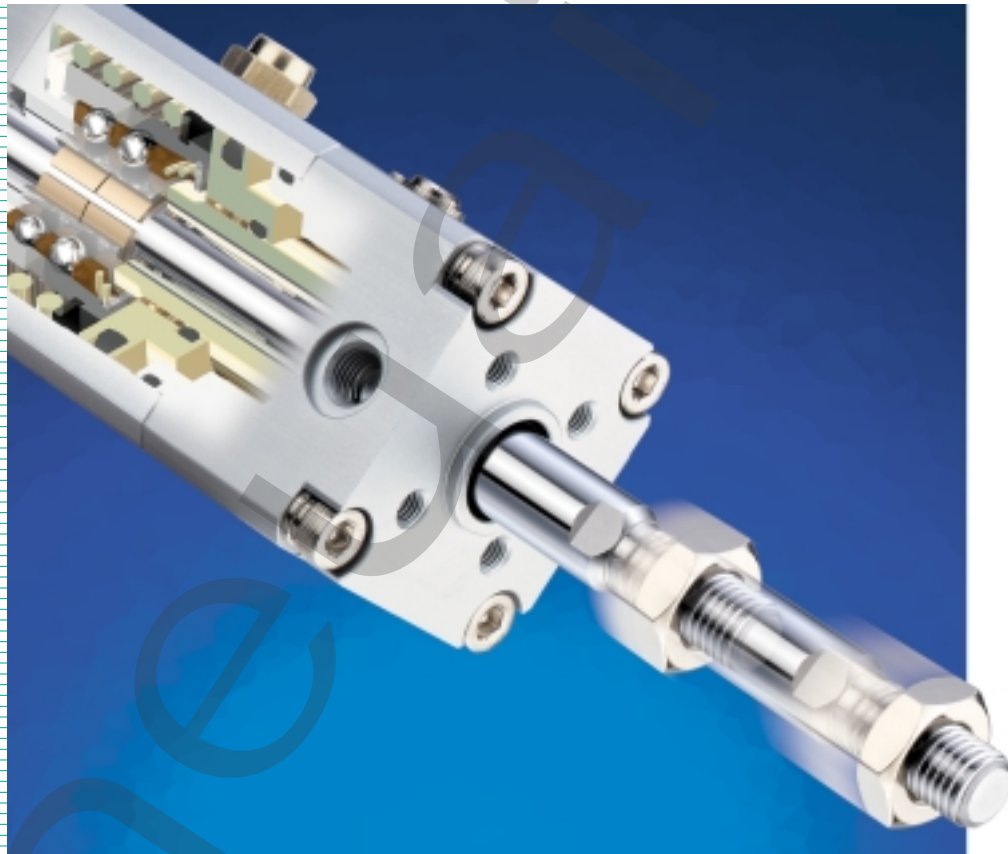


Cylinder with Lock

Series CNG

ø20, ø25, ø32, ø40



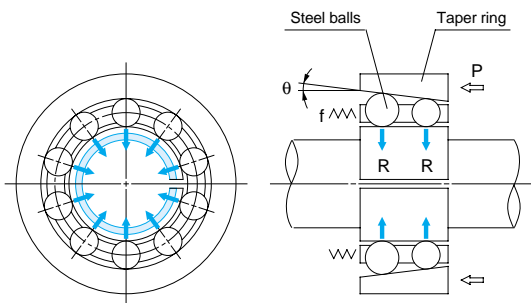
Dual Directional Mechanical Lock
Piston Speed Up to 39in/s
Compact, Space Saving

Series CNG Cylinder with Lock Double Acting: Single Rod

A locking cylinder ideal for emergency stops and

Simple construction

A force magnifying mechanism is employed based on the wedge effect of a taper ring and steel balls.



Enhanced locking efficiency

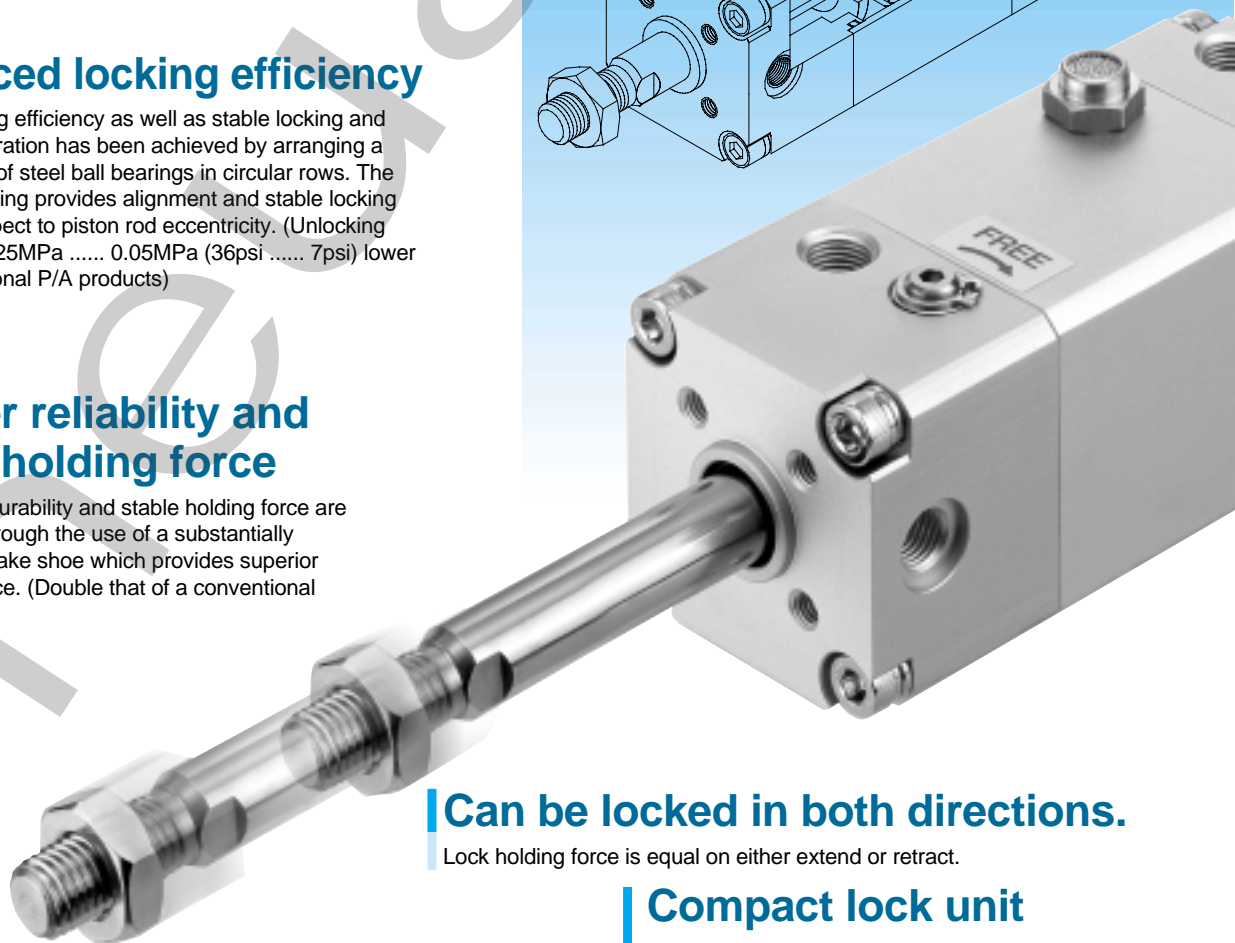
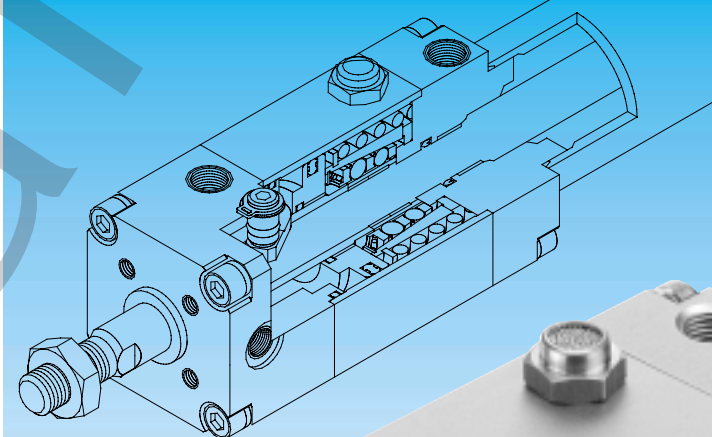
Greater locking efficiency as well as stable locking and unlocking operation has been achieved by arranging a large number of steel ball bearings in circular rows. The floating taper ring provides alignment and stable locking force with respect to piston rod eccentricity. (Unlocking pressure of 0.25MPa 0.05MPa (36psi 7psi) lower than conventional P/A products)

Greater reliability and stable holding force

Outstanding durability and stable holding force are maintained through the use of a substantially lengthened brake shoe which provides superior wear resistance. (Double that of a conventional P/A product)

Cylinder with Lock

Series CNG



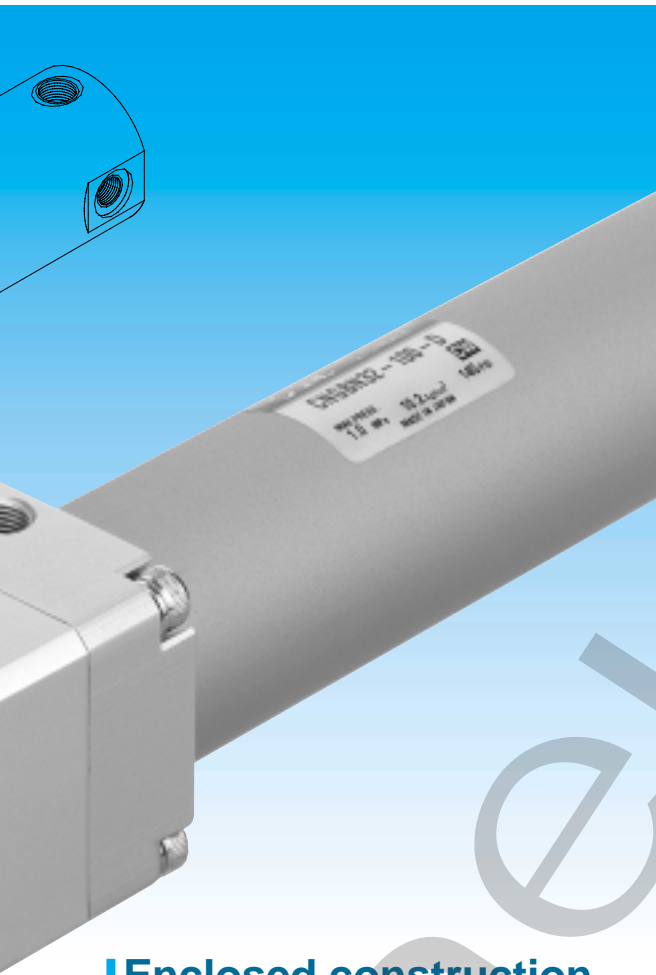
Can be locked in both directions.

Lock holding force is equal on either extend or retract.

Compact lock unit saves space

The lock unit is extremely compact, without a large overhang.

for intermediate stops, and drop prevention.

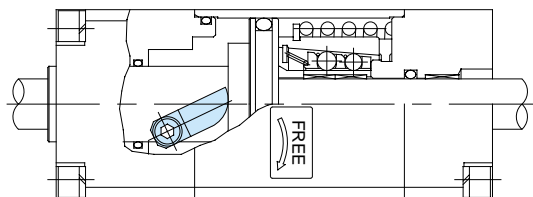


Maximum piston speed: 100mm/s (39in/s)

Within the allowable kinetic energy range, speeds between 50 to 1000mm/s (2 to 39in/s) can be achieved.

Simple manual override

In the event that the air supply is cut off or unavailable, unlocking can be performed with a commercially available tool. The fail safe mechanism locks again when the manual override is released.



Enclosed construction minimizes influences of poor air quality

Separation of the lock mechanism and the unlocking piston chamber produces a structure which is resistant to moisture and drainage in compressed air.

Series variations

Series	Action	Cushion type		Standard variations		Bore size (mm)	Standard stroke (mm)
		Rubber bumper	Air cushion	Built-in auto switch magnets	With rod boot		
Cylinder with lock Series CNG	Double acting Single rod	●	●	●	●	20	Maximum to 800
		●	●	●	●	25	
		●	●	●	●	32	
		●	●	●	●	40	

1in = 25.4mm

Applicable auto switch models

	Auto switch model	Electrical entry
Reed switches	D-C7, C8	Grommet
	D-C73C, C80C	Connector
	D-B5, B6	Grommet
	D-B59W	Grommet (2 color indication)
Solid state switches	D-H7□	Grommet
	D-H7□W	Grommet (2 color indication)
	D-H7LF	Grommet (2 color indication, latch type with diagnostic output)
	D-H7NF	Grommet (2 color indication, with diagnostic output)
	D-H7BA	Grommet (2 color indication, water resistant)
	D-H7C	Connector
	D-G5NT	Grommet (with timer)

Cylinder with Lock
Double Acting:
Single Rod

Series CNG

ø20, ø25, ø32, ø40

How to Order

Standard Type CNG L N 32 100 [] D

With Auto Switch CDNG L N 32 100 [] D B53 []

With auto switch (with magnet)

Mounting brackets

B	Basic type
L	Axial foot type
F	Front flange type
G	Rear flange type
U	Front trunnion type
T	Rear trunnion type
D	Clevis type

* Brackets are packed together (not attached) when shipped.

Cushion type

N	Non-lube/rubber bumper
A	Non-lube/air cushion

Bore size

20	20mm
25	25mm
32	32mm
40	40mm

Number of auto switches

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

Auto Switch Type

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

* Select applicable auto switch models from the table below.

Locking direction

D	Both directions
---	-----------------

Rod boot

Rod boot	Nil	None
	J	Nylon tarpaulin
	K	Heat resistant tarpaulin

* When equipped with rod boot, foot and front flange type brackets are attached before shipment.

Cylinder strokes (mm)
Refer to standard stroke table on page 2.

Applicable Auto Switches/Refer to page 16 for detailed auto switch specifications.

Type	Special function	Electrical entry	Indicator light	Wiring (output)	Load voltage		Auto switch model	Lead wire length (m)*				Applicable loads		
					DC	AC		0.5 (Nil)	3 (L)	5 (Z)	None (N)			
Reed switches	—	Grommet	Yes	3 wire (NPN equiv.)	—	5V	—	C76	●	●	—	—	IC circuit	
								B53	●	●	●	—	—	PLC
								B54	●	●	●	—	—	—
								B64	●	●	—	—		
								C73	●	●	●	—	—	
								C80	●	●	—	—	IC circuit	
	C73C	●	●	●	●	—	—							
Connector	No	2 wire	24V	5V, 12V	100V or less	—	C80C	●	●	●	●	IC circuit		
C730							●	●	●	●	—	—		
Diagnostic indication (2 color indicator)	Grommet	Yes	—	—	—	—	B59W	●	●	—	—	—		
Solid state switches	—	Grommet	Yes	3 wire (NPN)	5V, 12V	—	—	H7A1	●	●	○	—	IC circuit	
								H7A2	●	●	○	—		
								H7B	●	●	○	—	—	
								H7C	●	●	●	●		
	Diagnostic indication (2 color indicator)	Grommet	Yes	3 wire (NPN)	5V, 12V	—	—	H7NW	●	●	○	—	IC circuit	
								H7PW	●	●	○	—		
	Water resistant (2 color indicator)	Grommet	Yes	2 wire	12V	—	—	H7BW	●	●	○	—	Relay, PLC	
								H7BA	—	●	○	—		
	With timer	Grommet	Yes	3 wire (NPN)	5V, 12V	—	—	G5NT	—	●	○	—	IC circuit	
								H7NF	●	●	○	—		
With diagnostic output (2 color indicator)	Grommet	Yes	4 wire (NPN)	5V, 12V	—	—	H7LF	●	●	○	—	—		
							—	—	—	—	—			

* Lead wire length symbols 0.5m Nil (Example) C73C 5m Z (Example) C73CZ
3m L C73CL None N C73CN

* Solid state auto switches marked with a "○" are produced upon receipt of order.

Internal magnet cylinder part numbers

In the case of internal magnets with no auto switches, the auto switch type symbol is "Nil".
(Example) CDNGLN40-100-D

Mounting brackets part numbers

Refer to page 3 for the part numbers of mounting brackets for other than the basic air cylinder.

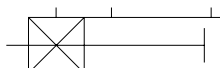
Cylinder with Lock

Double Acting: Single Rod

Series CNG



Symbol



Models

Series	Type	Action	Bore size (mm)	Locking action
CNG	Non-lube type	Double acting	20, 25, 32, 40	Spring locking

Cylinder Specifications

Type	Non-lube type
Fluid	Air
Proof pressure	1.5MPa (218psi)
Maximum operating pressure	1.0MPa (145psi)
Minimum operating pressure	0.08MPa (11psi)
Piston speed	5 to 1000mm/s* (2 to 39in/s)
Ambient and fluid temperature	Without auto switch: -10 to 70°C (14 to 158°F) With auto switch: -10 to 60°C (14 to 140°F)
Cushion	Rubber bumper, Air cushion
Stroke length tolerance (mm)	to 800st: $^{+1.4}_0$
Thread tolerance	JIS class 2
Mounting brackets	Basic type, Axial foot type, Front flange type, Rear flange type, Front trunnion type, Rear trunnion type, Clevis type (used for 90° change of port position)

* There is a limit to the load weight depending on the piston speed when locked, mounting position and operating pressure.

Lock Specifications

Bore size (mm)	20	25	32	40
Locking action	Spring locking (exhaust locking)			
Unlocking pressure	0.20MPa or more (29psi)	0.25MPa or more (36psi)		
Locking pressure	0.15MPa or less (22psi)	0.20MPa or less (29psi)		
Operating pressure range	0.2 to 1.0MPa (29 to 145psi)		0.25 to 1.0MPa (36 to 145psi)	
Locking direction	Both directions			

Minimum Stroke for Auto Switch Mounting

Model	Number of auto switches mounted	
	2 pcs.	1 pc.
D-C7, C8 D-B5, B6 D-H7 D-G5N	15mm	10mm
D-B59W	20mm	15mm
D-H7LF	20mm	10mm

Rod Boot Material

Symbol	Rod boot material	Max. operating temp.
J	Nylon tarpaulin	70°C (158°F)
K	Heat resistant tarpaulin	110°C* (230°F)

* The maximum ambient temperature for the rod boot itself.

Note: 1in = 25.4mm

Standard Strokes

1in=25.4mm

Bore size (mm)	Standard stroke (mm)	Long stroke (mm)	Maximum available stroke (mm)
	Note 1)		
20	25, 50, 75, 100, 125, 150, 200		1500
25	25, 50, 75, 100, 125, 150, 200, 250, 300		
32	25, 50, 75, 100, 125, 150, 200, 250, 300		
40	25, 50, 75, 100, 125, 150, 200, 250, 300		

Note 1) Intermediate strokes other than the above are produced upon receipt of order. Spacers are not used for intermediate strokes. (Refer to pages 5 through 12 for dimensions.)

Note 2) Long strokes are applicable to the axial foot type and front flange type.

In case of other mounting brackets or when long stroke limits are exceeded, the maximum useable stroke is determined by the stroke selection table (information edition).

Stopping Accuracy

Unit: mm

Locking action	Piston speed (mm/s)			
	100	300	500	1000
Spring locking	±0.3	±0.6	±1.0	±2.0

Conditions/Horizontal, supply pressures P = 0.5MPa (72psi)

Load weight Upper limit of allowed values

Solenoid valve for locking Mounted directly to unlocking port

Maximum value taken from the range of 100 measured stopping positions

Holding Force for Spring Locking (Maximum Static Load)

Bore size(mm)	20	25	32	40
Holding force N (lbf)	215 (48)	335 (75)	550 (124)	860 (193)

Series CNG

Cylinder with Lock

Double Acting: Single Rod

Mounting Bracket Part Numbers

Mounting bracket	Bore size (mm)			
	20	25	32	40
Axial foot *	CNG-L020	CNG-L025	CNG-L032	CNG-L040
Flange	CNG-F020	CNG-F025	CNG-F032	CNG-F040
Trunnion pin	CG-T020	CG-T025	CG-T032	CG-T040
Clevis **	CG-D020	CG-D025	CG-D032	CG-D040
Front trunnion bracket	CNG-020-24	CNG-025-24	CNG-032-24	CNG-040-24
Rear trunnion bracket	CG-020-24A	CG-025-24A	CG-032-24A	CG-040-24A

* Order 2 pcs. of foot brackets for each cylinder.

** The clevis type is packaged with clevis pin, snap ring and mounting bolts.

*** Mounting bolts are included with the foot and flange types.

Auto Switch Mounting Bracket Part Nos.

Auto switch model	Bore size (mm)			
	20	25	32	40
D-C7, C8	BMA2-020	BMA2-025	BMA2-032	BMA2-040
D-H7				
D-B5, B6	BA-01	BA-02	BA-32	BA-04
D-G5NT				

Stainless Steel Mounting Screw Kits

The following stainless steel mounting screw kits are available for use depending on the operating environment. (Switch mounting bands are not included and should be ordered separately.)

BBA3: for D-B5/B6/G5

BBA4: for D-C7/C8/H7

When type D-H7BAL switches are shipped mounted on a cylinder, the above stainless steel screws are used. Also, when switches are shipped separately BBA4 is included.

Accessories

Mounting bracket		Basic type	Axial foot type	Front flange type	Rear flange type	Front trunnion type	Rear trunnion type	Clevis type
Standard equipment	Rod end nut	●	●	●	●	●	●	●
	Clevis pin	-	-	-	-	-	-	●
Options	Single knuckle joint	●	●	●	●	●	●	●
	Double knuckle joint (with pin) *	●	●	●	●	●	●	●
	Trunnion bracket	-	-	-	-	●	●	●
	Rod boot	●	●	●	●	●	●	●

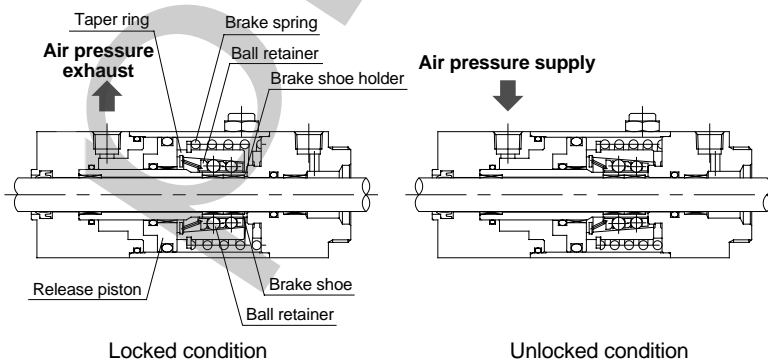
* The pin and snap ring are packaged together with the double knuckle joint when shipped.

Weight Table

Bore size (mm)		20	25	32	40
Basic weight	Basic type	0.52 (1.15)	0.83 (1.83)	0.91 (2.01)	1.24 (2.73)
	Axial foot type	0.63 (1.39)	0.96 (2.12)	1.07 (2.36)	1.46 (3.22)
	Flange type	0.64 (1.41)	1.01 (2.23)	1.08 (2.38)	1.47 (3.24)
	Trunnion type	0.53 (1.17)	0.85 (1.87)	0.94 (2.07)	1.29 (2.84)
	Clevis type	0.57 (1.26)	0.91 (2.01)	1.06 (2.34)	1.47 (3.24)
Front trunnion bracket		0.11 (0.24)	0.13 (0.29)	0.20 (0.44)	0.27 (0.60)
Rear trunnion bracket		0.08 (0.18)	0.09 (0.20)	0.17 (0.37)	0.25 (0.55)
Single knuckle joint		0.05 (0.11)	0.09 (0.20)	0.09 (0.20)	0.10 (0.22)
Double knuckle joint (with pin)		0.05 (0.11)	0.09 (0.20)	0.09 (0.20)	0.13 (0.29)
Additional weight per 50mm of stroke		0.05 (0.11)	0.07 (0.15)	0.09 (0.20)	0.15 (0.33)
Additional weight for air cushion		0.01 (0.02)	0.01 (0.02)	0.02 (0.04)	0.02 (0.04)
Additional weight for long stroke		0.01 (0.02)	0.01 (0.02)	0.02 (0.04)	0.03 (0.07)

Calculation method (Example) CNGLA20-100-D (foot type, ø20, 100st) Basic weight 0.63kg (foot type, ø20)
 Additional weight 0.05kg/50st
 Air cylinder stroke 100st
 Air cushion additional weight 0.01kg
 $0.63 + 0.05 \times 100/50 + 0.01 = 0.74\text{kg}$

Construction Principle



Spring Locking (Exhaust Locking)

The spring force which acts upon the taper ring is magnified by a wedge effect, and is conveyed to all of the numerous steel balls which are arranged in two circles. These act on the brake shoe holder and brake, which locks the piston rod by tightening against it with a large force.

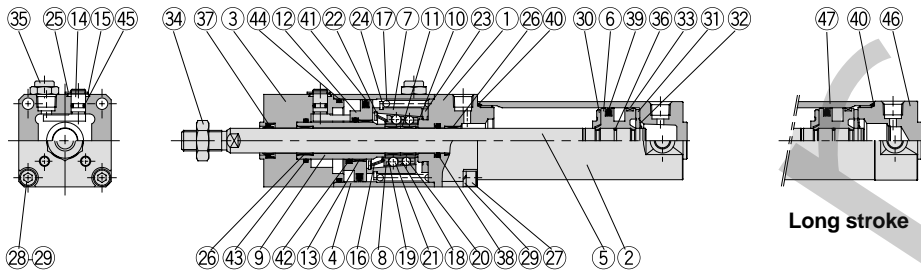
Unlocking is accomplished when air pressure is supplied to the unlocking port. The release piston and taper ring oppose the spring force, moving to the right side, and the ball retainer strikes the cover section. The braking force is released as the steel balls are removed from the taper ring by the ball retainer.

Cylinder with Lock

Double Acting: Single Rod

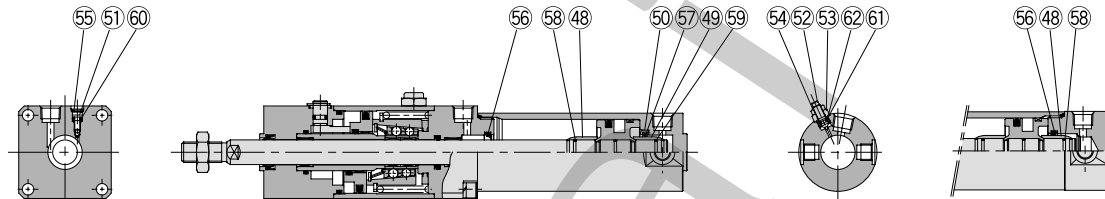
Construction

With rubber bumper/CNGBN



Long stroke

With air cushion/CNGBA



Long stroke

Parts list

No.	Description	Material	Note
1	Rod cover	Aluminum alloy	White hard anodized
2	Tube cover	Aluminum alloy	White hard anodized
3	Cover	Aluminum alloy	White hard anodized
4	Intermediate cover	Aluminum alloy	White hard anodized
5	Piston rod	Carbon steel *	Hard chrome plated
6	Piston	Aluminum alloy	Chromated
7	Taper ring	Carbon steel	Heat treated
8	Ball retainer	Special resin	
9	Piston guide	Carbon steel	Zinc chromated
10	Brake shoe holder	Special steel	Heat treated
11	Brake shoe	Special friction material	
12	Release piston	Carbon steel	Zinc chromated
13	Release piston bushing	ø20	Sintered oil containing alloy
		ø25, ø32, ø40	Steel + Special resin
14	Unlocking cam	Chromium molybdenum steel	Electroless nickel plated
15	Washer	Rolled steel	Electroless nickel plated
16	Retainer pre-load spring	Steel wire	Zinc chromated
17	Brake spring	Steel wire	Zinc chromated
18	Clip A	Stainless steel	ø25, ø32 only
19	Clip B	Stainless steel	ø25, ø32 only
20	Steel ball A	Carbon steel	
21	Steel ball B	Carbon steel	
22	Tooth ring	Stainless steel	
23	Damper	Urethane	
24	C type snap ring for taper ring	Carbon steel	
25	C type snap ring for unlocking cam shaft	Carbon steel	
26	Bushing	Sintered oil containing alloy	ø40 is lead bronze casting
27	Hexagon socket head screw	Chromium molybdenum steel	Nickel plated
28	Hexagon socket head screw	Chromium molybdenum steel	Nickel plated
29	Spring washer for hexagon socket head screw	Steel wire	Nickel plated
30	Damper A	Urethane	
31	Damper B	Urethane	ø40 is the same as damper A
32	Snap ring	Stainless steel	
33	Wear ring	Resin	
34	Rod end nut	Rolled steel	Nickel plated
35	BC element	Bronze	
36	Piston gasket	NBR	

Parts list

No.	Description	Material	Note
37	Rod seal A	NBR	
38	Rod seal B	NBR	
39	Piston seal	NBR	
40	Cylinder tube gasket	NBR	
41	Release piston seal	NBR	
42	Rod seal C	NBR	
43	Piston guide gasket	NBR	
44	Intermediate cover gasket	NBR	
45	Unlocking cam gasket	NBR	
46	Head cover	Aluminum alloy	White hard anodized
47	Cylinder tube	Aluminum alloy	Hard anodized
48	Cushion ring A	Brass	
49	Cushion ring B	Brass	Same as cushion ring A except for ø20, 25 standard strokes
50	Seal retainer	Rolled steel	Zinc chromated long strokes not available
51	Cushion valve A	Chromium molybdenum steel	Electroless nickel plated
52	Cushion valve B	Rolled steel	Electroless nickel plated
53	Valve retainer	Rolled steel	Electroless nickel plated
54	Lock nut	Rolled steel	Nickel plated
55	Snap ring	Stainless steel	
56	Cushion seal A	Urethane	
57	Cushion seal B	Urethane	Same as cushion seal A except for ø20, 25 standard strokes
58	Cushion ring gasket A	NBR	
59	Cushion ring gasket B	NBR	Same as cushion ring gasket A except for ø20, 25 standard strokes
60	Valve seal A	NBR	
61	Valve seal B	NBR	
62	Valve retainer gasket	NBR	

Replacement parts: Seal kits

Bore size (mm)	Seal kit No.	Contents
20	CG1N20-PS	A set of above Nos. 37, 39, 40
25	CG1N25-PS	
32	CG1N32-PS	
40	CG1N40-PS	

* Since the lock section for Series CNG is normally replaced as a unit, replacement seal kits are for the cylinder section only. Order using the seal kit number for each bore size.

Note) In the case of cylinders equipped with auto switches, magnets are installed in the piston.
* The material for ø20 and ø25 cylinders equipped with auto switches is stainless steel.

Series CNG

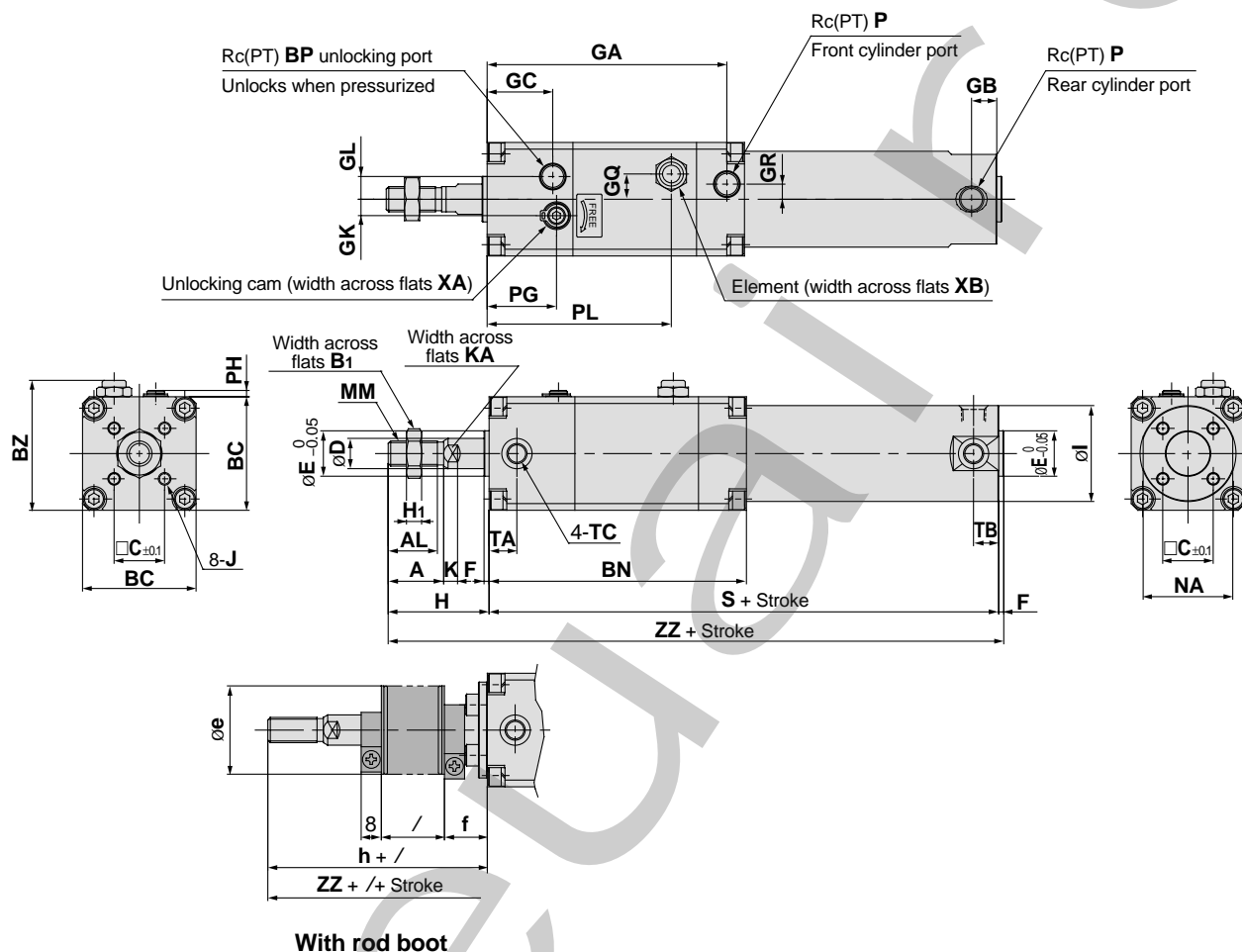
Cylinder with Lock

Double Acting: Single Rod

Dimensions (mm)

Basic type (B): With rubber bumper/CNGBN

1in = 25.4mm



Bore size (mm)	Stroke range without rod boot		Stroke range with rod boot																					
	Standard	Long stroke	Standard	Long stroke	A	AL	B1	BC	BN	BP	BZ	□C	D	E	F	GA	GB	GC	GK	GL	GR	GQ	H1	I
20	to 200	201 to 350	20 to 200	201 to 350	18	15.5	13	38	93	1/8	44.5	14	8	12	2	85	10 (12)	18	5.5	6	4	8	5	26
25	to 300	301 to 400	20 to 300	301 to 400	22	19.5	17	45	103	1/8	51.5	16.5	10	14	2	96	10 (12)	25	6.5	9	7	10	6	31
32	to 300	301 to 450	20 to 300	301 to 450	22	19.5	17	45	104	1/8	51.5	20	12	18	2	97	10 (12)	25	6.5	9	7	10	6	38
40	to 300	301 to 800	20 to 300	301 to 800	30	27	19	52	112	1/8	58.5	26	16	25	2	104	10 (13)	26	7	11	7	12	8	47

Bore size (mm)	J	K	KA	MM	NA	P	PG	PH	PL	S	TA	TB	TC	XA	XB	Without rod boot			With rod boot			
																H	ZZ	e	f	h	/	ZZ
20	M4 x 0.7 depth 7	5	6	M8 x 1.25	24	1/8	21.5	2	65	141 (149)	11	11	M5 x 0.8	3	12	35	178 (186)	30	16	55	0.25	198 (206)
25	M5 x 0.8 depth 7.5	5.5	8	M10 x 1.25	29	1/8	26.5	2.5	73	151 (159)	11	11	M6 x 0.75	3	12	40	193 (201)	30	17	62	Stroke x	215 (223)
32	M5 x 0.8 depth 8	5.5	10	M10 x 1.25	35.5	1/8	26.5	2.5	73	154 (162)	11	10 (11)	M8 x 1.0	3	12	40	196 (204)	35	17	62		218 (226)
40	M6 x 1 depth 12	6	14	M14 x 1.5	44	1/8	28	2.5	81	169 (178)	12	10 (12)	M10 x 1.25	4	12	50	221 (230)	35	17	70		241 (250)

Note) Dimensions inside () are for long strokes.

Cylinder with Lock

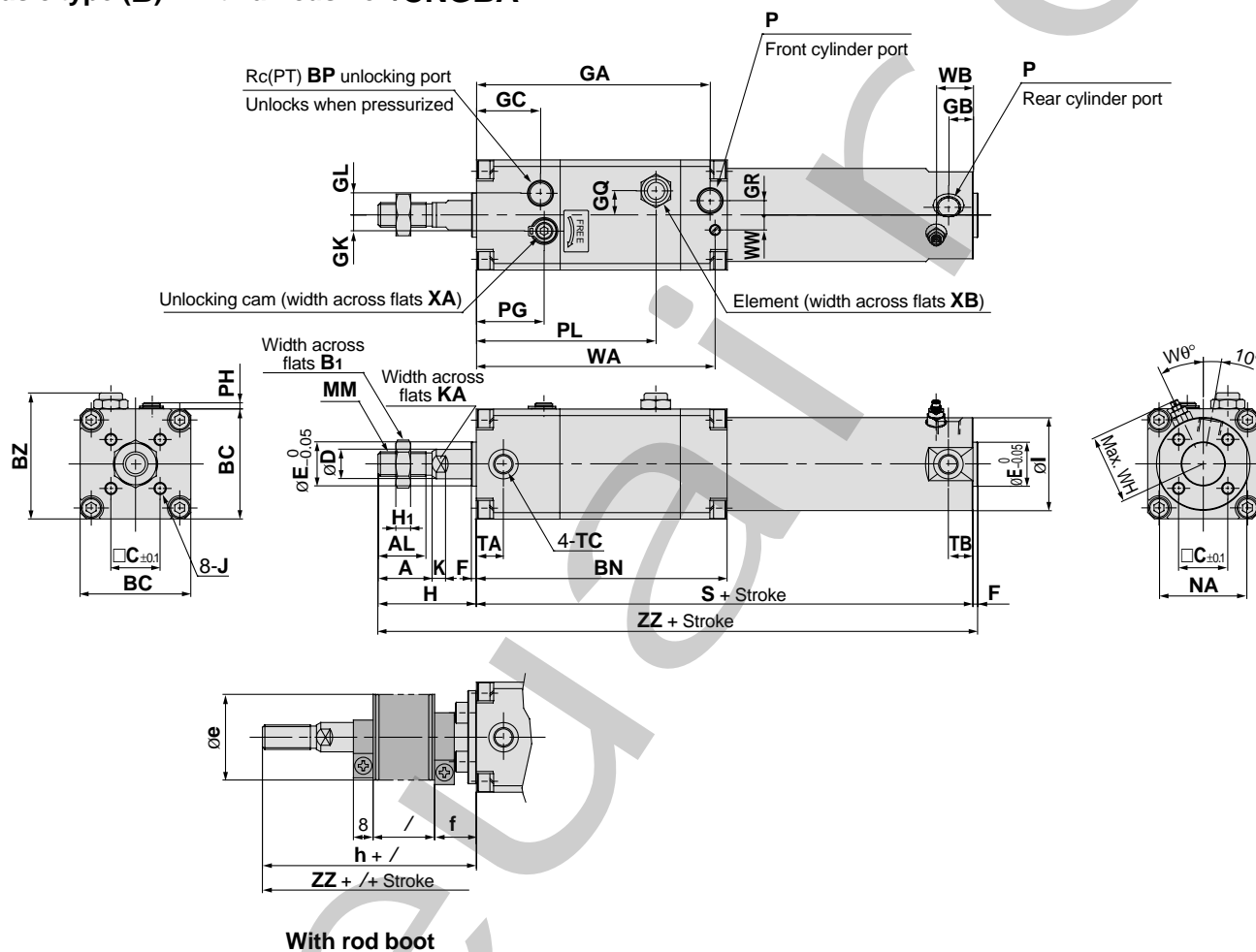
Series CNG

Double Acting: Single Rod

Dimensions (mm)

1in = 25.4mm

Basic type (B): With air cushion/CNGBA



With rod boot

Bore size (mm)	Stroke range without rod boot		Stroke range with rod boot		(mm)																			
	Standard	Long stroke	Standard	Long stroke	A	AL	B1	BC	BN	BP	BZ	□C	D	E	F	GA	GB	GC	GK	GL	GR	GQ	H1	I
20	to 200	201 to 350	20 to 200	201 to 350	18	15.5	13	38	93	1/8	44.5	14	8	12	2	87	10 (12)	18	5.5	6	4	8	5	26
25	to 300	301 to 400	20 to 300	301 to 400	22	19.5	17	45	103	1/8	51.5	16.5	10	14	2	97	10 (12)	25	6.5	9	7	10	6	31
32	to 300	301 to 450	20 to 300	301 to 450	22	19.5	17	45	104	1/8	51.5	20	12	18	2	97	10 (12)	25	6.5	9	7	10	6	38
40	to 300	301 to 800	20 to 300	301 to 800	30	27	19	52	112	1/8	58.5	26	16	25	2	104	10 (13)	26	7	11	7	12	8	47

Bore size (mm)	J	K	KA	MM	NA	P	PG	PH	PL	S	TA	TB	TC	WA	WB	WH	WW	Wθ	XA	XB	(mm)	
																					Stroke x	ZZ
20	M4 x 0.7 depth 7	5	6	M8 x 1.25	24	M5 x 0.8	21.5	2	65	141 (149)	11	11	M5 x 0.8	88	15 (16)	23	5.5	30°	3	12	Stroke x	ZZ
25	M5 x 0.8 depth 7.5	5.5	8	M10 x 1.25	29	M5 x 0.8	26.5	2.5	73	151 (159)	11	11	M6 x 0.75	98	15 (16)	25	6	30°	3	12	Stroke x	ZZ
32	M5 x 0.8 depth 8	5.5	10	M10 x 1.25	35.5	Rc(PT) 1/8	26.5	2.5	73	154 (162)	11	10 (11)	M8 x 1.0	99	15 (16)	28.5	6	25°	3	12	Stroke x	ZZ
40	M6 x 1 depth 12	6	14	M14 x 1.5	44	Rc(PT) 1/8	28	2.5	81	169 (178)	12	10 (12)	M10 x 1.25	107	15 (16)	33	8	20°	4	12	Stroke x	ZZ

Bore size (mm)	Without rod boot		With rod boot				
	H	ZZ	e	f	h	ZZ	
20	35	178 (186)	30	16	55	198 (206)	
25	40	193 (201)	30	17	62	215 (223)	
32	40	196 (204)	35	17	62	218 (226)	
40	50	221 (230)	35	17	70	241 (250)	

Note) Dimensions inside () are for long strokes.
Dimensions with mounting bracket are the same as dimensions with rubber bumper.

Series CNG

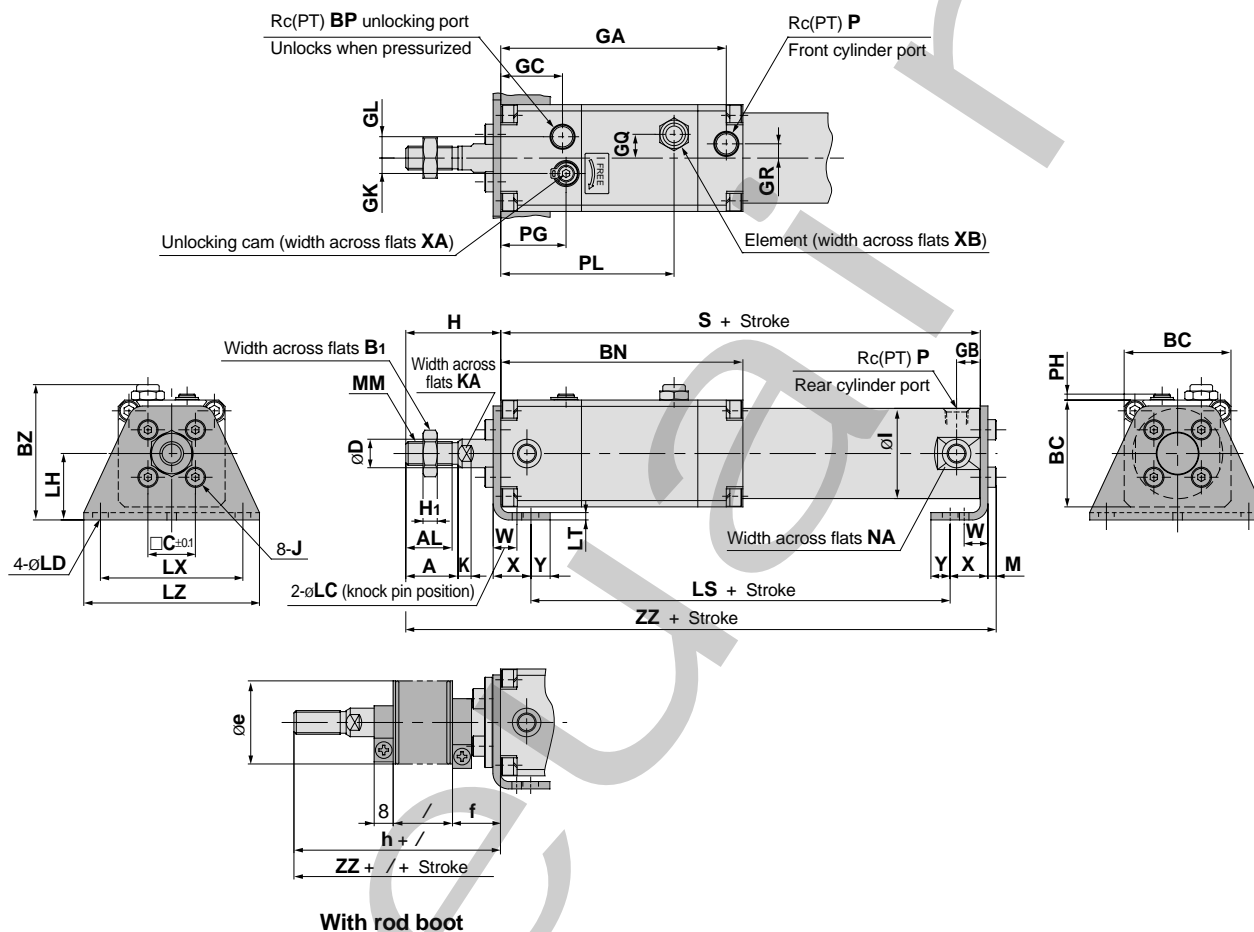
Cylinder with Lock

Double Acting: Single Rod

Dimensions (mm)

Axial foot type (L): With rubber bumper/CNGLN

1in = 25.4mm



Bore size (mm)	Stroke range without rod boot		Stroke range with rod boot		A	AL	B1	BC	BN	BP	BZ	C	D	GA	GB	GC	GK	GL	GR	GQ	H1	I	J
	Standard	Long stroke	Standard	Long stroke																			
20	to 200	201 to 350	20 to 200	201 to 350	18	15.5	13	38	93	1/8	50.5	14	8	85	10 (12)	18	5.5	6	4	8	5	26	M4 x 0.7
25	to 300	301 to 400	20 to 300	301 to 400	22	19.5	17	45	103	1/8	57	16.5	10	96	10 (12)	25	6.5	9	7	10	6	31	M5 x 0.8
32	to 300	301 to 450	20 to 300	301 to 450	22	19.5	17	45	104	1/8	57	20	12	97	10 (12)	25	6.5	9	7	10	6	38	M5 x 0.8
40	to 300	301 to 800	20 to 300	301 to 800	30	27	19	52	112	1/8	65.5	26	16	104	10 (13)	26	7	11	7	12	8	47	M6 x 1

Bore size (mm)	K	KA	M	MM	NA	P	PG	PH	PL	S	LC	LD	LH	LS	LT	LX	LZ	X	Y	W	XA	XB
20	5	6	3	M8 x 1.25	24	1/8	21.5	2	65	141 (149)	4	6	25	117 (125)	3	50	62	15	7	10	3	12
25	5.5	8	3.5	M10 x 1.25	29	1/8	26.5	2.5	73	151 (159)	4	6	28	127 (135)	3	57	70	15	7	10	3	12
32	5.5	10	3.5	M10 x 1.25	35.5	1/8	26.5	2.5	73	154 (162)	4	6.6	28	128 (136)	3	60	74	16	8	10	3	12
40	6	14	4	M14 x 1.5	44	1/8	28	2.5	81	169 (178)	4	6.6	33	142 (151)	3	68	84	16.5	8.5	10	4	12

Bore size (mm)	Without rod boot		With rod boot			
	H	ZZ	e	f	h	ZZ
20	35	182 (190)	30	19	55	0.25
25	40	197.5 (205.5)	30	20	62	Stroke x
32	40	200.5 (208.5)	35	20	62	219.5 (227.5)
40	50	226 (235)	35	20	70	222.5 (230.5)
						246 (255)

Note) Dimensions inside () are for long strokes.

Cylinder with Lock

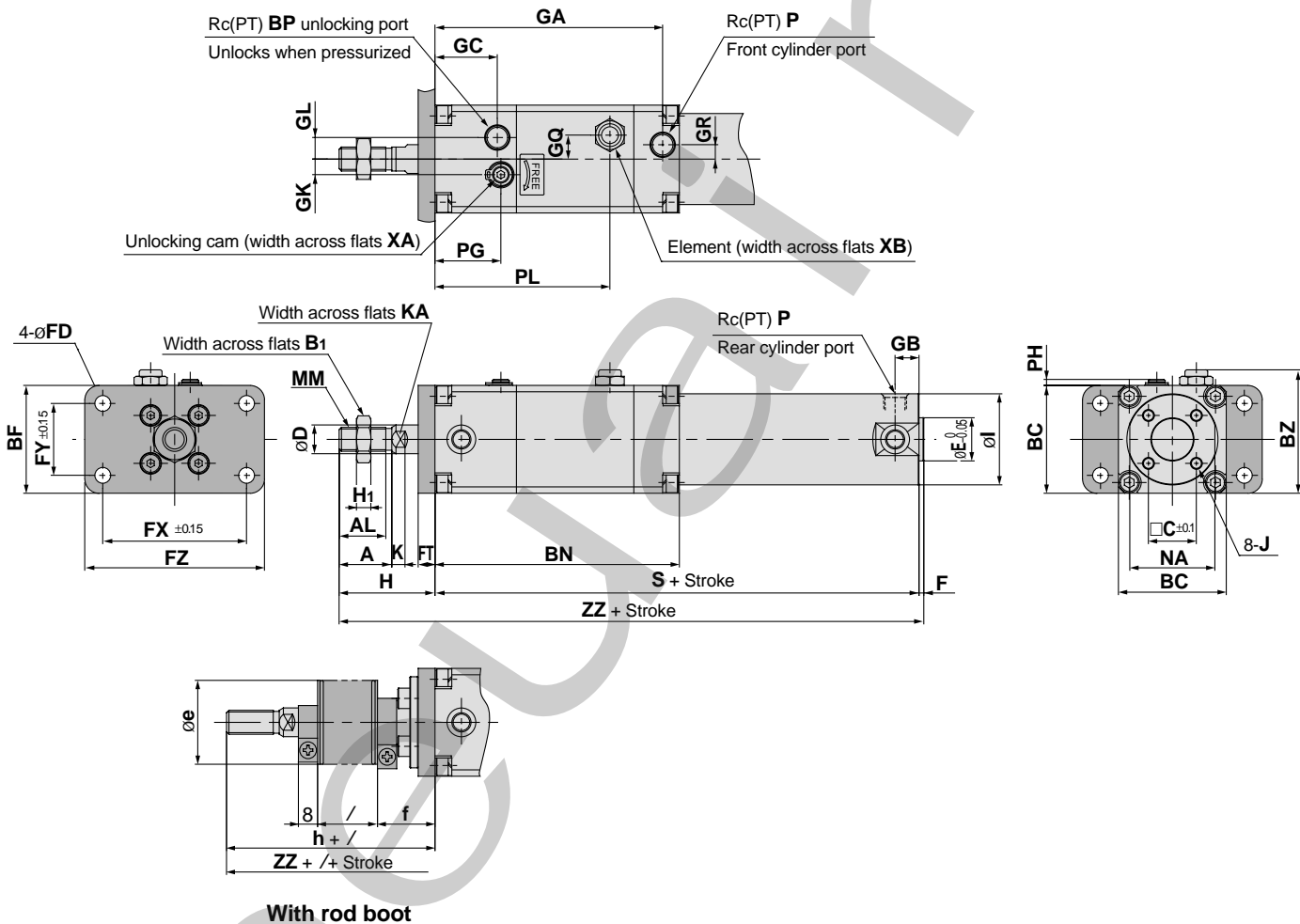
Double Acting: Single Rod

Series CNG

Dimensions (mm)

1in = 25.4mm

Front flange type (F): With rubber bumper/CNGFN



With rod boot

Bore size (mm)	Stroke range without rod boot		Stroke range with rod boot		(mm)																			
	Standard	Long stroke	Standard	Long stroke	A	AL	B1	BC	BF	BN	BP	BZ	□C	D	E	F	GA	GB	GC	GK	GL	GR	GQ	H1
20	to 200	201 to 350	20 to 200	201 to 350	18	15.5	13	38	38	93	1/8	44.5	14	8	12	2	85	10 (12)	18	5.5	6	4	8	5
25	to 300	301 to 400	20 to 300	301 to 400	22	19.5	17	45	45	103	1/8	51.5	16.5	10	14	2	96	10 (12)	25	6.5	9	7	10	6
32	to 300	301 to 450	20 to 300	301 to 450	22	19.5	17	45	45	104	1/8	51.5	20	12	18	2	97	10 (12)	25	6.5	9	7	10	6
40	to 300	301 to 800	20 to 300	301 to 800	30	27	19	52	52	112	1/8	58.5	26	16	25	2	104	10 (13)	26	7	11	7	12	8

Bore size (mm)	I	J	K	KA	MM	NA	P	PG	PH	PL	S	FD	FT	FX	FY	FZ	XA	XB	Without rod boot		With rod boot				
																			H	ZZ	e	f	h	/	ZZ
20	26	M4 x 0.7	5	6	M8 x 1.25	24	1/8	21.5	2	65	141 (149)	5.5	6	52	25	65	3	12	35	178 (186)	30	22	55	0.25	198 (206)
25	31	M5 x 0.8	5.5	8	M10 x 1.25	29	1/8	26.5	2.5	73	151 (159)	5.5	7	60	30	75	3	12	40	193 (201)	30	24	62	Stroke x	215 (223)
32	38	M5 x 0.8	5.5	10	M10 x 1.25	35.5	1/8	26.5	2.5	73	154 (162)	6.6	7	60	30	75	3	12	40	196 (204)	35	24	62		218 (226)
40	47	M6 x 1	6	14	M14 x 1.5	44	1/8	28	2.5	81	169 (178)	6.6	8	66	36	82	4	12	50	221 (230)	35	25	70		241 (250)

Note) Dimensions inside () are for long strokes.

Series CNG

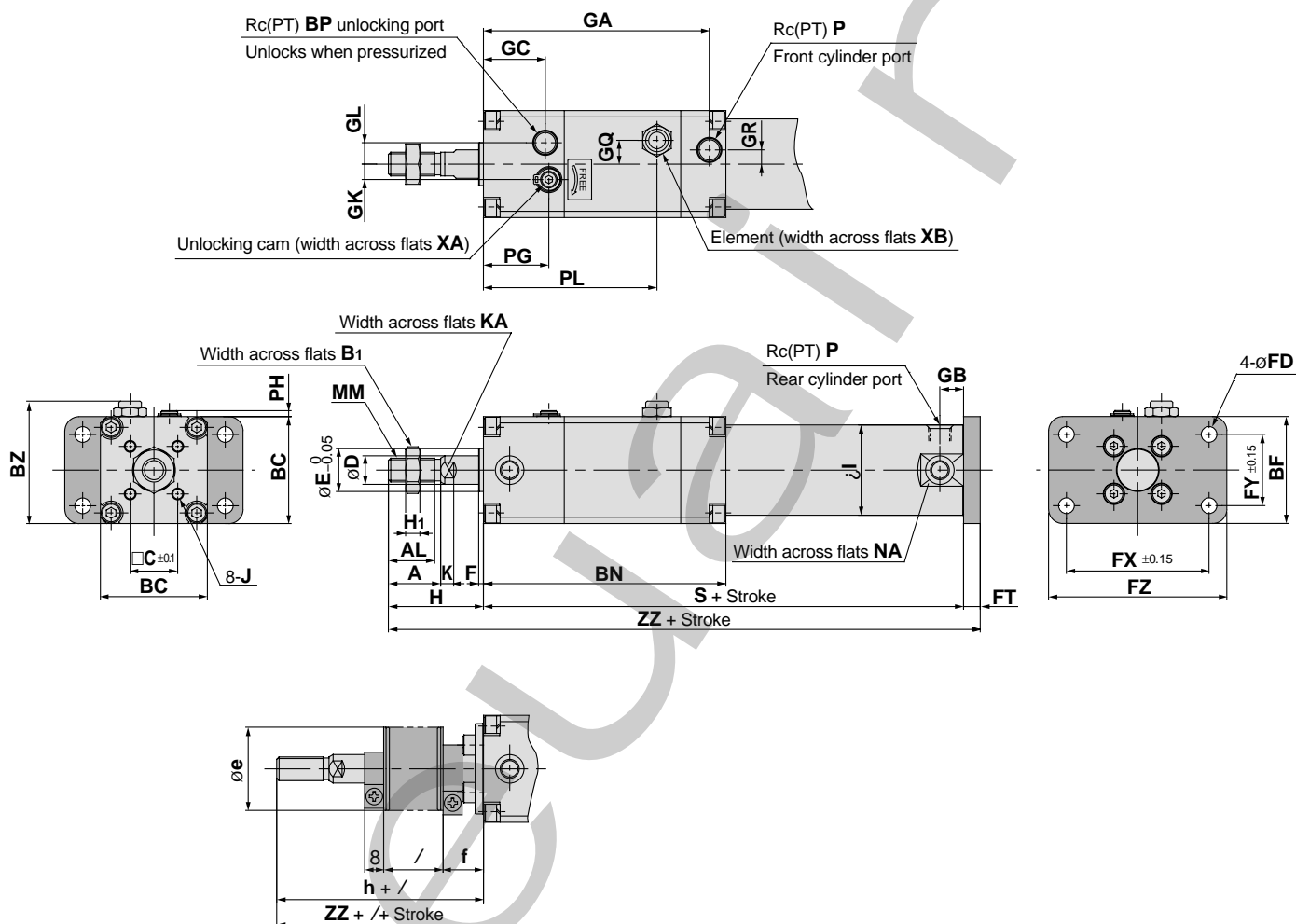
Cylinder with Lock

Double Acting: Single Rod

Dimensions (mm)

1in = 25.4mm

Rear flange type (G): With rubber bumper/CNGGN



With rod boot

Bore size (mm)	Stroke range without rod boot		Stroke range with rod boot		(mm)																				
	Standard	Long stroke	Standard	Long stroke	A	AL	B1	BC	BF	BN	BP	BZ	□C	D	E	F	GA	GB	GC	GK	GL	GR	GQ	H1	I
20	to 200	—	20 to 200	—	18	15.5	13	38	38	93	1/8	44.5	14	8	12	2	85	10	18	5.5	6	4	8	5	26
25	to 300	—	20 to 300	—	22	19.5	17	45	45	103	1/8	51.5	16.5	10	14	2	96	10	25	6.5	9	7	10	6	31
32	to 300	—	20 to 300	—	22	19.5	17	45	45	104	1/8	51.5	20	12	18	2	97	10	25	6.5	9	7	10	6	38
40	to 300	301 to 500	20 to 300	301 to 500	30	27	19	52	52	112	1/8	58.5	26	16	25	2	104	10 (13)	26	7	11	7	12	8	47

Bore size (mm)	J	K	KA	MM	NA	P	PG	PH	PL	S	FD	FT	FX	FY	FZ	XA	XB	Without rod boot			With rod boot			
																		H	ZZ	e	f	h	/	ZZ
20	M4 x 0.7	5	6	M8 x 1.25	24	1/8	21.5	2	65	141	5.5	6	52	25	65	3	12	35	182	30	16	55	0.25	202
25	M5 x 0.8	5.5	8	M10 x 1.25	29	1/8	26.5	2.5	73	151	5.5	7	60	30	75	3	12	40	198	30	17	62	Stroke x	220
32	M5 x 0.8	5.5	10	M10 x 1.25	35.5	1/8	26.5	2.5	73	154	6.6	7	60	30	75	3	12	40	201	35	17	62		223
40	M6 x 1	6	14	M14 x 1.5	44	1/8	28	2.5	81	169 (178)	6.6	8	66	36	82	4	12	50	227 (236)	35	17	70		247 (256)

Note) Dimensions inside () are for long strokes.

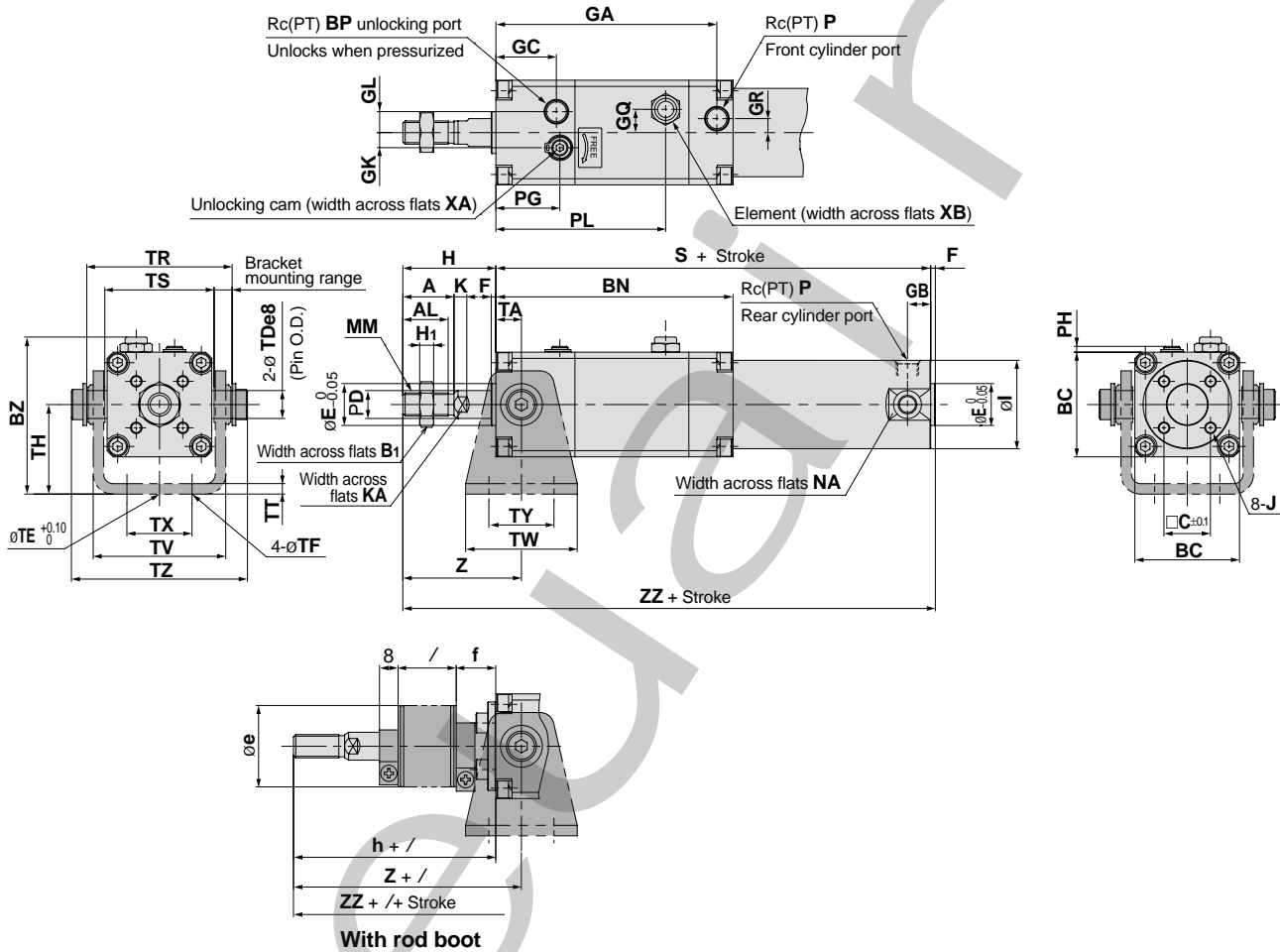
Cylinder with Lock

Double Acting: Single Rod

Dimensions (mm)

Front trunnion type (U): With rubber bumper/CNGUN

1in = 25.4mm



(mm)

Bore size (mm)	Stroke range without rod boot		Stroke range with rod boot		A	AL	B ₁	BC	BN	BP	BZ	□C	D	E	F	GA	GB	GC	GK	GL	GR	GQ	H ₁	I
	Standard	Long stroke	Standard	Long stroke																				
20	to 200	—	20 to 200	—	18	15.5	13	38	93	1/8	56.5	14	8	12	2	85	10	18	5.5	6	4	8	5	26
25	to 300	—	20 to 300	—	22	19.5	17	45	103	1/8	66	16.5	10	14	2	96	10	25	6.5	9	7	10	6	31
32	to 300	—	20 to 300	—	22	19.5	17	45	104	1/8	67.5	20	12	18	2	97	10	25	6.5	9	7	10	6	38
40	to 300	301 to 500	20 to 300	301 to 500	30	27	19	52	112	1/8	75	26	16	25	2	104	10 (13)	26	7	11	7	12	8	47

(mm)

Bore size (mm)	J	K	KA	MM	NA	P	PG	PH	PL	S	TA	TDe8	TE	TF	TH	TR	TS	TT	TV	TW	TX	TY	TZ	XA	XB
20	M4 x 0.7	5	6	M8 x 1.25	24	1/8	21.5	2	65	141	11	8 ^{-0.025} _{-0.047}	10	5.5	31	51	40	3.2	47.8	42	26	28	59.6	3	12
25	M5 x 0.8	5.5	8	M10 x 1.25	29	1/8	26.5	2.5	73	151	11	10 ^{-0.025} _{-0.047}	10	5.5	37	58	47	3.2	54.8	42	28	28	68	3	12
32	M5 x 0.8	5.5	10	M10 x 1.25	35.5	1/8	26.5	2.5	73	154	11	12 ^{-0.032} _{-0.059}	10	6.6	38.5	62.5	47	4.5	57.4	48	28	28	75.7	3	12
40	M6 x 1	6	14	M14 x 1.5	44	1/8	28	2.5	81	169 (178)	12	14 ^{-0.032} _{-0.059}	10	6.6	42.5	72.5	54	4.5	65.4	56	36	30	85.7	4	12

(mm)

Bore size (mm)	Without rod boot			With rod boot			Stroke x	Z	ZZ
	H	Z	ZZ	e	f	h			
20	35	46	178	30	16	55	0.25	66	198
25	40	51	193	30	17	62	Stroke x	73	215
32	40	51	196	35	17	62		73	218
40	50	62	221 (230)	35	17	70		82	241 (250)

Note) Dimensions inside () are for long strokes.
Refer to page 13 regarding the trunnion bracket.

Series CNG

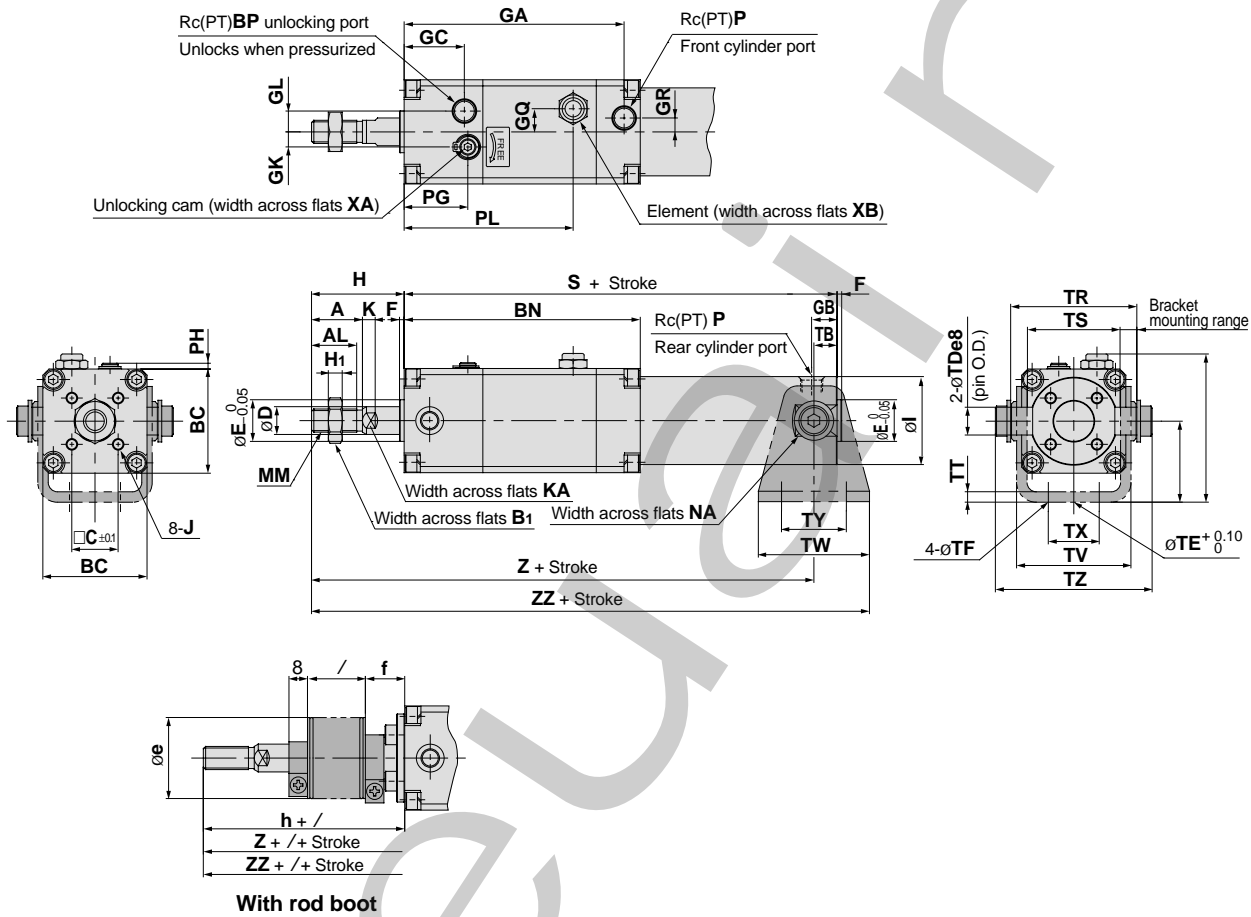
Cylinder with Lock

Double Acting: Single Rod

Dimensions (mm)

Rear trunnion type (T): With rubber bumper/CNGTN

1in = 25.4mm



Bore size (mm)	Stroke range without rod boot		Stroke range with rod boot		A	AL	B1	BC	BN	BP	BZ	C	D	E	F	GA	GB	GC	GK	GL	GR	GQ	H1	I
	Standard	Long stroke	Standard	Long stroke																				
20	to 200	—	20 to 200	—	18	15.5	13	38	93	1/8	50.5	14	8	12	2	85	10	18	5.5	6	4	8	5	26
25	to 300	—	20 to 300	—	22	19.5	17	45	103	1/8	59	16.5	10	14	2	96	10	25	6.5	9	7	10	6	31
32	to 300	—	20 to 300	—	22	19.5	17	45	104	1/8	64	20	12	18	2	97	10	25	6.5	9	7	10	6	38
40	to 300	301 to 500	20 to 300	301 to 500	30	27	19	52	112	1/8	72.5	26	16	25	2	104	10 (13)	26	7	11	7	12	8	47

Bore size (mm)	J	K	KA	MM	NA	P	PG	PH	PL	S	TB	TDe8	TE	TF	TH	TR	TS	TT	TV	TW	TX	TY	TZ	XA	XB
20	M4 x 0.7	5	6	M8 x 1.25	24	1/8	21.5	2	65	141	11	8 ^{-0.025} _{-0.047}	10	5.5	25	39	28	3.2	35.8	42	16	28	47.6	3	12
25	M5 x 0.8	5.5	8	M10 x 1.25	29	1/8	26.5	2.5	73	151	11	10 ^{-0.025} _{-0.047}	10	5.5	30	43	33	3.2	39.8	42	20	28	53	3	12
32	M5 x 0.8	5.5	10	M10 x 1.25	35.5	1/8	26.5	2.5	73	154	10	12 ^{-0.032} _{-0.059}	10	6.6	35	54.5	40	4.5	49.4	48	22	28	67.7	3	12
40	M6 x 1	6	14	M14 x 1.5	44	1/8	28	2.5	81	169 (178)	10 (12)	14 ^{-0.032} _{-0.059}	10	6.6	40	65.5	49	4.5	58.4	56	30	30	78.7	4	12

Bore size (mm)	Without rod boot			With rod boot			Stroke x	Z	ZZ
	H	Z	ZZ	e	f	h			
20	35	165	186	30	16	55	0.25	185	206
25	40	180	201	30	17	62		202	223
32	40	184	208	35	17	62		206	230
40	50	209 (216)	237 (244)	35	17	70		229 (236)	257 (264)

Note) Dimensions inside () are for long strokes.
Refer to page 13 regarding the trunnion bracket.

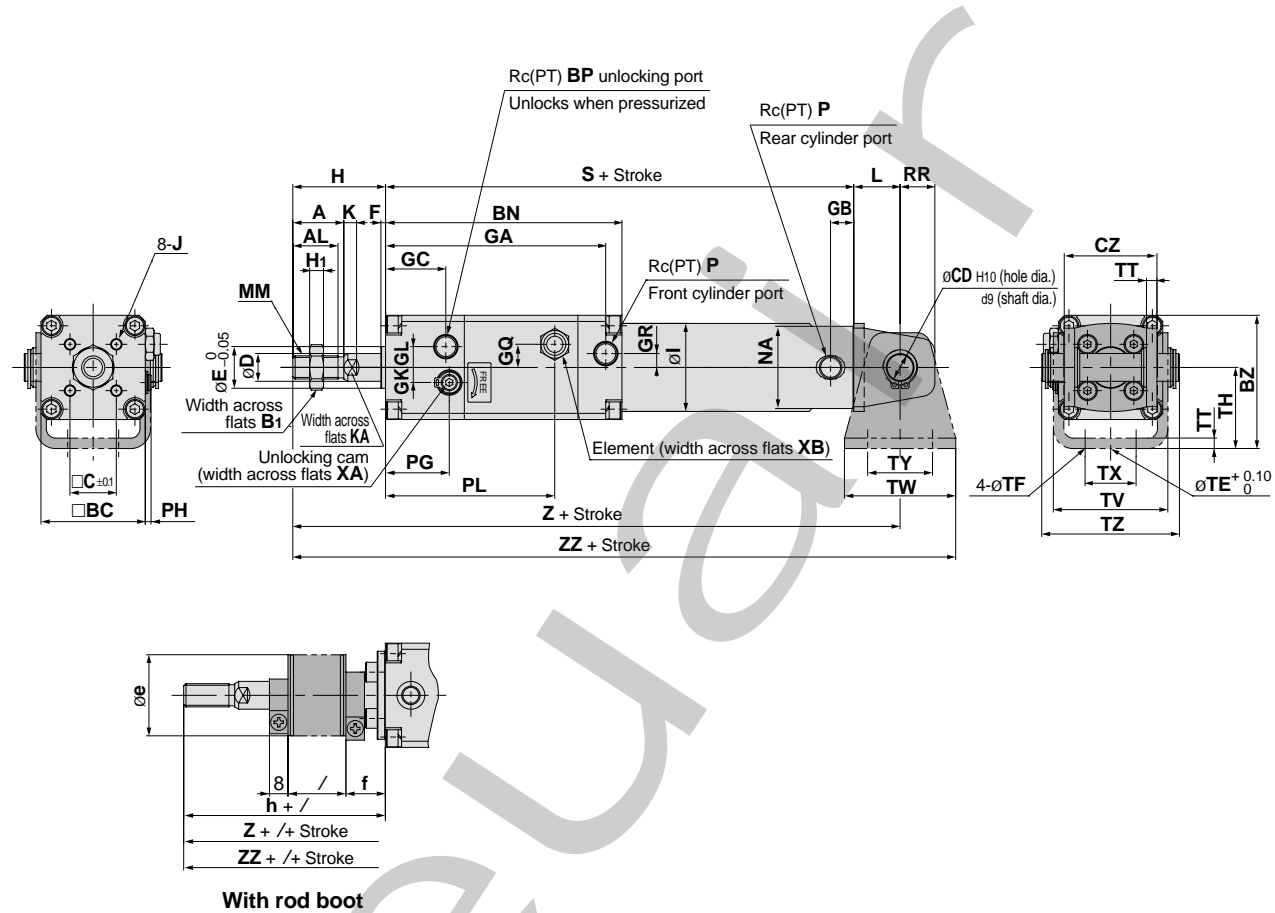
Cylinder with Lock

Double Acting: Single Rod

Dimensions (mm)

1in = 25.4mm

Clevis type (D): With rubber bumper/CNGDN



With rod boot

(mm)

Bore size (mm)	Stroke range without rod boot		Stroke range with rod boot		A	AL	B1	BC	BN	BP	BZ	C	D	E	F	GA	GB	GC	GK	GL	GR	GQ	H1	I
	Standard	Long stroke	Standard	Long stroke																				
20	to 200	—	20 to 200	—	18	15.5	13	38	93	1/8	44	14	8	12	2	85	10	18	5.5	6	4	8	5	26
25	to 300	—	20 to 300	—	22	19.5	17	45	103	1/8	52.5	16.5	10	14	2	96	10	25	6.5	9	7	10	6	31
32	to 300	—	20 to 300	—	22	19.5	17	45	104	1/8	57.5	20	12	18	2	97	10	25	6.5	9	7	10	6	38
40	to 300	301 to 500	20 to 300	301 to 500	30	27	19	52	112	1/8	66	26	16	25	2	104	10 (13)	26	7	11	7	12	8	47

(mm)

Bore size (mm)	J	K	KA	MM	NA	P	PG	PH	PL	S	CD	CZ	L	RR	TE	TF	TH	TT	TV	TW	TX	TY	TZ	XA	XB
20	M4 x 0.7	5	6	M8 x 1.25	24	1/8	21.5	2	65	141	8	29	14	11	10	5.5	25	3.2	35.8	42	16	28	43.4	3	12
25	M5 x 0.8	5.5	8	M10 x 1.25	29	1/8	26.5	2.5	73	151	10	33	16	13	10	5.5	30	3.2	39.8	42	20	28	48	3	12
32	M5 x 0.8	5.5	10	M10 x 1.25	35.5	1/8	26.5	2.5	73	154	12	40	20	15	10	6.6	35	4.5	49.4	48	22	28	59.4	3	12
40	M6 x 1	6	14	M14 x 1.5	44	1/8	28	2.5	81	169 (178)	14	49	22	18	10	6.6	40	4.5	58.4	56	30	30	71.4	4	12

(mm)

Bore size (mm)	Without rod boot			With rod boot		
	H	Z	ZZ	e	f	h
20	35	190	211	30	16	55
25	40	207	228	30	17	62
32	40	214	238	35	17	62
40	50	241 (250)	269 (278)	35	17	70

Note) Dimensions inside () are for long strokes.
The clevis pin and snap ring are included.
Refer to page 13 regarding the trunnion bracket.

Series CNG

Cylinder with Lock

Accessory Dimensions

1in = 25.4mm

* The knuckle pin and snap ring are included.

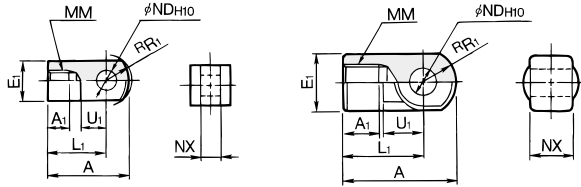
Single Knuckle Joint

I-G02, G03

Material: Rolled steel

I-G04

Material: Cast iron



(mm)

Part No.	Applicable bore size (mm)	A	A1	E1	L1	MM	R1	U1	NDH10	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}

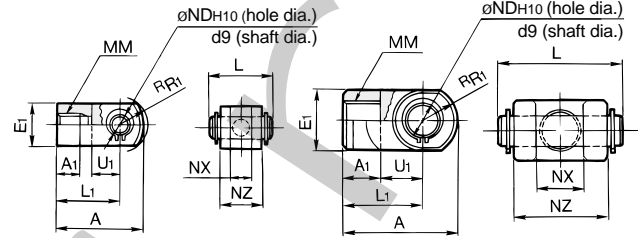
Double Knuckle Joint

Y-G02, G03

Material: Rolled steel

Y-G04

Material: Cast iron



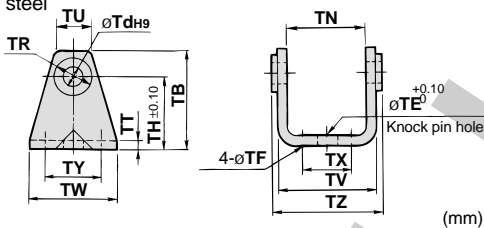
(mm)

Part No.	Applicable bore size (mm)	A	A1	E1	L1	MM	R1	U1	ND	NX	NZ	L	Applicable pin part no.
Y-G02	20	34	8.5	16	25	M8 x 1.25	10.3	11.5	8	8 ^{-0.2} _{-0.2}	16	21	IY-G02
Y-G03	25, 32	41	10.5	20	30	M10 x 1.25	12.8	14	10	10 ^{-0.2} _{-0.2}	20	25.6	IY-G03
Y-G04	40	42	16	22	30	M14 x 1.5	12	14	10	18 ^{-0.3} _{-0.3}	36	41.6	IY-G04

Front Trunnion Bracket

Ø20 to Ø40

Material: Rolled steel



(mm)

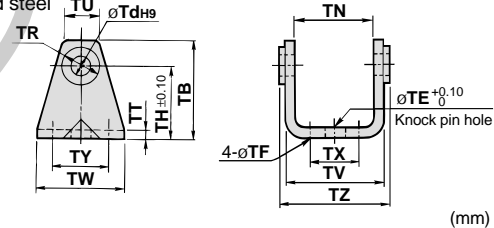
Part No.	Applicable bore size (mm)	TB	TdH9	TE	TF	TH	TN
CNG-020-24	20	42	8 ^{+0.036} ₀	10	5.5	31	41 ^{+0.4} _{+0.1}
CNG-025-24	25	48	10 ^{+0.036} ₀	10	5.5	37	48 ^{+0.4} _{+0.1}
CNG-032-24	32	53	12 ^{+0.043} ₀	10	6.6	38.5	48 ^{+0.5} _{+0.1}
CNG-040-24	40	60	14 ^{+0.043} ₀	10	6.6	42.5	56 ^{+0.5} _{+0.1}

Part No.	Applicable bore size (mm)	TR	TT	TU	TV	TW	TX	TY	TZ
CNG-020-24	20	13	3.2	21.2	47.8	42	26	28	50
CNG-025-24	25	15	3.2	21.3	54.8	42	28	28	57
CNG-032-24	32	17	4.5	25.6	57.4	48	28	28	61.4
CNG-040-24	40	21	4.5	26.3	65.4	56	36	30	71.4

Rear Trunnion Bracket

Ø20 to Ø40

Material: Rolled steel



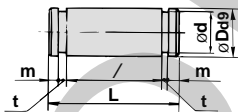
(mm)

Part No.	Applicable bore size (mm)	TB	TdH9	TE	TF	TH	TN
CG-020-24A	20	36	8 ^{+0.036} ₀	10	5.5	25	(29.3)
CG-025-24A	25	43	10 ^{+0.036} ₀	10	5.5	30	(33.1)
CG-032-24A	32	50	12 ^{+0.043} ₀	10	6.6	35	(40.4)
CG-040-24A	40	58	14 ^{+0.043} ₀	10	6.6	40	(49.2)

Part No.	Applicable bore size (mm)	TR	TT	TU	TV	TW	TX	TY	TZ
CG-020-24A	20	13	3.2	18.1	35.8	42	16	28	38.3
CG-025-24A	25	15	3.2	20.7	39.8	42	20	28	42.1
CG-032-24A	32	17	4.5	23.6	49.4	48	22	28	53.8
CG-040-24A	40	21	4.5	27.3	58.4	56	30	30	64.6

Knuckle Pin

Material: Carbon steel

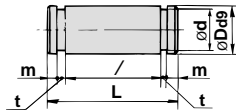


(mm)

Part No.	Applicable bore size (mm)	Dd9	L	d	m	t	Snap ring
IY-G02	20	8 ^{-0.040} _{-0.076}	21	7.6	16.2	1.5	0.9 C type 8 for shaft
IY-G03	25, 32	10 ^{-0.040} _{-0.076}	25.6	9.6	20.2	1.55	1.15 C type 10 for shaft
IY-G04	40	10 ^{-0.040} _{-0.076}	41.6	9.6	36.2	1.55	1.15 C type 10 for shaft

Clevis Pin

Material: Carbon steel

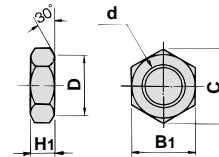


(mm)

Part No.	Applicable bore size (mm)	Dd9	L	d	m	t	Snap ring
CD-G02	20	8 ^{-0.040} _{-0.076}	43.4	7.6	38.6	1.5	0.9 C type 8 for shaft
CD-G25	25	10 ^{-0.040} _{-0.076}	48	9.6	42.6	1.55	1.15 C type 10 for shaft
CD-G03	32	12 ^{-0.050} _{-0.093}	59.4	11.5	54	1.55	1.15 C type 12 for shaft
CD-G04	40	14 ^{-0.050} _{-0.093}	71.4	13.4	65	2.05	1.15 C type 14 for shaft

Rod End Nut

Material: Rolled steel



(mm)

Part No.	Applicable bore size (mm)	B1	C	D	d	H1
NT-02	20	13	(15)	12.5	M8 x 1.25	5
NT-03	25, 32	17	(19.6)	16.5	M10 x 1.25	6
NT-G04	40	19	(21.9)	18	M14 x 1.5	8

Cylinder with Lock

Series CNG

Auto Switch Specifications

Applicable Auto Switch Models

Auto switch model		Electrical entry
Reed switches	D-C7, C8	Grommet
	D-C73C, C80C	Connector
	D-B5, B6	Grommet
	D-B59W	Grommet (2 color indication)
Solid state switches	D-H7□	Grommet
	D-H7□W	Grommet (2 color indication)
	D-H7LF	Grommet (2 color indication, latch type with diagnostic output)
	D-H7NF	Grommet (2 color indication, with diagnostic output)
	D-H7BA	Grommet (2 color indication, water resistant)
	D-H7C	Connector
	D-G5NT	Grommet (with timer)

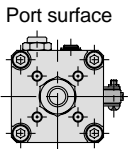
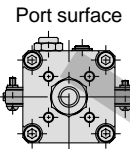
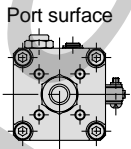
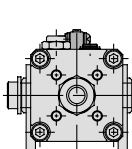
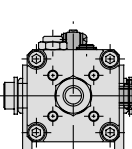
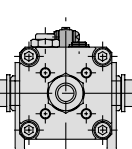
⚠ Specific Product Precautions

Be sure to read before handling.
When using auto switches, refer to pages 25 through 27 regarding safety instructions and common precautions.

Auto Switch Mounting Brackets by Stroke/Mounting Surfaces

1 in = 25.4mm

st: Stoke (mm)

Mounting bracket	Basic type, Foot type, Flange type, Clevis type			Trunnion type		
	1 pc. (rod cover side)	2 pcs. (mounted on different sides)	2 pcs. (mounted on same side)	1 pc.	2 pcs. (mounted on different sides)	2 pcs. (mounted on same side)
Switch mounting surface	Port surface 	Port surface 	Port surface 			
Switch model						
D-C7, C8	10st or more	15 to 49st	50st or more	10st or more	15 to 49st	50st or more
D-H7□, H7□W D-H7BA, H7NF	10st or more	15 to 59st	60st or more	10st or more	15 to 59st	60st or more
D-C73C, C80C, H7C	10st or more	15 to 64st	65st or more	10st or more	15 to 64st	65st or more
D-H7LF	10st or more	20 to 64st	65st or more	10st or more	20 to 64st	65st or more
D-B5, B6, G5NT	10st or more	15 to 74st	75st or more	10st or more	15 to 74st	75st or more
D-B59W	15st or more	20 to 74st	75st or more	15st or more	20 to 74st	75st or more

Series CNG

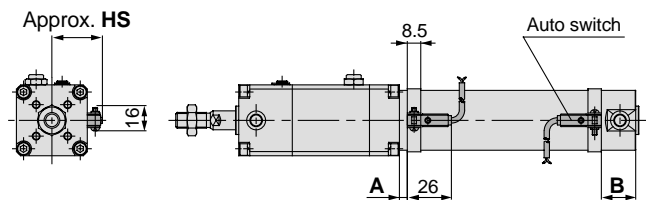
Cylinder with Lock

Auto Switch Specifications

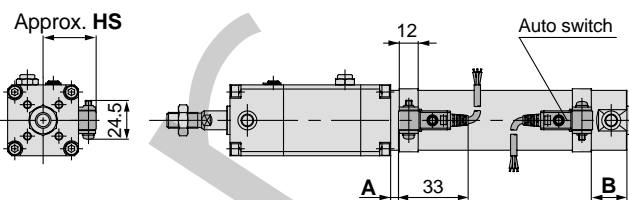
Auto Switches/Proper Mounting Position and Mounting Height for Stroke End Detection

1in = 25.4mm

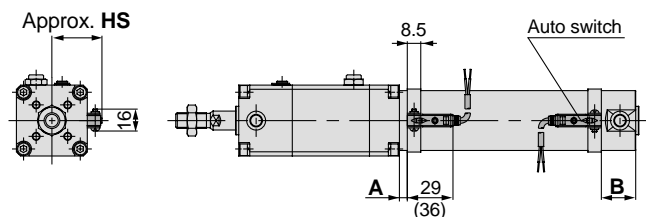
D-C7, D-C8



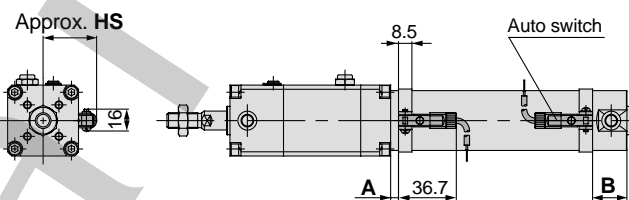
D-G5NT



D-H7, D-H7□W
D-H7□F, D-H7BA

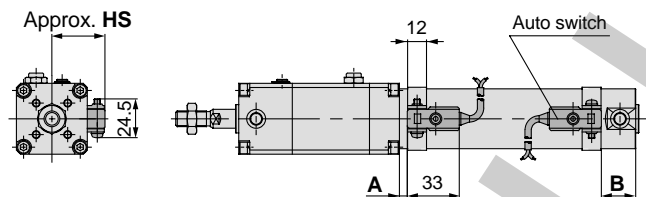


D-C73C, D-C80C

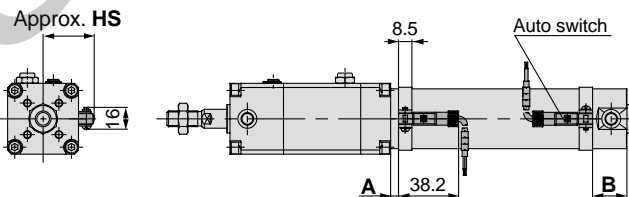


* Numbers inside () are for type D-H7LF.

D-B5, D-B6, D-B59W



D-H7C



Auto switch mounting position

(mm) Auto switch mounting height (mm)

Auto switch model	D-C7, C8 D-C73C D-C80C						D-B5, B6		D-B59W		D-H7□ D-H7C D-H7□W D-H7BA		D-H7□F		D-G5NT	
	A	B	A	B	A	B	A	B	A	B	A	B	A	B		
20	8.5	20.5 (28.5)	2.5	14.5 (22.5)	5.5	17.5 (25.5)	7.5	19.5 (27.5)	6	18 (26)	4	16 (24)				
25	8.5	20.5 (28.5)	2.5	14.5 (22.5)	5.5	17.5 (25.5)	7.5	19.5 (27.5)	6	18 (26)	4	16 (24)				
32	9.5	21.5 (29.5)	3.5	15.5 (23.5)	6.5	18.5 (26.5)	8.5	20.5 (28.5)	7	19 (27)	5	17 (25)				
40	14.5	23.5 (33)	8.5	17.5 (27)	11	20.5 (30)	13.5	22.5 (32)	12	21 (30.5)	10	19 (28.5)				

Dimensions inside () are for long strokes.

Cylinder with Lock

Auto Switch Specifications

Contact Protection Boxes/CD-P11, CD-P12

<Applicable switch models>

D-C7/C8, D-C73C/C80C, D-B53

The above auto switches do not have internal contact protection circuits.

- 1. The operating load is an induction load.**
- 2. The length of wiring to the load is 5m or more.**
- 3. The load voltage is 100VAC.**

A contact protection box should be used in any of the above situations.

Otherwise, the life of the contacts may be reduced. (They may stay on continuously.)

Further, even in the case of a type having an internal contact protection circuit (D-B54, D-B64, D-B59W), if the length of the wiring to the load is extremely long (30m or more) and a PLC having a large rush current is used, confirm whether a contact protection box may be necessary.

Contact protection box specifications

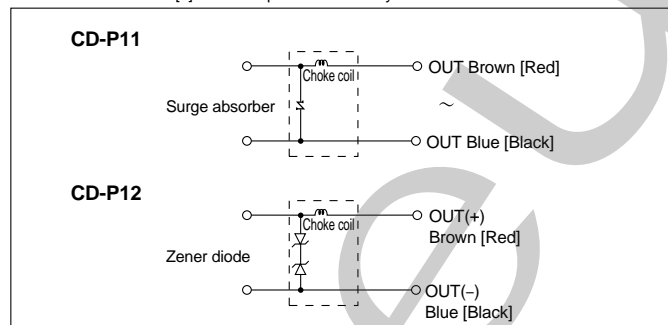
Part No.	CD-P11		CD-P12
Load voltage	100VAC	200VAC	24VDC
Maximum load current	25mA	12.5mA	50mA

* Lead wire length Switch connection side 0.5m
Load connection side 0.5m

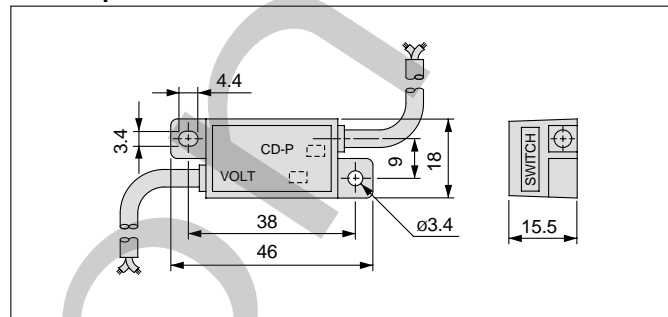


Contact protection box internal circuits

Lead wire colors inside [] are those prior to conformity with IEC standards.



Contact protection box/Dimensions



Contact protection box/Connection

To connect a switch unit to a contact protection box, connect the lead wire from the side of the contact protection box marked SWITCH to the lead wire coming out of the switch unit.

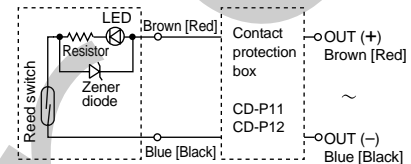
Moreover, the switch unit should be kept as close as possible to the contact protection box, with a lead wire length of no more than 1m.

Auto Switch Internal Circuits

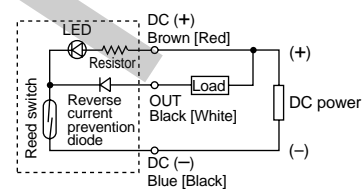
Lead wire colors inside [] are those prior to conformity with IEC standards.

Reed switches

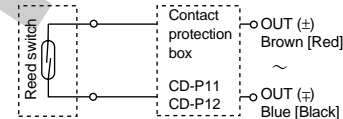
D-C73



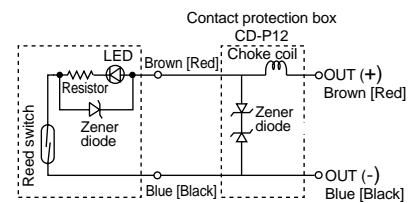
D-C76



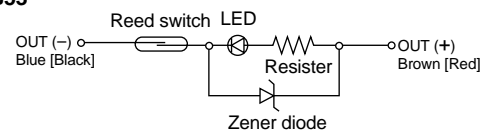
D-C80



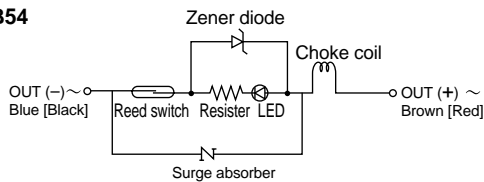
D-C73C



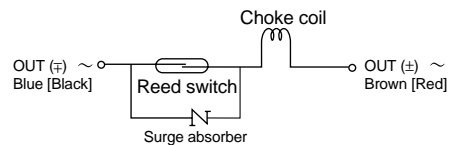
D-B53



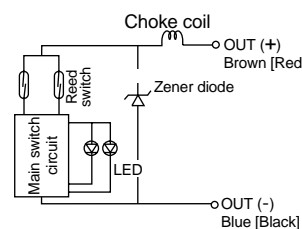
D-B54



D-B64



D-B59W

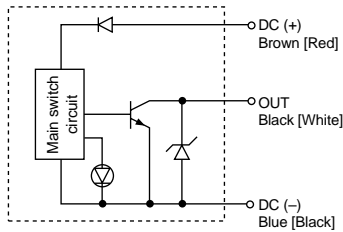


Auto Switch Internal Circuits

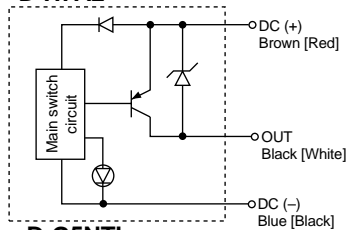
Lead wire colors inside [] are those prior to conformity with IEC standards.

Solid state switches

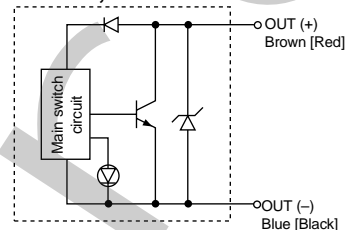
D-H7A1



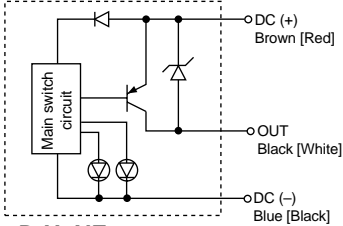
D-H7A2



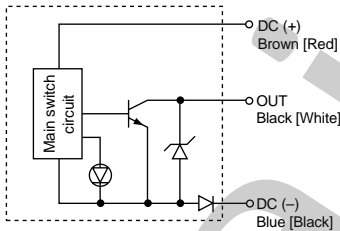
D-H7B, D-H7C



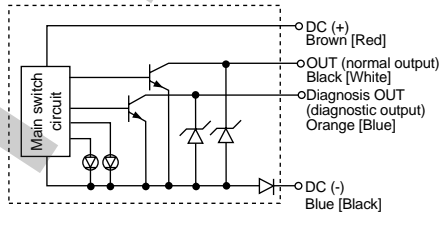
D-H7PW



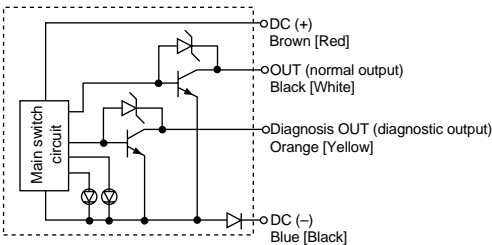
D-G5NTL



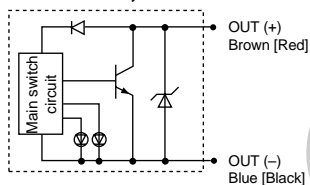
D-H7LF



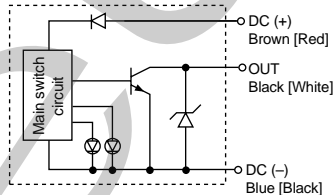
D-H7NF



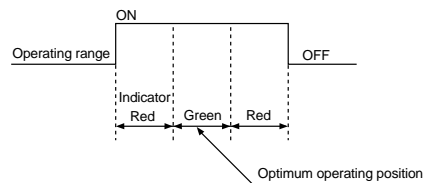
D-H7BAL, D-H7BW



D-H7NW



Indicator light/Display method

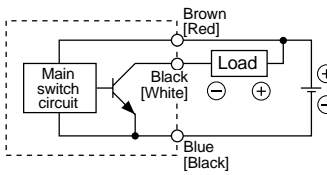


Cylinder with Lock

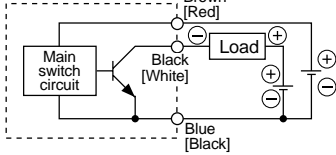
Auto Switch Connections and Examples

Basic Wiring

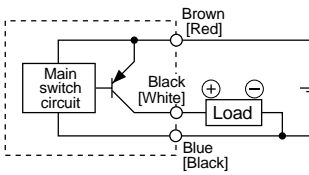
Solid state 3 wire, NPN



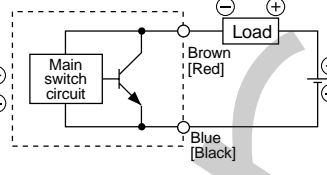
(Power supplies for switch and load are separate.)



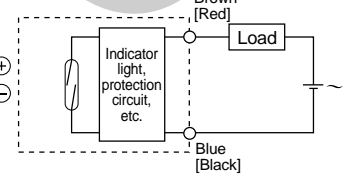
Solid state 3 wire, PNP



2 wire <Solid state>

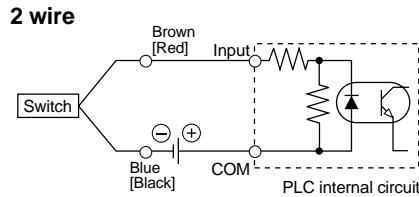
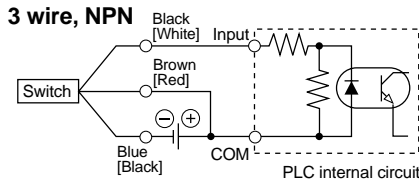


2 wire <Reed switch>

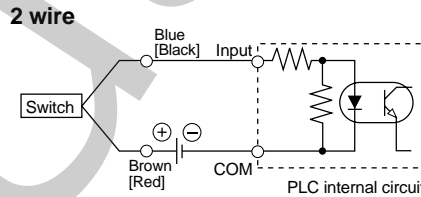
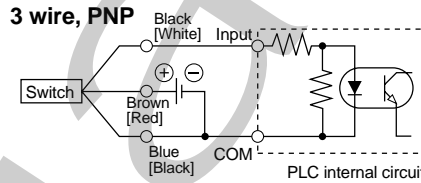


Examples of Connection to PLC

Sink input specifications



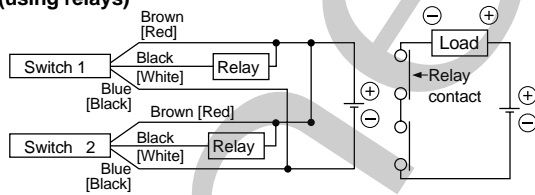
Source input specifications



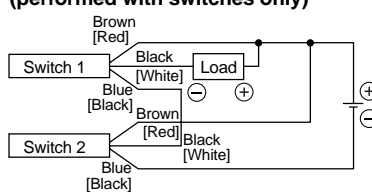
Connect according to the applicable PLC input specifications, as the connection method will vary depending on the PLC input specifications.

Connection Examples for AND (Series) and OR (Parallel)

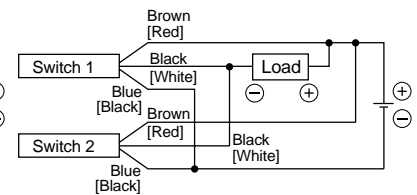
3 wire AND connection for NPN output (using relays)



AND connection for NPN output (performed with switches only)

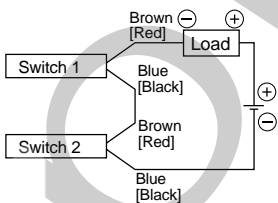


OR connection for NPN output



The indicator lights will light up when both switches are turned ON.

2 wire with 2 switch AND connection

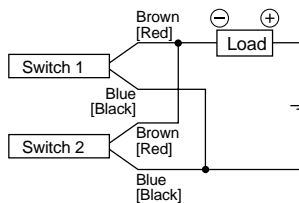


When two switches are connected in series, a load may malfunction because the load voltage will decline when in the ON state. The indicator lights will light up if both of the switches are in the ON state.

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

Example: Power supply is 24VDC
Voltage decline in switch is 4V

2 wire with 2 switch OR connection



<Solid state>
When two switches are connected in parallel, malfunction may occur because the load voltage will increase when in the OFF state.

<Reed switch>
Because there is no current leakage, the load voltage will not increase when turned OFF, but due to the number of switches in the ON state, the indicator lights will sometimes get dark or not light up, because of dispersion and reduction of the current flowing to the switches.

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

Example: Load impedance is 3kΩ
Leakage current from switch is 1mA

Precautions on Model Selection

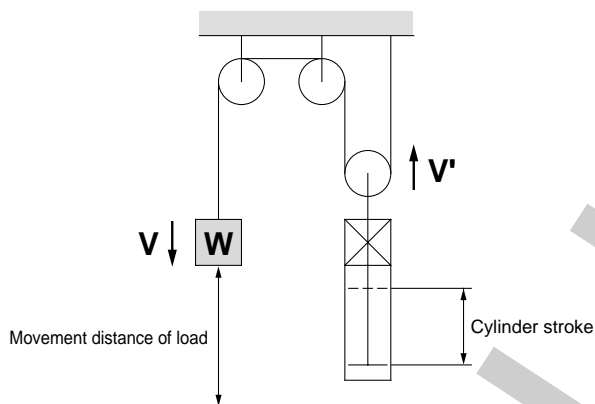
⚠ Caution

1. In order that the originally selected maximum speed is not exceeded, be certain to use a speed controller to adjust the total movement distance of the load so that movement takes place in no less than the applicable movement time.

The movement time is the time that is necessary for the load to travel the total movement distance from the start without any intermediate stops.

2. In cases where the cylinder stroke and the movement distance of the load are different (double speed mechanism, etc.), use the movement distance of the load for selection purposes.

Example)



Selection Example

- **Load weight:** $m = 12\text{kg}$
- **Movement distance:** $st = 200\text{mm}$
- **Movement time:** $t = 0.8\text{s}$
- **Load condition:** Vertical downward = Load in direction of rod extension
- **Operating pressure:** $P = 0.4\text{MPa}$

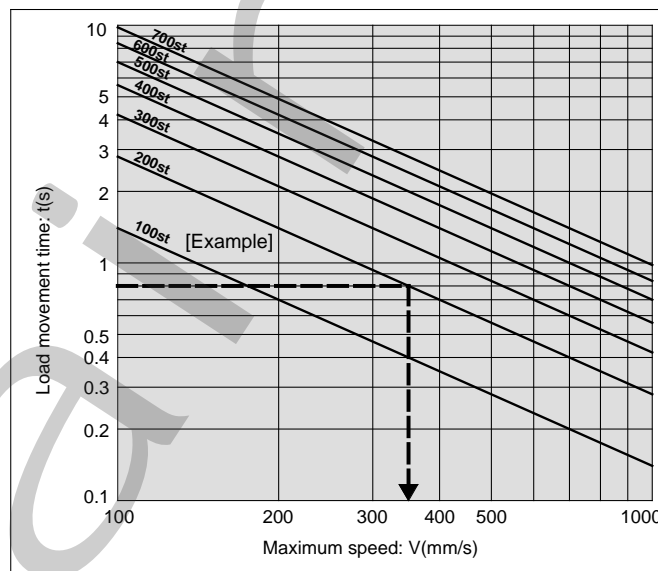
Step 1: From graph 1 find the maximum movement speed of the load
 \therefore Maximum speed V : approx. 350mm/s

Step 2: Select Graph 6 based upon the load condition and operating pressure, and then from the intersection of the maximum speed $V = 350\text{mm/s}$ found in Step 1, and the load weight $m = 12\text{kg}$
 $\therefore \phi 32 \rightarrow$ select a CNG32 or larger bore size.

Step 1 Find the maximum load speed: V.

Find the maximum load speed: $V(\text{mm/s})$ from the load movement time: $t(\text{s})$ and the movement distance: $st(\text{mm})$.

Graph 1



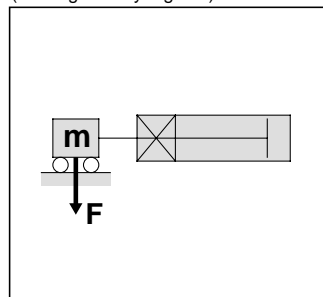
Step 2 Find the cylinder bore size.

Select a graph based upon the load condition and operating pressure, and then find the point of intersection for the maximum speed found in Step 1 and the load weight. Select the bore size on the line above the point of intersection.

Load condition

Operating pressure

Direction of load at right angle to rod
 (* Being held by a guide)

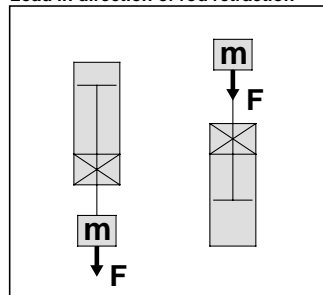


0.3MPa ≤ → Graph 2

0.4MPa ≤ → Graph 3

0.5MPa ≤ → Graph 4

Load in direction of rod extension
 Load in direction of rod retraction



0.3MPa ≤ → Graph 5

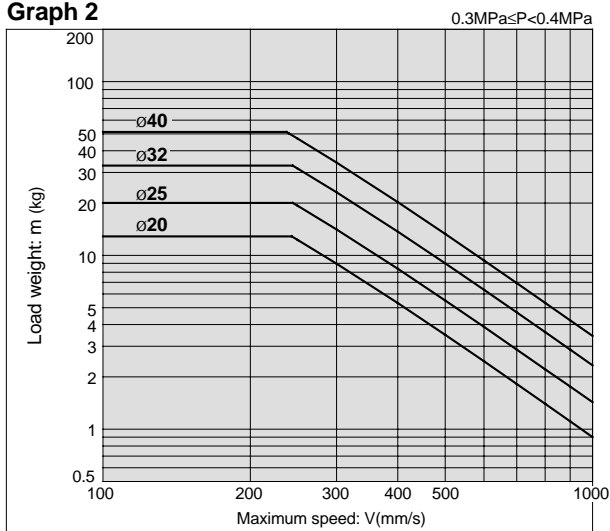
0.4MPa ≤ → Graph 6

0.5MPa ≤ → Graph 7

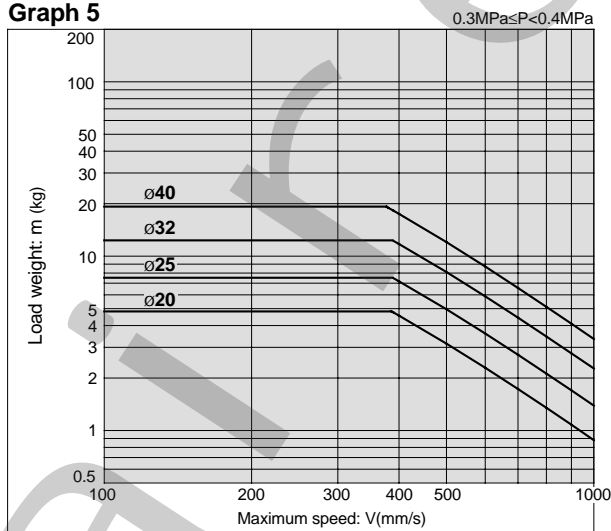
Model Selection

Selection Graphs

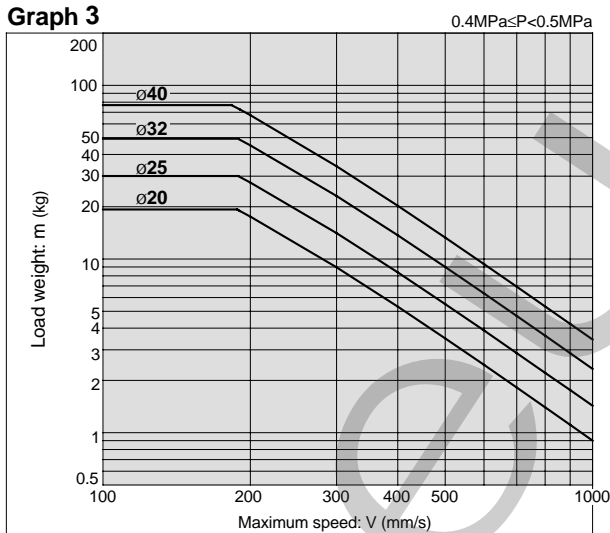
Graph 2



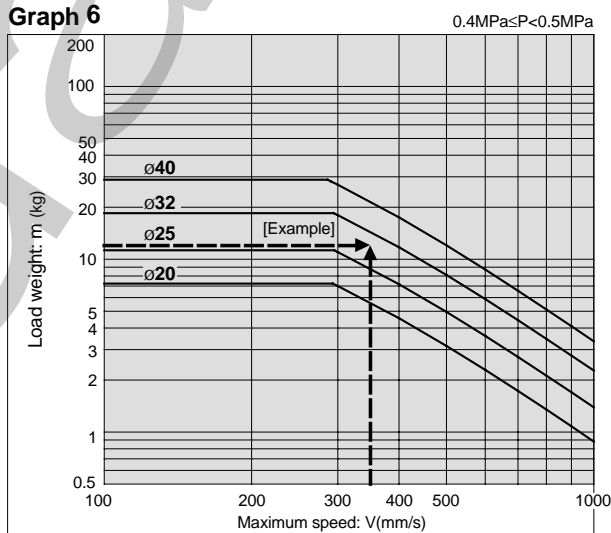
Graph 5



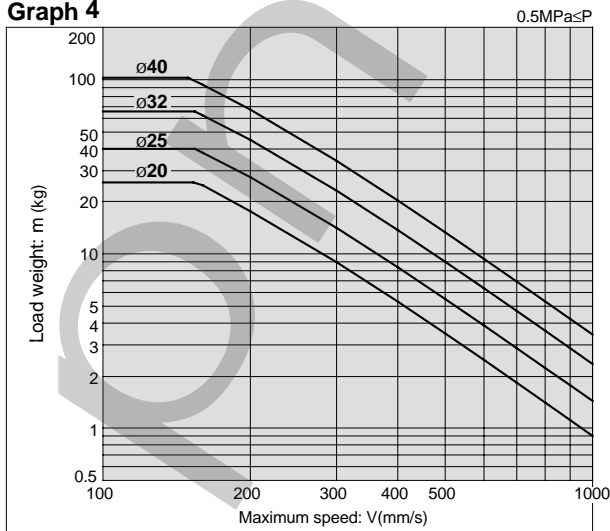
Graph 3



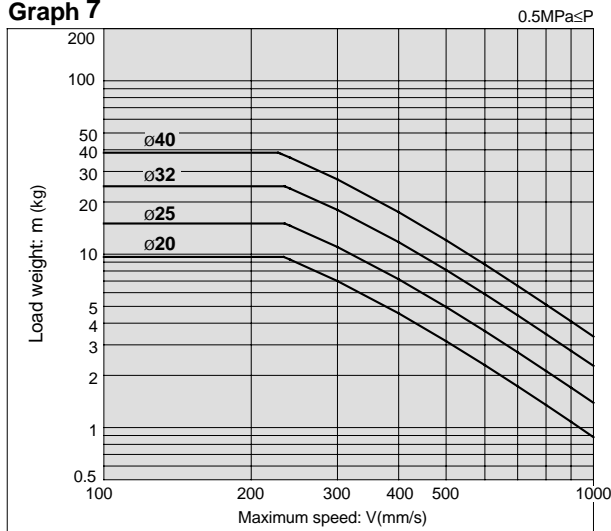
Graph 6



Graph 4



Graph 7



Note: 1kg = 2.2046lb 1MPa = 1450psi
1in = 25.4mm