Cylinder with Lock

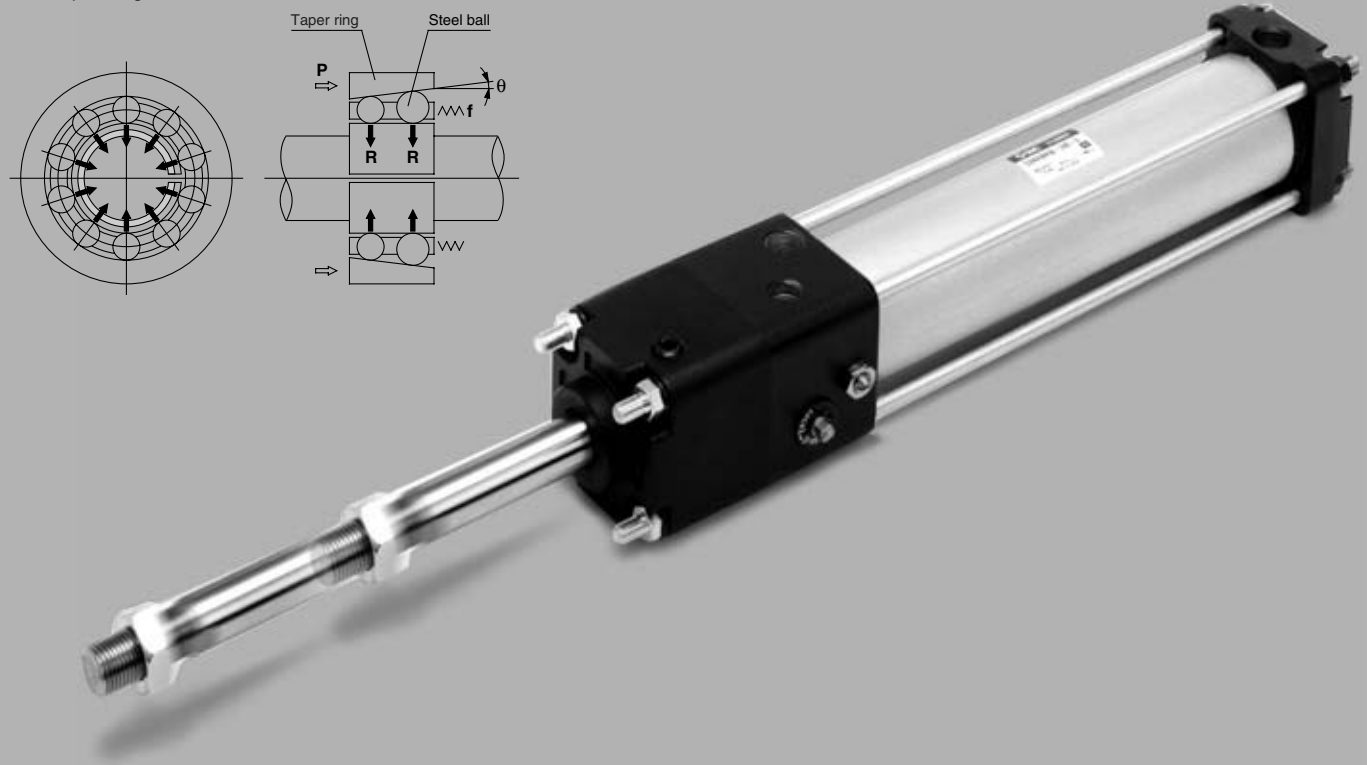
Series CNA

ø40, ø50, ø63, ø80, ø100

Suitable for intermediate stops, emergency stops and drop prevention

Simple construction

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



High locking efficiency

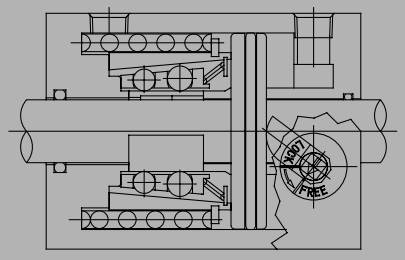
Greater locking efficiency as well as stable locking and unlocking operation has been achieved by arranging a large number of steel ball bearings in circular rows. (Unlocking pressure of 0.25 MPa ····· 0.05 MPa lower than conventional SMC products) In addition, both alignability and stable locking force with respect to piston rod eccentricity are obtained by allowing the taper ring to float.

High reliability and stable holding force

Outstanding durability and stable holding force are maintained by the use of a brake shoe having superior wear resistance, which has also been substantially lengthened (double the conventional SMC product).

Manual override for unlocking

Even if the air supply is blocked or exhausted, lock release is possible.
The fail safe mechanism locks again when the manual override is released.



Design minimizes the influences of unlocking air quality

A construction which is strong against moisture and drainage in the compressed air has been realized by separating the locking mechanism and the unlocking chamber.

Can be locked in both directions

An equal holding force can be obtained on either reciprocating stroke of the cylinder.

■ Series Variations

Series	Action	Type	Standard variations: With rod boot	Bore size (mm)	Lock holding force (N)	Max. stroke (mm)
Cylinder with lock Series CNA	Double acting	Single rod Series CNA		40	882	800
				50	1370	1200
				63	2160	
		Double rod Series CNAW		80	3430	1400
				100	5390	1500

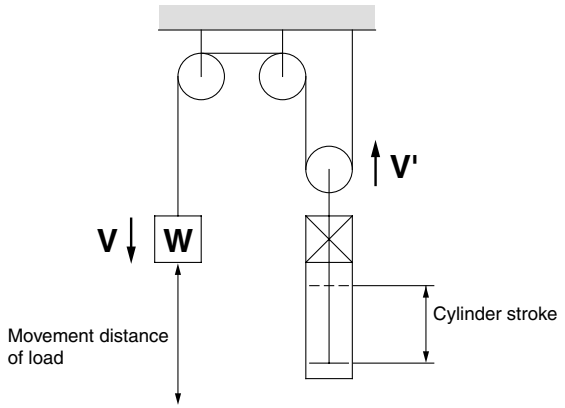
Model Selection

Precautions on Model Selection

⚠Warning

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)



3. The following selection example and procedures are based on use at the intermediate stop (including emergency stops during the operation). However, when the cylinder is in the locked state such as drop prevention, kinetic energy does not act upon it. Under these conditions, use the load mass at the maximum speed (V) of 100 mm/s shown in graphs 5 to 7 on page 725 depending on the operating pressure and select models.

Selection Example

- Load mass: m = 50 kg
- Movement distance: st = 500 mm
- Movement time: t = 2 s
- Load condition: Vertical downward = Load in direction of rod extension
- Operating pressure: P = 0.4 MPa

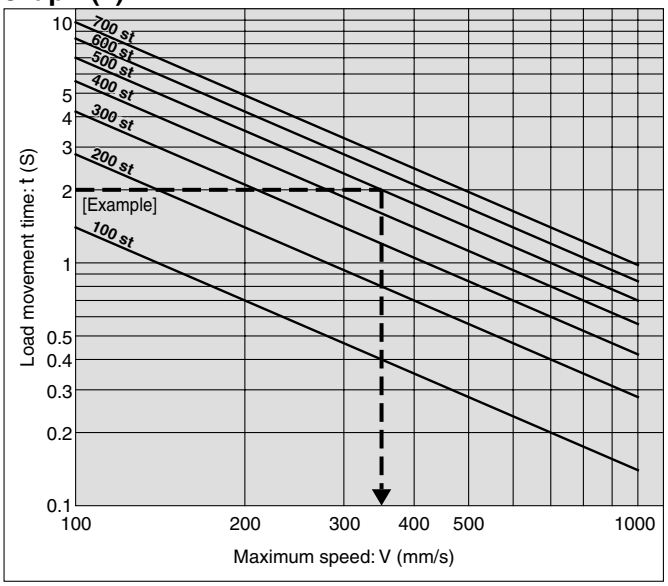
Step (1): From graph (1) find the maximum movement speed of the load.
∴Maximum speed V ≅ 350 mm/s

Step (2): Select graph (6) based upon the load conditions and operating pressure, and then from the intersection of the maximum speed V = 350 mm/s found in Step (1), and the load mass m = 50 kg.
∴ø63 → Decided the tube I.D. CNA63 or more.

Step (1) Find the maximum load speed V.

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

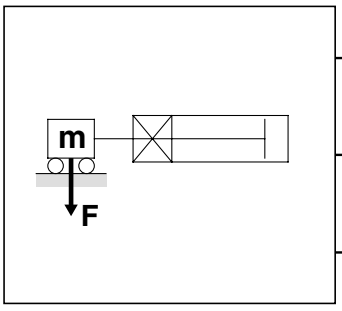
Graph (1)

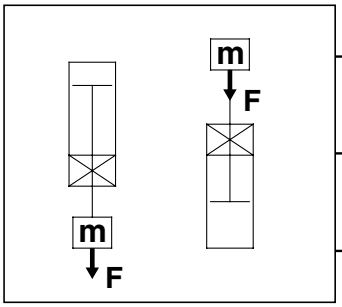


Step (2) Find the bore size.

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 mass. Select the bore size on the line above the point of intersection.

Load Condition	Operating Pressure	
Load in the direction at the right angle to rod (∗ Being held by a guide)	0.3 MPa ≤	Graph (2)
	0.4 MPa ≤	Graph (3)
	0.5 MPa ≤	Graph (4)
Load in the direction of rod extension **Load in the direction of rod retraction**	0.3 MPa ≤	Graph (5)
	0.4 MPa ≤	Graph (6)
	0.5 MPa ≤	Graph (7)

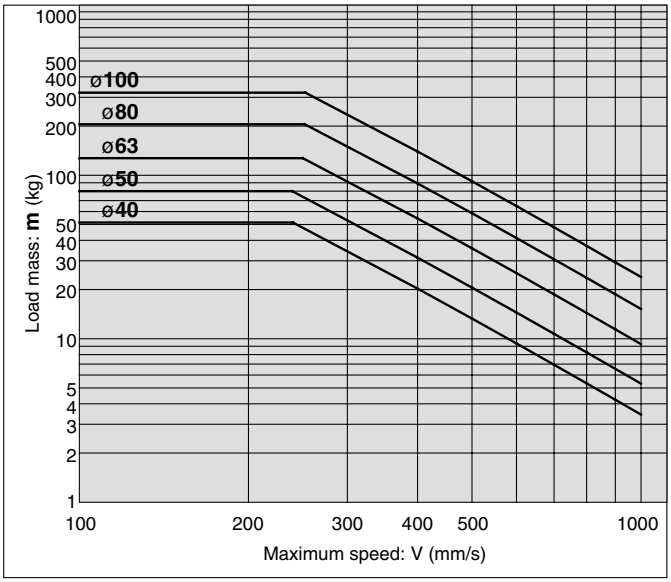




Selection Graph

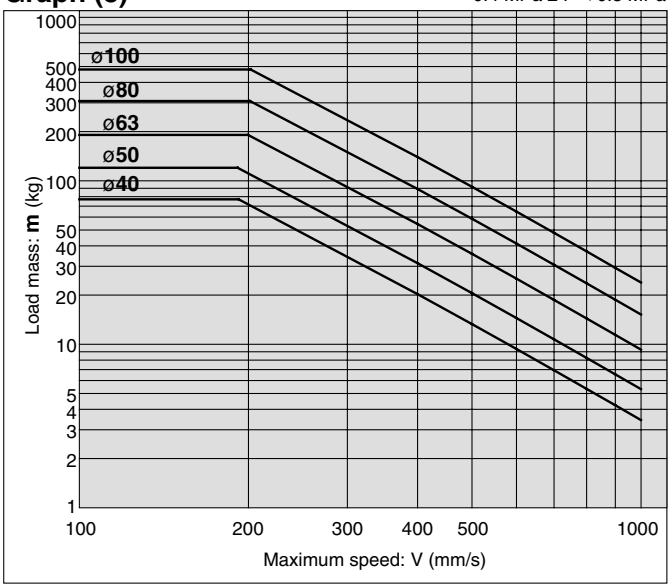
Graph (2)

0.3 MPa ≤ P < 0.4 MPa



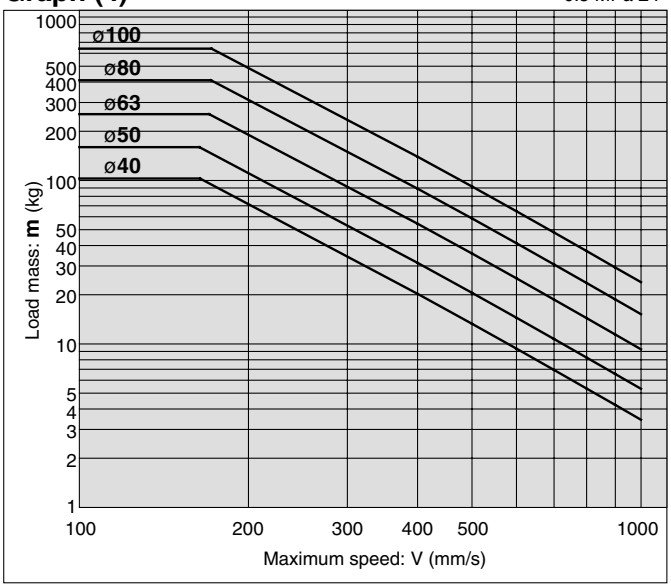
Graph (3)

0.4 MPa ≤ P < 0.5 MPa



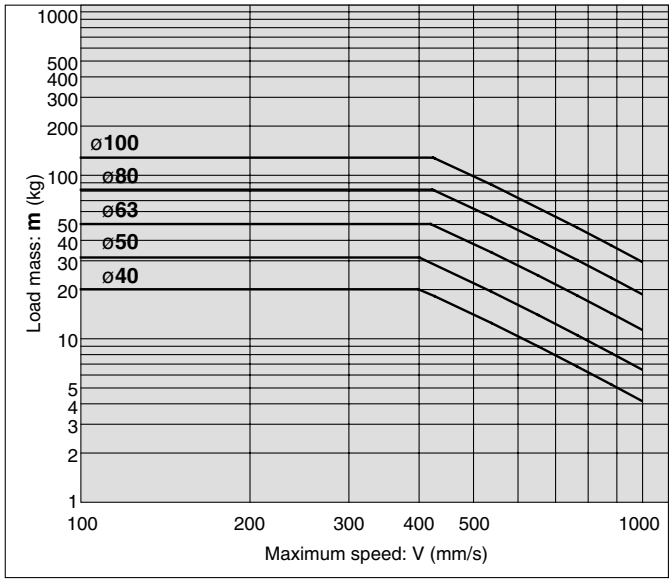
Graph (4)

0.5 MPa ≤ P



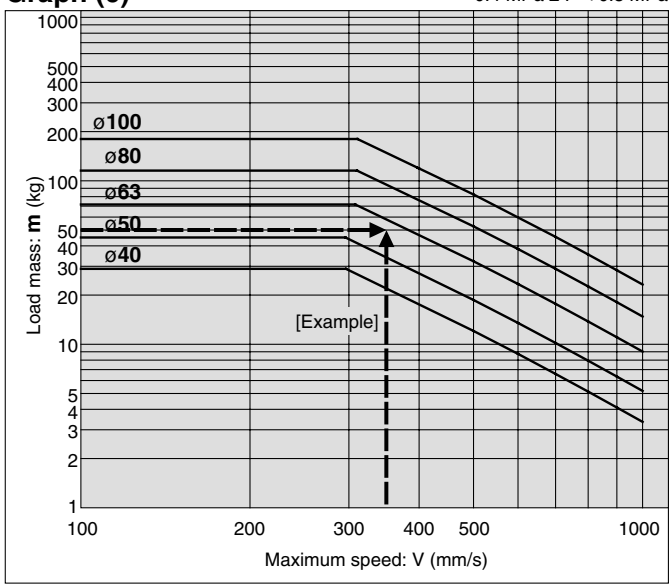
Graph (5)

0.3 MPa ≤ P < 0.4 MPa



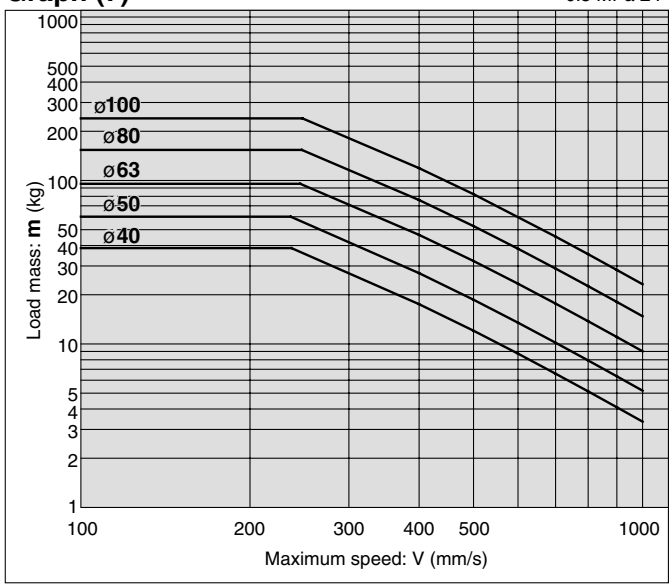
Graph (6)

0.4 MPa ≤ P < 0.5 MPa



Graph (7)

0.5 MPa ≤ P



Cylinder with Lock
Double Acting, Single Rod
Series CNA
ø40, ø50, ø63, ø80, ø100

How to Order

CNA | **L** | **N** | **50** | ☐ | – | **100** | **JN** | – | **D** | – | ☐

With auto switch **CDNA** | **L** | **N** | **50** | ☐ | – | **100** | **JN** | – | **D** | – | **M9BW** | ☐ | – | ☐

With auto switch
(Built-in magnet)

Mounting style

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

Type

N	Non-lube
F *	Steel tube

* Auto switches are not available with steel tube.

Bore size

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

Thread type

Nil	Rc
TN	NPT
TF	G

Cylinder stroke (mm)
Refer to page 727 for the standard stroke.

Locking direction

D	Both directions

Auto switch

Nil	Without auto switch

* For the applicable auto switch model, refer to the table below.

With rod boot/cushion

Rod boot	**J**	Nylon tarpaulin
	K	Heat resistant tarpaulin
Cushion	**Nil**	With double-side cushion
	N	Without cushion
	R	With rod cushion
	H	With head cushion

* When the symbols are two or more, indicate them alphabetically.

Number of auto switches

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

Made to Order
Refer to page 727 for details.

Built-in Magnet Cylinder Model

If a built-in magnet cylinder without an auto switch is required, there is no need to enter the symbol for the auto switch.
(Example) CDNALN40-100-D

Applicable Auto Switch/Refer to pages 1719 to 1827 for further information on auto switches.

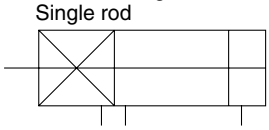
Type	Special function	Electrical entry	Indicator light	Wiring (Output)	Load voltage DC	Load voltage DC	Load voltage AC	Auto switch model Tie-rod mounting	Auto switch model Band mounting	Lead wire length (m) 0.5 (Nil)	1 (M)	3 (L)	5 (Z)	Pre-wired connector	Applicable load	
Solid state switch	—	Grommet	Yes	3-wire (NPN)	24 V	5 V, 12 V	—	**M9N**	—	●	●	●	○	○	IC circuit	Relay, PLC
								—	**G59**	●	—	●	○	○		
				3-wire (PNP)				**M9P**	—	●	●	●	○	○		
								—	**G5P**	●	—	●	○	○		
				2-wire		12 V		**M9B**	—	●	●	●	○	○	—	
								—	**K59**	●	—	●	○	○		
					—	—	100 V, 200 V	**J51**	—	●	—	●	○	—		
		Terminal conduit		3-wire (NPN)	24 V	12 V	—	**G39C**	**G39**	—	—	—	—	—		
				2-wire				**K39C**	**K39**	—	—	—	—	—		
	Diagnostic indication (2-color indication)	Grommet		3-wire (NPN)		5 V, 12 V		**M9NW**	—	●	●	●	○	○	IC circuit	
								—	**G59W**	●	—	●	○	○		
				3-wire (PNP)				**M9PW**	—	●	●	●	○	○		
								—	**G5PW**	●	—	●	○	○		
				2-wire		12 V		**M9BW**	—	●	●	●	○	○	—	
								—	**K59W**	●	—	●	○	○		
	Water resistant (2-color indication)			3-wire (NPN)		5 V, 12 V		**M9NA**	—	○	○	●	○	○		
				3-wire (PNP)				**M9PA**	—	○	○	●	○	○		
				2-wire		12 V		**M9BA**	—	○	○	●	○	○		
								—	**G5BA**	—	—	●	○	○		
	With diagnostic output (2-color indication)			4-wire (NPN)		5 V, 12 V		**F59F**	**G59F**	●	—	●	○	○	IC circuit	
	Magnetic field resistant (2-color indication)			2-wire (Non-polar)		—		**P4DW**	—	—	—	●	●	○	—	
Reed switch	—	Grommet	Yes	3-wire (NPN equivalent)	—	5 V	—	**A96 [Z76]****	—	●	—	●	—	—	IC circuit	—
			No	2 wire	24 V	12 V	100 V	**A93 [Z73]****	—	●	—	●	—	—	—	Relay, PLC
							100 V or less	**A90 [Z80]****	—	●	—	●	—	—	IC circuit	
			Yes				100 V, 200 V	**A54**	**B54**	●	—	●	●	—	—	
			No				200 V or less	**A64**	**B64**	●	—	●	—	—		
		Terminal conduit	Yes				—	**A33C**	**A33**	—	—	—	—	—	—	PLC
							100 V, 200 V	**A34C**	**A34**	—	—	—	—	—		Relay, PLC
		DIN terminal						**A44C**	**A44**	—	—	—	—	—		
	Diagnostic indication (2-color indication)	Grommet				—	—	**A59W**	**B59W**	●	—	●	—	—		

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

* Solid state auto switches marked with "○" are produced upon receipt of order.
** D-A9□ and D-A9□V cannot be mounted on ø50. Select auto switches in brackets.

* Since there are other applicable auto switches than listed, refer to page 751 for details.
* For details about auto switches with pre-wired connector, refer to pages 1784 and 1785.
* D-A9□/M9□/M9□W/M9□AL auto switches are shipped together (not assembled). (Only auto switch brackets are assembled at the time of shipment.)

JIS Symbol
Double acting,
Single rod



Specifications

Bore size (mm)	40	50	63	80	100
Lubrication	Not required (Non-lube)				
Action	Double acting				
Proof pressure	1.5 MPa				
Max. operating pressure	1.0 MPa				
Min. operating pressure	0.08 MPa				
Piston speed	50 to 1000 mm/s *				
Ambient and fluid temperature	Without auto switch: –10 to 70°C (No freezing) With auto switch: –10 to 60°C (No freezing)				
Cushion	Air cushion				
Stroke length tolerance	Up to 250: $^{+1.0}_{0}$, 251 to 1000: $^{+1.4}_{0}$, 1001 to 1500: $^{+1.8}_{0}$				
Mounting	Basic style, Axial foot style, Rod side flange style, Head side flange style, Single clevis style, Double clevis style, Center trunnion style				

* Load limits exist depending upon piston speed when locked, mounting direction and operating pressure.

Lock Specifications

Bore size (mm)	40	50	63	80	100
Locking action	Spring locking (Exhaust locking)				
Unlocking pressure	0.25 MPa or more				
Lock starting pressure	0.20 MPa or less				
Max. operating pressure	1.0 MPa				
Locking direction	Both directions				
Holding force N	882	1370	2160	3430	5390

* Be sure to select cylinders in accordance with the procedures on page 724.

Standard Stroke

For cases with auto switches, refer to the table of minimum strokes for auto switches mounting on pages 748 and 749.

Bore size (mm)	Standard stroke (mm) (1)	Long stroke (mm) (2)
40	25, 50, 75, 100, 125, 150, 175, 200, 250, 300, 350, 400, 450, 500	800
50, 63	25, 50, 75, 100, 125, 150, 175, 200, 250, 300, 350, 400, 450, 500, 600	1200
80, 100	25, 50, 75, 100, 125, 150, 175, 200, 250, 300, 350, 400, 450, 500, 600, 700	ø80: 1400 ø100: 1500

Note 1) Intermediate strokes other than the above are produced upon receipt of order. Spacers are not used for intermediate strokes.
Note 2) Long stroke applies to the axial foot style and the rod side flange style.
When exceeding the stroke range for each bracket, determine the maximum strokes referring to the Selection Table (front matter 29 in Best Pneumatics No. 2).

Stopping Accuracy

(mm)

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

Condition: Lateral, Supply pressure P = 0.5 MPa
Load mass ····· Upper limit of allowed value
Solenoid valve for locking mounted on the unlocking port
Maximum value of stopping position dispersion from 100 measurements

Made to Order Specifications

(For details, refer to pages 1829 to 1954.)

Symbol	Specification
—XA□	Change of rod end shape
—XC3	Special port location
—XC4	With heavy duty scraper
—XC11	Dual stroke cylinder/Single rod type
—XC14	Change of trunnion bracket mounting position
—XC15	Change of tie-rod length
—XC35	With coil scraper

Refer to pages 746 to 751 for cylinders with auto switches.

- Minimum auto switch mounting stroke
- Proper auto switch mounting position (detection at stroke end) and mounting height
- Operating range
- Switch mounting bracket: Part no.

Mounting Bracket Part No.

Bore size (mm)	40	50	63	80	100
Foot *	CA1-L04	CA1-L05	CA1-L06	CA1-L08	CA1-L10
Flange	CA1-F04	CA1-F05	CA1-F06	CA1-F08	CA1-F10
Single clevis	CA1-C04	CA1-C05	CA1-C06	CA1-C08	CA1-C10
Double clevis **	CA1-D04	CA1-D05	CA1-D06	CA1-D08	CA1-D10

* When ordering foot bracket, order 2 pieces per cylinder.
** Clevis pin, plain washer, and cotter pin are shipped together with double clevis style.

Rod Boot Material

Symbol	Rod boot material	Max. ambient temperature
J	Nylon tarpaulin	70°C
K	Heat resistant tarpaulin	110°C *

* Maximum ambient temperature for the rod boot itself.

Accessory

Mounting style		Basic style	Foot style	Rod side flange style	Head side flange style	Single clevis style	Double clevis style	Center trunnion style
Standard equipment	Rod end nut	●	●	●	●	●	●	●
	Clevis pin	—	—	—	—	—	●	—
Option	Single knuckle joint	●	●	●	●	●	●	●
	Double knuckle joint (With pin)	●	●	●	●	●	●	●
	With rod boot	●	●	●	●	●	●	●

Mass/( ): Denotes the values for steel tube.

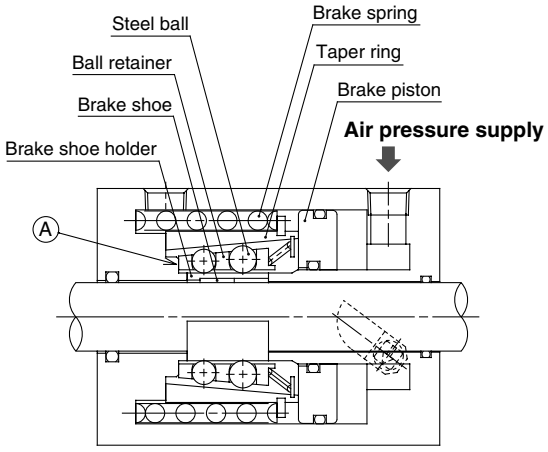
(kg)

Bore size (mm)			40	50	63	80	100
Basic mass	Basic style		1.70 (1.75)	2.70 (2.76)	4.08 (4.12)	7.30 (7.46)	10.80 (11.01)
	Foot style		1.89 (1.94)	2.74 (2.78)	4.42 (4.46)	7.97 (8.13)	11.79 (12.00)
	Flange style		2.07 (2.12)	2.97 (3.01)	4.87 (4.91)	8.75 (8.91)	12.72 (12.93)
	Single clevis style		1.93 (1.98)	2.86 (2.90)	4.71 (4.75)	8.41 (8.57)	12.58 (12.79)
	Double clevis style		1.97 (2.02)	2.95 (2.99)	4.87 (4.91)	8.70 (8.86)	13.10 (13.31)
	Trunnion style		2.15 (2.25)	3.05 (3.15)	4.97 (5.17)	9.00 (9.29)	13.20 (13.59)
Additional mass per each 50mm of stroke	Aluminum tube	Mounting bracket	0.22	0.28	0.37	0.52	0.65
	Steel tube	Mounting bracket except trunnion	0.28	0.35	0.43	0.70	0.87
		Trunnion style	0.36	0.46	0.65	0.86	1.07
Accessory bracket	Single knuckle joint		0.23	0.26	0.26	0.60	0.83
	Double knuckle joint		0.32	0.38	0.38	0.73	1.08
	Knuckle pin		0.05	0.05	0.05	0.14	0.19

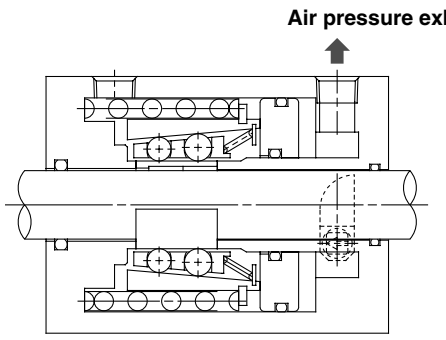
Calculation: (Example) **CNALN40-100-D**
- Base mass ····· 1.89 (Foot style, ø40)
- Additional mass ····· 0.22/50 strokes
- Cylinder stroke ····· 100 strokes

1.89 + 0.22 x 100/50 = 2.33 kg

Construction Principle



Unlocked state



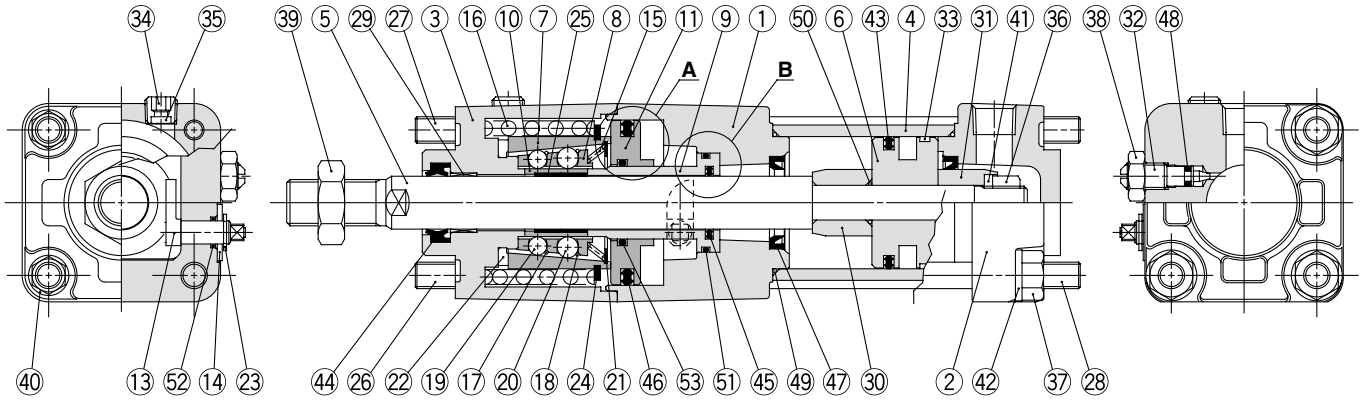
Locked state

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 lock the piston rod by tightening against it with a large force.

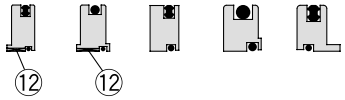
Unlocking is accomplished when air pressure is supplied to the unlocking port. The brake piston and taper ring oppose the spring force, moving to the left side, and the ball retainer strikes the cover section A. The braking force is released as the steel balls are removed from the taper ring by the ball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

Construction



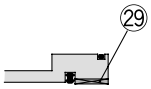
A section (Release piston bushing)

ø100 ø80 ø63 ø50 ø40



B section (Piston guide bushing)

ø50, ø63, ø80, ø100



Component Parts

No.	Description	Material	Note
1	**Rod cover**	Aluminum alloy	Black painted after hard anodized
2	**Head cover**	Aluminum alloy	Black painted
3	**Cover**	Aluminum alloy	Black painted after chromated
4	**Cylinder tube**	Aluminum alloy	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	**Release piston**	Aluminum alloy	Hard anodized (ø40, ø50, ø63) Chromated (ø80, ø100)
12	**Release piston bushing**	Steel + Special resin	
13	**Unlocking cam**	Chromium molybdenum steel	Zinc chromated
14	**Washer**	Carbon steel	Black zinc chromated
15	**Retainer pre-load spring**	Stainless steel wire	
16	**Brake spring**	Steel wire	Zinc chromated
17	**Clip A**	Stainless steel	
18	**Clip B**	Stainless steel	
19	**Steel ball A**	Carbon steel	
20	**Steel ball B**	Carbon steel	
21	**Tooth ring**	Stainless steel	
22	**Bumper**	Polyurethane rubber	
23	Type C retaining ring for unlocking cam shaft	Carbon steel	
24	Type C retaining ring for taper ring	Carbon steel	
25	**Brake shoe**	Special friction material	
26	**Unit holding tie-rod A**	Carbon steel	Chromated
27	**Unit holding tie-rod B**	Carbon steel	Chromated
28	**Tie-rod**	Carbon steel	Chromated
29	**Bushing**	Copper alloy	
30	**Cushion ring A**	Rolled steel plate	Zinc chromated
31	**Cushion ring B**	Rolled steel plate	Zinc chromated
32	**Cushion valve**	Rolled steel plate	Electroless nickel plated

Component Parts

No.	Description	Material	Note
33	**Wear ring**	Special resin	
34	**Hexagon socket head plug**	Chromium molybdenum steel	Black zinc chromated
35	**Element**	Bronze	
36	**Piston nut**	Rolled steel plate	Zinc chromated
37	**Tie-rod nut**	Carbon steel	Black zinc chromated
38	**Lock nut**	Carbon steel	Nickel plated
39	**Rod end nut**	Carbon steel	Nickel plated
40	**Spring washer**	Steel wire	Black zinc chromated
41	**Spring washer**	Steel wire	Zinc chromated
42	**Spring washer**	Steel wire	Black zinc chromated
43	**Piston seal**	NBR	
44	**Rod seal A**	NBR	
45	**Rod seal B**	NBR	
46	**Release piston seal**	NBR	
47	**Cushion seal**	NBR	
48	**Cushion valve seal**	NBR	
49	**Tube gasket**	NBR	
50	**Piston gasket**	NBR	
51	**Piston guide gasket**	NBR	
52	**Unlocking cam gasket**	NBR	
53	**O-ring**	NBR	

Replacement Parts/Seal Kit

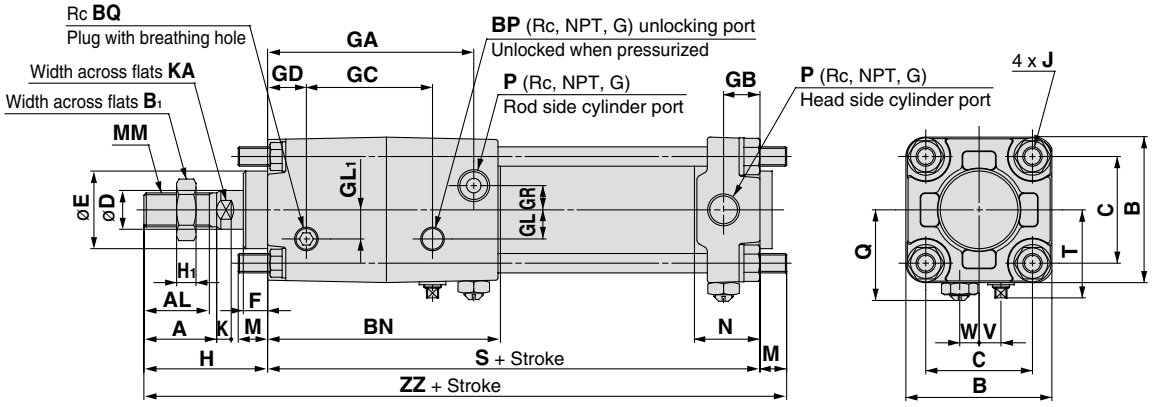
Bore size (mm)	Kit no.	Contents
40	CA1N 40A-PS	Including no. ㊸, ㊹, ㊽ and ㊾.
50	CA1N 50A-PS	
63	CA1N 63A-PS	
80	CA1N 80A-PS	
100	CA1N100A-PS	

∗ Since the lock section for Series CNA is normally replaced as a unit, kits are for the cylinder section only. These can be ordered using the order number for each bore size.

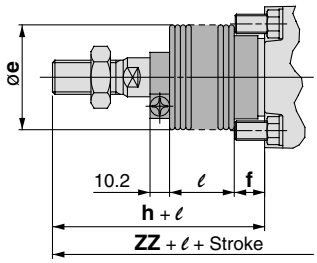
∗ Seal kit includes a grease pack (ø40 and ø50: 10 g, ø63 and ø80: 20 g, ø100: 30 g). Order with the following part number when only the grease pack is needed.
Grease pack part number: GR-S-010 (10 g), **GR-S-020** (20 g)

Dimensions

Basic style (B): CNABN



With rod boot



(mm)

Bore size (mm)	Stroke range (mm)	A	AL	B	B1	BN	BP	BQ	C	D	E	F	GA	GB	GC	GD	GL	GL1	GR	H1	J	K	KA
40	Up to 500	30	27	60	22	96	1/8	1/8	44	16	32	10	85	15	52	16	12	12	10	8	M8 x 1.25	6	14
50	Up to 600	35	32	70	27	108	1/4	1/8	52	20	40	10	95	17	56.5	20	13	15	12	11	M8 x 1.25	7	18
63	Up to 600	35	32	86	27	115	1/4	1/4	64	20	40	10	102	17	67	20	18	12	15	11	M10 x 1.25	7	18
80	Up to 750	40	37	102	32	139	1/4	1/4	78	25	52	14	123	21	83	20	23	18	17	13	M12 x 1.75	11	22
100	Up to 750	40	37	116	41	160	1/4	1/4	92	30	52	14	144	21	98	22	25	20	19	16	M12 x 1.75	11	26

(mm)

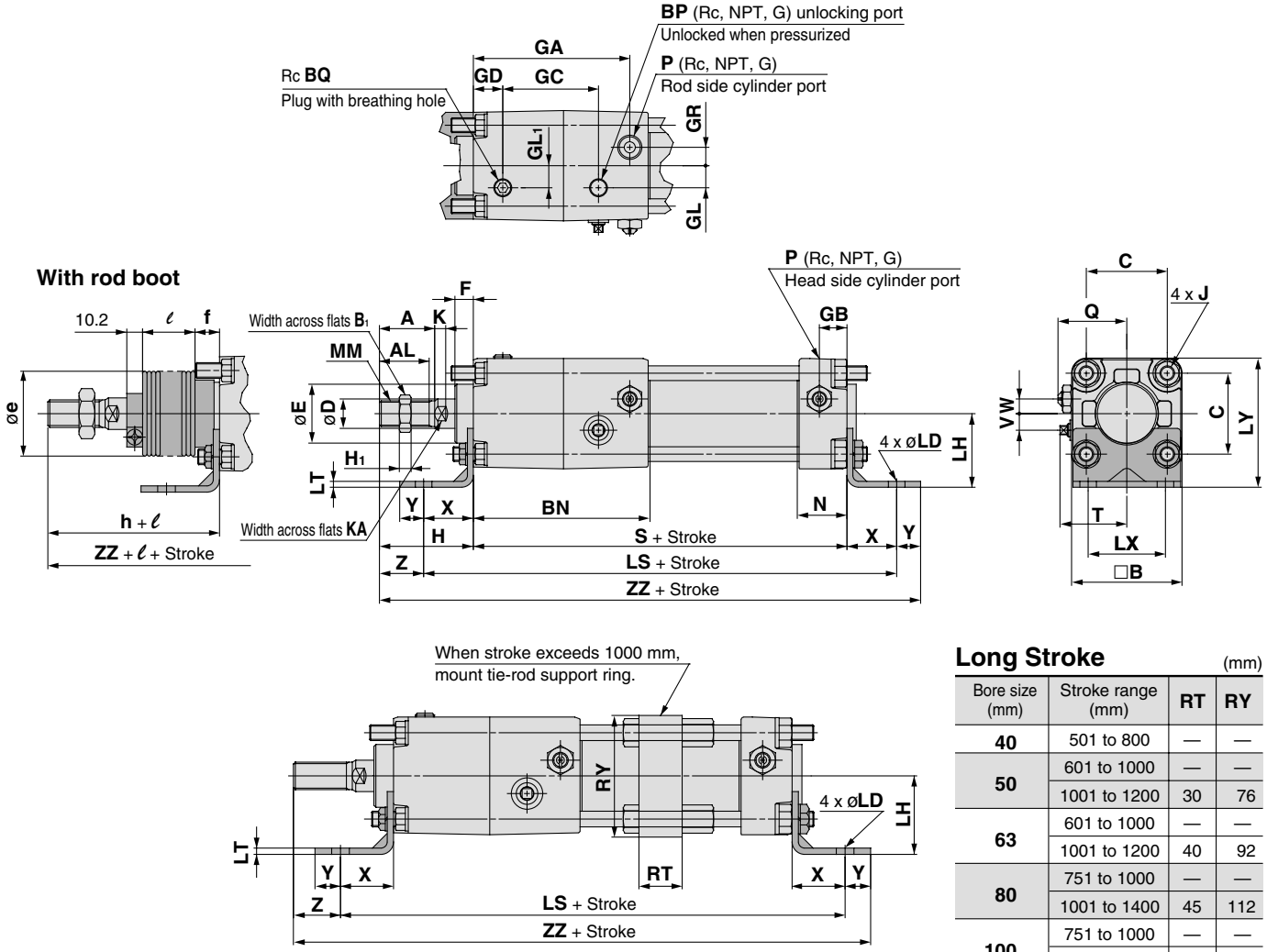
Bore size (mm)	M	MM	N	P	Q	H	S	T	V	W	ZZ
40	11	M14 x 1.5	27	1/4	37 to 39.5	51	153	37.5	9	8	215
50	11	M18 x 1.5	30	3/8	42 to 44.5	58	168	44	11	0	237
63	14	M18 x 1.5	31	3/8	50 to 51.5	58	182	52.5	12	0	254
80	17	M22 x 1.5	37	1/2	59.5 to 62.5	71	218	59.5	15	0	306
100	17	M26 x 1.5	40	1/2	66.5 to 69.5	72	246	69.5	15	0	335

With Rod Boot (mm)

Bore size (mm)	Stroke range (mm)	e	f	h	ℓ	ZZ
40	20 to 500	43	11.2	59	1/4 stroke	223
50	20 to 600	52	11.2	66	1/4 stroke	245
63	20 to 600	52	11.2	66	1/4 stroke	262
80	20 to 750	65	12.5	80	1/4 stroke	315
100	20 to 750	65	14	81	1/4 stroke	344

Dimensions

Axial foot style (L): CNALN



Long Stroke

(mm)

Bore size (mm)	Stroke range (mm)	RT	RY
40	501 to 800	—	—
50	601 to 1000	—	—
	1001 to 1200	30	76
63	601 to 1000	—	—
	1001 to 1200	40	92
80	751 to 1000	—	—
	1001 to 1400	45	112
100	751 to 1000	—	—
	1001 to 1500	50	136

(mm)

Bore size (mm)	Stroke range (mm)	A	AL	B	B1	BN	BP	BQ	C	D	E	F	GA	GB	GC	GD	GL	GL1	GR	H1	J	K	KA
40	Up to 500	30	27	60	22	96	1/8	1/8	44	16	32	10	85	15	52	16	12	12	10	8	M8 x 1.25	6	14
50	Up to 600	35	32	70	27	108	1/4	1/8	52	20	40	10	95	17	56.5	20	13	15	12	11	M8 x 1.25	7	18
63	Up to 600	35	32	86	27	115	1/4	1/4	64	20	40	10	102	17	67	20	18	12	15	11	M10 x 1.25	7	18
80	Up to 750	40	37	102	32	139	1/4	1/4	78	25	52	14	123	21	83	20	23	18	17	13	M12 x 1.75	11	22
100	Up to 750	40	37	116	41	160	1/4	1/4	92	30	52	14	144	21	98	22	25	20	19	16	M12 x 1.75	11	26

(mm)

Bore size (mm)	LD	LH	LS	LT	LX	LY	MM	N	P	Q	H	S	T	V	W	X	Y	Z	ZZ
40	9	40	207	3.2	42	70	M14 x 1.5	27	1/4	37 to 39.5	51	153	37.5	9	8	27	13	24	244
50	9	45	222	3.2	50	80	M18 x 1.5	30	3/8	42 to 44.5	58	168	44	11	0	27	13	31	266
63	11.5	50	250	3.2	59	93	M18 x 1.5	31	3/8	50 to 51.5	58	182	52.5	12	0	34	16	24	290
80	13.5	65	306	4.5	76	116	M22 x 1.5	37	1/2	59.5 to 62.5	71	218	59.5	15	0	44	16	27	349
100	13.5	75	332	6.0	92	133	M26 x 1.5	40	1/2	66.5 to 69.5	72	246	69.5	15	0	43	17	29	378

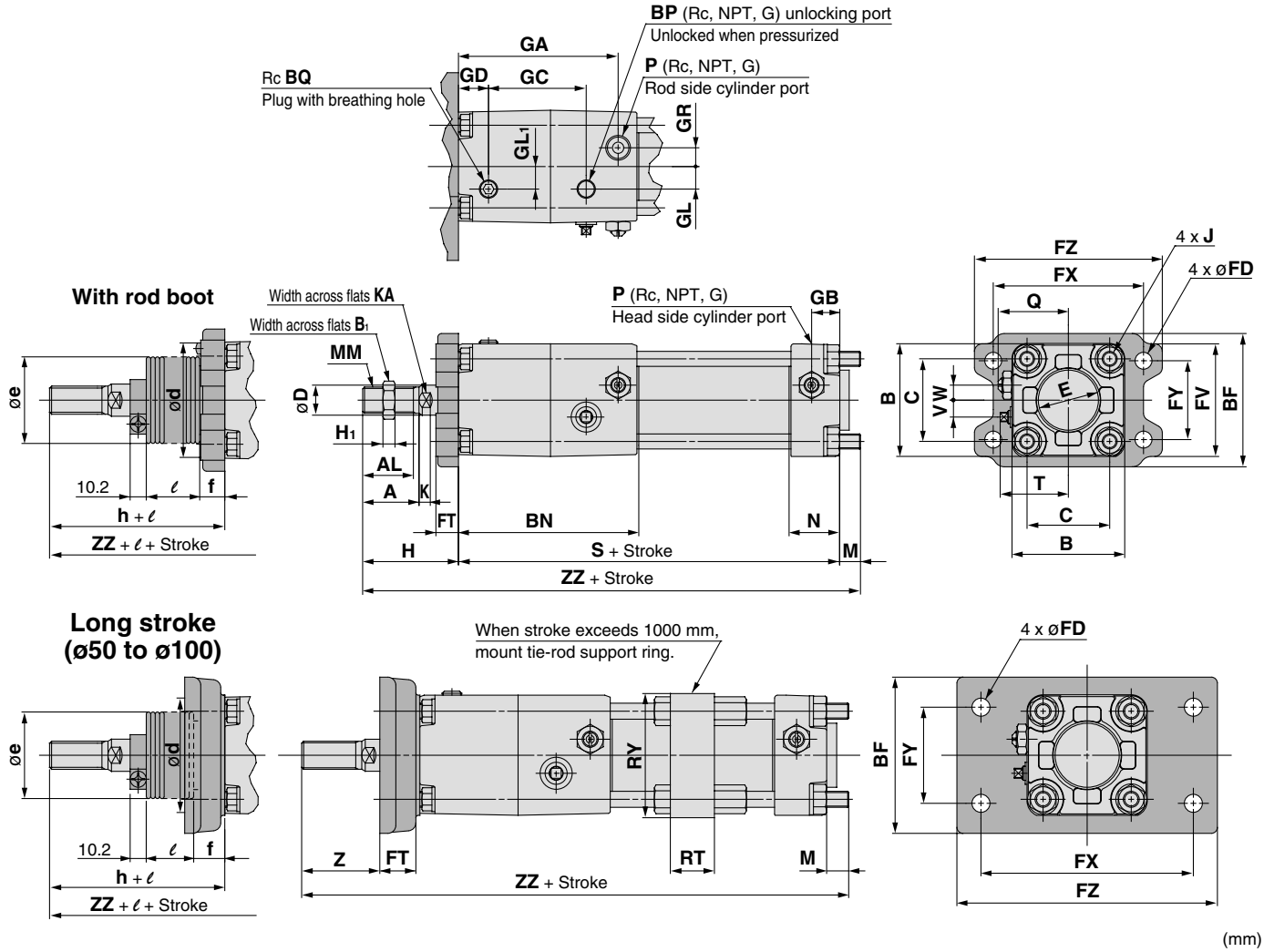
With Rod Boot

(mm)

Bore size (mm)	Stroke range (mm)	e	f	h	ℓ	ZZ
40	20 to 500	43	11.2	59	1/4 stroke	252
50	20 to 600	52	11.2	66	1/4 stroke	274
63	20 to 600	52	11.2	66	1/4 stroke	298
80	20 to 750	65	12.5	80	1/4 stroke	358
100	20 to 750	65	14	81	1/4 stroke	387

Dimensions

Rod side flange style (F): CNAFN



(mm)

Bore size (mm)	Stroke range (mm)	A	AL	B	B1	BF	BN	BP	BQ	C	D	E	FD	FT	FV	FX	FY	FZ	GA	GB	GC	GD	GL	GL1	GR	H1	J
40	Up to 800	30	27	60	22	71	96	1/8	1/8	44	16	32	9	12	60	80	42	100	85	15	52	16	12	12	10	8	M8 x 1.25
50	Up to 1000	35	32	70	27	81	108	1/4	1/8	52	20	40	9	12	70	90	50	110	95	17	56.5	20	13	15	12	11	M8 x 1.25
63	Up to 1000	35	32	86	27	101	115	1/4	1/4	64	20	40	11.5	15	86	105	59	130	102	17	67	20	18	12	15	11	M10 x 1.25
80	Up to 1000	40	37	102	32	119	139	1/4	1/4	78	25	52	13.5	18	102	130	76	160	123	21	83	20	23	18	17	13	M12 x 1.75
100	Up to 1000	40	37	116	41	133	160	1/4	1/4	92	30	52	13.5	18	116	150	92	180	144	21	98	22	25	20	19	16	M12 x 1.75

(mm)

Bore size (mm)	K	KA	M	MM	N	P	Q	H	S	T	V	W	ZZ
40	6	14	11	M14 x 1.5	27	1/4	37 to 39.5	51	153	37.5	9	8	215
50	7	18	11	M18 x 1.5	30	3/8	42 to 44.5	58	168	44	11	0	237
63	7	18	14	M18 x 1.5	31	3/8	50 to 51.5	58	182	52.5	12	0	254
80	11	22	17	M22 x 1.5	37	1/2	59.5 to 62.5	71	218	59.5	15	0	306
100	11	26	17	M26 x 1.5	40	1/2	66.5 to 69.5	72	246	69.5	15	0	335

With Rod Boot (mm)

Bore size (mm)	Stroke range (mm)	d	e	f	h	ℓ	ZZ
40	20 to 800	52	43	15	59	1/4 stroke	223
50	20 to 1000	58	52	15	66	1/4 stroke	245
63	20 to 1000	58	52	17.5	66	1/4 stroke	262
80	20 to 1000	80	65	21.5	80	1/4 stroke	315
100	20 to 1000	80	65	21.5	81	1/4 stroke	344

Long Stroke (mm)

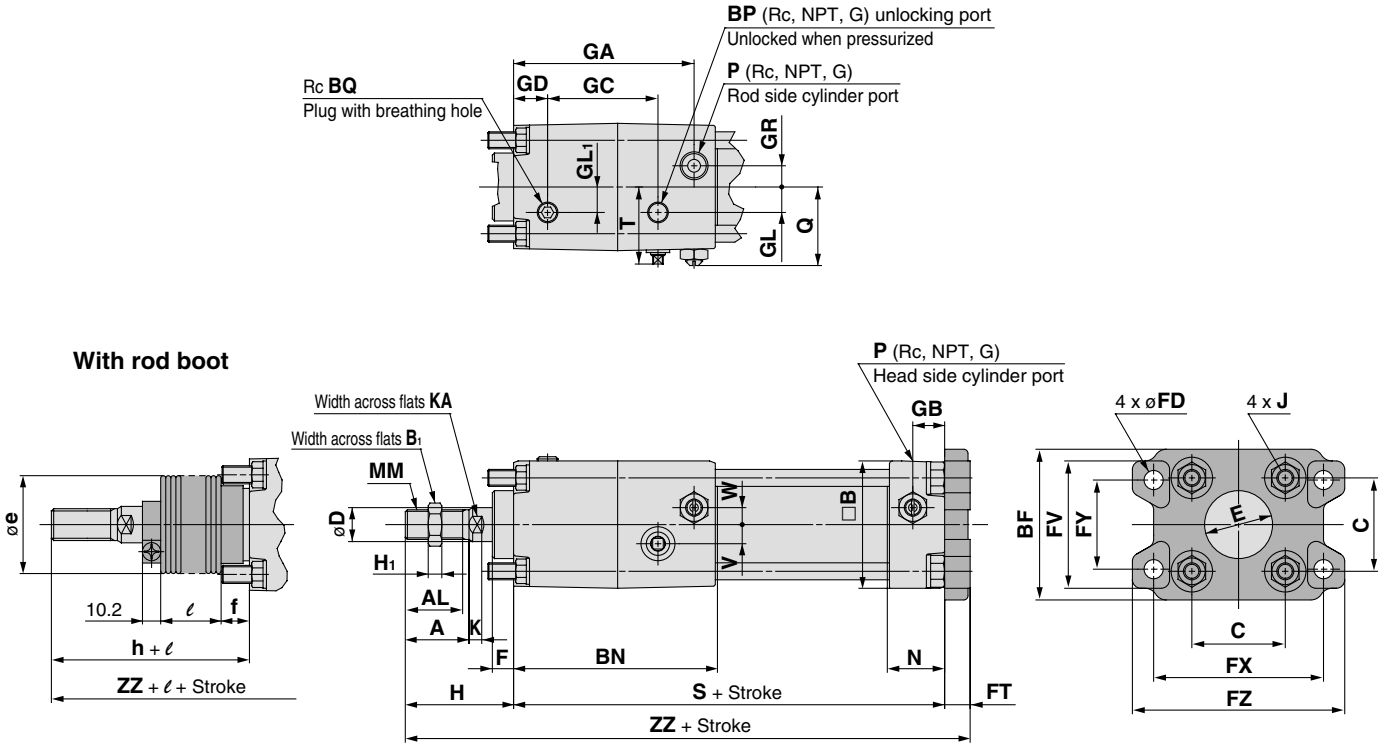
Bore size (mm)	Stroke range (mm)	M	BF	FD	FT	FX	FY	FZ	RT	RY	Z	ZZ
50	1001 to 1200	6	88	9	20	120	58	144	30	76	47	241
63	1001 to 1200	10	105	11.5	23	140	64	170	40	92	48	263
80	1001 to 1400	12	124	13.5	28	164	84	198	45	112	59	317
100	1001 to 1500	12	140	13.5	29	180	100	220	50	136	60	347

With Long Stroke Boot (mm)

Bore size (mm)	Stroke range (mm)	d	e	f	h	ℓ	ZZ
50	1001 to 1200	58	52	19	66	1/4 stroke	240
63	1001 to 1200	58	52	19	66	1/4 stroke	258
80	1001 to 1400	80	65	21	80	1/4 stroke	310
100	1001 to 1500	80	65	21	81	1/4 stroke	339

Dimensions

Head side flange style (G): CNAGN



(mm)

Bore size (mm)	Stroke range (mm)	A	AL	B	B1	BF	BN	BP	BQ	C	D	E	F	FD	FT	FV	FX	FY	FZ	GA	GB	GC	GD	GL	GL1	GR	H1
40	Up to 500	30	27	60	22	71	96	1/8	1/8	44	16	32	10	9	12	60	80	42	100	85	15	52	16	12	12	10	8
50	Up to 600	35	32	70	27	81	108	1/4	1/8	52	20	40	10	9	12	70	90	50	110	95	17	56.5	20	13	15	12	11
63	Up to 600	35	32	86	27	101	115	1/4	1/4	64	20	40	10	11.5	15	86	105	59	130	102	17	67	20	18	12	15	11
80	Up to 750	40	37	102	32	119	139	1/4	1/4	78	25	52	14	13.5	18	102	130	76	160	123	21	83	20	23	18	17	13
100	Up to 750	40	37	116	41	133	160	1/4	1/4	92	30	52	14	13.5	18	116	150	92	180	144	21	98	22	25	20	19	16

(mm)

Bore size (mm)	J	K	KA	M	MM	N	P	Q	H	S	T	V	W	ZZ
40	M8 x 1.25	6	14	11	M14 x 1.5	27	1/4	37 to 39.5	51	153	37.5	9	8	216
50	M8 x 1.25	7	18	11	M18 x 1.5	30	3/8	42 to 44.5	58	168	44	11	0	238
63	M10 x 1.25	7	18	14	M18 x 1.5	31	3/8	50 to 51.5	58	182	52.5	12	0	255
80	M12 x 1.75	11	22	17	M22 x 1.5	37	1/2	59.5 to 62.5	71	218	59.5	15	0	307
100	M12 x 1.75	11	26	17	M26 x 1.5	40	1/2	66.5 to 69.5	72	246	69.5	15	0	336

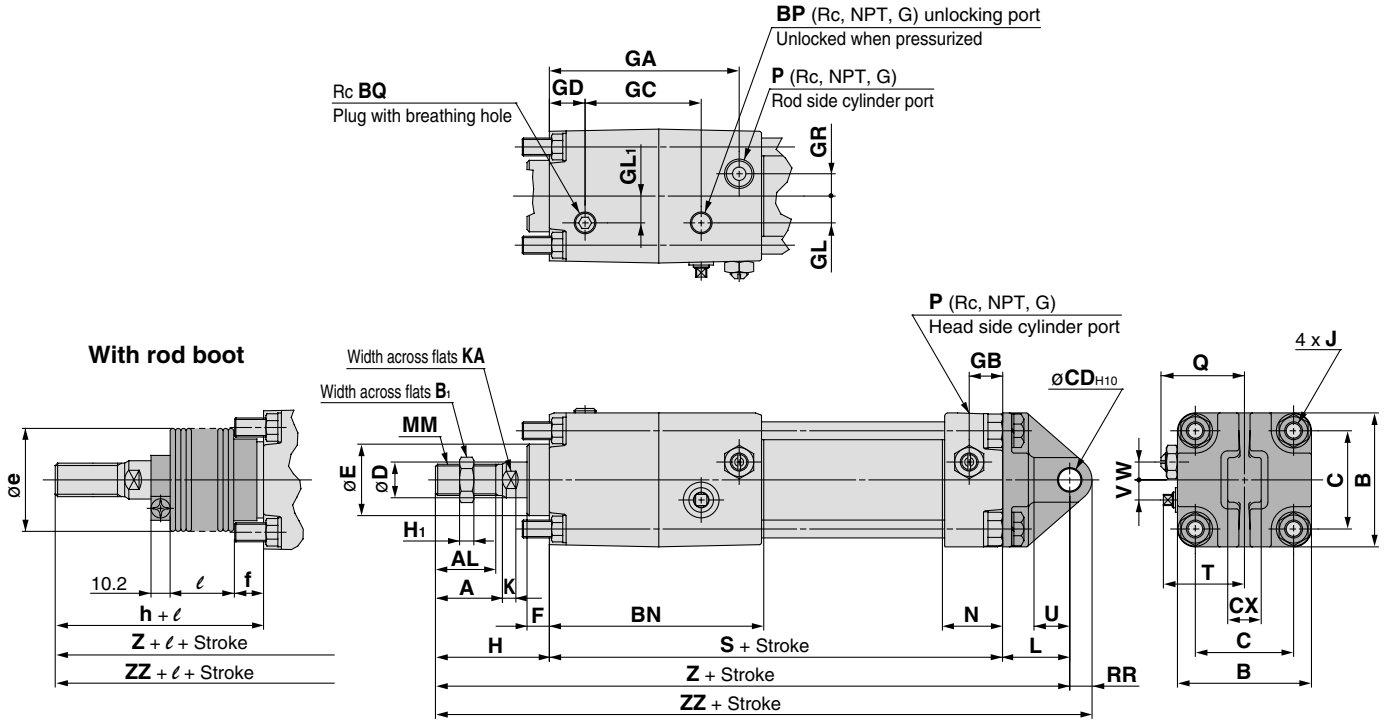
With Rod Boot

(mm)

Bore size (mm)	Stroke range (mm)	e	f	h	ℓ	ZZ
40	20 to 500	43	11.2	59	1/4 stroke	224
50	20 to 600	52	11.2	66	1/4 stroke	246
63	20 to 600	52	11.2	66	1/4 stroke	263
80	20 to 750	65	12.5	80	1/4 stroke	316
100	20 to 750	65	14	81	1/4 stroke	345

Dimensions

Single clevis style (C): CNACN



(mm)

Bore size (mm)	Stroke range (mm)	A	AL	B	B_1	BN	BP	BQ	C	CD	CX	D	E	F	GA	GB	GC	GD	GL	GL_1	GR	H_1
40	Up to 500	30	27	60	22	96	1/8	1/8	44	10	$15^{-0.1}_{-0.3}$	16	32	10	85	15	52	16	12	12	10	8
50	Up to 600	35	32	70	27	108	1/4	1/8	52	12	$18^{-0.1}_{-0.3}$	20	40	10	95	17	56.5	20	13	15	12	11
63	Up to 600	35	32	86	27	115	1/4	1/4	64	16	$25^{-0.1}_{-0.3}$	20	40	10	102	17	67	20	18	12	15	11
80	Up to 750	40	37	102	32	139	1/4	1/4	78	20	$31.5^{-0.1}_{-0.3}$	25	52	14	123	21	83	20	23	18	17	13
100	Up to 750	40	37	116	41	160	1/4	1/4	92	25	$35.5^{-0.1}_{-0.3}$	30	52	14	144	21	98	22	25	20	19	16

(mm)

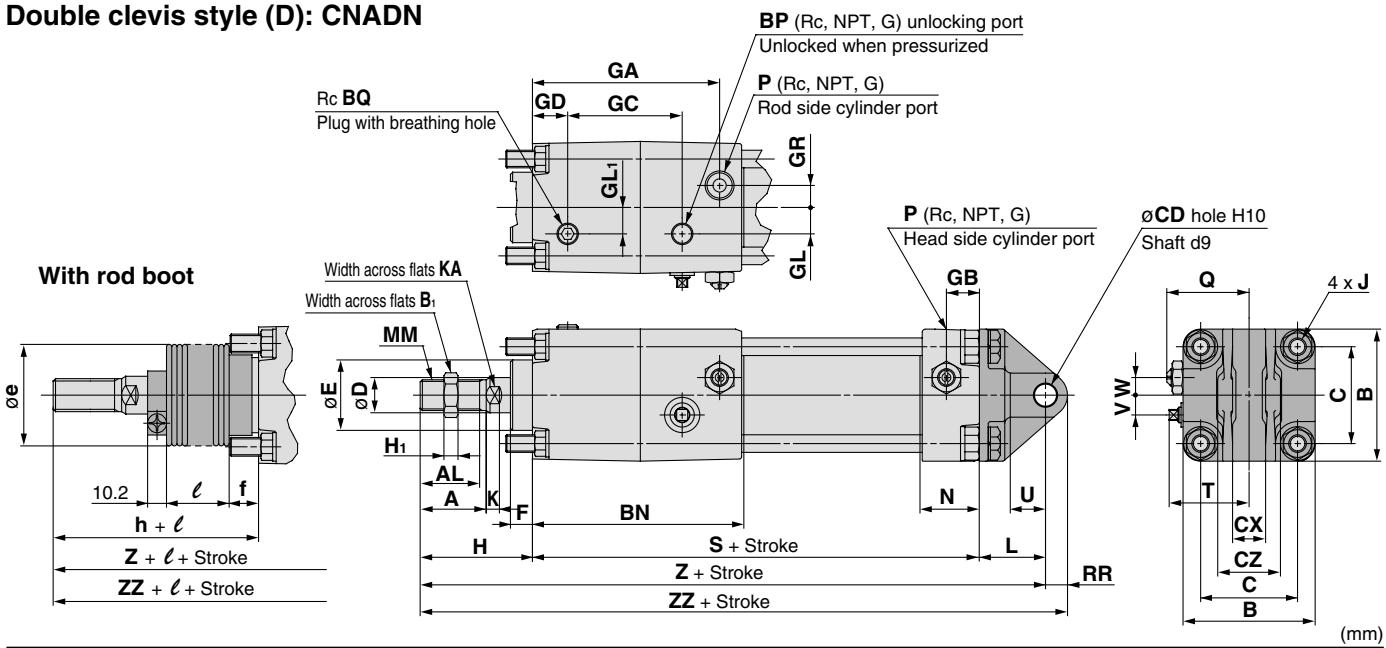
Bore size (mm)	J	K	KA	L	MM	N	P	Q	H	RR	S	T	U	V	W	Z	ZZ
40	M8 x 1.25	6	14	30	M14 x 1.5	27	1/4	37 to 39.5	51	10	153	37.5	16	9	8	234	244
50	M8 x 1.25	7	18	35	M18 x 1.5	30	3/8	42 to 44.5	58	12	168	44	19	11	0	261	273
63	M10 x 1.25	7	18	40	M18 x 1.5	31	3/8	50 to 51.5	58	16	182	52.5	23	12	0	280	296
80	M12 x 1.75	11	22	48	M22 x 1.5	37	1/2	59.5 to 62.5	71	20	218	59.5	28	15	0	337	357
100	M12 x 1.75	11	26	58	M26 x 1.5	40	1/2	66.5 to 69.5	72	25	246	69.5	36	15	0	376	401

With Rod Boot (mm)

Bore size (mm)	Stroke range (mm)	e	f	h	ℓ	Z	ZZ
40	20 to 500	43	11.2	59	1/4 stroke	242	252
50	20 to 600	52	11.2	66	1/4 stroke	269	281
63	20 to 600	52	11.2	66	1/4 stroke	288	304
80	20 to 750	65	12.5	80	1/4 stroke	346	366
100	20 to 750	65	14	81	1/4 stroke	385	410

Dimensions

Double clevis style (D): CNADN



(mm)

Bore size (mm)	Stroke range (mm)	A	AL	B	B1	BN	BP	BQ	C	CD	CX	CZ	D	E	F	GA	GB	GC	GD	GL	GL1	GR	H1	J	K	KA
40	Up to 500	30	27	60	22	96	1/8	1/8	44	10	$15^{+0.3}_{+0.1}$	29.5	16	32	10	85	15	52	16	12	12	10	8	M8 x 1.25	6	14
50	Up to 600	35	32	70	27	108	1/4	1/8	52	12	$18^{+0.3}_{+0.1}$	38	20	40	10	95	17	56.5	20	13	15	12	11	M8 x 1.25	7	18
63	Up to 600	35	32	86	27	115	1/4	1/4	64	16	$25^{+0.3}_{+0.1}$	49	20	40	10	102	17	67	20	18	12	15	11	M10 x 1.25	7	18
80	Up to 750	40	37	102	32	139	1/4	1/4	78	20	$31.5^{+0.3}_{+0.1}$	61	25	52	14	123	21	83	20	23	18	17	13	M12 x 1.75	11	22
100	Up to 750	40	37	116	41	160	1/4	1/4	92	25	$35.5^{+0.3}_{+0.1}$	64	30	52	14	144	21	98	22	25	20	19	16	M12 x 1.75	11	26

(mm)

Bore size (mm)	L	MM	N	P	Q	RR	S	T	U	V	W	H	Z	ZZ
40	30	M14 x 1.5	27	1/4	37 to 39.5	10	153	37.5	16	9	8	51	234	244
50	35	M18 x 1.5	30	3/8	42 to 44.5	12	168	44	19	11	0	58	261	273
63	40	M18 x 1.5	31	3/8	50 to 51.5	16	182	52.5	23	12	0	58	280	296
80	48	M22 x 1.5	37	1/2	59.5 to 62.5	20	218	59.5	28	15	0	71	337	357
100	58	M26 x 1.5	40	1/2	66.5 to 69.5	25	246	69.5	36	15	0	72	376	401

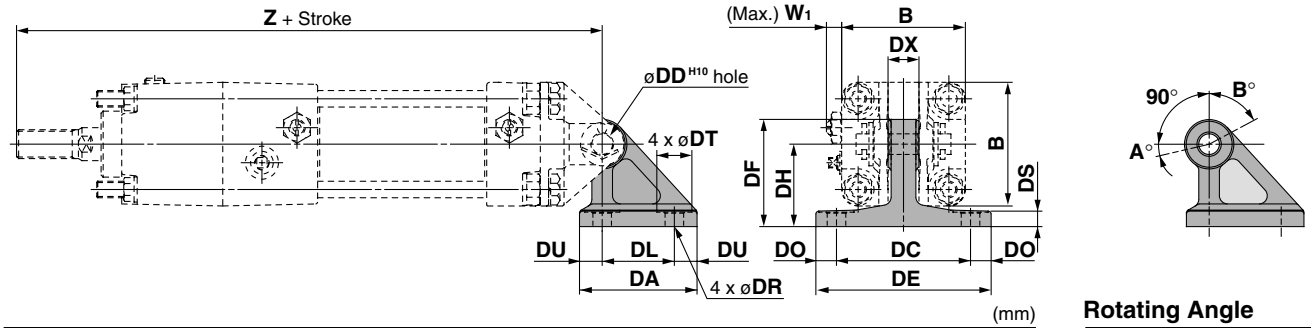
With Rod Boot

(mm)

Bore size (mm)	Stroke range (mm)	e	f	h	ℓ	Z	ZZ
40	20 to 500	43	11.2	59	1/4 stroke	242	252
50	20 to 600	52	11.2	66	1/4 stroke	269	281
63	20 to 600	52	11.2	66	1/4 stroke	288	304
80	20 to 750	65	12.5	80	1/4 stroke	346	366
100	20 to 750	65	14	81	1/4 stroke	385	410

Double Clevis Pivot Bracket

Material: Cast iron



(mm)

Part no.	Bore size (mm)	DA	DL	DU	DC	DX	DE	DO	DR	DT	DS	DH	DF	B	W1	Z	DD
CA1-B04	**40**	57	35	11	65	15	85	10	9	17	8	40	52	60	10	234	$10^{+0.058}_{0}$
CA1-B05	**50**	57	35	11	65	18	85	10	9	17	8	40	52	70	10	261	$12^{+0.070}_{0}$
CA1-B06	**63**	67	40	13.5	80	25	105	12.5	11	22	10	50	66	85	10	280	$16^{+0.070}_{0}$
CA1-B08	**80**	93	60	16.5	100	31.5	130	15	13.5	24	12	65	90	102	12	337	$20^{+0.084}_{0}$
CA1-B10	**100**	93	60	16.5	100	35.5	130	15	13.5	24	12	65	90	116	12	376	$25^{+0.084}_{0}$

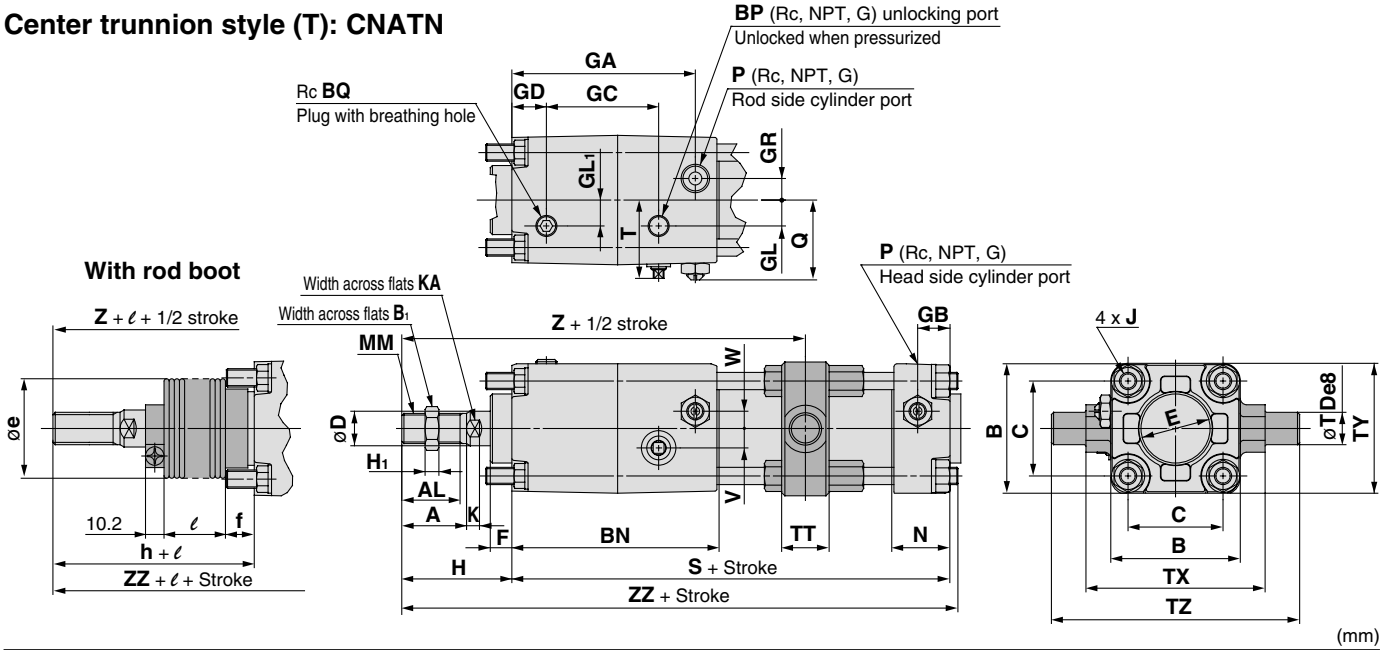
Rotating Angle

Bore size (mm)	A°	B°	A° + B° + 90°
40	12°	60°	162°
50			
63			
80			
100			

Note) 1. There is no mention of cylinder part no. 2. Order it separately from cylinder. 3. Pin, retainer, etc. of double clevis, double knuckle joint clevis are shipped together.

Dimensions

Center trunnion style (T): CNATN



(mm)

Bore size (mm)	Stroke range (mm)	A	AL	B	B1	BN	BP	BQ	C	D	E	F	GA	GB	GC	GD	GL	GL1	GR	H1	J	K	KA	MM	N
40	25 to 500	30	27	60	22	96	1/8	1/8	44	16	32	10	85	15	52	16	12	12	10	8	M8 x 1.25	6	14	M14 x 1.5	27
50	25 to 600	35	32	70	27	108	1/4	1/8	52	20	40	10	95	17	56.5	20	13	15	12	11	M8 x 1.25	7	18	M18 x 1.5	30
63	32 to 600	35	32	86	27	115	1/4	1/4	64	20	40	10	102	17	67	20	18	12	15	11	M10 x 1.25	7	18	M18 x 1.5	31
80	41 to 750	40	37	102	32	139	1/4	1/4	78	25	52	14	123	21	83	20	23	18	17	13	M12 x 1.75	11	22	M22 x 1.5	37
100	45 to 750	40	37	116	41	160	1/4	1/4	92	30	52	14	144	21	98	22	25	20	19	16	M12 x 1.75	11	26	M26 x 1.5	40

(mm)

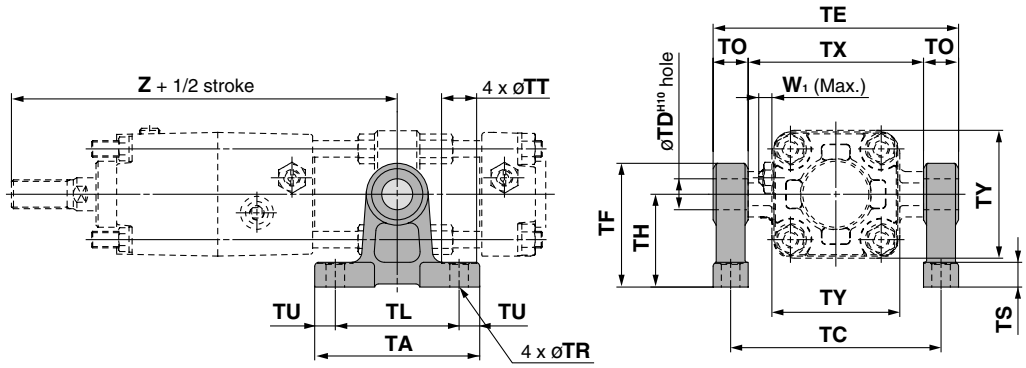
Bore size (mm)	P	Q	S	T	TDe8	TT	TX	TY	TZ	V	W	H	Z	ZZ
40	1/4	37 to 39.5	153	37.5	$15^{-0.032}_{-0.059}$	22	85	62	117	9	8	51	162	209
50	3/8	42 to 44.5	168	44	$15^{-0.032}_{-0.059}$	22	95	74	127	11	0	58	181	232
63	3/8	50 to 51.5	182	52.5	$18^{-0.032}_{-0.059}$	28	110	90	148	12	0	58	191	246
80	1/2	59.5 to 62.5	218	59.5	$25^{-0.040}_{-0.073}$	34	140	110	192	15	0	71	231	296
100	1/2	66.5 to 69.5	246	69.5	$25^{-0.040}_{-0.073}$	40	162	130	214	15	0	72	255	326

With Rod Boot (mm)

Bore size (mm)	Stroke range (mm)	e	f	h	ℓ	Z	ZZ
40	25 to 500	43	11.2	59	1/4 stroke	170	217
50	25 to 600	52	11.2	66	1/4 stroke	189	240
63	32 to 600	52	11.2	66	1/4 stroke	199	254
80	41 to 750	65	12.5	80	1/4 stroke	240	305
100	45 to 750	65	14	81	1/4 stroke	264	335

Trunnion Pivot Bracket

Material: Cast iron



(mm)

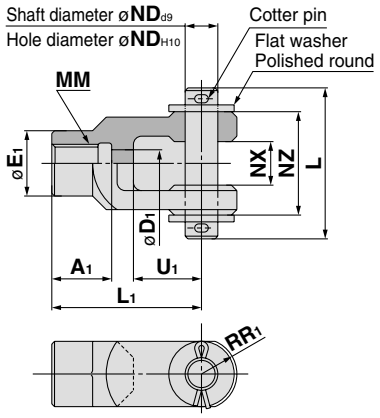
Part no.	Bore size (mm)	TA	TL	TU	TC	TX	TE	TO	TR	TT	TS	TH	TF	TY	W1	Z	TD
CA1-S04	**40**	80	60	10	102	85	119	17	9	17	12	45	60	62	10	162	$15^{+0.070}_{0}$
	50	80	60	10	112	95	129	17	9	17	12	45	60	74	10	181	$15^{+0.070}_{0}$
CA1-S06	**63**	100	70	15	130	110	150	20	11	22	14	55	73	90	10	191	$18^{+0.070}_{0}$
CA1-S08	**80**	120	90	15	166	140	192	26	13.5	24	17	75	100	110	12	231	$25^{+0.084}_{0}$
	100	120	90	15	188	162	214	26	13.5	24	17	75	100	130	12	255	$25^{+0.084}_{0}$

Note 1) There is no mention of cylinder part no.
Note 2) Order it separately from cylinder.
Note 3) Two trunnion pivot brackets are needed per one cylinder.

Accessory Bracket Dimensions

Y Type Double Knuckle Joint

∗ Pin and retaining ring are shipped together with double clevis and double knuckle joint.

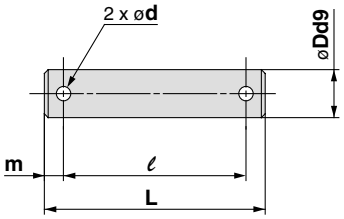


Material: Cast iron (mm)

Part no.	Applicable bore size (mm)	A1	E1	D1	L1	MM	RR1	U1	ND	NX	NZ	L	Cotter pin size	Flat washer size
Y-04C	**40**	22	24	10	55	M14 x 1.5	13	25	12	16 $^{+0.3}_{+0.1}$	38	55.5	ø3 x 18 ℓ	Polished round 12
Y-05C	**50, 63**	27	28	14	60	M18 x 1.5	15	27	12	16 $^{+0.3}_{+0.1}$	38	55.5	ø3 x 18 ℓ	Polished round 12
Y-08C	**80**	37	36	18	71	M22 x 1.5	19	28	18	28 $^{+0.3}_{+0.1}$	55	76.5	ø4 x 25 ℓ	Polished round 18
Y-10C	**100**	37	40	21	83	M26 x 1.5	21	38	20	30 $^{+0.3}_{+0.1}$	61	83	ø4 x 30 ℓ	Polished round 20

∗ Knuckel pin, cotter pins and flat washers are packaged with knuckles.

Clevis Pin/Knuckle Pin

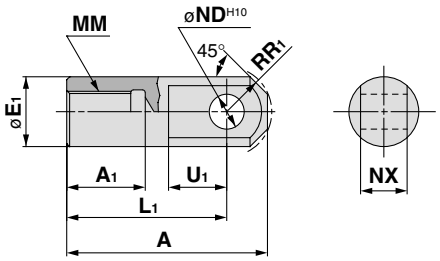


Material: Carbon steel (mm)

Part no.	Applicable bore size(mm)		Dd9	L	ℓ	m	d Drill through	Applicable cotter pin	Applicable flat washer
	Clevis	Knuckle							
CDP-2A	**40**	**—**	10 $^{-0.040}_{-0.076}$	46	38	4	3	ø3 x 18 ℓ	Polished round 10
CDP-3A	**50**	**40, 50, 63**	12 $^{-0.050}_{-0.093}$	55.5	47.5	4	3	ø3 x 18 ℓ	Polished round 12
CDP-4A	**63**	**—**	16 $^{-0.050}_{-0.093}$	71	61	5	4	ø4 x 25 ℓ	Polished round 16
CDP-5A	**—**	**80**	18 $^{-0.050}_{-0.093}$	76.5	66.5	5	4	ø4 x 25 ℓ	Polished round 18
CDP-6A	**80**	**100**	20 $^{-0.065}_{-0.117}$	83	73	5	4	ø4 x 30 ℓ	Polished round 20
CDP-7A	**100**	**—**	25 $^{-0.065}_{-0.117}$	88	78	5	4	ø4 x 36 ℓ	Polished round 24

∗ Cotter pin and flat washer are attached.

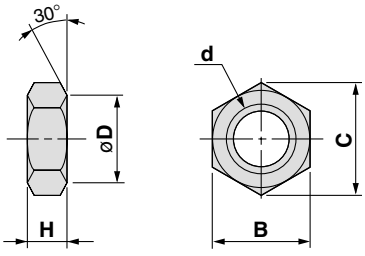
I Type Single Knuckle Joint



Material: Sulfur free-cutting steel (mm)

Part no.	Applicable bore size (mm)	A	A1	E1	L1	MM	R1	U1	ND	NX
I-04	**40**	69	22	24	55	M14 x 1.5	15.5	20	12 $^{+0.070}_{0}$	16 $^{-0.1}_{-0.3}$
I-05	**50, 63**	74	27	28	60	M18 x 1.5	15.5	20	12 $^{+0.070}_{0}$	16 $^{-0.1}_{-0.3}$
I-08	**80**	91	37	36	71	M22 x 1.5	22.5	26	18 $^{+0.070}_{0}$	28 $^{-0.1}_{-0.3}$
I-10	**100**	105	37	40	83	M26 x 1.5	24.5	28	20 $^{+0.084}_{0}$	30 $^{-0.1}_{-0.3}$

Rod End Nut (Standard equipment)



Material: Rolled steel (mm)

Part no.	Applicable bore size (mm)	d	H	B	C	D
NT-04	**40**	M14 x 1.5	8	22	25.4	21
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

Cylinder with Lock
Double Acting, Double Rod
Series CNAW
ø40, ø50, ø63, ø80, ø100

How to Order

CNAW L N 50 □ – 100 JN – D – □

With auto switch CDNAW L N 50 □ – 100 JN – D – M9BW □ – □

With auto switch (Built-in magnet)

Double rod type

Mounting style

B	Basic style
L	Axial foot style
F	Rod side flange style
T	Center trunnion style

Type

N	Non-lube
F *	Steel tube

* Auto switches are not available with steel tube.

Bore size

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

Port thread type

Nil	Rc
TN	NPT
TF	G

Cylinder stroke (mm)
Refer to page 741 for the standard stroke.

With rod boot/cushion**

One side* rod boot	J	Nylon tarpaulin
	K	Heat resistant tarpaulin
Both sides rod boot	JJ	Nylon tarpaulin
	KK	Heat resistant tarpaulin
Cushion	Nil	With double-side cushion
	N	Without cushion
	R	With rod cushion
	H	With head cushion

* In the case of one side, it is in the lock side.
** When the symbols are two or more, indicate them alphabetically.

Locking direction

D	Both directions

Made to Order
Refer to page 741 for details.

Number of auto switches

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

Auto switch

Nil	Without auto switch

* For the applicable auto switch part model, refer to the table below.

Built-in Magnet Cylinder Model

If a built-in magnet cylinder without an auto switch is required, there is no need to enter the symbol for the auto switch.
(Example) CDNAWLN40-100-D

Applicable Auto Switch/Refer to pages 1719 to 1827 for further information on auto switches.

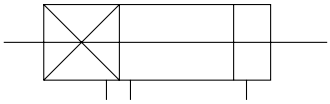
Type	Special function	Electrical entry	Indicator light	Wiring (Output)	Load voltage DC	Load voltage DC	Load voltage AC	Auto switch model: Tie-rod mounting	Auto switch model: Band mounting	Lead wire length (m): 0.5 (Nil)	1 (M)	3 (L)	5 (Z)	Pre-wired connector	Applicable load	
Solid state switch	—	Grommet	Yes	3-wire (NPN)	24 V	5 V, 12 V	—	M9N	—	●	●	●	○	○	IC circuit	Relay, PLC
								—	G59	●	—	●	○	○		
				3-wire (PNP)				M9P	—	●	●	●	○	○		
								—	G5P	●	—	●	○	○		
				2-wire		12 V		M9B	—	●	●	●	○	○	—	
								—	K59	●	—	●	○	○		
					—	—	100 V, 200 V	J51	—	●	—	●	○	—		
		Terminal conduit		3-wire (NPN)	24 V	12 V	—	G39C	G39	—	—	—	—	—		
				2-wire				K39C	K39	—	—	—	—	—		
	Diagnostic indication (2-color indication)	Grommet		3-wire (NPN)		5 V, 12 V		M9NW	—	●	●	●	○	○	IC circuit	
								—	G59W	●	—	●	○	○		
				3-wire (PNP)				M9PW	—	●	●	●	○	○		
								—	G5PW	●	—	●	○	○		
				2-wire		12 V		M9BW	—	●	●	●	○	○	—	
								—	K59W	●	—	●	○	○		
	Water resistant (2-color indication)			3-wire (NPN)		5 V, 12 V		M9NA	—	○	○	●	○	○		
				3-wire (PNP)				M9PA	—	○	○	●	○	○		
				2-wire		12 V		M9BA	—	○	○	●	○	○		
								—	G5BA	—	—	●	○	○		
	With diagnostic output (2-color indication)			4-wire (NPN)		5 V, 12 V		F59F	G59F	●	—	●	○	○	IC circuit	
	Magnetic field resistant (2-color indication)			2-wire (Non-polar)		—		P4DW	—	—	—	●	●	○	—	
Reed switch	—	Grommet	Yes	3-wire (NPN equivalent)	—	5 V	—	A96 [Z76]**	—	●	—	●	—	—	IC circuit	—
			No	2-wire	24 V	12 V	100 V	A93 [Z73]**	—	●	—	●	—	—	—	Relay, PLC
							100 V or less	A90 [Z80]**	—	●	—	●	—	—	IC circuit	
			Yes				100 V, 200 V	A54	B54	●	—	●	●	—	—	
			No				200 V or less	A64	B64	●	—	●	—	—		
		Terminal conduit	Yes				—	A33C	A33	—	—	—	—	—	—	PLC
							100 V, 200 V	A34C	A34	—	—	—	—	—		Relay, PLC
		DIN terminal						A44C	A44	—	—	—	—	—		
	Diagnostic indication (2-color indication)	Grommet				—	—	A59W	B59W	●	—	●	—	—		

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

* Solid state auto switches marked with "○" are produced upon receipt of order.
** D-A9□ and D-A9□V cannot be mounted on ø50. Select auto switches in brackets.

* Since there are other applicable auto switches than listed, refer to page 751 for details.
* For details about auto switches with pre-wired connector, refer to pages 1784 and 1785.
* D-A9□/M9□/M9□W/M9□AL auto switches are shipped together (not assembled). (Only auto switch brackets are assembled at the time of shipment.)

JIS Symbol
Double acting,
Double rod



Specifications

Bore size (mm)	40	50	63	80	100
Fluid	Air				
Type	Non-lube				
Action	Double acting				
Lock operation	Spring locking				
Proof pressure	1.5 MPa				
Max. operating pressure	1.0 MPa				
Min. operating pressure	0.1 MPa				
Piston speed	50 to 1000 mm/s *				
Ambient and fluid temperature	Without auto switch: –10 to 70°C (No freezing) With auto switch: –10 to 60°C (No freezing)				
Cushion	Air cushion				
Stroke length tolerance	Up to 250: $^{+1.0}_{0}$, 251 to 1000: $^{+1.4}_{0}$, 1001 to 1500: $^{+1.8}_{0}$				
Mounting	Basic style, Axial foot style, Rod side flange style, Center trunnion style				

* Load limits exist depending upon piston speed when locked, mounting direction and operating pressure.

Made to Order Specifications
(For details, refer to pages 1844 and 1846.)

Symbol	Specification
—XC14	Change of trunnion pivot bracket mounting position
—XC15	Change of tie-rod length

Refer to pages 746 to 751 for cylinders with auto switches.

- Minimum auto switch mounting stroke
- Proper auto switch mounting position (detection at stroke end) and mounting height
- Operating range
- Switch mounting bracket: Part no.

Lock Specifications

Bore size (mm)	40	50	63	80	100
Locking action	Spring locking (Exhaust locking)				
Unlocking pressure	0.25 MPa or more				
Lock starting pressure	0.20 MPa or less				
Max. operating pressure	1.0 MPa				
Locking direction	Both directions				
Holding force N	882	1370	2160	3430	5390

* Be sure to select cylinders in accordance with the procedures on page 724.

Standard Stroke
For cases with auto switches, refer to the table of minimum strokes for mounting of auto switches Table on pages 748 and 749.

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

* Intermediate strokes other than the above are produced upon receipt of order.
Spacers are not used for intermediate strokes.

Stopping Accuracy

(mm)

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

Condition: Lateral, Supply pressure P = 0.5 MPa
Load mass ····· Upper limit of allowed value
Solenoid valve for locking mounted on the unlocking port
Maximum value of stopping position dispersion from 100 measurements

Mounting Bracket Part No.

Bore size (mm)	40	50	63	80	100
Foot *	CA1-L04	CA1-L05	CA1-L06	CA1-L08	CA1-L10
Flange	CA1-F04	CA1-F05	CA1-F06	CA1-F08	CA1-F10

* When ordering foot bracket, order 2 pieces per cylinder.

Rod Boot Material

Symbol	Rod boot material	Max. ambient temperature
J	Nylon tarpaulin	70°C
K	Heat resistant tarpaulin	110°C *

* Maximum ambient temperature for the rod boot itself.

Accessory

Mounting		Basic style	Foot style	Flange style	Center trunnion style
Standard equipment	Rod end nut	●	●	●	●
	Clevis pin	—	—	—	—
Option	Single knuckle joint	●	●	●	●
	Double knuckle joint (With pin)	●	●	●	●
	With rod boot	●	●	●	●

* Dimensions are same as double acting, single rod type of Series CNA. (Refer to page 738.)

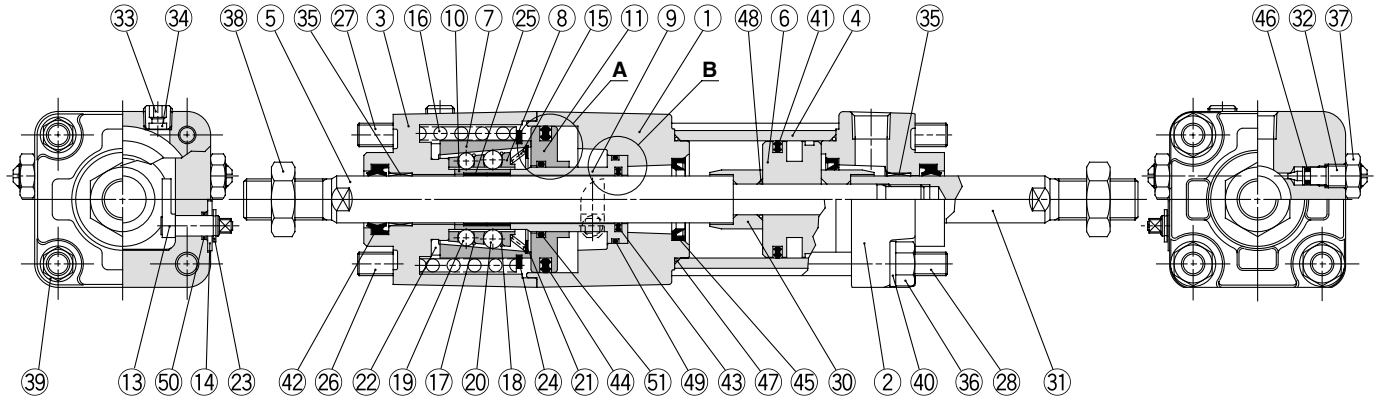
Mass/( ): denotes the values for steel tube.

(kg)

Bore size (mm)			40	50	63	80	100
Basic mass	Basic style		1.84 (1.89)	2.93 (2.99)	4.34 (4.38)	7.76 (7.92)	11.50 (11.71)
	Foot style		2.03 (2.08)	2.97 (3.01)	4.68 (4.72)	8.43 (8.59)	12.49 (12.70)
	Flange style		2.21 (2.26)	3.20 (3.24)	5.13 (5.17)	9.21 (9.37)	13.42 (13.63)
	Trunnion style		2.29 (2.39)	3.28 (3.38)	5.23 (5.43)	9.46 (9.75)	13.90 (14.29)
Additional mass per each 50 mm of stroke	Aluminum tube	Mounting bracket	0.30	0.40	0.50	0.71	0.92
	Steel tube	Mounting bracket except trunnion	0.35	0.47	0.55	0.89	1.15
		Trunnion style	0.44	0.58	0.77	1.06	1.35
Accessory bracket	Single knuckle joint		0.23	0.26	0.26	0.60	0.83
	Double knuckle joint		0.32	0.38	0.38	0.73	1.08
	Knuckle pin		0.05	0.05	0.05	0.14	0.19

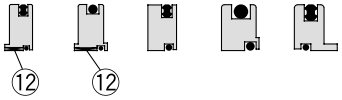
Calculation: (Example) **CNAWLN40-100-D**
Base mass ····· 2.03 (Foot style, ø40)
Additional mass ····· 0.03/50 strokes
Cylinder stroke ····· 100 strokes
2.03 + 0.30 x 100/50 = 2.63 kg

Construction



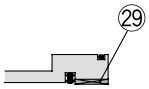
A section (Release piston bushing)

ø100 ø80 ø63 ø50 ø40



B section (Piston guide bushing)

ø50, ø63, ø80, ø100



Component Parts

No.	Description	Material	Note
1	**Rod cover**	Aluminum alloy	Black painted after hard anodized
2	**Rod cover**	Aluminum alloy	Black painted
3	**Cover**	Aluminum alloy	Black painted after chromated
4	**Cylinder tube**	Aluminum alloy	Hard anodized
5	**Piston rod A**	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	**Release piston**	Aluminum alloy	Hard anodized (ø40, ø50, ø63) Chromated (ø80, ø100)
12	**Release piston bushing**	Steel + Special resin	
13	**Unlocking cam**	Chromium molybdenum steel	Zinc chromated
14	**Washer**	Carbon steel	Black zinc chromated
15	**Retainer pre-load spring**	Stainless steel wire	
16	**Brake spring**	Steel wire	Zinc chromated
17	**Clip A**	Stainless steel	
18	**Clip B**	Stainless steel	
19	**Steel ball A**	Carbon steel	
20	**Steel ball B**	Carbon steel	
21	**Tooth ring**	Stainless steel	
22	**Bumper**	Polyurethane rubber	
23	Type C retaining ring for unlocking cam shaft	Carbon steel	
24	Type C retaining ring for taper ring	Carbon steel	
25	**Brake shoe**	Special friction material	
26	**Unit holding tie-rod A**	Carbon steel	Chromated
27	**Unit holding tie-rod B**	Carbon steel	Chromated
28	**Tie-rod**	Carbon steel	Chromated
29	**Bushing**	Copper alloy	
30	**Cushion ring**	Rolled steel plate	Zinc chromated
31	**Piston rod B**	Carbon steel	Hard chrome plated

Component Parts

No.	Description	Material	Note
32	**Cushion valve**	Rolled steel plate	Electroless nickel plated
33	**Hexagon socket head plug**	Chromium molybdenum steel	Black zinc chromated
34	**Element**	Bronze	
35	**Bushing**	Copper alloy	
36	**Tie-rod nut**	Carbon steel	Black zinc chromated
37	**Lock nut**	Carbon steel	Nickel plated
38	**Rod end nut**	Carbon steel	Nickel plated
39	**Spring washer**	Steel wire	Black zinc chromated
40	**Spring washer**	Steel wire	Black zinc chromated
41	**Piston seal**	NBR	
42	**Rod seal A**	NBR	
43	**Rod seal B**	NBR	
44	**Release piston seal**	NBR	
45	**Cushion seal**	NBR	
46	**Cushion valve seal**	NBR	
47	**Tube gasket**	NBR	
48	**Piston gasket**	NBR	
49	**Piston guide gasket**	NBR	
50	**Unlocking cam gasket**	NBR	
51	**O-ring**	NBR	

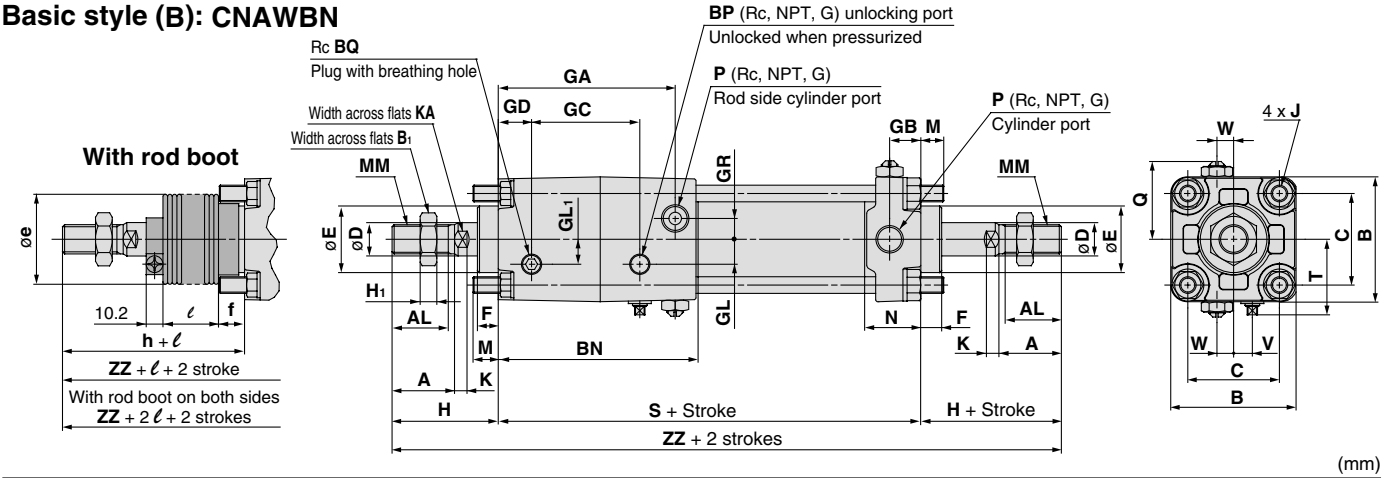
Replacement Parts/Seal Kit

Bore size (mm)	Kit no.	Contents
40	CA1WN 40A-PS	Including no. ㊶, ㊷, ㊻ and ㊼.
50	CA1WN 50A-PS	
63	CA1WN 63A-PS	
80	CA1WN 80A-PS	
100	CA1WN100A-PS	

∗ Since the lock section for Series CNA is normally replaced as a unit, kits are for the cylinder section only. These can be ordered using the order number for each bore size.
∗ Seal kit includes a grease pack (ø40 and ø50: 10 g, ø63 and ø80: 20 g, ø100: 30 g). Order with the following part number when only the grease pack is needed.
Grease pack part number: GR-S-010 (10 g), **GR-S-020** (20 g)

Dimensions

Basic style (B): CNAWBN



(mm)

Bore size (mm)	Stroke range (mm)	A	AL	B	B1	BN	BP	BQ	C	D	E	F	GA	GB	GC	GD	GL	GL1	GR	H1	J	K	KA
40	Up to 500	30	27	60	22	96	1/8	1/8	44	16	32	10	85	15	52	16	12	12	10	8	M8 x 1.25	6	14
50	Up to 600	35	32	70	27	108	1/4	1/8	52	20	40	10	95	17	56.5	20	13	15	12	11	M8 x 1.25	7	18
63	Up to 600	35	32	86	27	115	1/4	1/4	64	20	40	10	102	17	67	20	18	12	15	11	M10 x 1.25	7	18
80	Up to 750	40	37	102	32	139	1/4	1/4	78	25	52	14	123	21	83	20	23	18	17	13	M12 x 1.75	11	22
100	Up to 750	40	37	116	41	160	1/4	1/4	92	30	52	14	144	21	98	22	25	20	19	16	M12 x 1.75	11	26

(mm)

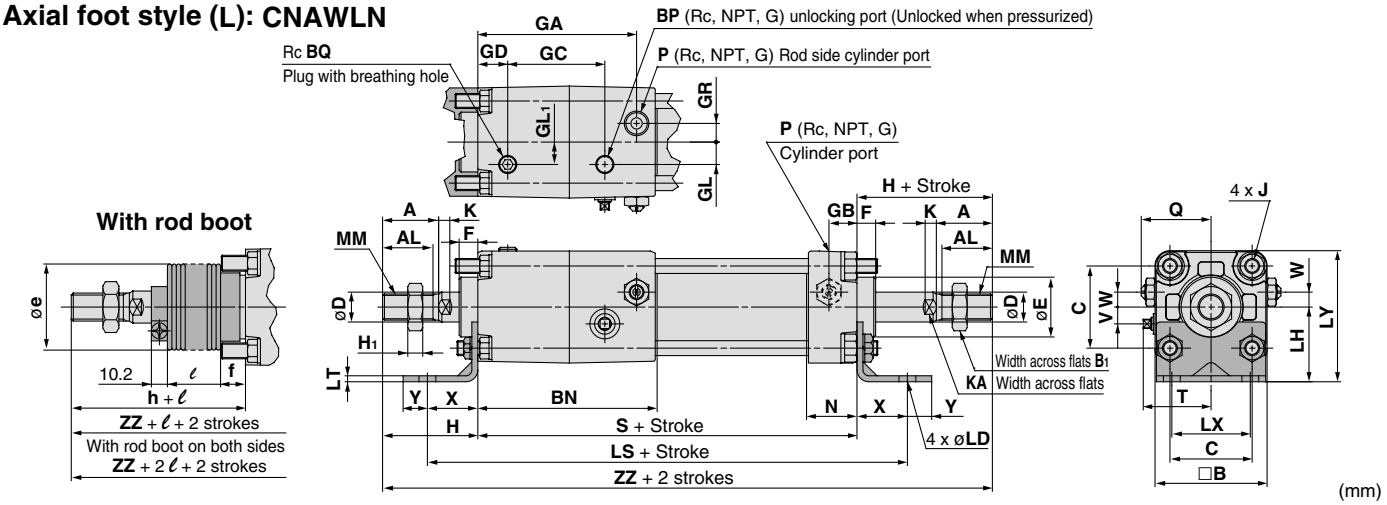
Bore size (mm)	M	MM	N	P	Q	H	S	T	V	W	ZZ
40	11	M14 x 1.5	27	1/4	37 to 39.5	51	153	37.5	9	8	255
50	11	M18 x 1.5	30	3/8	42 to 44.5	58	168	44	11	0	284
63	14	M18 x 1.5	31	3/8	50 to 51.5	58	182	52.5	12	0	298
80	17	M22 x 1.5	37	1/2	59.5 to 62.5	71	218	59.5	15	0	360
100	17	M26 x 1.5	40	1/2	66.5 to 69.5	72	246	69.5	15	0	390

With Rod Boot

(mm)

Bore size (mm)	Stroke range (mm)	e	f	h	ℓ	ZZ (One side)	ZZ (Both sides)
40	20 to 500	43	11.2	59	1/4 stroke	263	271
50	20 to 600	52	11.2	66	1/4 stroke	292	300
63	20 to 600	52	11.2	66	1/4 stroke	306	314
80	20 to 750	65	12.5	80	1/4 stroke	369	378
100	20 to 750	65	14	81	1/4 stroke	399	408

Axial foot style (L): CNAWLN



(mm)

Bore size (mm)	Stroke range (mm)	A	AL	B	B1	BN	BP	BQ	C	D	E	F	GA	GB	GC	GD	GL	GL1	GR	H1	J	K	KA	LD	LH	LS	LT
40	Up to 500	30	27	60	22	96	1/8	1/8	44	16	32	10	85	15	52	16	12	12	10	8	M8 x 1.25	6	14	9	40	207	3.2
50	Up to 600	35	32	70	27	108	1/4	1/8	52	20	40	10	95	17	56.5	20	13	15	12	11	M8 x 1.25	7	18	9	45	222	3.2
63	Up to 600	35	32	86	27	115	1/4	1/4	64	20	40	10	102	17	67	20	18	12	15	11	M10 x 1.25	7	18	11.5	50	250	3.2
80	Up to 750	40	37	102	32	139	1/4	1/4	78	25	52	14	123	21	83	20	23	18	17	13	M12 x 1.75	11	22	13.5	65	306	4.5
100	Up to 750	40	37	116	41	160	1/4	1/4	92	30	52	14	144	21	98	22	25	20	19	16	M12 x 1.75	11	26	13.5	75	332	6.0

(mm)

Bore size (mm)	LX	LY	MM	N	P	Q	H	S	T	V	W	X	Y	ZZ
40	42	70	M14 x 1.5	27	1/4	37 to 39.5	51	153	37.5	9	8	27	13	255
50	50	80	M18 x 1.5	30	3/8	42 to 44.5	58	168	44	11	0	27	13	284
63	59	93	M18 x 1.5	31	3/8	50 to 51.5	58	182	52.5	12	0	34	16	298
80	76	116	M22 x 1.5	37	1/2	59.5 to 62.5	71	218	59.5	15	0	44	16	360
100	92	133	M26 x 1.5	40	1/2	66.5 to 69.5	72	246	69.5	15	0	43	17	390

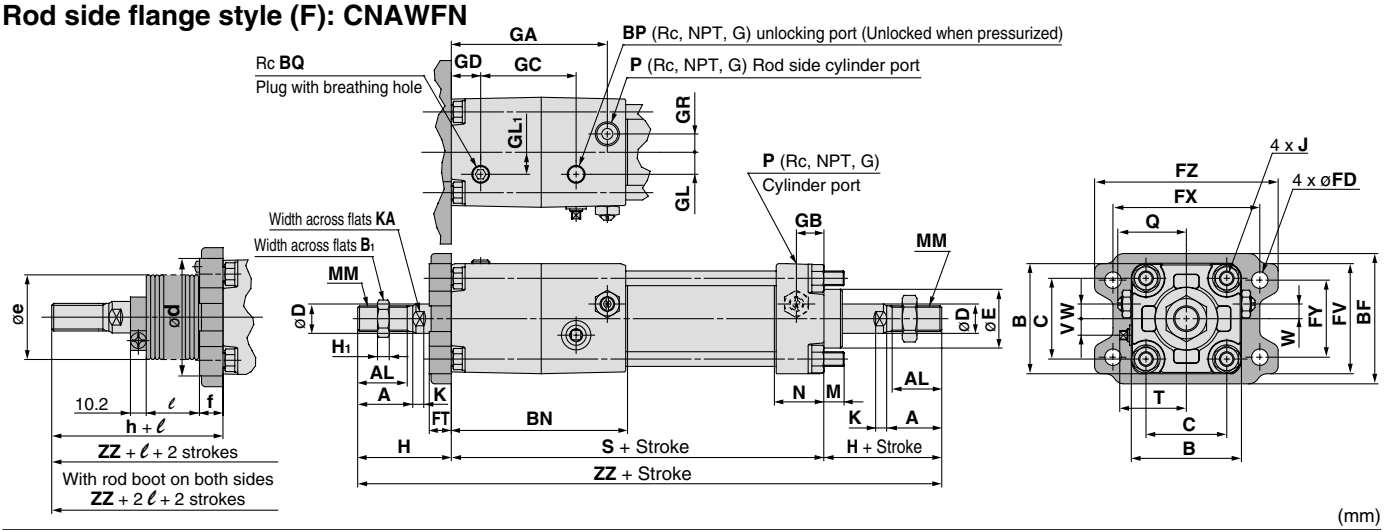
With Rod Boot

(mm)

Bore size (mm)	Stroke range (mm)	e	f	h	ℓ	ZZ (One side)	ZZ (Both sides)
40	20 to 500	43	11.2	59	1/4 stroke	263	271
50	20 to 600	52	11.2	66	1/4 stroke	292	300
63	20 to 600	52	11.2	66	1/4 stroke	306	314
80	20 to 750	65	12.5	80	1/4 stroke	369	378
100	20 to 750	65	14	81	1/4 stroke	399	408

Dimensions

Rod side flange style (F): CNAWFN



(mm)

Bore size (mm)	Stroke range (mm)	A	AL	B	B1	BF	BN	BP	BQ	C	D	E	FD	FT	FV	FX	FY	FZ	GA	GB	GC	GD	GL	GL1	GR	H1	J
40	Up to 500	30	27	60	22	71	96	1/8	1/8	44	16	32	9	12	60	80	42	100	85	15	52	16	12	12	10	8	M8 x 1.25
50	Up to 600	35	32	70	27	81	108	1/4	1/8	52	20	40	9	12	70	90	50	110	95	17	56.5	20	13	15	12	11	M8 x 1.25
63	Up to 600	35	32	86	27	101	115	1/4	1/4	64	20	40	11.5	15	86	105	59	130	102	17	67	20	18	12	15	11	M10 x 1.25
80	Up to 750	40	37	102	32	119	139	1/4	1/4	78	25	52	13.5	18	102	130	76	160	123	21	83	20	23	18	17	13	M12 x 1.75
100	Up to 750	40	37	116	41	133	160	1/4	1/4	92	30	52	13.5	18	116	150	92	180	144	21	98	22	25	20	19	16	M12 x 1.75

(mm)

Bore size (mm)	K	KA	M	MM	N	P	Q	H	S	T	V	W	ZZ
40	6	14	11	M14 x 1.5	27	1/4	37 to 39.5	51	153	37.5	9	8	255
50	7	18	11	M18 x 1.5	30	3/8	42 to 44.5	58	168	44	11	0	284
63	7	18	14	M18 x 1.5	31	3/8	50 to 51.5	58	182	52.5	12	0	298
80	11	22	17	M22 x 1.5	37	1/2	59.5 to 62.5	71	218	59.5	15	0	360
100	11	26	17	M26 x 1.5	40	1/2	66.5 to 69.5	72	246	69.5	15	0	390

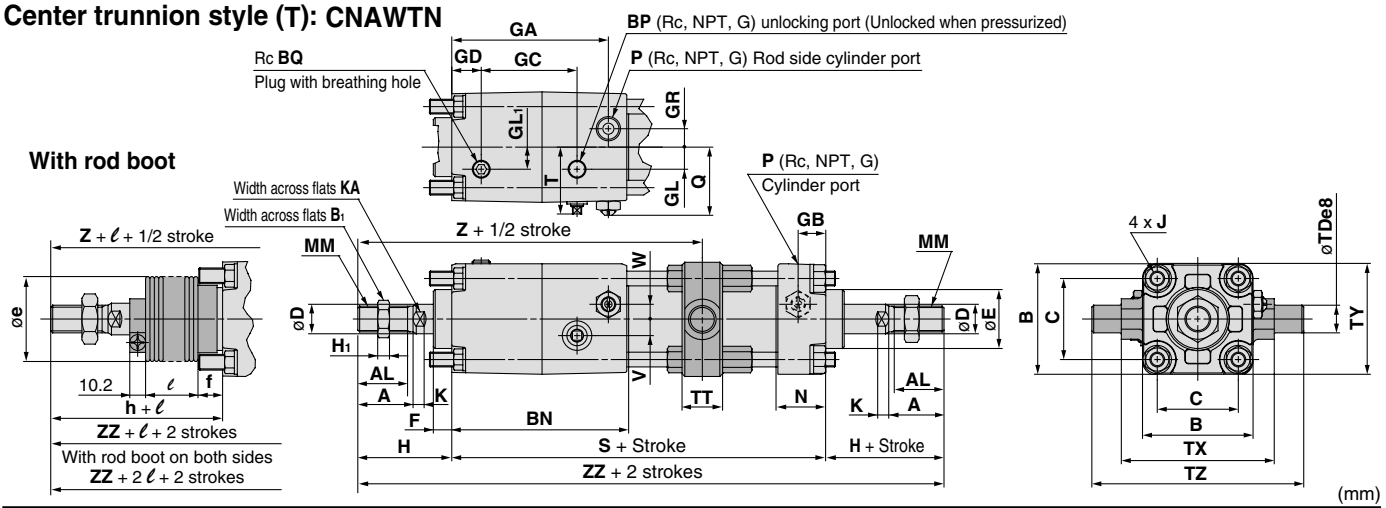
With Rod Boot

(mm)

Bore size (mm)	Stroke range (mm)	d	e	f	h	ℓ	ZZ (One side)	ZZ (Both sides)
40	20 to 500	52	43	15	59	1/4 stroke	263	271
50	20 to 600	58	52	15	66	1/4 stroke	292	300
63	20 to 600	58	52	17.5	66	1/4 stroke	306	314
80	20 to 750	80	65	21.5	80	1/4 stroke	369	378
100	20 to 750	80	65	21.5	81	1/4 stroke	399	408

Center trunnion style (T): CNAWTN

With rod boot



(mm)

Bore size (mm)	Stroke range (mm)	A	AL	B	B1	BN	BP	BQ	C	D	E	F	GA	GB	GC	GD	GL	GL1	GR	H1	J	K	KA	MM	N	P
40	25 to 500	30	27	60	22	96	1/8	1/8	44	16	32	10	85	15	52	16	12	12	10	8	M8 x 1.25	6	14	M14 x 1.5	27	1/4
50	25 to 600	35	32	70	27	108	1/4	1/8	52	20	40	10	95	17	56.5	20	13	15	12	11	M8 x 1.25	7	18	M18 x 1.5	30	3/8
63	32 to 600	35	32	86	27	115	1/4	1/4	64	20	40	10	102	17	67	20	18	12	15	11	M10 x 1.25	7	18	M18 x 1.5	31	3/8
80	41 to 750	40	37	102	32	139	1/4	1/4	78	25	52	14	123	21	83	20	23	18	17	13	M12 x 1.75	11	22	M22 x 1.5	37	1/2
100	45 to 750	40	37	116	41	160	1/4	1/4	92	30	52	14	144	21	98	22	25	20	19	16	M12 x 1.75	11	26	M26 x 1.5	40	1/2

(mm)

Bore size (mm)	Q	S	T	TDe8	TT	TX	TY	TZ	V	W	H	Z	ZZ
40	37 to 39.5	153	37.5	15 $^{-0.032}_{-0.059}$	22	85	62	117	9	8	51	162	255
50	42 to 44.5	168	44	15 $^{-0.032}_{-0.059}$	22	95	74	127	11	0	58	181	284
63	50 to 51.5	182	52.5	18 $^{-0.032}_{-0.059}$	28	110	90	148	12	0	58	191	298
80	59.5 to 62.5	218	59.5	25 $^{-0.040}_{-0.073}$	34	140	110	192	15	0	71	231	360
100	66.5 to 69.5	246	69.5	25 $^{-0.040}_{-0.073}$	40	162	130	214	15	0	72	255	390

With Rod Boot

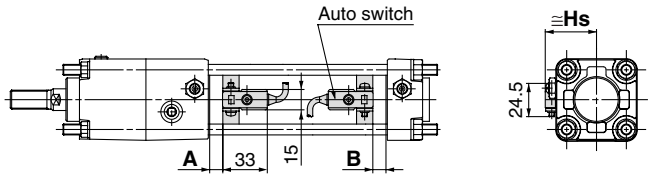
(mm)

Bore size (mm)	Stroke range (mm)	e	f	h	ℓ	Z (One side)	ZZ (One side)	Z (Both sides)	ZZ (Both sides)
40	25 to 500	43	11.2	59	1/4 stroke	170	263	170	271
50	25 to 600	52	11.2	66	1/4 stroke	189	292	189	300
63	32 to 600	52	11.2	66	1/4 stroke	199	306	199	314
80	41 to 750	65	12.5	80	1/4 stroke	240	369	240	378
100	45 to 750	65	14	81	1/4 stroke	264	399	264	408

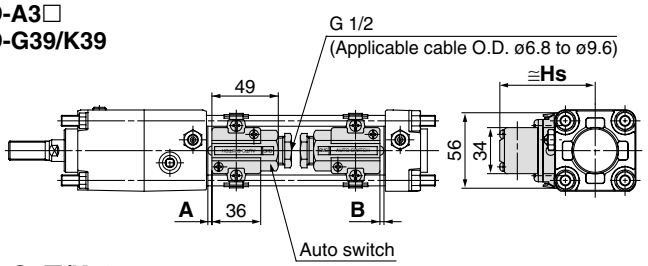
Auto Switch Proper Mounting Position (Detection at Stroke End) and Its Mounting Height

<Band mounting style>

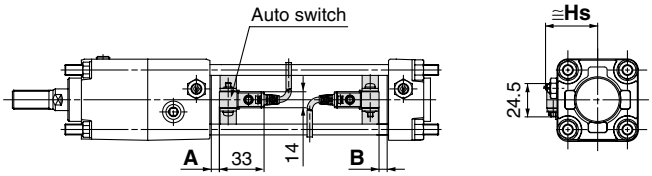
D-B5□/B64
D-B59W



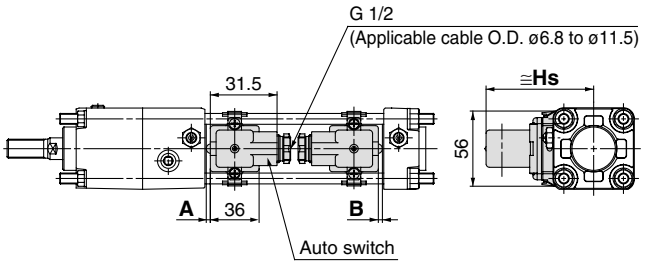
D-A3□
D-G39/K39



D-G5□/K59
D-G5□W/K59W
D-G5BAL
D-G59F/G5NTL

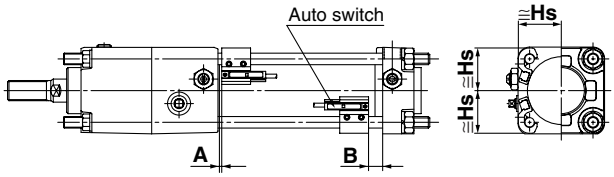


D-A44

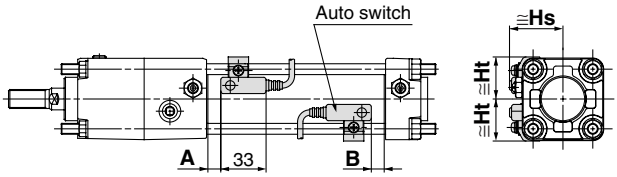


<Tie-rod mounting style>

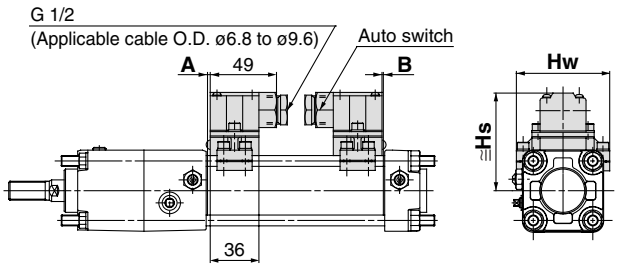
D-A9□/A9□V
D-M9□/M9□V
D-M9□W/M9□WV
D-M9□AL/M9□AVL
D-Z7□/Z80
D-Y59□/Y69□/Y7P/Y7PV
D-Y7□W/Y7□WV
D-Y7BAL



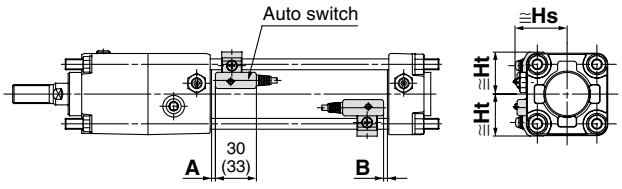
D-A5□/A6□
D-A59W



D-A3□C
D-G39C/K39C

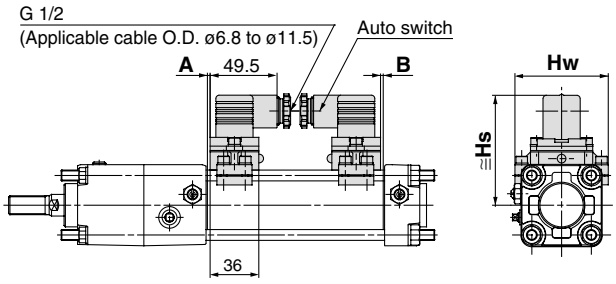


D-F5□/J5□
D-F5NTL
D-F5□W/J59W
D-F5BA/F59F

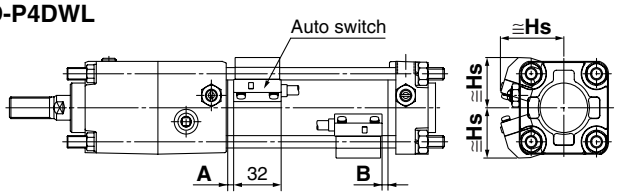


∗ ( ): Donates the value of D-F5LF.

D-A44C



D-P4DWL



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

Auto Switch Proper Mounting Position

(mm)

Auto switch model / Bore size (mm)	D-A9□ D-A9□V		D-M9□ D-M9□V D-M9□W D-M9□WV D-M9□AL D-M9□AVL		D-B59W D-Z7□ D-Z80 D-Y59□ D-Y69□ D-Y7P D-Y7PV D-Y7□W D-Y7□WV D-Y7BAL		D-P4DWL		D-A5□ D-A6□ D-A3□ D-A3□C D-A44 D-A44C D-G39 D-G39C D-K39 D-K39C		D-B5□ D-B64		D-F5□ D-J5□ D-F59F D-F5□W D-J59W D-F5BAL		D-G59F D-G5□W D-K59W D-G5BAL D-G5□ D-K59 D-G5NTL		D-A59W		D-F5NTL	
	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B
40	6	4	10	8	3.5	1.5	3	1	0	0	0.5	0	6.5	4.5	2	0	4	2	11.5	9.5
50	—	—	10	8	3.5	1.5	3	1	0	0	0.5	0	6.5	4.5	2	0	4	2	11.5	9.5
63	8.5	7.5	12.5	11.5	6	5	5.5	4	2.5	1.5	3	2	9	8	4.5	3.5	6.5	5.5	14	13
80	12	10	16	14	9.5	7.5	9	7	6	4	6.5	4.5	4.5	12.5	8	6	10	8	17.5	15.5
100	13.5	12.5	17.5	16.5	11	10	10.5	9	7.5	6.5	8	7	14	13	9.5	8.5	11.5	10.5	19	18

∗ D-A9□ and D-A9□V cannot be mounted on ø50.
∗ Long stroke is available only for foot style and rod side flange style mounting support.
Note) Adjust the auto switch after confirming the operating conditions in the actual setting.

Auto Switch Mounting Height

(mm)

Auto switch model / Bore size (mm)	D-A9□ D-M9□ D-M9□W D-M9□AL		D-A9□V		D-M9□V D-M9□WV D-M9□AVL		D-Z7□ D-Z80 D-Y59□ D-Y7P D-Y7□W D-Y7BAL		D-Y69□ D-Y7PV D-Y7□WV		D-P4DWL		D-B5□ D-B64 D-B59W D-G5□ D-K59 D-G5NTL D-G5□W D-K59W D-G5BAL D-G59F	D-A3□ D-G39 D-K39	D-A44	D-A5□ D-A6□ D-A59W		D-F5□ D-J59 D-F5□W D-J59W D-F5BAL D-F59F D-F5NTL		D-A3□C D-G39C D-K39C		D-A44C	
	Hs	Ht	Hs	Ht	Hs	Ht	Hs	Ht	Hs	Ht	Hs	Ht	Hs	Hs	Hs	Hs	Ht	Hs	Ht	Hs	Hw	Hs	Hw
40	30	30	32	30	35	30	30	30	30.5	30	43	33.5	38	72.5	80.5	40	31	38.5	31	73	69	81	69
50	34	34	36.5	34	39	34	34	34	35	34	47	38	43.5	78	86	43.5	35	42.5	35	78.5	77	86.5	77
63	41	41	43.5	41	46	41	41	41	42.5	41	53	44	50.5	85	93	49	42	48	42	85.5	91	93.5	91
80	49.5	49	51.5	49	54	49	49.5	48.5	51	48.5	60	52	59	93.5	101.5	55.5	50	54	50	94	107	102	107
100	57	56	59.5	56	62.5	56	58.5	56	59	56	67	59	69.5	104	112	63	57.5	62	57.5	104	121	112	121

∗ D-A9□ and D-A9□V cannot be mounted on ø50.

Minimum Stroke for Auto Switch Mounting

n: Number of auto switch (mm)

Auto switch model	Number of auto switches mounted		Mounting brackets other than center trunnion	Center trunnion				
				ø40	ø50	ø63	ø80	ø100
D-A9□	2 (Different surfaces, Same surface), 1		15	75	—	90	100	110
	n		$15 + 40\ \frac{(n-2)}{2}$ (n = 2, 4, 6, 8 ⋯)	$75 + 40\ \frac{(n-4)}{2}$ (n = 4, 8, 12, 16 ⋯)		$90 + 40\ \frac{(n-4)}{2}$ (n = 4, 8, 12, 16 ⋯)	$100 + 40\ \frac{(n-4)}{2}$ (n = 4, 8, 12, 16 ⋯)	$110 + 40\ \frac{(n-4)}{2}$ (n = 4, 8, 12, 16 ⋯)
D-A9□V	2 (Different surfaces, Same surface), 1		10	75	—	90	100	110
	n		$10 + 30\ \frac{(n-2)}{2}$ (n = 2, 4, 6, 8 ⋯)	$75 + 30\ \frac{(n-4)}{2}$ (n = 4, 8, 12, 16 ⋯)		$90 + 30\ \frac{(n-4)}{2}$ (n = 4, 8, 12, 16 ⋯)	$100 + 30\ \frac{(n-4)}{2}$ (n = 4, 8, 12, 16 ⋯)	$110 + 30\ \frac{(n-4)}{2}$ (n = 4, 8, 12, 16 ⋯)
D-M9□ D-M9□W D-M9□AL	2 (Different surfaces, Same surface), 1		15	80		95	110	115
	n		$15 + 40\ \frac{(n-2)}{2}$ (n = 2, 4, 6, 8 ⋯)	$80 + 40\ \frac{(n-4)}{2}$ (n = 4, 8, 12, 16 ⋯)		$95 + 40\ \frac{(n-4)}{2}$ (n = 4, 8, 12, 16 ⋯)	$110 + 40\ \frac{(n-4)}{2}$ (n = 4, 8, 12, 16 ⋯)	$115 + 40\ \frac{(n-4)}{2}$ (n = 4, 8, 12, 16 ⋯)
D-M9□V D-M9□WV D-M9□AVL	2 (Different surfaces, Same surface), 1		10	80		95	110	115
	n		$10 + 30\ \frac{(n-2)}{2}$ (n = 2, 4, 6, 8 ⋯)	$80 + 30\ \frac{(n-4)}{2}$ (n = 4, 8, 12, 16 ⋯)		$95 + 30\ \frac{(n-4)}{2}$ (n = 4, 8, 12, 16 ⋯)	$110 + 30\ \frac{(n-4)}{2}$ (n = 4, 8, 12, 16 ⋯)	$115 + 30\ \frac{(n-4)}{2}$ (n = 4, 8, 12, 16 ⋯)
D-A5□/A6□ D-F5□/J5□ D-F5□W/J59W D-F5BAL/F59F	2 (Different surfaces, Same surface), 1		15	90		100	110	120
	n (Same surface)		$15 + 55\ \frac{(n-2)}{2}$ (n = 2, 4, 6, 8 ⋯)	$90 + 55\ \frac{(n-4)}{2}$ (n = 4, 8, 12, 16 ⋯)		$100 + 55\ \frac{(n-4)}{2}$ (n = 4, 8, 12, 16 ⋯)	$110 + 55\ \frac{(n-4)}{2}$ (n = 4, 8, 12, 16 ⋯)	$120 + 55\ \frac{(n-4)}{2}$ (n = 4, 8, 12, 16 ⋯)
D-A59W	2 (Different surfaces, Same surface), 1		20	90		100	110	120
	n (Same surface)		$20 + 55\ \frac{(n-2)}{2}$ (n = 2, 4, 6, 8 ⋯)	$90 + 55\ \frac{(n-4)}{2}$ (n = 4, 8, 12, 16 ⋯)		$100 + 55\ \frac{(n-4)}{2}$ (n = 4, 8, 12, 16 ⋯)	$110 + 55\ \frac{(n-4)}{2}$ (n = 4, 8, 12, 16 ⋯)	$120 + 55\ \frac{(n-4)}{2}$ (n = 4, 8, 12, 16 ⋯)
	1		15	90		100	110	120
D-F5NTL	2 (Different surfaces, Same surface), 1		25	110		120	130	140
	n (Same surface)		$25 + 55\ \frac{(n-2)}{2}$ (n = 2, 4, 6, 8 ⋯)	$110 + 55\ \frac{(n-4)}{2}$ (n = 4, 8, 12, 16 ⋯)		$120 + 55\ \frac{(n-4)}{2}$ (n = 4, 8, 12, 16 ⋯)	$130 + 55\ \frac{(n-4)}{2}$ (n = 4, 8, 12, 16 ⋯)	$140 + 55\ \frac{(n-4)}{2}$ (n = 4, 8, 12, 16 ⋯)
D-B5□/B64 D-G5□/K59 D-G5□W D-K59W D-G5BAL D-G59F D-G5NTL	2	Different surfaces	15	90		100	110	
		Same surface	75					
	n	Different surfaces	$15 + 50\ \frac{(n-2)}{2}$ (n = 2, 4, 6, 8, ⋯)	$90 + 50\ \frac{(n-4)}{2}$ (n = 4, 8, 12, 16, ⋯)		$100 + 50\ \frac{(n-4)}{2}$ (n = 4, 8, 12, 16, ⋯)	$110 + 50\ \frac{(n-4)}{2}$ (n = 4, 8, 12, 16 ⋯)	
		Same surface	75 + 50 (n – 2) (n = 2, 3, 4, ⋯)	90 + 50 (n – 2) (n = 2, 4, 6, 8, ⋯)		100 + 50 (n – 2) (n = 2, 4, 6, 8, ⋯)	110 + 50 (n – 2) (n = 2, 4, 6, 8, ⋯)	
	1		10	90		100	110	
D-B59W	2	Different surfaces	20	90		100	110	
		Same surface	75					
	n	Different surfaces	$20 + 50\ \frac{(n-2)}{2}$ (n = 2, 4, 6, 8, ⋯)	$90 + 50\ \frac{(n-4)}{2}$ (n = 4, 8, 12, 16, ⋯)		$100 + 50\ \frac{(n-4)}{2}$ (n = 4, 8, 12, 16, ⋯)	$110 + 50\ \frac{(n-4)}{2}$ (n = 4, 8, 12, 16, ⋯)	
		Same surface	75 + 50 (n – 2) (n = 2, 3, 4, ⋯)	90 + 50 (n – 2) (n = 2, 4, 6, 8, ⋯)		100 + 50 (n – 2) (n = 2, 4, 6, 8, ⋯)	110 + 50 (n – 2) (n = 2, 4, 6, 8, ⋯)	
	1		15	90		100	110	
D-A3□ D-G39 D-K39	2	Different surfaces	35	100		100	110	
		Same surface	100					
	n	Different surfaces	35 + 30 (n – 2) (n = 2, 3, 4, ⋯)	100 + 30 (n – 2) (n = 2, 4, 6, 8, ⋯)		100 + 30 (n – 2) (n = 2, 4, 6, 8, ⋯)	110 + 30 (n – 2) (n = 2, 4, 6, 8, ⋯)	
		Same surface	100 + 100 (n – 2) (n = 2, 3, 4, ⋯)	100 + 100 (n – 2) (n = 2, 4, 6, 8, ⋯)		100 + 100 (n – 2) (n = 2, 4, 6, 8, ⋯)	110 + 100 (n – 2) (n = 2, 4, 6, 8, ⋯)	
	1		10	100		100	110	
D-A44	2	Different surfaces	35	100		100	110	
		Same surface	55					
	n	Different surfaces	35 + 30 (n – 2) (n = 2, 3, 4, ⋯)	100 + 30 (n – 2) (n = 2, 4, 6, 8, ⋯)		100 + 30 (n – 2) (n = 2, 4, 6, 8, ⋯)	110 + 30 (n – 2) (n = 2, 4, 6, 8, ⋯)	
		Same surface	55 + 50 (n – 2) (n = 2, 3, 4, ⋯)	100 + 50 (n – 2) (n = 2, 4, 6, 8, ⋯)		100 + 50 (n – 2) (n = 2, 4, 6, 8, ⋯)	110 + 50 (n – 2) (n = 2, 4, 6, 8, ⋯)	
	1		10	100		100	110	

Minimum Stroke for Auto Switch Mounting

n: Number of auto switch (mm)

Auto switch model	Number of auto switches mounted		Mounting brackets other than center trunnion	Center trunnion				
				ø40	ø50	ø63	ø80	ø100
D-A3□C **D-G39C** **D-K39C**	2	Different surfaces	20	100		100	120	
		Same surface	100					
	n	Different surfaces	20 + 35 (n – 2) (n = 2, 3, 4, ⋯)	100 + 35 (n – 2) (n = 2, 4, 6, 8, ⋯)		100 + 35 (n – 2) (n = 2, 4, 6, 8, ⋯)	120 + 35 (n – 2) (n = 2, 4, 6, 8, ⋯)	
		Same surface	100 + 100 (n – 2) (n = 2, 3, 4, 5 ⋯)	100 + 100 (n – 2) (n = 2, 4, 6, 8, ⋯)		100 + 100 (n – 2) (n = 2, 4, 6, 8, ⋯)	120 + 100 (n – 2) (n = 2, 4, 6, 8, ⋯)	
	1		10	100		100	120	
D-A44C	2	Different surfaces	20	100		100	120	
		Same surface	55					
	n	Different surfaces	20 + 35 (n – 2) (n = 2, 3, 4, ⋯)	100 + 35 (n – 2) (n = 2, 4, 6, 8, ⋯)		100 + 35 (n – 2) (n = 2, 4, 6, 8, ⋯)	120 + 35 (n – 2) (n = 2, 4, 6, 8, ⋯)	
		Same surface	55 + 50 (n – 2) (n = 2, 3, 4, ⋯)	100 + 50 (n – 2) (n = 2, 4, 6, 8, ⋯)		100 + 50 (n – 2) (n = 2, 4, 6, 8, ⋯)	120 + 50 (n – 2) (n = 2, 4, 6, 8, ⋯)	
	1		10	100		100	120	
D-Z7□/Z80 **D-Y59□/Y7P** **D-Y7□W**	2 (Different surfaces, Same surface), 1		15	80	85	90	95	105
	n		15 + 40 $\frac{(n-2)}{2}$ (n = 2, 4, 6, 8 ⋯)	80 + 40 $\frac{(n-4)}{2}$ (n = 4, 8, 12, 16 ⋯)	85 + 40 $\frac{(n-4)}{2}$ (n = 4, 8, 12, 16 ⋯)	90 + 40 $\frac{(n-4)}{2}$ (n = 4, 8, 12, 16 ⋯)	95 + 40 $\frac{(n-4)}{2}$ (n = 4, 8, 12, 16 ⋯)	105 + 40 $\frac{(n-4)}{2}$ (n = 4, 8, 12, 16 ⋯)
D-Y69□/Y7PV **D-Y7□WV**	2 (Different surfaces, Same surface), 1		10	65		75	80	90
	n		10 + 30 $\frac{(n-2)}{2}$ (n = 2, 4, 6, 8 ⋯)	65 + 30 $\frac{(n-4)}{2}$ (n = 4, 8, 12, 16 ⋯)		75 + 30 $\frac{(n-4)}{2}$ (n = 4, 8, 12, 16 ⋯)	80 + 30 $\frac{(n-4)}{2}$ (n = 4, 8, 12, 16 ⋯)	90 + 30 $\frac{(n-4)}{2}$ (n = 4, 8, 12, 16 ⋯)
D-Y7BAL	2 (Different surfaces, Same surface), 1		20	95		100	105	110
	n		20 + 45 $\frac{(n-2)}{2}$ (n = 2, 4, 6, 8 ⋯)	95 + 45 $\frac{(n-4)}{2}$ (n = 4, 8, 12, 16 ⋯)		100 + 45 $\frac{(n-4)}{2}$ (n = 4, 8, 12, 16 ⋯)	105 + 45 $\frac{(n-4)}{2}$ (n = 4, 8, 12, 16 ⋯)	110 + 45 $\frac{(n-4)}{2}$ (n = 4, 8, 12, 16 ⋯)
D-P4DWL	2 (Different surfaces, Same surface), 1		15	120		130	140	
	n		15 + 65 $\frac{(n-2)}{2}$ (n = 2, 4, 6, 8 ⋯)	120 + 65 $\frac{(n-4)}{2}$ (n = 4, 8, 12, 16 ⋯)		130 + 65 $\frac{(n-4)}{2}$ (n = 4, 8, 12, 16 ⋯)	140 + 65 $\frac{(n-4)}{2}$ (n = 4, 8, 12, 16 ⋯)	

Operating Range

(mm)

Auto switch model	Bore size (mm)				
	40	50	63	80	100
D-A9□/A9□V	7	—	9	9	9
D-M9□/M9□V D-M9□W/M9□WV D-M9□AL/M9□AVL	4.5	5	5.5	5	6
D-Z7□/Z80	8	7	9	9.5	10.5
D-A3□/A44 D-A3□C/A44C	9	10	11	11	11
D-A5□/A6□					
D-B5□/B64					
D-A59W	13	13	14	14	15
D-B59W	14	14	17	16	18
D-Y59□/Y69□ D-Y7P/Y7□V D-Y7□W/Y7□WV D-Y7BAL	8	7	5.5	6.5	6.5

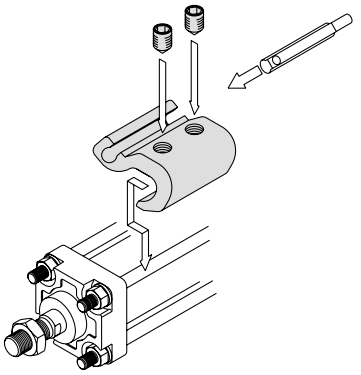
Auto switch model	Bore size (mm)				
	40	50	63	80	100
D-F5□/J5□/F59F D-F5□W/J59W D-F5BAL/F5NTL	4	4	4.5	4.5	4.5
D-G5□/K59/G59F D-G5□W/K59W D-G5NTL/G5BAL	5	6	6.5	6.5	7
D-G39/K39 D-G39C/K39C	9	9	10	10	11
D-P4DWL	4	4	4.5	4	4.5

∗ D-A9□ and D-A9□V cannot be mounted on ø50.
∗ Since this is a guideline including hysteresis, not meant to be guaranteed. (Assuming approximately ±30% dispersion.)
There may be the case it will vary substantially depending on an ambient environment.

Auto Switch Mounting Bracket Part No.

<Tie-rod Mounting>

Auto switch model	Bore size (mm)				
	ø40	ø50	ø63	ø80	ø100
D-A9□/A9□V D-M9□/M9□V D-M9□W/M9□WV D-M9□AL/M9□AVL	BA7-040	BA7-040	BA7-063	BA7-080	BA7-080
D-A5□/A6□/A59W D-F5□/J5□/F5□W/J59W D-F5NT/F5BAL/F59F	BT-04	BT-04	BT-06	BT-08	BT-08
D-A3□C/A44C/G39C/K39C	BA3-040	BA3-050	BA3-063	BA3-080	BA3-100
D-Z7□/Z80 D-Y59□/Y69□ D-Y7P/Y7PV D-Y7□W/Y7□WV D-Y7BAL	BA4-040	BA4-040	BA4-063	BA4-080	BA4-080
D-P4DWL	BAP2-040	BAP2-040	BAP2-063	BAP2-080	BAP2-080



• The above figure shows the mounting example of D-A9□ (V) /M9□ (V) /M9□W (V) / M9□A (V) L.

<Band Mounting>

Auto switch model	Bore size (mm)				
	ø40	ø50	ø63	ø80	ø100
D-A3□/A44/G39/K39	BD1-04M	BD1-05M	BD1-06M	BD1-08M	BD1-10M
D-B5□/B64/B59W D-G5□/K59/G5□W/K59W D-G5BAL/G59F/G5NTL	BA-04	BA-05	BA-06	BA-08	BA-10

∗ D-A9□ and D-A9□V cannot be mounted on ø50.
∗ Auto switch mounting bolt is attached to D-A3□C/A44C/G39C, and K39C. To order, indicate as shown below, according to the cylinder size.
(Example) ø40: D-A3□C-4, ø50: D-A3□C-5
ø63: D-A3□C-6, ø80: D-A3□C-8, ø100: D-A3□C-10
To order the auto switch mounting brackets separately, use the part number shown above.

[Mounting screw set made of stainless steel]
The following set of mounting screws made of stainless steel (including nuts) is available. Use it in accordance with the operating environment. (Please order the auto switch mounting bracket and band separately, since it is not included.)
BBA1: For D-A5/A6/F5/J5 types
BBA3: For D-B5/B6/G5/K5 types
D-H5BAL/G5BAL auto switches are set on the cylinder with the stainless steel screws above when shipped. When an auto switch is shipped independently, BBA1 or BBA3 is attached.
Note 1) Refer to pages 1813 and 1821 for the details of BBA1 and BBA3.
Note 2) When using D-M9□AL and D-M9□AVL/Y7BAL, do not use the steel set screws which is included with the auto switch mounting brackets above (BA7-□□□, BA4-□□□). Order a stainless steel screw set (BBA1) separately, and select and use the M4 x 6L stainless steel set screws included in the BBA1.

Other than the applicable auto switches listed in “How to Order”, the following auto switches can be mounted.
For detailed specifications, refer to pages 1719 to 1827.

Auto switch type	Model	Electrical entry (Fetching direction)	Features
Read	D-A93V, A96V	Grommet (Perpendicular)	—
	D-A90V		Without indicator light
	D-A53, A56, B53, Z73, Z76	Grommet (In-line)	—
	D-A67, Z80		Without indicator light
Solid state	D-M9NV, M9PV, M9BV	Grommet (Perpendicular)	—
	D-Y69A, Y69B, Y7PV		
	D-M9NWV, M9PWV, M9BWV		Diagnostic indication (2-color indication)
	D-Y7NWV, Y7PWV, Y7BWV		
	D-M9NAVL, M9PAVL, M9BAVL		Water resistant (2-color indication)
	D-Y59A, Y59B, Y7P	Grommet (In-line)	—
	D-F59, F5P, J59		
	D-Y7NW, Y7PW, Y7BW		Diagnostic indication (2-color indication)
	D-F59W, F5PW, J59W		
	D-F5BAL, Y7BAL		Water resistant (2-color indication)
	D-F5NTL, G5NTL		With timer
	D-P5DWL		Magnetic field resistant (2-color indication)

∗ With pre-wired connector is available for solid state auto switches. For details, refer to pages 1784 and 1785.
∗ Normally closed (NC = b contact), solid state auto switch (D-F9G/F9H/Y7G/Y7H type) are also available. For details, refer to pages 1746 and 1748.
∗ Wide range detection type, solid state auto switches (D-G5NBL type) are also available. Refer to page 1776 for details.

Series CNA
Specific Product Precautions 1

Be sure to read before handling. Refer to front matters 42 and 43 for Safety Instructions and pages 3 to 11 for Actuator and Auto Switch Precautions.

Design of Equipment and Machinery

⚠Warning

1. Construct so that the human body will not come into direct contact with driven objects or the moving parts of locking cylinders.

Devise a safe structure by attaching protective covers that prevent direct contact with the human body, or in cases where there is a danger of contact, provide sensors or other devices to perform an emergency stop, etc., before contact occurs.

2. Use a balance circuit, taking cylinder lurching into consideration.

In cases such as an intermediate stop, where a lock is operated at a desired position within the stroke and air pressure is applied from only one side of the cylinder, the piston will lurch at high speed when the lock is released. In such situations, there is a danger of causing human injury by having hands or feet, etc. caught, and also a danger for causing damage to the equipment. In order to prevent this lurching, a balance circuit such as the recommended pneumatic circuits (page 753) should be used.

Selection

⚠Warning

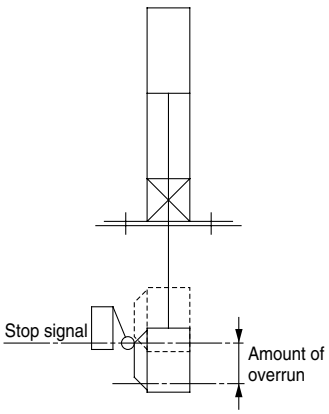
1. When in the locked state, do not apply a load accompanied by an impact shock, strong vibration or turning force, etc.

Use caution, because an external action such as an impacting load, strong vibration or turning force, may damage the locking mechanism or reduce its life.

2. Consider stopping accuracy and the amount of over-run when an intermediate stop is performed.

Due to the nature of a mechanical lock, there is a momentary lag with respect to the stop signal, and a time delay occurs before stopping. The cylinder stroke resulting from this delay is the overrun amount. The difference between the maximum and minimum overrun amounts is the stopping accuracy.

- Place a limit switch before the desired stopping position, at a distance equal to the overrun amount.
- The limit switch must have a detection length (dog length) of the overrun amount + α.
- For SMC's auto switches, the operating range is between 8 and 14 mm. (It varies depending on a switch model.)
  When the overrun amount exceeds this range, self-holding of the contact should be performed at the switch load side.



∗For stopping accuracy, refer to page 727.

3. In order to further improve stopping accuracy, the time from the stop signal to the operation of the lock should be shortened as much as possible.

To accomplish this, use a device such as a highly responsive electric control circuit or solenoid valve driven by direct current, and place the solenoid valve as close as possible to the cylinder.

Selection

⚠Warning

4. Note that the stopping accuracy will be influenced by changes in piston speed.

When piston speed changes during the course of the cylinder stroke due to variations in the load or disturbances, etc., the dispersion of stopping positions will increase. Therefore, consideration should be given to establishing a standard speed for the piston just before it reaches the stopping position.

Moreover, the dispersion of stopping positions will increase during the cushioned portion of the stroke and during the accelerating portion of the stroke after the start of operation, due to the large changes in piston speed.

5. The holding force (max. static load) indicates the maximum capability to hold a static load without loads, vibration and impact. This does not indicate a load that can be held in ordinary conditions.

Select the most suitable bore sizes for the operating conditions in accordance with the selection procedures. The Model Selection (pages 724 and 725) is based on use at the intermediate stop (including emergency stops during the operation). However, when the cylinder is in a locked state, kinetic energy does not act upon it. Under these conditions, use the load mass at the maximum speed (V) of 100 mm/s shown in the graphs 5 to 7 on page 725 depending on the operating pressure and select models.

Mounting

⚠Warning

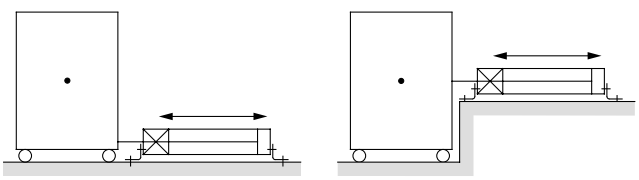
1. Be certain to connect the rod end to the load with the lock released.

- If connected in the locked state, a load greater than the turning force or holding force, etc. may operate on the piston rod and cause damage to the lock mechanism. Series CNA is equipped with an emergency unlocking mechanism; however, when connecting the rod end to the load, this should be done with the lock released. This can be accomplished by simply connecting an air line to the unlocking port and supplying air pressure of 0.25 MPa or more.

⚠Caution

1. Do not apply offset loads to the piston rod.

Particular care should be taken to match the load's center of gravity with the center of the cylinder shaft. When there is a large discrepancy, the piston rod may be subjected to uneven wear or damage due to the inertial moment during locking stops.



× Load center of gravity and cylinder shaft center are not matched.

○ Load center of gravity and cylinder shaft center are matched.

Note) Can be used if all of the generated moment is absorbed by an effective guide.

Series CNA
Specific Product Precautions 2

Be sure to read before handling. Refer to front matters 42 and 43 for Safety Instructions and pages 3 to 11 for Actuator and Auto Switch Precautions.

Mounting

⚠Caution

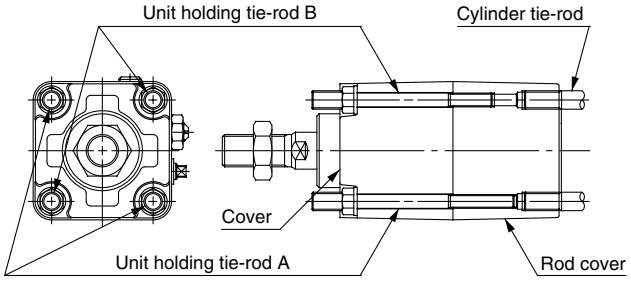
2. Caution on using the basic style or replacing the support bracket.

The lock unit and cylinder rod cover are assembled as shown in the figure below. For this reason, it cannot be installed as in the case of common air cylinders, by using the basic type and screwing the cylinder tie-rods directly to machinery.

Furthermore, when replacing mounting brackets, the unit holding tie-rods may get loosen. Tighten them once again in such a case.

Use socket wrench for replacing the mounting bracket or tightening tie-rod for unit mounting.

Bore size (mm)	Mounting bracket nut			Unit holding tie-rod	
	Nut	Width across flats	Socket	Width across flats	Socket
40	JIS B 1181 Class 3 M8 x 1.25	13	JIS B 4636 2 point angle socket 13	10	JIS B 4636 2 point angle socket 10
50				13	JIS B 4636 2 point angle socket 13
63	JIS B 1181 Class 3 M10 x 1.25	17	JIS B 4636 2 point angle socket 17	13	JIS B 4636 2 point angle socket 13
80, 100	JIS B 1181 Class 3 M12 x 1.25	19	JIS B 4636 2 point angle socket 19	17	JIS B 4636 2 point angle socket 17



(ø2 depth 1 mm hole is on the side of tie-rod for attaching unit A.)

Adjustment

⚠Caution

1. Adjust air balance for cylinder. Balance the load by adjusting the air pressure in the cylinder rod side and head side after the lock is released when the load is mounted on cylinder. When you have this air balance, cylinder ejection at lock release can be avoided.

2. Adjust mounting position for detection area of auto switch etc. When intermediate stop is done, adjust the mounting position for detection area of auto switch etc., with consideration of over-run distance to required stop position.

Pneumatic Circuit

⚠Warning

1. Be certain to use an pneumatic circuit which will apply balancing pressure to both sides of the piston when in a locked stop.

In order to prevent cylinder lurching after a lock stop, when restarting or when manually unlocking, a circuit should be used to which will apply balancing pressure to both sides of the piston, thereby canceling the force generated by the load in the direction of piston movement.

2. Use a solenoid valve for unlocking which has a large effective area, as a rule 50% or more of the effective area of the cylinder drive solenoid valve.

The larger the effective area is, the shorter the locking time will be (the overrun amount will be shorter), and stopping accuracy will be improved.

3. Place the solenoid valve for unlocking close to the cylinder, and no farther than the cylinder drive solenoid valve.

The shorter the distance from the cylinder (the shorter the piping), the shorter the overrun amount will be, and stopping accuracy will be improved.

4. Allow at least 0.5 seconds from a locked stop (intermediate stop of the cylinder) until release of the lock.

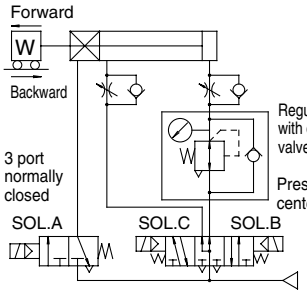
When the locked stop time is too short, the piston rod (and load) may lurch at a speed greater than the control speed of the speed controller.

5. When restarting, control the switching signal for the unlocking solenoid valve so that it acts before or at the same time as the cylinder drive solenoid valve.

If the signal is delayed, the piston rod (and load) may lurch at a speed greater than the control speed of the speed controller.

6. Basic circuit

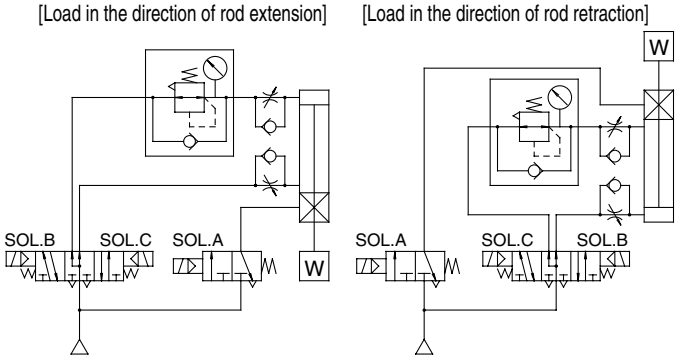
1) [Horizontal]



SOL.A	SOL.B	SOL.C	Action	
ON	ON	OFF	Forward	
OFF	OFF	OFF	Locked stop	0.5 s or more
ON	OFF	OFF	Unlocked	0 to 0.5 s
ON	ON	OFF	Forward	
ON	OFF	ON	Backward	
OFF	OFF	OFF	Locked stop	0.5 s or more
ON	OFF	OFF	Unlocked	0 to 0.5 s
ON	OFF	ON	Backward	

2) [Vertical]

[Load in the direction of rod extension] [Load in the direction of rod retraction]



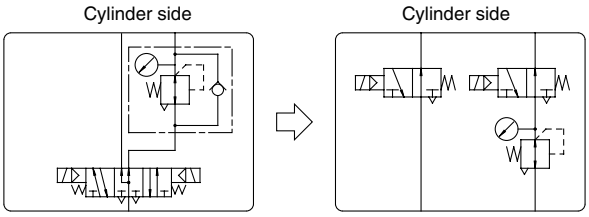
Series CNA
Specific Product Precautions 3

Be sure to read before handling. Refer to front matters 42 and 43 for Safety Instructions and pages 3 to 11 for Actuator and Auto Switch Precautions.

Pneumatic Circuit

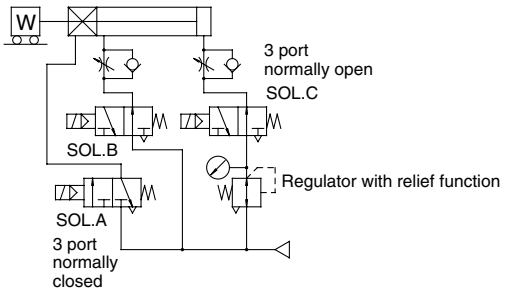
⚠Caution

1. 3 position pressure center solenoid valve and regulator with check valve can be replaced with two 3 port normally open valves and a regulator with relief function.



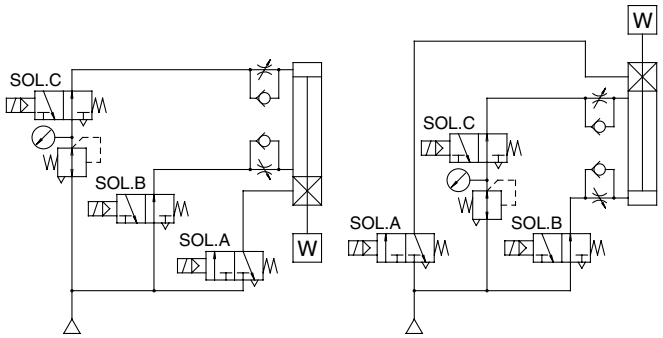
[Example]

1) [Horizontal]



2) [Vertical]

[Load in the direction of rod extension] [Load in the direction of rod retraction]



Manually Unlocking

⚠Warning

1. Never operate the unlocking cam until safety has been confirmed. (Do not turn to the FREE side.)
- When unlocking is performed with air pressure applied to only one side of the cylinder, the moving parts of the cylinder will lurch at high speed causing a serious hazard.
- When unlocking is performed, be sure to confirm that personnel are not within the load movement range and that no other problems will occur if the load moves.

2. Before operating the unlocking cam, exhaust any residual pressure which is in the system.

3. Take measures to prevent the load from dropping when unlocking is performed.
- Perform work with the load in its lowest position.
- Take measures for drop prevention by strut, etc.

⚠Caution

1. The unlocking cam is an emergency unlocking mechanism only. During an emergency when the air supply is stopped or cut off, this is used to alleviate a problem by forcibly pushing back the release piston and brake spring to release the lock.

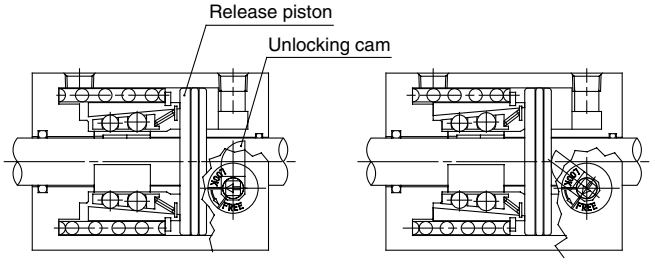
2. When installing the cylinder into equipment or performing adjustments, etc., be sure to apply air pressure of 0.25 MPa or more to the unlocking port, and do not perform work using the unlocking cam.

3. When releasing the lock with the unlocking cam, it must be noted that the internal resistance of the cylinder will be high, unlike normally unlocking with air pressure.

Bore size (mm)	Cylinder internal resistance (N)	Cam operating torque (standard) (N·m)	Width across flats (mm)
40	108	5.9	5
50	275	11.8	6
63	432	12.8	7
80	686	20.6	7
100	765	23.5	9

4. Be sure to operate the unlocking cam on the FREE side (clockwise direction), and do not turn with a torque greater than the maximum cam operating torque. There is a danger of damaging the unlocking cam if it is turned excessively.

5. For safety reasons, the unlocking cam is constructed so that it cannot be fixed in the unlocked condition.



Locked state **Manually unlocked state**

[Principle]

If the unlocking cam is turned counter clockwise with a tool such as an adjustable angle wrench, the release piston is pushed back and the lock is released. Since the lever will return to its original position when released and become locked again, it should be held in this position for as long as unlocking is needed.

Specific Product Precautions 4

Be sure to read before handling. Refer to front matters 42 and 43 for Safety Instructions and pages 3 to 11 for Actuator and Auto Switch Precautions.

Maintenance

⚠Caution

1. Replacement of lock unit for Series CNA is possible.

To order Series CNA lock units for maintenance, use the order numbers given in the table below.

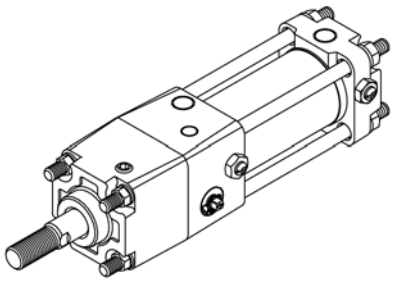
Bore size (mm)	Lock unit part no.
40	CNA 40D-UA
50	CNA 50D-UA
63	CNA 63D-UA
80	CNA 80D-UA
100	CNA100D-UA

∗ But, suffix "L" to the end of part number for 1001 stroke or more on CDNAF50 to 100. (Example: CNA100D-UAL)

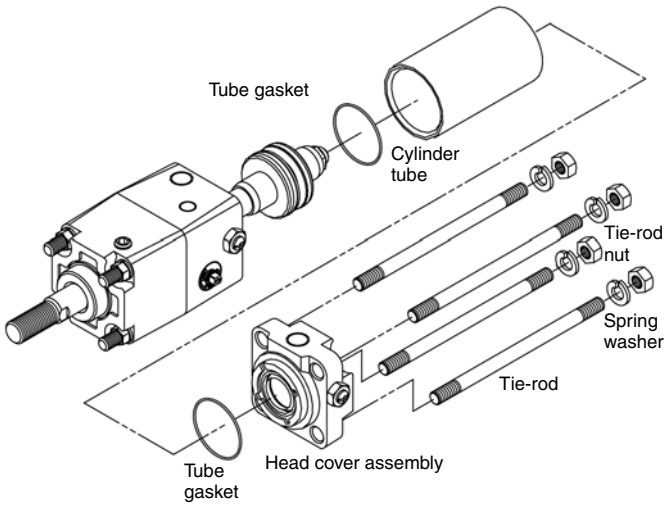
2. How to replace lock unit

1) Loosen the tie-rod nuts (4 pcs.) on the cylinder head cover side by using a socket wrench.
For the applicable socket, refer to the table below.

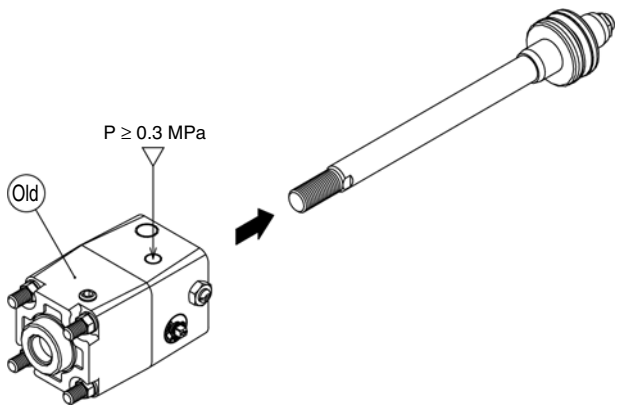
Bore size (mm)	Nut	Width across flats dimension	Socket
40, 50	JIS B 1181 Class 2 M8 x 1.25	13	JIS B 4636 + 2 point angle socket 13
63	JIS B 1181 Class 2 M10 x 1.25	17	JIS B 4636 + 2 point angle socket 17
80, 100	JIS B 1181 Class 2 M12 x 1.75	19	JIS B 4636 + 2 point angle socket 19



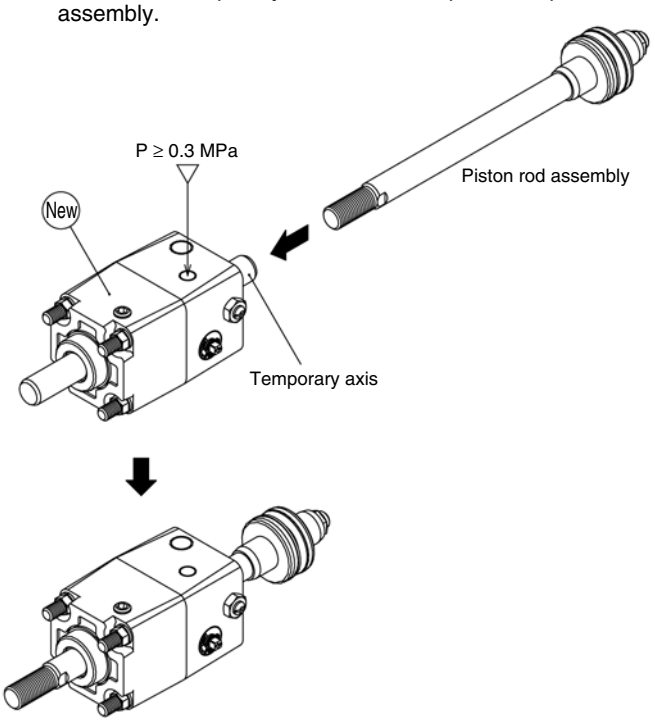
2) Remove the tie-rods, head cover and cylinder tube.



3) Apply 0.3 MPa or more of compressed air to the unlocking port, and pull out the piston rod assembly.



4) Similarly, apply 0.3 MPa or more of compressed air to the unlocking port of the new lock unit, and replace the new lock unit's temporary axis with the previous piston rod assembly.



5) Reassemble in reverse order from steps 2) and 1).