

# Cylinder with Lock

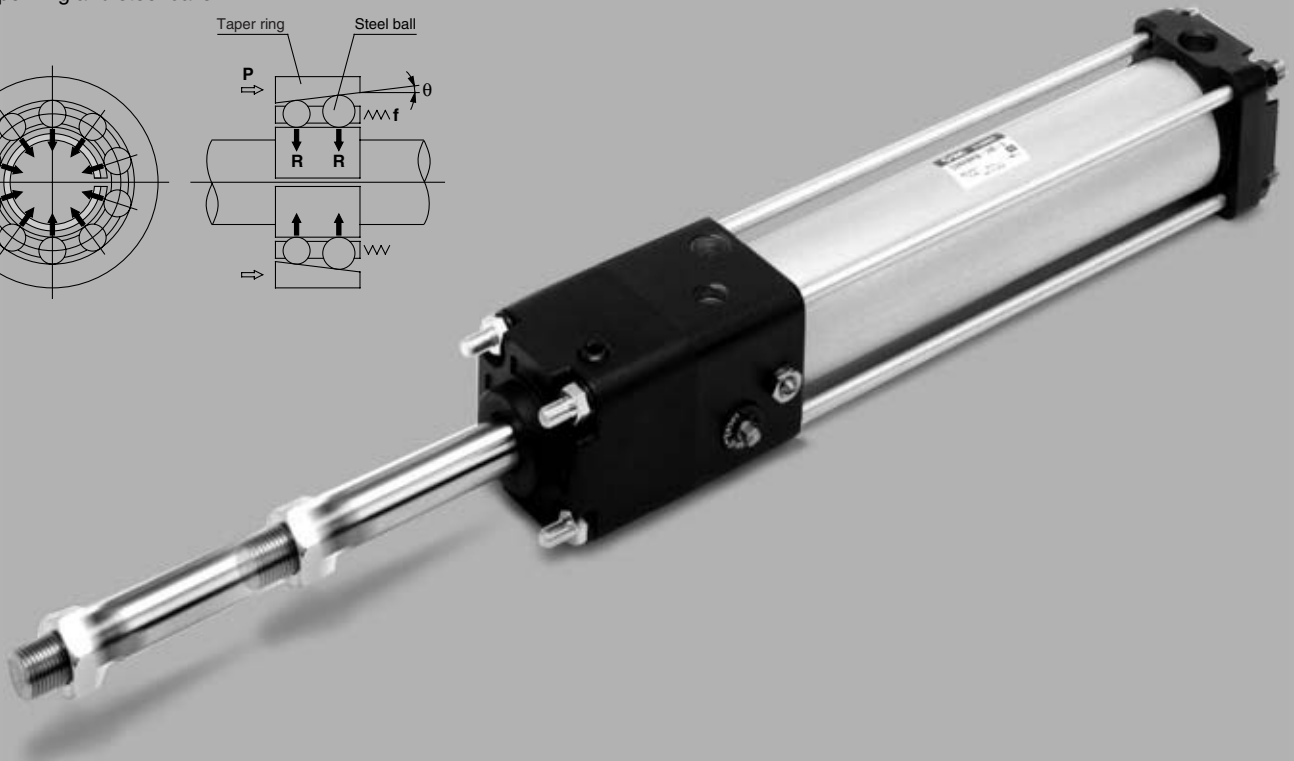
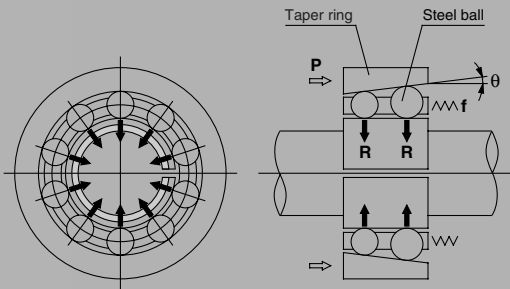
## Series CNA

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

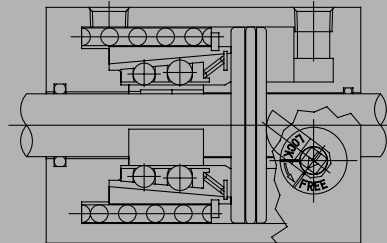
Outstanding durability and stable holding force are maintained by the use of a brake shoe having superior wear resistance, which has also been substantially lengthened (double the conventional SMC product).

### Series Variations

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

### 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.

CLJ2

CLM2

CLG1

CL1

MLGC

CNG

MNB

**CNA**

CNS

CLS

CLQ

RLQ

MLU

MLGP

ML1C

D-□

-X□

Individual

-X□

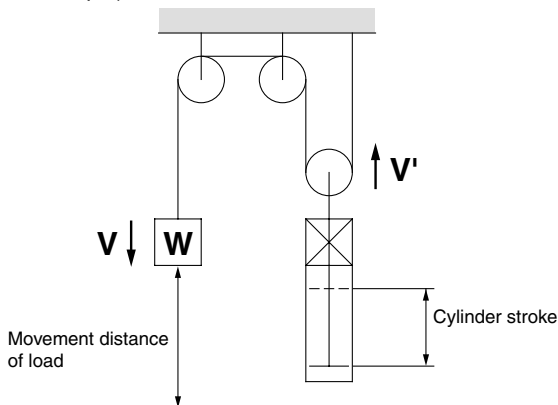
# Series CNA Model Selection

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

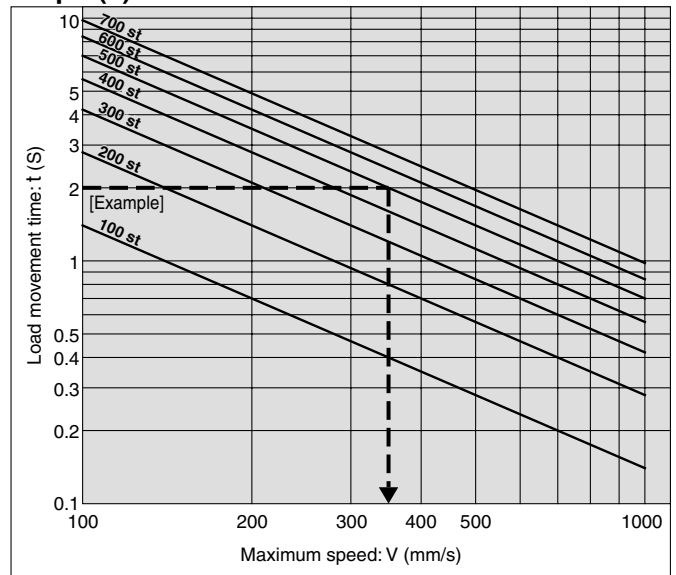
Step (1): From graph (1) find the maximum movement speed of the load.  
 $\therefore$  Maximum speed  $V \cong 350 \text{ mm/s}$

Step (2): Select graph (6) based upon the load conditions and operating pressure, and then from the intersection of the maximum speed  $V = 350 \text{ mm/s}$  found in Step (1), and the load mass  $m = 50 \text{ kg}$ .  
 $\therefore \phi 63 \rightarrow$  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)



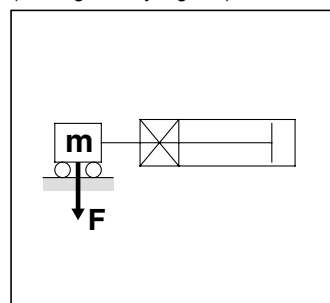
### Step (2) Find the bore size.

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

Load in the direction at the right angle to rod  
 (\* Being held by a guide)

#### Operating Pressure

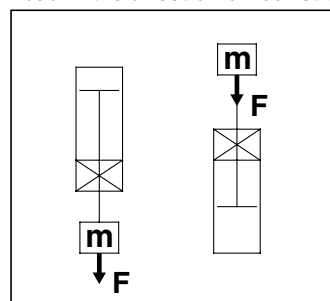


$0.3 \text{ MPa} \leq$  → Graph (2)

$0.4 \text{ MPa} \leq$  → Graph (3)

$0.5 \text{ MPa} \leq$  → Graph (4)

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



$0.3 \text{ MPa} \leq$  → Graph (5)

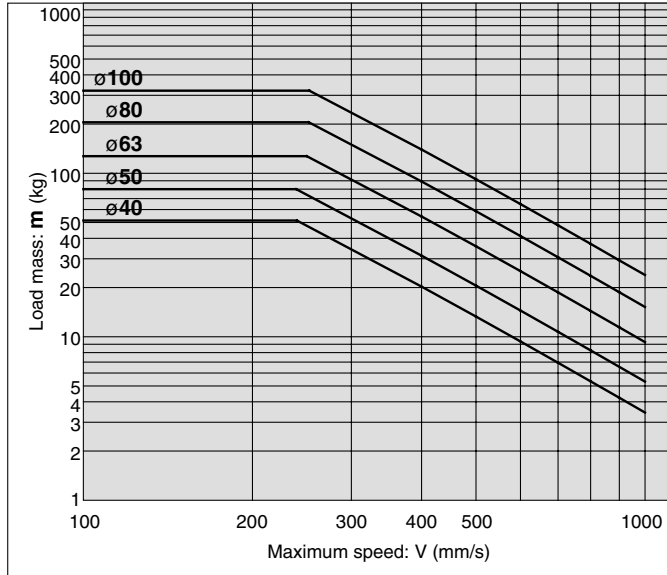
$0.4 \text{ MPa} \leq$  → Graph (6)

$0.5 \text{ MPa} \leq$  → Graph (7)

## Selection Graph

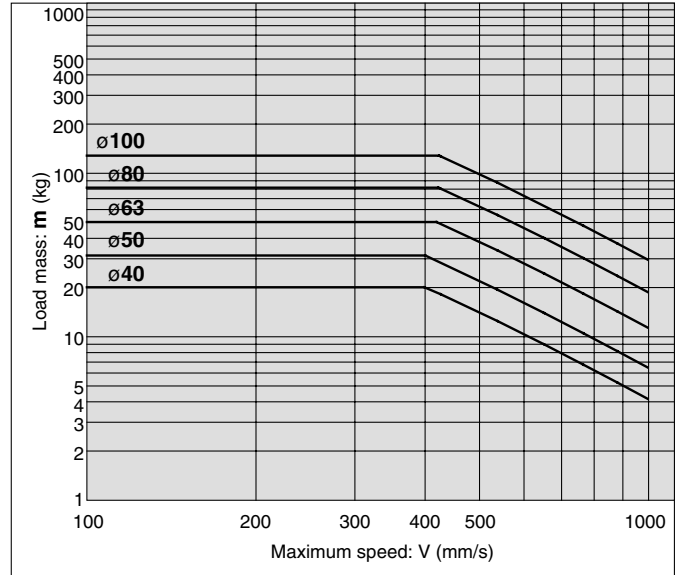
**Graph (2)**

0.3 MPa ≤ P < 0.4 MPa



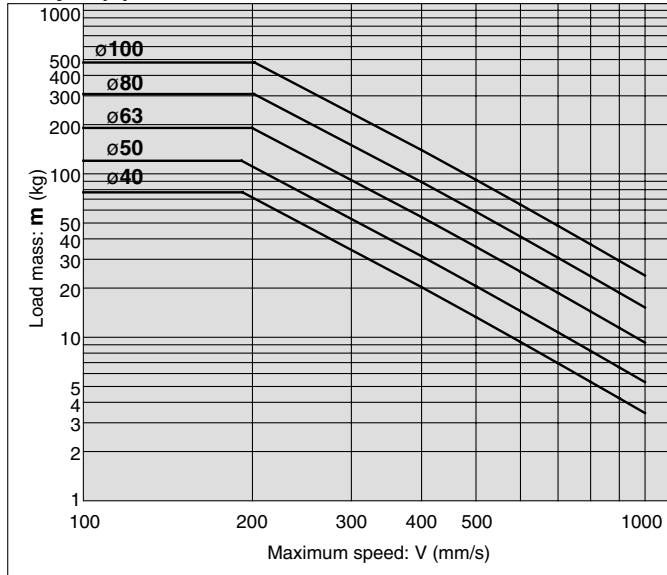
**Graph (5)**

0.3 MPa ≤ P < 0.4 MPa



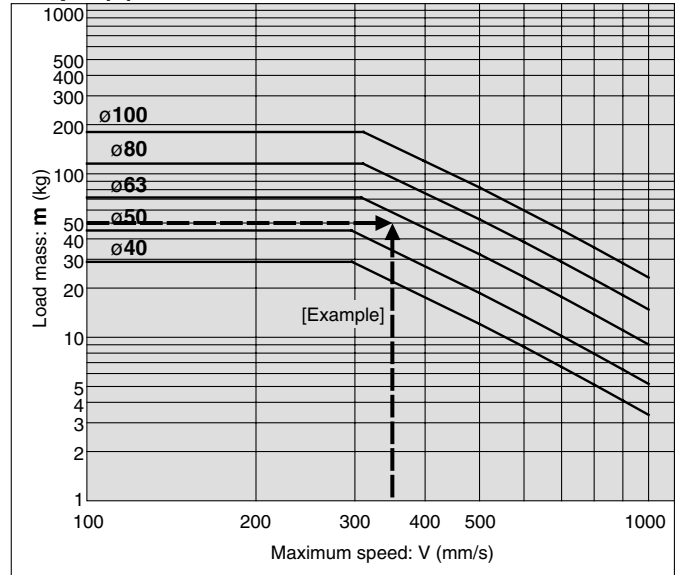
**Graph (3)**

0.4 MPa ≤ P < 0.5 MPa



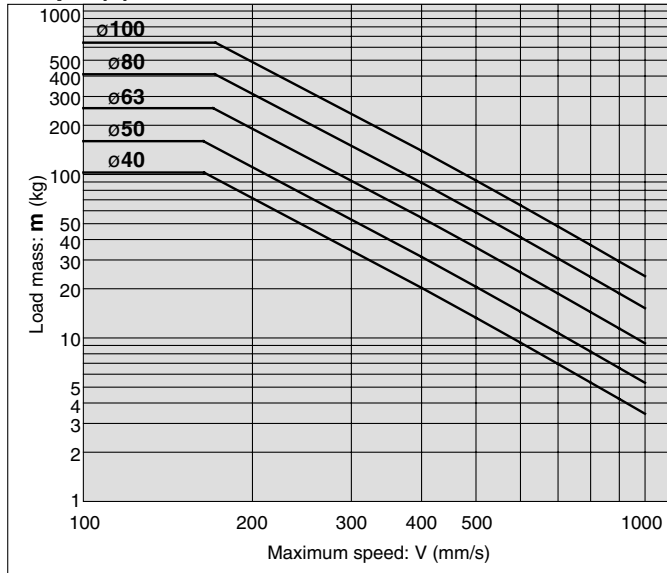
**Graph (6)**

0.4 MPa ≤ P < 0.5 MPa



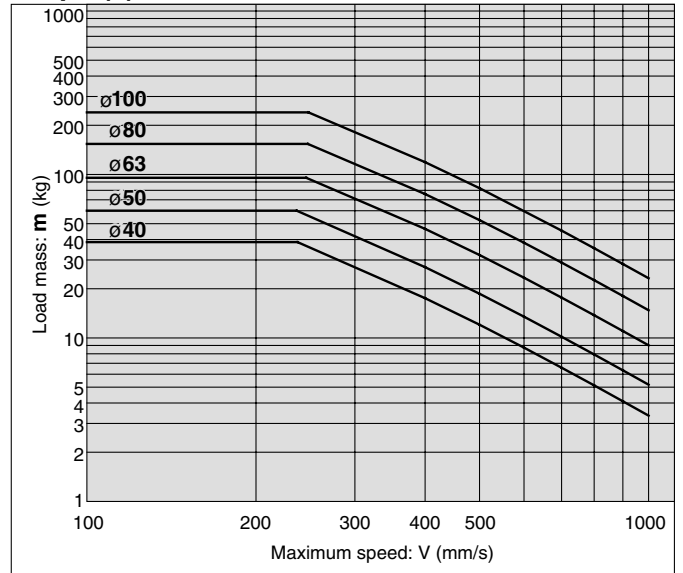
**Graph (4)**

0.5 MPa ≤ P



**Graph (7)**

0.5 MPa ≤ P



CLJ2

CLM2

CLG1

CL1

MLGC

CNG

MNB

**CNA**

CNS

CLS

CLQ

RLQ

MLU

MLGP

ML1C

D-□

-X□

Individual  
-X□

# 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**  
**Type**

<b>B</b>	Basic style	<b>N</b>	Non-lube
<b>L</b>	Axial foot style	<b>F*</b>	Steel tube
<b>F</b>	Rod side flange style	* Auto switches are not available with steel tube.	
<b>G</b>	Head side flange style		
<b>C</b>	Single clevis style		
<b>D</b>	Double clevis style		
<b>T</b>	Center trunnion style		

**Bore size**

<b>40</b>	40 mm
<b>50</b>	50 mm
<b>63</b>	63 mm
<b>80</b>	80 mm
<b>100</b>	100 mm

**Thread type**

<b>Nil</b>	Rc
<b>TN</b>	NPT
<b>TF</b>	G

**Locking direction**  
**D** Both directions

**Auto switch**  
**Nil** Without auto switch  
 \* For the applicable auto switch model, refer to the table below.

**Made to Order**  
 Refer to page 727 for details.

**Number of auto switches**

<b>Nil</b>	2 pcs.
<b>S</b>	1 pc.
<b>n</b>	"n" pcs.

**With rod boot/cushion**

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

**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

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

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

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

\* 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

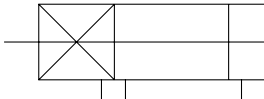
\* Solid state auto switches marked with "O" are produced upon receipt of order.  
 \*\* D-A9□ and D-A9□V cannot be mounted on ø50. Select auto switches in brackets.

\* 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.)

# Cylinder with Lock Double Acting, Single Rod **Series CNA**



**JIS Symbol**  
Double acting,  
Single rod



## 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.

## Specifications

Bore size (mm)	40	50	63	80	100
<b>Lubrication</b>	Not required (Non-lube)				
<b>Action</b>	Double acting				
<b>Proof pressure</b>	1.5 MPa				
<b>Max. operating pressure</b>	1.0 MPa				
<b>Min. operating pressure</b>	0.08 MPa				
<b>Piston speed</b>	50 to 1000 mm/s *				
<b>Ambient and fluid temperature</b>	Without auto switch: -10 to 70°C (No freezing) With auto switch: -10 to 60°C (No freezing)				
<b>Cushion</b>	Air cushion				
<b>Stroke length tolerance</b>	Up to 250: $^{+1.0}_0$ , 251 to 1000: $^{+1.4}_0$ , 1001 to 1500: $^{+1.8}_0$				
<b>Mounting</b>	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
<b>Locking action</b>	Spring locking (Exhaust locking)				
<b>Unlocking pressure</b>	0.25 MPa or more				
<b>Lock starting pressure</b>	0.20 MPa or less				
<b>Max. operating pressure</b>	1.0 MPa				
<b>Locking direction</b>	Both directions				
<b>Holding force N</b>	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) <sup>(1)</sup>	Long stroke (mm) <sup>(2)</sup>
<b>40</b>	25, 50, 75, 100, 125, 150, 175, 200, 250, 300, 350, 400, 450, 500	800
<b>50, 63</b>	25, 50, 75, 100, 125, 150, 175, 200, 250, 300, 350, 400, 450, 500, 600	1200
<b>80, 100</b>	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

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

CLJ2

CLM2

CLG1

CL1

MLGC

CNG

MNB

CNA

CNS

CLS

CLQ

RLQ

MLU

MLGP

ML1C

D-□

-X□

Individual  
-X□

# Series CNA

## 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
<b>J</b>	Nylon tarpaulin	70°C
<b>K</b>	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.

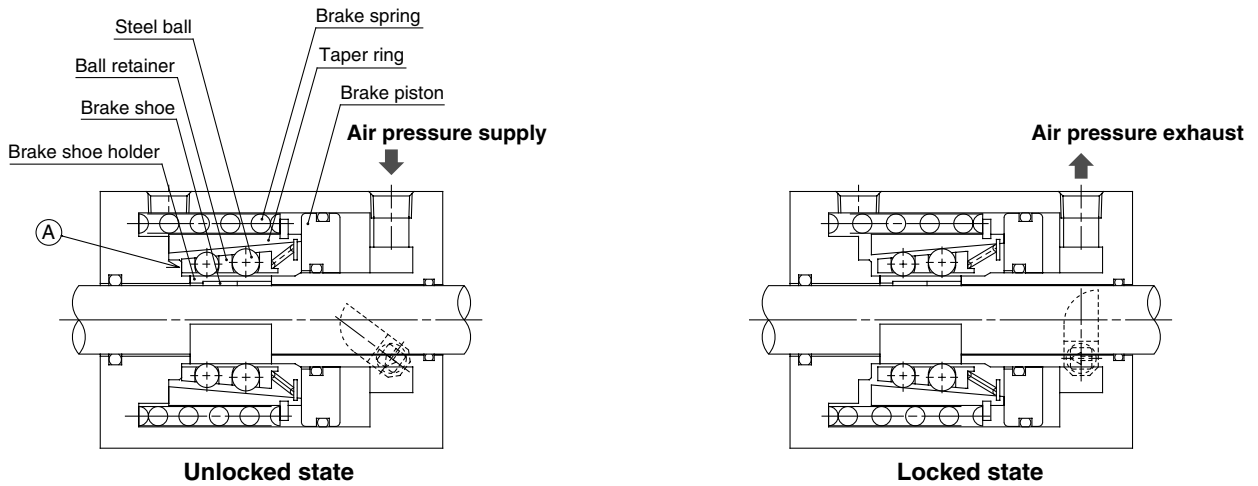
Bore size (mm)		40	50	63	80	100	
Basic mass	Basic style	1.70 (1.75)	2.70 (2.76)	4.08 (4.12)	7.30 (7.46)	10.80 (11.01)	
	Foot style	1.89 (1.94)	2.74 (2.78)	4.42 (4.46)	7.97 (8.13)	11.79 (12.00)	
	Flange style	2.07 (2.12)	2.97 (3.01)	4.87 (4.91)	8.75 (8.91)	12.72 (12.93)	
	Single clevis style	1.93 (1.98)	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

$$1.89 + 0.22 \times 100/50 = 2.33 \text{ kg}$$

## 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 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.

CLJ2

CLM2

CLG1

CL1

MLGC

CNG

MNB

**CNA**

CNS

CLS

CLQ

RLQ

MLU

MLGP

ML1C

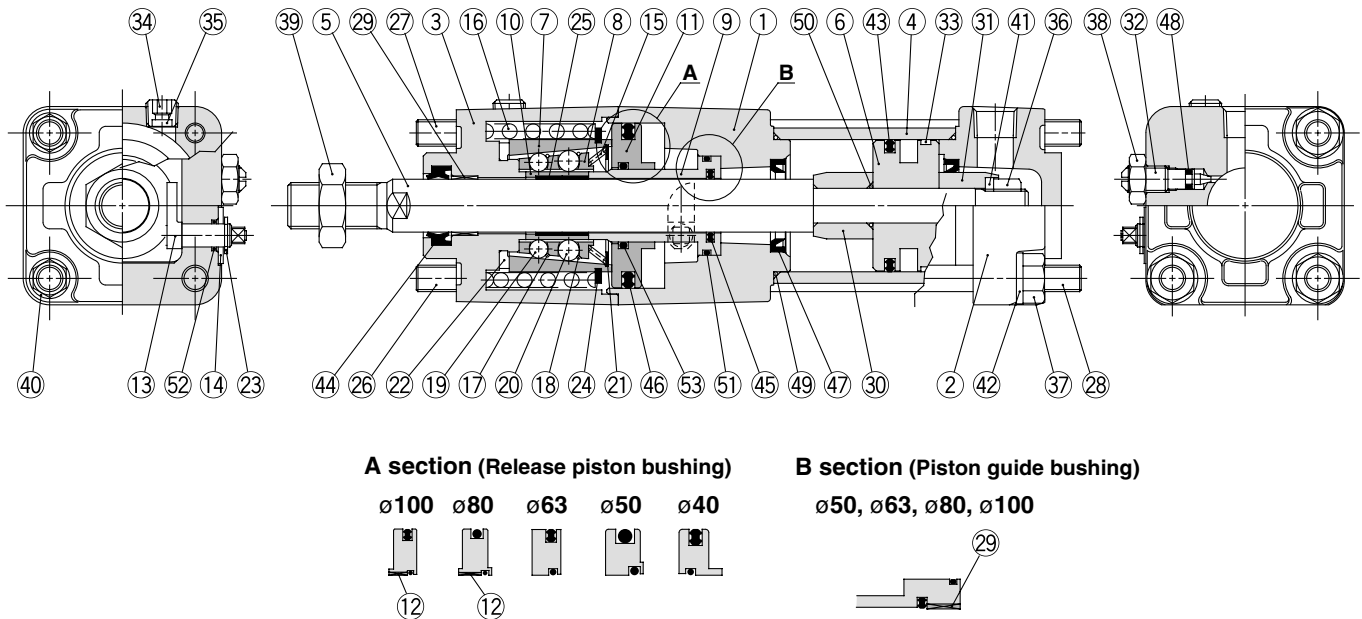
D-□

-X□

Individual  
-X□

# Series CNA

## Construction



### 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	

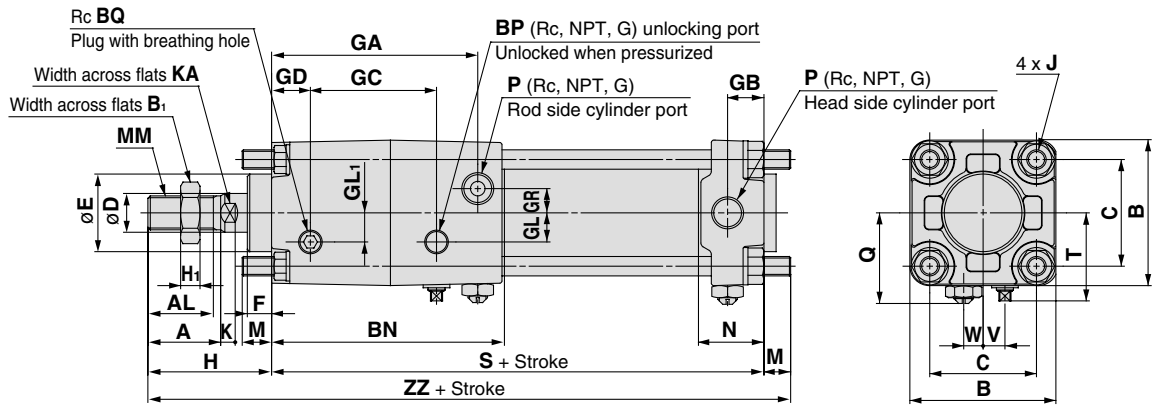
\* Since the lock section for Series CNA is normally replaced as a unit, kits are for the cylinder section only. These can be ordered using the order number for each bore size.

\* 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)

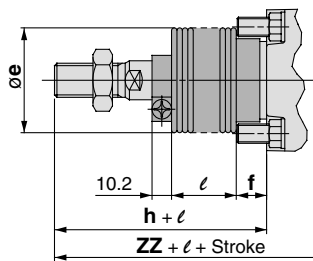


## Dimensions

### Basic style (B): CNABN



**With rod boot**



Bore size (mm)	Stroke range (mm)	A	AL	B	B <sub>1</sub>	BN	BP	BQ	C	D	E	F	GA	GB	GC	GD	GL	GL <sub>1</sub>	GR	H <sub>1</sub>	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

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

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

CLJ2

CLM2

CLG1

CL1

MLGC

CNG

MNB

**CNA**

CNS

CLS

CLQ

RLQ

MLU

MLGP

ML1C

D-□

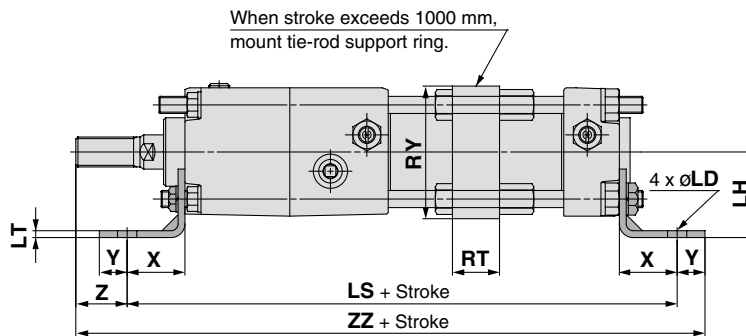
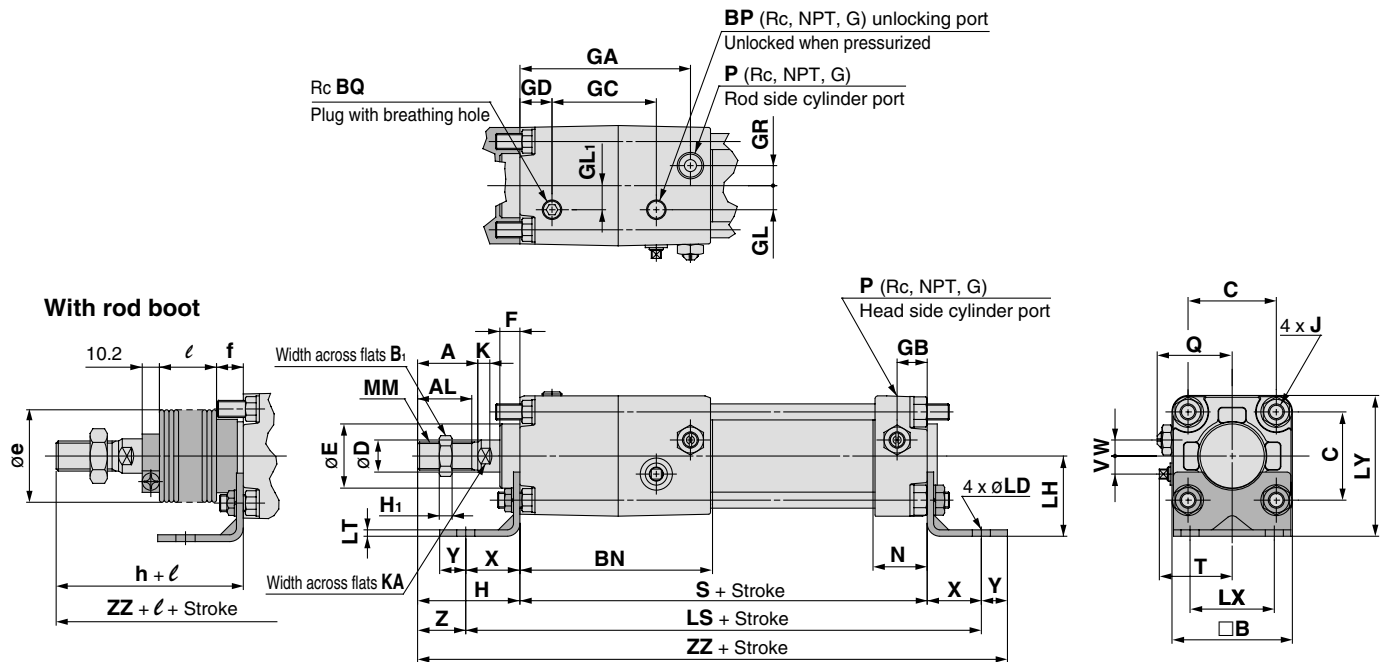
-X□

Individual  
-X□

# Series CNA

## Dimensions

### Axial foot style (L): CNALN



### Long Stroke

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

Bore size (mm)	Stroke range (mm)	A	AL	B	B <sub>1</sub>	BN	BP	BQ	C	D	E	F	GA	GB	GC	GD	GL	GL <sub>1</sub>	GR	H <sub>1</sub>	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

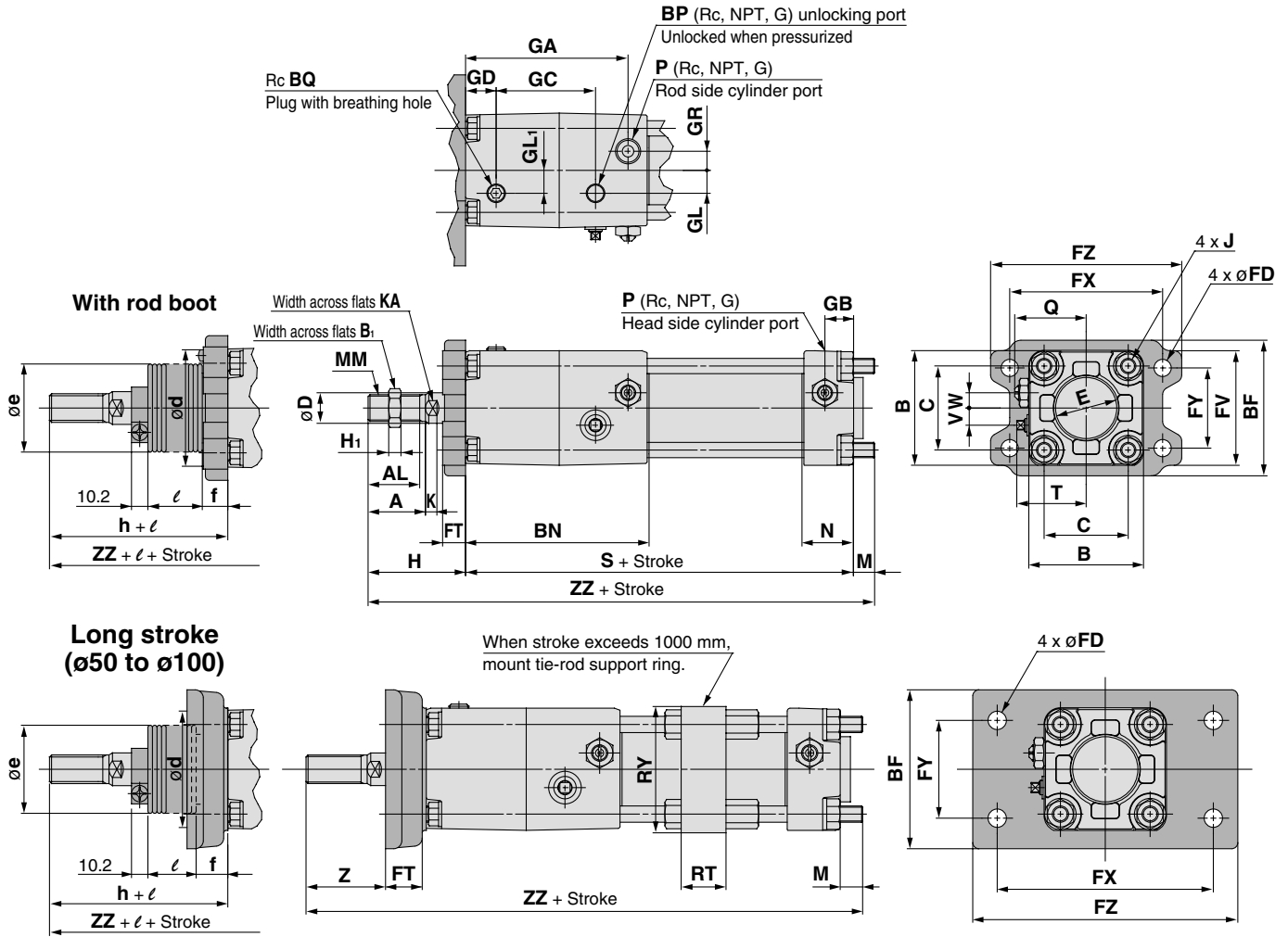
Bore size (mm)	LD	LH	LS	LT	LX	LY	MM	N	P	Q	H	S	T	V	W	X	Y	Z	ZZ
40	9	40	207	3.2	42	70	M14 x 1.5	27	1/4	37 to 39.5	51	153	37.5	9	8	27	13	24	244
50	9	45	222	3.2	50	80	M18 x 1.5	30	3/8	42 to 44.5	58	168	44	11	0	27	13	31	266
63	11.5	50	250	3.2	59	93	M18 x 1.5	31	3/8	50 to 51.5	58	182	52.5	12	0	34	16	24	290
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

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**



- CLJ2
- CLM2
- CLG1
- CL1
- MLGC
- CNG
- MNB
- CNA**
- CNS
- CLS
- CLQ
- RLQ
- MLU
- MLGP
- ML1C

Bore size (mm)	Stroke range (mm)	A	AL	B	B <sub>1</sub>	BF	BN	BP	BQ	C	D	E	FD	FT	FV	FX	FY	FZ	GA	GB	GC	GD	GL	GL <sub>1</sub>	GR	H <sub>i</sub>	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

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

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

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

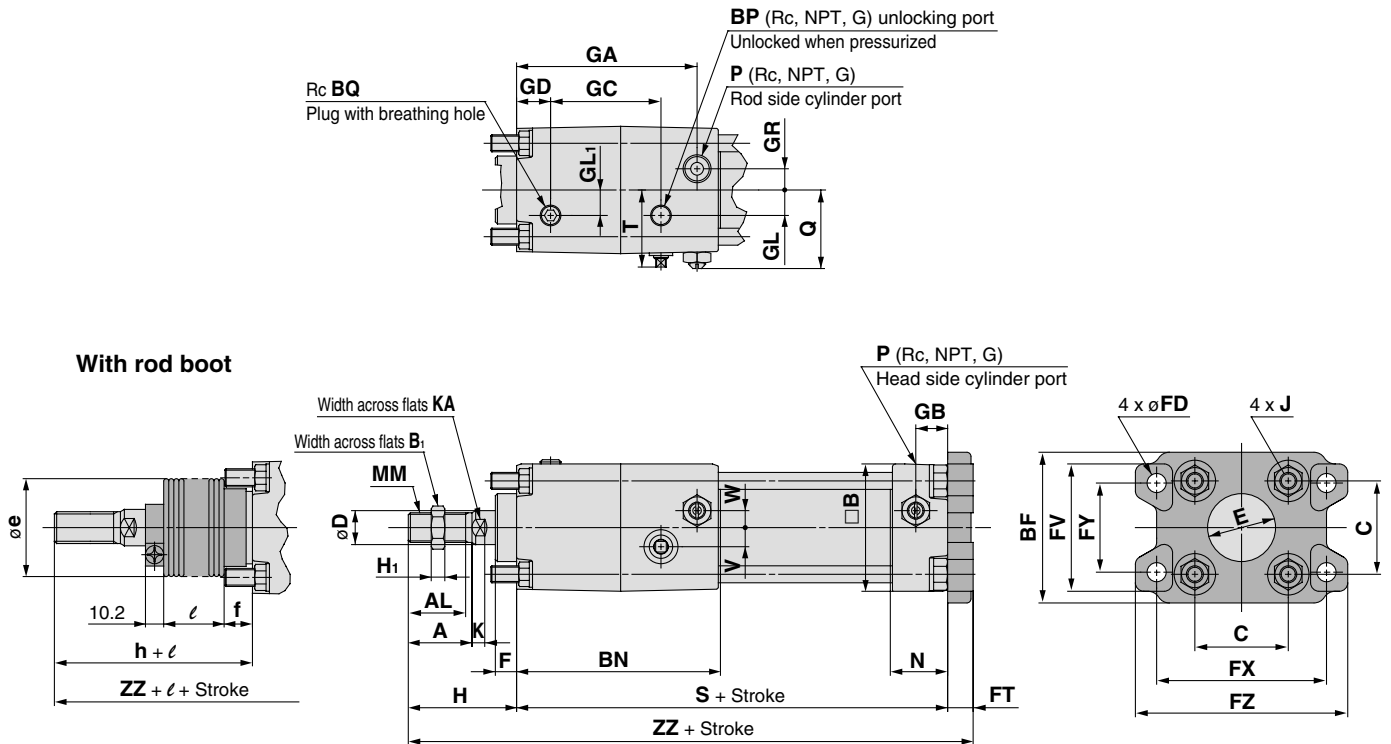
Bore size (mm)	Stroke range (mm)	d	e	f	h	l	ZZ
50	1001 to 1200	58	52	19	66	1/4 stroke	240
63	1001 to 1200	58	52	19	66	1/4 stroke	258
80	1001 to 1400	80	65	21	80	1/4 stroke	310
100	1001 to 1500	80	65	21	81	1/4 stroke	339

- D-□
- X□
- Individual
- X□

# Series CNA

## Dimensions

### Head side flange style (G): CNAGN



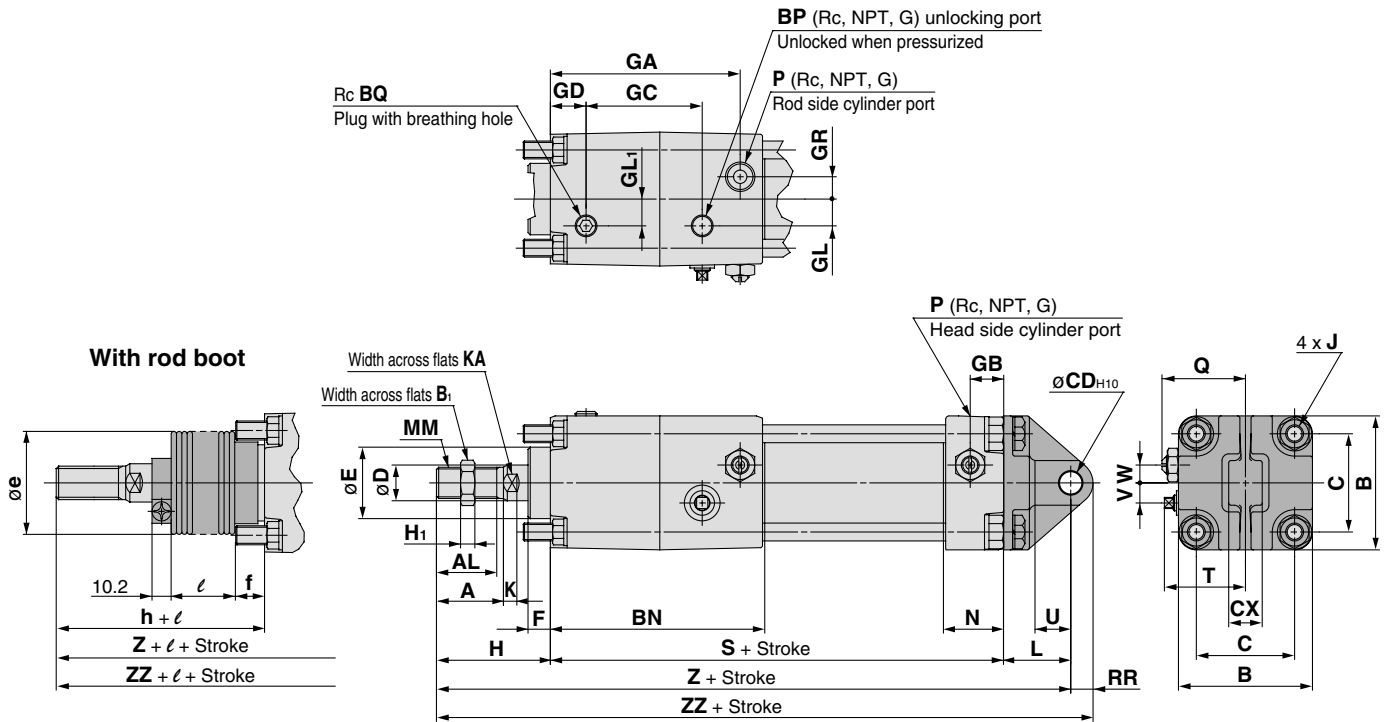
Bore size (mm)	Stroke range (mm)	A	AL	B	B <sub>1</sub>	BF	BN	BP	BQ	C	D	E	F	FD	FT	FV	FX	FY	FZ	GA	GB	GC	GD	GL	GL <sub>1</sub>	GR	H <sub>1</sub>
40	Up to 500	30	27	60	22	71	96	1/8	1/8	44	16	32	10	9	12	60	80	42	100	85	15	52	16	12	12	10	8
50	Up to 600	35	32	70	27	81	108	1/4	1/8	52	20	40	10	9	12	70	90	50	110	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

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

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**



- CLJ2
- CLM2
- CLG1
- CL1
- MLGC
- CNG
- MNB
- CNA**
- CNS
- CLS
- CLQ
- RLQ
- MLU
- MLGP
- ML1C

Bore size (mm)	Stroke range (mm)	A	AL	B	B <sub>1</sub>	BN	BP	BQ	C	CD	CX	D	E	F	GA	GB	GC	GD	GL	GL <sub>1</sub>	GR	H <sub>1</sub>
40	Up to 500	30	27	60	22	96	1/8	1/8	44	10	15 <sup>-0.1</sup> <sub>-0.3</sub>	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 <sup>-0.1</sup> <sub>-0.3</sub>	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 <sup>-0.1</sup> <sub>-0.3</sub>	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 <sup>-0.1</sup> <sub>-0.3</sub>	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 <sup>-0.1</sup> <sub>-0.3</sub>	30	52	14	144	21	98	22	25	20	19	16

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

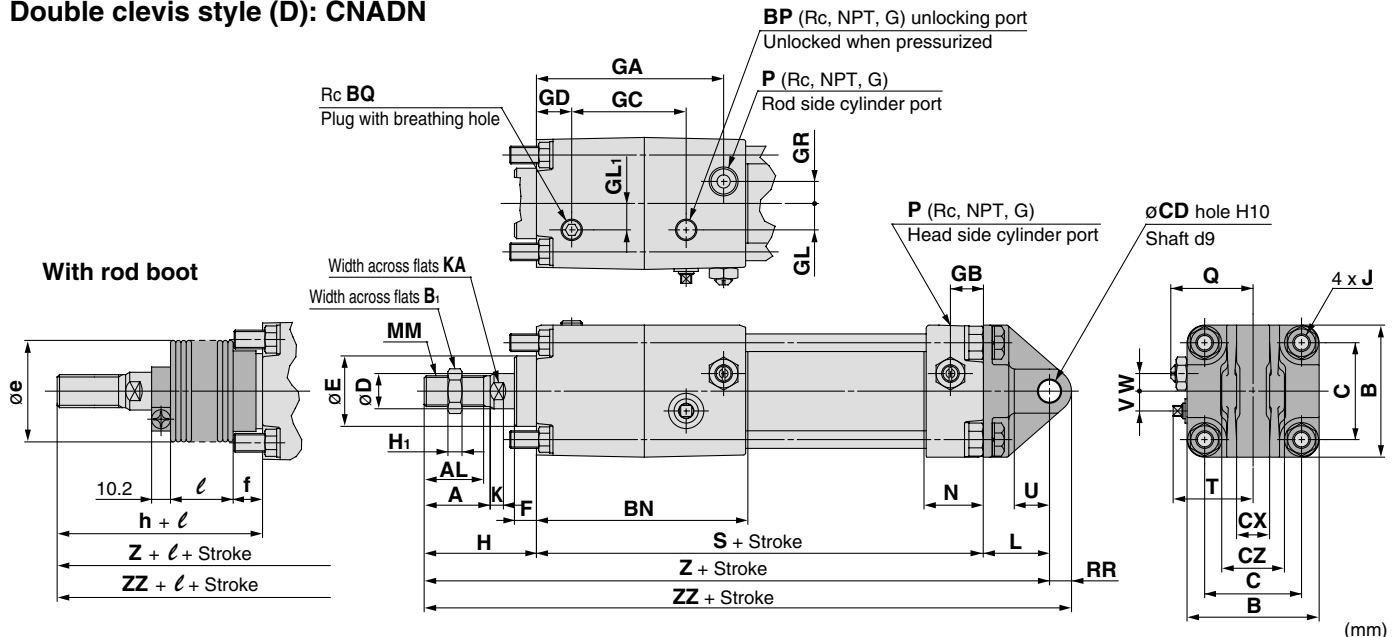
Bore size (mm)	Stroke range (mm)	e	f	h	l	Z	ZZ
40	20 to 500	43	11.2	59	1/4 stroke	242	252
50	20 to 600	52	11.2	66	1/4 stroke	269	281
63	20 to 600	52	11.2	66	1/4 stroke	288	304
80	20 to 750	65	12.5	80	1/4 stroke	346	366
100	20 to 750	65	14	81	1/4 stroke	385	410

- D-□
- X□
- Individual -X□

# Series CNA

## Dimensions

### Double clevis style (D): CNADN



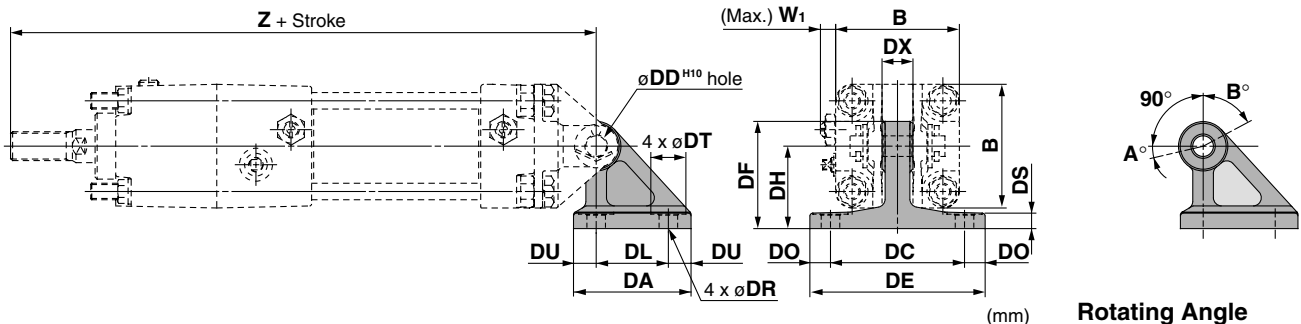
Bore size (mm)	Stroke range (mm)	A	AL	B	B <sub>1</sub>	BN	BP	BQ	C	CD	CX	CZ	D	E	F	GA	GB	GC	GD	GL	GL <sub>1</sub>	GR	H <sub>1</sub>	J	K	KA
40	Up to 500	30	27	60	22	96	1/8	1/8	44	10	15 <sup>+0.3</sup> <sub>+0.1</sub>	29.5	16	32	10	85	15	52	16	12	12	10	8	M8 x 1.25	6	14
50	Up to 600	35	32	70	27	108	1/4	1/8	52	12	18 <sup>+0.3</sup> <sub>+0.1</sub>	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 <sup>+0.3</sup> <sub>+0.1</sub>	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 <sup>+0.3</sup> <sub>+0.1</sub>	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 <sup>+0.3</sup> <sub>+0.1</sub>	64	30	52	14	144	21	98	22	25	20	19	16	M12 x 1.75	11	26

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

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



Part no.	Bore size (mm)	DA	DL	DU	DC	DX	DE	DO	DR	DT	DS	DH	DF	B	W <sub>1</sub>	Z	DD
CA1-B04	40	57	35	11	65	15	85	10	9	17	8	40	52	60	10	234	10 <sup>+0.058</sup> <sub>0</sub>
CA1-B05	50	57	35	11	65	18	85	10	9	17	8	40	52	70	10	261	12 <sup>+0.070</sup> <sub>0</sub>
CA1-B06	63	67	40	13.5	80	25	105	12.5	11	22	10	50	66	85	10	280	16 <sup>+0.070</sup> <sub>0</sub>
CA1-B08	80	93	60	16.5	100	31.5	130	15	13.5	24	12	65	90	102	12	337	20 <sup>+0.084</sup> <sub>0</sub>
CA1-B10	100	93	60	16.5	100	35.5	130	15	13.5	24	12	65	90	116	12	376	25 <sup>+0.084</sup> <sub>0</sub>

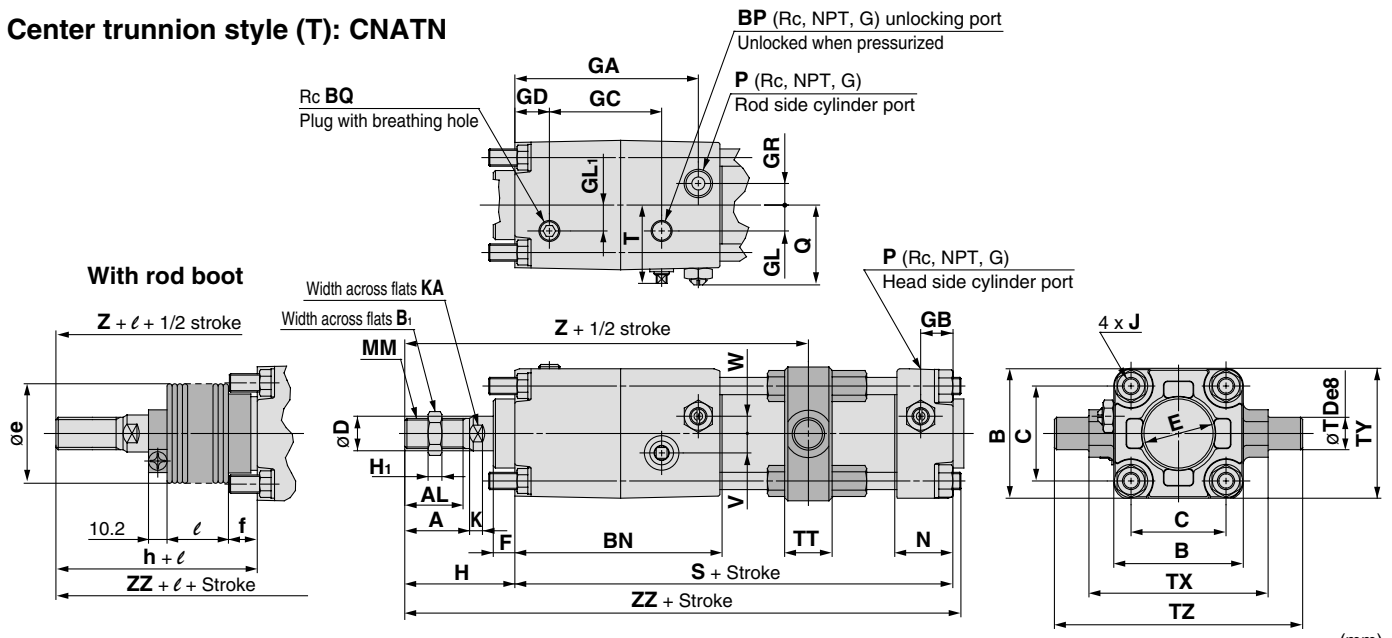
### Rotating Angle

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



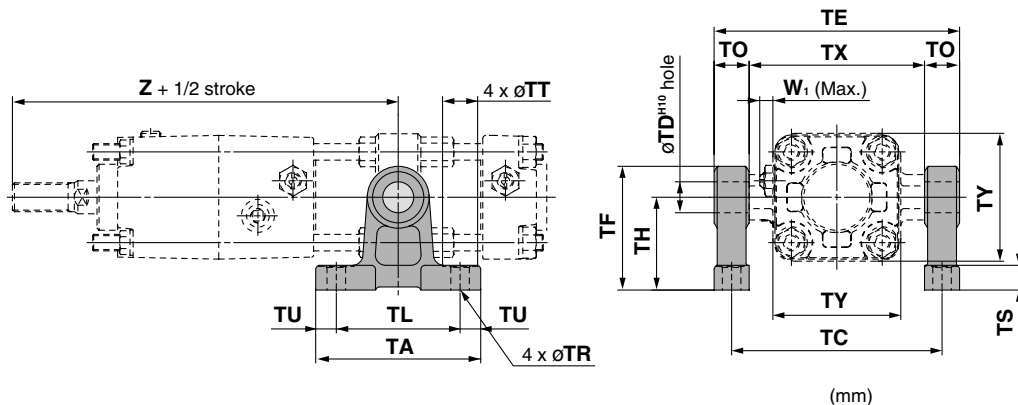
Bore size (mm)	Stroke range (mm)	A	AL	B	B <sub>1</sub>	BN	BP	BQ	C	D	E	F	GA	GB	GC	GD	GL	GL <sub>1</sub>	GR	H <sub>1</sub>	J	K	KA	MM	N
40	25 to 500	30	27	60	22	96	1/8	1/8	44	16	32	10	85	15	52	16	12	12	10	8	M8 x 1.25	6	14	M14 x 1.5	27
50	25 to 600	35	32	70	27	108	1/4	1/8	52	20	40	10	95	17	56.5	20	13	15	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

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 <sup>-0.032</sup> <sub>-0.059</sub>	22	85	62	117	9	8	51	162	209
50	3/8	42 to 44.5	168	44	15 <sup>-0.032</sup> <sub>-0.059</sub>	22	95	74	127	11	0	58	181	232
63	3/8	50 to 51.5	182	52.5	18 <sup>-0.032</sup> <sub>-0.059</sub>	28	110	90	148	12	0	58	191	246
80	1/2	59.5 to 62.5	218	59.5	25 <sup>-0.040</sup> <sub>-0.073</sub>	34	140	110	192	15	0	71	231	296
100	1/2	66.5 to 69.5	246	69.5	25 <sup>-0.040</sup> <sub>-0.073</sub>	40	162	130	214	15	0	72	255	326

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



Part no.	Bore size (mm)	TA	TL	TU	TC	TX	TE	TO	TR	TT	TS	TH	TF	TY	W <sub>1</sub>	Z	TD
CA1-S04	40	80	60	10	102	85	119	17	9	17	12	45	60	62	10	162	15 <sup>+0.070</sup> <sub>0</sub>
	50	80	60	10	112	95	129	17	9	17	12	45	60	74	10	181	15 <sup>+0.070</sup> <sub>0</sub>
CA1-S06	63	100	70	15	130	110	150	20	11	22	14	55	73	90	10	191	18 <sup>+0.070</sup> <sub>0</sub>
	80	120	90	15	166	140	192	26	13.5	24	17	75	100	110	12	231	25 <sup>+0.084</sup> <sub>0</sub>
CA1-S08	100	120	90	15	188	162	214	26	13.5	24	17	75	100	130	12	255	25 <sup>+0.084</sup> <sub>0</sub>

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.

CLJ2

CLM2

CLG1

CL1

MLGC

CNG

MNB

CNA

CNS

CLS

CLQ

RLQ

MLU

MLGP

ML1C

D-□

-X□

Individual

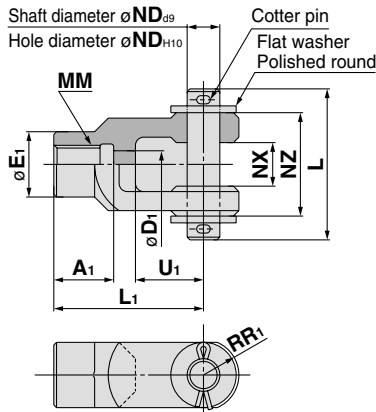
-X□

# Series CNA

# Accessory Bracket Dimensions

## Y Type Double Knuckle Joint

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



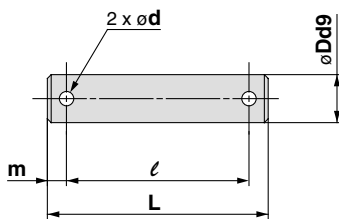
Material: Cast iron

(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 <sup>+0.3</sup> / <sub>+0.1</sub>	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 <sup>+0.3</sup> / <sub>+0.1</sub>	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 <sup>+0.3</sup> / <sub>+0.1</sub>	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 <sup>+0.3</sup> / <sub>+0.1</sub>	61	83	ø4 x 30 ℓ	Polished round 20

\* Knuckle pin, cotter pins and flat washers are packaged with knuckles.

## Clevis Pin/Knuckle Pin



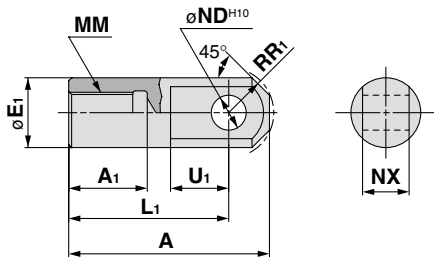
Material: Carbon steel

(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 <sup>-0.040</sup> / <sub>-0.076</sub>	46	38	4	3	ø3 x 18 ℓ	Polished round 10
CDP-3A	50	40, 50, 63	12 <sup>-0.050</sup> / <sub>-0.093</sub>	55.5	47.5	4	3	ø3 x 18 ℓ	Polished round 12
CDP-4A	63	—	16 <sup>-0.050</sup> / <sub>-0.093</sub>	71	61	5	4	ø4 x 25 ℓ	Polished round 16
CDP-5A	—	80	18 <sup>-0.050</sup> / <sub>-0.093</sub>	76.5	66.5	5	4	ø4 x 25 ℓ	Polished round 18
CDP-6A	80	100	20 <sup>-0.065</sup> / <sub>-0.117</sub>	83	73	5	4	ø4 x 30 ℓ	Polished round 20
CDP-7A	100	—	25 <sup>-0.065</sup> / <sub>-0.117</sub>	88	78	5	4	ø4 x 36 ℓ	Polished round 24

\* Cotter pin and flat washer are attached.

## I Type Single Knuckle Joint

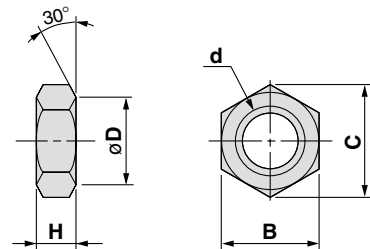


Material: Sulfur free-cutting steel

(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 <sup>+0.070</sup> / <sub>0</sub>	16 <sup>-0.1</sup> / <sub>-0.3</sub>
I-05	50, 63	74	27	28	60	M18 x 1.5	15.5	20	12 <sup>+0.070</sup> / <sub>0</sub>	16 <sup>-0.1</sup> / <sub>-0.3</sub>
I-08	80	91	37	36	71	M22 x 1.5	22.5	26	18 <sup>+0.070</sup> / <sub>0</sub>	28 <sup>-0.1</sup> / <sub>-0.3</sub>
I-10	100	105	37	40	83	M26 x 1.5	24.5	28	20 <sup>+0.084</sup> / <sub>0</sub>	30 <sup>-0.1</sup> / <sub>-0.3</sub>

## 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



CLJ2

CLM2

CLG1

CL1

MLGC

CNG

MNB

**CNA**

CNS

CLS

CLQ

RLQ

MLU

MLGP

ML1C

D-□

-X□

Individual  
-X□

# 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)**

**Mounting style**

<b>B</b>	Basic style
<b>L</b>	Axial foot style
<b>F</b>	Rod side flange style
<b>T</b>	Center trunnion style

**Type**

<b>N</b>	Non-lube
<b>F*</b>	Steel tube

\* Auto switches are not available with steel tube.

**Bore size**

<b>40</b>	40 mm
<b>50</b>	50 mm
<b>63</b>	63 mm
<b>80</b>	80 mm
<b>100</b>	100 mm

**Port thread type**

<b>Nil</b>	Rc
<b>TN</b>	NPT
<b>TF</b>	G

**Locking direction**

**D** Both directions

**With rod boot/cushion\*\***

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

**Made to Order**  
Refer to page 741 for details.

**Number of auto switches**

<b>Nil</b>	2 pcs.
<b>S</b>	1 pc.
<b>n</b>	"n" pcs.

**Auto switch**

<b>Nil</b>	Without auto switch
------------	---------------------

**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) CDNAWL N40-100-D

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

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

\* 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

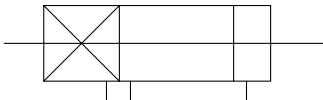
\* Solid state auto switches marked with "O" are produced upon receipt of order.  
\*\* D-A9□ and D-A9□V cannot be mounted on ø50. Select auto switches in brackets.

\* 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.)

# Cylinder with Lock Double Acting, Double Rod *Series CNAW*



**JIS Symbol**  
Double acting,  
Double rod



### 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.

## Specifications

Bore size (mm)	40	50	63	80	100
<b>Fluid</b>	Air				
<b>Type</b>	Non-lube				
<b>Action</b>	Double acting				
<b>Lock operation</b>	Spring locking				
<b>Proof pressure</b>	1.5 MPa				
<b>Max. operating pressure</b>	1.0 MPa				
<b>Min. operating pressure</b>	0.1 MPa				
<b>Piston speed</b>	50 to 1000 mm/s *				
<b>Ambient and fluid temperature</b>	Without auto switch: -10 to 70°C (No freezing) With auto switch: -10 to 60°C (No freezing)				
<b>Cushion</b>	Air cushion				
<b>Stroke length tolerance</b>	Up to 250: $^{+1.0}_0$ , 251 to 1000: $^{+1.4}_0$ , 1001 to 1500: $^{+1.8}_0$				
<b>Mounting</b>	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.

## Lock Specifications

Bore size (mm)	40	50	63	80	100
<b>Locking action</b>	Spring locking (Exhaust locking)				
<b>Unlocking pressure</b>	0.25 MPa or more				
<b>Lock starting pressure</b>	0.20 MPa or less				
<b>Max. operating pressure</b>	1.0 MPa				
<b>Locking direction</b>	Both directions				
<b>Holding force N</b>	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)
<b>40</b>	25, 50, 75, 100, 125, 150, 175, 200, 250, 300, 350, 400, 450, 500
<b>50, 63</b>	25, 50, 75, 100, 125, 150, 175, 200, 250, 300, 350, 400, 450, 500, 600
<b>80, 100</b>	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

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

CLJ2

CLM2

CLG1

CL1

MLGC

CNG

MNB

CNA

CNS

CLS

CLQ

RLQ

MLU

MLGP

ML1C

D-□

-X□

Individual  
-X□

# Series CNAW

## 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
<b>J</b>	Nylon tarpaulin	70°C
<b>K</b>	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.)

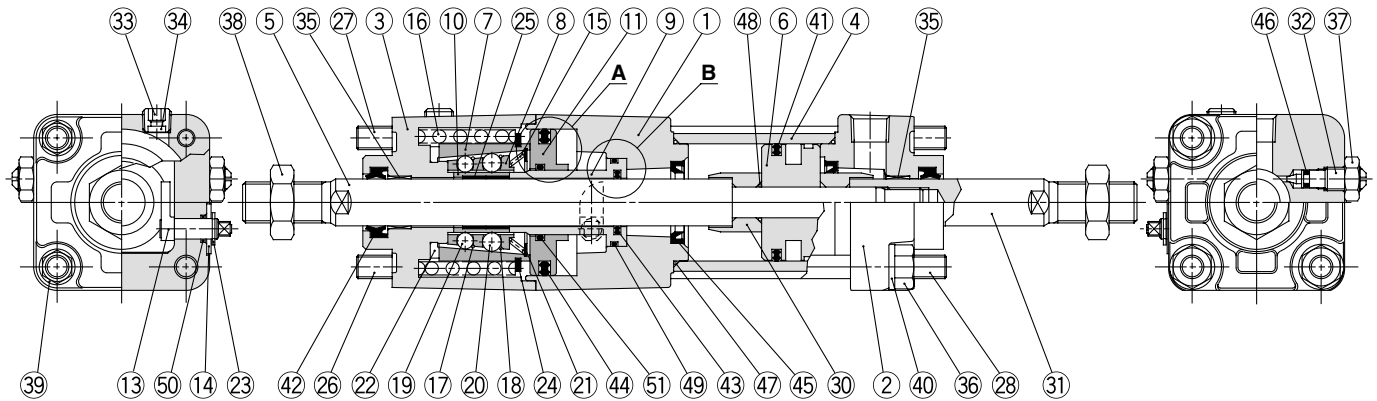
**Mass**( ): denotes the values for steel tube.

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	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  
 $2.03 + 0.30 \times 100/50 = 2.63$  kg

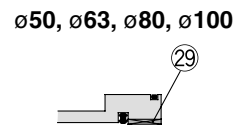
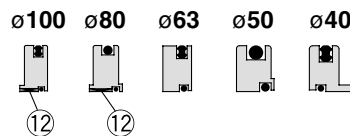
# Cylinder with Lock Double Acting, Double Rod **Series CNAW**

## Construction



**A section (Release piston bushing)**

**B section (Piston guide bushing)**



### 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)**

CLJ2

CLM2

CLG1

CL1

MLGC

CNG

MNB

CNA

CNS

CLS

CLQ

RLQ

MLU

MLGP

ML1C

D-□

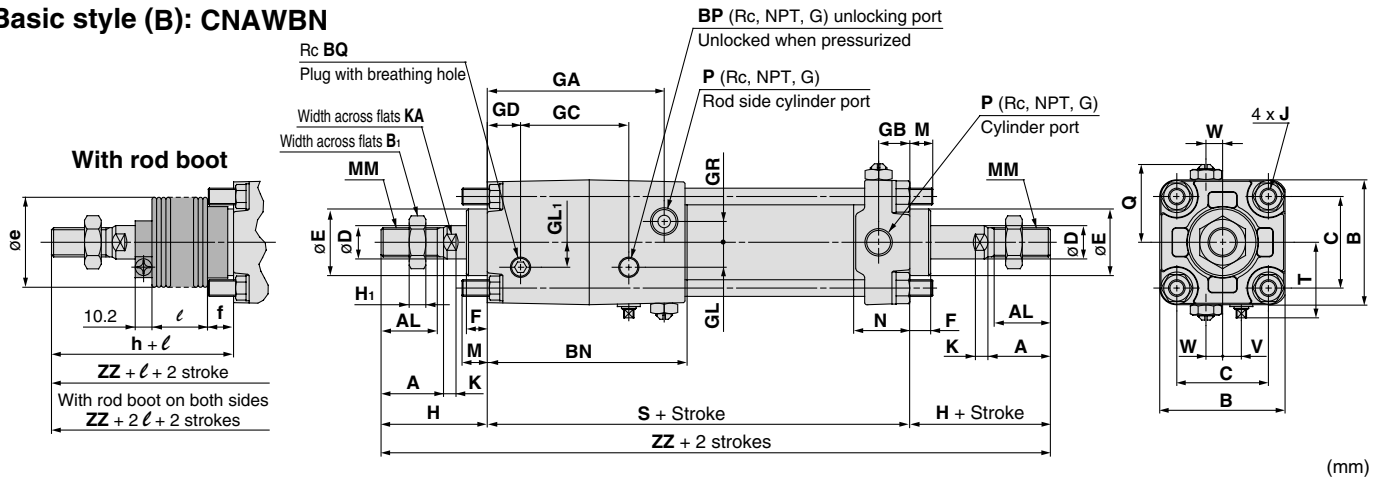
-X□

Individual  
-X□

# Series CNAW

## Dimensions

### Basic style (B): CNAWB

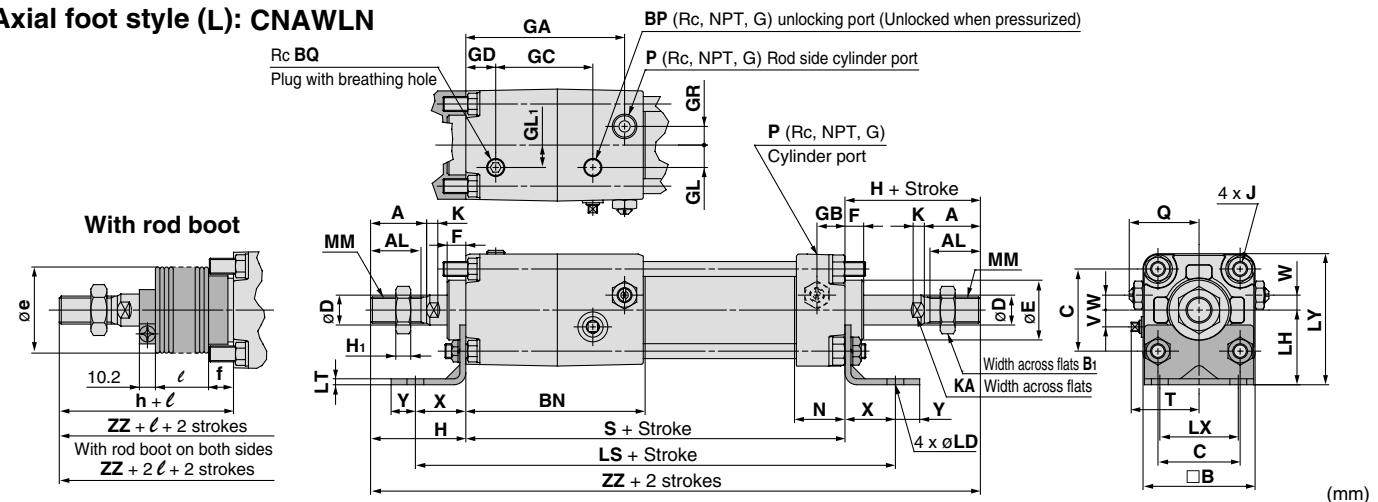


Bore size (mm)	Stroke range (mm)	A	AL	B	B <sub>1</sub>	BN	BP	BQ	C	D	E	F	GA	GB	GC	GD	GL	GL <sub>1</sub>	GR	H <sub>1</sub>	J	K	KA
40	Up to 500	30	27	60	22	96	1/8	1/8	44	16	32	10	85	15	52	16	12	12	10	8	M8 x 1.25	6	14
50	Up to 600	35	32	70	27	108	1/4	1/4	52	20	40	10	95	17	56.5	20	13	15	12	11	M8 x 1.25	7	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

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

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



Bore size (mm)	Stroke range (mm)	A	AL	B	B <sub>1</sub>	BN	BP	BQ	C	D	E	F	GA	GB	GC	GD	GL	GL <sub>1</sub>	GR	H <sub>1</sub>	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	1/4	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

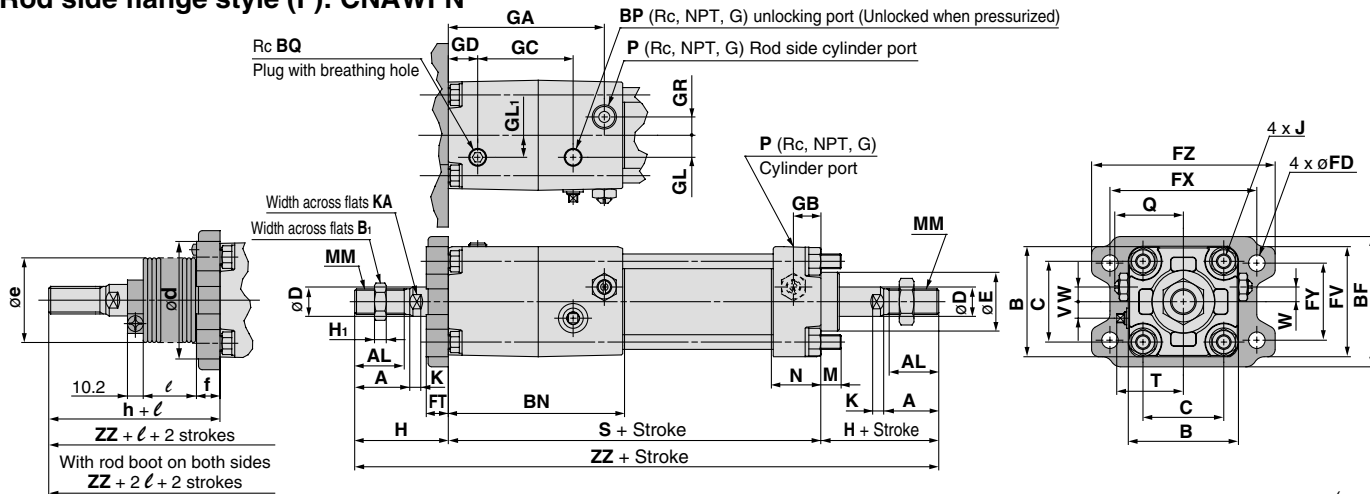
Bore size (mm)	LX	LY	MM	N	P	Q	H	S	T	V	W	X	Y	ZZ
40	42	70	M14 x 1.5	27	1/4	37 to 39.5	51	153	37.5	9	8	27	13	255
50	50	80	M18 x 1.5	30	3/8	42 to 44.5	58	168	44	11	0	27	13	284
63	59	93	M18 x 1.5	31	3/8	50 to 51.5	58	182	52.5	12	0	34	16	298
80	76	116	M22 x 1.5	37	1/2	59.5 to 62.5	71	218	59.5	15	0	44	16	360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

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

# Cylinder with Lock Double Acting, Double Rod **Series CNAW**

## Dimensions

### Rod side flange style (F): CNAWFN

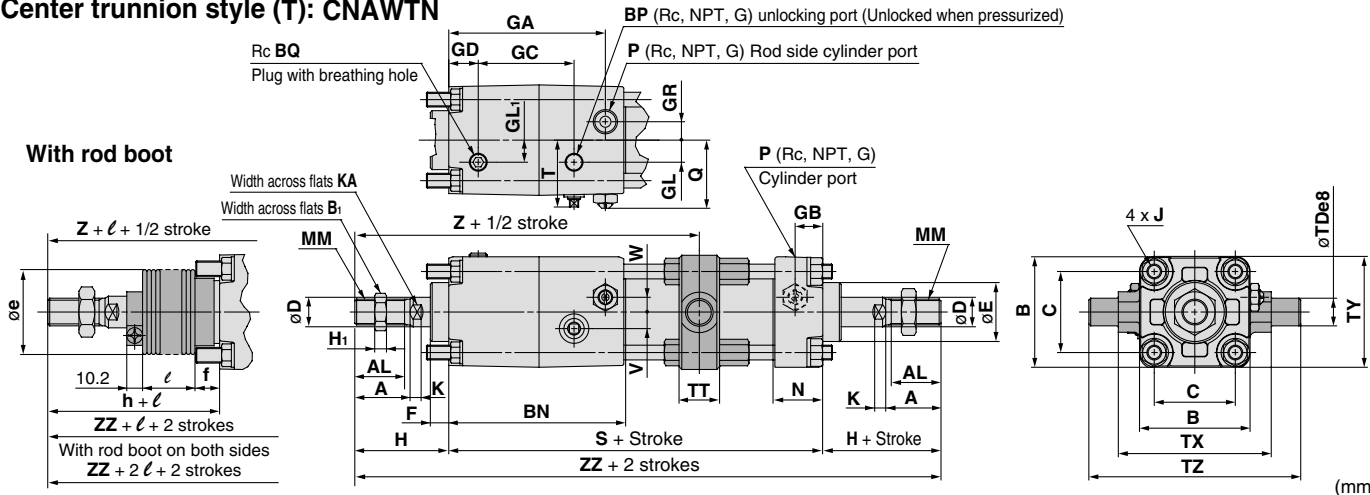


Bore size (mm)	Stroke range (mm)	A	AL	B	B <sub>1</sub>	BF	BN	BP	BQ	C	D	E	FD	FT	FV	FX	FY	FZ	GA	GB	GC	GD	GL	GL <sub>1</sub>	GR	H <sub>1</sub>	J
40	Up to 500	30	27	60	22	71	96	1/8	1/8	44	16	32	9	12	60	80	42	100	85	15	52	16	12	12	10	8	M8 x 1.25
50	Up to 600	35	32	70	27	81	108	1/4	1/8	52	20	40	9	12	70	90	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

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

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



Bore size (mm)	Stroke range (mm)	A	AL	B	B <sub>1</sub>	BN	BP	BQ	C	D	E	F	GA	GB	GC	GD	GL	GL <sub>1</sub>	GR	H <sub>1</sub>	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

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 <sup>-0.032</sup> <sub>-0.059</sub>	22	85	62	117	9	8	51	162	255
50	42 to 44.5	168	44	15 <sup>-0.032</sup> <sub>-0.059</sub>	22	95	74	127	11	0	58	181	284
63	50 to 51.5	182	52.5	18 <sup>-0.032</sup> <sub>-0.059</sub>	28	110	90	148	12	0	58	191	298
80	59.5 to 62.5	218	59.5	25 <sup>-0.040</sup> <sub>-0.073</sub>	34	140	110	192	15	0	71	231	360
100	66.5 to 69.5	246	69.5	25 <sup>-0.040</sup> <sub>-0.073</sub>	40	162	130	214	15	0	72	255	390

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

- CLJ2
- CLM2
- CLG1
- CL1
- MLGC
- CNG
- MNB
- CNA**
- CNS
- CLS
- CLQ
- RLQ
- MLU
- MLGP
- ML1C

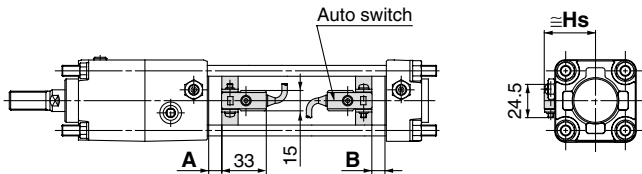
- D-□
- X□
- Individual
- X□

# Series CNA

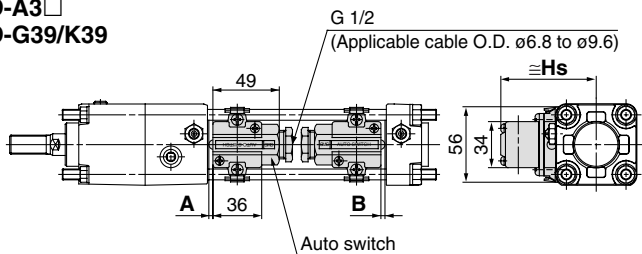
## Auto Switch Proper Mounting Position (Detection at Stroke End) and Its Mounting Height

### <Band mounting style>

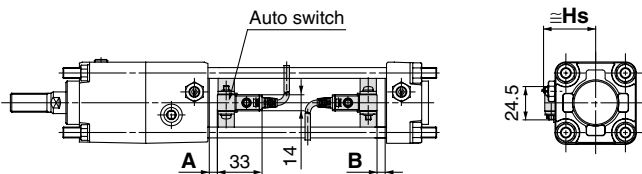
D-B5□/B64  
D-B59W



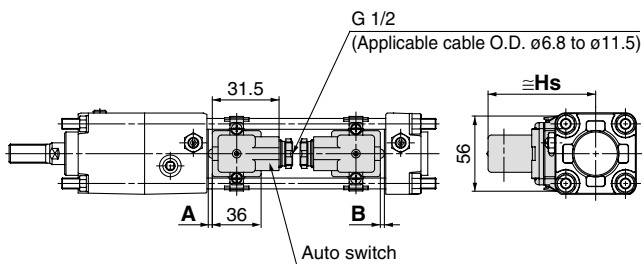
D-A3□  
D-G39/K39



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



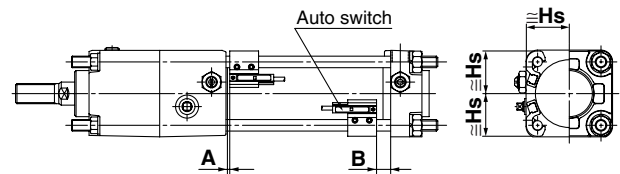
D-A44



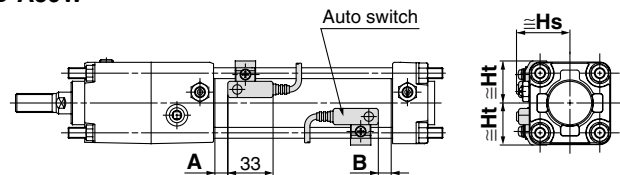
### <Tie-rod mounting style>

D-A9□/A9□V  
D-M9□/M9□V  
D-M9□W/M9□WV  
D-M9□AL/M9□AVL

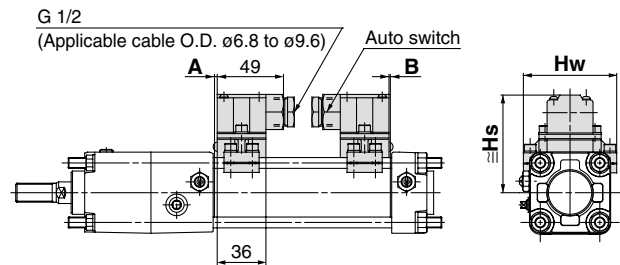
D-Z7□/Z80  
D-Y59□/Y69□/Y7P/Y7PV  
D-Y7□W/Y7□WV  
D-Y7BAL



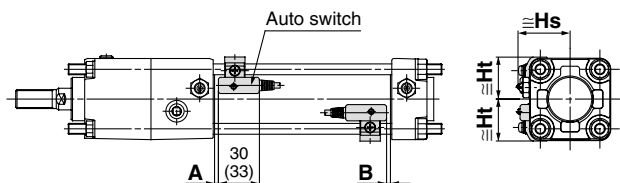
D-A5□/A6□  
D-A59W



D-A3□C  
D-G39C/K39C

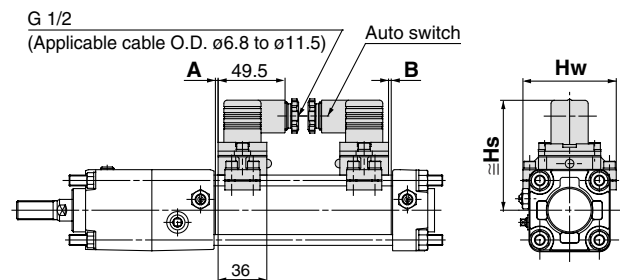


D-F5□/J5□  
D-F5NTL  
D-F5□W/J59W  
D-F5BA/F59F

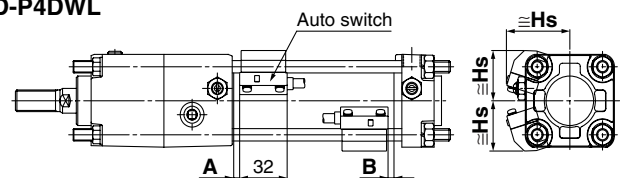


\* ( ): Donates the value of D-F5LF.

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	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	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	Ht	Hs	Ht	Hs	Ht	Hs	Hw	Hs	Hw		
40	30	30	32	30	35	30	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	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	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.

CLJ2

CLM2

CLG1

CL1

MLGC

CNG

MNB

CNA

CNS

CLS

CLQ

RLQ

MLU

MLGP

ML1C

D-□

-X□

Individual  
-X□

## Minimum Stroke for Auto Switch Mounting

Auto switch model	Number of auto switches mounted	Mounting brackets other than center trunnion	Center trunnion				
			ø40	ø50	ø63	ø80	ø100
			n: Number of auto switch (mm)				
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	90		100	110
	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	90		100	110
	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	100		100	110
	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	100		100	110
	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**

Auto switch model	Number of auto switches mounted	Mounting brackets other than center trunnion	Center trunnion				
			n: Number of auto switch (mm)				
			ø40	ø50	ø63	ø80	ø100
<b>D-A3□C</b> <b>D-G39C</b> <b>D-K39C</b>	2	Different surfaces	100		100	120	
		Same surface	100		100	120	
	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	
<b>D-A44C</b>	2	Different surfaces	100		100	120	
		Same surface	55		100	120	
	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	
<b>D-Z7□/Z80</b> <b>D-Y59□/Y7P</b> <b>D-Y7□W</b>	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 ...)
<b>D-Y69□/Y7PV</b> <b>D-Y7□WV</b>	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 ...)
<b>D-Y7BAL</b>	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 ...)
<b>D-P4DWL</b>	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 ...)	

- CLJ2**
- CLM2**
- CLG1**
- CL1**
- MLGC**
- CNG**
- MNB**
- CNA**
- CNS**
- CLS**
- CLQ**
- RLQ**
- MLU**
- MLGP**
- ML1C**

- D-□**
- X□**
- Individual  
**-X□**

# Series CNA

## Operating Range

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

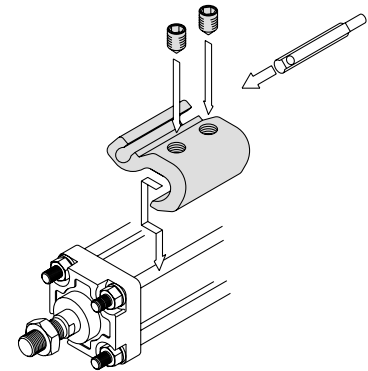
(mm)

\* 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
<b>Read</b>	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
<b>Solid state</b>	D-M9NV, M9PV, M9BV	Grommet (Perpendicular)	—
	D-Y69A, Y69B, Y7PV		Diagnostic indication (2-color indication)
	D-M9NWV, M9PWV, M9BWV		
	D-Y7NWV, Y7PWV, Y7BWV		
	D-M9NAVL, M9PAVL, M9BAVL	Grommet (In-line)	Water resistant (2-color indication)
	D-Y59A, Y59B, Y7P		—
	D-F59, F5P, J59		Diagnostic indication (2-color indication)
	D-Y7NW, Y7PW, Y7BW		
	D-F59W, F5PW, J59W		Water resistant (2-color indication)
	D-F5BAL, Y7BAL		With timer
	D-F5NTL, G5NTL		Magnetic field resistant (2-color indication)
	D-P5DWL		

\* 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.

**CLJ2**

**CLM2**

**CLG1**

**CL1**

**MLGC**

**CNG**

**MNB**

**CNA**

**CNS**

**CLS**

**CLQ**

**RLQ**

**MLU**

**MLGP**

**ML1C**

**D-□**

**-X□**

**Individual  
-X□**



# 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.

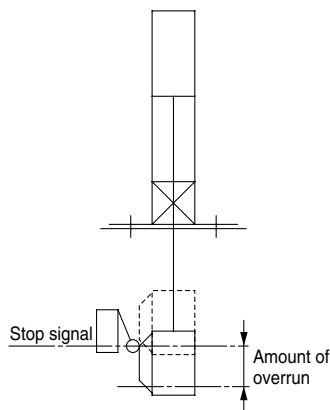
- Place a limit switch before the desired stopping position, at a distance equal to the overrun amount.
- The limit switch must have a detection length (dog length) of the overrun amount +  $\alpha$ .
- For SMC's auto switches, the operating range is between 8 and 14 mm. (It varies depending on a switch 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

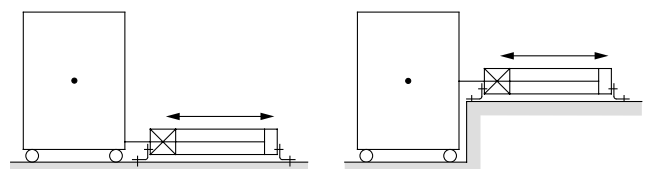
1. Be certain to connect the rod end to the load with the lock released.

• 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

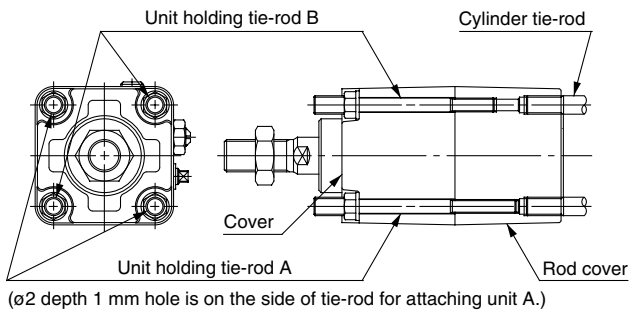
#### 2. Caution on using the basic style or replacing the support bracket.

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
40	JIS B 1181 Class 3 M8 x 1.25	13	JIS B 4636	10
50			2 point angle socket 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
80, 100	JIS B 1181 Class 3 M12 x 1.25	19	JIS B 4636 2 point angle socket 19	17



## 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 a 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.

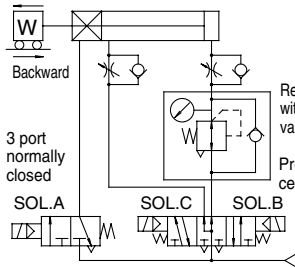
#### 5. When restarting, control the switching signal for the unlocking solenoid valve so that it acts before or at the same time as the cylinder drive solenoid valve.

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]

Forward

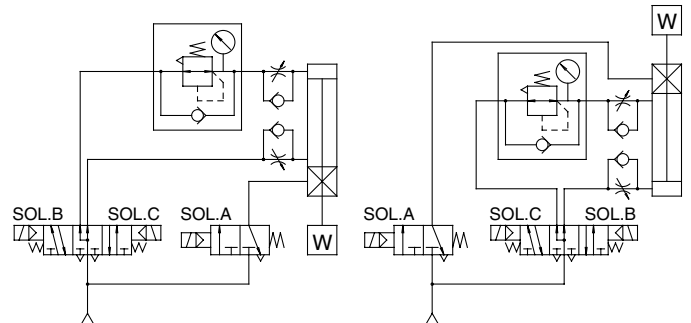


SOL.A	SOL.B	SOL.C	Action
ON	ON	OFF	Forward
OFF	OFF	OFF	Locked stop
ON	OFF	OFF	Unlocked
ON	ON	OFF	Forward
ON	OFF	ON	Backward
OFF	OFF	OFF	Locked stop
ON	OFF	OFF	Unlocked
ON	OFF	ON	Backward

##### 2) [Vertical]

[Load in the direction of rod extension]

[Load in the direction of rod retraction]



CLJ2

CLM2

CLG1

CL1

MLGC

CNG

MNB

CNA

CNS

CLS

CLQ

RLQ

MLU

MLGP

ML1C

D-□

-X□

Individual  
-X□



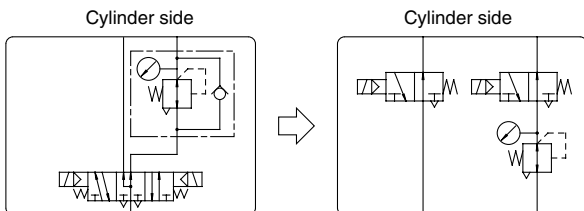
# Series CNA Specific Product Precautions 3

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

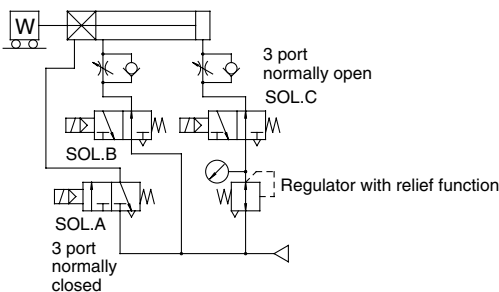
### ⚠ Caution

- 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]

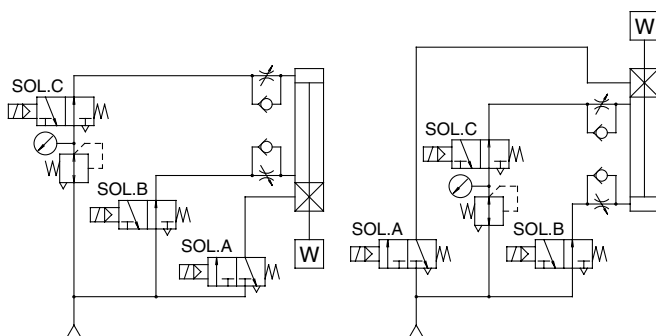
#### 1) [Horizontal]



#### 2) [Vertical]

[Load in the direction of rod extension]

[Load in the direction of rod retraction]



## Manually Unlocking

### ⚠ Warning

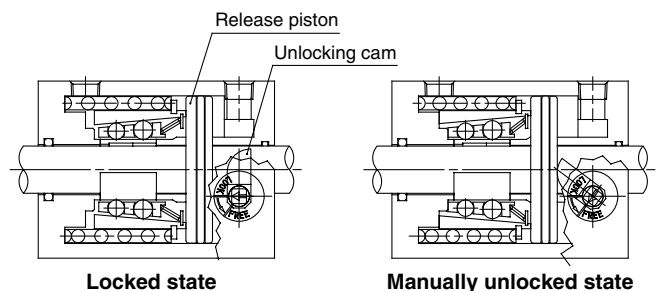
- Never operate the unlocking cam until safety has been confirmed. (Do not turn to the FREE side.)
  - When unlocking is performed with air pressure applied to only one side of the cylinder, the moving parts of the cylinder will lurch at high speed causing a serious hazard.
  - When unlocking is performed,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

- 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.
- 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.
- 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

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



### [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.





# Series CNA 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.

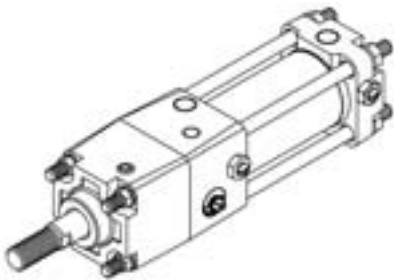
Bore size (mm)	Lock unit part no.
40	CNA 40D-UA
50	CNA 50D-UA
63	CNA 63D-UA
80	CNA 80D-UA
100	CNA100D-UA

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

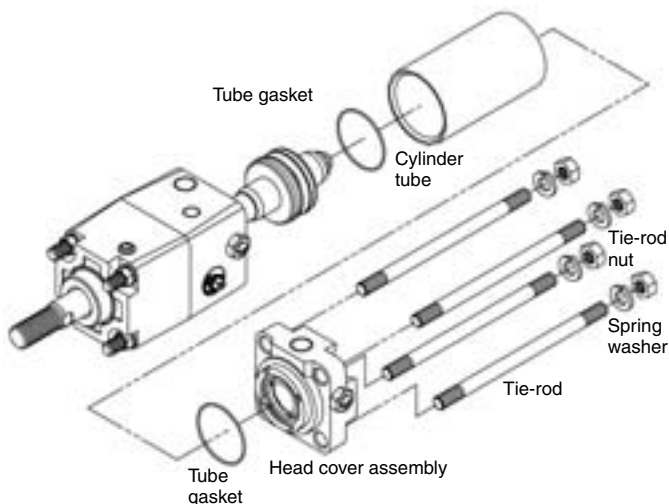
#### 2. How to replace lock unit

- 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.

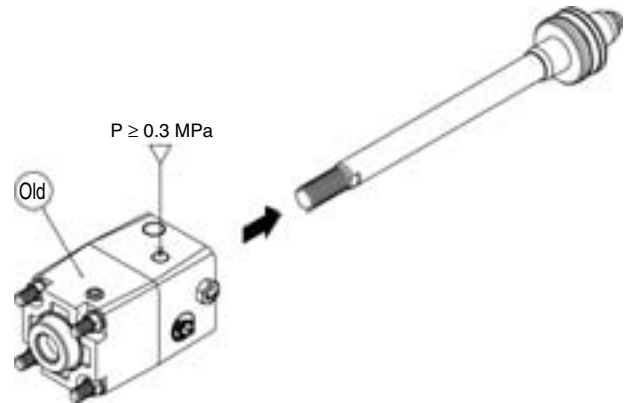
Bore size (mm)	Nut	Width across flats dimension	Socket
40, 50	JIS B 1181 Class 2 M8 x 1.25	13	JIS B 4636 + 2 point angle socket 13
63	JIS B 1181 Class 2 M10 x 1.25	17	JIS B 4636 + 2 point angle socket 17
80, 100	JIS B 1181 Class 2 M12 x 1.75	19	JIS B 4636 + 2 point angle socket 19



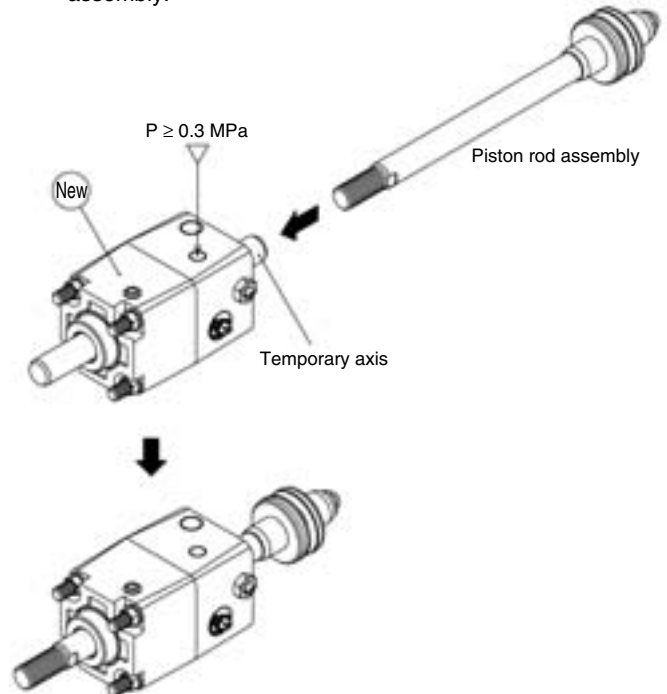
- Remove the tie-rods, head cover and cylinder tube.



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



- 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.



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

CLJ2

CLM2

CLG1

CL1

MLGC

CNG

MNB

CNA

CNS

CLS

CLQ

RLQ

MLU

MLGP

ML1C

D-□

-X□

Individual  
-X□