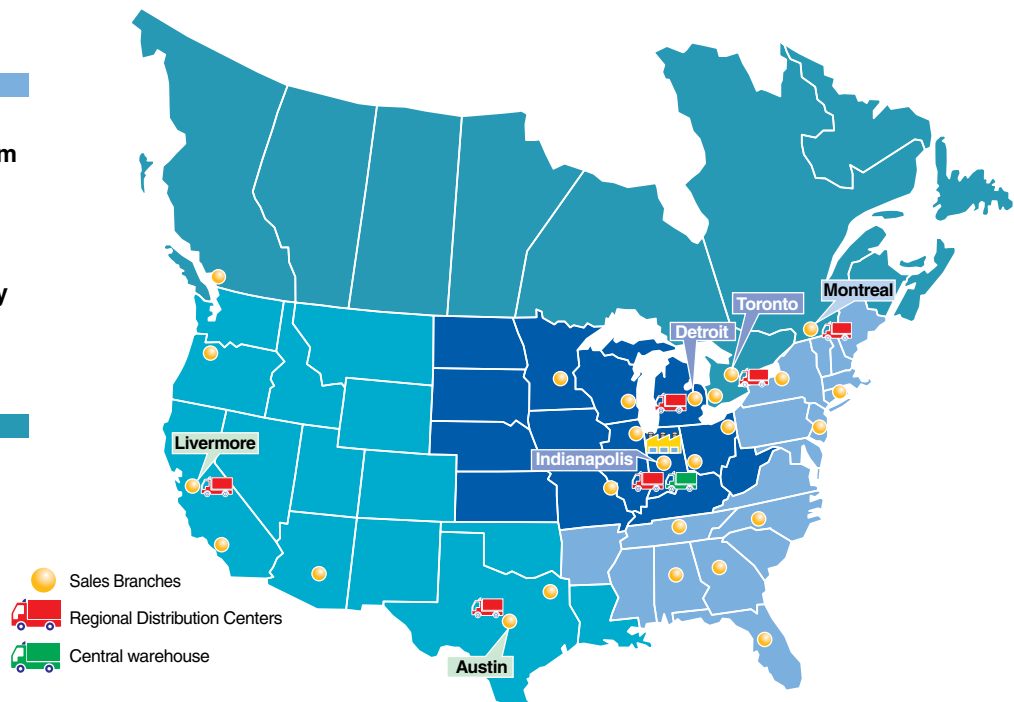
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