

Air Cylinder

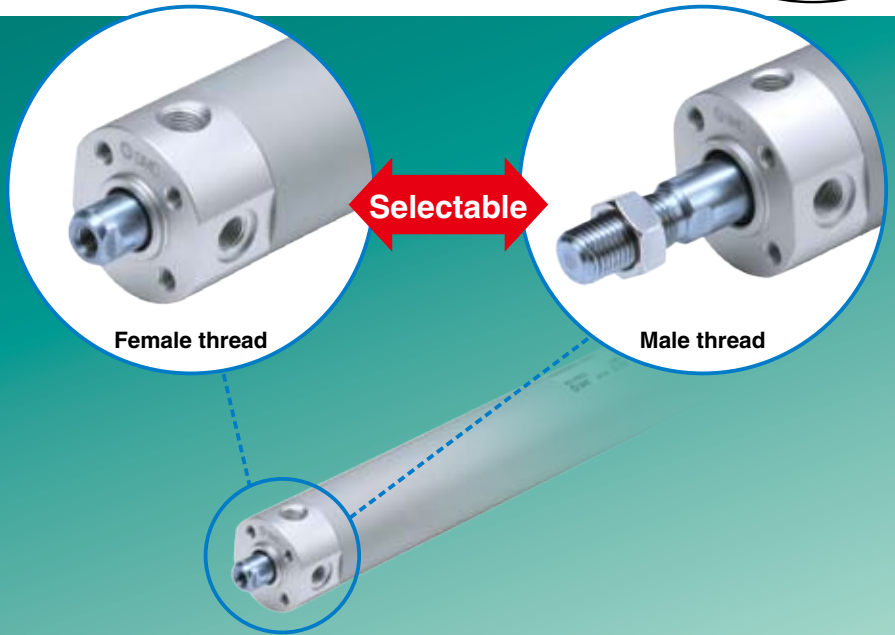
ø20, ø25, ø32, ø40, ø50, ø63, ø80, ø100

New

RoHS

Female rod end available as standard

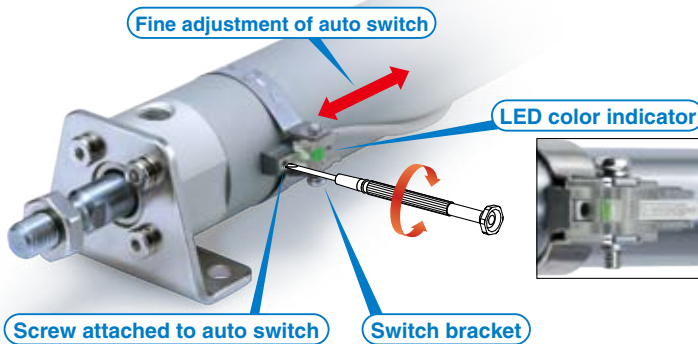
Rod end styles suitable for the application can be selected.



Easy fine adjustment of auto switch position

Fine adjustment of the auto switch position is possible by simply loosening the screw attached to the auto switch.

Transparent switch bracket improves visibility of indicator LED.



No trunnion mounting female thread added to basic type variation

No foreign matter accumulation due to the simple construction



Series **CG1**

 SMC

CAT.ES20-224A

Air Cylinder

New Part numbers with rod end bracket and/or pivot bracket available

Not necessary to order a bracket for the applicable cylinder separately
 Note) Mounting bracket is shipped together with the product, but not assembled.

Example) CDG1DN20-50Z- **N** **W** -M9BW

Pivot bracket	
Nil	None
N	Pivot bracket is shipped together with the product, but not assembled.

N: Kit of pivot bracket and clevis



T: Kit of pivot bracket and trunnion



Rod end bracket	
Nil	None
V	Single knuckle joint
W	Double knuckle joint

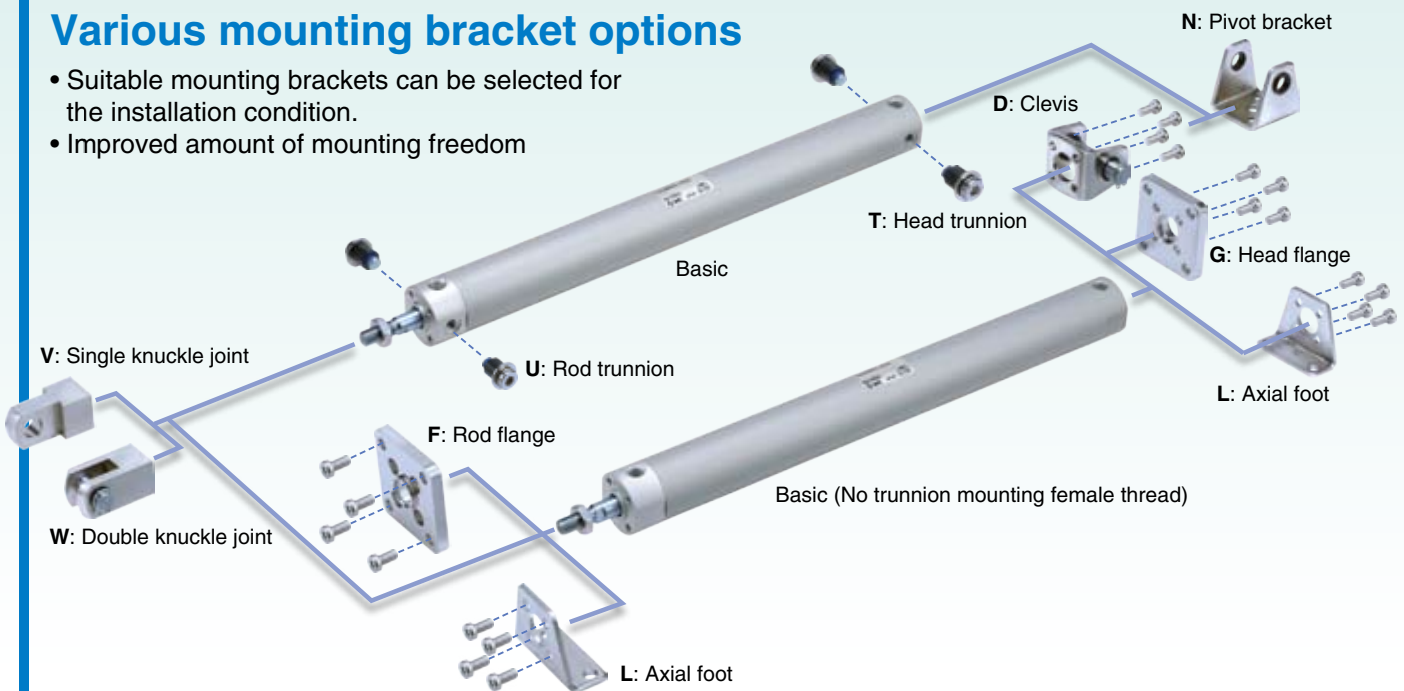
With rod end bracket

V: Single knuckle joint **W: Double knuckle joint**



Various mounting bracket options

- Suitable mounting brackets can be selected for the installation condition.
- Improved amount of mounting freedom



Easy fine adjustment of auto switch position

Fine adjustment of the auto switch set position can be performed by loosening the auto switch attached screw without loosening the auto switch mounting band. Operability improved compared with the conventional auto switch set position adjustment, where the complete switch mounting band requires loosening.



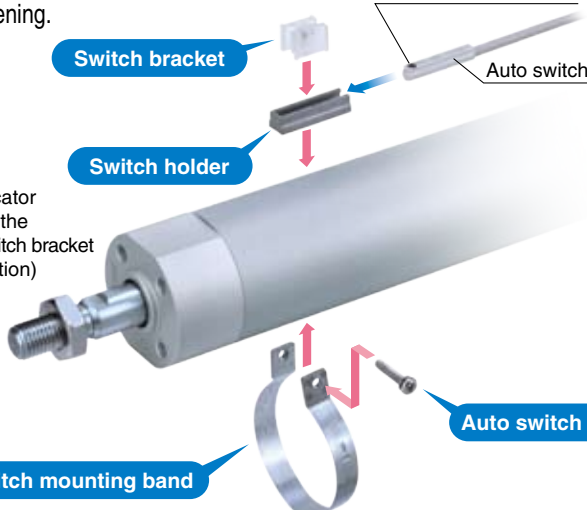
Visibility of the indicator LED improved with the transparent resin switch bracket (Standard specification)

Switch bracket

Switch holder

Screw attached to auto switch

Auto switch



Auto switch mounting band

Auto switch mounting screw

No environmental hazardous substances used

Compliant with EU RoHS directive.
 Lead free bushing is used as sliding material.

Specifications, performance and mounting method are same as the existing product.

Grease is selectable. (Option)

- Grease for food processing equipment (XC85)
- PTFE grease (X446)

















Water resistant compact auto switch now available

- Solid state auto switch D-M9□A(V)

Stroke Variations

Bore size (mm)	Standard stroke (mm)								
	20	50	75	100	125	150	200	250	300
20	●	●	●	●	●	●	●	●	●
25	●	●	●	●	●	●	●	●	●
32	●	●	●	●	●	●	●	●	●
40	●	●	●	●	●	●	●	●	●
50	●	●	●	●	●	●	●	●	●
63	●	●	●	●	●	●	●	●	●
80	●	●	●	●	●	●	●	●	●
100	●	●	●	●	●	●	●	●	●

Series Variations

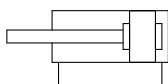
Series	Action	Rod	Bore size (mm)	Cushion	Variations				Catalogs
					With one-touch fittings	With rod boot	Air-hydro	Clean series	
CG1 Standard  New	Double acting	Single rod	20, 25, 32 40, 50, 63 80, 100	Rubber bumper					Page of this catalog Page 1
CG1 Standard 	Double acting	Single rod	20, 25, 32 40, 50, 63 80, 100	Rubber bumper	●	●	●	●	 Best Pneumatics Page 222
				Air cushion		●			
	Double acting	Double rod	20, 25, 32 40, 50, 63 80, 100	Rubber bumper		●	●	●	 Best Pneumatics Page 238
Air cushion		●							
CG1K Non-rotating rod 	Double acting	Single rod	20, 25 32, 40 50, 63 40, 50, 63	Rubber bumper					 Best Pneumatics Page 250
				Air cushion					
CG1R Direct mount 	Double acting	Single rod	20, 25 32, 40 50, 63	Rubber bumper				●	 Best Pneumatics Page 259
				Air cushion					
CG1KR Direct mount, Non-rotating rod 	Double acting	Single rod	20, 25 32, 40 50, 63	Rubber bumper					 Best Pneumatics Page 264
CG1□Y Low friction 	Double acting	Single rod	20, 25, 32 40, 50, 63 80, 100	Rubber bumper					 Best Pneumatics Page 1083
CBG1 With end lock 	Double acting	Single rod	20, 25, 32 40, 50, 63 80, 100	Rubber bumper		●			 Best Pneumatics Page 268
				Air cushion		●			
CG3 Short type Standard 	Double acting	Single rod	20, 25, 32 40, 50, 63 80, 100	Rubber bumper					 CAT.ES20-213

Air Cylinder Standard: Double Acting, Single Rod *Series CG1*



JIS Symbol

Double acting



Refer to pages 13 to 16 for cylinders with auto switches

- Auto switch proper mounting position (detection at stroke end) and its mounting height
- Minimum stroke for auto switch mounting
- Operating range
- Auto switch mounting brackets/Part no.



Made to Order
(For details, refer to page 18.)

Symbol	Specifications
-XC85	Grease for food processing equipment
-X446	PTFE grease

Specifications

Bore size (mm)	20	25	32	40	50	63	80	100	
Action	Double acting, Single rod								
Lubricant	Not required (Non-lube)								
Fluid	Air								
Proof pressure	1.5 MPa								
Maximum operating pressure	1.0 MPa								
Minimum operating pressure	0.05 MPa								
Ambient and fluid temperature	Without auto switch: -10 to 70°C With auto switch: -10 to 60°C (No freezing)								
Piston speed	50 to 1000 mm/s						50 to 700 mm/s		
Stroke length tolerance	Up to 200 st ^{+1.4} ₀ mm (ø20) Up to 300 st ^{+1.4} ₀ mm (ø25 to ø100)								
Cushion	Rubber bumper								
Mounting*	Basic, Basic (without trunnion mounting female thread), Axial foot, Rod flange, Head flange, Rod trunnion, Head trunnion, Clevis (used for changing the port location by 90°)								
Allowable kinetic energy	Male rod end	0.28 J	0.41 J	0.66 J	1.20 J	2.00 J	3.40 J	5.90 J	9.90 J
	Female rod end	0.11 J	0.18 J	0.29 J	0.52 J	0.91 J	1.54 J	2.71 J	4.54 J

* Cylinder sizes ø80 and ø100 do not have basic type (without trunnion mounting female thread), rod trunnion type and head trunnion type.
Foot type, flange type and clevis type of cylinder sizes from ø20 to ø63 do not have trunnion mounting female thread. Operate the cylinder within the allowable kinetic energy. Refer to page 4 for details.

Accessories

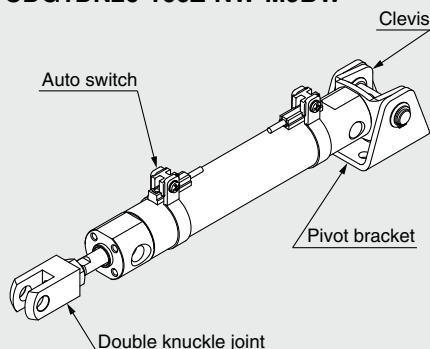
Mounting		Basic	Axial foot	Rod flange	Head flange	Rod trunnion	Head trunnion	Clevis
Standard	Rod end nut	●	●	●	●	●	●	●
	Clevis pin	—	—	—	—	—	—	●
Option	Single knuckle joint	●	●	●	●	●	●	●
	Double knuckle joint (with pin)**	●	●	●	●	●	●	●
	Pivot bracket	—	—	—	—	●*	●*	●

* Not available for ø80 and ø100.

** A double knuckle joint pin and retaining rings are shipped together.

Ordering Example of Cylinder Assembly

Cylinder model:
CDG1DN20-100Z-NW-M9BW



Mounting D: Clevis
Pivot bracket N: Yes
Rod end bracket W: Double knuckle joint
Auto switch D-M9BW: 2 pcs.

* Pivot bracket, double knuckle joint and auto switch are shipped together with the product, but not assembled.

Standard Strokes

Bore size (mm)	Standard stroke (mm) ^{Note}
20	25, 50, 75, 100, 125, 150, 200
25	25, 50, 75, 100, 125, 150, 200, 250, 300
32	
40	
50, 63	
80	
100	

Note) Manufacture of intermediate strokes in 1 mm intervals is possible. (Spacers are not used.)
Produced upon receipt of order.

Series CG1

Mounting Brackets/Part No.

Mounting bracket	Order qty.	Bore size (mm)								Contents
		20	25	32	40	50	63	80	100	
Foot	2 ^{Note)}	CG-L020	CG-L025	CG-L032	CG-L040	CG-L050	CG-L063	CG-L080	CG-L100	2 feet, 8 mounting bolts
Flange	1	CG-F020	CG-F025	CG-F032	CG-F040	CG-F050	CG-F063	CG-F080	CG-F100	1 flange, 4 mounting bolts
Trunnion pin	1	CG-T020	CG-T025	CG-T032	CG-T040	CG-T050	CG-T063	—	—	2 trunnion pins, 2 trunnion bolts, 2 flat washers
Clevis	1	CG-D020	CG-D025	CG-D032	CG-D040	CG-D050	CG-D063	CG-D080	CG-D100	1 clevis, 4 mounting bolts, 1 clevis pin, 2 retaining rings
Pivot bracket	1	CG-020-24A	CG-025-24A	CG-032-24A	CG-040-24A	CG-050-24A	CG-063-24A	CG-080-24A	CG-100-24A	1 pivot bracket

Note) Order two foot brackets per cylinder.

Mounting Brackets, Accessories/Material, Surface Treatment

Segment	Description	Material	Surface treatment	
Mounting brackets	Foot	Carbon steel	Nickel plating	
	Flange	Carbon steel (ø20 to ø63)	Nickel plating	
		Cast iron (ø80, ø100)	Nickel plating	
	Clevis	Carbon steel (ø20 to ø63)	Nickel plating	
		Cast iron (ø80, ø100)	Nickel plating	
	Trunnion pin	Trunnion pin	Carbon steel	Salt-bath nitrocarburizing
		Trunnion bolt	Carbon steel	Nickel plating
Flat washer		Carbon steel	Nickel plating	
Accessories	Rod end nut	Carbon steel	Plating	
	Single knuckle joint	Carbon steel (ø20 to ø32)	Nickel plating	
		Cast iron (ø40 to ø100)	Zinc chromate	
	Double knuckle joint	Carbon steel (ø20 to ø32)	Nickel plating	
		Cast iron (ø40 to ø100)	Zinc chromate	
	Knuckle pin	Carbon steel	—	
	Clevis pin	Carbon steel	—	
	Pivot bracket	Carbon steel (ø20 to ø63)	Nickel plating	
		Cast iron (ø80, ø100)	Nickel plating	
	Mounting bolt	Carbon steel	Nickel plating	
Retaining ring	Carbon tool steel	Phosphate coating		

Weights

Bore size (mm)		20	25	32	40	50	63	80	100	(kg)
Basic weight	Basic (B)	0.11	0.17	0.24	0.44	0.79	1.06	2.07	3.16	
	Basic (Z)	0.11	0.17	0.25	0.45	0.80	1.09	—	—	
	Axial foot	0.21	0.29	0.40	0.67	1.26	1.77	3.04	4.91	
	Flange	0.18	0.26	0.38	0.65	1.16	1.64	2.78	4.44	
	Trunnion	0.12	0.19	0.28	0.49	0.88	1.20	—	—	
	Clevis	0.17	0.25	0.39	0.68	1.19	1.78	2.77	4.44	
Pivot bracket		0.08	0.09	0.17	0.25	0.44	0.80	0.98	1.75	
Single knuckle joint		0.05	0.09	0.09	0.10	0.22	0.22	0.39	0.57	
Double knuckle joint (with pin)		0.05	0.09	0.09	0.13	0.26	0.26	0.64	1.31	
Additional weight per 50 mm of stroke		0.05	0.07	0.09	0.14	0.21	0.25	0.35	0.50	
Additional weight for switch magnet		0.01	0.01	0.01	0.01	0.01	0.02	0.02	0.04	
Weight reduction for female rod end		-0.01	-0.02	-0.02	-0.05	-0.10	-0.10	-0.19	-0.27	

Calculation (Example) **CDG1FN20-100Z** (Built-in magnet, Flange type, ø20, 100 stroke)

- Basic weight..... 0.18 kg (Flange type, ø20) • Air cylinder stroke..... 100 mm
- Additional weight for stroke..... 0.05 kg/50 mm • Additional weight for switch magnet..... 0.01 kg

$$0.18 + 0.05 \times (100/50) + 0.01 = 0.29 \text{ kg}$$

Weights of Cylinder Movable Parts

Bore size (mm)	20	25	32	40	50	63	80	100	(g)
Male rod end	40.0	68.5	96.0	209.7	379.1	409.7	827.8	1259.7	
Female rod end	30.9	51.7	77.0	161.0	282.0	312.5	637.4	991.5	

Additional Weights

Bore size (mm)	20	25	32	40	50	63	80	100	(g)
Additional weight per 50 mm of stroke	19.6	30.6	44.1	78.4	122.5	122.5	191.4	275.7	
Switch magnet	3.5	4.0	9.0	12.6	14.0	22.0	24.0	35.0	

* Do not apply a lateral load over the allowable range to the rod end when it is mounted horizontally.

Standard weight of movable parts

Calculation (Example) **CDG1BN40-150Z** (Built-in magnet, Basic type, ø40, 150 stroke)

- Standard weight of movable parts: Male rod end, Bore size [40] 209.7 g
- Additional weight: Additional weight of stroke 78.4 x 150/50 = 235.2 g 235.2 g
- Switch magnet 12.6 g

Total 457.5 g

Maximum Allowable Kinetic Energy

Bore size (mm)	20	25	32	40	50	63	80	100
Male rod end	0.28	0.41	0.66	1.20	2.00	3.40	5.90	9.90
Female rod end	0.11	0.18	0.29	0.52	0.91	1.54	2.71	4.54

Kinetic energy E (J) = $\frac{(m_1 + m_2)V^2}{2}$

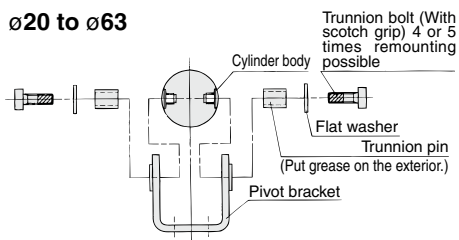
m₁: Mass of cylinder movable parts kg
m₂: Load mass kg
V : Piston speed at the end m/s

Mounting Procedure

Mounting procedure for trunnion

Follow the procedures below when mounting a pivot bracket on the trunnion.

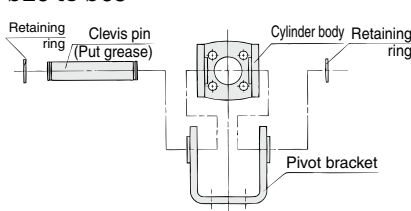
ø20 to ø63



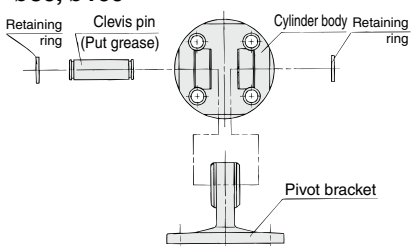
Mounting procedure for clevis

Follow the procedures below when mounting a pivot bracket on the clevis type.

ø20 to ø63



ø80, ø100



⚠ Precautions

Be sure to read before handling. Refer to back cover for Safety Instructions, "Handling Precautions for SMC Products" (M-E03-3) and the Operation Manual for Actuator Precautions and Auto Switch Precautions. Please download it via our website, <http://www.smcworld.com>

Operating Precautions

⚠ Warning

1. **Use within the specified cylinder speed and kinetic energy ranges.**
Otherwise, cylinder and seal damage may occur.
2. **When the cylinder is used as mounted with a single side fixed or free (basic type, flange type), a bending moment will be applied to the cylinder due to the vibration generated at the stroke end, and the cylinder may be damaged. In such a case, mount a bracket to reduce the vibration of the cylinder or use the cylinder at a piston speed low enough to prevent the cylinder from vibrating at the stroke end.**
Also, please use a support bracket to reduce vibrations when the cylinder body moves or when the cylinder is fixed horizontally on one side and moved at a high speed and frequency.
3. **Do not apply excessive lateral load to the piston rod.**
Easy checking method
Minimum operating pressure after the cylinder is mounted to the equipment (MPa) = Minimum operating pressure of cylinder (MPa) + {Load weight (kg) x Friction coefficient of guide/Sectional area of cylinder (mm²)}
If smooth operation is confirmed within the above value, the load on the cylinder is the resistance of the thrust only and it can be judged as having no lateral load.

⚠ Caution

1. **Do not use the air cylinder as an air-hydro cylinder.**
This will cause an oil leak.
2. **Tighten clevis bracket mounting bolts with the following proper tightening torque.**
ø20: 1.5 N·m, ø25 to 32: 2.9 N·m, ø40: 4.9 N·m, ø50: 11.8 N·m, ø63 to 80: 24.5 N·m, ø100: 42.2 N·m

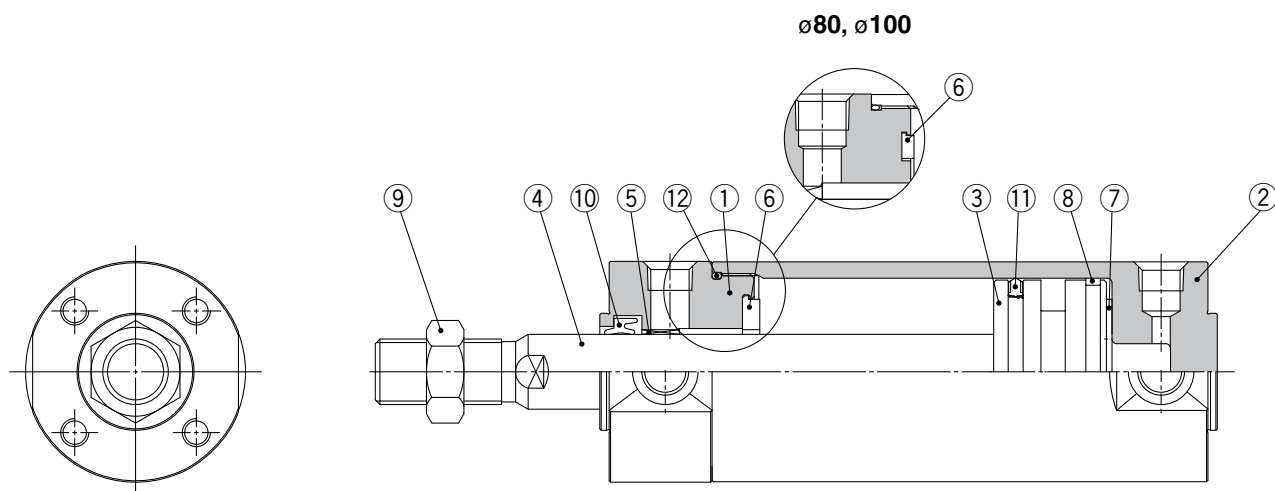
Disassembly/Replacement

⚠ Caution

1. **Do not replace the bushings.**
The bushings are press-fit. To replace them, they must be replaced together with the cover assembly.
2. **To replace a seal, apply grease to the new seal before installing it.**
If the cylinder is put into operation without applying grease to the seal, it could cause the seal to wear significantly, leading to premature air leakage.
3. **Cylinders with ø50 or larger bore sizes cannot be disassembled.**
When disassembling cylinders with bore sizes of ø20 through ø40, grip the double flat part of either the head cover or the rod cover with a vise and loosen the other side with a wrench or a monkey wrench, etc., and then remove the cover. When re-tightening, tighten approximately 2 degrees more than the original position. (Cylinders with ø50 or larger bore sizes are tightened with a large tightening torque and cannot be disassembled. If disassembly is required, please contact SMC.)

Series CG1

Construction



Note) Cylinder sizes ø80 and ø100 do not have trunnion mounting female thread.

Component Parts

No.	Description	Material	Note
1	Rod cover	Aluminum alloy	Hard anodized
2	Tube cover	Aluminum alloy	Hard anodized
3	Piston	Aluminum alloy	
4	Piston rod	Carbon steel*	Hard chrome plating*
5	Bushing	Bearing alloy	
6	Bumper A	Resin	
7	Bumper B	Resin	ø32 or larger: The same as bumper A
8	Wear ring	Resin	
9	Rod end nut	Carbon steel	Plating
10	Rod seal	NBR	
11	Piston seal	NBR	
12	Tube gasket	NBR	

Note) For cylinders with auto switches, the magnet is installed in the piston.

* The material for ø20, ø25 cylinders with auto switches is made of stainless steel.

Replacement Parts/Seal Kit

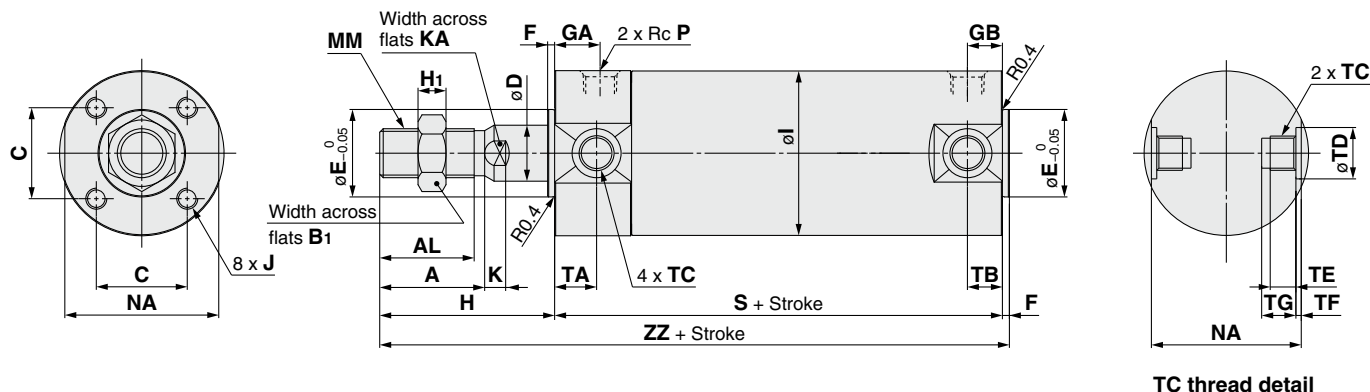
Bore size (mm)	Kit no.	Contents
20	CG1N20Z-PS	Set of the nos. ⑩, ⑪, ⑫
25	CG1N25Z-PS	
32	CG1N32Z-PS	
40	CG1N40Z-PS	

Note) Refer to the Specific Product Precautions on page 4 for Disassembly/Replacement. Order with the kit number according to the bore size.

* The seal kit includes a grease pack (10 g). Order with the following part number when only the grease pack is needed.

Grease pack part number: GR-S-010 (10 g)

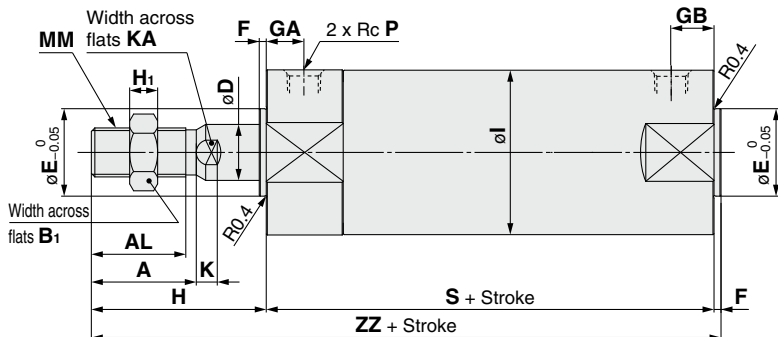
Basic: CG1BN



Bore size	Standard stroke	A	AL	B ₁	C	D	E	F	GA	GB	H	H ₁	I	J	K	KA	MM	NA	P	S	TA	TB	ZZ
20	Up to 200	18	15.5	13	14	8	12	2	12	10	35	5	26	M4 x 0.7 depth 7	5	6	M8 x 1.25	24	1/8	69	11	11	106
25	Up to 300	22	19.5	17	16.5	10	14	2	12	10	40	6	31	M5 x 0.8 depth 7.5	5.5	8	M10 x 1.25	29	1/8	69	11	11	111
32	Up to 300	22	19.5	17	20	12	18	2	12	10	40	6	38	M5 x 0.8 depth 8	5.5	10	M10 x 1.25	35.5	1/8	71	11	10	113
40	Up to 300	30	27	19	26	16	25	2	13	10	50	8	47	M6 x 1 depth 12	6	14	M14 x 1.5	44	1/8	78	12	10	130
50	Up to 300	35	32	27	32	20	30	2	14	12	58	11	58	M8 x 1.25 depth 16	7	18	M18 x 1.5	55	1/4	90	13	12	150
63	Up to 300	35	32	27	38	20	32	2	14	12	58	11	72	M10 x 1.5 depth 16	7	18	M18 x 1.5	69	1/4	90	13	12	150
80	Up to 300	40	37	32	50	25	40	3	20	16	71	13	89	M10 x 1.5 depth 22	10	22	M22 x 1.5	86	3/8	108	—	—	182
100	Up to 300	40	37	41	60	30	50	3	20	16	71	16	110	M12 x 1.75 depth 22	10	26	M26 x 1.5	106	1/2	108	—	—	182

* When female thread is used, use a washer, etc. to prevent the contact part at the rod end from being deformed depending on the material of the work piece.

Basic (No Trunnion Mounting Female Thread): CG1ZN

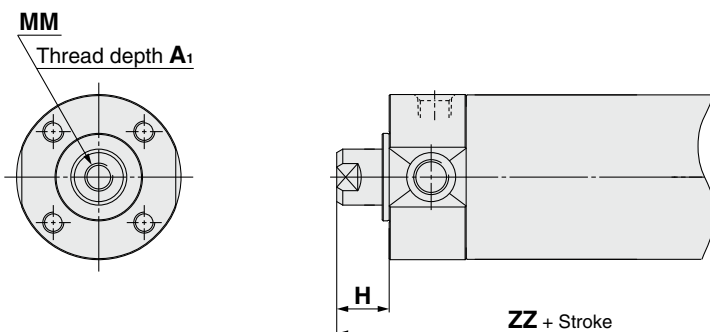


TA/TB Sectional View (mm)

Bore size	TC	TD	TE	TF	TG
20	M5 x 0.8	8 ^{+0.08} ₀	4	0.5	5.5
25	M6 x 0.75	10 ^{+0.08} ₀	5	1	6.5
32	M8 x 1.0	12 ^{+0.08} ₀	5.5	1	7.5
40	M10 x 1.25	14 ^{+0.08} ₀	6	1.25	8.5
50	M12 x 1.25	16 ^{+0.08} ₀	7.5	2	10
63	M14 x 1.5	18 ^{+0.08} ₀	11.5	3	14.5
80	—	—	—	—	—
100	—	—	—	—	—

* Cylinder sizes ø80 and ø100 do not have trunnion mounting female thread on the width across flats NA.

Female rod end

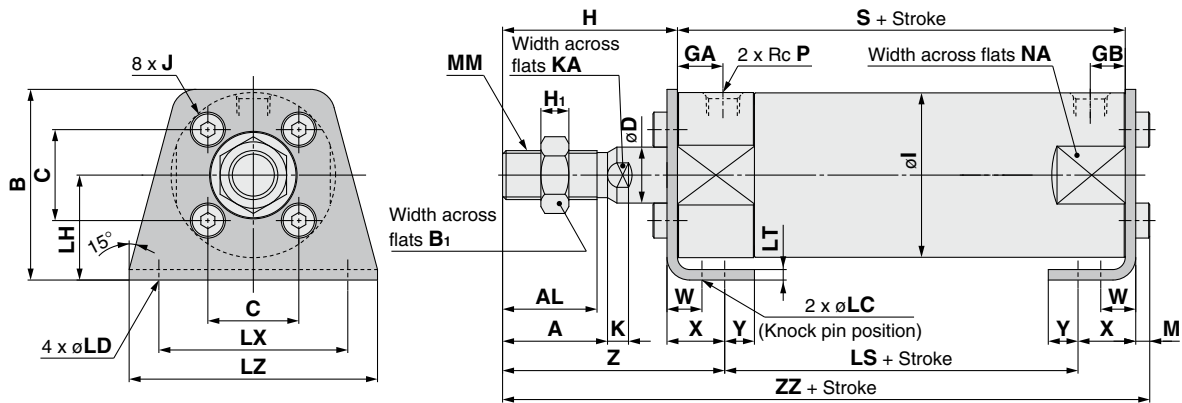


Female Rod End (mm)

Bore size	A ₁	H	MM	ZZ
20	8	13	M4 x 0.7	84
25	8	14	M5 x 0.8	85
32	12	14	M6 x 1	87
40	13	15	M8 x 1.25	95
50	18	16	M10 x 1.5	108
63	18	16	M10 x 1.5	108
80	21	19	M14 x 1.5	130
100	25	22	M16 x 1.5	133

Series CG1

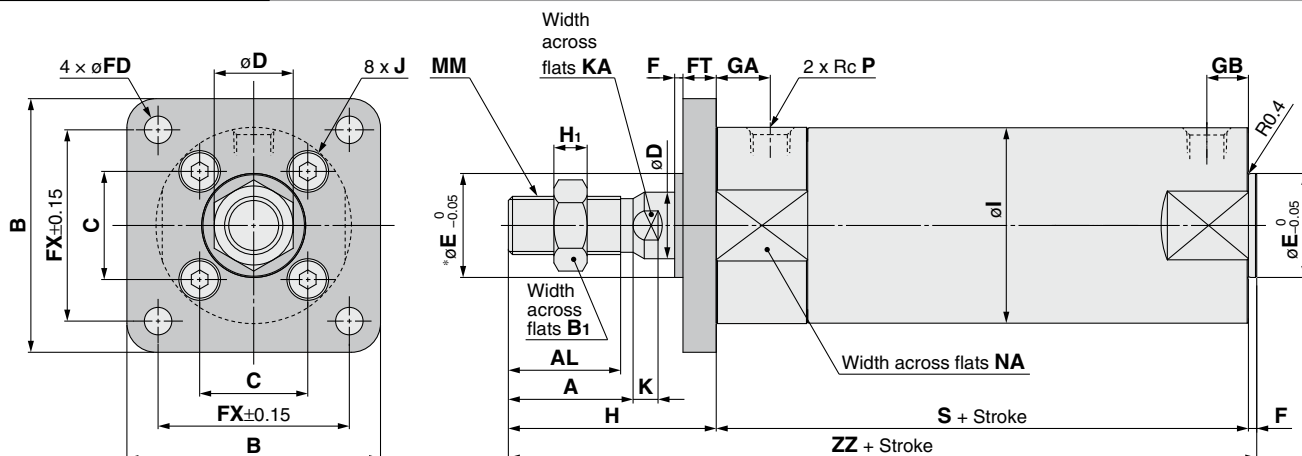
Axial Foot: CG1LN



Bore size	Standard stroke	A	AL	B	B ₁	C	D	GA	GB	H	H ₁	I	J	K	KA	LC	LD	LH	LS	LT	LX	LZ	M	MM	NA	P	S	W	X	Y	Z	ZZ
20	Up to 200	18	15.5	34	13	14	8	12	10	35	5	26	M4 × 0.7	5	6	4	6	20	45	3	32	44	3	M8 × 1.25	24	1/8	69	10	15	7	47	110
25	Up to 300	22	19.5	38.5	17	16.5	10	12	10	40	6	31	M5 × 0.8	5.5	8	4	6	22	45	3	36	49	3.5	M10 × 1.25	29	1/8	69	10	15	7	52	115.5
32	Up to 300	22	19.5	45	17	20	12	12	10	40	6	38	M5 × 0.8	5.5	10	4	7	25	45	3	44	58	3.5	M10 × 1.25	35.5	1/8	71	10	16	8	53	117.5
40	Up to 300	30	27	54.5	19	26	16	13	10	50	8	47	M6 × 1	6	14	4	7	30	51	3	54	71	4	M14 × 1.5	44	1/8	78	10	16.5	8.5	63.5	135
50	Up to 300	35	32	70.5	27	32	20	14	12	58	11	58	M8 × 1.25	7	18	5	10	40	55	4.5	66	86	5	M18 × 1.5	55	1/4	90	17.5	22	11	75.5	157.5
63	Up to 300	35	32	82.5	27	38	20	14	12	58	11	72	M10 × 1.5	7	18	5	12	45	55	4.5	82	106	5	M18 × 1.5	69	1/4	90	17.5	22	13	75.5	157.5
80	Up to 300	40	37	101	32	50	25	20	16	71	13	89	M10 × 1.5	10	22	6	11	55	60	4.5	100	125	5	M22 × 1.5	86	3/8	108	20	28.5	14	95	188.5
100	Up to 300	40	37	121	41	60	30	20	16	71	16	110	M12 × 1.75	10	26	6	14	65	60	6	120	150	7	M26 × 1.5	106	1/2	108	20	30	16	95	192

* For the female rod end type, since the wrench flap (K and KA portions) will be inside of the bracket when the piston rod is retracted at the stroke end, extend the piston rod to tighten the nut using a tool, and mount a workpiece on the rod end.
 * Refer to the basic type for the female rod end type.

Rod Flange: CG1FN



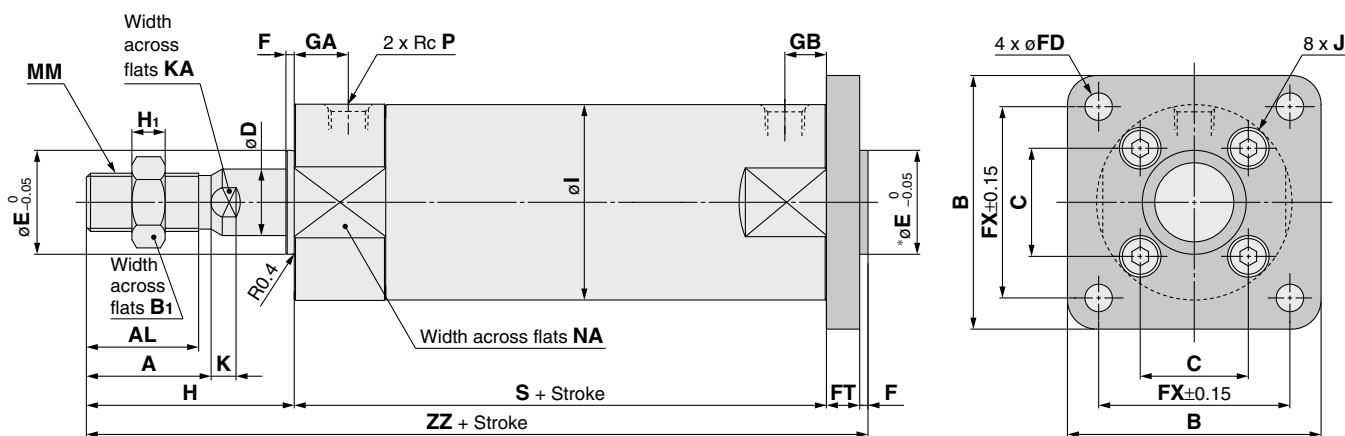
* End boss is machined on the flange for øE.

Bore size	Standard stroke	A	AL	B	B ₁	C	D	E	F	FD	FT	FX	GA	GB	H	H ₁	I	J	K	KA	MM	NA	P	S	ZZ
20	Up to 200	18	15.5	40	13	14	8	12	2	5.5	6	28	12	10	35	5	26	M4 x 0.7	5	6	M8 x 1.25	24	1/8	69	106
25	Up to 300	22	19.5	44	17	16.5	10	14	2	5.5	7	32	12	10	40	6	31	M5 x 0.8	5.5	8	M10 x 1.25	29	1/8	69	111
32	Up to 300	22	19.5	53	17	20	12	18	2	6.6	7	38	12	10	40	6	38	M5 x 0.8	5.5	10	M10 x 1.25	35.5	1/8	71	113
40	Up to 300	30	27	61	19	26	16	25	2	6.6	8	46	13	10	50	8	47	M6 x 1	6	14	M14 x 1.5	44	1/8	78	130
50	Up to 300	35	32	76	27	32	20	30	2	9	9	58	14	12	58	11	58	M8 x 1.25	7	18	M18 x 1.5	55	1/4	90	150
63	Up to 300	35	32	92	27	38	20	32	2	11	9	70	14	12	58	11	72	M10 x 1.5	7	18	M18 x 1.5	69	1/4	90	150
80	Up to 300	40	37	104	32	50	25	40	3	11	11	82	20	16	71	13	89	M10 x 1.5	10	22	M22 x 1.5	86	3/8	108	182
100	Up to 300	40	37	128	41	60	30	50	3	14	14	100	20	16	71	16	110	M12 x 1.75	10	26	M26 x 1.5	106	1/2	108	182

* For the female rod end type, since the wrench flap (K and KA portions) will be inside of the bracket when the piston rod is retracted at the stroke end, extend the piston rod to tighten the nut using a tool, and mount a workpiece on the rod end.

* Refer to the basic type for the female rod end type.

Head Flange: CG1GN



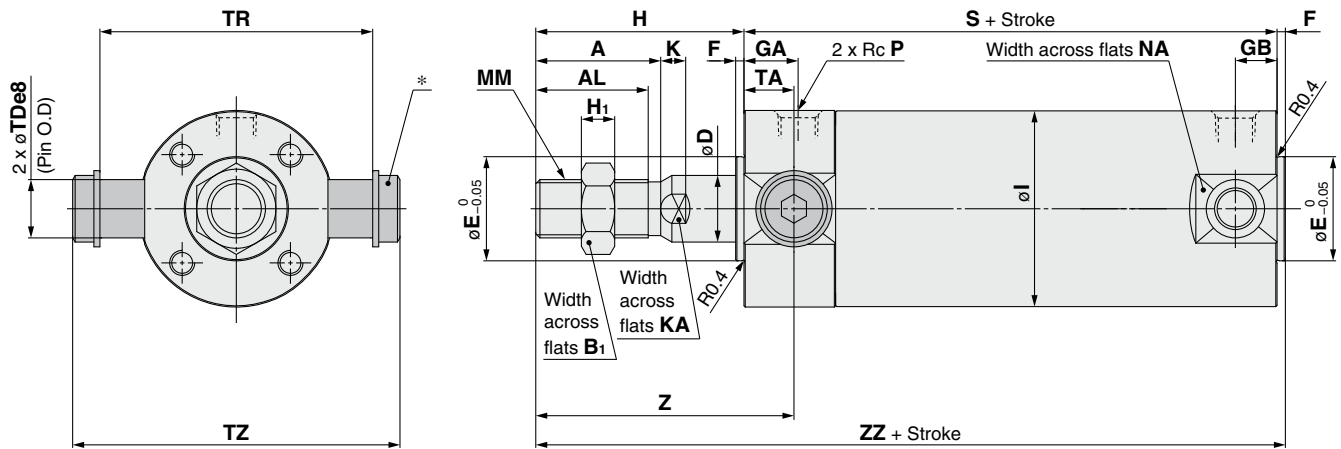
* End boss is machined on the flange for øE.

Bore size	Standard stroke	A	AL	B	B ₁	C	D	E	F	FD	FT	FX	GA	GB	H	H ₁	I	J	K	KA	MM	NA	P	S	ZZ
20	Up to 200	18	15.5	40	13	14	8	12	2	5.5	6	28	12	10	35	5	26	M4 x 0.7	5	6	M8 x 1.25	24	1/8	69	112
25	Up to 300	22	19.5	44	17	16.5	10	14	2	5.5	7	32	12	10	40	6	31	M5 x 0.8	5.5	8	M10 x 1.25	29	1/8	69	118
32	Up to 300	22	19.5	53	17	20	12	18	2	6.6	7	38	12	10	40	6	38	M5 x 0.8	5.5	10	M10 x 1.25	35.5	1/8	71	120
40	Up to 300	30	27	61	19	26	16	25	2	6.6	8	46	13	10	50	8	47	M6 x 1	6	14	M14 x 1.5	44	1/8	78	138
50	Up to 300	35	32	76	27	32	20	30	2	9	9	58	14	12	58	11	58	M8 x 1.25	7	18	M18 x 1.5	55	1/4	90	159
63	Up to 300	35	32	92	27	38	20	32	2	11	9	70	14	12	58	11	72	M10 x 1.5	7	18	M18 x 1.5	69	1/4	90	159
80	Up to 300	40	37	104	32	50	25	40	3	11	11	82	20	16	71	13	89	M10 x 1.5	10	22	M22 x 1.5	86	3/8	108	193
100	Up to 300	40	37	128	41	60	30	50	3	14	14	100	20	16	71	16	110	M12 x 1.75	10	26	M26 x 1.5	106	1/2	108	196

* Refer to the basic type for the female rod end type.

Series CG1

Rod Trunnion: CG1UN

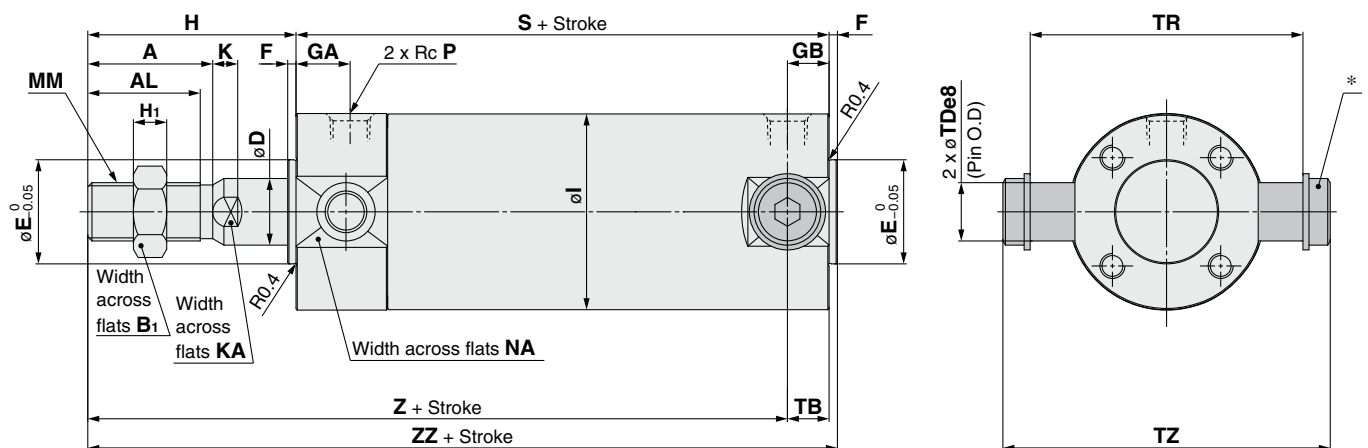


* Constructed of a trunnion pin, flat washer and hexagon socket head cap screw.

Bore size	Standard stroke	A	AL	B ₁	D	E	F	GA	GB	H	H ₁	I	K	KA	MM	NA	P	S	TA	TDe8	TR	TZ	Z	ZZ
20	Up to 200	18	15.5	13	8	12	2	12	10	35	5	26	5	6	M8 x 1.25	24	1/8	69	11	8 ^{-0.025} _{-0.047}	39	47.6	46	106
25	Up to 300	22	19.5	17	10	14	2	12	10	40	6	31	5.5	8	M10 x 1.25	29	1/8	69	11	10 ^{-0.025} _{-0.047}	43	53	51	111
32	Up to 300	22	19.5	17	12	18	2	12	10	40	6	38	5.5	10	M10 x 1.25	35.5	1/8	71	11	12 ^{-0.032} _{-0.059}	54.5	67.7	51	113
40	Up to 300	30	27	19	16	25	2	13	10	50	8	47	6	14	M14 x 1.5	44	1/8	78	12	14 ^{-0.032} _{-0.059}	65.5	78.7	62	130
50	Up to 300	35	32	27	20	30	2	14	12	58	11	58	7	18	M18 x 1.5	55	1/4	90	13	16 ^{-0.032} _{-0.059}	80	98.6	71	150
63	Up to 300	35	32	27	20	32	2	14	12	58	11	72	7	18	M18 x 1.5	69	1/4	90	13	18 ^{-0.032} _{-0.059}	98	119.2	71	150

* Refer to the basic type for the female rod end type.

Head Trunnion: CG1TN

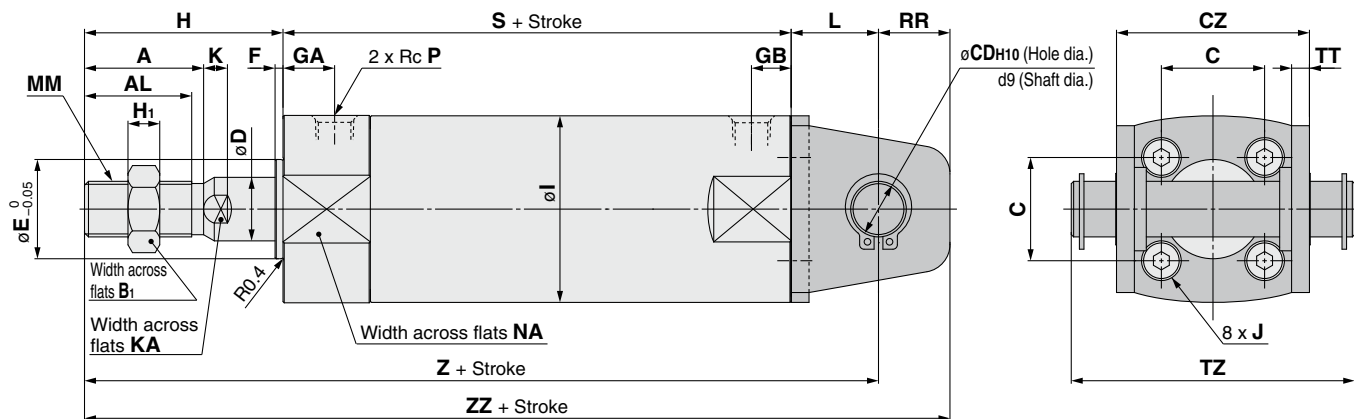


* Constructed of a trunnion pin, flat washer and hexagon socket head cap screw.

Bore size	Standard stroke	A	AL	B ₁	D	E	F	GA	GB	H	H ₁	I	K	KA	MM	NA	P	S	TB	TDe8	TR	TZ	Z	ZZ
20	Up to 200	18	15.5	13	8	12	2	12	10	35	5	26	5	6	M8 x 1.25	24	1/8	69	11	8 ^{-0.025} _{-0.047}	39	47.6	93	106
25	Up to 300	22	19.5	17	10	14	2	12	10	40	6	31	5.5	8	M10 x 1.25	29	1/8	69	11	10 ^{-0.025} _{-0.047}	43	53	98	111
32	Up to 300	22	19.5	17	12	18	2	12	10	40	6	38	5.5	10	M10 x 1.25	35.5	1/8	71	10	12 ^{-0.032} _{-0.059}	54.5	67.7	101	113
40	Up to 300	30	27	19	16	25	2	13	10	50	8	47	6	14	M14 x 1.5	44	1/8	78	10	14 ^{-0.032} _{-0.059}	65.5	78.7	118	130
50	Up to 300	35	32	27	20	30	2	14	12	58	11	58	7	18	M18 x 1.5	55	1/4	90	12	16 ^{-0.032} _{-0.059}	80	98.6	136	150
63	Up to 300	35	32	27	20	32	2	14	12	58	11	72	7	18	M18 x 1.5	69	1/4	90	12	18 ^{-0.032} _{-0.059}	98	119.2	136	150

* Refer to the basic type for the female rod end type.

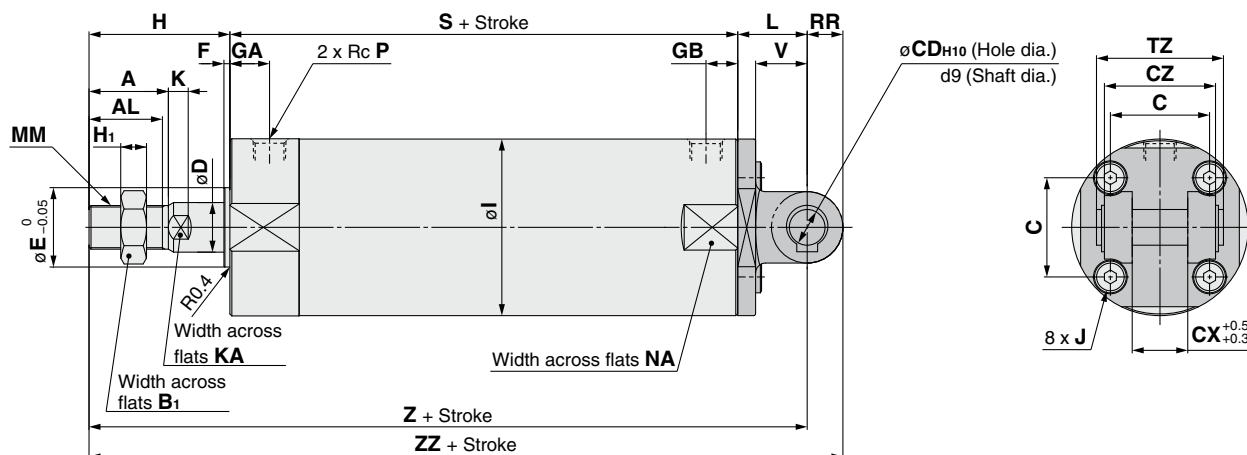
Clevis: CG1DN (ø20 to ø63)



Bore size	Standard stroke	A	AL	B ₁	C	CD	CZ	D	E	F	GA	GB	H	H ₁	I	J	K	KA	L	MM	NA	P	RR	S	TT	TZ	Z	ZZ	Applicable pin part no.
20	Up to 200	18	15.5	13	14	8	29	8	12	2	12	10	35	5	26	M4 x 0.7	5	6	14	M8 x 1.25	24	1/8	11	69	3.2	43.4	118	129	CD-G02
25	Up to 300	22	19.5	17	16.5	10	33	10	14	2	12	10	40	6	31	M5 x 0.8	5.5	8	16	M10 x 1.25	29	1/8	13	69	3.2	48	125	138	CD-G25
32	Up to 300	22	19.5	17	20	12	40	12	18	2	12	10	40	6	38	M5 x 0.8	5.5	10	20	M10 x 1.25	35.5	1/8	15	71	4.5	59.4	131	146	CD-G03
40	Up to 300	30	27	19	26	14	49	16	25	2	13	10	50	8	47	M6 x 1	6	14	22	M14 x 1.5	44	1/8	18	78	4.5	71.4	150	168	CD-G04
50	Up to 300	35	32	27	32	16	60	20	30	2	14	12	58	11	58	M8 x 1.25	7	18	25	M18 x 1.5	55	1/4	20	90	6	86	173	193	CD-G05
63	Up to 300	35	32	27	38	18	74	20	32	2	14	12	58	11	72	M10 x 1.5	7	18	30	M18 x 1.5	69	1/4	22	90	8	105.4	178	200	CD-G06

* Refer to the basic type for the female rod end type.

Clevis: CG1DN (ø80, ø100)



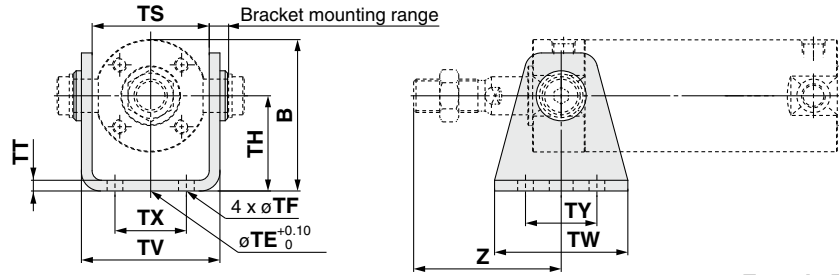
Bore size	Standard stroke	A	AL	B ₁	C	CD	CX	CZ	D	E	F	GA	GB	H	H ₁	I	J	K	KA	L	MM	NA	P	RR	S	TZ	V	Z	ZZ	Applicable pin part no.
80	Up to 300	40	37	32	50	18	28	56	25	40	3	20	16	71	13	89	M10 x 1.5	10	22	35	M22 x 1.5	86	3/8	18	108	64	26	214	232	IY-G08
100	Up to 300	40	37	41	60	22	32	64	30	50	3	20	16	71	16	110	M12 x 1.75	10	26	43	M26 x 1.5	106	1/2	22	108	72	32	222	244	IY-G10

* Refer to the basic type for the female rod end type.

Series CG1

With Pivot Bracket

Rod Trunnion (U) with Pivot Bracket



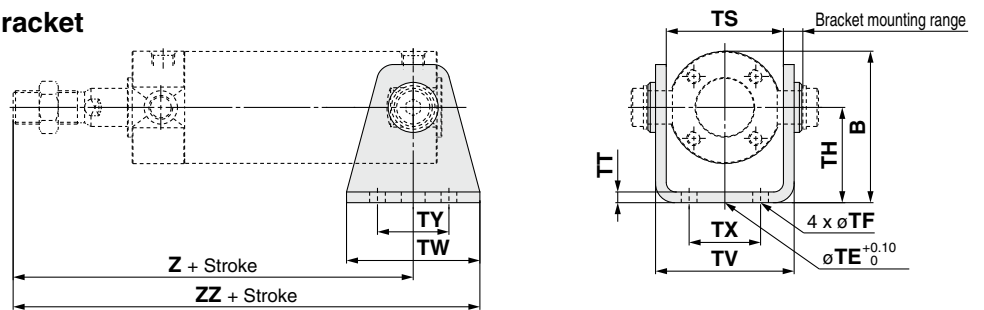
Male Thread

Bore size	B	TE	TF	TH	TS	TT	TV	TW	TX	TY	Z
20	38	10	5.5	25	28	3.2	35.8	42	16	28	46
25	45.5	10	5.5	30	33	3.2	39.8	42	20	28	51
32	54	10	6.6	35	40	4.5	49.4	48	22	28	51
40	63.5	10	6.6	40	49	4.5	58.4	56	30	30	62
50	79	20	9	50	60	6	72.4	64	36	36	71
63	96	20	11	60	74	8	90.4	74	46	46	71

Female Thread (mm)

Bore size	Z
20	24
25	25
32	25
40	27
50	29
63	29

Head Trunnion (T) with Pivot Bracket



Male Thread

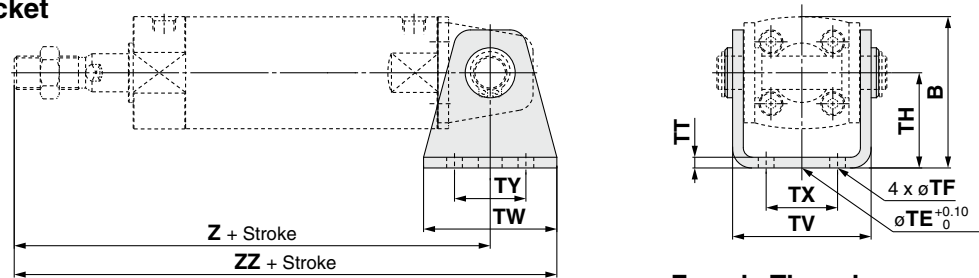
Bore size	B	TE	TF	TH	TS	TT	TV	TW	TX	TY	Z	ZZ
20	38	10	5.5	25	28	3.2	35.8	42	16	28	93	114
25	45.5	10	5.5	30	33	3.2	39.8	42	20	28	98	119
32	54	10	6.6	35	40	4.5	49.4	48	22	28	101	125
40	63.5	10	6.6	40	49	4.5	58.4	56	30	30	118	146
50	79	20	9	50	60	6	72.4	64	36	36	136	168
63	96	20	11	60	74	8	90.4	74	46	46	136	173

Female Thread (mm)

Bore size	Z	ZZ
20	71	92
25	72	93
32	75	99
40	83	111
50	94	126
63	94	131

Clevis (D) with Pivot Bracket

ø20 to ø63



Male Thread

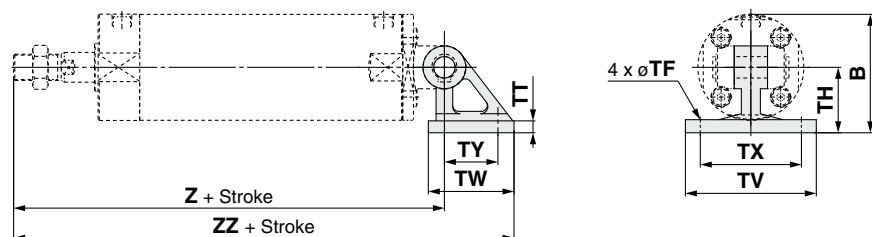
Bore size	B	TE	TF	TH	TT	TV	TW	TX	TY	Z	ZZ
20	38	10	5.5	25	3.2	35.8	42	16	28	118	139
25	45.5	10	5.5	30	3.2	39.8	42	20	28	125	146
32	54	10	6.6	35	4.5	49.4	48	22	28	131	155
40	63.5	10	6.6	40	4.5	58.4	56	30	30	150	178
50	79	20	9	50	6	72.4	64	36	36	173	205
63	96	20	11	60	8	90.4	74	46	46	178	215

Female Thread (mm)

Bore size	Z	ZZ
20	96	117
25	99	120
32	105	129
40	115	143
50	131	163
63	136	173

Clevis (D) with Pivot Bracket

ø80, ø100



Male Thread

Bore size	B	TF	TH	TT	TV	TW	TX	TY	Z	ZZ
80	99.5	11	55	11	110	72	85	45	214	272.5
100	120	13.5	65	12	130	93	100	60	222	298.5

Female Thread (mm)

Bore size	Z	ZZ
80	162	220.5
100	173	249.5

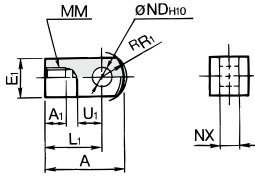
Series CG1

Dimensions of Accessories

Single Knuckle Joint

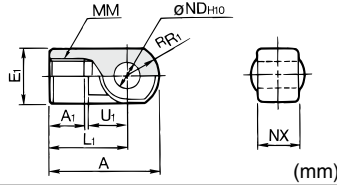
I-G02/G03

Material: Carbon steel



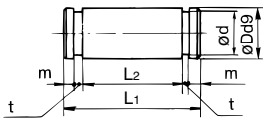
I-G04/G05/G08/G10

Material: Cast iron



Part no.	Applicable bore size	A	A ₁	E ₁	L ₁	MM	R ₁	U ₁	ND _{H10}	NX
I-G02	20	34	8.5	□16	25	M8 x 1.25	10.3	11.5	8 ^{+0.058} ₀	8 ^{-0.2} _{-0.4}
I-G03	25,32	41	10.5	□20	30	M10 x 1.25	12.8	14	10 ^{+0.058} ₀	10 ^{-0.2} _{-0.4}
I-G04	40	42	14	∅22	30	M14 x 1.5	12	14	10 ^{+0.058} ₀	18 ^{-0.3} _{-0.5}
I-G05	50,63	56	18	∅28	40	M18 x 1.5	16	20	14 ^{+0.070} ₀	22 ^{-0.3} _{-0.5}
I-G08	80	71	21	∅38	50	M22 x 1.5	21	27	18 ^{+0.070} ₀	28 ^{-0.3} _{-0.5}
I-G10	100	79	21	∅44	55	M26 x 1.5	24	31	22 ^{+0.084} ₀	32 ^{-0.3} _{-0.5}

Knuckle Pin

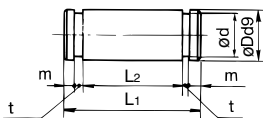


Material: Carbon steel

Part no.	Applicable bore size	D _{d9}	L ₁	d	L ₂	m	t	Included retaining ring
IY-G02	20	8 ^{-0.040} _{-0.076}	21	7.6	16.2	1.5	0.9	Type C8 for axis
IY-G03	25,32	10 ^{-0.040} _{-0.076}	25.6	9.6	20.2	1.55	1.15	Type C10 for axis
IY-G04	40	10 ^{-0.040} _{-0.076}	41.6	9.6	36.2	1.55	1.15	Type C10 for axis
IY-G05	50,63	14 ^{-0.050} _{-0.093}	50.6	13.4	44.2	2.05	1.15	Type C14 for axis
IY-G08	80	18 ^{-0.050} _{-0.093}	64	17	56.2	2.55	1.35	Type C18 for axis
IY-G10	100	22 ^{-0.065} _{-0.117}	72	21	64.2	2.55	1.35	Type C22 for axis

* Retaining rings are included.

Clevis Pin



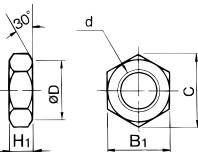
Material: Carbon steel

Part no.	Applicable bore size	D _{d9}	L ₁	d	L ₂	m	t	Included retaining ring
CD-G02	20	8 ^{-0.040} _{-0.076}	43.4	7.6	38.6	1.5	0.9	Type C8 for axis
CD-G25	25	10 ^{-0.040} _{-0.076}	48	9.6	42.6	1.55	1.15	Type C10 for axis
CD-G03	32	12 ^{-0.050} _{-0.093}	59.4	11.5	54	1.55	1.15	Type C12 for axis
CD-G04	40	14 ^{-0.050} _{-0.093}	71.4	13.4	65	2.05	1.15	Type C14 for axis
CD-G05	50	16 ^{-0.050} _{-0.093}	86	15.2	79.6	2.05	1.15	Type C16 for axis
CD-G06	63	18 ^{-0.050} _{-0.093}	105.4	17	97.8	2.45	1.35	Type C18 for axis

* Retaining rings are included.

* A clevis pin and a knuckle pin are common for the bore size ∅80 and ∅100.

Rod End Nut



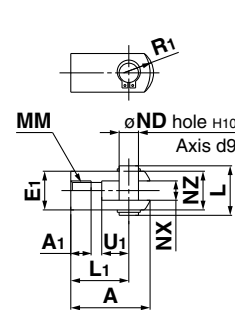
Material: Carbon steel

Part no.	Applicable bore size	d	H ₁	B ₁	C	D
NT-02	20	M8 x 1.25	5	13	(15)	12.5
NT-03	25,32	M10 x 1.25	6	17	(19.6)	16.5
NT-G04	40	M14 x 1.5	8	19	(21.9)	18
NT-05	50,63	M18 x 1.5	11	27	(31.2)	26
NT-08	80	M22 x 1.5	13	32	(37.0)	31
NT-10	100	M26 x 1.5	16	41	(47.3)	39

Double Knuckle Joint

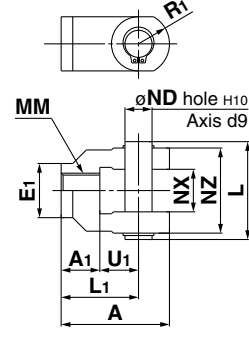
Y-G02/G03

Material: Carbon steel



Y-G04/G05/G08/G10

Material: Cast iron



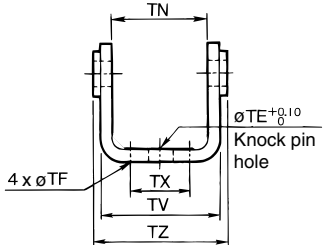
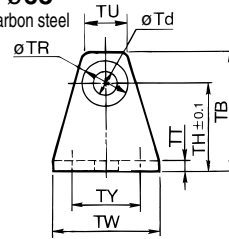
Part no.	Applicable bore size	A	A ₁	E ₁	L ₁	MM	R ₁	U ₁	ND	NX	NZ	L	Included pin part no.
Y-G02	20	34	8.5	□16	25	M8 x 1.25	10.3	11.5	8	8 ^{+0.4} _{+0.2}	16	21	IY-G02
Y-G03	25,32	41	10.5	□20	30	M10 x 1.25	12.8	14	10	10 ^{+0.4} _{+0.2}	20	25.6	IY-G03
Y-G04	40	42	16	∅22	30	M14 x 1.5	12	14	10	18 ^{+0.5} _{+0.3}	36	41.6	IY-G04
Y-G05	50,63	56	20	∅28	40	M18 x 1.5	16	20	14	22 ^{+0.5} _{+0.3}	44	50.6	IY-G05
Y-G08	80	71	23	∅38	50	M22 x 1.5	21	27	18	28 ^{+0.5} _{+0.3}	56	64	IY-G08
Y-G10	100	79	24	∅44	55	M26 x 1.5	24	31	22	32 ^{+0.5} _{+0.3}	64	72	IY-G10

* A knuckle pin and retaining rings are included.

Pivot bracket

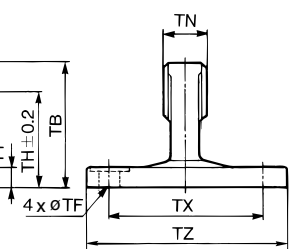
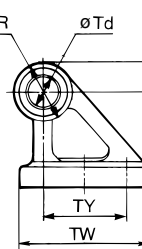
∅20 to ∅63

Material: Carbon steel



∅80, ∅100

Material: Cast iron



Part no.	Applicable bore size	TB	Td	TE	TF	TH	TN	TR	TT
CG-020-24A	20	36	8	10	5.5	25	(29.3)	13	3.2
CG-025-24A	25	43	10	10	5.5	30	(33.1)	15	3.2
CG-032-24A	32	50	12	10	6.6	35	(40.4)	17	4.5
CG-040-24A	40	58	14	10	6.6	40	(49.2)	21	4.5
CG-050-24A	50	70	16	20	9	50	(60.4)	24	6
CG-063-24A	63	82	18	20	11	60	(74.6)	26	8
CG-080-24A	80	73	18	-	11	55	28 ^{+0.5} _{-0.3}	36	11
CG-100-24A	100	90	22	-	13.5	65	32 ^{+0.5} _{-0.3}	50	12

Part no.	Applicable bore size	TU	TV	TW	TX	TY	TZ	Applicable pin O.D.
CG-020-24A	20	(18.1)	(35.8)	42	16	28	38.3	8d ₉ ^{-0.040} _{-0.076}
CG-025-24A	25	(20.7)	(39.8)	42	20	28	42.1	10d ₉ ^{-0.040} _{-0.076}
CG-032-24A	32	(23.6)	(49.4)	48	22	28	53.8	12d ₉ ^{-0.050} _{-0.093}
CG-040-24A	40	(27.3)	(58.4)	56	30	30	64.6	14d ₉ ^{-0.050} _{-0.093}
CG-050-24A	50	(29.7)	(72.4)	64	36	36	79.2	16d ₉ ^{-0.050} _{-0.093}
CG-063-24A	63	(34.3)	(90.4)	74	46	46	97.2	18d ₉ ^{-0.050} _{-0.093}
CG-080-24A	80	-	-	72	85	45	110	18d ₉ ^{-0.050} _{-0.093}
CG-100-24A	100	-	-	93	100	60	130	22d ₉ ^{-0.065} _{-0.117}

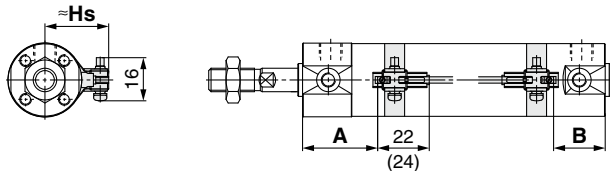
Series CG1 Auto Switch Mounting 1

Auto Switch Proper Mounting Position (Detection at stroke end) and Its Mounting Height

Solid state auto switch

D-M9□/M9□W, D-M9□A

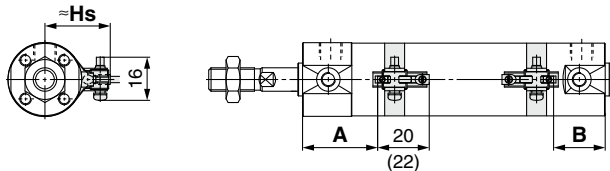
ø20 to ø63



() : Dimension of the D-M9□A.
A and B are the dimensions from the end of the head cover/rod cover to the end of the auto switch.

D-M9□V/M9□WV, D-M9□AV

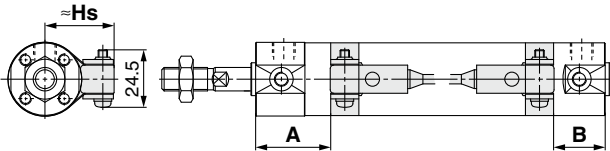
ø20 to ø63



() : Dimension of the D-M9□AV.
A and B are the dimensions from the end of the head cover/rod cover to the end of the auto switch.

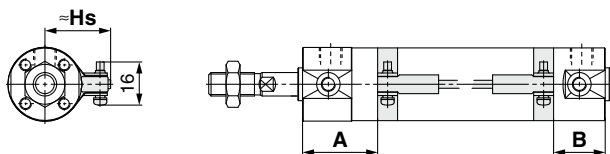
D-G5/K5/G5□W/G5BA
D-K59W, D-G59F, D-G5NT

ø20 to ø100



D-H7□/H7□W
D-H7NF/H7BA/D-H7C

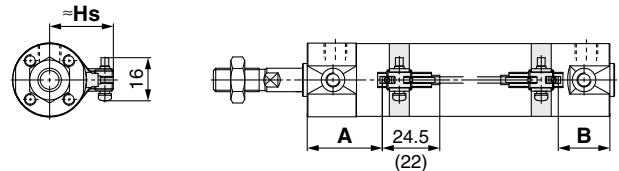
ø20 to ø63



Reed auto switch

D-A9□

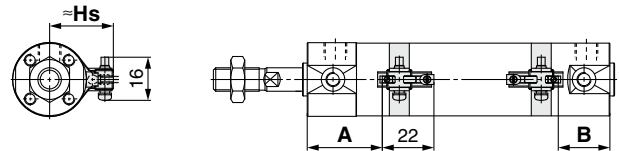
ø20 to ø63



() : Dimension of the D-A96.
A and B are the dimensions from the end of the head cover/rod cover to the end of the auto switch.

D-A9□V

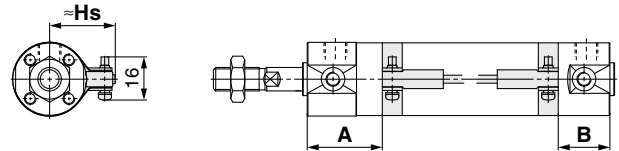
ø20 to ø63



A and B are the dimensions from the end of the head cover/rod cover to the end of the auto switch.

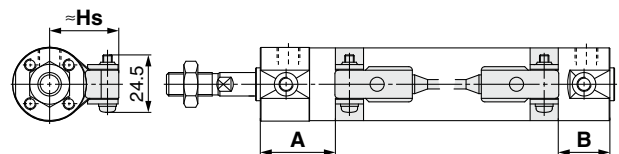
D-C7/C8, D-C73C/C80C

ø20 to ø63



D-B5/B6/B59W

ø20 to ø100



Auto Switch Proper Mounting Position

Auto switch model	D-M9□(V) D-M9□W(V) D-M9□A(V)		D-A9□(V)		D-C7/C8 D-C73C D-C80C		D-B5 D-B6		D-B59W		D-H7□ D-H7C D-H7□W D-H7BA D-H7NF		D-G5□W D-K59W D-G59F D-G5 D-K5 D-G5NT D-G5BA	
	A	B	A	B	A	B	A	B	A	B	A	B	A	B
Bore size 20	33	24	29	20	29.5	20.5	23.5	14.5	26.5	17.5	28.5	19.5	25	16
25	32.5	24.5	28.5	20.5	29	21	23	15	26	18	28	20	24.5	16.5
32	34	25	30	21	30.5	21.5	25	15.5	27.5	18.5	29.5	20.5	26	17
40	39	27	35	23	35.5	23.5	29.5	17.5	32.5	20.5	34.5	22.5	31	19
50	46	32	42	28	42.5	28.5	36.5	22.5	39.5	26	41.5	27.5	38	24
63	44.5	33.5	40.5	29.5	41	30	35	24	38	27	40	29	36.5	25.5
80	—	—	—	—	—	—	48	29	51	32	53	34	50	30.5
100	—	—	—	—	—	—	47	30	50	32.5	52	35	48.5	31.5

Auto Switch Mounting Height

Auto switch model	D-M9□V D-M9□WV D-M9□AV D-A9□V		D-M9□ D-M9□W D-M9□A D-A9□		D-H7□ D-H7□W D-H7NF D-H7BA D-C7/C8		D-C73C D-C80C		D-G5/K5 D-G5□W D-K59W D-G59F D-K59W D-H7C D-B5/B6 D-G5BA D-B59W	
	Hs	Hs	Hs	Hs	Hs	Hs	Hs	Hs		
Bore size 20	25.5	24.5	27	27.5	—	—	—	—		
25	28	27	29.5	30	—	—	—	—		
32	31.5	30.5	33	33.5	—	—	—	—		
40	36	35	37.5	38	—	—	—	—		
50	41.5	40.5	43	43.5	—	—	—	—		
63	48.5	47.5	50	50.5	—	—	—	—		
80	—	—	—	59	—	—	—	—		
100	—	—	—	69.5	—	—	—	—		

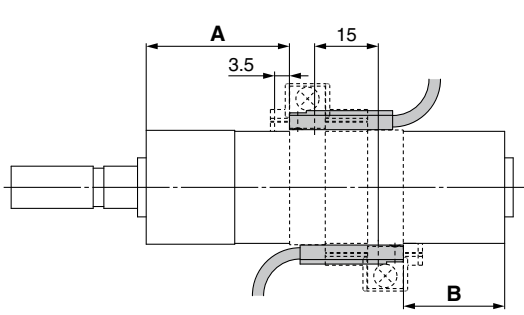
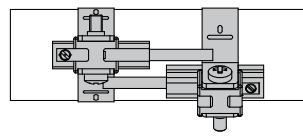
Note) Adjust the auto switch after confirming the operating condition in the actual setting.

Minimum Stroke for Auto Switch Mounting

n: Number of auto switches (mm)

Auto switch model	Number of auto switches				
	With 1 pc.	With 2 pcs.		With n pcs.	
		Different surfaces	Same surface	Different surfaces	Same surface
D-M9□	5	15 Note 1)	40 Note 1)	$20 + 35 \frac{(n-2)}{2}$ (n=2, 4, 6···)	$55 + 35(n-2)$ (n=2, 3, 4, 5···)
D-M9□W	10	15 Note 1)	40 Note 1)	$20 + 35 \frac{(n-2)}{2}$ (n=2, 4, 6···)	$55 + 35(n-2)$ (n=2, 3, 4, 5···)
D-M9□A	10	25	40 Note 1)	$25 + 35 \frac{(n-2)}{2}$ (n=2, 4, 6···)	$60 + 35(n-2)$ (n=2, 3, 4, 5···)
D-A9□	5	15	30 Note 1)	$15 + 35 \frac{(n-2)}{2}$ (n=2, 4, 6···)	$50 + 35(n-2)$ (n=2, 3, 4, 5···)
D-M9□V	5	20	35	$20 + 35 \frac{(n-2)}{2}$ (n=2, 4, 6···)	$35 + 35(n-2)$ (n=2, 3, 4, 5···)
D-A9□V	5	15	25	$15 + 35 \frac{(n-2)}{2}$ (n=2, 4, 6···)	$25 + 35(n-2)$ (n=2, 3, 4, 5···)
D-M9□WV D-M9□AV	10	20	35	$20 + 35 \frac{(n-2)}{2}$ (n=2, 4, 6···)	$35 + 35(n-2)$ (n=2, 3, 4, 5···)
D-C7□ D-C80	5	20	60	$20 + 45 \frac{(n-2)}{2}$ (n=2, 4, 6···)	$60 + 45(n-2)$ (n=2, 3, 4, 5···)
D-H7□ D-H7□W D-H7BA D-H7NF	10	25	70	$25 + 45 \frac{(n-2)}{2}$ (n=2, 4, 6···)	$70 + 45(n-2)$ (n=2, 3, 4, 5···)
D-C73C D-C80C D-H7C	5	30	80	$30 + 50 \frac{(n-2)}{2}$ (n=2, 4, 6···)	$80 + 50(n-2)$ (n=2, 3, 4, 5···)
D-B5□ D-B64 D-G5□ D-K59□	5	25	70	$25 + 50 \frac{(n-2)}{2}$ (n=2, 4, 6···)	$70 + 50(n-2)$ (n=2, 3, 4, 5···)
D-B59W	10	30	75	$30 + 50 \frac{(n-2)}{2}$ (n=2, 4, 6···)	$75 + 50(n-2)$ (n=2, 3, 4, 5···)

Note 1) Auto switch mounting

Auto switch model	With 2 auto switches	
	Different surfaces	Same surface
	 <p>Correct auto switch mounting position is 3.5 mm from the back face of the switch holder.</p>	 <p>The auto switch is mounted by slightly displacing it in a direction (cylinder tube circumferential exterior) so that the auto switch and lead wire do not interfere with each other.</p>
D-M9□ D-M9□W	Less than 20 stroke Note 2)	Less than 55 stroke Note 2)
D-M9□A	Less than 20 stroke Note 2)	Less than 60 stroke Note 2)
D-A9□	—	Less than 50 stroke Note 2)

Note 2) Minimum stroke for auto switch mounting in styles other than those mentioned in Note 1.

Series CG1

Auto Switch Mounting 2

Auto Switch Mounting Brackets/Part No.

Auto switch model	Bore size (mm)							
	20	25	32	40	50	63	80	100
D-M9□(V) D-M9□W(V) D-A9□(V)	Note 1) BMA3-020	Note 1) BMA3-025	Note 1) BMA3-032	Note 1) BMA3-040	Note 1) BMA3-050	Note 1) BMA3-063	—	—
D-M9□A(V)	Note 2) BMA3-020S	Note 2) BMA3-025S	Note 2) BMA3-032S	Note 2) BMA3-040S	Note 2) BMA3-050S	Note 2) BMA3-063S	—	—
D-C7□/C80 D-C73C/C80C D-H7□ D-H7□W D-H7NF D-H7BA	BMA2-020A	BMA2-025A	BMA2-032A	BMA2-040A	BMA2-050A	BMA2-063A	—	—
D-B5□/B64 D-B59W D-G5□/K59 D-G5□W/K59W D-G5BA/G59F D-G5NT D-G5NB	BA-01	BA-02	BA-32	BA-04	BA-05	BA-06	BA-08	BA-10

Note 1) Set part number which includes the auto switch mounting band (BMA2-□□□A) and the holder kit (BJ5-1/Switch bracket: Transparent).

Since the switch bracket (made from nylon) are affected in an environment where alcohol, chloroform, methylamines, hydrochloric acid or sulfuric acid is splashed over, so it cannot be used. Please consult SMC regarding other chemicals.

Note 2) Set part number which includes the auto switch mounting band (BMA2-□□□AS/Stainless steel screw) and the holder kit (BJ4-1/Switch bracket: White).

Avoid the indicator LED for mounting the switch bracket. As the indicator LED is projected from the switch unit, indicator LED may be damaged if the switch bracket is fixed on the indicator LED.

[Stainless Steel Mounting Screw]

The following stainless steel mounting screw kit is available. Use it in accordance with the operating environment. (Since the auto switch mounting bracket is not included, order it separately.)

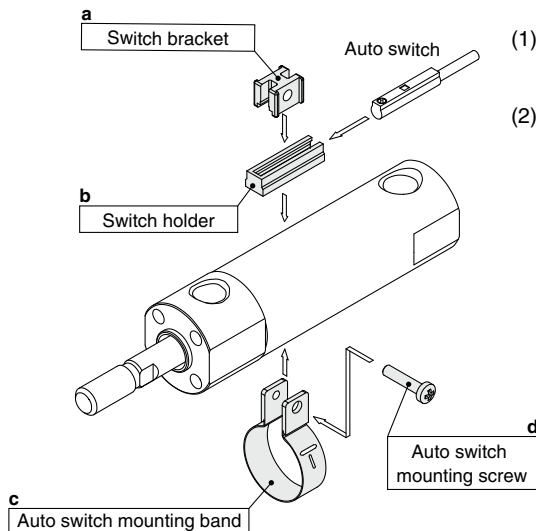
BBA3: For D-B5/B6/G5/K5 types

BBA4: For D-C7/C8/H7 types

Note 3) Refer to page 1357 in Best Pneumatics No. 2 for details on the BBA3.

The above stainless steel screws are used when a cylinder is shipped with the D-H7BA or G5BA auto switches.

When only an auto switch is shipped independently, the BBA3 or BBA4 is attached.



(1) BJ□-1 is a set of "a" and "b".

BJ4-1 (Switch bracket: White)

BJ5-1 (Switch bracket: Transparent)

(2) BMA2-□□□A(S) is a set of "c" and "d".







Band (c) is mounted so that the projected part is on the internal side (contact side with the tube).

Operating Range

Auto switch model	Bore size							
	20	25	32	40	50	63	80	100
D-M9□(V) D-M9□W(V) D-M9□A(V)	4.5	5.0	4.5	5.5	5.0	5.5	—	—
D-A9□	7	6	8	8	8	9	—	—
D-C7/C80 D-C73C/C80C	8	10	9	10	10	11	—	—
D-B5□/B64	8	10	9	10	10	11	11	11
D-B59W	13	13	14	14	14	17	16	18
D-H7□/H7□W D-H7NF/H7BA	4	4	4.5	5	6	6.5	—	—
D-H7C	7	8.5	9	10	9.5	10.5	—	—
D-G5□/G5□W/G59F D-G5BA/K59/K59W	4	4	4.5	5	6	6.5	6.5	7
D-G5NT	4	4	4.5	5	6	6.5	6.5	7
D-G5NB	35	40	40	45	45	45	45	50

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

Cylinder Mounting Bracket, by Stroke/Auto Switch Mounting Surfaces

		Basic, Foot, Flange, Clevis			Trunnion		
Auto switch model		With 1 pc. (Rod cover side)	With 2 pcs. (Different surfaces)	With 2 pcs. (Same surface)	With 1 pc. (Rod cover side)	With 2 pcs. (Different surfaces)	With 2 pcs. (Same surface)
	Switch mounting surface	Port surface 	Port surface 	Port surface 			
	Switch type						
D-M9□(V) D-M9□W(V) D-M9□A(V) D-A9□		10 st or more	15 to 44 st	45 st or more	10 st or more	15 to 44 st	45 st or more
D-C7/C8		10 st or more	15 to 49 st	50 st or more	10 st or more	15 to 49 st	50 st or more
D-H7□/H7□W D-H7BA/H7NF		10 st or more	15 to 59 st	60 st or more	10 st or more	15 to 59 st	60 st or more
D-C73C/C80C/H7C		10 st or more	15 to 64 st	65 st or more	10 st or more	15 to 64 st	65 st or more
D-B5/B6/G5/K5 D-G5□W/K59W/G5BA D-G59F/G5NT		10 st or more	15 to 74 st	75 st or more	10 st or more	15 to 74 st	75 st or more
D-B59W		15 st or more	20 to 74 st	75 st or more	15 st or more	20 to 74 st	75 st or more

* Trunnion type is not available for ø80 and ø100.

Other than the applicable auto switches listed in “How to Order”, the following auto switches are mountable.

Refer to pages 1263 to 1371 in Best Pneumatics No. 2 for detailed specifications.

Type	Model	Electrical entry	Features	Applicable bore size (mm)
Solid state	D-H7A1/H7A2/H7B	Grommet (In-line)	—	ø20 to ø63
	D-H7NW/H7PW/H7BW		Diagnostic indication (2-color indication)	
	D-H7BA		Water resistant (2-color indication)	
	D-G5NT		With timer	ø20 to ø100
Reed	D-C73/C76		—	ø20 to ø63
	D-C80		Without indicator light	
	D-B53		—	ø20 to ø100

* With pre-wired connector is also available for solid state auto switches. For details, refer to pages 1328 and 1329 in Best Pneumatics No. 2.

* Normally closed (NC = b contact) solid state auto switches (D-F9G/F9H) are also available. For details, refer to page 1290 in Best Pneumatics No. 2.

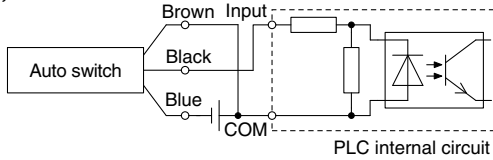
* Wide range detection type, solid state auto switch (D-G5NBL) is also available. For details, refer to page 1320 in Best Pneumatics No. 2.

Prior to Use

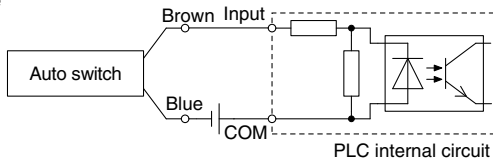
Auto Switch Connection and Example

Sink Input Specifications

3-wire, NPN

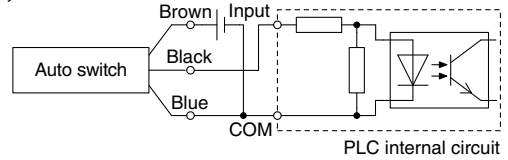


2-wire

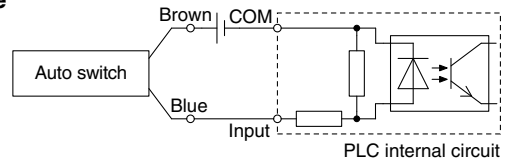


Source Input Specifications

3-wire, PNP



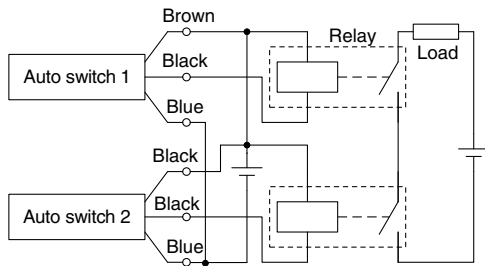
2-wire



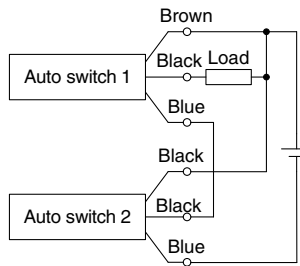
Connect according to the applicable PLC input specifications, as the connection method will vary depending on the PLC input specifications.

Example of AND (Series) and OR (Parallel) Connection

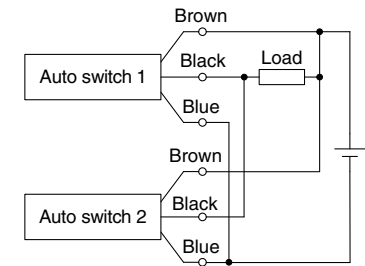
3-wire, AND connection for NPN output (Using relays)



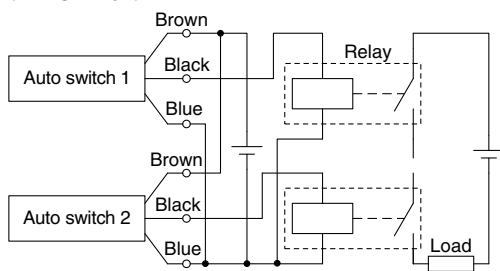
(Performed with auto switches only)



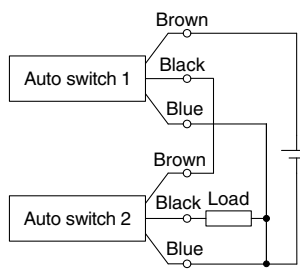
3-wire, OR connection for NPN output



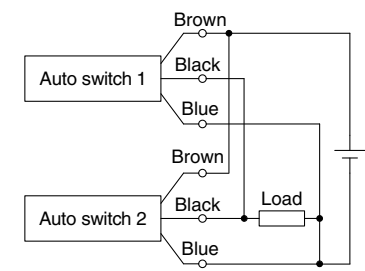
3-wire, AND connection for PNP output (Using relays)



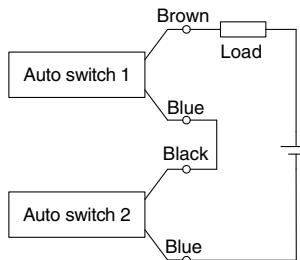
(Performed with auto switches only)



3-wire, OR connection for PNP output



2-wire, AND connection

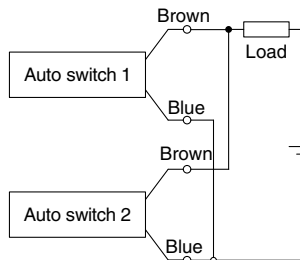


When two auto switches are connected in series, malfunction may occur because the load voltage will decrease in the ON state. The indicator lights will light up when both of the auto switches are in the ON state.

$$\begin{aligned} \text{Load voltage at ON} &= \text{Power supply voltage} - \text{Residual voltage} \times 2 \text{ pcs.} \\ &= 24 \text{ V} - 4 \text{ V} \times 2 \text{ pcs.} \\ &= 16 \text{ V} \end{aligned}$$

Example: Power supply voltage 24 VDC
Auto switch internal voltage drop 4 V

2-wire, OR connection



(Solid state)
When two auto switches are connected in parallel, malfunction may occur because the load voltage will increase in the OFF state.

$$\begin{aligned} \text{Load voltage at OFF} &= \text{Leakage current} \times 2 \text{ pcs.} \times \text{Load impedance} \\ &= 1 \text{ mA} \times 2 \text{ pcs.} \times 3 \text{ k}\Omega \\ &= 6 \text{ V} \end{aligned}$$

Example: Load impedance 3 kΩ
Auto switch leakage current 1 mA

(Reed)
Because there is no leakage current, the load voltage will not increase in the OFF state. However, depending on the number of auto switches in the ON state, the indicator lights may sometimes grow dim or not light up, due to the dispersion and reduction of the current flowing to the auto switches.

Series CG1 Made to Order

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



1 Grease for Food Processing Equipment

Symbol
-XC85

Food grade grease (certified by NSF-H1) is used as lubricant.

How to Order

Standard model no.	-XC85
--------------------	-------

Grease for food processing machine

Specifications: Same as standard model

Dimensions: Same as standard model

* When grease is necessary for maintenance, grease pack is available.
Please order it separately.
Grease pack part number: **GR-H-010** (10 g)

Operating Environment

⚠ Caution

1. Avoid installing and using a cylinder inside a food zone.

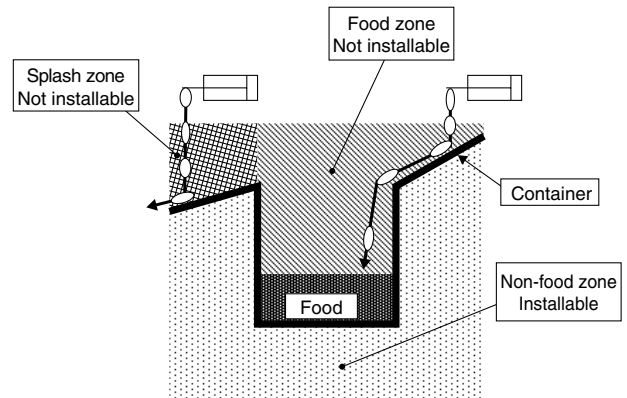
<Not installable>

Food zone.....An environment where food which will be sold as merchandize, directly touches the cylinder's components.

Splash zone.....An environment where food which will not be sold as merchandize, directly touches the cylinder's components.

<Installable>

Non-food zone.....An environment where there is no contact with food.



* When the product is used in an area of liquid splash, or a water resistant function is required for the product, please consult SMC.

2 PTFE Grease

Symbol
-X446

How to Order

Standard model no.	-X446
--------------------	-------


Specifications: Same as standard model


Dimensions: Same as standard model


* When grease is necessary for maintenance, grease pack is available.
Please order it separately.
Grease pack part number: **GR-F-005** (5 g)

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.

Safety Instructions

Be sure to read “Handling Precautions for SMC Products” (M-E03-3) before using.

SMC Corporation

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Specifications are subject to change without prior notice and any obligation on the part of the manufacturer.

D-DN

1st printing QV printing QV 8150SZ Printed in Japan.