

# Compact Hydraulic Cylinder

## Series *CHQ*

### Series *CHQ*



Nominal pressure: **3.5 MPa**

Bore size (mm): 20, 32, 40, 50, 63, 80, 100

**CHQ**

CHK

CHN

CHM

CHS

CH2

CHA

Related  
Equipment

D-

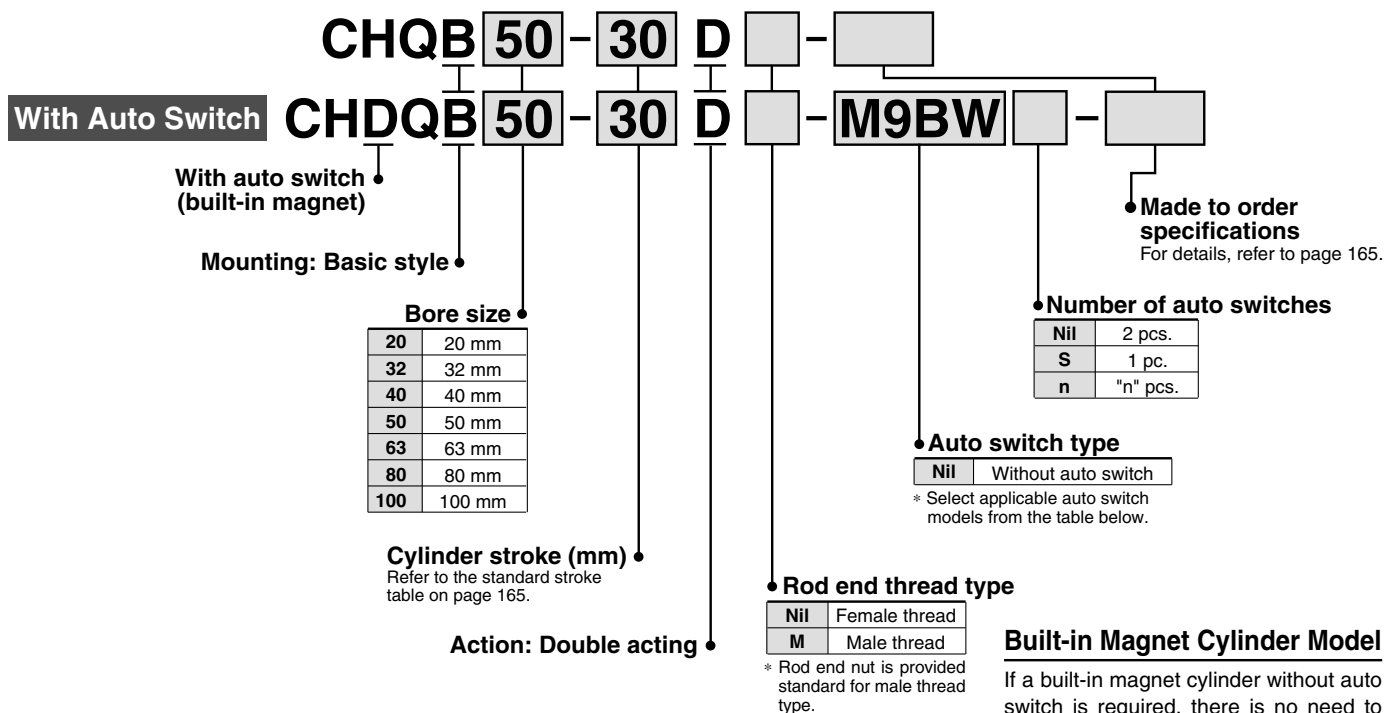
# Compact Hydraulic Cylinder Double Acting/Single Rod

## Series **CH□QB**

3.5 MPa

∅20, ∅32, ∅40, ∅50, ∅63, ∅80, ∅100

### How to Order



### Built-in Magnet Cylinder Model

If a built-in magnet cylinder without auto switch is required, there is no need to enter the symbol for the auto switch.  
(Example) CHDQB50-100D

### Applicable Auto Switches: Refer to pages 347 to 406 for further details on each auto switch.

Type	Special function	Electrical entry	Indicator light	Wiring (output)	Load voltage		Auto switch model		Lead wire length (m)					Pre-wired connector	Applicable load			
					DC	AC	Perpendicular	In-line	0.5 (Nil)	1 (M)	3 (L)	5 (Z)	None (N)					
Solid state switch	—	Grommet	No	3-wire (NPN)	5 V, 12 V	—	M9NV	M9N	●	●	●	○	—	○	IC circuit			
				3-wire (PNP)			M9PV	M9P	●	●	●	○	—	○				
		2-wire		M9BV			M9B	●	●	●	○	—	○					
		J79C		—			●	—	●	●	●	—	—					
	Diagnostic indication (2-color display)	Grommet	Yes	3-wire (NPN)	5 V, 12 V	—	M9NWW	M9NW	●	●	●	○	—	○	IC circuit			
				3-wire (PNP)			M9PWW	M9PW	●	●	●	○	—	○				
	Water resistant (2-color display)	Grommet	No	3-wire (NPN)	5 V, 12 V	—	M9NAV	M9NA	○	○	●	○	—	○	IC circuit			
				3-wire (PNP)			M9PAV	M9PA	○	○	●	○	—	○				
	Diagnostic output (2-color display)	Grommet	No	2-wire	12 V	—	M9BAV	M9BA	○	○	●	○	—	○	—			
				4-wire			—	F79F	●	—	●	○	—	○				
Reed switch	—	Grommet	Yes	3-wire (NPN equiv.)	5 V	—	A96V	A96	●	—	●	—	—	—	IC circuit			
				—			A72	A72H	●	—	●	—	—	—				
				12 V			A93V	A93	●	—	●	—	—	—				
		Connector		Yes			2-wire	5 V, 12 V	100 V or less	A90V	A90	●	—	●	—	—	—	IC circuit
								12 V	—	A73C	—	●	—	●	●	—		
		Grommet		Yes			2-wire	5 V, 12 V	24 V or less	A80C	—	●	—	●	●	—	—	IC circuit
								—	—	A79W	—	●	—	●	—	—		

\* 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  
 None ..... N (Example) J79CN

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

\* Since there are applicable auto switches other than listed, refer to page 178 for details.

\* For details about auto switches with pre-wired connector, refer to pages 389 and 390.

\* For mounting D-A9□(V), M9□(V), M9□W(V), M9□A(V)L with ∅32 to ∅50 to a surface other than the port surface, order an auto switch mounting bracket separately. Refer to page 179 for details.

# Compact Hydraulic Cylinder Double Acting/Single Rod: 3.5 MPa **Series CH□QB**

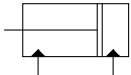
## Specifications



**Made to order specifications**  
(For details, refer to page 170)

Symbol	Specifications
-XB10	Intermediate stroke (Using exclusive body)

JIS symbol



## Hydraulic Fluid Compatibility

Hydraulic fluid	Compatibility
Standard mineral hydraulic fluid	Compatible
W/O hydraulic fluid	Compatible
O/W hydraulic fluid	Compatible
Water/Glycol hydraulic fluid	Not compatible
Phosphate hydraulic fluid	Not compatible

Bore size (mm)	20	32	40	50	63	80	100
<b>Action</b>	Double acting/Single rod						
<b>Fluid</b>	Hydraulic fluid						
<b>Nominal pressure</b>	3.5 MPa						
<b>Proof pressure</b>	5.0 MPa						
<b>Maximum allowable pressure</b>	3.5 MPa						
<b>Minimum operating pressure</b>	0.3 MPa						
<b>Ambient and fluid temperature</b>	Without auto switch: -10° to 80°C						
	With auto switch: -10° to 60°C						
<b>Piston speed</b>	8 to 100 mm/s						
<b>Cushion</b>	None						
<b>Rod end thread</b>	Standard: Female thread, Male thread						
<b>Stroke length tolerance</b>	$\begin{matrix} +1.0 \\ 0 \end{matrix}$ mm						
<b>Mounting style</b>	Basic style						
<b>Mounting</b>	Through hole						

Note) Refer to page 134 for definitions of terms related to pressure.

## Standard Strokes

Bore size (mm)	Standard strokes (mm)
<b>20</b>	5, 10, 15, 20, 25, 30, 35, 40, 45, 50
<b>32</b>	5, 10, 15, 20, 25, 30, 35, 40, 45, 50, 75, 100
<b>40</b>	5, 10, 15, 20, 25, 30, 35, 40, 45, 50, 75, 100
<b>50</b>	10, 15, 20, 25, 30, 35, 40, 45, 50, 75, 100
<b>63</b>	10, 15, 20, 25, 30, 35, 40, 45, 50, 75, 100
<b>80</b>	10, 15, 20, 25, 30, 35, 40, 45, 50, 75, 100
<b>100</b>	10, 15, 20, 25, 30, 35, 40, 45, 50, 75, 100

Note) Consult with SMC regarding the manufacture of strokes other than the above.

**CHQ**

**CHK**□

**CHN**

**CHM**

**CHS**□

**CH2**□

**CHA**

Related  
Equipment

**D-**□

## Theoretical Output



Unit: N

Bore size (mm)	Rod size (mm)	Operating direction	Piston area (mm <sup>2</sup> )	Operating pressure (MPa)					
				1	1.5	2	2.5	3	3.5
20	10	OUT	314	314	471	628	785	942	1099
		IN	235	235	352	470	587	705	822
32	16	OUT	804	804	1206	1608	2010	2412	2814
		IN	603	603	904	1206	1507	1809	2110
40	16	OUT	1256	1256	1884	2512	3140	3768	4396
		IN	1055	1055	1582	2110	2637	3165	3692
50	20	OUT	1963	1963	2944	3926	4907	5889	6870
		IN	1649	1649	2473	3298	4122	4947	5771
63	20	OUT	3117	3117	4675	6234	7792	9351	10909
		IN	2803	2803	4204	5606	7007	8409	9810
80	25	OUT	5026	5026	7539	10052	12565	15078	17591
		IN	4535	4535	6802	9070	11337	13605	15872
100	30	OUT	7853	7853	11779	15706	19632	23559	27485
		IN	7147	7147	10720	14294	17867	21441	25014

Theoretical output (N) = Pressure (MPa) x Piston area (mm<sup>2</sup>)

## Mass

Unit: g

Bore size (mm)	Cylinder stroke (mm)											Male thread additional mass	
	5	10	15	20	25	30	35	40	45	50	75		100
20	180	200	220	240	260	280	300	320	340	360	—	—	10
32	330	350	370	390	410	430	450	470	490	510	610	710	52
40	480	500	520	540	560	580	600	620	640	660	760	860	52
50	—	860	890	920	950	980	1010	1040	1070	1100	1250	1400	100
63	—	1250	1290	1330	1370	1410	1450	1490	1530	1570	1770	1970	100
80	—	2380	2470	2560	2650	2740	2830	2920	3010	3100	3550	4000	172
100	—	3520	3630	3740	3850	3960	4070	4180	4290	4400	4950	5500	283

## ⚠ Specific Product Precautions

Be sure to read before handling. Refer to front matters 30 and 31 for Safety Instructions, and pages 134 to 142 for precautions for hydraulic cylinder and auto switch.

### Usage

#### ⚠ Caution

- Use hexagon socket head cap screws (JISB1176, strength class 10.9 or higher) for cylinder mounting. (ø20: 2 pcs.; ø32 to ø100: 4 pcs.)
- Since a lateral load (eccentric load) cannot be applied to the piston rod, build the mounting jig in such a way that a lateral load will not be applied to the piston rod.
- Make sure that the interlocking length of the rod end thread (male or female thread) and the mounting material is at least 80% of the thread diameter.

- When operating a cylinder for the first time, be sure to release the air inside the cylinder and the piping. When the air release is complete, operate the cylinder at reduced pressure, then gradually increase it to the normal operating pressure.
- Since Series CH□QB does not have an air release plug, release air from other components (e.g. from piping, etc.) as well.
- When mounting the cylinder body with mounting bolts, use the tightening torques in the table at right as a guide.

#### Body mounting bolt tightening torques

Bore size (mm)	Mounting bolt		Tightening torque N·m
	Size	Qty.	
20	M5 x 0.8	2	3
32	M5 x 0.8	4	3
40	M5 x 0.8	4	3
50	M6 x 1	4	6
63	M8 x 1.25	4	11.5
80	M10 x 1.5	4	24
100	M10 x 1.5	4	34

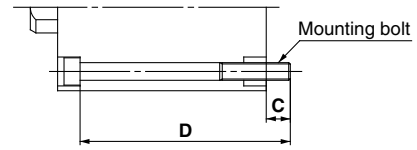
- Do not use two cylinders facing one another horizontally or vertically in such a way that their piston rods strike each other.
- When the cylinder head side contains hydraulic fluid or is in a normally pressurized condition, the applied load must not be allowed to strike the piston rod end. Avoid such applications.

## Mounting Bolts for CH□QB

Mounting: Through hole type mounting bolts are available.  
 How to order: Add "Bolt" in front of the bolts to be used.

**Example: M5 x 50L 4 pcs.**

**Mounting bolt diagram**



Model	C	D	Mounting bolt
<b>CH□QB20-5D (M)</b>	7	55	M5 x 55L
-10D (M)		60	x 60L
-15D (M)		65	x 65L
-20D (M)		70	x 70L
-25D (M)		75	x 75L
-30D (M)		80	x 80L
-35D (M)		85	x 85L
-40D (M)		90	x 90L
-45D (M)		95	x 95L
-50D (M)		100	x 100L
<b>CH□QB32-5D (M)</b>	7	70	M5 x 70L
-10D (M)		75	x 75L
-15D (M)		80	x 80L
-20D (M)		85	x 85L
-25D (M)		90	x 90L
-30D (M)		95	x 95L
-35D (M)		100	x 100L
-40D (M)		105	x 105L
-45D (M)		110	x 110L
-50D (M)		115	x 115L
-75D (M)		140	x 140L
-100D (M)		165	x 165L
<b>CH□QB40-5D (M)</b>	10	75	M5 x 75L
-10D (M)		80	x 80L
-15D (M)		85	x 85L
-20D (M)		90	x 90L
-25D (M)		95	x 95L
-30D (M)		100	x 100L
-35D (M)		105	x 105L
-40D (M)		110	x 110L
-45D (M)		115	x 115L
-50D (M)		120	x 120L
-75D (M)		145	x 145L
-100D (M)		170	x 170L
<b>CH□QB50-10D (M)</b>	12	90	M6 x 90L
-15D (M)		95	x 95L
-20D (M)		100	x 100L
-25D (M)		105	x 105L
-30D (M)		110	x 110L
-35D (M)		115	x 115L
-40D (M)		120	x 120L
-45D (M)		125	x 125L
-50D (M)		130	x 130L
-75D (M)		155	x 155L
-100D (M)	180	x 180L	

Model	C	D	Mounting bolt
<b>CH□QB63-10D (M)</b>	15.5	95	M8 x 95L
-15D (M)		100	x 100L
-20D (M)		105	x 105L
-25D (M)		110	x 110L
-30D (M)		115	x 115L
-35D (M)		120	x 120L
-40D (M)		125	x 125L
-45D (M)		130	x 130L
-50D (M)		135	x 135L
-75D (M)		160	x 160L
-100D (M)	185	x 185L	
<b>CH□QB80-10D (M)</b>	14.5	100	M10 x 100L
-15D (M)		105	x 105L
-20D (M)		110	x 110L
-25D (M)		115	x 115L
-30D (M)		120	x 120L
-35D (M)		125	x 125L
-40D (M)		130	x 130L
-45D (M)		135	x 135L
-50D (M)		140	x 140L
-75D (M)		165	x 165L
-100D (M)	190	x 190L	
<b>CH□QB100-10D (M)</b>	13.5	105	M10 x 105L
-15D (M)		110	x 110L
-20D (M)		115	x 115L
-25D (M)		120	x 120L
-30D (M)		125	x 125L
-35D (M)		130	x 130L
-40D (M)		135	x 135L
-45D (M)		140	x 140L
-50D (M)		145	x 145L
-75D (M)		170	x 170L
-100 (M)	195	x 195L	

**CHQ**

CHK□

**CHN**

CHM

CHS□

CH2□

**CHA**

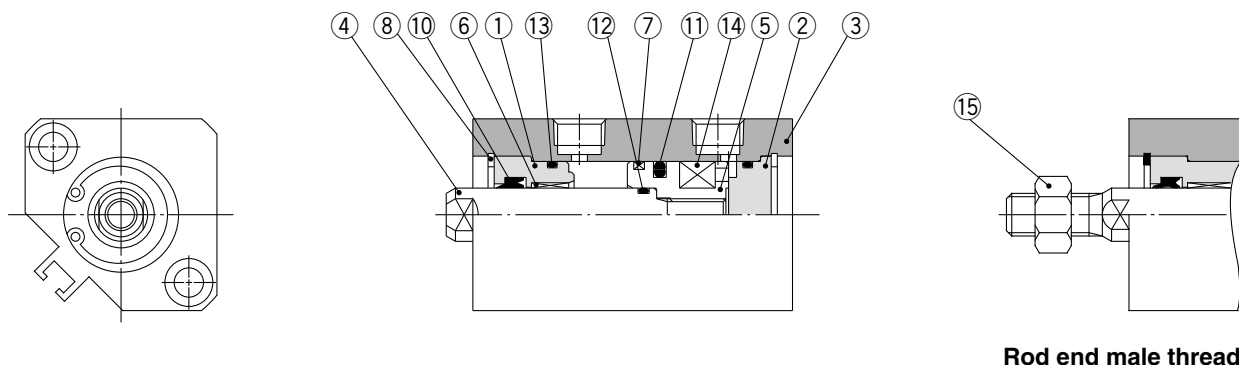
Related Equipment

D-□

# Series CH□QB

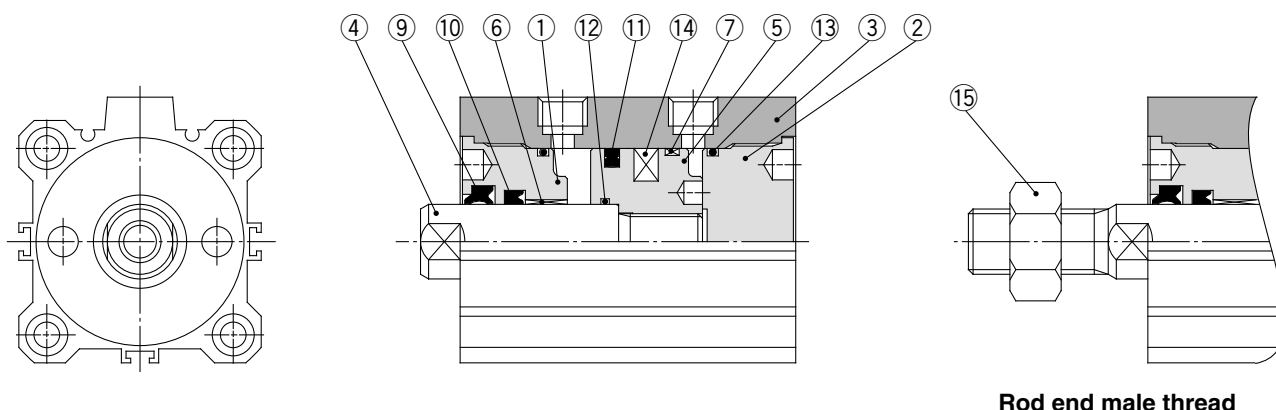
## Construction

### CH□QB20



Rod end male thread

### CH□QB32 to CH□QB100



Rod end male thread

### Parts List

No.	Description	Material	Note
1	Rod cover	Aluminum alloy	Black anodized
2	Head cover	Aluminum alloy	Black anodized
3	Cylinder tube	Aluminum alloy	Hard anodized
4	Piston rod	ø20: Stainless steel ø32 to ø100: Carbon steel	Hard chromium electroplated
5	Piston	Aluminum alloy	Chromated
6	Bushing	Copper alloy	
7	Wear ring	Resin	
8	Retaining ring (ø20 only)	Carbon tool steel	Black zinc chromated
9	Scraper	NBR	
10	Rod seal	NBR	
11	Piston seal	NBR	
12	Piston gasket	NBR	
13	Tube gasket	NBR	
14	Magnet	—	
15	Rod end nut	Carbon steel	Nickel plated

### Replacement Parts: Seal Kit

Bore size (mm)	Seal kit no.	Content
20	CHQ20-PS	Nos. ⑨, ⑩, ⑪ and ⑬ from the chart at left
32	CHQ32-PS	
40	CHQ40-PS	
50	CHQ50-PS	
63	CHQ63-PS	
80	CHQ80-PS	
100	CHQ100-PS	

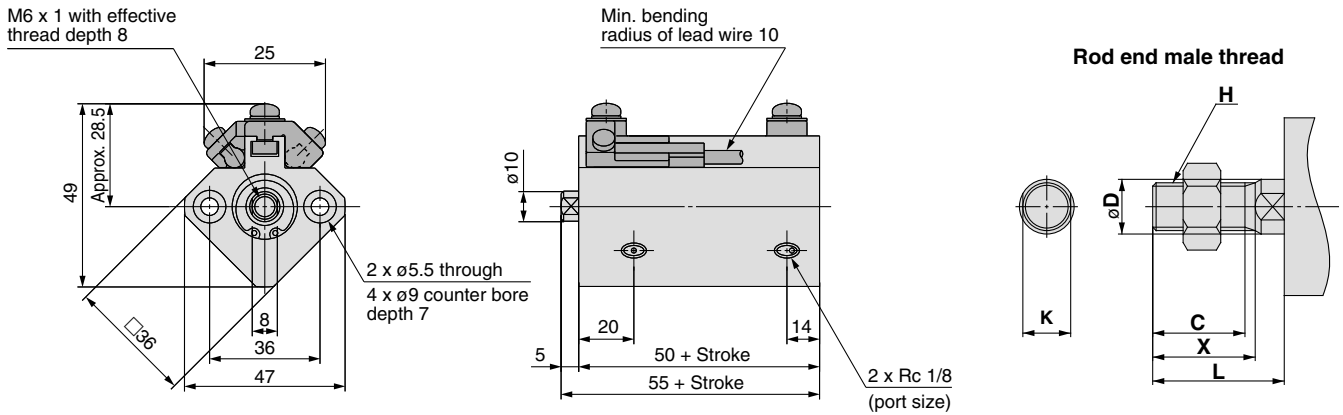
\* Seal kit consists of items ⑨, ⑩, ⑪ and ⑬ and can be ordered by using the seal kit number for each bore size.

\* Special tool required for disassembly. Contact SMC for recommended tool designs and dimensions.

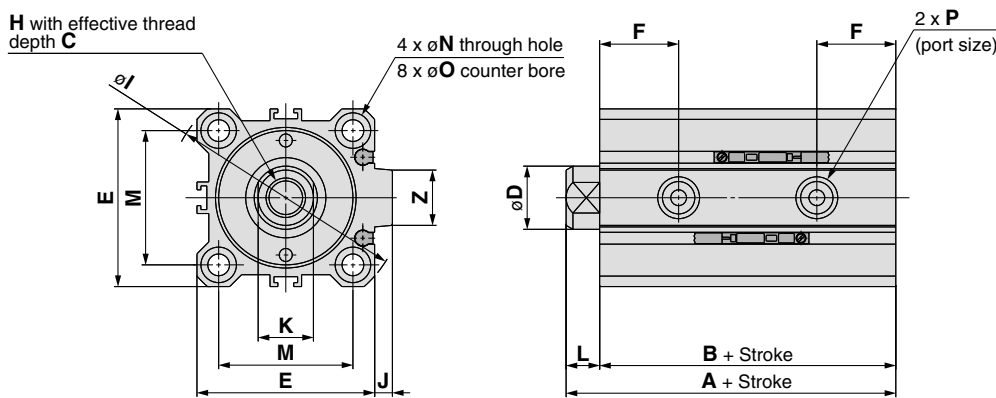
# Compact Hydraulic Cylinder Double Acting/Single Rod: 3.5 MPa **Series CH□QB**

## Dimensions

### ∅20



### ∅32 to ∅100



Note) The auto switches above are shown for a D-M9□(W) solid state auto switch.

Bore size (mm)	A	B	C	D	E	F	H	I	J	K	L	M	N	O	P	S	U	Z
32	73.5	65	12	16	45	20	M10 x 1.5	60	4.5	14	8.5	34	5.5	9 depth 7	Rc1/8	58.5	31.5	14
40	75.5	67	12	16	52	22	M10 x 1.5	69	5	14	8.5	40	5.5	9 depth 7	Rc1/8	66	35	14
50	87	76	15	20	64	25	M12 x 1.75	86	7	18	11	50	6.6	11 depth 8	Rc1/4	80	41	19
63	91	80	15	20	77	27	M12 x 1.75	103	7	18	11	60	9	14 depth 10.5	Rc1/4	93	47.5	19
80	100	89	20	25	98	28	M16 x 2	132	6	22	11	77	11	17.5 depth 13.5	Rc3/8	112.5	57.5	26
100	107	95	24	30	117	29	M20 x 2.5	156	6.5	26	12	94	11	17.5 depth 13.5	Rc3/8	132.5	67.5	26

### Rod end male threads (mm)

Bore size (mm)	C	X	D	H	L	K
20	15.5	18	10	M8 x 1.25	23	8
32	27	30	16	M14 x 1.5	38.5	14
40	27	30	16	M14 x 1.5	38.5	14
50	32	35	20	M18 x 1.5	46	18
63	32	35	20	M18 x 1.5	46	18
80	37	40	25	M22 x 1.5	51	22
100	37	40	30	M26 x 1.5	52	26

**CHQ**

CHK□

CHN

CHM

CHS□

CH2□

CHA

Related Equipment

D-□



Please consult with SMC for detailed specifications, delivery and prices.

## 1 Intermediate Strokes (Using Exclusive Body) Symbol -XB10

CH □ QB Bore size - Stroke - XB10

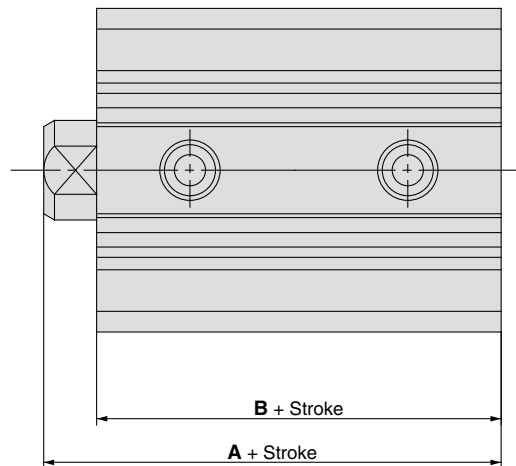
Intermediate stroke (Using exclusive body) ●

When using an intermediate stroke other than the compact hydraulic cylinder (Series CH□QB) standard strokes, it is possible to shorten the overall length and reduce the mounting space by using an exclusive body that does not have spacers installed.

### Specifications

Model	CH□QB
Action	Double acting/Single rod
Bore size (mm)	32, 40, 50, 63, 80, 100
Mounting	Through hole
Auto switch	Mountable
Other specifications	Same as standard double acting single rod

### Dimensions



(mm)

Bore size (mm)	A	B
	55 to 100 mm strokes	55 to 100 mm strokes
32	73.5	65
40	75.5	67
50	87	76
63	91	80
80	100	89
100	107	95

\* Dimensions other than the above are the same as the standard double acting single rod type.

Note) Applicable strokes are available in 5 mm increments.



3.5 MPa

# Compact Hydraulic Cylinder Double Acting/Double Rod

# Series CH□QWB

∅20, ∅32, ∅40, ∅50, ∅63, ∅80, ∅100

## How to Order

**CHQ W B 50 - 30 D □**

**With Auto Switch CHDQ W B 50 - 30 D □ - M9BW □**

**With auto switch (built-in magnet)**

**Model: Double acting/Double rod**

**Mounting: Basic style**

**Bore size**

20	20 mm
32	32 mm
40	40 mm
50	50 mm
63	63 mm
80	80 mm
100	100 mm

**Cylinder stroke (mm)**  
Refer to the standard stroke table on page 172.

**Action: Double acting**

**Auto switch type**

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

\* Select applicable auto switch models from the table below.

**Number of auto switches**

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

**Auto switch type**

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

\* Select applicable auto switch models from the table below.

**Rod end thread type**

Nil	Female thread
M	Male thread

\* Rod end nut is provided standard for male thread type.

**Built-in Magnet Cylinder Model**  
If a built-in magnet cylinder without auto switch is required, there is no need to enter the symbol for the auto switch.  
(Example) CHDQWB50-100D

CHQ

CHK□

CHN

CHM

CHS□

CH2□

CHA

Related Equipment

D-□

**Applicable Auto Switches:** Refer to pages 347 to 406 for further details on each auto switch.

Type	Special function	Electrical entry	Indicator light	Wiring (output)	Load voltage		Auto switch model		Lead wire length (m)					Pre-wired connector	Applicable load								
					DC	AC	Perpendicular	In-line	0.5 (Nil)	1 (M)	3 (L)	5 (Z)	None (N)										
Solid state switch	—	Grommet	No	3-wire (NPN)	5 V, 12 V	—	M9NV	M9N	●	●	●	○	—	○	IC circuit								
				3-wire (PNP)			M9PV	M9P	●	●	●	○	—	○									
		2-wire		M9BV			M9B	●	●	●	○	—	○	—									
		—		J79C			—	●	—	●	●	●	—										
	Diagnostic indication (2-color display)	Grommet	Yes	3-wire (NPN)	24 V	5 V, 12 V	—	M9NWV	M9NW	●	●	●	○	—	○	IC circuit							
				3-wire (PNP)				M9PWV	M9PW	●	●	●	○	—	○								
		2-wire		M9BWV				M9BW	●	●	●	○	—	○	—								
		3-wire (NPN)		M9NAV				M9NA	○	○	●	○	—	○									
		3-wire (PNP)		M9PAV				M9PA	○	○	●	○	—	○	IC circuit								
		2-wire		M9BAV				M9BA	○	○	●	○	—	○									
Diagnostic output (2-color display)	—	—	4-wire	5 V, 12 V	—	F79F	—	●	—	○	—	○	IC circuit										
Reed switch	—	Grommet	Yes	3-wire (NPN equiv.)	24 V	5 V	—	A96V	A96	●	—	●	—	—	—	IC circuit							
								—	A72	A72H	●	—	●	—	—		—						
								12 V	100 V	A93V	A93	●	—	●	—		—	—					
								5 V, 12 V	100 V or less	A90V	A90	●	—	●	—		—						
		Connector		Yes				2-wire	24 V	5 V, 12 V	—	12 V	—	A73C	—	●	—	●	●	—	IC circuit		
														—	A80C	—	●	—	●	●		—	
														5 V, 12 V	24 V or less	A79W	—	●	—	●		—	—
														—	—	—	—	●	—	●		—	—

\* 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  
 None ..... N (Example) J79CN

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

\* Since there are applicable auto switches other than listed, refer to page 178 for details.

\* For details about auto switches with pre-wired connector, refer to pages 389 and 390.

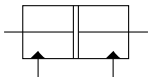
\* For mounting D-A9□(V), M9□(V), M9□W(V), M9□A(V)L with ∅32 to ∅50 to a surface other than the port surface, order an auto switch mounting bracket separately. Refer to page 179 for details.

# Series CH□QWB



## JIS symbol

Double acting/Double rod



## Specifications

Bore size (mm)	20	32	40	50	63	80	100
<b>Action</b>	Double acting/Double rod						
<b>Fluid</b>	Hydraulic fluid						
<b>Nominal pressure</b>	3.5 MPa						
<b>Proof pressure</b>	5.0 MPa						
<b>Maximum allowable pressure</b>	3.5 MPa						
<b>Minimum operating pressure</b>	0.3 MPa						
<b>Ambient and fluid temperature</b>	Without auto switch: -10° to 80°C						
	With auto switch: -10° to 60°C						
<b>Piston speed</b>	8 to 100 mm/s						
<b>Cushion</b>	None						
<b>Rod end thread</b>	Standard: Female thread, Male thread						
<b>Stroke length tolerance</b>	$\begin{matrix} +1.0 \\ 0 \end{matrix}$ mm						
<b>Mounting style</b>	Basic style						
<b>Mounting</b>	Through hole						

Note) Refer to page 134 for definitions of terms related to pressure.

## Hydraulic Fluid Compatibility

Hydraulic fluid	Compatibility
<b>Standard mineral hydraulic fluid</b>	Compatible
<b>W/O hydraulic fluid</b>	Compatible
<b>O/W hydraulic fluid</b>	Compatible
<b>Water/Glycol hydraulic fluid</b>	Not compatible
<b>Phosphate hydraulic fluid</b>	Not compatible

## Standard Strokes

Bore size (mm)	Standard strokes (mm)
<b>20</b>	5, 10, 15, 20, 25, 30, 35, 40, 45, 50
<b>32</b>	5, 10, 15, 20, 25, 30, 35, 40, 45, 50, 75, 100
<b>40</b>	5, 10, 15, 20, 25, 30, 35, 40, 45, 50, 75, 100
<b>50</b>	10, 15, 20, 25, 30, 35, 40, 45, 50, 75, 100
<b>63</b>	10, 15, 20, 25, 30, 35, 40, 45, 50, 75, 100
<b>80</b>	10, 15, 20, 25, 30, 35, 40, 45, 50, 75, 100
<b>100</b>	10, 15, 20, 25, 30, 35, 40, 45, 50, 75, 100

Note) Consult with SMC regarding the manufacture of strokes other than the above.

### Theoretical Output

Unit: N

Bore size (mm)	Rod size (mm)	Piston area (mm <sup>2</sup> )	Operating pressure (MPa)					
			1.0	1.5	2.0	2.5	3.0	3.5
20	10	235	235	352	470	587	705	822
32	16	603	603	904	1206	1507	1809	2110
40	16	1055	1055	1582	2110	2637	3165	3692
50	20	1649	1649	2473	3298	4122	4947	5771
63	20	2803	2803	4204	5606	7007	8409	9810
80	25	4535	4535	6802	9070	11337	13605	15872
100	30	7147	7147	10720	14294	17867	21441	25014

Theoretical output (N) = Pressure (MPa) x Piston area (mm<sup>2</sup>)

### Mass

Unit: g

Bore size (mm)	Cylinder stroke (mm)												Male thread additional mass
	5	10	15	20	25	30	35	40	45	50	75	100	
20	205	230	255	280	305	330	355	380	405	430	—	—	20
32	410	445	480	515	550	585	620	655	690	725	900	1075	104
40	570	605	640	675	710	745	780	815	850	885	1060	1235	104
50	—	1030	1080	1130	1180	1230	1280	1330	1380	1430	1680	1930	200
63	—	1430	1485	1540	1595	1650	1705	1760	1815	1870	2145	2420	200
80	—	2680	2805	2930	3055	3180	3305	3430	3555	3680	4305	4930	344
100	—	4075	4235	4395	4555	4715	4875	5035	5195	5355	6155	6955	566

### ⚠ Specific Product Precautions

Be sure to read before handling. Refer to front matters 30 and 31 for Safety Instructions, and pages 134 to 142 for precautions for hydraulic cylinder and auto switch.

### Usage

#### ⚠ Caution

1. Use hexagon socket head cap screws (JISB1176, strength class 10.9 or higher) for cylinder mounting. (ø20: 2pcs, ø32 to ø100: 4pcs.)
2. Since a lateral load (eccentric load) cannot be applied to the piston rod, build your mounting jig in such a way that a lateral load will not be applied to the piston rod.
3. Make sure that the interlocking length of the rod end threads (male or female thread) and the mounting material is at least 80% of the thread diameter.
4. Be sure to release the air inside the cylinder and the piping before operating the cylinder for the first time. When the air release is complete, operate the cylinder at reduced pressure, then gradually increase it to the normal operating pressure.

5. Since Series CH□QWB does not have an air release plug, release air from components other than the cylinder (e.g. from piping, etc.) as well.
6. When mounting the cylinder body with mounting bolts, use tightening torques in the table below as a guide.

#### Body mounting bolt tightening torques

Bore size (mm)	Mounting bolt		Tightening torque N·m
	Size	No.	
20	M5 x 0.8	2	3
32	M5 x 0.8	4	3
40	M5 x 0.8	4	3
50	M6 x 1	4	6
63	M8 x 1.25	4	11.5
80	M10 x 1.5	4	24
100	M10 x 1.5	4	34

7. When tightening the piston rod end threads, be sure to use the wrench flats of the rod on the side where the threads are being tightened. Use care, as damage may occur if rotational force is applied to both ends of the piston rod.
8. Do not use two cylinders facing one another horizontally or vertically in such a way that their piston rods strike each other.
9. When the cylinder head contains fluid or is in a normally pressurized condition, the load should not be allowed to strike the piston rod end. Avoid such applications.

CHQ

CHK□

CHN

CHM

CHS□

CH2□

CHA

Related Equipment

D-□

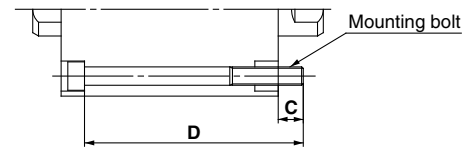
# Series CH□QWB

## Mounting Bolts for CH□QWB

Mounting: Through hole type mounting bolts are available.  
How to order: Add "Bolt" in front of the bolts to be used.

**Example: M5 x 50L 4 pcs.**

Mounting bolt diagram



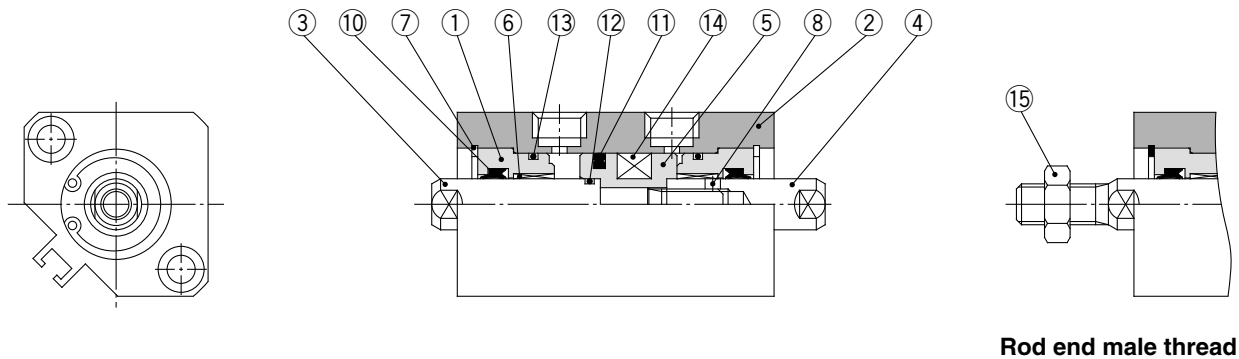
### Mounting Bolts

Model	C	D	Mounting bolt
CH□QWB20-5D (M)	10	65	M5 x 65L
-10D (M)		70	x 70L
-15D (M)		75	x 75L
-20D (M)		80	x 80L
-25D (M)		85	x 85L
-30D (M)		90	x 90L
-35D (M)		95	x 95L
-40D (M)		100	x 100L
-45D (M)		105	x 105L
-50D (M)		110	x 110L
CH□QWB32-5D (M)	7	70	M5 x 70L
-10D (M)		75	x 75L
-15D (M)		80	x 80L
-20D (M)		85	x 85L
-25D (M)		90	x 90L
-30D (M)		95	x 95L
-35D (M)		100	x 100L
-40D (M)		105	x 105L
-45D (M)		110	x 110L
-50D (M)		115	x 115L
-75D (M)	140	x 140L	
-100D (M)	165	x 165L	
CH□QWB40-5D (M)	10	75	M5 x 75L
-10D (M)		80	x 80L
-15D (M)		85	x 85L
-20D (M)		90	x 90L
-25D (M)		95	x 95L
-30D (M)		100	x 100L
-35D (M)		105	x 105L
-40D (M)		110	x 110L
-45D (M)		115	x 115L
-50D (M)		120	x 120L
-75D (M)	145	x 145L	
-100D (M)	170	x 170L	
CH□QWB50-10D (M)	12	90	M6 x 90L
-15D (M)		95	x 95L
-20D (M)		100	x 100L
-25D (M)		105	x 105L
-30D (M)		110	x 110L
-35D (M)		115	x 115L
-40D (M)		120	x 120L
-45D (M)		125	x 125L
-50D (M)		130	x 130L
-75D (M)		155	x 155L
-100D (M)	180	x 180L	
CH□QWB63-10D (M)	15.5	95	M8 x 95L
-15D (M)		100	x 100L
-20D (M)		105	x 105L
-25D (M)		110	x 110L
-30D (M)		115	x 115L
-35D (M)		120	x 120L
-40D (M)		125	x 125L
-45D (M)		130	x 130L
-50D (M)		135	x 135L
-75D (M)		160	x 160L
-100D (M)	185	x 185L	
CH□QWB80-10D (M)	14.5	100	M10 x 100L
-15D (M)		105	x 105L
-20D (M)		110	x 110L
-25D (M)		115	x 115L
-30D (M)		120	x 120L
-35D (M)		125	x 125L
-40D (M)		130	x 130L
-45D (M)		135	x 135L
-50D (M)		140	x 140L
-75D (M)		165	x 165L
-100D (M)	190	x 190L	
CH□QWB100-100D (M)	13.5	105	M10 x 105L
-15D (M)		110	x 110L
-20D (M)		115	x 115L
-25D (M)		120	x 120L
-30D (M)		125	x 125L
-35D (M)		130	x 130L
-40D (M)		135	x 135L
-45D (M)		140	x 140L
-50D (M)		145	x 145L
-75D (M)		170	x 170L
-100 (M)	195	x 195L	

# Compact Hydraulic Cylinder Double Acting/Double Rod: 3.5 MPa **Series CH□QWB**

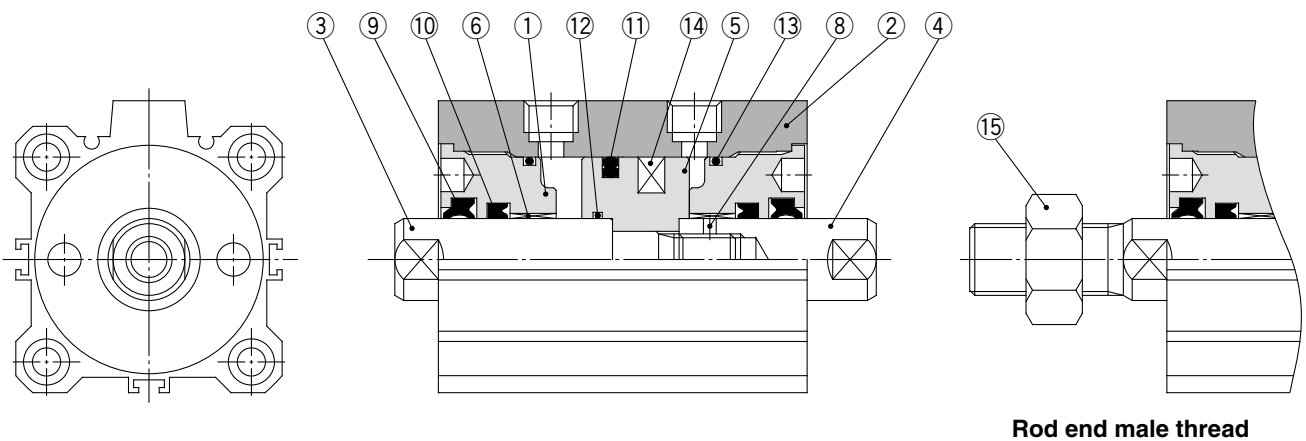
## Construction

### CH□QWB20



Rod end male thread

### CH□QWB32 to CH□QWB100



Rod end male thread

#### Parts List

No.	Description	Material	Note
1	Rod cover	Aluminum alloy	Black anodized
2	Cylinder tube	Aluminum alloy	Hard anodized
3	Piston rod A	ø20: Stainless steel ø32 to ø100: Carbon steel	Hard chromium electroplated
4	Piston rod B	ø20: Stainless steel ø32 to ø100: Carbon steel	Hard chromium electroplated
5	Piston	Aluminum alloy	Chromated
6	Bushing	Copper alloy	
7	Retaining ring (ø20 only)	Carbon tool steel	Black zinc chromated
8	Spring pin		
9	Scraper	NBR	
10	Rod seal	NBR	
11	Piston seal	NBR	
12	Piston gasket	NBR	
13	Tube gasket	NBR	
14	Magnet	—	
15	Rod end nut	Carbon steel	Nickel plated

#### Replacement Parts: Seal Kit

Bore size (mm)	Seal kit no.	Content
20	CHQW20-PS	Nos. 9, 10, 11 and 13 from the chart at left
32	CHQW32-PS	
40	CHQW40-PS	
50	CHQW50-PS	
63	CHQW63-PS	
80	CHQW80-PS	
100	CHQW100-PS	

\* Seal kit consists of items 9, 10, 11 and 13 and can be ordered by using the seal kit number for each bore size.

\* Special tool required for disassembly. Contact SMC for recommended tool designs and dimensions.

**CHQ**

CHK□

CHN

CHM

CHS□

CH2□

**CHA**

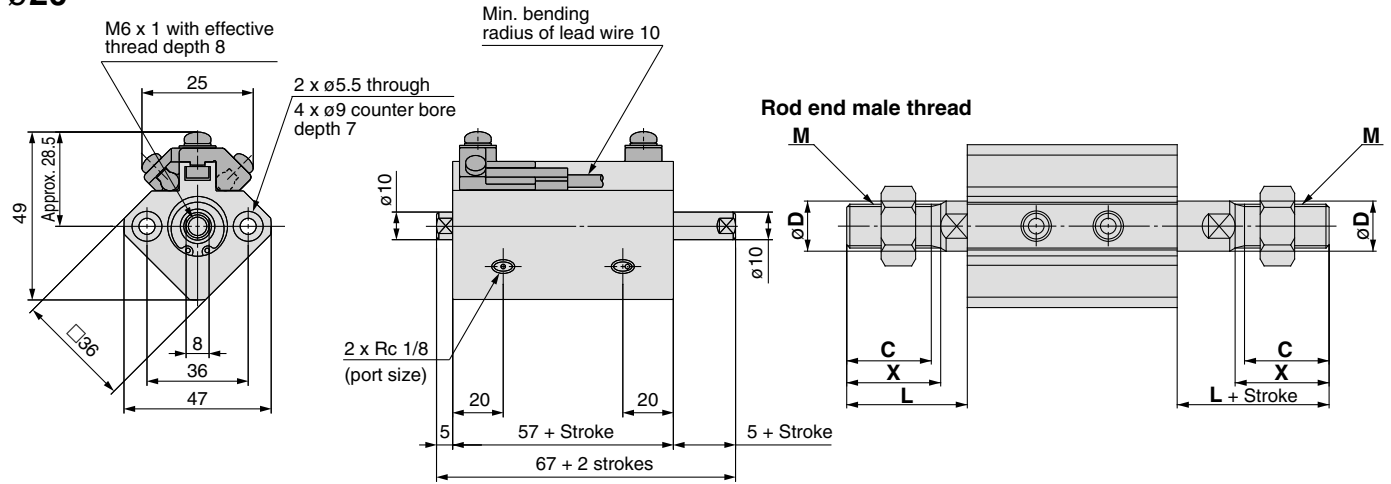
Related  
Equipment

D-□

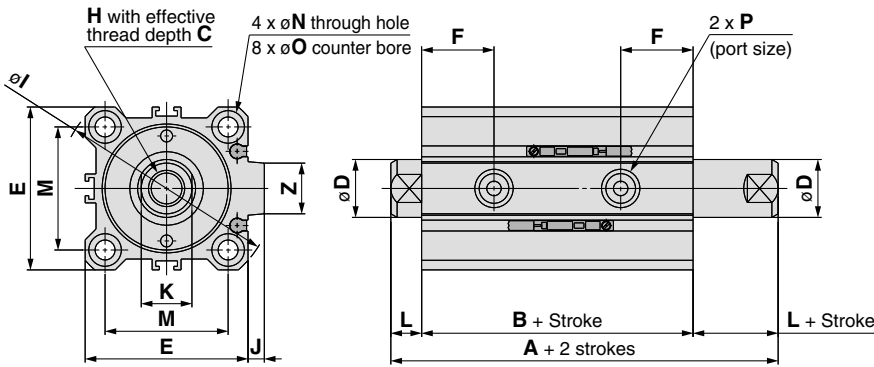
# Series CH□QWB

## Dimensions

### ∅20



### ∅32 to ∅100



Note) The auto switches above are shown for a D-M9□(W) solid state auto switch.

Bore size (mm)	A	B	C	D	E	F	H	I	J	K	L	M	N	O	P	S	U	Z
32	82	65	12	16	45	20	M10 x 1.5	60	4.5	14	8.5	34	5.5	9 depth 7	Rc1/8	58.5	31.5	14
40	84	67	12	16	52	22	M10 x 1.5	69	5	14	8.5	40	5.5	9 depth 7	Rc1/8	66	35	14
50	98	76	15	20	64	25	M12 x 1.75	86	7	18	11	50	6.6	11 depth 8	Rc1/4	80	41	19
63	102	80	15	20	77	27	M12 x 1.75	103	7	18	11	60	9	14 depth 10.5	Rc1/4	93	47.5	19
80	111	89	20	25	98	28	M16 x 2	132	6	22	11	77	11	17.5 depth 13.5	Rc3/8	112.5	57.5	26
100	119	95	24	30	117	29	M20 x 2.5	156	6.5	26	12	94	11	17.5 depth 13.5	Rc3/8	132.5	67.5	26

### Rod end male threads

Bore size (mm)	C	X	D	H	L	K
20	15.5	18	10	M8 x 1.25	23	8
32	27	30	16	M14 x 1.5	38.5	14
40	27	30	16	M14 x 1.5	38.5	14
50	32	35	20	M18 x 1.5	46	18
63	32	35	20	M18 x 1.5	46	18
80	37	40	25	M22 x 1.5	51	22
100	37	40	30	M26 x 1.5	52	26

# Series CH□QB/CH□QWB Auto Switch Specifications

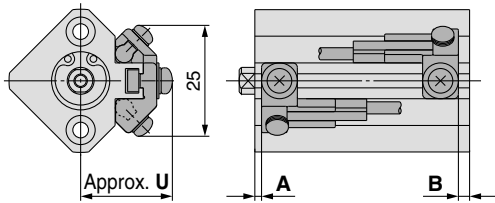
Refer to pages 347 to 406 for detailed specifications.



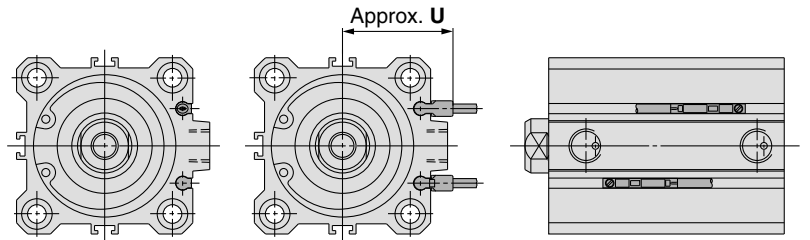
## Auto Switches: Proper Mounting Positions and Mounting Heights for Stroke End Detection

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

ø20

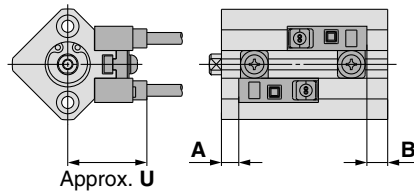


ø32 to ø100

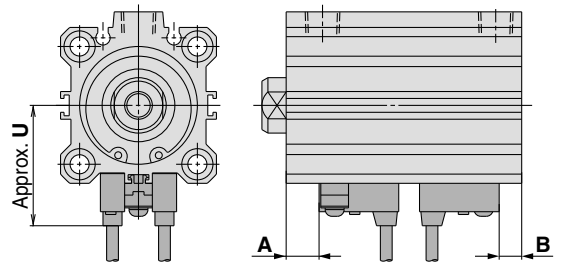


- D-F7□
- D-J79
- D-F7□W
- D-J79W
- D-F79F
- D-A7□
- D-A80
- D-A7□H
- D-A80H
- D-F7NTL
- D-F7BAL
- D-J79C
- D-A79W
- D-F7□WV
- D-J7□V
- D-F7BAVL
- D-A73C
- D-A80C

ø20



ø32 to ø100



## Auto Switch Proper Mounting Positions

Bore size (mm)	Solid state auto switch							Reed auto switch							
	D-M9□/M9□V D-M9□W/M9□WV D-M9□AL/M9□AVL		D-F7□/J79 D-F7□V/J79C D-F7□W/F7□WV D-F7BAL/F7BAVL D-F79F/J79W		D-F7NTL		D-A9□/A9□V		D-A73/A80		D-A7□H/A80H D-A73C/A80C D-A72		D-A79W		
	A	B	A	B	A	B	A	B	A	B	A	B	A	B	
20	24.5	10.5	23.5	9.5	28.5	14.5	20.5	6.5	23	9	23.5	9.5	20.5	6.5	
32	30	23	27.5	20.5	32.5	25.5	26	19	27	20	27.5	20.5	24.5	17.5	
40	29	26	26.5	23.5	31.5	28.5	25	22	26	23	26.5	23.5	23.5	20.5	
50	36.5	27.5	34	25	39	30	32.5	23.5	33.5	24.5	34	25	31	22	
63	36.5	31.5	34	29	39	34	32.5	27.5	33.5	28.5	34	29	31	26	
80	44	33	41.5	30.5	46.5	35.5	40	29	41	30	41.5	30.5	38.5	27.5	
100	47.5	35.5	45	33	50	38	43.5	31.5	44.5	32.5	45	33	42	30	

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

## Auto Switch Mounting Heights

Bore size (mm)	D-M9□ D-M9□W D-M9□AL D-A9□	D-M9□V D-M9□WV D-M9□AVL	D-A9□V	D-A7□ D-A80	D-F7□ D-F7□W D-J79 D-J79W D-F7BAL D-F7NTL D-F79F D-A7□H D-A80H	D-A73C D-A80C	D-F7□V D-F7□WV D-F7BAVL	D-J79C	D-A79W
	U	U	U	U	U	U	U	U	U
20	26.5	26.5	26.5	24.5	25.5	31.5	28	31	27
32	24.5	29	27	31.5	32.5	38.5	35	38	34
40	28	32.5	30.5	35	36	42	38.5	41.5	37.5
50	34	38.5	36.5	41	42	48	44.5	47.5	43.5
63	37.5	42	40	47.5	48.5	54.5	51	54	50
80	47.5	52	50	57.5	58.5	64.5	61	64	60
100	57.5	62	60	67.5	68.5	74.5	71	74	70

CHQ

CHK□

CHN

CHM

CHS□

CH2□

CHA

Related Equipment

D-□

# Series CH□QB/CH□QWB

## Minimum Auto Switch Mounting Stroke

(mm)

Auto switch mounting number	D-M9□ D-M9□V D-F7□V D-J79C	D-A9□ D-A9□V D-A7□ D-A80 D-A7□H D-A80H D-A73C D-A80C	D-F7□ D-J79	D-M9□WV D-M9□AVL D-F7□W D-F7□WV D-J79W D-F7BAVL	D-M9□W D-M9□AL D-F7BAL D-F7NTL D-F79F	D-A79W
1 pc.	5	5	10	10	15	15
2 pcs.	5	10	10	15	15	20

## Operating Range

(mm)

Auto switch model	Bore size						
	20	32	40	50	63	80	100
D-M9□/M9□V D-M9□W/M9□WV D-M9□AL/M9□AVL	5.5	6.5	6	6.5	6	7	7.5
D-F7□/J79 D-F7□V/J79C D-F7□W/F7□WV D-F7BAL/F7BAVL D-F79F/J79W/F7NTL	5.5	6	5.5	6	6.5	6.5	6.5
D-A9□/A9□V	9	9	9	8.5	10.5	10	10.5
D-A7□/A80 D-A7□H/A80H D-A73C/A80C	11.5	11.5	11.5	11.5	13.5	12.5	14
D-A79W	15	15	15	15	17	16	17.5

\* 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.

Besides the models listed in "How to Order," the following auto switches are applicable.  
Refer to pages 347 to 406 for detailed auto switch specifications.

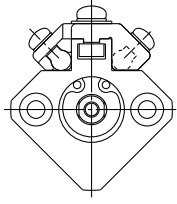
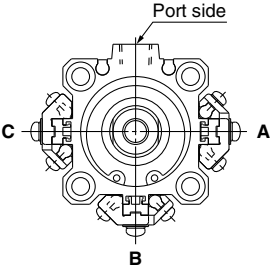
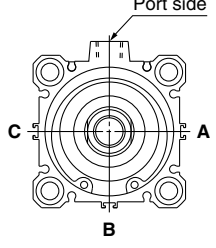
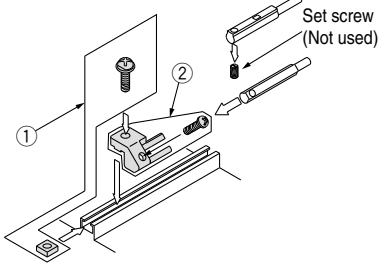
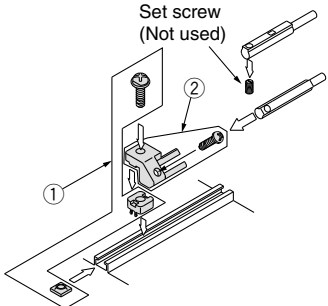
Auto switch type	Part no.	Electrical entry	Features
Solid state	D-F7NV, F7PV, F7BV	Grommet (perpendicular)	—
	D-F7NWV, F7BWV		Diagnostic indication (2-color display)
	D-F7BAVL		Water resistant (2-color display)
	D-F79, F7P, J79	Grommet (in-line)	—
	D-F79W, F7PW, J79W		Diagnostic indication (2-color display)
	D-F7BAL		Water resistant (2-color display)
	D-F7NTL		With timer
Reed	D-A73	Grommet (perpendicular)	—
	D-A80		Without indicator light
	D-A73H, A76H	Grommet (in-line)	—
	D-A80H		Without indicator light

\* Solid state switches are also available with pre-wired connector. Refer to pages 389 and 390 for details.

\* Normally closed (N.C. = b contact), solid state auto switches (D-F9G, F9H) are also available. For details, refer to page 365.



## Auto Switch Mounting Brackets: Part Nos.

Auto switch mounting surface	Bore size (mm)		
	ø20	ø32, ø40, ø50	ø63, ø80, ø100
			
Auto switch models	Auto switch mounting surface	Auto switch mounting surface	Auto switch mounting surface
	Auto switch mounting rail surface only	Port side	Port, A, B, C sides
<b>D-M9□</b> <b>D-M9□V</b> <b>D-M9□W</b> <b>D-M9□WV</b> <b>D-M9□AL</b> <b>D-M9□AVL</b> <b>D-A9□</b> <b>D-A9□V</b>	①BQ-1 ②BQ2-012 Two types of auto switch mounting bracket are used as a set.  	Auto switch mounting bracket not required.	①BQ-2 ②BQ2-012 Two types of auto switch mounting bracket are used as a set.  
		Auto switch mounting bracket not required.	Auto switch mounting bracket not required.

Note 1) To mount a compact auto switch on either of the three sides (A, B, and C above) other than the port side, mounting brackets are required separately other than the auto switch mounting brackets in the table above, so please order them separately from the cylinder.

(This is the same for when mounting a compact auto switch using an auto switch mounting rail, instead of using a compact auto switch mounting groove for ø63 to ø100.)

Example  
 CHDQB32-50-M9NW.....1 unit  
 BQ-2.....2 pcs.  
 BQ2-012.....2 pcs.

Note 2) Auto switch mounting brackets and auto switches are packed together at cylinder shipment.

Auto switch models	Bore size (mm)		
	ø20	ø32	ø40 to ø100
<b>D-F7□/J79</b> <b>D-F7□V</b> <b>D-J79C</b> <b>D-F7□W/J79W</b> <b>D-F7□WV</b> <b>D-F7BAL/F7BAVL</b> <b>D-F79F/F7NTL</b> <b>D-A7□/A80</b> <b>D-A73C/A80C</b> <b>D-A7□H/A80H</b> <b>D-A79W</b>	BQ-1		BQ-2

Note 3) Auto switch mounting brackets and auto switches are packed together at cylinder shipment.

### [Stainless steel mounting screw kits]

The following stainless mounting screw kits (including nuts) are available for use depending on the operating environment. (Auto switch spacers (for BQ-2) are not included. Please order BQ-2 separately.)

BBA2: For D-A7/A8/F7/J7 types

When D-F7BAL and F7BAVL auto switches are shipped mounted on a cylinder, the above stainless steel screws are used. Also when switches are shipped separately, BBA2 is included.

Note 4) Refer to the table below for details on BBA2.

Note 5) When an additional D-M9□A(V)/M9□(V)/M9□W(V), or M9□A(V)L auto switches, use stainless steel screws equivalent to the auto switch mounting brackets appropriate for each cylinder series.

### Stainless mounting screw kit details

Part no.	Contents				Applicable auto switch mounting bracket part nos.	Applicable auto switches
	No.	Description	Size	Pcs.		
BBA2	1	Auto switch mounting screws	M3 x 0.5 x 6L	1	BMU-1-025	D-A7/A8 D-F7/J7
			M3 x 0.5 x 8L	1	BQ-1	
			M3 x 0.5 x 10L	1	BQ-2	
2	Auto switch mounting nuts (square nut)	M3 x 0.5	1	BQ-1		
				BQ-2		
3	Auto switch mounting nuts (convex)	M3 x 0.5	1	BQ-2		

Note 6) Spacers (black resin) for BQ-2 are not included.

Note 7) Also when using BQ2-012 with D-A9□(V)/M9□(V)/M9□W(V), or M9□A(V)L auto switches, use stainless steel screws equivalent to the auto switch mounting brackets appropriate for each cylinder series.

### Mass of auto switch mounting bracket

Mounting bracket part no.	Applicable cylinder I.D.	Mass (g)
BQ-1	ø20	1.5
BQ-2	ø32 to ø100	1.5
BQ2-012	ø20	5

- CHQ**
- CHK□
- CHN
- CHM
- CHS□
- CH2□
- CHA
- Related Equipment
- D-□

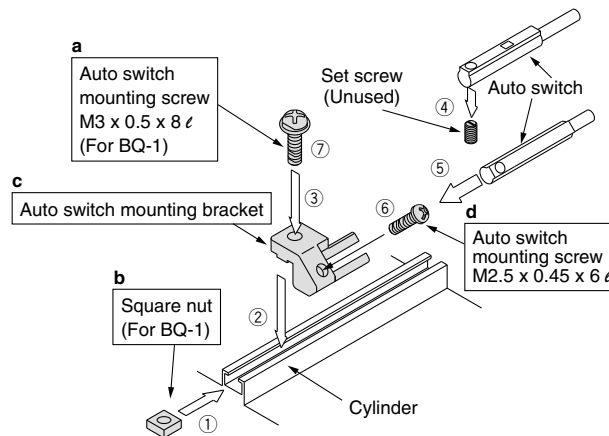
## How to Mount and Move the Auto Switch

### <Applicable auto switch>

Solid state ..... D-M9N(V), D-M9P(V), D-M9B(V)  
 D-M9NW(V), D-M9PW(V), D-M9BW(V)  
 D-M9NA(V), D-M9PA(V), D-M9BA(V)  
 Reed ..... D-A90(V), A93(V), A96(V)

#### ø20

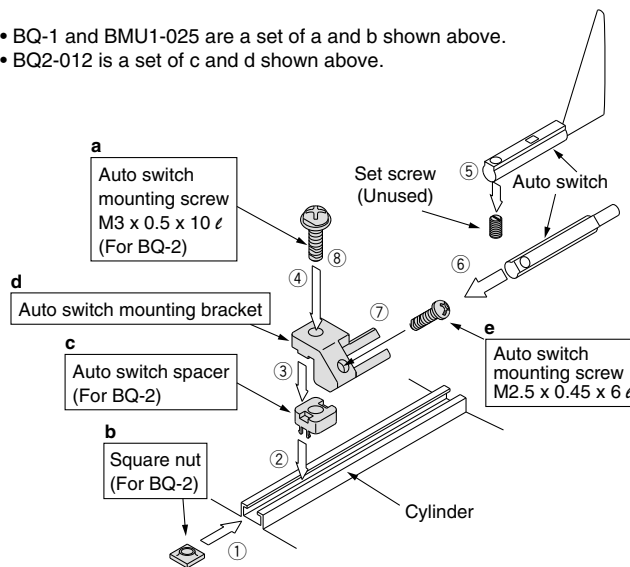
1. Insert the square nut for BQ-1 in the auto switch mounting rail and set it at the approximate auto switch mounting position.
2. Fit the convex part of the auto switch mounting bracket arm over the concave part of the rail, and slide the arm to the nut position.
3. Push the auto switch mounting screw (M3 for BQ-1) lightly into the square nut through the hole of the auto switch mounting arm.
4. Remove the set screw (M2.5) attached to the auto switch.
5. Insert the auto switch in the auto switch attachment part of the auto switch mounting bracket.
6. Secure the auto switch mounting screw (M2.5). (Tightening torque of M2.5 screw: 0.1 to 0.2 N·m)
7. Secure the auto switch mounting screw (3) after confirming the detecting position. (Tightening torque of M3 screw: 0.5 to 0.7 N·m)
8. Modify the detecting position while the auto switch is secured at the position of (3) in the figure.



- BQ-1 and BMU1-025 are a set of a and b shown above.
- BQ2-012 is a set of c and d shown above.

#### ø32 to ø100

1. Insert the square nut for BQ-2 in the auto switch mounting rail and set it at the approximate auto switch mounting position.
2. Fit the protruding part of the auto switch mounting spacer over the concave part of the rail, and slide the spacer to the nut position.
3. Fit the convex part of the auto switch mounting bracket arm over the concave part of the switch spacer.
4. Turn the auto switch mounting screw (M3 for BQ-2) lightly into the square nut through the mounting holes of the auto switch mounting arm and switch spacer.
5. Remove the set screw (M2.5) attached to the auto switch.
6. Insert the auto switch in the auto switch attachment part of the auto switch mounting bracket.
7. Secure the auto switch mounting screw (M2.5). (Tightening torque of M2.5 screw: 0.1 to 0.2 N·m)
8. Secure the auto switch mounting screw (4) after confirming the detecting position. (Tightening torque of M3 screw: 0.5 to 0.7 N·m)
9. Modify the detecting position while the auto switch is secured at the position of (4) in the figure.



- BQ-2 is a set of a, b and c shown above.
- BQ2-012 is a set of c, d and e shown above.

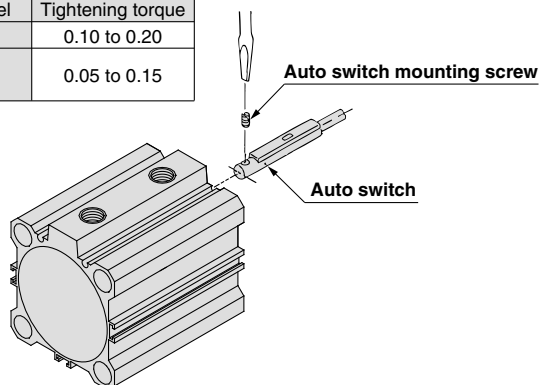
#### ø32 to ø100

- When tightening an auto switch mounting screw, use a watchmaker's screwdriver with a grip diameter of 5 to 6 mm.

### Tightening torque for

#### auto switch mounting screw (N·m)

Auto switch model	Tightening torque
D-A9□(V)	0.10 to 0.20
D-M9□(V)	0.05 to 0.15
D-M9□W(V)	



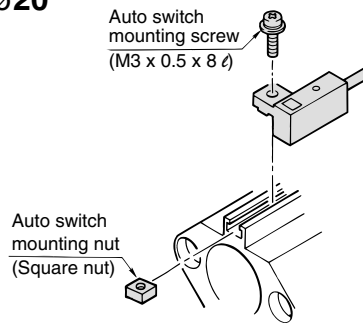
## <Applicable auto switch>

**Solid state** ..... D-F79, D-F7P, D-J79, D-F7NV  
 D-F7PV, D-F7BV, D-J79C  
 D-F79W, D-F7PW, D-J79W  
 D-F7NWV, D-F7BWV  
 D-F79F, D-F7BAL, D-F7BAVL  
 D-F7NTL

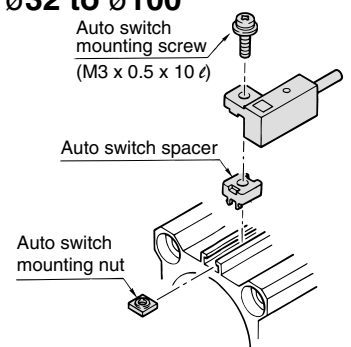
**Reed** ..... D-A72, D-A73, D-A80, D-A72H  
 D-A73H, D-A76H, D-A80H  
 D-A73C, D-A80C, D-A79W

1. Slide the auto switch mounting nut inserted into the mounting rail and set it at the auto switch mounting position.
2. Fit the convex part of auto switch mounting arm into the concave part of auto switch mounting rail. Then slide the switch over the nut.  
 (Series CDQ2: Fit the convex part of auto switch mounting arm through the auto switch spacer into the concave part of auto switch mounting rail.)
3. Push the auto switch mounting screw lightly into the mounting nut through the hole of auto switch mounting arm.
4. After reconfirming the detecting position, tighten the mounting screw to secure the auto switch.  
 (Tightening torque of M3 screw should be 0.5 to 0.7 N·m.)
5. Modification of the detecting position should be made in the condition of 3.

∅20



∅32 to ∅100



**CHQ**

CHK□

CHN

CHM

CHS□

CH2□

CHA

Related Equipment

D-□

# JIS Standard Compact Hydraulic Cylinder Compact Hydraulic Cylinder

## Series **CHKD/CHKG**

### Series **CHKD**



Nominal pressure: **10 MPa**

Bore size (mm): 20, 25, 32, 40, 50, 63, 80, 100

### Series **CHKG**



Nominal pressure: **16 MPa**

Bore size (mm): 20, 25, 32, 40, 50, 63, 80, 100

CHQ

CHK

CHN

CHM

CHS

CH2

CHA

Related  
Equipment

D-

# JIS Standard Compact Hydraulic Cylinder

## Series CH□KD

10 MPa

∅20, ∅25, ∅32, ∅40, ∅50, ∅63, ∅80, ∅100

### How to Order

**With Auto Switch** CHDKD B 32 □ - 30 □ - M9BW □ - □

**With auto switch (built-in magnet)**

**Mounting bracket style**

Symbol	Style	Port position <small>Note)</small>
B	Basic style	—
L	Foot style	Top
LB		Right
LD		Left

Note) Indicates the relative position of the foot bracket and port, as seen from the rod side.

**Bore size**

Symbol	Bore size (mm)
20	20 mm
25	25 mm
32	32 mm
40	40 mm
50	50 mm
63	63 mm
80	80 mm
100	100 mm

**Port thread type**

Symbol	Thread type
Nil	Rc
TN	NPT

**Auto switch type**

Symbol	Auto switch type
Nil	Without auto switch

\* Select applicable auto switch models from the table below.

**Number of auto switches**

Symbol	Number of auto switches
Nil	2 pcs.
S	1 pc.
n	"n" pcs.

**Auto switch type**

Symbol	Auto switch type
Nil	Female thread
M	Male thread

\* Rod end thread type is an optional product. (Refer to page 186).

**Rod end thread type**

Symbol	Thread type
Nil	Female thread
M	Male thread

\* Rod end thread type is an optional product. (Refer to page 186).

**Cylinder stroke (mm)**

Refer to the standard stroke table on page 185.

**Made to order specifications**

For details, refer to page 185.

**Built-in Magnet Cylinder Model**

If a built-in magnet cylinder without auto switch is required, there is no need to enter the symbol for the auto switch. (Example) CHDKDB50-100

**Applicable Auto Switches:** Refer to pages 347 to 406 for further details on each auto switch.

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	Electrical entry direction		0.5 (Nil)	1 (M)	3 (L)	5 (Z)			
							Perpendicular	In-line							
Solid state switch	—	Grommet	Yes	3-wire (NPN)	5 V, 12 V	—	M9NV	M9N	●	●	●	○	○	IC circuit	
				3-wire (PNP)			M9PV	M9P	●	●	●	○	○		
				2-wire	M9BV		M9B	●	●	●	○	○	—		
				3-wire (NPN)	M9NWV		M9NW	●	●	●	○	○	IC circuit		
	3-wire (PNP)			M9PWV	M9PW		●	●	●	○	○				
	Diagnostic indication (2-color display)			2-wire	M9BWV		M9BW	●	●	●	○	○	—		
				3-wire (NPN)	M9NAV		M9NA	○	○	●	○	○	IC circuit		
	Water resistant (2-color display)			3-wire (PNP)	M9PAV		M9PA	○	○	●	○	○			
2-wire		M9BAV	M9BA	○	○	●	○	○	—						
Reed switch	—	Grommet	Yes	3-wire (NPN)	5 V	—	*A96V	*A96	●	—	●	—	—	IC circuit	
				2-wire			24 V	12 V	100 V	*A93V	*A93	●	—		●
				2-wire	24 V		12 V	100 V or less	*A90V	*A90	●	—	●	—	IC circuit

\* Lead wire length symbols: 0.5 m ..... Nil (Example) M9NV  
 1 m ..... M (Example) M9NV  
 3 m ..... L (Example) M9NV  
 5 m ..... Z (Example) M9NV

\* Solid state auto switches marked "○" are produced upon receipt of order.  
 \* The D-A9 model cannot be mounted on ∅50.

\* For ∅32 to ∅100, there are applicable auto switches other than listed. Refer to page 193 for details.  
 \* For details about auto switches with pre-wired connector, refer to pages 389 and 390.  
 \* Cylinders with auto switch will be shipped together with the auto switch and auto switch mounting bracket (∅32 to ∅50) (not assembled).

## Specifications



Bore size (mm)	20	25	32	40	50	63	80	100
<b>Action</b>	Double acting/Single rod							
<b>Fluid</b>	Hydraulic fluid							
<b>Nominal pressure</b>	10 MPa							
<b>Proof pressure</b>	15 MPa							
<b>Maximum allowable pressure</b>	13 MPa							
<b>Minimum operating pressure</b>	0.3 MPa							
<b>Ambient and fluid temperature</b>	Without auto switch: -10° to 80°C							
	With auto switch: -10° to 60°C							
<b>Piston speed</b>	8 to 100 mm/s							
<b>Cushion</b>	None							
<b>Rod end thread</b>	Female thread, Male thread							
<b>Stroke length tolerance</b>	+0.8 0 mm							
<b>Mounting style</b>	Basic style (through hole), Foot style							

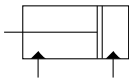
Note) Refer to page 134 for definitions of terms related to pressure.



**Made to order specifications**  
(For details, refer to pages 195 to 197)

Symbol	Specifications
<b>-XC61</b>	Compatible with CHQHB series (14 MPa)
<b>-XC63</b>	Intermediate stroke type (Built-in spacer type)
<b>-XC64</b>	With air release valve

JIS symbol



## Standard Strokes

Stroke (mm) \ Bore size (mm)	Stroke (mm)										75				100			
	5	10	15	20	25	30	35	40	45	50	Intermediate stroke [XC63] (Built-in spacer type)				Intermediate stroke [XC63] (Built-in spacer type)			
	55	60	65	70	80	85	90	95										
<b>20, 25</b>	○	○	○	○	○	○	○	○	○	○	—	—	—	—	—	—	—	—
<b>32</b>	○	○	○	○	○	○	○	○	○	○	□	□	□	□	○	—	—	—
<b>40, 50, 63, 80, 100</b>	○	○	○	○	○	○	○	○	○	○	□	□	□	□	○	□	□	□

○: Standard stroke (dedicated cylinder tube)  
□: Intermediate stroke XC63 (built-in spacer type)

## Manufacture of Intermediate Stroke Cylinders [XC63] (Built-in spacer type)

Intermediate strokes in 5 mm increments can be manufactured by installing spacers inside standard stroke cylinders. 55, 60, 65 and 70 mm stroke cylinders have the same overall length as a 75 mm stroke cylinder, and 80, 85, 90 and 95 mm stroke cylinders have the same length as a 100 mm stroke cylinder. Refer to the Made to Order Specifications on page 196 for the ordering procedure.

## Hydraulic Fluid Compatibility

Hydraulic fluid	Compatibility
<b>Standard mineral hydraulic fluid</b>	Compatible
<b>W/O hydraulic fluid</b>	Compatible
<b>O/W hydraulic fluid</b>	Compatible
<b>Water/Glycol hydraulic fluid</b>	*
<b>Phosphate hydraulic fluid</b>	Not compatible

\* Consult with SMC.

CHQ

CHK□

CHN

CHM

CHS□

CH2□

CHA

Related Equipment

D-□

## Theoretical Output

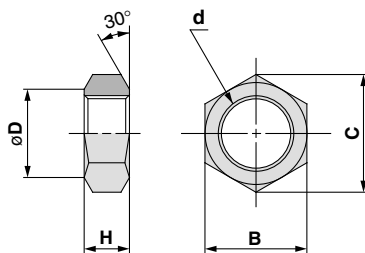
Unit: N

Bore size (mm)	Rod size (mm)	Operating direction	Piston area (mm <sup>2</sup> )	Operating pressure (MPa)		
				3.5	7	10
20	12	OUT	314	1099	2198	3140
		IN	201	704	1407	2010
25	14	OUT	490	1715	3430	4900
		IN	336	1176	2352	3360
32	18	OUT	804	2814	5628	8040
		IN	549	1922	3843	5490
40	22.4	OUT	1256	4396	8792	12560
		IN	862	3017	6034	8620
50	28	OUT	1963	6871	13741	19630
		IN	1347	4715	9429	13470
63	35.5	OUT	3117	10910	21819	31170
		IN	2127	7445	14889	21270
80	45	OUT	5026	17591	35182	50260
		IN	3436	12026	24052	34360
100	56	OUT	7853	27486	54971	78530
		IN	5390	18865	37730	53900

 Theoretical output (N) = Pressure (MPa) x Piston area (mm<sup>2</sup>)

## Optional Parts

### Rod end nut



Part no.	Bore size (mm)	B	C	d	D	H
NTH-020	20	13	15	M8 x 1	12.5	5
NTH-025	20	17	19.6	M10 x 1.25	16.5	6
NTH-032	25	19	21.9	M12 x 1.25	18	7
NTH-040	32	22	25.4	M16 x 1.5	21	10
NTH-050	40	27	31.2	M20 x 1.5	26	12
NTH-060	50	32	37	M24 x 1.5	31	14
NTH-080	63	41	47.3	M30 x 1.5	40	17
NTH-100	80	55	63.5	M39 x 1.5	54	20
NTH-125	100	70	80.8	M48 x 1.5	69	26

(Note) There may be a slight difference between the part numbers and the corresponding bore size.

## Mass

### CH□KDB/Basic style

Unit: g

Bore size (mm)	Standard stroke (mm)											
	5	10	15	20	25	30	35	40	45	50	75	100
20	218	240	262	282	304	326	348	370	392	414	—	—
25	299	327	355	383	411	439	467	495	523	551	—	—
32	515	558	601	644	687	730	773	816	859	902	1117	1332
40	729	784	839	894	949	1004	1059	1114	1169	1224	1499	1774
50	1065	1139	1213	1287	1361	1435	1509	1583	1657	1731	2101	2471
63	1773	1882	1991	2100	2209	2318	2427	2536	2645	2754	3299	3844
80	3216	3379	3542	3868	4031	4194	4357	4520	4683	4846	5661	6476
100	6142	6384	6626	6868	7110	7352	7594	7836	8078	8320	9530	10740

### CH□KDL/Foot style

Unit: g

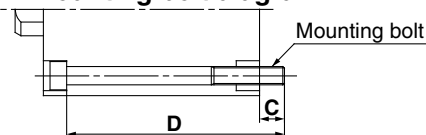
Bore size (mm)	Standard stroke (mm)											
	5	10	15	20	25	30	35	40	45	50	75	100
20	465	490	510	535	560	580	605	630	650	675	—	—
25	570	600	630	660	690	720	750	780	810	840	—	—
32	880	925	970	1015	1060	1100	1150	1190	1235	1280	1505	1730
40	1375	1435	1495	1550	1610	1670	1725	1785	1845	1900	2195	2485
50	2200	2280	2360	2435	2515	2595	2675	2755	2835	2910	3310	3705
63	3845	3960	4075	4195	4310	4425	4545	4660	4775	4895	5475	6060
80	6555	6725	6900	7235	7410	7580	7755	7930	8100	8275	9150	10010
100	11355	11610	11865	12120	12375	12630	12885	13140	13400	13655	14930	16210

## Mounting Bolts for CH□KDB

Through hole type mounting bolts are available.  
How to order: Add "Bolt" in front of the bolts to be used.

**Example: M8 x 80L 4 pcs.**

Mounting bolt diagram



Model	C	D	Mounting bolt
<b>CH□KDB20-5 (M)</b>	12.4	55	M5 x 55L
-10 (M)		60	x 60L
-15 (M)		65	x 65L
-20 (M)		70	x 70L
-25 (M)		75	x 75L
-30 (M)		80	x 80L
-35 (M)		85	x 85L
-40 (M)		90	x 90L
-45 (M)		95	x 95L
-50 (M)		100	x 100L
<b>CH□KDB25-5 (M)</b>		10.4	55
-10 (M)	60		x 60L
-15 (M)	65		x 65L
-20 (M)	70		x 70L
-25 (M)	75		x 75L
-30 (M)	80		x 80L
-35 (M)	85		x 85L
-40 (M)	90		x 90L
-45 (M)	95		x 95L
-50 (M)	100		x 100L
<b>CH□KDB32-5 (M)</b>	10.5	60	M6 x 60L
-10 (M)		65	x 65L
-15 (M)		70	x 70L
-20 (M)		75	x 75L
-25 (M)		80	x 80L
-30 (M)		85	x 85L
-35 (M)		90	x 90L
-40 (M)		95	x 95L
-45 (M)		100	x 100L
-50 (M)		105	x 105L
-75 (M)	130	x 130L	
<b>CH□KDB40-5 (M)</b>	13.5	65	M8 x 65L
-10 (M)		70	x 70L
-15 (M)		75	x 75L
-20 (M)		80	x 80L
-25 (M)		85	x 85L
-30 (M)		90	x 90L
-35 (M)		95	x 95L
-40 (M)		100	x 100L
-45 (M)		105	x 105L
-50 (M)		110	x 110L
-75 (M)		135	x 135L
-100 (M)	160	x 160L	

Model	C	D	Mounting bolt
<b>CH□KDB50-5 (M)</b>	15.8	70	M10 x 70L
-10 (M)		75	x 75L
-15 (M)		80	x 80L
-20 (M)		85	x 85L
-25 (M)		90	x 90L
-30 (M)		95	x 95L
-35 (M)		100	x 100L
-40 (M)		105	x 105L
-45 (M)		110	x 110L
-50 (M)		115	x 115L
-75 (M)		140	x 140L
-100 (M)		165	x 165L
<b>CH□KDB63-5 (M)</b>		16	75
-10 (M)	80		x 80L
-15 (M)	85		x 85L
-20 (M)	90		x 90L
-25 (M)	95		x 95L
-30 (M)	100		x 100L
-35 (M)	105		x 105L
-40 (M)	110		x 110L
-45 (M)	115		x 115L
-50 (M)	120		x 120L
-75 (M)	145		x 145L
-100 (M)	170	x 170L	
<b>CH□KDB80-5 (M)</b>	22.2	90	M14 x 90L
-10 (M)		95	x 95L
-15 (M)		100	x 100L
-20 (M)		105	x 105L
-25 (M)		110	x 110L
-30 (M)		115	x 115L
-35 (M)		120	x 120L
-40 (M)		125	x 125L
-45 (M)		130	x 130L
-50 (M)		135	x 135L
-75 (M)		160	x 160L
-100 (M)		185	x 185L
<b>CH□KDB100-5 (M)</b>		26.5	110
-10 (M)	115		x 115L
-15 (M)	120		x 120L
-20 (M)	125		x 125L
-25 (M)	130		x 130L
-30 (M)	135		x 135L
-35 (M)	140		x 140L
-40 (M)	145		x 145L
-45 (M)	150		x 150L
-50 (M)	155		x 155L
-75 (M)	180		x 180L
-100 (M)	205		x 205L

CHQ

CHK□

CHN

CHM

CHS□

CH2□

CHA

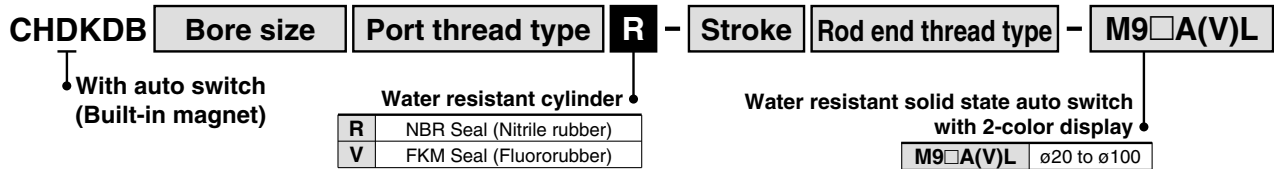
Related Equipment

D-□



## Water Resistant Type

A special scraper is installed on the basic cylinder to prevent liquid in the surrounding area from entering the cylinder. It can be used in environments where exposure to machine tool coolants is likely, as well as in environments where water spray and splashing is frequent, such as in food processing machinery and car washing equipment.



Refer to page 185 for specifications.

## ⚠ Specific Product Precautions

Be sure to read before handling. Refer to front matters 30 and 31 for Safety Instructions, and pages 134 to 142 for precautions for hydraulic cylinder and auto switch.

### Usage

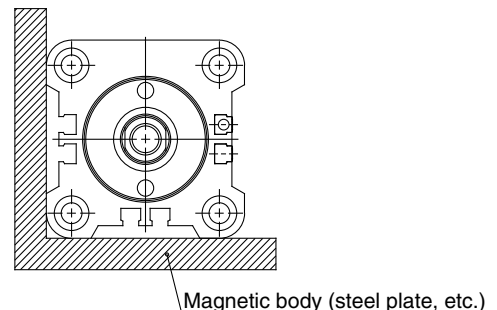
#### ⚠ Caution

1. Use hexagon socket head cap screws (JISB1176, strength class 10.9 or higher) for cylinder mounting.
2. Since a lateral load (eccentric load) cannot be applied to the piston rod, build the mounting jig in such a way that a lateral load will not be applied to the piston rod.
3. Make sure that the interlocking length of the rod end thread (male or female thread) and the mounting material is at least 80% of the thread diameter.
4. When operating a cylinder for the first time, be sure to release the air inside the cylinder and the piping. When the air release is complete, operate the cylinder at reduced pressure, then gradually increase it to the normal operating pressure.
5. Since Series CH□KDB does not have an air release plug, release air from other components (e.g. from piping, etc.) as well.
6. Do not use two cylinders facing one another horizontally or vertically in such a way that their piston rods strike each other.
7. When the cylinder head side contains hydraulic fluid or is in a normally pressurized condition, the applied load must not be allowed to strike the piston rod end. Avoid such applications.
8. When mounting the cylinder body with mounting bolts, use tightening torques in the table at left as a guide.

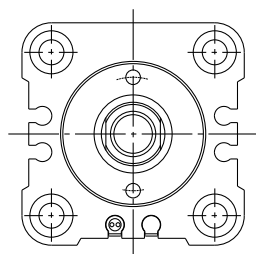
#### Body mounting bolt tightening torques

Bore size (mm)	Mounting bolt size	Tightening torque (N·m)
20	M5	2.5
25	M5	4
32	M6	7
40	M8	16
50	M10	30
63	M12	40
80	M14	70
100	M16	100

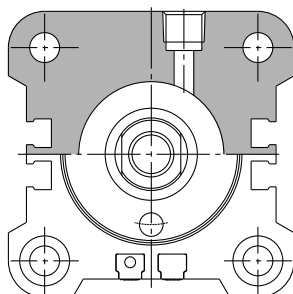
Consult with SMC when using a cylinder in close proximity to a magnetic body (including proximity on any side) as shown in the figure below, as the operation of auto switches may become unstable.



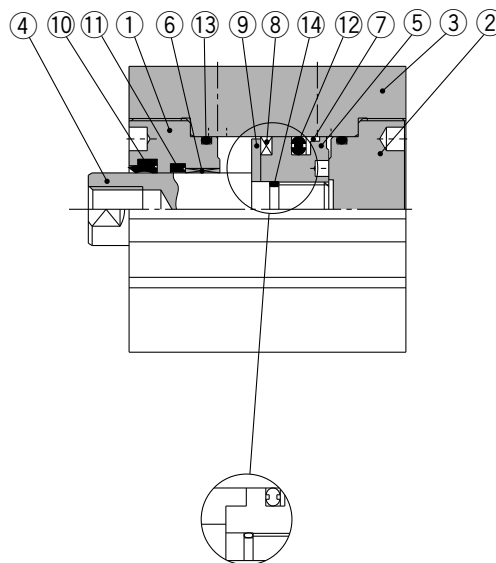
## Construction



ø20 to ø25



ø32 to ø100



Without auto switch

### Parts List

No.	Description	Material	Note
1	Rod cover	Aluminum alloy	Black anodized
2	Head cover	Aluminum alloy	Black anodized
3	Cylinder tube	Aluminum alloy	Hard anodized
4	Piston rod	ø20, ø25 Stainless steel	Hard chromium electroplated
		ø32 to ø100 Carbon steel	
5	Piston	Stainless steel	
6	Bushing	Copper alloy	
7	Back-up ring	Resin	
8	Magnet	—	With auto switch only
9	Magnet plate	Stainless steel	With auto switch only
10	Scraper	NBR	
11	Rod seal		
12	Piston seal		
13	Tube gasket		
14	Piston gasket		

### Replacement Parts/Seal Kit

Bore size (mm)	Seal kit no.	Content
20	CHKD20-PS	Nos. ⑦, ⑩, ⑪, ⑫, and ⑬ from the chart at left
25	CHKD25-PS	
32	CHKD32-PS	
40	CHKD40-PS	
50	CHKD50-PS	
63	CHKD63-PS	
80	CHKD80-PS	
100	CHKD100-PS	

\* Seal kit consists of items ⑦, ⑩, ⑪, ⑫ and ⑬, and can be ordered by using the seal kit number for each bore size.

\* Special tools are necessary for disassembly. Contact SMC for recommended tool designs and dimensions. Furthermore, ø80 and ø100 are tightened with a large tightening torque, so disassembly will be difficult. Contact SMC if disassembly is required.

CHQ

CHK□

CHN

CHM

CHS□

CH2□

CHA

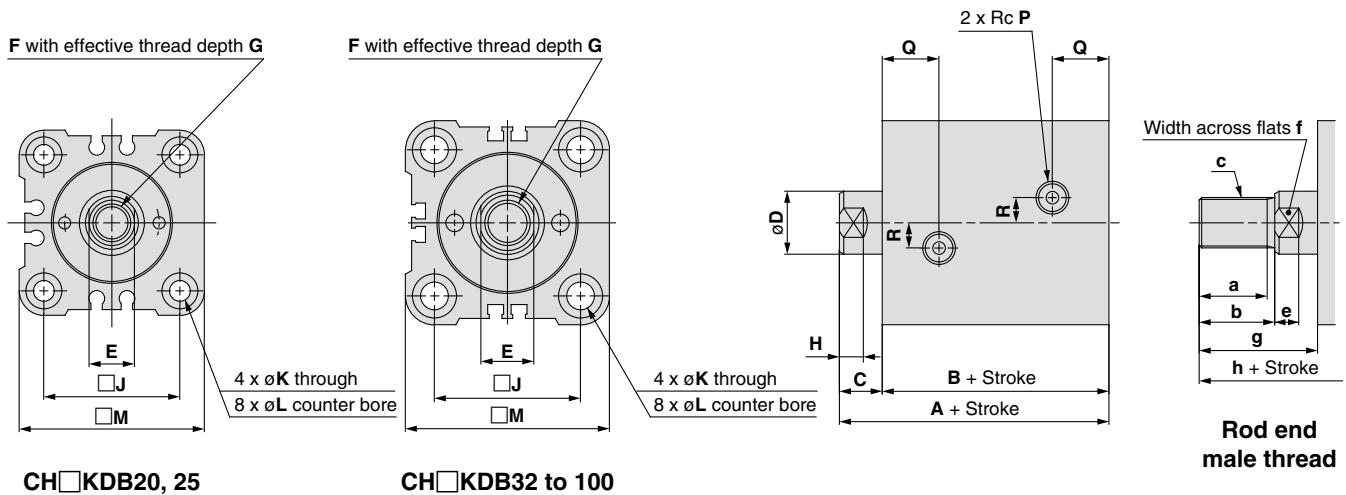
Related Equipment

D-□

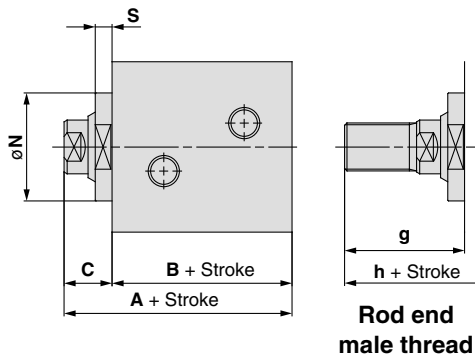
# Series CH□KD

## Dimensions

### Basic style/CH□KDB



### Water resistant type



Bore size (mm)	A	B	C	D	E	F	G	H	J	K	L	M	P	Q	R
20	51	43	8	12	10	M8 x 1.25	10	6	30	5.5	9.5 depth 5.4	43	1/8	16.5	6
25	53	45	8	14	12	M10 x 1.5	12	6	36	5.5	9.5 depth 5.4	49	1/8	17	8
32	61	51	10	18	14	M12 x 1.75	15	7	47	6.6	11 depth 6.5	63	1/4	19.5	10
40	65	55	10	22.4	19	M16 x 2	20	7	52	9	14 depth 8.6	71	1/4	20.5	10
50	71	60	11	28	24	M20 x 2.5	24	8	58	11	17.5 depth 10.8	81	1/4	22	10
63	80	67	13	35.5	30	M27 x 3	33	9	69	13	20 depth 13	97	1/4	25.5	10
80	95	78	17	45	41	M30 x 3.5	36	14	86	15	23 depth 15.2	117	3/8	30	15
100	122	96	26	56	50	M39 x 4	45	21	106	17	26 depth 17.5	142	3/8	36	15

Note 1) Body dimensions are the same with or without auto switches.

### Rod end male threads

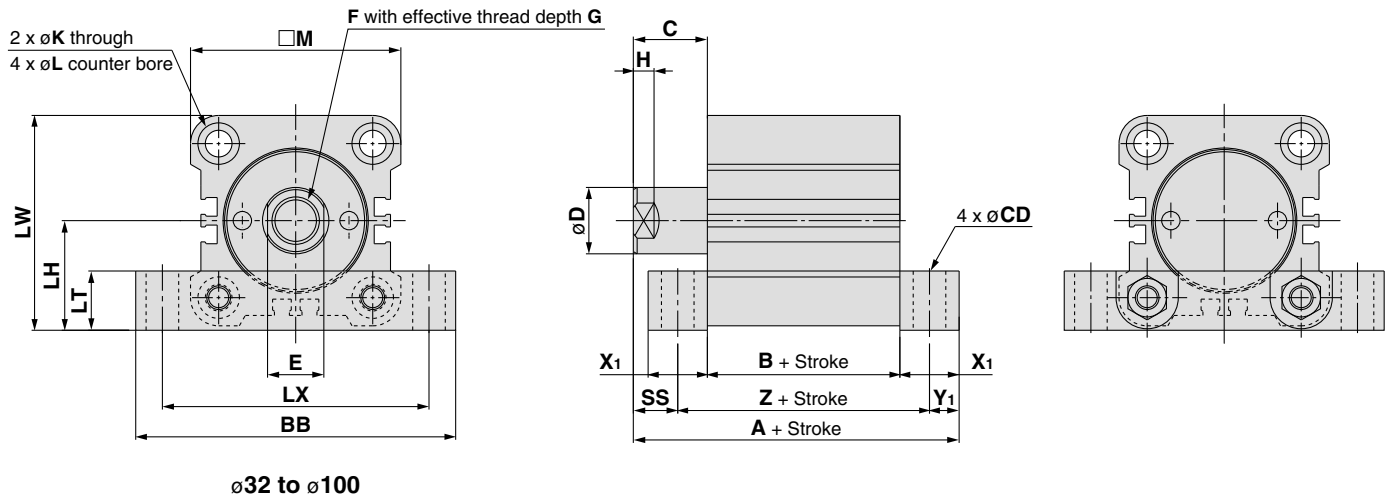
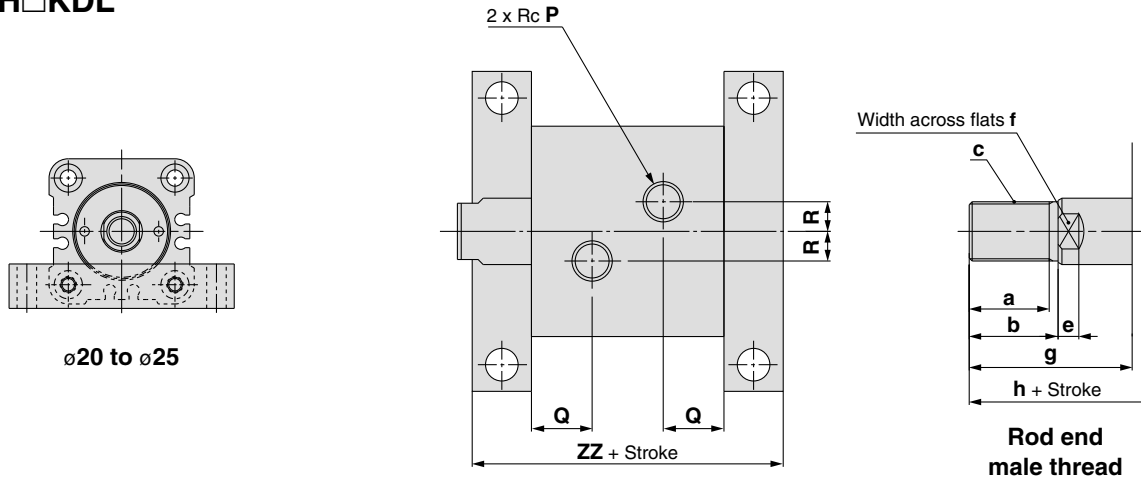
Bore size (mm)	a	b	c	e	f	g	h
20	12.5	15	M10 x 1.25	6	10	23	66
25	15.5	18	M12 x 1.25	6	12	26	71
32	22	25	M16 x 1.5	7	14	35	86
40	27	30	M20 x 1.5	7	19	40	95
50	32	35	M24 x 1.5	8	24	46	106
63	42	45	M30 x 1.5	9	30	58	125
80	57	60	M39 x 1.5	14	41	77	155
100	72	75	M48 x 1.5	21	50	101	197

### Water resistant type

Bore size (mm)	A	B	C	N	S	g	h
20	61	43	18	26.5	6	33	76
25	63	45	18	30	6	36	81
32	71	51	20	38	7	45	96
40	75	55	20	45	7	50	105
50	81	60	21	55	7	56	116
63	90	67	23	66	7	68	135
80	105	78	27	86	7	87	165
100	132	96	36	104	7	111	207

**Dimensions**

**Foot style/CH□KDL**



- CHQ
- CHK□
- CHN
- CHM
- CHS□
- CH2□
- CHA
- Related Equipment
- D-□

Bore size (mm)	A	B	BB	C	CD	D	E	F	G	H	K	L	LH	LT	LX
20	76	43	70	18	6.6	12	10	M8 x 1.25	10	6	5.5	9.5 depth 5.4	23	15	58
25	78	45	76	18	6.6	14	12	M10 x 1.5	12	6	5.5	9.5 depth 5.4	26	15	64
32	86	51	94	19	9	18	14	M12 x 1.75	15	7	6.6	11 depth 6.5	33	16	79
40	98	55	108	23	11	22.4	19	M16 x 2	20	7	9	14 depth 8.6	37	20	90
50	111	60	126	27	14	28	24	M20 x 2.5	24	8	11	17.5 depth 10.8	43	24	104
63	130	67	146	33	16	35.5	30	M27 x 3	33	9	13	20 depth 13	52	30	121
80	151	78	172	38	18	45	41	M30 x 3.5	36	14	15	23 depth 15.2	63	35	144
100	179	96	208	43	22	56	50	M39 x 4	45	21	17	26 depth 17.5	76	40	174

Note 1) Body dimensions are the same with or without auto switches.

Bore size (mm)	LW	M	P	Q	R	SS	X <sub>1</sub>	Y <sub>1</sub>	Z	ZZ
20	44.5	43	1/8	16.5	6	10.5	15	7.5	58	73
25	50.5	49	1/8	17	8	10.5	15	7.5	60	75
32	64.5	63	1/4	19.5	10	11	16	8	67	83
40	72.5	71	1/4	20.5	10	13	20	10	75	95
50	83.5	81	1/4	22	10	15	24	12	84	108
63	100.5	97	1/4	25.5	10	18	30	15	97	127
80	121.5	117	3/8	30	15	20.5	35	17.5	113	148
100	147	142	3/8	36	15	23	40	20	136	176

Bore size (mm)	a	b	c	e	f	g	h
20	12.5	15	M10 x 1.25	6	10	33	91
25	15.5	18	M12 x 1.25	6	12	36	96
32	22	25	M16 x 1.5	7	14	44	111
40	27	30	M20 x 1.5	7	19	53	128
50	32	35	M24 x 1.5	8	24	62	146
63	42	45	M30 x 1.5	9	30	78	175
80	57	60	M39 x 1.5	14	41	98	221
100	72	75	M48 x 1.5	21	50	118	254

# Series CH□KD Auto Switch Specifications

Refer to pages 347 to 406 for detailed specifications.

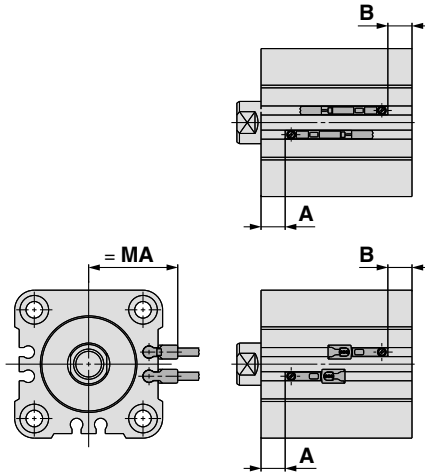


## Auto Switches: Proper Mounting Positions and Mounting Heights for Stroke End Detection

ø20, ø25

D-M9□  
D-M9□W  
D-M9□AL  
D-A9□

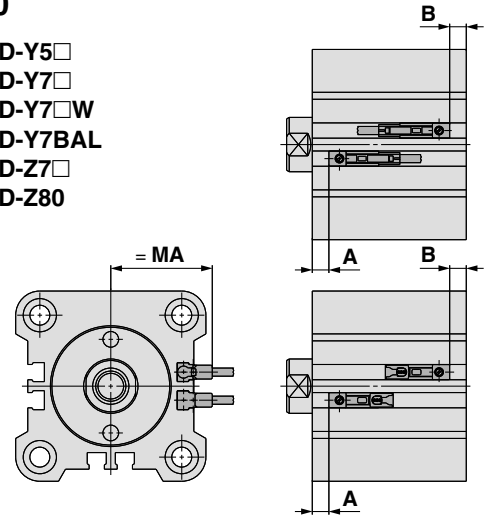
D-M9□V  
D-M9□WV  
D-M9□AVL  
D-A9□V



ø32 to ø100

D-M9□  
D-M9□W  
D-M9□AL  
D-A9□  
D-Y5□  
D-Y7□  
D-Y7□W  
D-Y7BAL  
D-Z7□  
D-Z80

D-M9□V  
D-M9□WV  
D-M9□AVL  
D-Y6□  
D-Y7□V  
D-Y7□WV  
D-A9□V



## Auto Switch Proper Mounting Positions

(mm)

Bore size (mm)	Solid state auto switch				Reed auto switch			
	D-M9□/M9□V D-M9□W/M9□WV D-M9□AL/M9□AVL		D-Y59□/Y69□ D-Y7□/Y7□V D-Y7□W/Y7□WV D-Y7BAL		D-A9□/A9□V		D-Z7□/Z80	
	A	B	A	B	A	B	A	B
20	12	19	—	—	8	15	—	—
25	13	20	—	—	9	16	—	—
32	15	21.5	10	16.5	11	17.5	10	16.5
40	17	23.5	12	18.5	13	19.5	12	18.5
50	18	27.5	13	22.5	—	—	13	22.5
63	21.5	31	16.5	26	17.5	27	16.5	26
80	23.5	40	18.5	35	19.5	36	18.5	35
100	31.5	49.5	26.5	44.5	27.5	45.5	26.5	44.5

Note 1) D-A9□/A9□V models cannot be mounted on ø50.

Note 2) Adjust the auto switch after confirming the operating conditions in the actual setting.

## Auto Switch Mounting Heights

(mm)

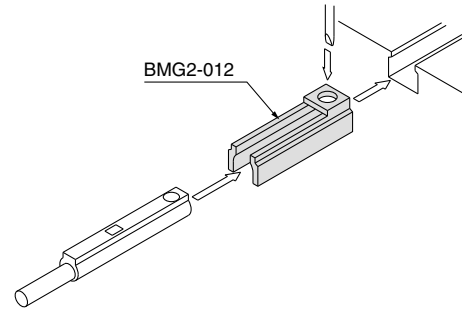
Bore size (mm)	D-M9□ D-M9□W D-M9□AL D-A9□	D-M9□V D-M9□WV D-M9□AVL	D-A9□V	D-Y59□ D-Y7P D-Y7□W D-Y7BAL D-Z7□ D-Z80	D-Y69□ D-Y7PV D-Y7□WV
	U	U	U	U	U
20	21.5	28	25.5	—	—
25	24.5	30	27.5	—	—
32	31.5	34	31.5	31.5	31.5
40	35.5	38.5	36	35.5	35.5
50	40.5 <sup>Note)</sup>	44.5	— <sup>Note)</sup>	40.5	41.5
63	48.5	53	50.5	48.5	50
80	58.5	63.5	61	58.5	60.5
100	71	76	73.5	71	73

Note 1) D-A9□/A9□V models cannot be mounted on ø50.

### Auto Switch Mounting Brackets: Part Nos.

Auto switch models	Bore size (mm)	
	ø32 to ø100	
D-M9□/M9□V D-M9□W/M9□WV D-M9□AL/M9□AVL D-A9□/A9□V	BMG2-012	

Note 1) D-A9□/A9□V models cannot be mounted on ø50.



\* Examples of D-A9□(V), M9□(V), M9□W(V), M9□A(V)L models mounted on CHKD.

### Minimum Auto Switch Mounting Stroke

Auto Switch Mounting Number	(mm)				
	D-M9□ D-M9□V D-Y59□ D-Y69□ D-Y7P D-Y7PV	D-A9□ D-A9□V D-Z7□ D-Z80	D-Y7□W D-Y7□WV	D-M9□W D-M9□WV D-M9□AL D-M9□AVL	D-Y7BAL
1 pc.	5	5	10	10	15
2 pcs.	5	10	10	15	15

### Operating Range

Auto switch models	(mm)							
	Bore size							
	20	25	32	40	50	63	80	100
D-M9□/M9□V D-M9□W/M9□WV D-M9□AL/M9□AVL	4.5	4.5	4	7	5	5.5	7.5	11
D-Y59□/Y69□ D-Y7□/Y7□V D-Y7□W/Y7□WV D-Y7BAL	—	—	8	9.5	11.5	11.5	16	17
D-A9□/A9□V	12	11	9	9.5	—	11.5	15	17
D-Z7□/Z80	—	—	9.5	11	12	14	16	20

Note) D-A9□/A9□V models 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.

For ø32 to ø100, besides the models listed in "How to Order," the following auto switches are applicable.

Refer to pages 347 to 406 for detailed auto switch specifications.

Auto switch type	Part no.	Electrical entry	Features
Solid state	D-Y69A, Y69B, Y7PV	Grommet (perpendicular)	—
	D-Y7NWV, Y7PWV, Y7BWV		Diagnostic indication (2-color display)
	D-Y59A, Y59B, Y7P	Grommet (in-line)	—
	D-Y7NW, Y7PW, Y7BW		Diagnostic indication (2-color display)
	D-Y7BAL		Water resistant (2-color display)
Reed	D-Z73, Z76	Grommet (in-line)	—
	D-Z80		Without indicator light

\* Solid state auto switches are also available with pre-wired connector. Refer to pages 389 and 390 for details.

\* Normally closed (N.C. = b contact), solid state auto switches (D-F9G, F9H, Y7G, Y7H) are also available. For details, refer to pages 365 and 367.

CHQ

CHK□

CHN

CHM

CHS□

CH2□

CHA

Related Equipment

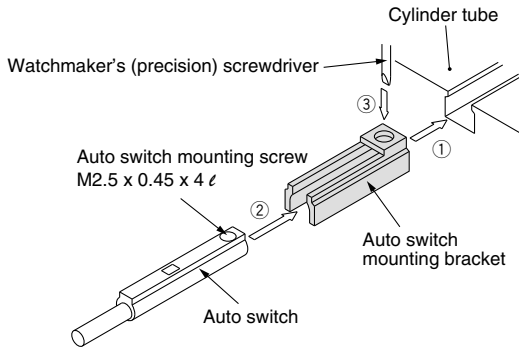
D-□

## How to Mount and Move the Auto Switch

### <Applicable auto switch>

Solid state ..... D-M9N(V), D-M9P(V), D-M9B(V),  
D-M9NW(V), D-M9PW(V), D-M9BW(V)  
D-M9NA(V), D-M9PA(V), D-M9BA(V)

Reed ..... D-A90(V), D-A93(V), D-A96(V)



1. Insert the auto switch mounting bracket into the auto switch mounting groove to set it roughly to the auto switch mounting position.
2. Insert the auto switch into the attachment part of the auto switch mounting bracket.
3. After confirming the detecting position, secure the auto switch by tightening the set screw (M2.5) attached to the auto switch.
4. When changing the detecting position, carry out in the state of 2.

Note) When tightening the auto switch mounting screw, use a watchmaker's screw driver with a grip diameter of 5 to 6 mm.  
Also, tighten with a torque of 0.1 to 0.15 N·m. As a rule, the mounting screw should be turned about 90° past the point at which tightening can first be felt.

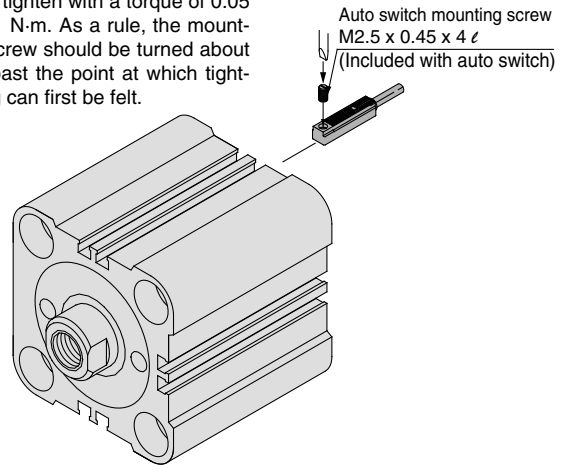
### <Applicable auto switch>

Solid state ..... D-Y59<sup>A</sup><sub>B</sub>, D-Y69<sup>A</sup><sub>B</sub>, D-Y7P(V)  
D-Y7NW(V), D-Y7PW(V), D-Y7BW(V)  
D-Y7BAL

Reed ..... D-Z73, D-Z76, D-Z80

Note) When tightening the auto switch mounting screw, use a watchmaker's screw driver with a grip diameter of 5 to 6 mm.

Also, tighten with a torque of 0.05 to 0.1 N·m. As a rule, the mounting screw should be turned about 90° past the point at which tightening can first be felt.



1. Insert the auto switch into the mounting groove and set it at the auto switch mounting position.
2. After reconfirming the detecting position, tighten the mounting screw to secure the auto switch.
3. Modification of the detecting position should be made in the condition of 1.



Please consult with SMC for detailed specifications, delivery and prices.

## 1

### Series CHQHB (14 MPa) Interchangeable Parts

CH□KDB [Bore size] - [Stroke] [Rod end thread type] - [Auto switch] [Suffix for auto switch] - XC61 □

#### CH□QHB interchangeable parts

Interchangeable contents	Overall length End thread size
--------------------------	-----------------------------------

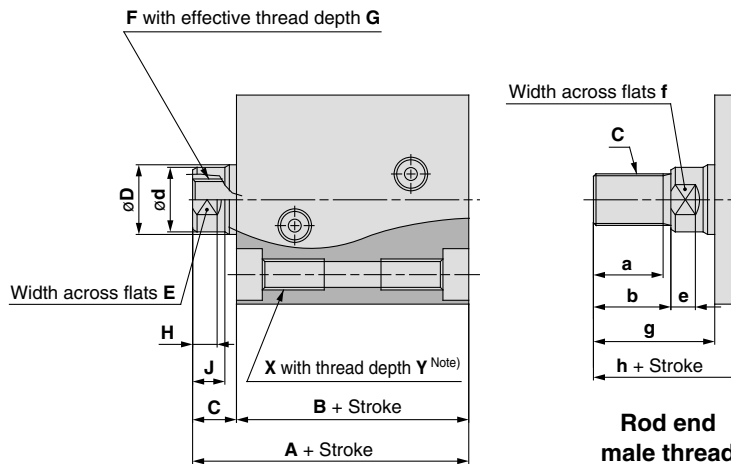
#### Cylinder mounting

Nil	Through hole
R	Front taps
H	Rear taps
W	Double side taps

\* Built-in spacer types are required for intermediate strokes.  
(Example) The overall length of the cylinder tube for CHDKDB50-60-XC61, is equivalent to 75 strokes.

## Dimensions

CH□KDB□-□-XC61□



CHQ

CHK□

CHN

CHM

CHS□

CH2□

CHA

Related Equipment

D-□

Bore size (mm)	A	B	C	D	d	E	F	G	H	J	X	Y
20	53	43	10	12	11	10	M6 x 1	8	5.5	6.5	M6 x 1	12
25	56	45	11	14	13	12	M8 x 1.25	10	6.5	7.5	M6 x 1	12
32	63	51	12	18	15	13	M10 x 1.5	12	7	8.5	M8 x 1.25	16
40	69	55	14	22.4	19	16	M12 x 1.75	15	8	10	M10 x 1.5	20
50	75	60	15	28	24	21	M16 x 2	20	9.5	11.5	M12 x 1.75	24
63	85	67	18	35.5	31	27	M20 x 2.5	24	11.5	14	M16 x 2	24
80	99	78	21	45	39	36	M27 x 3	33	15	17	M18 x 2.5	27
100	122	96	26	56	48	41	M30 x 3.5	36	17.5	22	M20 x 2.5	30

#### Rod end male threads

Bore size (mm)	a	b	c	e	f	g	h
20	12	14	M8 x 1	5.5	10	24	67
25	14.5	17	M10 x 1.25	6.5	12	28	73
32	17.5	20	M12 x 1.25	7	13	32	83
40	22	25	M16 x 1.5	8	16	39	94
50	27	30	M20 x 1.5	9.5	21	45	105
63	32	35	M24 x 1.5	11.5	27	53	120
80	40	43	M30 x 1.5	15	36	64	142
100	47	50	M39 x 1.5	17.5	41	76	172

Part no. suffix	X & Y dimensions
-XC61	None
-XC61R	4 places on front side
-XC61H	4 places on rear side
-XC61W	8 places on both sides

Note) The relationship between the mounting taps (X and Y dimensions) provided on cylinder tubes and their order numbers is as shown above.





Please consult with SMC for detailed specifications, delivery and prices.

## 2 Intermediate Stroke Type (Built-in spacer type)

Intermediate strokes in 5mm increments can be manufactured by installing spacers inside standard stroke cylinders.

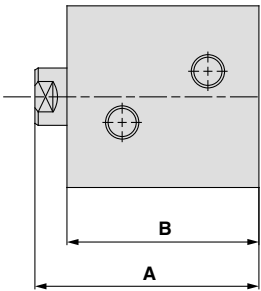
CH□KDB **Bore size** - **Stroke** **Rod end thread type** - **Auto switch** **Suffix for auto switch** - **XC63**  
 CH□KDL **Bore size** - **Stroke** **Rod end thread type** - **Auto switch** **Suffix for auto switch** - **XC63**

### Intermediate stroke

Bore size (mm)	Applicable stroke	Applicable cylinder tube
32	55, 60, 65, 70	For 75 mm stroke
40 50 63	55, 60, 65, 70	For 75 mm stroke
80 100	80, 85, 90, 95	For 100 mm stroke

## Dimensions

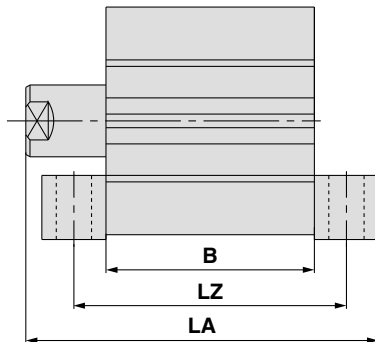
### CH□KDB□-□-XC63



Bore size (mm)	Stroke	55, 60, 65, 70		80, 85, 90, 95	
		A	B	A	B
32		136	126	—	—
40		140	130	165	155
50		146	135	171	160
63		155	142	180	167
80		170	153	195	178
100		197	171	222	196

Note) Dimensions other than those highlighted above are standard.

### CH□KDL□-□-XC63



Bore size (mm)	Stroke	55, 60, 65, 70			80, 85, 90, 95		
		LA	B	LZ	LA	B	LZ
32		161	126	142	—	—	—
40		173	130	150	198	155	175
50		186	135	159	211	160	184
63		205	142	172	230	167	197
80		226	153	188	251	178	213
100		254	171	211	279	196	236



Please consult with SMC for detailed specifications, delivery and prices.

## 3 With Air Release Valve

Air release valves are provided on cylinder tube surfaces machined for ports.

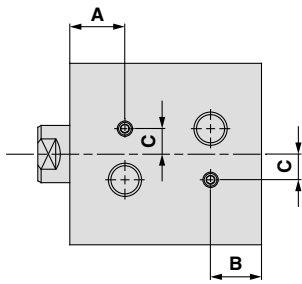
CH□KDB  Bore size -  Stroke  Rod end thread type -  Auto switch  Suffix for auto switch - XC64

CH□KDL  Bore size -  Stroke  Rod end thread type -  Auto switch  Suffix for auto switch - XC64

With air release valve •

### Dimensions

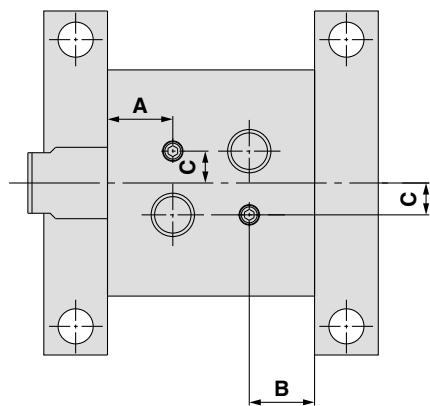
CH□KDB□-□-XC64



Bore size (mm)	A	B	C
20	16.5	14.5	7
25	17	15	8
32	19.5	17	10
40	20.5	17.5	10
50	22	19.5	10
63	25.5	22	10
80	30	26.5	15
100	36	33	15

Note) Dimensions other than those highlighted above are standard.

CH□KDL□-□-XC64



CHQ

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CH2□

CHA

Related Equipment

D-□

# Compact Hydraulic Cylinder

# Series CH□KG

16 MPa

∅20, ∅25, ∅32, ∅40, ∅50, ∅63, ∅80, ∅100

## How to Order

**CHKG B 32 □ - 30 □ - □**

**With Auto Switch CHDKG B 32 □ - 30 □ - M9BW □ - □**

**With auto switch (built-in magnet)**

**Mounting bracket style**

Symbol	Style	Port position (Note)
B	Basic style	—
L	Foot style	Top
LB		Right
LD		Left

Note) Indicates the relative position of the foot bracket and port, as seen from the rod side.

**Bore size**

20	20 mm
25	25 mm
32	32 mm
40	40 mm
50	50 mm
63	63 mm
80	80 mm
100	100 mm

**Port thread type**

Nil	Rc
TN	NPT

**Auto switch type**

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

\* Select applicable auto switch models from the table below.

**Auto switch type**

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

**Auto switch type**

Nil	Female thread
M	Male thread

\* Rod end thread type is an optional product. (Refer to page 201).

**Cylinder stroke (mm)**  
Refer to the standard stroke table on page 200.

**Made to order specifications**  
For details, refer to page 200.

**Built-in Magnet Cylinder Model**  
If a built-in magnet cylinder without auto switch is required, there is no need to enter the symbol for the auto switch. (Example) CHDKGB50-100

**Applicable Auto Switches:** Refer to pages 347 to 406 for further details on each auto switch.

Type	Special function	Electrical entry	Indicator light	Wiring (output)	Load voltage		Auto switch model				Lead wire length (m)				Pre-wired connector	Applicable load
					DC	AC	Perpendicular		In-line		0.5 (Nil)	1 (M)	3 (L)	5 (Z)		
							∅20, ∅25	∅32 to ∅100	∅20, ∅25	∅32 to ∅100						
Solid state switch	—	Grommet	Yes	3-wire (NPN)	5 V, 12 V	—	M9NV	M9N	●	●	●	○	○	IC circuit	Relay PLC	
				3-wire (PNP)			M9PV	M9P	●	●	●	○				
				2-wire	M9BV		M9B	●	●	●	○					
				3-wire (NPN)	M9NWV		M9NW	●	●	●	○					
	Diagnostic indication (2-color display)			3-wire (PNP)	M9PWV		M9PW	●	●	●	○					
				2-wire	M9BWV		M9BW	●	●	●	○					
				3-wire (NPN)	M9NAV		M9NA	○	○	●	○					
				3-wire (PNP)	M9PAV		M9PA	○	○	●	○					
Water resistant (2-color display)	2-wire	M9BAV	M9BA	○	○	●	○									
	3-wire (NPN)	—	5 V	A96V	—	A96	Z76	●	—	●	—	—	IC circuit	—		
				A93V	—	A93	—	●	—	●	—					
	Reed switch	—	Grommet	Yes	2-wire	24 V	12 V	100 V	—	—	—	Z73	●	—	●	—
100 V or less									A90V	—	A90	Z80	●	—	●	—

\* 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 "○" are produced upon receipt of order.

\* For ∅32 to ∅100, there are applicable auto switches other than listed. Refer to page 207 for details.  
\* For details about auto switches with pre-wired connector, refer to pages 389 and 390.  
\* Cylinders with auto switch will be shipped together with the auto switch and auto switch mounting bracket (∅32 to ∅50) (not assembled).

# Compact Hydraulic Cylinder: 16 MPa **Series CH□KG**

## Specifications



Bore size (mm)	20	25	32	40	50	63	80	100
<b>Action</b>	Double acting/Single rod type							
<b>Fluid</b>	Hydraulic fluid							
<b>Nominal pressure</b>	16 MPa							
<b>Proof pressure</b>	24 MPa							
<b>Maximum allowable pressure</b>	16 MPa							
<b>Minimum operating pressure</b>	0.3 MPa							
<b>Ambient and fluid temperature</b>	Without auto switch: -10° to 80°C							
	With auto switch: -10° to 60°C							
<b>Piston speed</b>	8 to 100 mm/s							
<b>Cushion</b>	None							
<b>Rod end thread</b>	Female thread, Male thread							
<b>Stroke length tolerance</b>	+0.8 0 mm							
<b>Mounting style</b>	Basic style (through hole), Foot style							

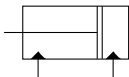
Note) Refer to page 134 for definitions of terms related to pressure.



**Made to order specifications**  
(For details, refer to pages 210 to 212)

Symbol	Specifications
<b>-XC62</b>	Compatible with series CHQHB series (14 MPa)
<b>-XC63</b>	Intermediate stroke type (Built-in spacer type)
<b>-XC64</b>	With air release valve

JIS symbol



## Standard Strokes

Bore size (mm)	Standard strokes (mm)
<b>20, 25</b>	5, 10, 15, 20, 25, 30, 35, 40, 45, 50, 75, 100
<b>32</b>	5, 10, 15, 20, 25, 30, 35, 40, 45, 50, 75, 100, 125, 150
<b>40, 50, 63, 80, 100</b>	5, 10, 15, 20, 25, 30, 35, 40, 45, 50, 75, 100, 125, 150, 175

## Manufacture of Intermediate Stroke Cylinders [XC63] (Built-in spacer type)

Intermediate strokes in 5 mm increments can be manufactured by installing spacers inside standard stroke cylinders.

55, 60, 65 and 70 mm stroke cylinders have the same overall length as a 75 mm stroke cylinder, and 80, 85, 90 and 95 mm stroke cylinders have the same length as a 100 mm stroke cylinder.

Refer to the Made to Order Specifications on page 211 for the ordering procedure.

## Hydraulic Fluid Compatibility

Hydraulic fluid	Compatibility
<b>Standard mineral hydraulic fluid</b>	Compatible
<b>W/O hydraulic fluid</b>	Compatible
<b>O/W hydraulic fluid</b>	Compatible
<b>Water/Glycol hydraulic fluid</b>	*
<b>Phosphate hydraulic fluid</b>	Not compatible

\* Consult with SMC.

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Related Equipment

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## Theoretical Output

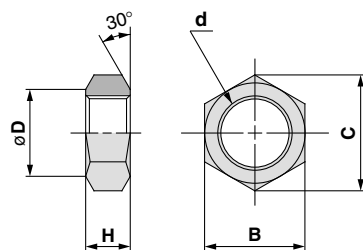
Unit: N

Bore size (mm)	Rod size (mm)	Operating direction	Piston area (mm <sup>2</sup> )	Operating pressure (MPa)			
				3.5	7	10	16
20	12	OUT	314	1099	2198	3140	5024
		IN	201	704	1407	2010	3216
25	14	OUT	490	1715	3430	4900	7840
		IN	336	1176	2352	3360	5376
32	18	OUT	804	2814	5628	8040	12864
		IN	549	1922	3843	5490	8784
40	22.4	OUT	1256	4396	8792	12560	20096
		IN	862	3017	6034	8620	13792
50	28	OUT	1963	6871	13741	19630	31408
		IN	1347	4715	9429	13470	21552
63	35.5	OUT	3117	10910	21819	31170	49872
		IN	2127	7445	14889	21270	34032
80	45	OUT	5026	17591	35182	50260	80416
		IN	3436	12026	24052	34360	54976
100	56	OUT	7853	27486	54971	78530	125648
		IN	5390	18865	37730	53900	86240

 Theoretical output (N) = Pressure (MPa) x Piston area (mm<sup>2</sup>)

## Optional Parts

### Rod end nut



Part no.	Bore size (mm)	B	C	d	D	H
NTH-020	20	13	15	M8 x 1	12.5	5
NTH-025	20	17	19.6	M10 x 1.25	16.5	6
NTH-032	25	19	21.9	M12 x 1.25	18	7
NTH-040	32	22	25.4	M16 x 1.5	21	10
NTH-050	40	27	31.2	M20 x 1.5	26	12
NTH-060	50	32	37	M24 x 1.5	31	14
NTH-080	63	41	47.3	M30 x 1.5	40	17
NTH-100	80	55	63.5	M39 x 1.5	54	20
NTH-125	100	70	80.8	M48 x 1.5	69	26

Note) There may be a slight difference between the part numbers and the corresponding bore size.

## Mass

### CH□KGB/Basic style

Unit: g

Bore size (mm)	Standard stroke (mm)											
	5	10	15	20	25	30	35	40	45	50	75	100
20	221	242	263	284	305	326	347	368	389	410	—	—
25	312	339	366	393	420	447	474	501	528	555	—	—
32	581	625	669	713	757	801	845	889	933	977	1197	1417
40	927	986	1045	1104	1163	1222	1281	1340	1399	1458	1753	2048
50	1351	1430	1509	1588	1667	1746	1825	1904	1983	2062	2457	2852
63	1813	1936	2059	2182	2305	2428	2551	2674	2797	2920	3535	4150
80	3870	4053	4236	4419	4602	4785	4968	5151	5334	5517	6432	7347
100	7188	7457	7726	7995	8264	8533	8802	9071	9340	9609	10954	12299

### CH□KGL/Foot style

Unit: g

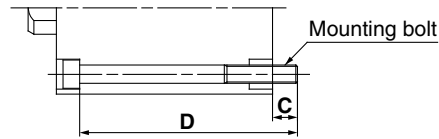
Bore size (mm)	Standard stroke (mm)														
	5	10	15	20	25	30	35	40	45	50	75	100	125	150	175
20	465	490	515	535	560	580	605	625	650	670	785	890	—	—	—
25	585	610	640	670	700	725	755	785	815	840	985	1130	—	—	—
32	945	990	1040	1085	1130	1175	1220	1265	1310	1360	1585	1815	2045	2270	—
40	1580	1645	1705	1770	1830	1895	1955	2015	2080	2140	2455	2765	3075	3390	3700
50	2495	2580	2665	2750	2835	2915	3000	3085	3170	3255	3675	4095	4515	4935	5355
63	3900	4030	4160	4290	4420	4550	4685	4815	4945	5075	5730	6380	7035	7685	8340
80	7225	7420	7615	7805	8000	8195	8385	8580	8775	8965	9935	10990	11870	12835	13800
100	12425	12710	12990	13275	13555	13840	14120	14405	14685	14970	16385	17795	19210	20625	22035

## Mounting Bolts for CH□KGB

Through hole type mounting bolts are available.  
How to order: Add "Bolt" in front of the bolts to be used.

**Example: M8 x 80L 4 pcs.**

Mounting bolt diagram



Model	C	D	Mounting bolt
<b>CH□KGB20-5 (M)</b>	12.4	55	M5 x 55L
-10 (M)		60	x 60L
-15 (M)		65	x 65L
-20 (M)		70	x 70L
-25 (M)		75	x 75L
-30 (M)		80	x 80L
-35 (M)		85	x 85L
-40 (M)		90	x 90L
-45 (M)		95	x 95L
-50 (M)		100	x 100L
-75 (M)		125	x 125L
-100 (M)		150	x 150L
<b>CH□KGB25-5 (M)</b>		10.4	55
-10 (M)	60		x 60L
-15 (M)	65		x 65L
-20 (M)	70		x 70L
-25 (M)	75		x 75L
-30 (M)	80		x 80L
-35 (M)	85		x 85L
-40 (M)	90		x 90L
-45 (M)	95		x 95L
-50 (M)	100		x 100L
-75 (M)	125		x 125L
-100 (M)	150		x 150L
<b>CH□KGB32-5 (M)</b>	10.5		65
-10 (M)		70	x 70L
-15 (M)		75	x 75L
-20 (M)		80	x 80L
-25 (M)		85	x 85L
-30 (M)		90	x 90L
-35 (M)		95	x 95L
-40 (M)		100	x 100L
-45 (M)		105	x 105L
-50 (M)		110	x 110L
-75 (M)		135	x 135L
-100 (M)		160	x 160L
-125 (M)		185	x 185L
-150 (M)	210	x 210L	
<b>CH□KGB40-5 (M)</b>	13.5	75	M8 x 75L
-10 (M)		80	x 80L
-15 (M)		85	x 85L
-20 (M)		90	x 90L
-25 (M)		95	x 95L
-30 (M)		100	x 100L
-35 (M)		105	x 105L
-40 (M)		110	x 110L
-45 (M)		115	x 115L
-50 (M)		120	x 120L
-75 (M)		145	x 145L
-100 (M)		170	x 170L
-125 (M)		195	x 195L
-150 (M)	220	x 220L	
-175 (M)	245	x 245L	

Model	C	D	Mounting bolt
<b>CH□KGB50-5 (M)</b>	15.5	80	M10 x 80L
-10 (M)		85	x 85L
-15 (M)		90	x 90L
-20 (M)		95	x 95L
-25 (M)		100	x 100L
-30 (M)		105	x 105L
-35 (M)		110	x 110L
-40 (M)		115	x 115L
-45 (M)		120	x 120L
-50 (M)		125	x 125L
-75 (M)		150	x 150L
-100 (M)		175	x 175L
-125 (M)		200	x 200L
-150 (M)	225	x 225L	
-175 (M)	250	x 250L	
<b>CH□KGB63-5 (M)</b>	16	85	M12 x 85L
-10 (M)		90	x 90L
-15 (M)		95	x 95L
-20 (M)		100	x 100L
-25 (M)		105	x 105L
-30 (M)		110	x 110L
-35 (M)		115	x 115L
-40 (M)		120	x 120L
-45 (M)		125	x 125L
-50 (M)		130	x 130L
-75 (M)		155	x 155L
-100 (M)		180	x 180L
-125 (M)		205	x 205L
-150 (M)	230	x 230L	
-175 (M)	255	x 255L	
<b>CH□KGB80-5 (M)</b>	22	100	M14 x 100L
-10 (M)		105	x 105L
-15 (M)		110	x 110L
-20 (M)		115	x 115L
-25 (M)		120	x 120L
-30 (M)		125	x 125L
-35 (M)		130	x 130L
-40 (M)		135	x 135L
-45 (M)		140	x 140L
-50 (M)		145	x 145L
-75 (M)		170	x 170L
-100 (M)		195	x 195L
-125 (M)		220	x 220L
-150 (M)	245	x 245L	
-175 (M)	270	x 270L	
<b>CH□KGB100-5 (M)</b>	26.5	120	M16 x 120L
-10 (M)		125	x 125L
-15 (M)		130	x 130L
-20 (M)		135	x 135L
-25 (M)		140	x 140L
-30 (M)		145	x 145L
-35 (M)		150	x 150L
-40 (M)		155	x 155L
-45 (M)		160	x 160L
-50 (M)		165	x 165L
-75 (M)		190	x 190L
-100 (M)		215	x 215L
-125 (M)		240	x 240L
-150 (M)	265	x 255L	
-175 (M)	290	x 290L	

CHQ

CHK□

CHN

CHM

CHS□

CH2□

CHA

Related Equipment

D-□

## ⚠ Specific Product Precautions

Be sure to read before handling. Refer to front matters 30 and 31 for Safety Instructions, and pages 134 to 142 for precautions for hydraulic cylinder and auto switch.

### Usage

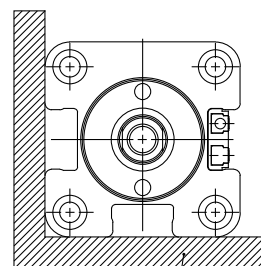
#### ⚠ Caution

1. Use hexagon socket head cap screws (JISB1176, strength class 10.9 or higher) for cylinder mounting.
2. Since a lateral load (eccentric load) cannot be applied to the piston rod, build the mounting jig in such a way that a lateral load will not be applied to the piston rod.
3. Make sure that the interlocking length of the rod end thread (male or female thread) and the mounting material is at least 80% of the thread diameter.
4. When operating a cylinder for the first time, be sure to release the air inside the cylinder and the piping. When the air release is complete, operate the cylinder at reduced pressure, then gradually increase it to the normal operating pressure.
5. Since Series CH□KGB does not have an air release plug, release air from other components (e.g. from piping, etc.) as well.
6. Do not use two cylinders facing one another horizontally or vertically in such a way that their piston rods strike each other.
7. When the cylinder head side contains hydraulic fluid or is in a normally pressurized condition, the applied load must not be allowed to strike the piston rod end. Avoid such applications.
8. When mounting the cylinder body with mounting bolts, use tightening torques in the table at left as a guide.

#### Body mounting bolt tightening torques

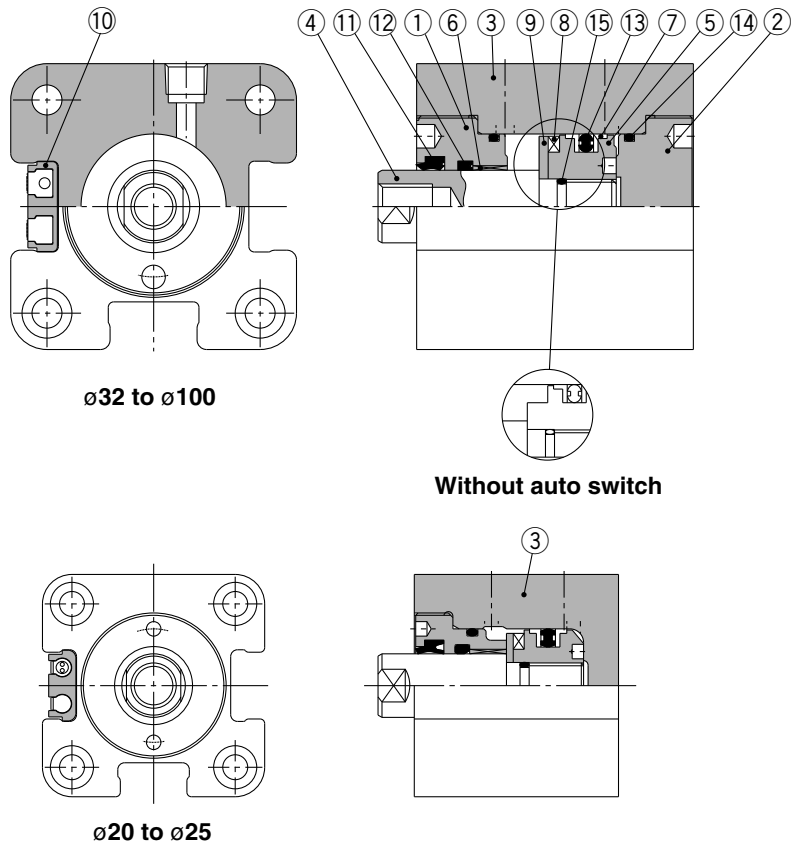
Bore size (mm)	Mounting bolt size	Tightening torque (N·m)
20	M5	3.0
25	M5	4.9
32	M6	10
40	M8	20
50	M10	40
63	M12	50
80	M14	80
100	M16	120

Consult with SMC when using a cylinder in close proximity to a magnetic body (including proximity on any side) as shown in the figure below, as the operation of auto switches may become unstable.



Magnetic body (steel plate, etc.)

**Construction**



**Parts List**

No.	Description	Material	Note
1	Rod cover	Aluminum alloy	Black anodized
2	Head cover	Aluminum alloy	Black anodized
3	Cylinder tube	Aluminum alloy	Hard anodized
4	Piston rod	ø20, ø25 Stainless steel	Hard chromium electroplated
		ø32 to ø100 Carbon steel	
5	Piston	Stainless steel	
6	Bushing	Copper alloy	
7	Back-up ring	Resin	
8	Magnet	—	With auto switch only
9	Magnet plate	Stainless steel	With auto switch only
10	Switch mounting bracket	Aluminum alloy	With auto switch only
11	Scraper	NBR	
12	Rod seal		With back-up ring
13	Piston seal		
14	Tube gasket		
15	Piston gasket		

**Replacement Parts/Seal kit**

Bore size (mm)	Seal kit no.	Content
20	CHKG20-PS	Nos. ⑦, ⑪, ⑫, ⑬ and ⑭ from the chart at left
25	CHKG25-PS	
32	CHKG32-PS	
40	CHKG40-PS	
50	CHKG50-PS	
63	CHKG63-PS	
80	CHKG80-PS	
100	CHKG100-PS	

\* Seal kit consists of items ⑦, ⑪, ⑫, ⑬ and ⑭ and can be ordered by using the seal kit number for each bore size.

\* Special tools are necessary for disassembly. Contact SMC for recommended tool designs and dimensions. Furthermore, ø80 and ø100 are tightened with a large tightening torque, so disassembly will be difficult. Contact SMC if disassembly is required.

CHQ

CHK□

CHN

CHM

CHS□

CH2□

CHA

Related Equipment

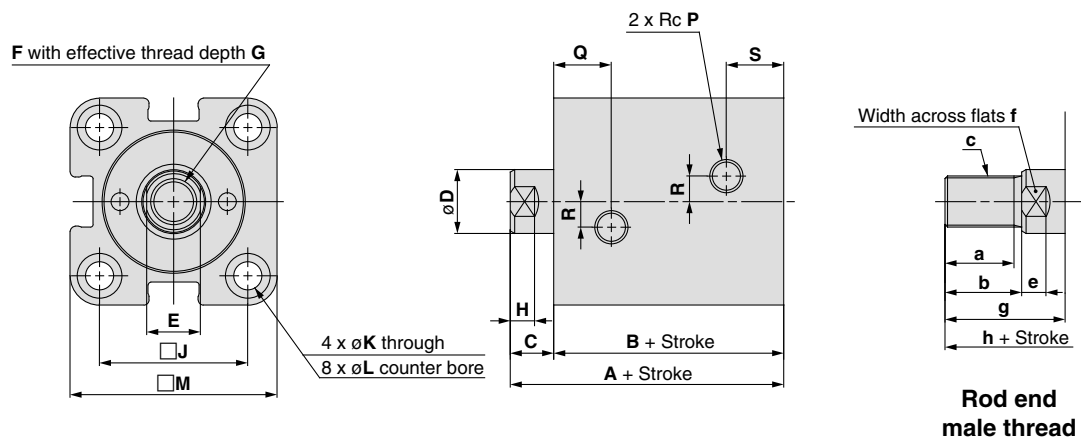
D-□



# Series CH□KG

## Dimensions

### Basic style/CH□KGB



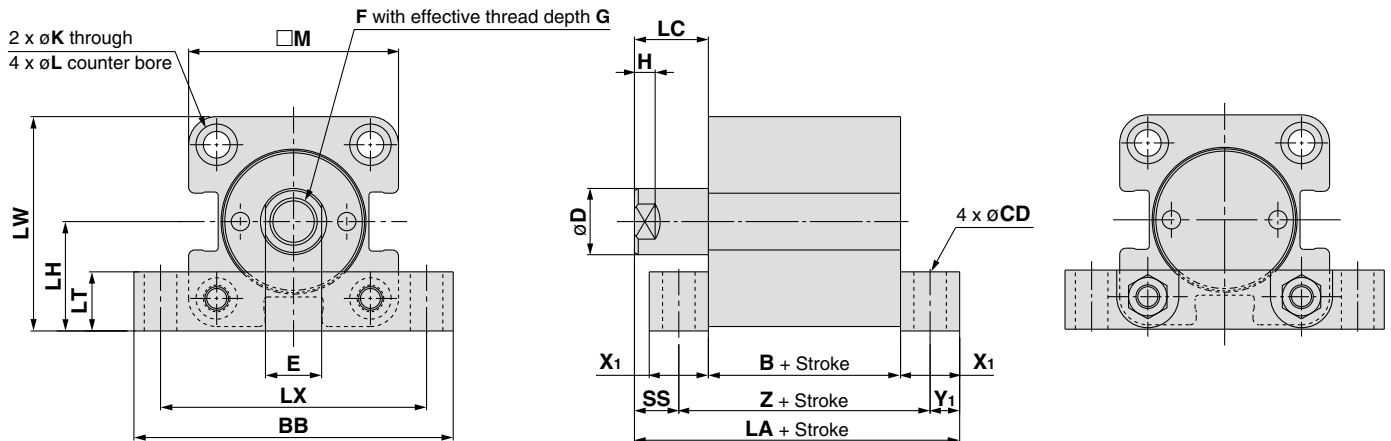
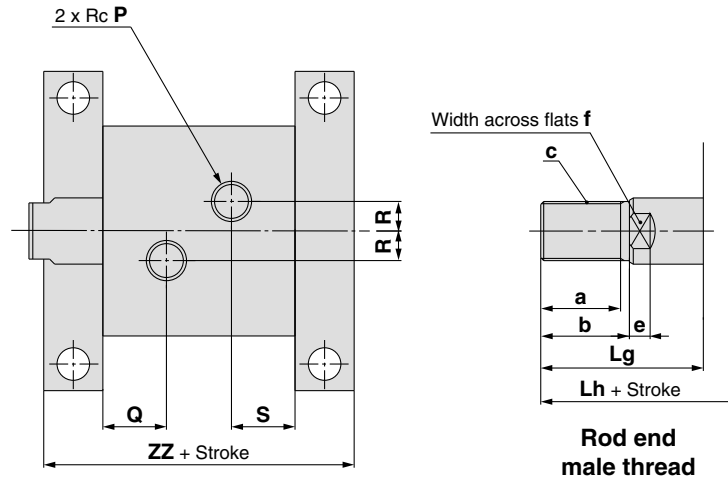
Bore size (mm)	A	B	C	D	E	F	G	H	J	K	L	M	P	Q	R	S
20	51	43	8	12	10	M8 x 1.25	10	6	30	5.5	9.5 depth 5.4	43	1/8	16.5	6	11.5
25	53	45	8	14	12	M10 x 1.5	12	6	36	5.5	9.5 depth 5.4	49	1/8	17	8	12
32	66	56	10	18	14	M12 x 1.75	15	7	47	6.6	11 depth 6.5	63	1/4	19.5	10	19.5
40	75	65	10	22.4	19	M16 x 2	20	7	52	9	14 depth 8.6	71	1/4	21.5	10	21.5
50	81	70	11	28	24	M20 x 2.5	24	8	58	11	17.5 depth 10.8	81	1/4	24	10	24
63	90	77	13	35.5	30	M27 x 3	33	9	69	13	20 depth 13	100	1/4	27.5	10	27.5
80	105	88	17	45	41	M30 x 3.5	36	14	86	15	23 depth 15.2	121	3/8	31	15	31
100	132	106	26	56	50	M39 x 4	45	21	106	17	26 depth 17.5	146	3/8	36	15	36

Note 1) Body dimensions are the same with or without auto switches.

Bore size (mm)	a	b	c	e	f	g	h
20	12.5	15	M10 x 1.25	6	10	23	66
25	15.5	18	M12 x 1.25	6	12	26	71
32	22	25	M16 x 1.5	7	14	35	91
40	27	30	M20 x 1.5	7	19	40	105
50	32	35	M24 x 1.5	8	24	46	116
63	42	45	M30 x 1.5	9	30	58	135
80	57	60	M39 x 1.5	14	41	77	165
100	72	75	M48 x 1.5	21	50	101	207

## Dimensions

### Foot style/CH□KGL



CHQ

CHK

CHN

CHM

CHS

CH2

CHA

Related Equipment

D-□

Bore size (mm)	LA	B	BB	LC	CD	D	E	F	G	H	K	L	LH	LT	LX	LW
20	76	43	70	18	6.6	12	10	M8 x 1.25	10	6	5.5	9.5 depth 5.4	23	15	58	44.5
25	78	45	76	18	6.6	14	12	M10 x 1.5	12	6	5.5	9.5 depth 5.4	26	15	64	50.5
32	91	56	94	19	9	18	14	M12 x 1.75	15	7	6.6	11 depth 6.5	33	16	79	64.5
40	108	65	108	23	11	22.4	19	M16 x 2	20	7	9	14 depth 8.6	37	20	90	72.5
50	121	70	126	27	14	28	24	M20 x 2.5	24	8	11	17.5 depth 10.8	43	24	104	83.5
63	140	77	146	33	16	35.5	30	M27 x 3	33	9	13	20 depth 13	52	30	121	102
80	161	88	172	38	18	45	41	M30 x 3.5	36	14	15	23 depth 15.2	63	35	144	123.5
100	189	106	208	43	22	56	50	M39 x 4	45	21	17	26 depth 17.5	76	40	174	149

Note 1) Body dimensions are the same with or without auto switches.

Bore size (mm)	M	P	Q	R	S	SS	X <sub>1</sub>	Y <sub>1</sub>	Z	ZZ
20	43	1/8	16.5	6	11.5	10.5	15	7.5	58	73
25	49	1/8	17	8	12	10.5	15	7.5	60	75
32	63	1/4	19.5	10	19.5	11	16	8	72	88
40	71	1/4	21.5	10	21.5	13	20	10	85	105
50	81	1/4	24	10	24	15	24	12	94	118
63	100	1/4	27.5	10	27.5	18	30	15	107	137
80	121	3/8	31	15	31	20.5	35	17.5	123	158
100	146	3/8	36	15	36	23	40	20	146	186

Bore size (mm)	a	b	c	e	f	Lg	Lh
20	12.5	15	M10 x 1.25	6	10	33	91
25	15.5	18	M12 x 1.25	6	12	36	96
32	22	25	M16 x 1.5	7	14	44	116
40	27	30	M20 x 1.5	7	19	53	138
50	32	35	M24 x 1.5	8	24	62	156
63	42	45	M30 x 1.5	9	30	78	185
80	57	60	M39 x 1.5	14	41	98	221
100	72	75	M48 x 1.5	21	50	118	264

# Series CH□KG Auto Switch Specifications

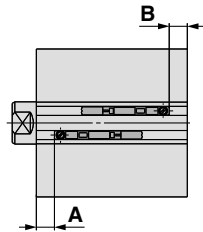
Refer to pages 347 to 406 for detailed specifications.



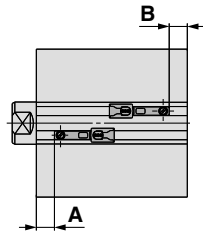
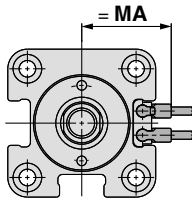
## Auto Switches: Proper Mounting Positions and Mounting Heights for Stroke End Detection

ø20, ø25

D-M9□  
D-M9□W  
D-M9□AL  
D-A9□

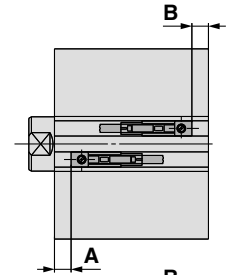


D-M9□V  
D-M9□WV  
D-M9□AVL  
D-A9□V

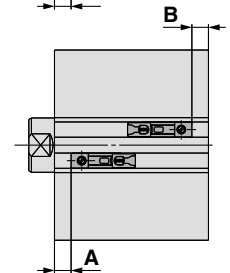
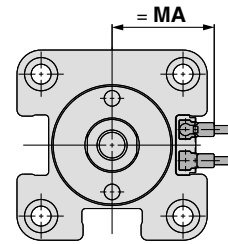


ø32 to ø100

D-M9□ D-Y5□  
D-M9□W D-Y7□  
D-M9□AL D-Y7□W  
D-A9□ D-Y7BAL  
D-Z7□  
D-Z80



D-M9□V  
D-M9□WV  
D-M9□AVL  
D-Y6□  
D-Y7□V  
D-Y7□WV  
D-A9□V



## Auto Switch Proper Mounting Positions

(mm)

Bore size (mm)	Solid state auto switch				Reed auto switch			
	D-M9□/M9□V D-M9□W/M9□WV D-M9□AL/M9□AVL		D-Y59□/Y69□ D-Y7□/Y7□V D-Y7□W/Y7□WV D-Y7BAL		D-A9□/A9□V		D-Z7□/Z80	
	A	B	A	B	A	B	A	B
20	16	15	—	—	12	11	—	—
25	17	16	—	—	13	12	—	—
32	18.5	23	13.5	18	—	—	13.5	18
40	24	26.5	19	21.5	—	—	19	21.5
50	24	31.5	19	26.5	—	—	19	26.5
63	26.5	36	21.5	31	—	—	21.5	31
80	29.5	44	24.5	39	—	—	24.5	39
100	39.5	51.5	34.5	46.5	—	—	34.5	46.5

Note 1) D-A9□/A9□V models cannot be mounted on ø32 to ø100.

Note 2) Adjust the auto switch after confirming the operating conditions in the actual setting.

## Auto Switch Mounting Heights

(mm)

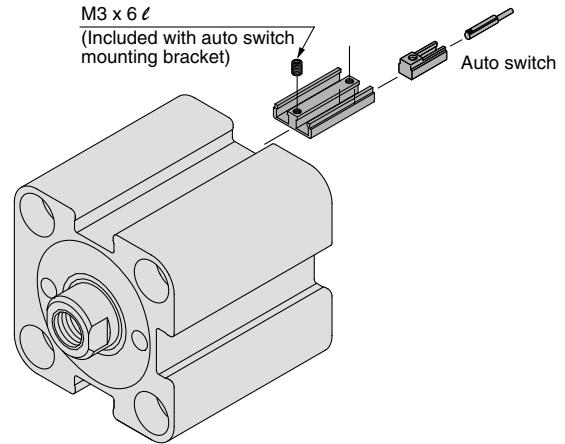
Bore size (mm)	D-M9□ D-M9□W D-M9□AL D-A9□	D-M9□V D-M9□WV D-M9□AVL	D-A9□V	D-Y59□ D-Y7P D-Y7□W D-Y7BAL D-Z7□ D-Z80	D-Y69□ D-Y7PV D-Y7□WV
	U	U	U	U	U
20	22	28	25.5	—	—
25	24.5	30	27.5	—	—
32	31.5	34.5	—	31.5	31.5
40	35.5	39	—	35.5	36
50	40.5	45	—	40.5	42
63	50	53.5	—	50	50.5
80	60.5	64	—	60.5	61
100	73	76.5	—	73	73.5

\* D-A9□/A9□V models cannot be mounted on ø32 to ø100.

### Auto Switch Mounting Brackets: Part Nos.

Auto switch models	Bore size (mm)	
	ø20, 25	ø32 to ø100
D-M9□/M9□V D-M9□W/M9□WV D-M9□AL/M9□AVL D-A9□/A9□V	BHK1-020	Note1) ① BHK2-032 ② BMG2-012
D-Y59□/Y69□ D-Y7□/Y7□V D-Y7□W/Y7□WV D-Y7BAL D-Z7□/Z80	—	BHK2-032

Note 1) Two types of mounting brackets are used as a set.  
Note 2) D-A9□/A9□V models cannot be mounted on ø32 to ø100.



### Minimum Auto Switch Mounting Stroke

Auto Switch Mounting Number	D-M9□ D-M9□V D-Y59□ D-Y69□ D-Y7P D-Y7PV	D-A9□ D-A9□V D-Z7□ D-Z80	D-Y7□W D-Y7□WV	D-M9□W D-M9□WV D-M9□AL D-M9□AVL	D-Y7BAL
1 pc.	5	5	10	10	15
2 pcs.	5	10	10	15	15

(mm)

### Operating Range

Auto switch models	Bore size (mm)							
	20	25	32	40	50	63	80	100
D-M9□/M9□V D-M9□W/M9□WV D-M9□AL/M9□AVL	6	5.5	4.5	5.5	5.5	6.5	8.5	9.5
D-Y59□/Y69□ D-Y7□/Y7□V D-Y7□W/Y7□WV D-Y7BAL	—	—	8	9.5	11.5	11.5	16	17
D-A9□/A9□V	12	11	—	—	—	—	—	—
D-Z7□/Z80	—	—	9.5	11	12	14	16	20

\* 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.

For ø32 to ø100, besides the models listed in "How to Order," the following auto switches are applicable. Refer to pages 347 to 406 for detailed auto switch specifications.

Auto switch type	Part no.	Electrical entry	Features
Solid state	D-Y69A, Y69B, Y7PV	Grommet (Perpendicular)	—
	D-Y7NWV, Y7PWV, Y7BWV		Diagnostic indication (2-color display)
	D-Y59A, Y59B, Y7P	Grommet (In-line)	—
	D-Y7NW, Y7PW, Y7BW		Diagnostic indication (2-color display) Water resistant (2-color display)
D-Y7BAL			
Reed	D-Z73, Z76	Grommet (In-line)	—
	D-Z80		Without indicator light

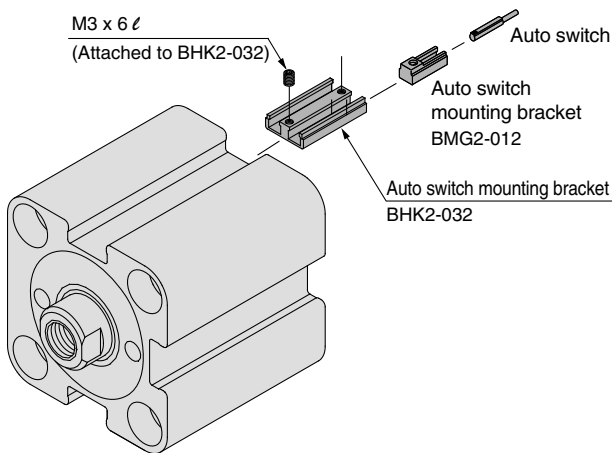
\* Solid state auto switches are also available with pre-wired connector. Refer to pages 389 and 390 for details.  
\* Normally closed (N.C. = b contact), solid state auto switches (D-F9G, F9H, Y7G, Y7H) are also available. For details, refer to pages 365 and 367.

CHQ
CHK□
CHN
CHM
CHS□
CH2□
CHA
Related Equipment
D-□

## How to Mount and Move the Auto Switch

### <Applicable auto switch>

Solid state ..... D-M9N(V), D-M9P(V), D-M9B(V)  
 D-M9NW(V), D-M9PW(V), D-M9BW(V)  
 D-M9NA(V)L, D-M9PA(V)L, D-M9BA(V)L  
 Reed ..... D-A90(V), D-A93(V), D-A96(V)

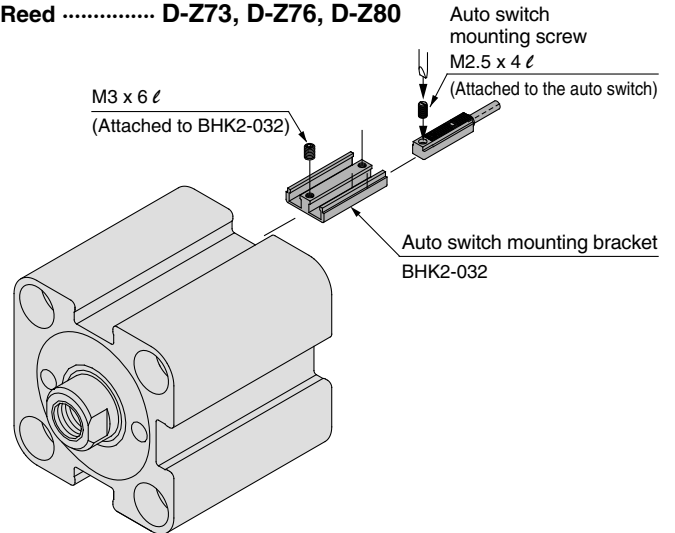


1. Set BMG2-012 into the auto switch mounting bracket (BHK2-032).
2. Set the auto switch into the auto switch mounting part of BMG2-012, then insert it into the cylinder's auto switch installing groove.
3. In the above state, set the approximate auto switch mounting sections, then, using a hexagonal wrench, tighten the mounting screw (M3 x 6L) that is an accessory to BHK-032.
4. After confirming the detecting position, tighten the mounting screw (M2.5) for the auto switch to keep it in place.

When tightening the auto switch mounting screw, use a watchmaker's screw driver with a grip diameter of 5 to 6 mm. When tightening the mounting bracket screw included with BHK-032, use a 1.5 mm hexagon wrench. Also, tighten with a torque of 0.1 to 0.15 N·m. As a rule, the mounting screw should be turned about 90° past the point at which tightening can first be felt.

### <Applicable auto switch>

Solid state ..... D-Y59<sup>A</sup><sub>B</sub>, D-Y69<sup>A</sup><sub>B</sub>, D-Y7P(V)  
 D-Y7NW(V), D-Y7PW(V), D-Y7BW(V)  
 D-Y7BAL  
 Reed ..... D-Z73, D-Z76, D-Z80



When tightening the auto switch mounting screw, use a watchmaker's screw driver with a grip diameter of 5 to 6 mm. When tightening the mounting bracket screw, use a 1.5 mm hexagon wrench. Also, tighten with a torque of 0.1 to 0.15 N·m. As a rule, the mounting screw should be turned about 90° past the point at which tightening can first be felt.



Please consult with SMC for detailed specifications, delivery and prices.

## 1

## Series CHQHB (14 MPa) Interchangeable Parts

CH□KGB **Bore size** - **Stroke** **Rod end thread type** - **Auto switch** **Suffix for auto switch** - **XC62** □

### CH□QHB Interchangeable parts Note)

Note) The interchangeable contents are the "C" dimension (from the front end surface to the rod end) and the "F" dimension (rod end thread size).

Interchangeable contents	Piston rod C dimension End thread size F dimension
--------------------------	---

### Cylinder mounting

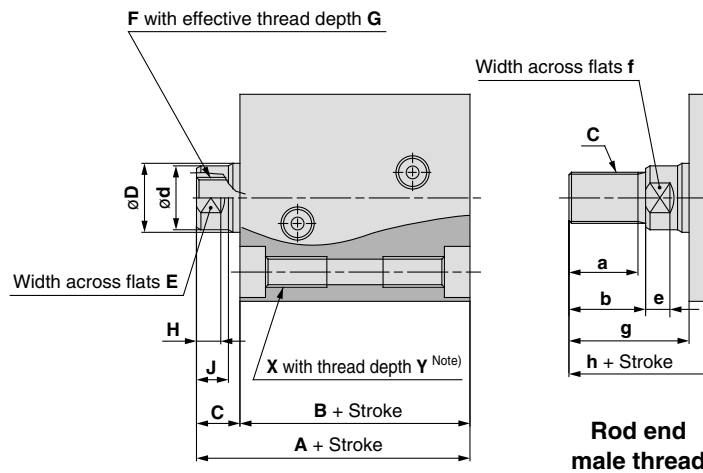
Nil	Through hole
R	Front taps
H	Rear taps
W	Double side taps

\* Built-in spacer types are required for intermediate strokes.

(Example) The overall length of the cylinder tube for CHDKGB50-60-XC62, is equivalent to 75 strokes.

## Dimensions

CH□KGB□-□-XC62□



CHQ

CHK□

CHN

CHM

CHS□

CH2□

CHA

Related Equipment

D-□

Bore size (mm)	A	B	C	D	d	E	F	G	H	J	X	Y
20	53	43	10	12	11	10	M6 x 1	8	5.5	6.5	M6 x 1	12
25	56	45	11	14	13	12	M8 x 1.25	10	6.5	7.5	M6 x 1	12
32	68	56	12	18	15	13	M10 x 1.5	12	7	8.5	M8 x 1.25	16
40	79	65	14	22.4	19	16	M12 x 1.75	15	8	10	M10 x 1.5	20
50	85	70	15	28	24	21	M16 x 2	20	9.5	11.5	M12 x 1.75	24
63	95	77	18	35.5	31	27	M20 x 2.5	24	11.5	14	M16 x 2	24
80	109	88	21	45	39	36	M27 x 3	33	15	17	M18 x 2.5	27
100	132	106	26	56	48	41	M30 x 3.5	36	17.5	22	M20 x 2.5	30

### Rod end male threads

Bore size (mm)	a	b	c	e	f	g	h
20	12	14	M8 x 1	5.5	10	24	67
25	14.5	17	M10 x 1.25	6.5	12	28	73
32	17.5	20	M12 x 1.25	7	13	32	88
40	22	25	M16 x 1.5	8	16	39	104
50	27	30	M20 x 1.5	9.5	21	45	115
63	32	35	M24 x 1.5	11.5	27	53	130
80	40	43	M30 x 1.5	15	36	64	152
100	47	50	M39 x 1.5	17.5	41	76	182

Part no. suffix	X & Y dimensions
-XC62	None
-XC62R	4 places on front side
-XC62H	4 places on rear side
-XC62W	8 places on both sides

Note) The relationship between the mounting taps (X & Y dimensions) provided on cylinder tubes and their order numbers is as shown above.



Please consult with SMC for detailed specifications, delivery and prices.

## 2 Intermediate Stroke Type (Built-in spacer type)

Intermediate strokes in 5 mm increments can be manufactured by installing spacers inside standard stroke cylinders.

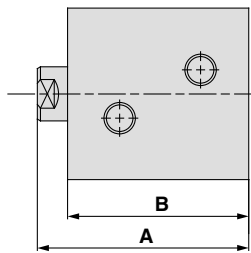
CH□KGB □ Bore size - Stroke Rod end thread type - Auto switch Suffix for auto switch - XC63  
 CH□KGL □ Bore size - Stroke Rod end thread type - Auto switch Suffix for auto switch - XC63

### Intermediate stroke

Bore size (mm)	Applicable stroke	Applicable cylinder tube
32	55, 60, 65, 70	For 75 mm stroke
	80, 85, 90, 95	For 100 mm stroke
	105, 110, 115, 120	For 125 mm stroke
	130, 135, 140, 145	For 150 mm stroke
40 50 63 80 100	55, 60, 65, 70	For 75 mm stroke
	80, 85, 90, 95	For 100 mm stroke
	105, 110, 115, 120	For 125 mm stroke
	130, 135, 140, 145	For 150 mm stroke
	155, 160, 165, 170	For 175 mm stroke

## Dimensions

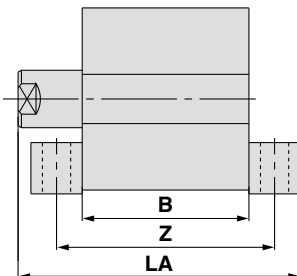
### CH□KGB□-□-XC63



Bore size (mm)	Stroke		55, 60, 65, 70		80, 85, 90, 95		105, 110, 115, 120		130, 135, 140, 145		155, 160, 165, 170	
	A	B	A	B	A	B	A	B	A	B		
32	141	131	166	156	191	181	216	206	—	—		
40	150	140	175	165	200	190	225	215	250	240		
50	156	145	181	170	206	195	231	220	256	245		
63	165	152	190	177	215	202	240	227	265	252		
80	180	163	205	188	230	213	255	238	280	263		
100	207	181	232	206	257	231	282	256	307	281		

Note) Dimensions other than those highlighted above are standard.

### CH□KGL□-□-XC63



Bore size (mm)	Stroke			55, 60, 65, 70			80, 85, 90, 95			105, 110, 115, 120			130, 135, 140, 145			155, 160, 165, 170		
	LA	B	Z	LA	B	Z	LA	B	Z	LA	B	Z	LA	B	Z			
32	166	131	147	191	156	172	216	181	197	241	206	222	—	—	—			
40	183	140	160	208	165	185	233	190	210	258	215	235	283	240	260			
50	196	145	169	221	170	194	246	195	219	271	220	244	296	245	269			
63	215	152	182	240	177	207	265	202	232	290	227	257	315	252	282			
80	236	163	198	261	188	223	286	213	248	311	238	273	336	263	298			
100	264	181	221	289	206	246	314	231	271	339	256	296	364	281	321			



Please consult with SMC for detailed specifications, delivery and prices.

## 3 With Air Release Valve

Air release valves are provided on cylinder tube surfaces machined for ports.

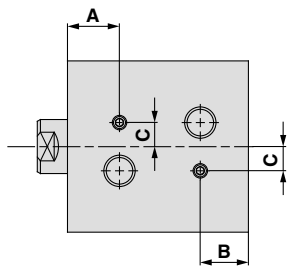
CH□KGB  Bore size -  Stroke  Rod end thread type -  Auto switch  Suffix for auto switch - XC64

CH□KGL  Bore size -  Stroke  Rod end thread type -  Auto switch  Suffix for auto switch - XC64

With air release valve

### Dimensions

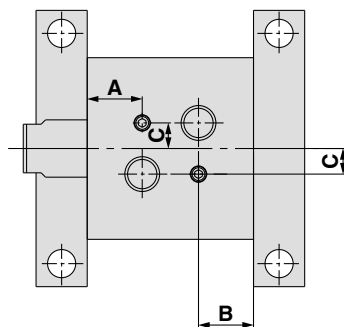
CH□KGB□-□-XC64



Bore size (mm)	A	B	C
20	16.5	9.5	7
25	17	10	8
32	19.5	17	10
40	21.5	18.5	10
50	24	21.5	10
63	27.5	24	10
80	31	27.5	15
100	36	33	15

Note) Dimensions other than those highlighted above are standard.

CH□KGL□-□-XC64



CHQ

CHK□

CHN

CHM

CHS□

CH2□

CHA

Related Equipment

D-□



# Small Bore Hydraulic Cylinder

## Series *CHN*

### Series *CHN*



Nominal pressure: **7 MPa**

Bore size (mm): 20, 25, 32, 40

CHQ

CHK

**CHN**

CHM

CHS

CH2

CHA

Related  
Equipment

D-

Stainless Steel Tube

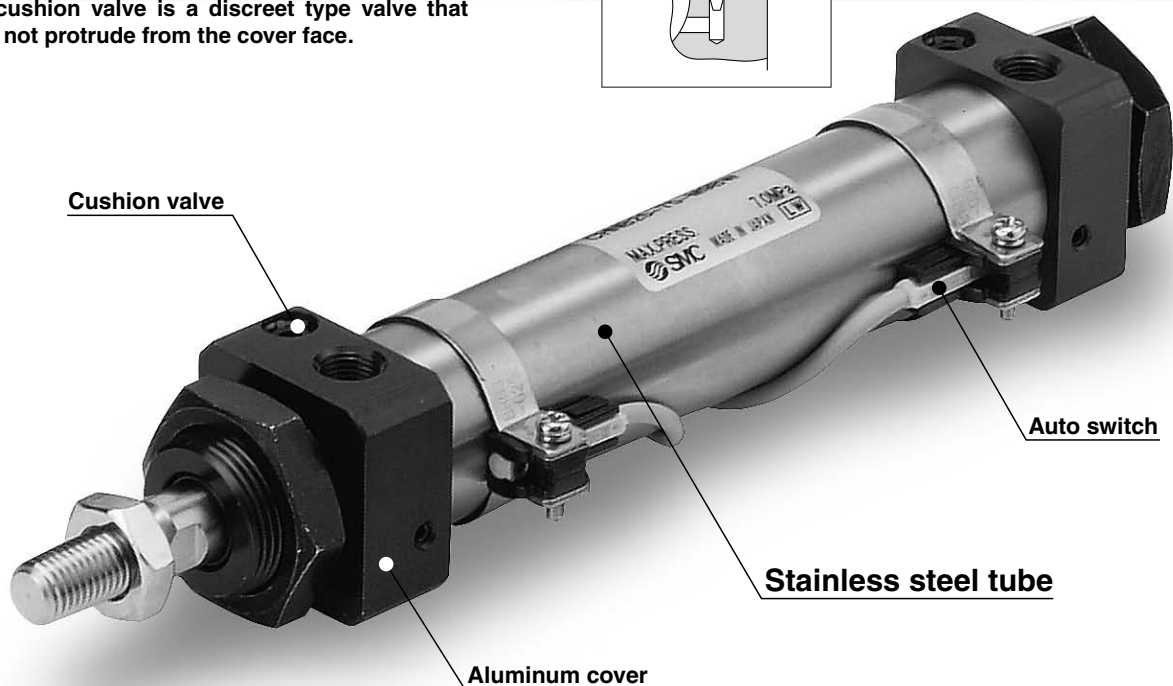
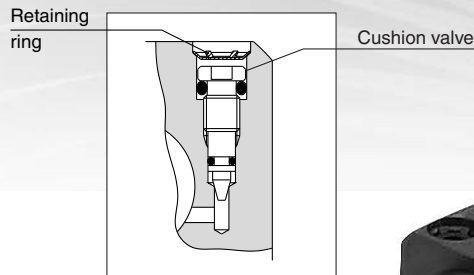
# Small Bore Hydraulic Cylinder for 7 MPa

## Series CHN

ø20, ø25, ø32, ø40

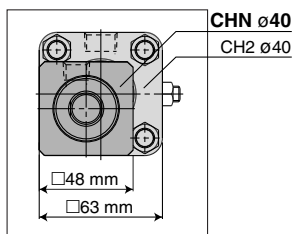
### Equipped with cushion mechanism

- A cushion seal system mechanism is now a standard feature.
- Cushion valves are enhanced with a non-slip retaining mechanism.
- The cushion valve is a discreet type valve that does not protrude from the cover face.



### Reduced cross sectional area

When compared to the same size tie-rod cylinder, the cross sectional area of our Series CHN cylinder projects less than 45%, thereby attaining better space savings.



### Lightweight

Using aluminum alloy for both the rod cover and head cover reduces overall weight.

Model	Mass (kg)
CHNB20-100	0.51
CHNB25-100	0.63
CHNB32-100	0.89
CHNB40-100	1.51

Basic type with a 100 mm stroke

### Built-in magnet

All cylinders come with a built-in magnet as a standard feature. This makes possible the mounting of an auto switch for piston position sensing even after the cylinder has been installed.

### Series Variations

Series	Nominal pressure	Bore size (mm)	Mounting bracket	Auto Switches
CHN	7.0 MPa	20	Basic style Axial foot style Rod flange style Head flange style Single clevis style	Band mounting type Reed type Solid state type
		25		
		32		
		40		

# Hydraulic Cylinder

# Series CHN

7 MPa

∅20, ∅25, ∅32, ∅40

## How to Order

CHN **L** **25** - **100** - **M9BW**

### Mounting style

<b>B</b>	Basic style
<b>L</b>	Axial foot style
<b>F</b>	Rod flange style
<b>G</b>	Head flange style
<b>C</b>	Single clevis style

### Bore size

<b>20</b>	20 mm
<b>25</b>	25 mm
<b>32</b>	32 mm
<b>40</b>	40 mm

### Cylinder stroke (mm)

Refer to the standard stroke table on page 216.

### Number of auto switches

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

### Auto switch type

<b>Nil</b>	Without auto switch (built-in magnet)
------------	---------------------------------------

\* Select applicable auto switches from the table below.

### Applicable Auto Switches: Refer to pages 347 to 406 for further details on each auto switch.

Type	Special function	Electrical entry	Indicator light	Wiring (output)	Load voltage		Auto switch model	Lead wire length (m)					Pre-wired connector	Applicable load			
					DC	AC		0.5 (Nil)	1 (M)	3 (L)	5 (Z)	None (N)		IC circuit	Relay PLC		
Solid state switch		Grommet		3-wire (NPN)	5 V, 12 V		<b>M9N</b>	●	●	●	○	—	○	IC circuit	Relay PLC		
				3-wire (PNP)			<b>M9P</b>	●	●	●	○	—	○				
		Connector		2-wire	12 V	<b>M9B</b>	●	●	●	○	—	○	—				
				Terminal conduit	3-wire (NPN)	5 V, 12 V	<b>H7C</b>	●	—	●	●	●	—	—			
	Diagnostic indication (2-color display)	Grommet	Yes	2-wire	24 V	12 V	<b>G39</b> *	—	—	—	—	●	—	IC circuit			
				3-wire (NPN)	5 V, 12 V	<b>K39</b> *	—	—	—	—	—	●	—	—			
				3-wire (PNP)	5 V, 12 V	<b>M9NW</b>	●	●	●	○	—	○	IC circuit				
				2-wire	12 V	<b>M9PW</b>	●	●	●	○	—	○	—				
				Water resistant (2-color display)			2-wire	12 V	<b>M9BW</b>	●	●	●	○	—		○	—
							4-wire (NPN)	5 V, 12 V	<b>H7BA</b>	○	○	●	○	—		○	—
With diagnostic output (2-color display)							<b>H7NF</b>	●	—	●	○	—	○	IC circuit			
Reed switch		Grommet	Yes	3-wire (NPN equiv.)	5 V	—	<b>A96</b>	●	—	●	—	—	—	IC circuit	—		
				No	100 V	<b>A93</b>	●	—	●	—	—	—	—	—			
					100 V or less	<b>A90</b>	●	—	●	—	—	—	—	IC circuit			
					100 V, 200 V	<b>B54</b>	●	—	●	●	—	—	—	—			
					200 V or less	<b>B64</b>	●	—	●	—	—	—	—	—			
					—	<b>C73C</b>	●	—	●	●	●	—	—	—			
				Connector	Yes	2-wire	24 V	12 V	<b>C80C</b>	●	—	●	●	●	—	IC circuit	
						No	24 V or less	<b>A33</b> *	—	—	—	—	—	●	—	—	
				Terminal conduit	Yes	—	—	—	<b>A34</b> *	—	—	—	—	●	—	—	
						100 V, 200 V	<b>A44</b> *	—	—	—	—	—	—	●	—	—	
DIN terminal	Yes	—	—	—	<b>B59W</b>	●	—	●	—	—	—	—					
		Diagnostic indication (2-color display)	Grommet	—	—	—	—	—	—	—	—	—	—				

\* 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  
 None ..... N (Example) H7CN

\* Solid state auto switches marked "○" are produced upon receipt of order.  
 \* You do not need to specify "N" (i.e., without lead wire) for D-A3□, D-A44, D-G39, and D-K39.  
 This is the only standard specification automatically available for these models.  
 \* D-A9□V, M9□V, M9□WV, and M9□A(V)L models cannot be mounted.

\* Since there are applicable auto switches other than listed, refer to page 228 for details.

\* For details about auto switches with pre-wired connector, refer to pages 389 and 390.

\* D-A9□, M9□, and M9□W type auto switches are shipped with the hydraulic cylinder (but not assembled). (However, they are auto switch mounting brackets are shipped with the mounting brackets mounted already).

CHQ

CHK□

CHN

CHM

CHS□

CH2□

CHA

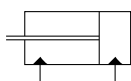
Related Equipment

D-□

# Series CHN



JIS symbol



## Specifications

Bore size (mm)	20	25	32	40
<b>Action</b>	Double acting/Single rod			
<b>Fluid</b>	Hydraulic fluid			
<b>Nominal pressure</b>	7 MPa			
<b>Proof pressure</b>	10.5 MPa			
<b>Maximum allowable pressure</b>	9 MPa			
<b>Minimum operating pressure</b>	0.3 MPa			
<b>Ambient and fluid temperature</b>	Without auto switch: -10° to 80°C			
	With auto switch: -10° to 60°C			
<b>Piston speed</b>	8 to 300 mm/s			
<b>Cushion</b>	Cushion seal			
<b>Stroke length tolerance</b>	to 250 mm $\begin{matrix} +1.0 \\ 0 \\ 0 \end{matrix}$			
	251 to 800 mm $\begin{matrix} +1.4 \\ 0 \\ 0 \end{matrix}$			
<b>Mounting style</b>	Basic style, Axial foot style Head flange style, Rod flange style Single clevis style			

Note) Refer to page 134 for definitions of terms related to pressure.

## Accessories

Mounting style		Basic	Axial foot	Head flange	Rod flange	Single clevis
Standard	Mounting nut	● (2 pcs.)	● (2 pcs.)	● (1 pc.)	● (1 pc.)	—
	Rod end nut	●	●	●	●	●

## Option

I-type single knuckle joint Y-type double knuckle joint Bracket for clevis type Knuckle pin Bracket pin	Refer to page 225
---	-------------------

## Hydraulic Fluid Compatibility

Hydraulic fluid	Compatibility
Standard mineral hydraulic fluid	Compatible
W/O hydraulic fluids	Compatible
O/W hydraulic fluids	Compatible
Water/Glycol hydraulic fluids	*
Phosphate hydraulic fluids	Not compatible

\* Consult with SMC.

## Standard Strokes: Refer to page 227 for minimum strokes for auto switch mounting.

Bore size (mm)	Standard strokes (mm)	Long stroke
20	25 to 300	800
25	25 to 400	
32	25 to 500	
40		

\* Standard strokes above have a minimal delivery time.

Consult with SMC for the manufacture of strokes other than the above.

## Mounting Brackets: Part Nos.

Bore size (mm)	20	25	32	40
Axial foot *	CHN-L020	CHN-L025	CHN-L032	CHN-L040
Flange	CHN-F020	CHN-F025	CHN-F032	CHN-F040

\* When ordering the axial foot type, order 2 pieces for each cylinder.

## Theoretical Output

Unit: N

Bore size (mm)	Rod size (mm)	Operating direction	Piston area (mm <sup>2</sup> )	Operating pressure (MPa)			
				1	3	5	7
20	10	OUT	314	314	942	1570	2198
		IN	235	235	705	1175	1645
25	12	OUT	490	490	1470	2450	3430
		IN	377	377	1131	1885	2639
32	16	OUT	804	804	2412	4020	5628
		IN	603	603	1809	3015	4221
40	18	OUT	1256	1256	3768	6280	8792
		IN	1002	1002	3006	5010	7014

Theoretical output (N) = Pressure (MPa) x Piston area (mm<sup>2</sup>)

## Mass

Unit: kg

Bore size (mm)		20	25	32	40
Basic Mass	Basic style	0.27	0.37	0.53	1.05
	Axial foot style	0.51	0.63	0.91	1.59
	Flange style	0.36	0.54	0.72	1.26
	Clevis style	0.25	0.45	0.67	1.00
Additional mass per 50 mm		0.12	0.13	0.18	0.23

- Calculation method (Example) **CHNL20-100** (Foot type, ø20, 100 mm stroke)
- Basic mass ..... 0.51 kg
- Additional mass ... 0.12/50 mm
- Cylinder stroke ..... 100 mm

$0.51 + 0.12/50 \times 100 = 0.75 \text{ kg}$

### Specific Product Precautions

**Be sure to read before handling. Refer to front matters 30 and 31 for Safety Instructions, and pages 134 to 142 for precautions for hydraulic cylinder and auto switch.**

### Caution

When operating a cylinder for the first time, make sure to release the air at low pressure. When the air release is complete, operate the cylinder at reduced pressure, gradually increasing it to the normal operating pressure. However, the piston speed at this time should be adjusted to the minimum speed.

### Mounting

### Caution

1. When mounting with bracket mounting nuts, tighten them using the tightening torques in the table below as a guide.

Bore size (mm)	Mounting nut thread	Mounting nut width across flats (mm)	Tightening torque (N·m)
20	M22 x 1.5	26	45
25	M24 x 1.5	32	60
32	M30 x 1.5	38	85
40	M33 x 1.5	41	110

2. When mounted with one side attached and one side unattached (basic type and flange type) and operating at high speed, bending moment acts on the cylinder due to oscillation at the stroke end, which may cause cylinder damage. In this case, install brackets to suppress the oscillation of the cylinder body, or reduce the piston speed enough so that the cylinder body does not oscillate at the stroke end.

CHQ

CHK

CHN

CHM

CHS

CH2

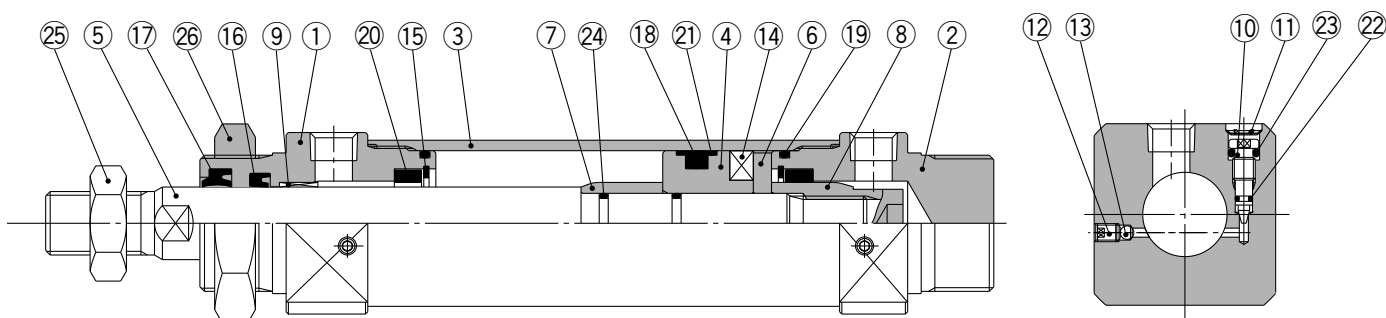
CHA

Related Equipment

D-

# Series CHN

## Construction



### Parts List

No.	Description	Material	Note
1	Rod cover	Aluminum alloy	Black anodized
2	Head cover	Aluminum alloy	Black anodized
3	Cylinder tube	Stainless steel	
4	Piston	Stainless steel	
5	Piston rod	ø20, 25: Stainless steel ø32, 40: Carbon steel	Hard chromium electro plating
6	Magnet plate	Stainless steel	
7	Cushion ring A	Carbon steel	
8	Cushion ring B	Carbon steel	
9	Bushing	Lead bronze	
10	Cushion valve	Carbon steel	
11	Retaining ring	Spring steel	
12	Air release valve	Alloy steel	
13	Check ball	Bearing steel	

### Parts List

No.	Description	Material	Note
14	Magnet	—	
15	Retaining ring	Spring steel	
16	Rod seal	NBR	
17	Scraper	NBR	
18	Piston seal	NBR	
19	Tube gasket	NBR	
20	Cushion seal	—	
21	Back-up ring	Resin	
22	Cushion valve seal A	NBR	
23	Cushion valve seal B	NBR	
24	Piston gasket	NBR	
25	Rod end nut	Carbon steel	
26	Mounting nut	Carbon steel	

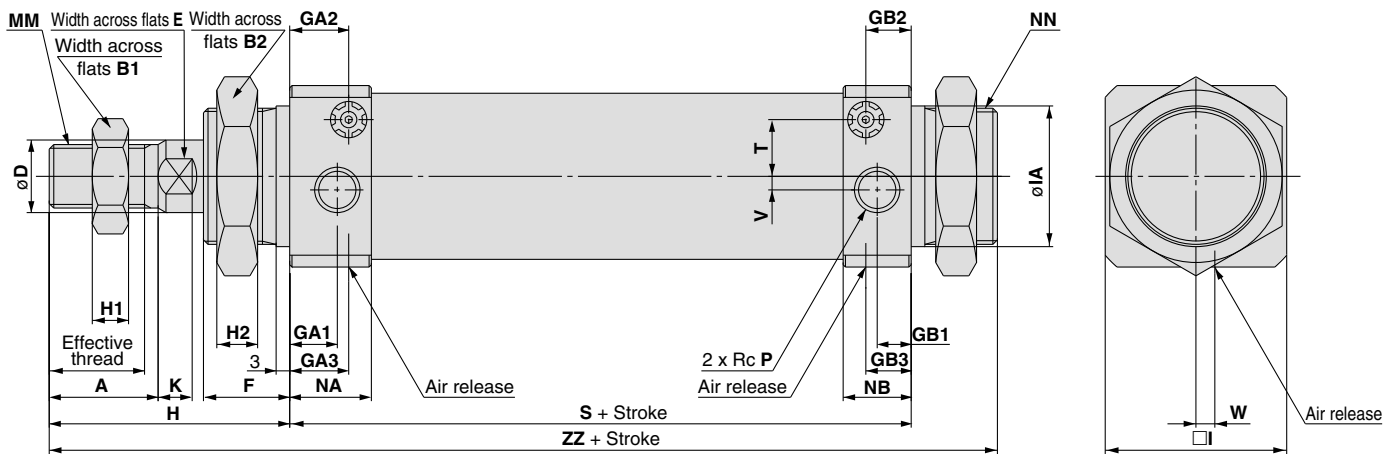
### Replacement Parts: Seal Kit

Bore size (mm)	Seal kit no.	Content
20	CHN20-PS	Nos. 16 to 21 from the chart
25	CHN25-PS	
32	CHN32-PS	
40	CHN40-PS	

\* Seal kit consists of items 16 to 20 and 22 and can be ordered by using the seal kit number for each bore size.

**Dimensions**

**Basic style: CHNB**



**CHQ**

**CHK**

**CHN**

**CHM**

**CHS**

**CH2**

**CHA**

Related Equipment

**D-**

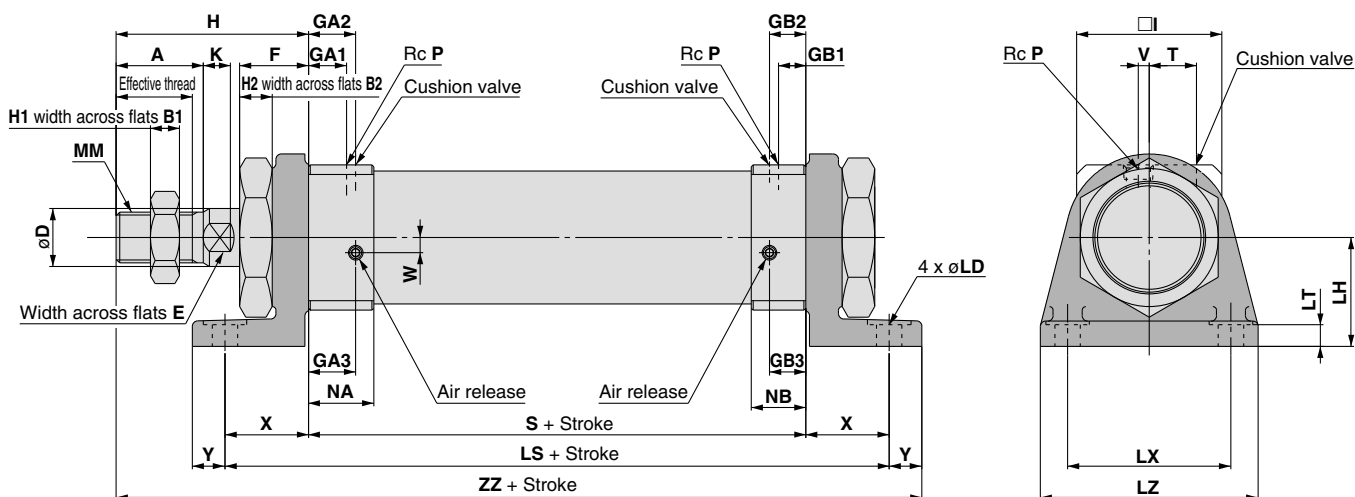
Bore size (mm)	Stroke range (mm)	Effective thread length (mm)	A	B1	B2	D	E	F	GA1	GA2	GA3	GB1	GB2	GB3	H	H1	H2	I
20	25 to 300	15.5	18	13	26	10	8	16	10	12	12	8	10	10	41	5	8	31
25	25 to 400	19.5	22	17	32	12	10	16	10	12	12	8	10	10	46	6	8	34
32	25 to 500	21	24	22	38	16	14	19	11	13	13	8	10	10	53	8	9	40
40	25 to 500	21	24	24	41	18	16	21	12	17	17	11	16	16	54	10	11	48

Bore size (mm)	IA	K	MM	NA	NB	NN	P	S	T	V	W	ZZ
20	23f8 <sup>-0.020</sup> <sub>-0.053</sub>	5	M8 x 1.25	17	15	M22 x 1.5	1/8	81	9.5	4.5	6.5	138
25	25f8 <sup>-0.020</sup> <sub>-0.053</sub>	5.5	M10 x 1.25	17	15	M24 x 1.5	1/8	81	11	3.5	5.5	143
32	31f8 <sup>-0.025</sup> <sub>-0.064</sub>	7.5	M14 x 1.5	18	15	M30 x 1.5	1/8	87	13	3	4	159
40	34f8 <sup>-0.025</sup> <sub>-0.064</sub>	7.5	M16 x 1.5	22	21	M33 x 2	1/4	108	16	5	0	183

# Series CHN

## Dimensions

### Axial foot style: CHNL



(mm)

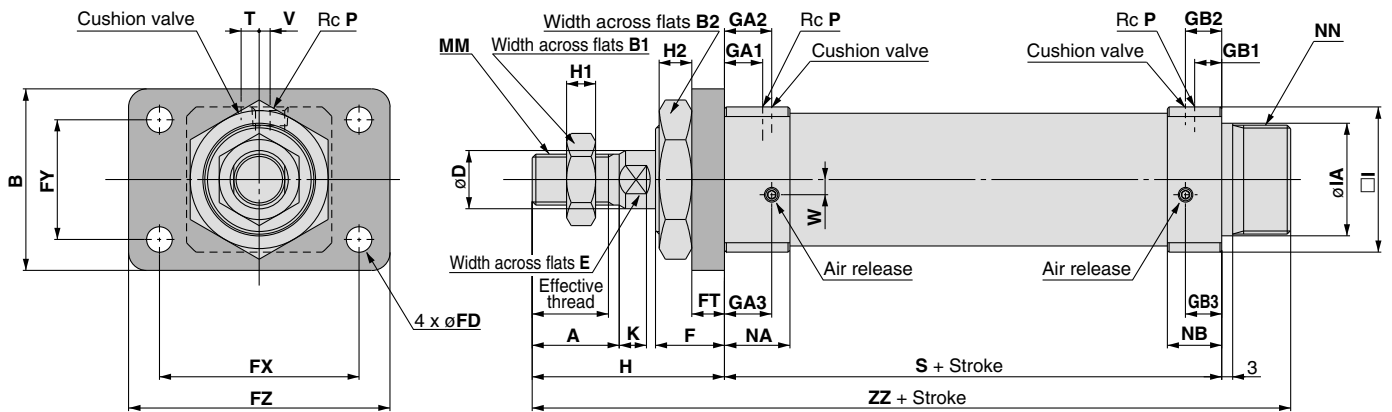
Bore size (mm)	Stroke range (mm)	Effective thread length (mm)	A	B1	B2	D	E	F	GA1	GA2	GA3	GB1	GB2	GB3	H	H1	H2	I	K
20	25 to 300	15.5	18	13	26	10	8	16	10	12	12	8	10	10	41	5	8	31	5
25	25 to 400	19.5	22	17	32	12	10	16	10	12	12	8	10	10	46	6	8	34	5.5
32	25 to 500	21	24	22	38	16	14	19	11	13	13	8	10	10	53	8	9	40	7.5
40	25 to 500	21	24	24	41	18	16	21	12	17	17	11	16	16	54	10	11	48	7.5

(mm)

Bore size (mm)	LD	LH	LS	LT	LX	LZ	MM	NA	NB	P	S	T	V	W	X	Y	ZZ
20	7	25	121	5.5	40	55	M8 x 1.25	17	15	1/8	81	9.5	4.5	6.5	20	9	151
25	7	28	121	5.5	40	55	M10 x 1.25	17	15	1/8	81	11	3.5	5.5	20	9	156
32	7	30	133	6	45	60	M14 x 1.5	18	15	1/8	87	13	3	4	23	9	172
40	9	35	158	6	55	75	M16 x 1.5	22	21	1/4	108	16	5	0	25	11	198



Rod flange style: **CHNF**



**CHQ**

**CHK**

**CHN**

**CHM**

**CHS**

**CH2**

**CHA**

Related Equipment

**D-**

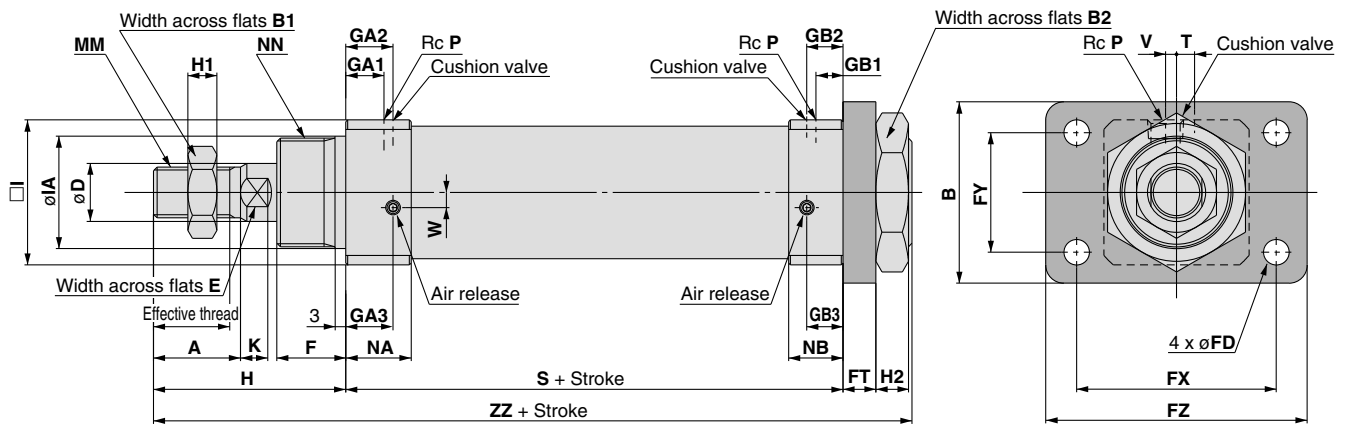
Bore size (mm)	Stroke range (mm)	Effective thread length (mm)	A	B	B1	B2	D	E	F	FD	FT	FX	FY	FZ	GA1	GA2	GA3	GB1	GB2
20	25 to 300	15.5	18	38	13	26	10	8	16	7	6	51	21	68	10	12	12	8	10
25	25 to 400	19.5	22	44	17	32	12	10	16	7	9	53	27	70	10	12	12	8	10
32	25 to 500	21	24	50	22	38	16	14	19	7	9	55	33	72	11	13	13	8	10
40	25 to 500	21	24	60	24	41	18	16	21	9	9	66	36	84	12	17	17	11	16

Bore size (mm)	GB3	H	H1	H2	I	IA	K	MM	NA	NB	NN	P	S	T	V	W	ZZ
20	10	41	5	8	31	23f8 <sup>-0.020</sup> <sub>-0.053</sub>	5	M8 x 1.25	17	15	M22 x 1.5	1/8	81	9.5	4.5	6.5	138
25	10	46	6	8	34	25f8 <sup>-0.020</sup> <sub>-0.053</sub>	5.5	M10 x 1.25	17	15	M24 x 1.5	1/8	81	11	3.5	5.5	143
32	10	53	8	9	40	31f8 <sup>-0.025</sup> <sub>-0.064</sub>	7.5	M14 x 1.5	18	15	M30 x 1.5	1/8	87	13	3	4	159
40	16	54	10	11	48	34f8 <sup>-0.025</sup> <sub>-0.064</sub>	7.5	M16 x 1.5	22	21	M33 x 2	1/4	108	16	5	0	183

# Series CHN

## Dimensions

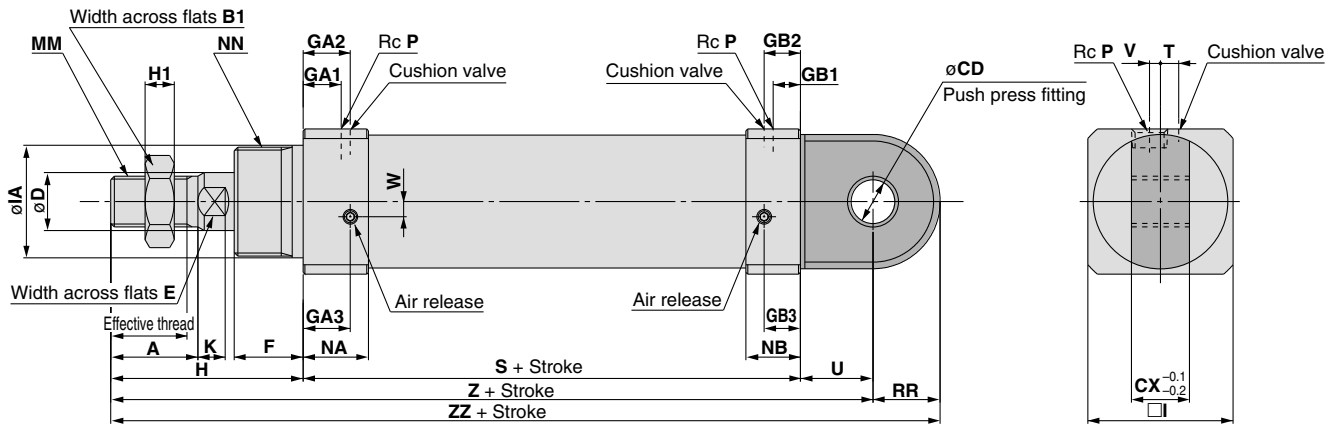
### Head flange style: CHNG



(mm)																			
Bore size (mm)	Stroke range (mm)	Effective thread length (mm)	A	B	B1	B2	D	E	F	FD	FT	FX	FY	FZ	GA1	GA2	GA3	GB1	GB2
20	25 to 300	15.5	18	38	13	26	10	8	16	7	6	51	21	68	10	12	12	8	10
25	25 to 400	19.5	22	44	17	32	12	10	16	7	9	53	27	70	10	12	12	8	10
32	25 to 500	21	24	50	22	38	16	14	19	7	9	55	33	72	11	13	13	8	10
40	25 to 500	21	24	60	24	41	18	16	21	9	9	66	36	84	12	17	17	11	16

(mm)																	
Bore size (mm)	GB3	H	H1	H2	I	IA	K	MM	NA	NB	NN	P	S	T	V	W	ZZ
20	10	41	5	8	31	23f8 <sup>-0.020</sup> <sub>-0.053</sub>	5	M8 x 1.25	17	15	M22 x 1.5	1/8	81	9.5	4.5	6.5	138
25	10	46	6	8	34	25f8 <sup>-0.020</sup> <sub>-0.053</sub>	5.5	M10 x 1.25	17	15	M24 x 1.5	1/8	81	11	3.5	5.5	143
32	10	53	8	9	40	31f8 <sup>-0.025</sup> <sub>-0.064</sub>	7.5	M14 x 1.5	18	15	M30 x 1.5	1/8	87	13	3	4	159
40	16	54	10	11	48	34f8 <sup>-0.025</sup> <sub>-0.064</sub>	7.5	M16 x 1.5	22	21	M33 x 2	1/4	108	16	5	0	183

Single clevis style: **CHNC**



**CHQ**

**CHK**

**CHN**

**CHM**

**CHS**

**CH2**

**CHA**

Related Equipment

**D-**

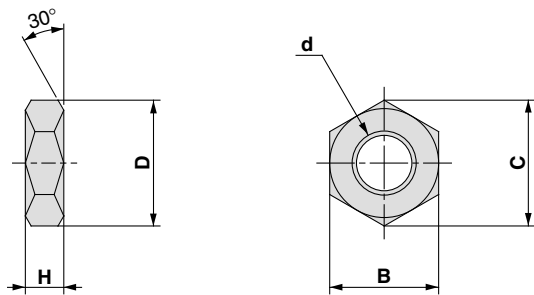
Bore size (mm)	Stroke range (mm)	Effective thread length (mm)	A	B1	CD	CX	D	E	F	GA1	GA2	GA3	GB1	GB2	GB3	H	H1	I
20	25 to 300	15.5	18	13	10 <sup>+0.109</sup> <sub>0</sub>	16	10	8	16	10	12	12	8	10	10	41	5	31
25	25 to 400	19.5	22	17	10 <sup>+0.109</sup> <sub>0</sub>	16	12	10	16	10	12	12	8	10	10	46	6	34
32	25 to 500	21	24	22	12 <sup>+0.109</sup> <sub>0</sub>	16	16	14	19	11	13	13	8	10	10	53	8	40
40	25 to 500	21	24	24	16 <sup>+0.034</sup> <sub>-0.015</sub>	24	18	16	21	12	17	17	11	16	16	54	10	48

Bore size (mm)	IA	K	MM	NA	NB	NN	P	RR	S	T	U	V	W	Z	ZZ
20	23f8 <sup>-0.020</sup> <sub>-0.053</sub>	5	M8 x 1.25	17	15	M22 x 1.5	1/8	13.5	81	9.5	14	4.5	6.5	136	149.5
25	25f8 <sup>-0.020</sup> <sub>-0.053</sub>	5.5	M10 x 1.25	17	15	M24 x 1.5	1/8	14.5	81	11	15	3.5	5.5	142	156.5
32	31f8 <sup>-0.025</sup> <sub>-0.064</sub>	7.5	M14 x 1.5	18	15	M30 x 1.5	1/8	18.5	87	13	20	3	4	160	178.5
40	34f8 <sup>-0.025</sup> <sub>-0.064</sub>	7.5	M16 x 1.5	22	21	M33 x 2	1/4	22.5	108	16	20	5	0	182	204.5

# Series CHN

## Accessories (Standard)

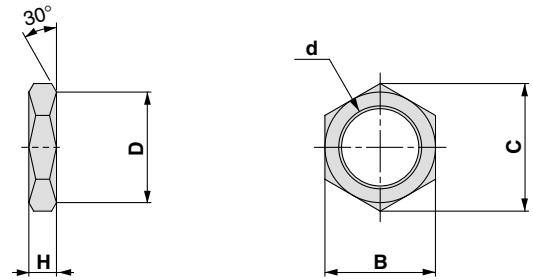
### Rod end nut



Material: Carbon steel

Part no.	Applicable bore size (mm)	d	H	B	C	D
<b>NT-02</b>	20	M8 x 1.25	5	13	15.0	12.5
<b>NT-03</b>	25	M10 x 1.25	6	17	19.6	16.5
<b>NT-04</b>	32	M14 x 1.5	8	22	25.4	21.0
<b>AC-NI-50</b>	40	M16 x 1.5	10	24	27.7	23

### Mounting nut



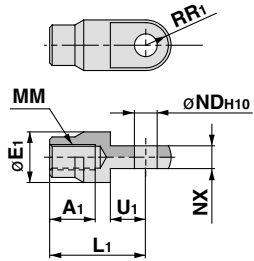
Material: Carbon steel

Part no.	Applicable bore size (mm)	d	H	B	C	D
<b>SO-02</b>	20	M22 x 1.5	8	26	30	26
<b>SO-03</b>	25	M24 x 1.5	8	32	36.9	32
<b>SO-04</b>	32	M30 x 1.5	9	38	43.9	38
<b>SO-05</b>	40	M33 x 2.0	11	41	47.3	41

## Accessory Brackets (Optional)

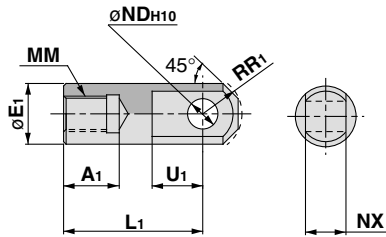
### I-type single knuckle joint

ø20: I-02  
ø25: I-03



Material: Rolled steel plate

ø32: I-04  
ø40: IHN-04

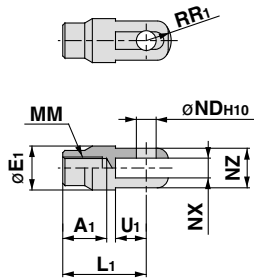


Material: Rolled steel plate

Part no.	Applicable bore size (mm)	A <sub>1</sub>	E <sub>1</sub>	L <sub>1</sub>	MM	R <sub>1</sub>	U <sub>1</sub>	ND <sup>H10</sup>	NX
I-02	20	16	20	36	M8 x 1.25	10	14	9 <sup>+0.058</sup> <sub>0</sub>	9 <sup>-0.1</sup> <sub>-0.2</sub>
I-03	25	18	20	38	M10 x 1.25	10	14	9 <sup>+0.058</sup> <sub>0</sub>	9 <sup>-0.1</sup> <sub>-0.2</sub>
I-04	32	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>
IHN-04	40	22	24	55	M16 x 1.5	15.5	20	15 <sup>+0.070</sup> <sub>0</sub>	16 <sup>-0.1</sup> <sub>-0.3</sub>

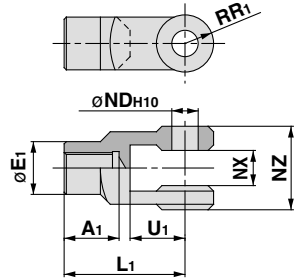
### Y-type double knuckle joint

ø20: Y-02  
ø25: Y-03



Material: Rolled steel plate

ø32: Y-04C  
ø40: YHN-04



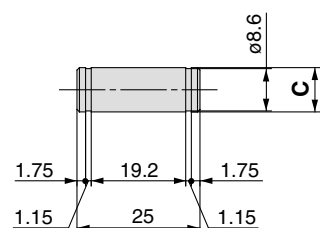
Material: Cast iron

Part no.	Applicable bore size (mm)	A <sub>1</sub>	E <sub>1</sub>	L <sub>1</sub>	MM	R <sub>1</sub>	U <sub>1</sub>	ND <sup>H10</sup>	NX
Y-02	20	16	20	36	M8 x 1.25	12	14	9 <sup>+0.058</sup> <sub>0</sub>	9 <sup>+0.2</sup> <sub>+0.1</sub>
Y-03	25	18	20	38	M10 x 1.25	12	14	9 <sup>+0.058</sup> <sub>0</sub>	9 <sup>+0.2</sup> <sub>+0.1</sub>
Y-04C	32	22	24	55	M14 x 1.5	13	25	12 <sup>+0.070</sup> <sub>0</sub>	16 <sup>+0.3</sup> <sub>+0.1</sub>
YHN-04	40	22	24	55	M16 x 1.5	13	25	15 <sup>+0.070</sup> <sub>0</sub>	16 <sup>+0.3</sup> <sub>+0.1</sub>

Part no.	NZ	Note
Y-02	18	With CDP-1 (with retaining ring)
Y-03	18	
Y-04C	38	With CDP-3 (with cotter pin)
YHN-04	38	With CDPN-4 (with cotter pin)

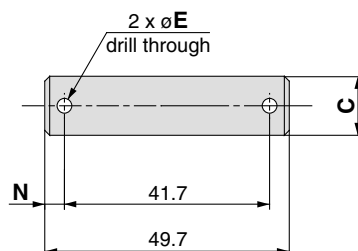
### Knuckle pin

ø20, ø25  
Part no.: CDP-1  
Material: Carbon steel



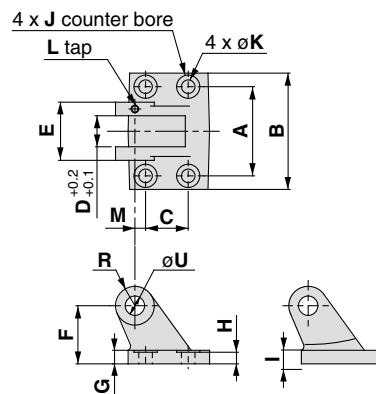
Retaining ring: C type 9 for shaft

ø32 ø40  
Part no.: CDP-3 CDPN-4  
Material: Carbon steel



Cotter pin: ø3 x 18 ℓ

### Bracket for clevis type

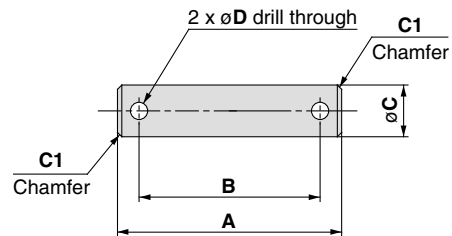


Material: Cast iron

Part no.	Applicable bore size (mm)	A	B	C	D	U (H8)		E	F	G	H	I	
						Size	Tolerance						
AD-FI-20	20	46	60	22	16	10	10	+0.027	30	28	6.5	5.5	10
AD-FI-25	25	46	60	22	16	10	10	+0.027	30	30	6.5	5.5	10
AD-FI-32	32	56	80	30	16	12	12	+0.027	36	40	10	9	13
AD-CHN-40	40	64	88	30	24	16	16	+0.027	44	43	10	9	13

Part no.	J	K	L	M	R	Note
AD-FI-20	12	7	M4	5.5	10	With AD-EI-20 (with cotter pin), and M4 set screws (once)
AD-FI-25	12	7	M4	5.5	10	With AD-EI-25 (with cotter pin), and M4 set screws (once)
AD-FI-32	12	7	M5	7	12	With AD-EI-32 (with cotter pin), and M5 set screws (once)
AD-CHN-40	16	9	M5	10	12	With AD-CHN-40 (with cotter pin), and M5 set screws (once)

### Bracket pin



Material: Carbon steel

Part no.	Applicable bore size (mm)	A	B	C (f7)		D	Note
				Size	Tolerance		
AD-EI-20	20	45.5	35.5	10	-0.016 -0.034	3.2	with (2) cotter pins ø3.2 x 16 ℓ
AD-EI-25	25	45.5	35.5	10	-0.016 -0.034	3.2	
AD-EI-32	32	52	42	12	-0.016 -0.034	4	with (2) cotter pins ø4 x 20 ℓ
AE-CHN-40	40	60	50	16	-0.016 -0.034	4	

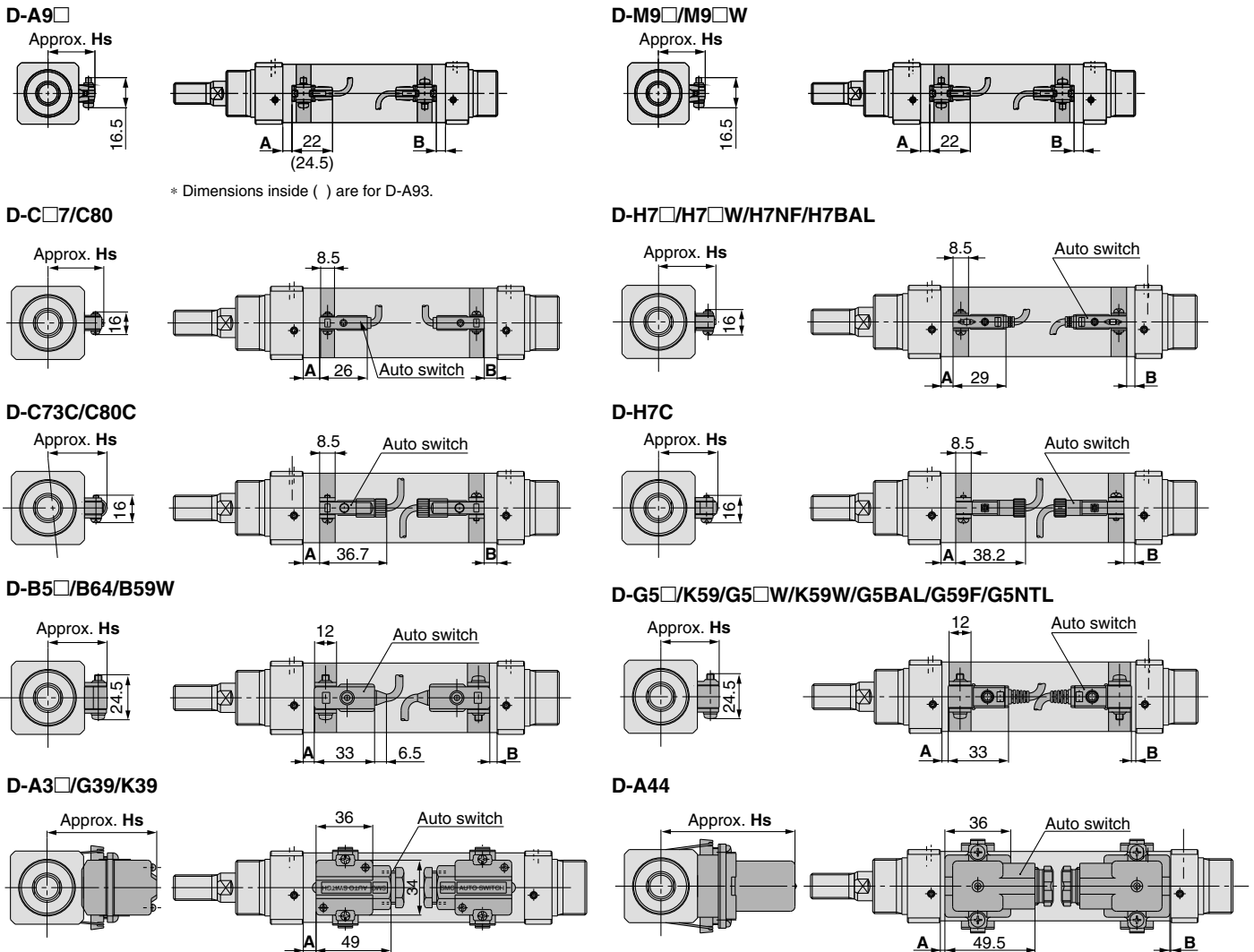
Part no.	Applicable bore size (mm)	C (d9)		N	E	Note
		Size	Tolerance			
CDP-1	20	9	-0.040 -0.076	—	—	with (2) retaining rings: C type 9
	25					
CDP-3	32	12	-0.050 -0.093	4	3	with (2) cotter pins ø3 x 18 ℓ
CDPN-4	40	15	-0.050 -0.093	5	3.2	with (2) cotter pins ø3.2 x 20 ℓ

# Series CHN Auto Switch Specifications

Refer to pages 347 to 406 for detailed auto switch specifications.



## Auto Switches: Proper Mounting Positions and Mounting Heights for Stroke End Detection



## Auto Switch Proper Mounting Positions

(mm)

Bore size (mm)	Solid state auto switch								Reed auto switch									
	D-M9□ D-M9□W		D-H7□ D-H7□W/H7C D-H7NF/H7BAL		D-G5□/K59 D-G5□W/K59W D-G59F/G5BAL D-G5NTL		D-G39/K39		D-A9□		D-C7□/C80 D-C73C/C80C		D-B5□/B64		D-B59W		D-A3□/A44	
	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B
20	23	14	18.5	9.5	15	6	13	4	19	10	19.5	10.5	13.5	4.5	16.5	7.5	13	4
25	23.5	13.5	19	9	15.5	5.5	13.5	3.5	19.5	9.5	20	10	14	4	17	7	13.5	3.5
32	25.5	16.5	21	12	17.5	8.5	15.5	6.5	21.5	12.5	22	13	16	7	19	10	15.5	6.5
40	31.5	21.5	27	17	23.5	13.5	21.5	11.5	27.5	17.5	28	18	22	12	25	15	21.5	11.5

## Auto Switch Mounting Heights

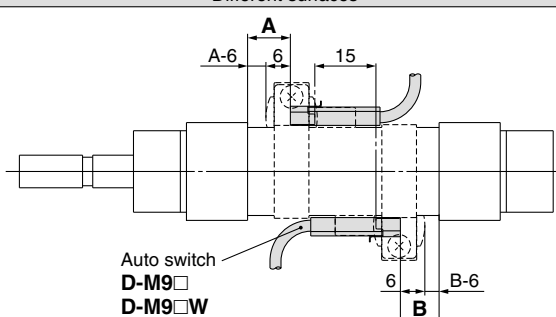
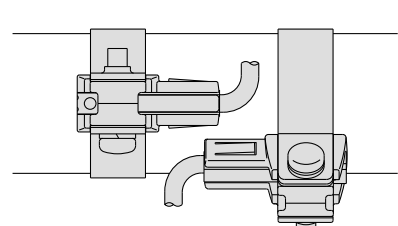
(mm)

Bore size (mm)	D-M9□/M9□W D-A9□	D-H7□/H7□W D-H7NF/H7BAL D-C7□/C80	D-C73C/C80C	D-G5□/K59 D-G5□W/K59W D-G59F/G5BAL D-G5NTL/H7C D-B5□/B64 D-B59W	D-G39/K39 D-A3□	D-A44
	Hs	Hs	Hs	Hs	Hs	Hs
20	24	25.5	27	27.5	62	72
25	26	27.5	29	29.5	64	74
32	29.5	31	32.5	33	67.5	77.5
40	33.5	35	36.5	37	71.5	81.5

## Minimum Auto Switch Mounting Stroke

(mm)

Auto switch model	Number of auto switches mounted				
	1 pc.	2 pcs.		n pcs.	
		Different surfaces	Same surface	Different surfaces	Same surface
D-M9□/M9□W D-A9□	10	15 <sup>Note)</sup>	45 <sup>Note)</sup>	$15 + 45 \frac{(n-2)}{2}$ (n = 2, 4, 6 ...)	45 + 45 (n - 2)
D-H7□/H7□W D-H7NF/H7BAL	10	15	60	$15 + 45 \frac{(n-2)}{2}$ (n = 2, 4, 6 ...)	60 + 45 (n - 2)
D-C7□ D-C80	10	15	50	$15 + 45 \frac{(n-2)}{2}$ (n = 2, 4, 6 ...)	50 + 45 (n - 2)
D-H7C D-C73C D-C80C	10	15	65	$15 + 50 \frac{(n-2)}{2}$ (n = 2, 4, 6 ...)	65 + 50 (n - 2)
D-G5□/K59 D-G5□W/K59W D-G59F/G5BAL/G5NTL D-B5□/B64	10	15	75	$15 + 50 \frac{(n-2)}{2}$ (n = 2, 4, 6 ...)	75 + 55 (n - 2)
D-B59W	15	20	75	$20 + 50 \frac{(n-2)}{2}$ (n = 2, 4, 6 ...)	75 + 55 (n - 2)
D-G39/K39 D-A3□/A44	10	35	100	$35 + 30 \frac{(n-2)}{2}$ (n = 2, 3, 4, 5 ...)	100 + 100 (n - 2)

Auto switch model	Auto switches — 2 pcs.	
	Different surfaces	Same surface
 <p>The proper mounting position is at 6 mm inward from the end surface of the switch holder.</p>	 <p>Mount auto switches offset (in circumferential direction of cylinder tube) so that auto switch units and lead wires do not run up against each other.</p>	
D-A93	—	Less than 50 strokes
D-M9□ D-M9□W	Less than 20 strokes	Less than 55 strokes

Note) The above diagram is a note for installing 2 of D-A93, M9□, or M9□W auto switches.

## Operating Range

(mm)

Auto switch model	Bore size			
	20	25	32	40
D-M9□ D-M9□W	4.5	4	4	4.5
D-H7□/H7C D-H7□W D-H7NF/H7BAL	4.5	5	4.5	5
D-G5□/K59/G59F D-G5□W/K59W D-G5BAL/G5NTL	5.5	5	4.5	5
D-G39/K39	9	8.5	10	10.5
D-A9□	8	7.5	7	8
D-C7□/C80 D-C73C/C80C	10.5	9.5	8.5	10
D-B5□/B64	13.5	11.5	10	12
D-B59W	13.5	13	11.5	13.5
D-A3□/A44	11.5	10	9	10.5

\* 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.

CHQ

CHK□

CHN

CHM

CHS□

CH2□

CHA

Related Equipment

D-□

## Auto Switch Mounting Brackets: Part Nos.

Auto switch models	Bore size (mm)			
	ø20	ø25	ø32	ø40
D-M9□ M9□W D-A9□	Note) ①BMA2-020 ②BJ3-1	Note) ①BHN3-025 ②BJ3-1	Note) ①BHN3-032 ②BJ3-1	Note) ①BHN3-040 ②BJ3-1
D-H7□/H7□W/H7NF D-H7BAL/C7□/C80 D-C73C/C80C	BMA2-020	BHN3-025	BHN3-032	BHN3-040
D-G5□/G5□W/G59F D-G5BAL/G5NTL D-B5□/B64/B59W	BA-01	BHN2-025	BGS1-032	BH2-040
D-G39/K39/A3□/A44	BD1-01M	BD1-02M	BHN1-032	BDS-04M

Note) Two types of auto switch mounting bracket are used as a set.

### [Stainless steel mounting screw kits]

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

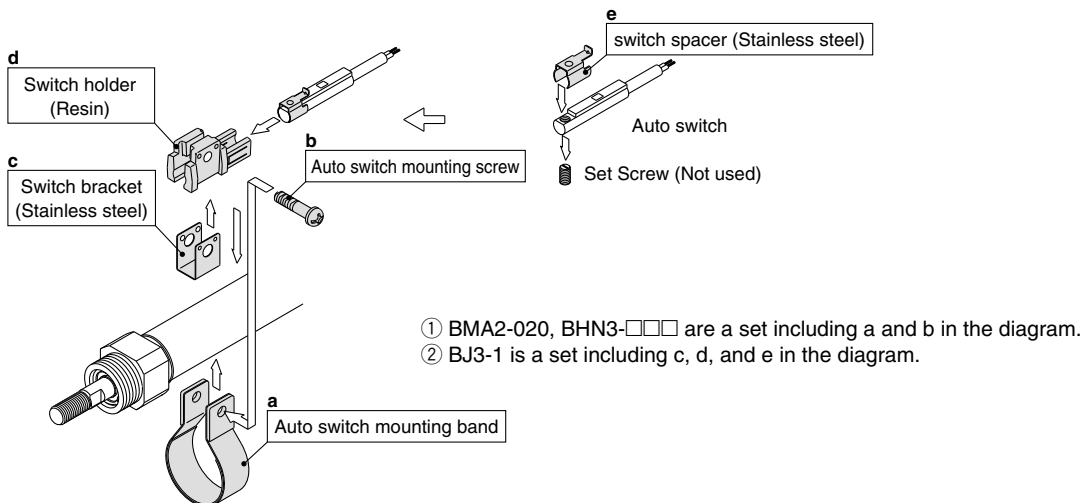
BBA3: D-B5, D-B6, D-G5, and D-K5

BBA4: D-C7, D-C8, D-H7

\* When D-H7BAL switches are shipped mounted on a cylinder, the above stainless steel screws are used. Also, when switches are shipped separately, BBA4, BBA3 is included.

### Stainless steel mounting screw kit details.

Part no.	Contents			Applicable auto switch mounting bracket part nos.	Applicable auto switches
	Description	size	pcs.		
BBA3	Auto switch mounting screw set	M4 x 0.7 x 22L	1	BA-01, BA-02, BA-32, BA-04, BA-05, BA-06, BA-08, BA-10	D-B5, B6 D-G5, K5
				BA2-020, BA2-025, BA2-032, BA2-040	
				BA5-050, BHN2-025, BSG1-032	
				BH2-040, BH2-050, BH2-080, BH2-100	
				BAF-32, BAF-04, BAF-05, BAF-06, BAF-08, BAF-10	
BBA4	Auto switch mounting screw set	M3 x 0.5 x 14L	1	BJ2-006, BJ2-010, BJ2-016	D-C7, C8 D-H7
				BM2-020, BM2-025, BM2-032, BM2-040	
				BMA2-020, BMA2-025, BMA2-032, BMA2-040, BMA2-050, BMA2-063	
				BHN3-025, BHN3-032, BHN3-040	



Besides the models listed in "How to Order," the following auto switches are applicable. Refer to pages 347 to 406 for detailed auto switch specifications.

Auto switch type	Part no.	Electrical entry	Features
Solid state	D-H7A1, H7A2, H7B	Grommet (in-line)	—
	D-G59, G5P, K59		Diagnostic indication (2-color display)
	D-H7NW, H7PW, H7BW		Water resistant (2-color display)
	D-G59W, G5PW, K59W		With timer
	D-G5BAL		With diagnostic output (2-color display)
	D-G5NTL		—
	D-G59F		Without indicator light
Reed	D-C73, C76, B53	Grommet (in-line)	—
	D-C80		Without indicator light

\* Solid state auto switches are also available with pre-wired connector. Refer to pages 389 and 390 for details.

\* Normally closed (N.C. = b contact), solid state auto switches (D-F9G, F9H) are also available. For details, refer to page 365.



## How to Mount and Move the Auto Switch

### ⚠ Caution

1. Tighten the screw under the specified torque when mounting auto switch.
2. Set the auto switch mounting band perpendicularly to cylinder tube.



### <Applicable auto switch>

Solid state ..... D-M9N, D-M9P, D-M9B  
 D-M9NW, D-M9PW, D-M9BW  
 Reed ..... D-A90, A93, A96

## How to Mount and Move the Auto Switch

### Mounting the Auto Switch

1. Attach the switch bracket to the switch holder.  
 (Fit the convex part of the switch bracket over the concave part of the holder.)
2. Mount the auto switch mounting band to the cylinder tube.
3. Set the switch holder between the reinforcing plates of the auto switch mounting band which is already attached to the cylinder.
4. Insert the auto switch mounting screw in the hole of the reinforcing plate through the switch holder, and thread it into the other plate. Tighten the screw temporarily.
5. Remove the set screw attached to the auto switch.
6. Attach the switch spacer to the auto switch.
7. Insert the auto switch with a switch spacer from the back of the switch holder and set it at the specified position.  
 (Insert the auto switch with an angle of approximately 10 to 15°. See figure 1.)
8. To secure the auto switch, tighten the switch mounting screw with the specified torque (0.8 N·m to 1.0 N·m).

### Adjusting the Switch Position

1. Unloosen the auto switch mounting screw 3 turns to adjust the auto switch set position.
2. Tighten the screw as described above (8) after adjustment.

### Dismounting Auto Switch

1. Remove the auto switch mounting screw from the switch holder.
2. Move the auto switch back towards the position where it stops at the lead wire side.
3. Hold up the lead wire side of the auto switch at the angle of around 45°.
4. Maintain the angle, and pull back the auto switch obliquely at the same angle.

Note 1) Be careful not to pull or strain the lead wires.  
 Be careful not to apply excess tensile force (over 10 N) to the auto switches.  
 Adjust the auto switch position after sufficiently loosening its screw. For the band mounting type BJ3-1, loosen the screw three rotations or more.

Note 2) Be sure to use the switch spacer and switch bracket for the band mounting type.  
 Use together with the conventional auto switch mounting bands (brackets) BMA2-020, or BHN3-□□□.  
 Confirm that a switch spacer is mounted to the end of the auto switch before fastening the auto switch. If the switch bracket is not mounted, the auto switch may move after installation.

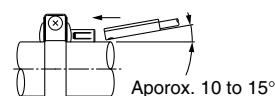
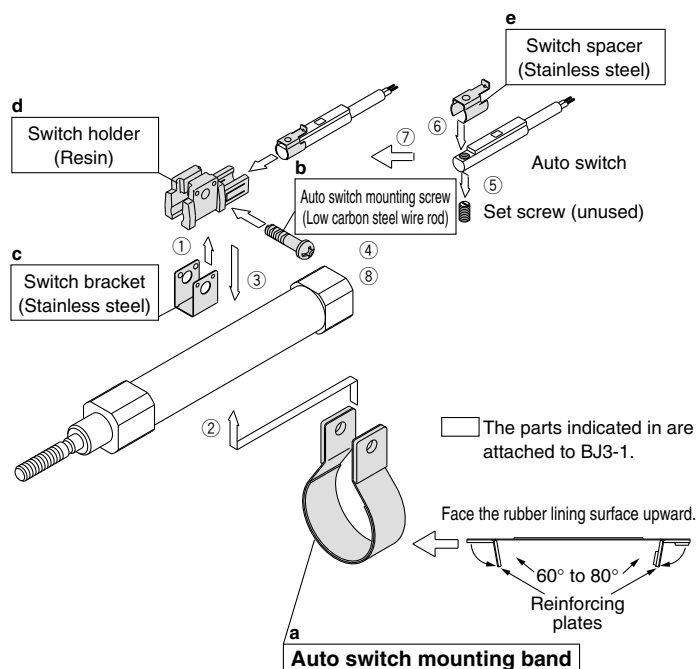


Figure 1. Switch insert angle



- BMA2-020 and BHN3-□□□ are a set of a and b shown above.
- BJ3-1 is a set of c, d and e shown above.

CHQ

CHK

CHN

CHM

CHS

CH2

CHA

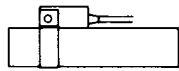
Related Equipment

D-□

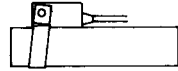
## How to Mount and Move the Auto Switch

### ⚠ Caution

1. Tighten the screw under the specified torque when mounting auto switch.
2. Set the auto switch mounting band perpendicularly to cylinder tube.



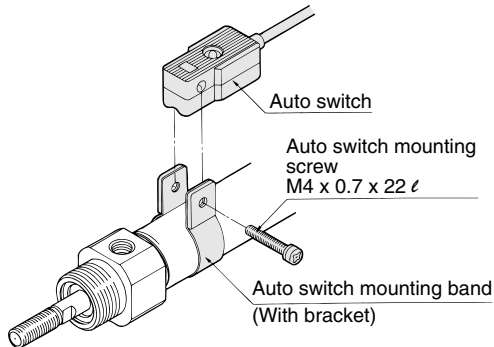
Mounting correctly



Mounting incorrectly

### <Applicable auto switch>

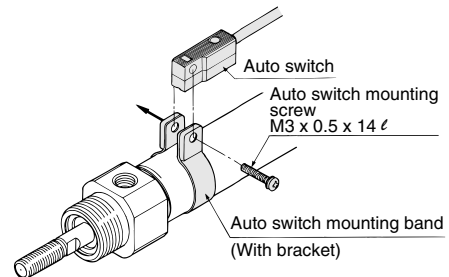
Solid state ..... D-G59, D-G5P, D-K59, D-G5BAL  
 D-G59W, D-G5PW, D-K59W  
 D-G59F, D-G5NTL, D-G5NBL  
 Reed ..... D-B53, D-B54, D-B64, D-B59W



1. Put an auto switch mounting band on the cylinder tube and set it at the auto switch mounting position.
2. Put the mounting section of the auto switch between the auto switch mounting band mounting holes, then adjust the position of mounting holes of switch to those of mounting band.
3. Lightly thread the auto switch mounting screw through the mounting hole into the thread part of band fitting.
4. After reconfirming the detection position, tighten the auto switch mounting screw to secure the auto switch while properly contacting the auto switch bottom part and the cylinder tube. (The tightening torque of M4 screw should be about 1 to 1.2 N·m.)
5. Modification of the detection position should be made in the condition of 3.

### <Applicable auto switch>

Solid state ..... D-H7A1, D-H7A2, D-H7B, D-H7BAL  
 D-H7C, D-H7NF, D-H7NW, D-H7PW  
 D-H7BW  
 Reed ..... D-C73, D-C76, D-C80, D-C73C, D-C80C

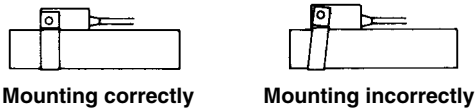


1. Put a mounting band on the cylinder tube and set it at the auto switch mounting position.
2. Put the mounting section of the auto switch between the auto switch mounting band mounting holes, then adjust the position of mounting holes of switch to those of mounting band.
3. Lightly thread the auto switch mounting screw through the mounting hole into the thread part of the auto switch mounting band fitting.
4. After setting the whole body to the detecting position by sliding, tighten the auto switch mounting screw to secure the auto switch while properly contacting the auto switch bottom part and the cylinder tube. (Tightening torque of M3 screw should be 0.8 to 1 N·m.)
5. Modification of the detection position should be made in the condition of 3.

## How to Mount and Move the Auto Switch

### **⚠ Caution**

1. Tighten the screw under the specified torque when mounting auto switch.
2. Set the auto switch mounting band perpendicularly to cylinder tube.



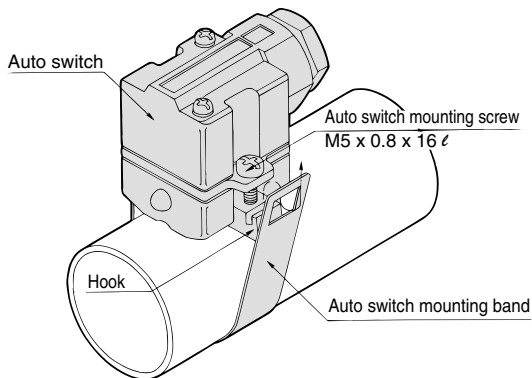
### <Applicable auto switch>

Solid state ..... D-G39, D-K39

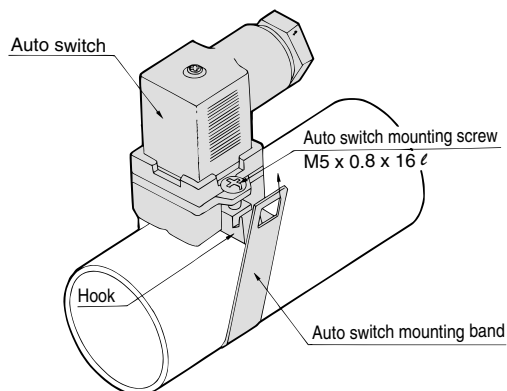
Reed ..... D-A33, D-A34, D-A44

## How to Mount and Move the Auto Switch

D-A3, D-G3/K3 type



**D-A4**



1. Loosen the auto switch mounting screws at both sides to pull down the hook.
2. Put an auto switch mounting band on the cylinder tube and set it at the auto switch mounting position, and then hook the band.
3. Screw lightly the auto switch mounting screw.
4. Set the whole body to the detecting position by sliding, tighten the mounting screw to secure the auto switch. (The tightening torque should be about 2 to 3 N·m.)
5. Modification of the detecting position should be made in the condition of 3.

CHQ

CHK

**CHN**

CHM

CHS

CH2

**CHA**

Related Equipment

D-

# Round Type Hydraulic Cylinder

## Series *CHM*

### Series *CHM*



Nominal pressure: **3.5 MPa**

Bore size (mm): 20, 25, 32, 40

CHQ

CHK

CHN

**CHM**

CHS

CH2

CHA

Related  
Equipment

D-

# Round Type Hydraulic Cylinder

# Series CH□M

3.5 MPa

∅20, ∅25, ∅32, ∅40

## How to Order

**CHM L 25 - 100**

**With Auto Switch** **CHDM L 25 - 100 - M9BW**

**With auto switch (built-in magnet)**

**Mounting style**

<b>B</b>	Basic style
<b>L</b>	Axial foot style
<b>F</b>	Rod flange style
<b>G</b>	Head flange style
<b>C</b>	Single clevis style

**Bore size**

<b>20</b>	20 mm
<b>25</b>	25 mm
<b>32</b>	32 mm
<b>40</b>	40 mm

**Cylinder stroke (mm)**

Refer to the standard stroke table on page 235.

**Number of auto switches**

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

**Auto switch type**

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

\* Select applicable auto switch models from the table below.

**Built-in Magnet Cylinder Model**

If a built-in magnet cylinder without auto switch is required, there is no need to enter the symbol for the auto switch.  
(Example) CHDMB20-100

### Applicable Auto Switches: Refer to pages 347 to 406 for further details on each auto switch.

Type	Special function	Electrical entry	Indicator light	Wiring (output)	Load voltage		Auto switch model	Lead wire length (m)					Pre-wired connector	Applicable load			
					DC	AC		0.5 (Nil)	1 (M)	3 (L)	5 (Z)	None (N)					
Solid state switch	—	Grommet	Yes	3-wire (NPN)	5 V, 12 V	—	<b>M9N</b>	●	●	●	○	—	○	IC circuit	Relay PLC		
				3-wire (PNP)			<b>M9P</b>	●	●	●	○	—				○	
		2-wire		12 V	<b>M9B</b>		●	●	●	○	—	○	—				
		Connector		3-wire (NPN)	5 V, 12 V		<b>H7C</b>	●	—	●	●	●	—			—	
				Terminal conduit	2-wire		24 V	12 V	<b>*G39</b>	—	—	—	—			●	—
	Diagnostic indication (2-color display)	Grommet	Yes	3-wire (NPN)	5 V, 12 V		<b>M9NW</b>	●	●	●	○	—	○	○		IC circuit	
				3-wire (PNP)			<b>M9PW</b>	●	●	●	○	—	○				
				2-wire	12 V		<b>M9BW</b>	●	●	●	○	—	○	—			
				Water resistant (2-color display)	4-wire (NPN)		5 V, 12 V	<b>H7BA</b>	○	○	●	○	—	○			—
							5 V, 12 V	<b>H7NF</b>	●	—	●	○	—	○			○
Reed switch	—	Grommet	Yes	3-wire (NPN equiv.)	—	5 V	<b>A96</b>	●	—	●	—	—	—	○	Relay PLC		
				100 V	<b>A93</b>	●	—	●	—	—	—	—	—				
					100 V or less	<b>A90</b>	●	—	●	—	—	—	—			—	IC circuit
				100 V, 200 V	<b>B54</b>	●	—	●	●	—	—	—	—			—	
					200 V or less	<b>B64</b>	●	—	●	—	—	—	—				—
		Connector		2-wire	24 V	12 V	<b>C73C</b>	●	—	●	●	●	—	—			
					24 V or less	<b>C80C</b>	●	—	●	●	●	—	—	○		IC circuit	
		Terminal conduit		Yes	100 V, 200 V	<b>A33*</b>	—	—	—	—	—	●	—	—		—	PLC
						<b>A34*</b>	—	—	—	—	—	●	—	—			
		DIN terminal		Yes	100 V, 200 V	<b>A44*</b>	—	—	—	—	—	●	—	—		—	Relay PLC
<b>B59W</b>	●		—			●	—	—	—	—	—						
Diagnostic indication (2-color display)	Grommet	—	—	—	—	—	<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  
 None ..... N (Example) H7CN

\* Solid state auto switches marked "○" are produced upon receipt of order.  
 \* Do not indicate lead wire length symbol N (none) for types D-A3□, D-A44, D-G-39 or D-K39.  
 \* D-A9□V, M9□V, M9□WV, M9□A(V)L are not mountable.

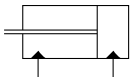
\* Since there are applicable auto switches other than listed, refer to page 244 for details.  
 \* For details about auto switches with pre-wired connector, refer to pages 389 and 390.  
 \* D-A9□, M9□, M9□W, M9□AL are shipped together (but not assembled). (Only auto switch mounting brackets are assembled at the time of shipment.)

# Round Type Hydraulic Cylinder: 3.5 MPa **Series CH□M**

## Specifications



JIS symbol



Bore size (mm)	20	25	32	40
<b>Action</b>	Double acting/Single rod			
<b>Fluid</b>	Hydraulic fluid			
<b>Nominal pressure</b>	3.5 MPa			
<b>Proof pressure</b>	5.0 MPa			
<b>Maximum allowable pressure</b>	3.5 MPa			
<b>Minimum operating pressure</b>	0.3 MPa			
<b>Ambient and fluid temperature</b>	Without auto switch: -10° to 80°C			
	With auto switch: -10° to 60°C			
<b>Piston speed</b>	8 to 300 mm/s			
<b>Cushion</b>	None			
<b>Stroke length tolerance</b>	to 250 mm		+1.0 0	
	250 to 800 mm		+1.4 0	
<b>Mounting style</b>	Basic style, Axial foot style Head flange style, Rod flange style Single clevis style			

Note) Refer to page 134 for definitions of terms related to pressure.

## Accessories

Mounting bracket		Basic style	Axial foot style	Head flange style	Rod flange style	Single clevis style
Standard	Mounting nut	● (2 pcs.)	● (2 pcs.)	● (1 pc.)	● (1 pc.)	—
	Rod end nut	●	●	●	●	●

## Optional

I-type single knuckle joint Y-type double knuckle joint Bracket for clevis style Knuckle pin Bracket pin	Refer to page 241
--	-------------------

## Hydraulic Fluid Compatibility

Hydraulic fluid	Compatibility
Standard mineral hydraulic fluid	Compatible
W/O hydraulic fluid	Compatible
O/W hydraulic fluid	Compatible
Water/Glycol hydraulic fluid	Not compatible
Phosphate hydraulic fluid	Not compatible

## Standard Strokes: Refer to page 243 regarding minimum strokes for auto switch mounting.

Bore size (mm)	Standard strokes (mm)
20	25 to 800
25	
32	
40	

\* Orders of the standard strokes above can be supplied with a minimum lead time.  
Please consult with SMC regarding the manufacture of strokes other than the above.

## Mounting Brackets: Part Nos.

Bore size (mm)	20	25	32	40
Axial foot*	CHM-L020	CHM-L025	CHM-L032	CHM-L040
Flange	CHM-F020	CHM-F025	CHM-F032	CHM-F040

\* When ordering the axial foot type, order 2 pcs. for each cylinder.

CHQ

CHK□

CHN

CHM

CHS□

CH2□

CHA

Related Equipment

D-□

## Theoretical Output

Unit: N

Bore size (mm)	Rod size (mm)	Operating direction	Piston area (mm <sup>2</sup> )	Operating pressure (MPa)					
				1	1.5	2	2.5	3	3.5
20	10	OUT	314	314	471	628	785	942	1099
		IN	235	235	352	470	587	705	822
25	12	OUT	490	490	735	980	1225	1470	1715
		IN	377	377	565	754	942	1131	1319
32	16	OUT	804	804	1206	1608	2010	2412	2814
		IN	603	603	904	1206	1507	1809	2110
40	18	OUT	1256	1256	1884	2512	3140	3768	4396
		IN	1002	1002	1503	2004	2505	3006	3507

Theoretical output (N) = Pressure (MPa) x Piston area (mm<sup>2</sup>)

## Mass

Unit: kg

Bore size (mm)		20	25	32	40
Basic mass	Basic type	0.20	0.29	0.50	0.82
	Axial foot type	0.44	0.55	0.88	1.36
	Flange type	0.29	0.46	0.69	1.03
	Clevis type	0.18	0.37	0.64	0.77
Additional mass per 50 mm		0.06	0.08	0.12	0.16

- Calculation method (Example) **CHML20-100** (Foot type ø20/100 mm stroke)
  - Basic mass.....0.44 kg
  - Additional mass...0.06/50 mm
  - Cylinder stroke....100 mm $0.44 + 0.06 \times 100/50 = 0.56 \text{ kg}$

## ⚠ Specific Product Precautions

**Be sure to read before handling. Refer to front matters 30 and 31 for Safety Instructions, and pages 134 to 142 for precautions for hydraulic cylinder and auto switch.**

### Air Release

## ⚠ Caution

1. Since Series CH□M does not have an air release valve, release air from components other than the cylinder (e.g. from piping, etc.).
2. When operating a cylinder for the first time, be sure to release the air at low pressure. When the air release is complete, operate the cylinder at reduced pressure, then gradually increase it to the normal operating pressure. However, the piston speed at this time should be adjusted to the minimum speed.

### Mounting

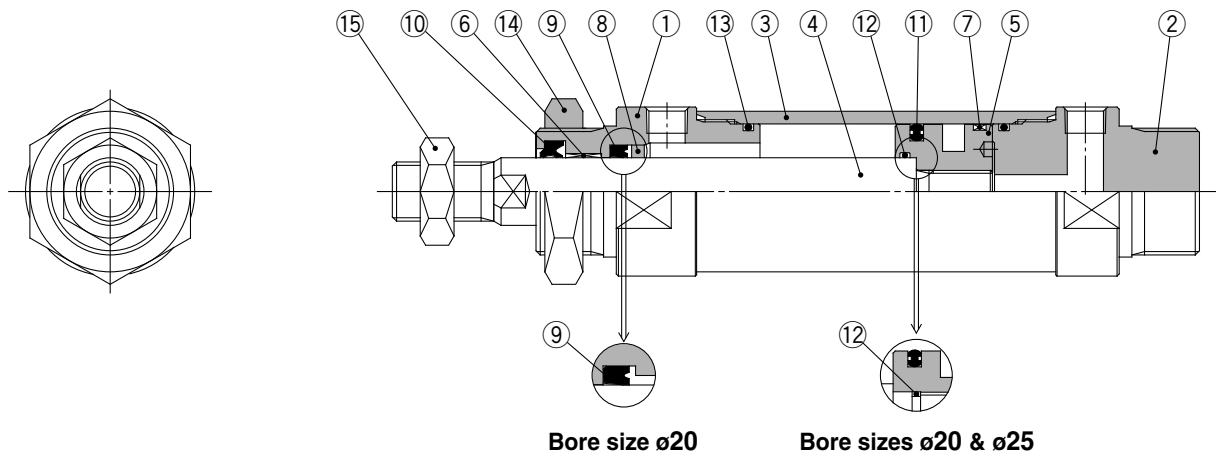
## ⚠ Caution

1. When mounting with bracket mounting nuts, tighten them using the tightening torques in the table below as a guide.

Bore size (mm)	Mounting nut thread	Mounting nut width across flats (mm)	Tightening torque (N·m)
20	M22 x 1.5	26	45
25	M24 x 1.5	32	60
32	M30 x 1.5	38	85
40	M33 x 1.5	41	110

2. When mounted with one side attached and one side free (basic type, flange type) and operating at high speed, the bending moment acts on the cylinder due to oscillation at the stroke end, which may cause cylinder damage. In this type of situation, install brackets to suppress the oscillation of the cylinder body, or reduce the piston speed enough so that the cylinder body does not oscillate at the stroke end.

## Construction



### Parts List

No.	Description	Material	Note
1	Rod cover	Aluminum alloy	Hard black anodized
2	Head cover	Aluminum alloy	Hard black anodized
3	Cylinder tube	Aluminum alloy	Hard anodized
4	Piston rod	Carbon steel	Hard chromium electroplated*
5	Piston	Aluminum alloy	Chromated
6	Bushing	Oil impregnated alloy	
7	Wear ring	Resin	
8	Retainer	Copper alloy	
9	Rod seal	NBR	
10	Wiper ring	NBR	
11	Piston seal	NBR	
12	Piston gasket	NBR	
13	Tube gasket	NBR	
14	Mounting nut	Carbon steel	Black zinc chromated
15	Rod end nut	Rolled steel	Nickel plated

\* In case of cylinder bore sizes ø20 and ø25 for built-in magnet type, the piston rod material is stainless steel when equipped with auto switches.

CHQ

CHK□

CHN

**CHM**

CHS□

CH2□

CHA

Related  
Equipment

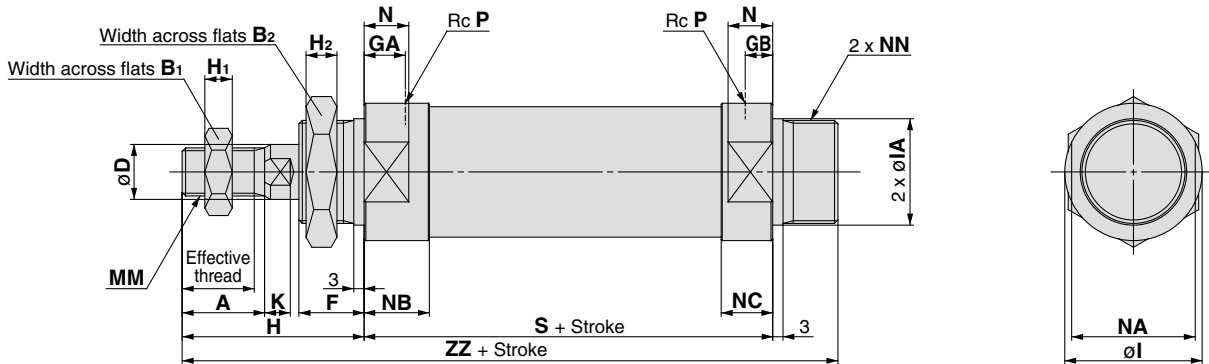
D-□



# Series CH□M

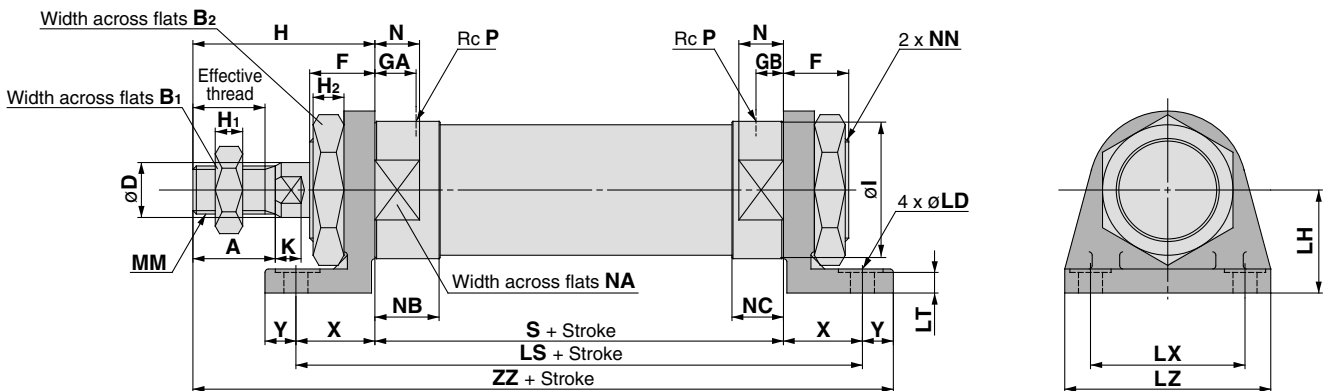
## Dimensions

### Basic style: CHMB



Bore size (mm)	Stroke range (mm)	Effective thread length (mm)	A	B <sub>1</sub>	B <sub>2</sub>	D	F	GA	GB	H	H <sub>1</sub>	H <sub>2</sub>	I	IA (tolerance)	K	MM	P	S	NN	N	NA	NB	NC	ZZ
20	Up to 800	15.5	18	13	26	10	16	12	8	41	5	8	30	23 f8 <sup>-0.020</sup> <sub>-0.053</sub>	5	M8 x 1.25	1/8	81	M22 x 1.5	13	26	19	15	138
25	Up to 800	19.5	22	17	32	12	16	12	8	46	6	8	32	25 f8 <sup>-0.020</sup> <sub>-0.053</sub>	5.5	M10 x 1.25	1/8	81	M24 x 1.5	13	28	19	15	143
32	Up to 800	21	24	22	38	16	19	12	8	53	8	9	40	31 f8 <sup>-0.025</sup> <sub>-0.064</sub>	7.5	M14 x 1.5	1/8	87	M30 x 1.5	13	36	19	15	159
40	Up to 800	21	24	24	41	18	21	14	11	54	10	11	48	34 f8 <sup>-0.025</sup> <sub>-0.064</sub>	7.5	M16 x 1.5	1/4	108	M33 x 2	19	44	24	21	183

### Axial foot style: CHML



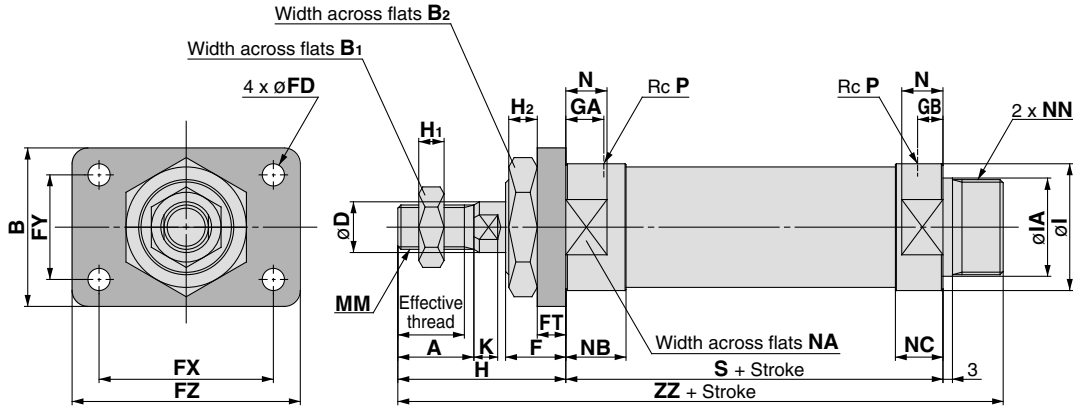
Bore size (mm)	Stroke range (mm)	Effective thread length (mm)	A	B <sub>1</sub>	B <sub>2</sub>	D	F	GA	GB	H	H <sub>1</sub>	H <sub>2</sub>	I	K	LD	LH	LS	LT	LX	LZ	MM	N	NA	NB	NC
20	Up to 800	15.5	18	13	26	10	16	12	8	41	5	8	30	5	7	25	121	5.5	40	55	M8 x 1.25	13	26	19	15
25	Up to 800	19.5	22	17	32	12	16	12	8	46	6	8	32	5.5	7	28	121	5.5	40	55	M10 x 1.25	13	28	19	15
32	Up to 800	21	24	22	38	16	19	12	8	53	8	9	40	7.5	7	30	133	6	45	60	M14 x 1.5	13	36	19	15
40	Up to 800	21	24	24	41	18	21	14	11	54	10	11	48	7.5	9	35	158	6	55	75	M16 x 1.5	19	44	24	21

(mm)

\* Foot bracket plate thickness is dimension LT + 1 mm.

Bore size (mm)	NN	P	S	X	Y	ZZ
20	M22 x 1.5	1/8	81	20	9	151
25	M24 x 1.5	1/8	81	20	9	156
32	M30 x 1.5	1/8	87	23	9	172
40	M33 x 2	1/4	108	25	11	198

Rod flange style: **CHMF**



(mm)

Bore size (mm)	Stroke range (mm)	Effective thread length (mm)	A	B	B <sub>1</sub>	B <sub>2</sub>	D	F	FD	FT	FX	FY	FZ	GA	GB	H	H <sub>1</sub>	H <sub>2</sub>	I	IA (tolerance)	K	MM	N	NA
20	Up to 800	15.5	18	38	13	26	10	16	7	6	51	21	68	12	8	41	5	8	30	23 f8 <sup>-0.020</sup> <sub>-0.053</sub>	5	M8 x 1.25	13	26
25	Up to 800	19.5	22	44	17	32	12	16	7	9	53	27	70	12	8	46	6	8	32	25 f8 <sup>-0.020</sup> <sub>-0.053</sub>	5.5	M10 x 1.25	13	28
32	Up to 800	21	24	50	22	38	16	19	7	9	55	33	72	12	8	53	8	9	40	31 f8 <sup>-0.025</sup> <sub>-0.064</sub>	7.5	M14 x 1.5	13	36
40	Up to 800	21	24	60	24	41	18	21	9	9	66	36	84	14	11	54	10	11	48	34 f8 <sup>-0.025</sup> <sub>-0.064</sub>	7.5	M16 x 1.5	19	44

(mm)

Bore size (mm)	NB	NC	NN	P	S	ZZ
20	19	15	M22 x 1.5	1/8	81	138
25	19	15	M24 x 1.5	1/8	81	143
32	19	15	M30 x 1.5	1/8	87	159
40	24	21	M33 x 2	1/4	108	183

**CHQ**

**CHK**□

**CHN**

**CHM**

**CHS**□

**CH2**□

**CHA**

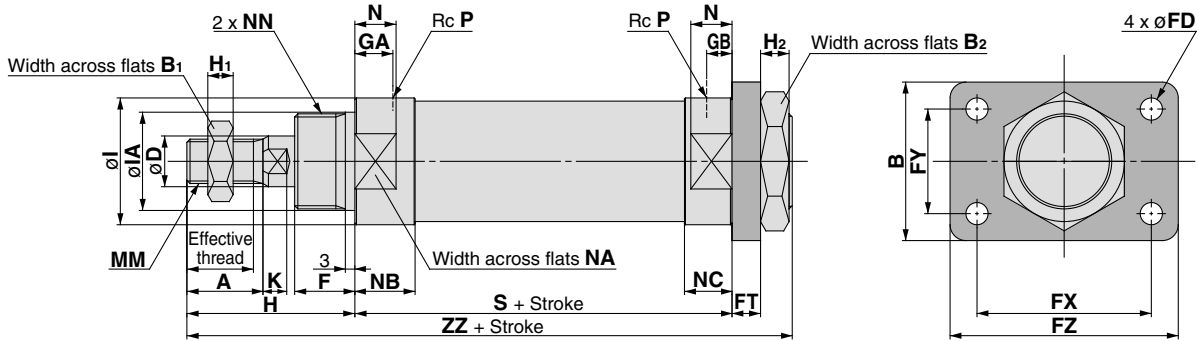
Related Equipment

**D-**□

# Series CH□M

## Dimensions

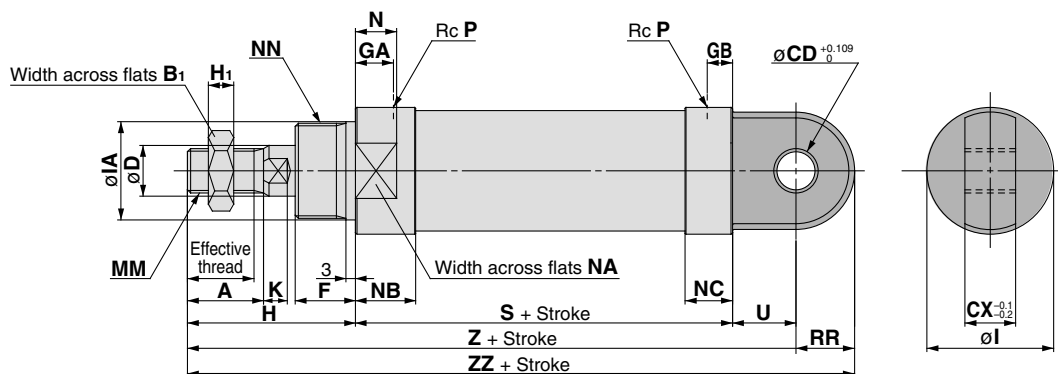
### Head flange style: CHMG



Bore size (mm)	Stroke range (mm)	Effective thread length (mm)	A	B	B <sub>1</sub>	B <sub>2</sub>	D	F	FD	FT	FX	FY	FZ	GA	GB	H	H <sub>1</sub>	H <sub>2</sub>	I	IA (tolerance)	K	MM	N	NA
20	Up to 800	15.5	18	38	13	26	10	16	7	6	51	21	68	12	8	41	5	8	30	23 f8 <sup>-0.020</sup> <sub>-0.053</sub>	5	M8 x 1.25	13	26
25	Up to 800	19.5	22	44	17	32	12	16	7	9	53	27	70	12	8	46	6	8	32	25 f8 <sup>-0.020</sup> <sub>-0.053</sub>	5.5	M10 x 1.25	13	28
32	Up to 800	21	24	50	22	38	16	19	7	9	55	33	72	12	8	53	8	9	40	31 f8 <sup>-0.025</sup> <sub>-0.064</sub>	7.5	M14 x 1.5	13	36
40	Up to 800	21	24	60	24	41	18	21	9	9	66	36	84	14	11	54	10	11	48	34 f8 <sup>-0.025</sup> <sub>-0.064</sub>	7.5	M16 x 1.5	19	44

Bore size (mm)	NB	NC	NN	P	S	ZZ
20	19	15	M22 x 1.5	1/8	81	138
25	19	15	M24 x 1.5	1/8	81	143
32	19	15	M30 x 1.5	1/8	87	159
40	24	21	M33 x 2	1/4	108	183

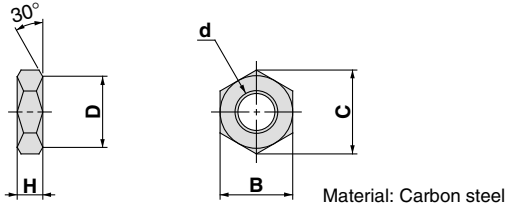
### Single clevis style: CHMC



Bore size (mm)	Stroke range (mm)	Effective thread length (mm)	A	B <sub>1</sub>	CD	CX	D	F	GA	GB	H	H <sub>1</sub>	I	IA (tolerance)	K	MM	N	NA	NB	NC	NN	P	RR	S	U	Z	ZZ
20	Up to 800	15.5	18	13	10	16	10	16	12	8	41	5	30	23 f8 <sup>-0.020</sup> <sub>-0.053</sub>	5	M8 x 1.25	13	26	19	15	M22 x 1.5	1/8	13.5	81	14	136	149.5
25	Up to 800	19.5	22	17	10	16	12	16	12	8	46	6	32	25 f8 <sup>-0.020</sup> <sub>-0.053</sub>	5.5	M10 x 1.25	13	28	19	15	M24 x 1.5	1/8	14.5	81	15	142	156.5
32	Up to 800	21	24	22	12	16	16	19	12	8	53	8	40	31 f8 <sup>-0.025</sup> <sub>-0.064</sub>	7.5	M14 x 1.5	13	36	19	15	M30 x 1.5	1/8	18.5	87	20	160	178.5
40	Up to 800	21	24	24	12	24	18	21	14	11	54	10	48	34 f8 <sup>-0.025</sup> <sub>-0.064</sub>	7.5	M16 x 1.5	19	44	24	21	M33 x 2	1/4	22.5	108	20	182	204.5

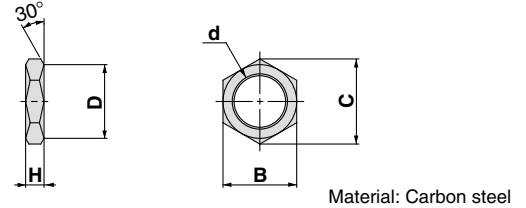
## Accessories (Standard)

### Rod end nut



Part no.	Applicable bore size (mm)	d	H	B	C	D
NT-02	20	M8 x 1.25	5	13	15.0	12.5
NT-03	25	M10 x 1.25	6	17	19.6	16.5
NT-04	32	M14 x 1.5	8	22	25.4	21.0
AC-NI-50	40	M16 x 1.5	10	24	27.7	23

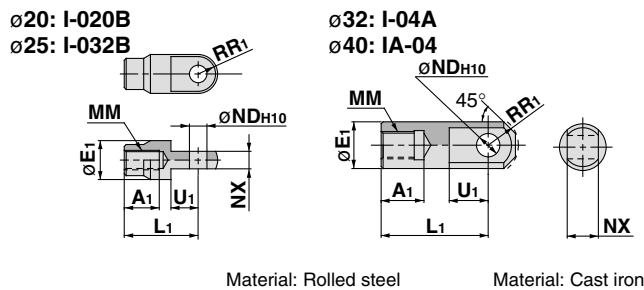
### Mounting nut



Part no.	Applicable bore size (mm)	d	H	B	C	D
SO-02	20	M22 x 1.5	8	26	30	26
SO-03	25	M24 x 1.5	8	32	36.9	32
SO-04	32	M30 x 1.5	9	38	43.9	38
SO-05	40	M33 x 2.0	11	41	47.3	41

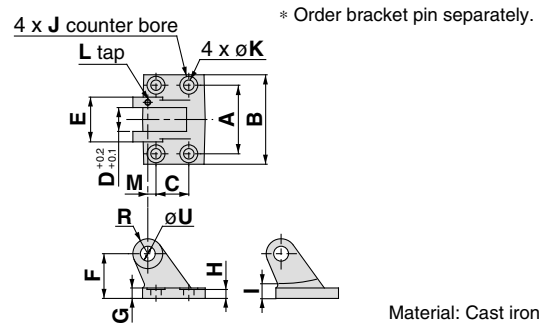
## Accessory Brackets (Optional)

### I-type single knuckle joint



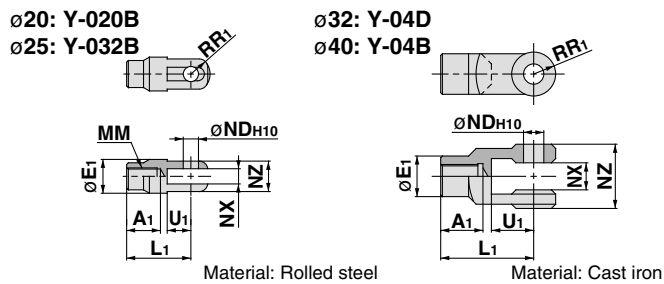
Part no.	Applicable bore size (mm)	A1	E1	L1	MM	R1	U1	NDH10		NX
								Size	Tolerance	
I-020B	20	16	20	36	M8 x 1.25	10	14	9 <sup>+0.058</sup> <sub>0</sub>	9 <sup>-0.1</sup> <sub>-0.2</sub>	9 <sup>-0.1</sup> <sub>-0.2</sub>
I-032B	25	18	20	38	M10 x 1.25	10	14	9 <sup>+0.058</sup> <sub>0</sub>	9 <sup>-0.1</sup> <sub>-0.2</sub>	9 <sup>-0.1</sup> <sub>-0.2</sub>
I-04A	32	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>	16 <sup>-0.1</sup> <sub>-0.3</sub>
IA-04	40	22	24	55	M16 x 1.5	15.5	20	12 <sup>+0.070</sup> <sub>0</sub>	16 <sup>-0.1</sup> <sub>-0.3</sub>	16 <sup>-0.1</sup> <sub>-0.3</sub>

### Bracket



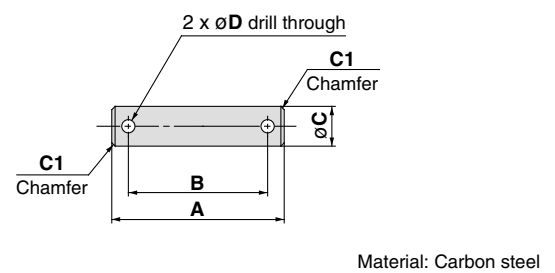
Part no.	Applicable bore size (mm)	A	B	C	D	U (H8)		E	F	G	H	I	J	K	L	M	R
						Size	Tolerance										
AD-FI-20	20	46	60	22	16	10	10 <sup>+0.027</sup> <sub>0</sub>	30	28	6.5	5.5	10	12	7	M4	5.5	10
AD-FI-25	25	46	60	22	16	10	10 <sup>+0.027</sup> <sub>0</sub>	30	30	6.5	5.5	10	12	7	M4	5.5	10
AD-FI-32	32	56	80	30	16	12	12 <sup>+0.027</sup> <sub>0</sub>	36	40	10	9	13	12	7	M5	7	12
AD-FI-40	40	64	88	30	24	12	12 <sup>+0.027</sup> <sub>0</sub>	44	43	10	9	13	16	9	M5	10	12

### Y-type double knuckle joint



Part no.	Applicable bore size (mm)	A1	E1	L1	MM	R1	U1	NDH10	NX	NZ	Note
Y-032B	25	18	20	38	M10 x 1.25	5	14	9 <sup>+0.058</sup> <sub>0</sub>	9 <sup>+0.2</sup> <sub>+0.1</sub>	18	With CDP-1
Y-04D	32	22	24	55	M14 x 1.5	13	25	12 <sup>+0.070</sup> <sub>0</sub>	16 <sup>+0.3</sup> <sub>+0.1</sub>	38	With CDP-3
Y-04B	40	22	24	55	M16 x 1.5	13	25	12 <sup>+0.070</sup> <sub>0</sub>	16 <sup>+0.3</sup> <sub>+0.1</sub>	38	With CDP-3

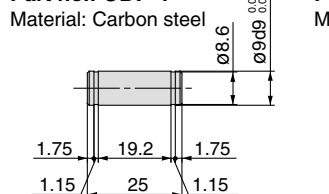
### Bracket pin



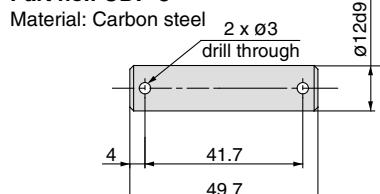
Part no.	Applicable bore size (mm)	A	B	C (f8)		D	Note
				Size	Tolerance		
AD-EI-20	20	45.5	35.5	10	-0.013 -0.035	3.2	Cotter pin
AD-EI-25	25	45.5	35.5	10	-0.013 -0.035	3.2	ø3.2 x 15 ℓ (2 pcs.)
AD-EI-32	32	52	42	12	-0.016 -0.043	4	Cotter pin
AD-EI-40	40	60	50	12	-0.016 -0.043	4	ø4 x 20 ℓ (2 pcs.)

### Clevis pin & Knuckle pin

Bore size: ø20 & ø25  
Part no.: CDP-1



Bore size: ø32 & ø40  
Part no.: CDP-3



Retaining ring: C type, ø9 size for shaft

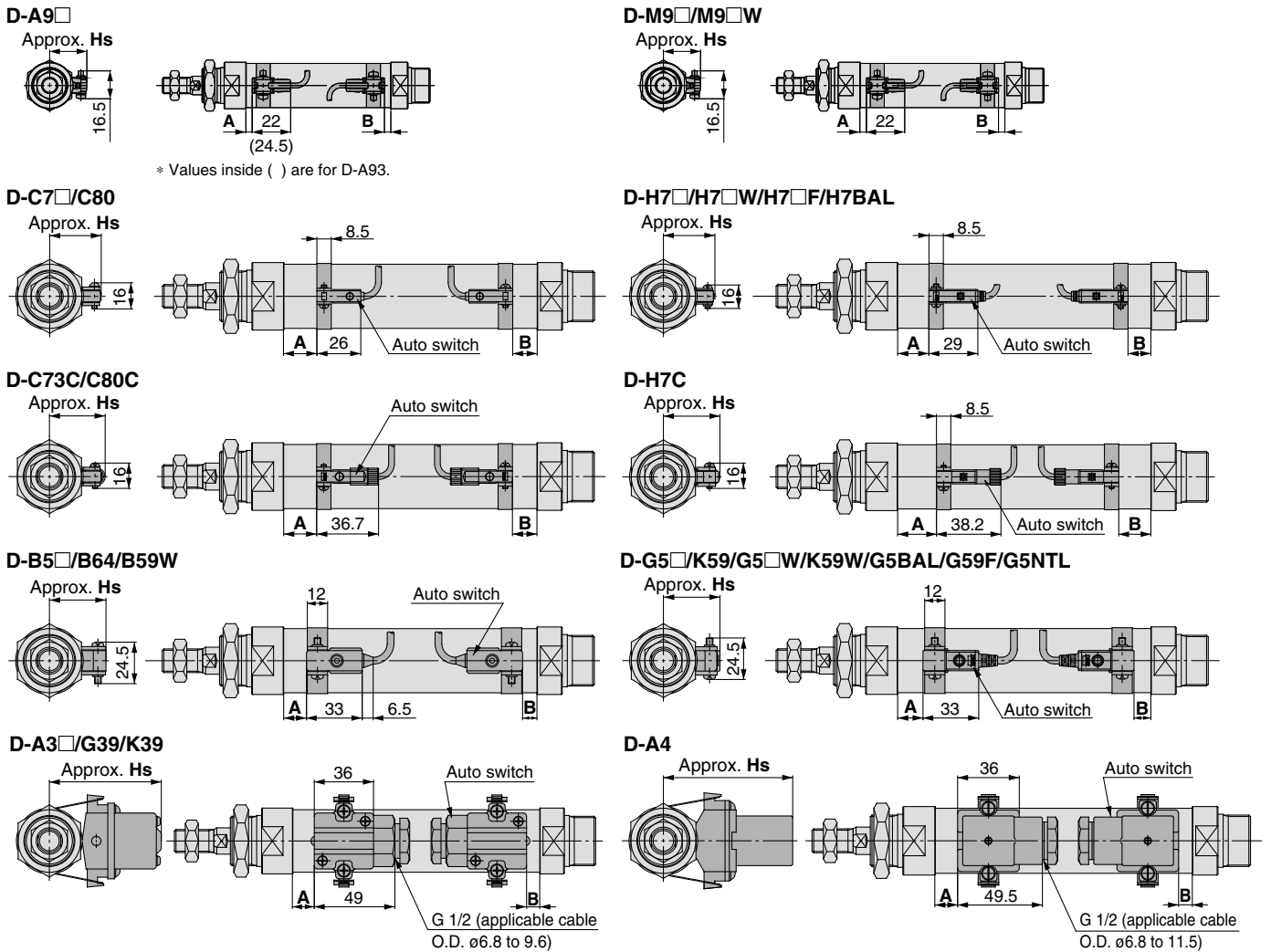
Cotter pin: ø3 x 18 ℓ (2 pcs.)

# Series CH□M Auto Switch Specifications

Refer to pages 347 to 406 for detailed specifications.



## Auto Switches: Proper Mounting Positions and Mounting Heights for Stroke End Detection



## Auto Switch Proper Mounting Positions

Bore size (mm)	Solid state auto switch								Reed auto switch									
	D-M9□ D-M9□W		D-H7□ D-H7□W/H7C D-H7NF/H7BAL		D-G5□/K59 D-G5□W/K59W D-G59F/G5BAL D-G5NTL		D-G39/K39		D-A9□		D-C7□/C80 D-C73C/C80C		D-B5□/B64		D-B59W		D-A3□/A44	
	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B
20	18	17	13.5	12.5	10	9	8	7	14	13	14.5	13.5	8.5	7.5	11.5	10.5	8	7
25	16	19	11.5	14.5	8	11	6	9	12	15	12.5	15.5	6.5	9.5	9.5	12.5	6	9
32	23	18	18.5	13.5	15	10	13	8	19	14	19.5	14.5	13.5	8.5	16	11.5	13	8
40	27.5	23.5	23	19	19.5	15.5	17.5	13.5	23.5	19.5	24	20	18	14	21	17	17.5	13.5

Note) When setting an auto switch, be sure to check its operation before adjusting.

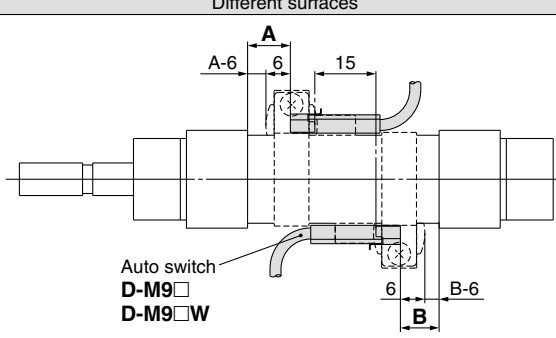
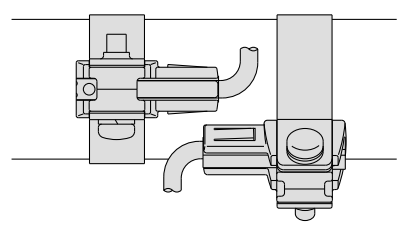
## Auto Switch Mounting Heights

Bore size (mm)	D-M9□/M9□W D-A9□	D-H7□/H7□W D-H7NF/H7BAL D-C7□/C80	D-C73C/C80C	D-G5□/K59 D-G5□W/K59W D-G59F/G5BAL D-G5NTL/H7C D-B5□/B64 D-B59W	D-G39/K39 D-A3□	D-A44
	Hs	Hs	Hs	Hs	Hs	Hs
20	24	25.5	27	27.5	62	72
25	26.5	28	29.5	30	64.5	74.5
32	30	31.5	33	33.5	68	78
40	34.5	36	37.5	38	72.5	82.5

### Minimum Auto Switch Mounting Stroke

(mm)

Auto switch model	Number of auto switches mounted				
	1 pc.	2 pcs.		n pcs.	
		Different surfaces	Same surface	Different surfaces	Same surface
D-M9□/M9□W D-A9□	10	15 <small>Note)</small>	45 <small>Note)</small>	$15 + 45 \frac{(n-2)}{2}$ (n = 2, 4, 6...)	45 + 45 (n - 2)
D-H7□/H7□W D-H7NF/H7BAL	10	15	60	$15 + 45 \frac{(n-2)}{2}$ (n = 2, 4, 6...)	60 + 45 (n - 2)
D-C7□ D-C80	10	15	50	$15 + 45 \frac{(n-2)}{2}$ (n = 2, 4, 6...)	50 + 45 (n - 2)
D-H7C D-C73C D-C80C	10	15	65	$15 + 50 \frac{(n-2)}{2}$ (n = 2, 4, 6...)	65 + 50 (n - 2)
D-G5□/K59 D-G5□W/K59W D-G59F/G5BAL/G5NTL D-B5□/B64	10	15	75	$15 + 50 \frac{(n-2)}{2}$ (n = 2, 4, 6...)	75 + 55 (n - 2)
D-B59W	15	20	75	$20 + 50 \frac{(n-2)}{2}$ (n = 2, 4, 6...)	75 + 55 (n - 2)
D-G39/K39 D-A3□/A44	10	35	100	$35 + 30(n-2)$ (n = 2, 3, 4, 5...)	100 + 100 (n - 2)

Auto switch model	Auto switches — 2 pcs.	
	Different surfaces	Same surface
 <p>Auto switch D-M9□ D-M9□W</p> <p>The proper mounting position is at 6 mm inward from the end surface of the switch holder.</p>	 <p>Mount auto switches offset (in circumferential direction of cylinder tube) so that auto switch units and lead wires do not run up against each other.</p>	
D-A93	—	Less than 50 strokes
D-M9□ D-M9□W	Less than 20 strokes	Less than 55 strokes

Note) The above diagram is a note for installing 2 of D-A93, M9□, or M9□W auto switches.

### Operating Range

(mm)

Auto switch model	Bore size			
	20	25	32	40
D-M9□ D-M9□W	4.5	6.5	4.5	6.5
D-H7□/H7C D-H7□W D-H7NF/H7BAL	4.5	5.5	5	5.5
D-G5□/K59/G59F D-G5□W/K59W D-G5BAL/G5NTL	5	5	5	5.5
D-G39/K39	9	8.5	10	10.5
D-A9□	7	6	8	8
D-C7□/C80 D-C73C/C80C	8	10	9	10
D-B5□/B64	8	10	9	10
D-B59W	13	13	14	14
D-A3□/A44	9	10	10	11

\* 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.

CHQ

CHK□

CHN

CHM

CHS□

CH2□

CHA

Related Equipment

D-□

## Auto Switch Mounting Brackets: Part Nos.

Auto switch model	Bore size (mm)			
	ø20	ø25	ø32	ø40
D-M9□ D-M9□W D-A9□	Note 1) ①BMA2-020 ②BJ3-1	Note 1) ①BMA2-025 ②BJ3-1	Note 1) ①BMA2-032 ②BJ3-1	Note 1) ①BMA2-040 ②BJ3-1
D-H7□/H7□W/H7NF D-H7BAL/C7□/C80 D-C73C/C80C	BMA2-020	BMA2-025	BMA2-032	BMA2-040
D-G5□/G5□W/G59F D-G5BAL/G5NTL D-B5□/B64/B59W	BA-01	BA-02	BA-32	BA-04
D-G39/K39 = A3□/A44	BD1-01M	BD1-02M	BD1-02	BD1-04M

Note 1) Two types of auto switch mounting bracket are used as a set.

### [Stainless steel mounting screw kits]

The following stainless mounting screw kits are available for use depending on the operating environment.  
(Auto switch mounting brackets are not included. Order separately.)

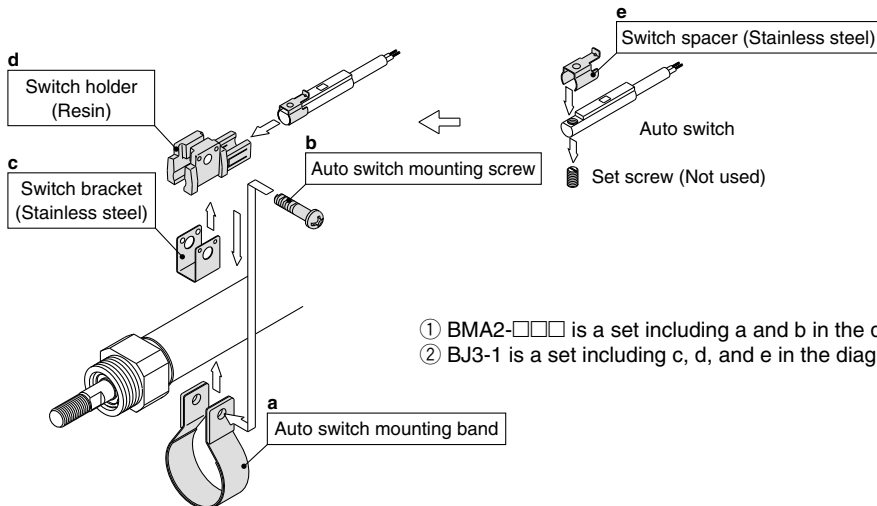
BBA3: D-G5, K5, B5, B6  
BBA4: D-C7, C8, H7

Note) Refer to the table below for details on BBA3, BBA4.

When D-H7BAL and G5BAL auto switches are shipped mounted on a cylinder, the above stainless steel screws are used. Also when switches are shipped separately, BBA3, BBA4 are included.

### Stainless mounting screw kit details

Part no.	Contents			Applicable auto switch mounting bracket part nos.	Applicable auto switches
	Description	Size	Pcs.		
BBA3	Auto switch mounting screws	M4 x 0.7 x 22L	1	BA-01, BA-02, BA-32, BA-04, BA-05, BA-06, BA-08, BA-10	D-B5, B6 D-G5, K5
				BA2-020, BA2-025, BA2-032, BA2-040	
				BA5-050, BHN2-025, BSG1-032	
				BH2-040, BH2-050, BH2-080, BH2-100	
				BAF-32, BAF-04, BAF-05, BAF-06, BAF-08, BAF-10	
BBA4	Auto switch mounting screws	M3 x 0.5 x 14L	1	BJ2-006, BJ2-010, BJ2-016	D-C7, C8 D-H7
				BM2-020, BM2-025, BM2-032, BM2-040	
				BMA2-020, BMA2-025, BMA2-032, BMA2-040, BMA2-050, BMA2-063	
				BHN3-025, BHN3-032, BHN3-040	



Besides the models listed in “How to Order,” the following auto switches are applicable.  
Refer to pages 347 to 406 for detailed auto switch specifications.

Auto switch type	Part no.	Electrical entry	Features
Solid state	D-H7A1, H7A2, H7B	Grommet (in-line)	—
	D-G59, G5P, K59		Diagnostic indication (2-color display)
	D-H7NW, H7PW, H7BW		Water resistant (2-color display)
	D-G59W, G5PW, K59W		With timer
	D-G5BAL		Diagnostic output (2-color display)
	D-G5NTL		—
	D-G59F		Without indicator light
Reed	D-C73, C76, B53	Grommet (in-line)	—
	D-C80		Without indicator light

\* Solid state auto switches are also available with pre-wired connector. Refer to pages 389 and 390 for details.

\* Normally closed (N.C. = b contact), solid state auto switches (D-F9G, F9H) are also available. For details, refer to page 365.

## How to Mount and Move the Auto Switch

### ⚠ Caution

1. Tighten the screw under the specified torque when mounting auto switch.
2. Set the auto switch mounting band perpendicularly to cylinder tube.



### <Applicable auto switch>

Solid state ..... **D-M9N, D-M9P, D-M9B**  
**D-M9NW, D-M9PW, D-M9BW**  
 Reed ..... **D-A90, A93, A96**

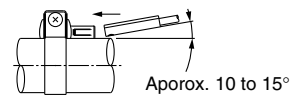


Figure 1. Switch insert angle

## How to Mount and Move the Auto Switch

### Mounting the Auto Switch

1. Attach the switch bracket to the switch holder.  
(Fit the convex part of the switch bracket over the concave part of the holder.)
2. Mount the auto switch mounting band to the cylinder tube.
3. Set the switch holder between the reinforcing plates of the auto switch mounting band which is already attached to the cylinder.
4. Insert the auto switch mounting screw in the hole of the reinforcing plate through the switch holder, and thread it into the other plate. Tighten the screw temporarily.
5. Remove the set screw attached to the auto switch.
6. Attach the switch spacer to the auto switch.
7. Insert the auto switch with a switch spacer from the back of the switch holder and set it at the specified position.  
(Insert the auto switch with an angle of approximately 10 to 15°. See figure 1.)
8. To secure the auto switch, tighten the switch mounting screw with the specified torque (0.8 N·m to 1.0 N·m).

### Adjusting the Switch Position

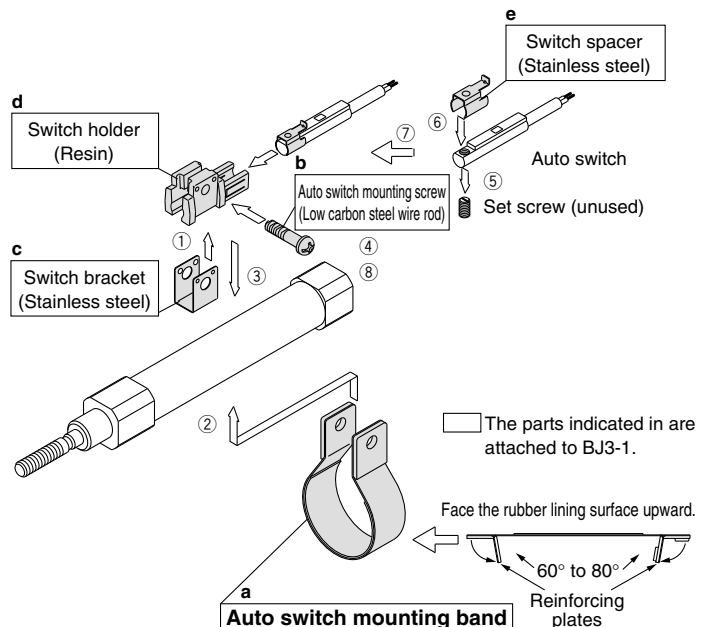
1. Unloosen the auto switch mounting screw 3 turns to adjust the auto switch set position.
2. Tighten the screw as described above (8) after adjustment.

### Dismounting Auto Switch

1. Remove the auto switch mounting screw from the switch holder.
2. Move the auto switch back towards the position where it stops at the lead wire side.
3. Hold up the lead wire side of the auto switch at the angle of around 45°.
4. Maintain the angle, and pull back the auto switch obliquely at the same angle.

Note 1) Be careful not to pull or strain the lead wires.  
 Be careful not to apply excess tensile force (over 10 N) to the auto switches.  
 Adjust the auto switch position after sufficiently loosening its screw.  
 For the band mounting type BJ3-1, loosen the screw three rotations or more.

Note 2) Be sure to use the switch spacer and switch bracket for the band mounting type.  
 Use together with the conventional auto switch mounting bands (brackets) BMA2-□□□.  
 Confirm that a switch spacer is mounted to the end of the auto switch before fastening the auto switch. If the switch bracket is not mounted, the auto switch may move after installation.



- BMA2-□□□ is a set of a and b shown above.
- BJ3-1 is a set of c, d and e shown above.

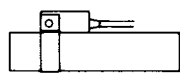
CHQ  
 CHK□  
 CHN  
**CHM**  
 CHS□  
 CH2□  
 CHA  
 Related Equipment  
 D-□



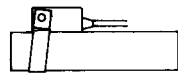
## How to Mount and Move the Auto Switch

### ⚠ Caution

1. Tighten the screw under the specified torque when mounting auto switch.
2. Set the auto switch mounting band perpendicularly to cylinder tube.



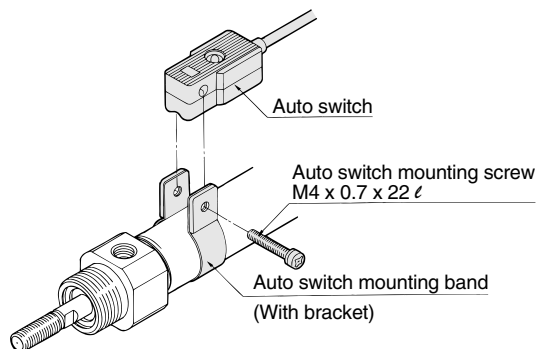
Mounting correctly



Mounting incorrectly

### <Applicable auto switch>

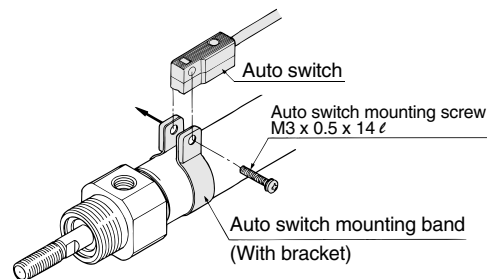
Solid state ..... D-G59, D-G5P, D-K59, D-G5BAL  
 D-G59W, D-G5PW, D-K59W  
 D-G59F, D-G5NTL, D-G5NBL  
 Reed ..... D-B53, D-B54, D-B64, D-B59W



1. Put an auto switch mounting band on the cylinder tube and set it at the auto switch mounting position.
2. Put the mounting section of the auto switch between the auto switch mounting band mounting holes, then adjust the position of mounting holes of switch to those of mounting band.
3. Lightly thread the auto switch mounting screw through the mounting hole into the thread part of band fitting.
4. After reconfirming the detection position, tighten the auto switch mounting screw to secure the auto switch while properly contacting the auto switch bottom part and the cylinder tube. (The tightening torque of M4 screw should be about 1 to 1.2 N·m.)
5. Modification of the detection position should be made in the condition of 3.

### <Applicable auto switch>

Solid state ..... D-H7A1, D-H7A2, D-H7B, D-H7BAL  
 D-H7C, D-H7NF, D-H7NW, D-H7PW,  
 D-H7BW  
 Reed ..... D-C73, D-C76, D-C80, D-C73C, D-C80C

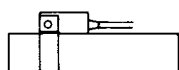


1. Put an auto switch mounting band on the cylinder tube and set it at the auto switch mounting position.
2. Put the mounting section of the auto switch between the auto switch mounting band mounting holes, then adjust the position of mounting holes of switch to those of mounting band.
3. Lightly thread the auto switch mounting screw through the mounting hole into the thread part of the auto switch mounting band fitting.
4. After setting the whole body to the detecting position by sliding, tighten the auto switch mounting screw to secure the auto switch while properly contacting the auto switch bottom part and the cylinder tube. (Tightening torque of M3 screw should be 0.8 to 1 N·m.)
5. Modification of the detection position should be made in the condition of 3.

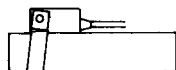
## How to Mount and Move the Auto Switch

### ⚠ Caution

1. Tighten the screw under the specified torque when mounting auto switch.
2. Set the auto switch mounting band perpendicularly to cylinder tube.



Mounting correctly



Mounting incorrectly

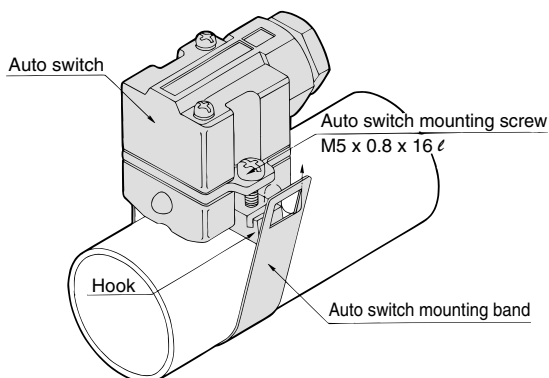
### <Applicable auto switch>

Solid state ..... D-G39, D-K39

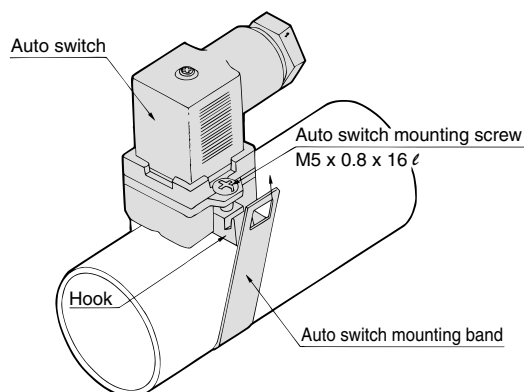
Reed ..... D-A33, D-A34, D-A44

## How to Mount and Move the Auto Switch

### D-A3, D-G3/K3 type



### D-A4



1. Loosen the auto switch mounting screws at both sides to pull down the hook.
2. Put an auto switch mounting band on the cylinder tube and set it at the auto switch mounting position, and then hook the band.
3. Screw lightly the auto switch mounting screw.
4. Set the whole body to the detecting position by sliding, tighten the auto switch mounting screw to secure the auto switch. (The tightening torque should be about 2 to 3 N·m.)
5. Modification of the detecting position should be made in the condition of 3.

CHQ

CHK□

CHN

**CHM**

CHS□

CH2□

CHA

Related Equipment

D-□

# ISO Standard Hydraulic Cylinder

## Series CHSD/CHSG

### Series CHSD



Nominal pressure: **10 MPa**

Bore size (mm): 40, 50, 63, 80, 100

### Series CHSG



Nominal pressure: **16 MPa**

Bore size (mm): 32, 40, 50, 63, 80, 100

CHQ

CHK

CHN

CHM

CHS

CH2

CHA

Related  
Equipment

D-

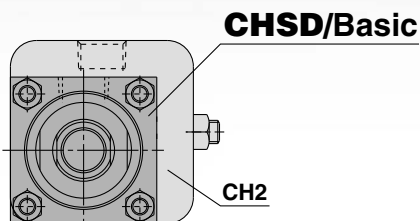
ISO Standard

# Hydraulic Cylinder

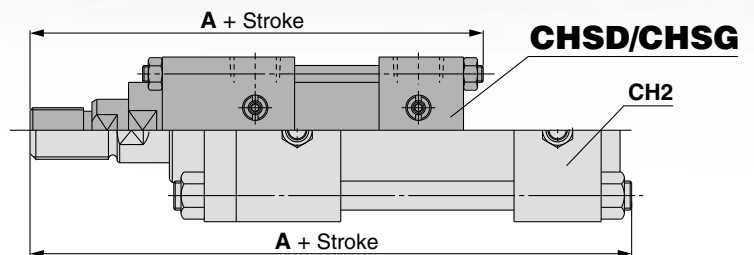
## Series CHS

Nominal pressure 10 MPa/16 MPa

Reduced projection area: **76%** or less



Reduced overall length



- **Maximum mass: no more than 50%\* or 52%\* of series CH2 (CHSD) (CHSG)**

\* Compared to series CH2, the tie-rod type cylinder of same size.

- **Cylinder with built-in cover and mounting bracket allows easy disassembly and assembly.**

Tube size (mm)	Overall length (A size)		
	CHSD	CHSG	CH2
32	—	153	207
40	163	184	212
50	177	200	231
63	199	217	257
80	225	251	295
100	260	275	325



Conforming to ISO 10762 (JIS B 8367-5:2002)

**Series CHSD/10 MPa**  
 $\varnothing 40, \varnothing 50, \varnothing 63, \varnothing 80, \varnothing 100$



Conforming to ISO 6020-2 (JIS B 8367-2:2002)

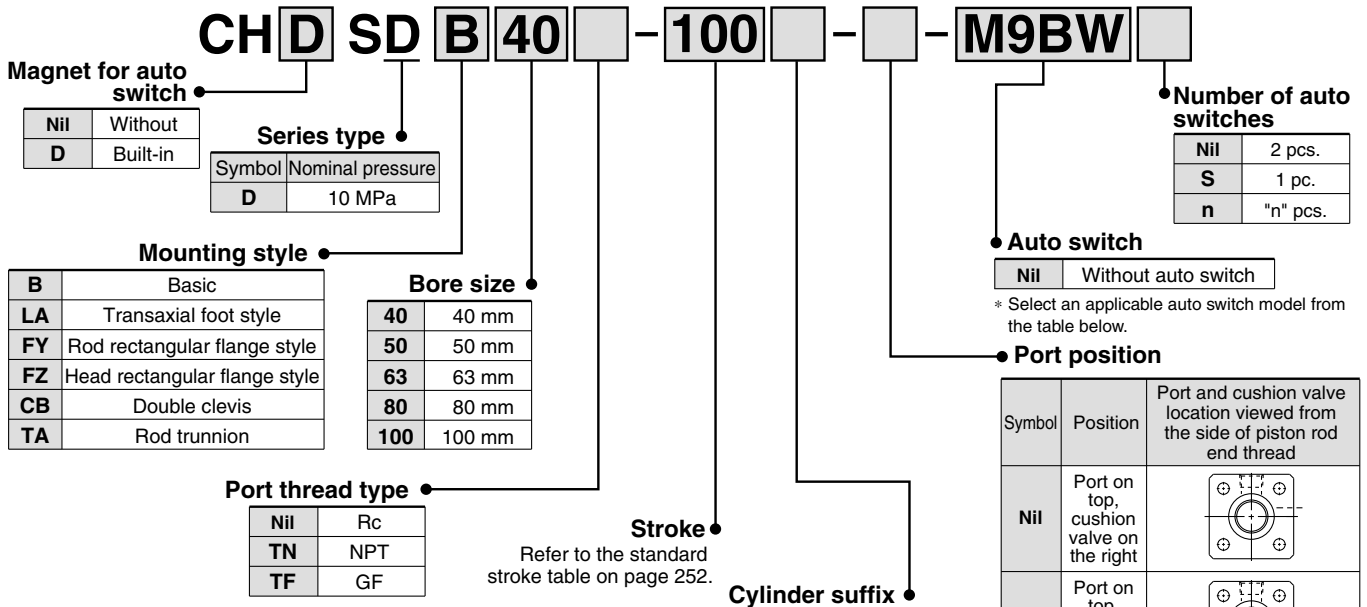
**Series CHSG/16 MPa**  
 $\varnothing 32, \varnothing 40, \varnothing 50, \varnothing 63, \varnothing 80, \varnothing 100$

# ISO Standard Hydraulic Cylinder

## Series CHSD

10 MPa  
 ∅40, ∅50, ∅63, ∅80, ∅100

### How to Order



Symbol	Position	Port and cushion valve location viewed from the side of piston rod end thread
Nil	Port on top, cushion valve on the right	
A	Port on top, cushion valve on the left	
B	Port on top, cushion valve down	
C	Port on the right, cushion valve down	
D	Port on the right, cushion valve on top	
E	Port on the right, cushion valve on the left	

- CHQ
- CHK
- CHN
- CHM
- CHS
- CH2
- CHA
- Related Equipment
- D-

### Built-in Magnet Cylinder Model

If a built-in magnet cylinder without auto switch is required, there is no need to enter the symbol for the auto switch. (Example) CHDSDB50-100

### Applicable Auto Switches: Refer to pages 347 to 406 for further details on each auto switch.

Type	Special function	Electrical entry	Indicator light	Wiring (output)	Load voltage		Auto switch model	Lead wire length (m)				Pre-wired connector	Applicable load	
					DC	AC		0.5 (Nil)	1 (M)	3 (L)	5 (Z)			
Solid state switch	—	Grommet	Yes	3-wire (NPN)	24 V	5 V, 12 V	—	M9N	●	●	●	○	IC circuit	Relay PLC
				3-wire (PNP)				M9P	●	●	●	○		
				2-wire				M9B	●	●	●	○		
				—				J51	●	—	●	○		
				3-wire (NPN)				M9NW	●	●	●	○		
				3-wire (PNP)				M9PW	●	●	●	○		
	Diagnostic indication (2-color display)	Grommet	Yes	2-wire	24 V	5 V, 12 V	—	M9BW	●	●	●	○	IC circuit	Relay PLC
				3-wire (NPN)				M9NA	○	○	●	○		
				3-wire (PNP)				M9PA	○	○	●	○		
				2-wire				M9BA	○	○	●	○		
Water resistant (2-color indicator)	Grommet	No	4-wire (NPN)	24 V	5 V, 12 V	—	F59F	●	—	●	○	IC circuit	Relay PLC	
			—				Z76	●	—	●	—			
Diagnostic output (2-color display)	Grommet	Yes	2-wire	24 V	12 V	100 V	Z73	●	—	●	—	IC circuit	Relay PLC	
							100 V or less	Z80	●	—	●			—
							100 V, 200 V	A54*	●	—	●			●
							200 V or less	A64*	●	—	●			—
—	Grommet	No	2-wire	24 V	12 V	—	A59W*	●	—	●	—	IC circuit	Relay PLC	
							—	A59W*	●	—	●			—

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

\* Solid state auto switches marked with "○" are produced upon receipt of order.  
 \* D-A5□/A6□/A59W can not be mounted to ∅40, 50.

\* Besides the models in the above table, there are some other auto switches that are applicable. For more information, refer to page 257.

\* For details about auto switches with pre-wired connector, refer to pages 389 and 390.

\* D-M9□, M9□W, M9□AL, Z7□, Z80 auto switches are shipped together, (not assembled). (Only auto switch mounting brackets are packed assembled.)

Note 1) Refer to table 1 for manufacturability.  
 Note 2) Diagrams illustrate the view from the rod on the left side of the cylinder dimensions.  
 Note 3) For mounting types FY, FZ, or TA, indicate port position with the symbol B.

**Table 1 Manufacturability Check List by Mounting Type and Port Position**

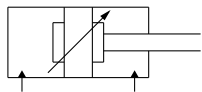
Mounting bracket Port position	B	LA	FY FZ	CB	TA
Nil	○	○	○	○	—
A	○	○	○	○	—
B	○	○	○	○	○
C	Note)	—	○	○	—
D	Note)	—	○	○	—
E	Note)	—	○	○	—

○: Standard product ○: Made to order  
 —: Not available due to size limitation.  
 Note) Each of C, D, E is same as the Nil, A, B just turned.

# Series CHSD



JIS Symbol



## Specifications

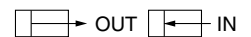
Bore size (mm)		40	50	63	80	100
Action		Double Acting: Single Rod				
Fluid		General mineral hydraulic fluid				
Nominal pressure		10 MPa				
Maximum allowable pressure		12 MPa				
Proof pressure		15 MPa				
Minimum operating pressure	With pressure at front side	0.25 MPa				
	With pressure at rear side	0.15 MPa				
Ambient and fluid temperature	Without magnet	-10 to 80°C				
	Built-in magnet	-10 to 60°C				
Piston speed		8 to 300 mm/s				
Cushion		Cushion seal				
Thread tolerance		JIS 6 g/6 H				
Stroke length tolerance	100 mm or less	0 to +0.8 mm				
	101 to 250 mm	0 to +1.0 mm				
	251 to 630 mm	0 to +1.25 mm				
	631 to 1000 mm	0 to +1.4 mm				

Note) Refer to page 134 for definitions of terms related to pressure.

## Standard Stroke

Bore size (mm)	Standard stroke (mm)
40	25 to 800
50	25 to 800
63	25 to 800
80	25 to 800
100	25 to 1000

## Theoretical Output



Unit: N

Bore size (mm)	Rod size (mm)	Operating direction	Piston area (mm <sup>2</sup> )	Operating pressure (MPa)		
				3.5	7	10
40	22	OUT	1256	4396	8792	12560
		IN	876	3066	6132	8760
50	28	OUT	1963	6871	13741	19630
		IN	1347	4715	9429	13470
63	36	OUT	3117	10910	21819	31170
		IN	2099	7346	14693	20990
80	45	OUT	5026	17591	35182	50260
		IN	3436	12026	24052	34360
100	56	OUT	7853	27486	57971	78530
		IN	5390	18865	37730	53900

Theoretical output (N) = Pressure (MPa) x Piston area (mm<sup>2</sup>)

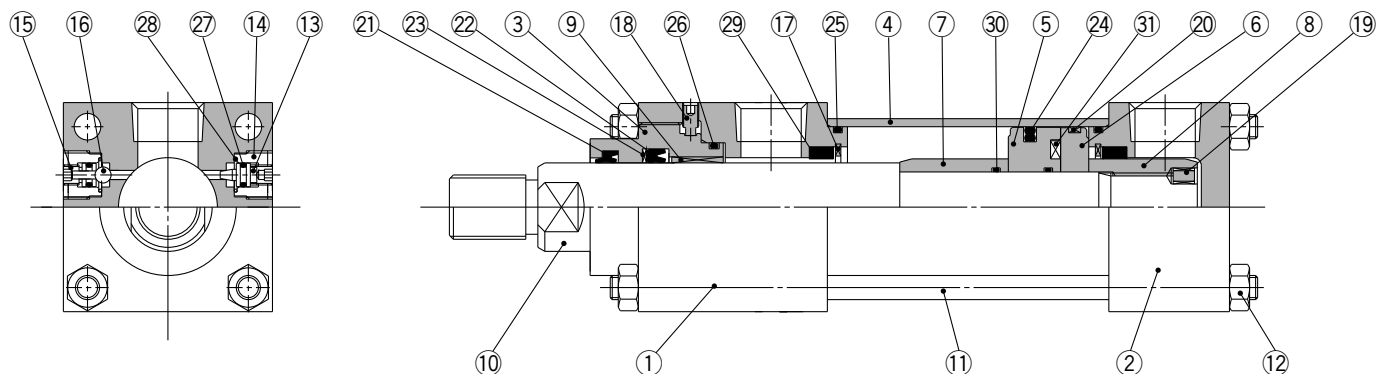
## Mass

Unit: kg

Bore size (mm)			40	50	63	80	100
Basic mass (0 stroke)	Basic	B	2.10	3.20	5.10	8.90	14.5
	Transaxial foot	LA	2.40	3.60	5.50	9.70	16.0
	Rod flange	FY	2.60	3.80	5.90	10.1	16.0
	Head flange	FZ	2.50	3.80	6.00	10.0	16.4
	Double clevis	CB	2.30	3.50	6.10	9.90	16.2
	Rod trunnion	TA	2.10	3.40	5.40	9.40	15.5
Additional mass per 10 strokes			0.06	0.09	0.13	0.21	0.32

## Construction

CH□SDB



### Parts List

No.	Description	Material
1	Rod cover	Carbon steel
2	Head cover	Carbon steel
3	Seal holder	Carbon steel
4	Cylinder tube	Stainless steel
5	Piston	Stainless steel
6	Magnet plate	Stainless steel
7	Cushion ring	Carbon steel
8	Cushion ring nut	Carbon steel
9	Bushing	Copper alloy
10	Piston rod	Carbon steel
11	Tie-rod	Chromium molybdenum steel
12	Tie-rod nut	Carbon steel
13	Cushion valve	Alloy steel
14	Valve holder	Carbon steel
15	Air release valve	Alloy steel
16	Check ball	Bearing steel

No.	Description	Material
17	Retaining ring	Carbon tool steel
18	Set screw	Alloy steel
19	Pin	Stainless steel
20	Wear ring	Resin
21	Scraper	NBR
22	Rod seal	NBR
23	Back-up ring	Resin
24	Piston seal	NBR
25	Cylinder tube gasket	NBR
26	Holder gasket	NBR
27	Valve seal	NBR
28	Valve holder gasket	NBR
29	Cushion seal	—
30	Piston gasket	NBR
31	Magnet	—

### Replacement Parts: Seal Kit

Bore size (mm)	Seal kit no.
40	CHSD40-PS
50	CHSD50-PS
63	CHSD63-PS
80	CHSD80-PS
100	CHSD100-PS

\* Seal kit consists of items 21 to 23 and 29, and can be ordered by using the seal kit number for each bore size.

CHQ

CHK□

CHN

CHM

CHS□

CH2□

CHA

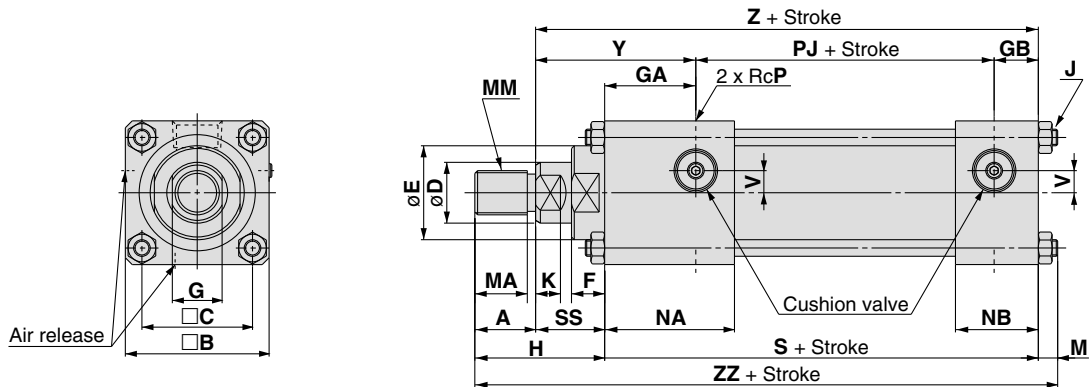
Related Equipment

D-□

# Series CHSD

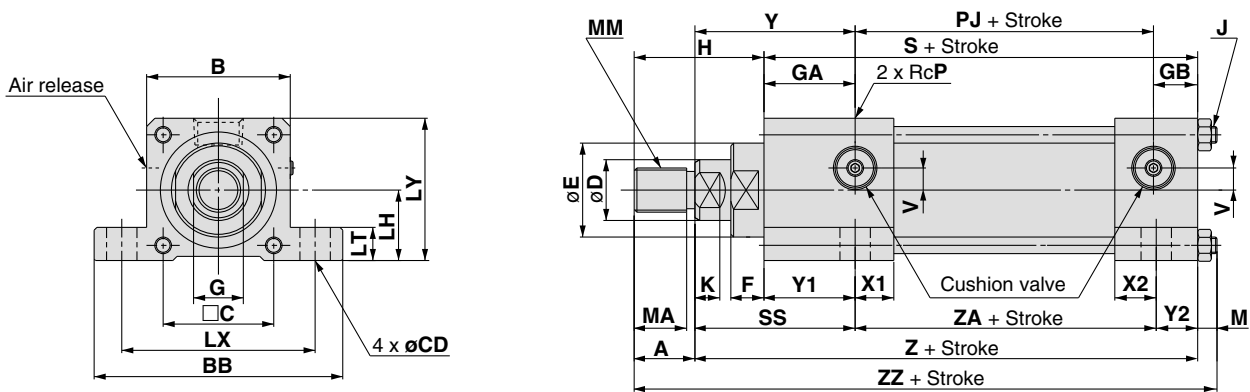
## Dimensions

### Basic: CHSDB



Bore size (mm)	Stroke range	A	B	C	D	E	F	G	GA	GB	H	J	K	M	MA	MM	NA	NB	P	PJ	S	SS	V	Y	Z	ZZ
40	25 to 800	22	52	40	22	34	12	19	33	16	47	M6 x 1	8	7.5	19	M16 x 1.5	46	29	3/8	58	107	25	6.5	58	132	161.5
50	25 to 800	28	65	50	28	42	15	24	34	16	59	M8 x 1	11	9	25	M20 x 1.5	46.5	28.5	3/8	58	108	31	8	65	139	176
63	25 to 800	36	77	58	36	50	19	30	31	18	74	M8 x 1	13	9	32	M27 x 2	46	33	1/2	66	115	38	12	69	153	198
80	25 to 800	45	96	75	45	60	13	41	42	17	80	M10 x 1.25	17	10.5	41	M33 x 2	57	32	1/2	74	133	35	15	77	168	223.5
100	25 to 1000	56	115	90	56	72	16	50	38	22	97	M14 x 1.5	19	14.5	52	M42 x 2	58	42	3/4	86	146	41	15	79	187	257.5

### Transaxial foot: CHSDLA

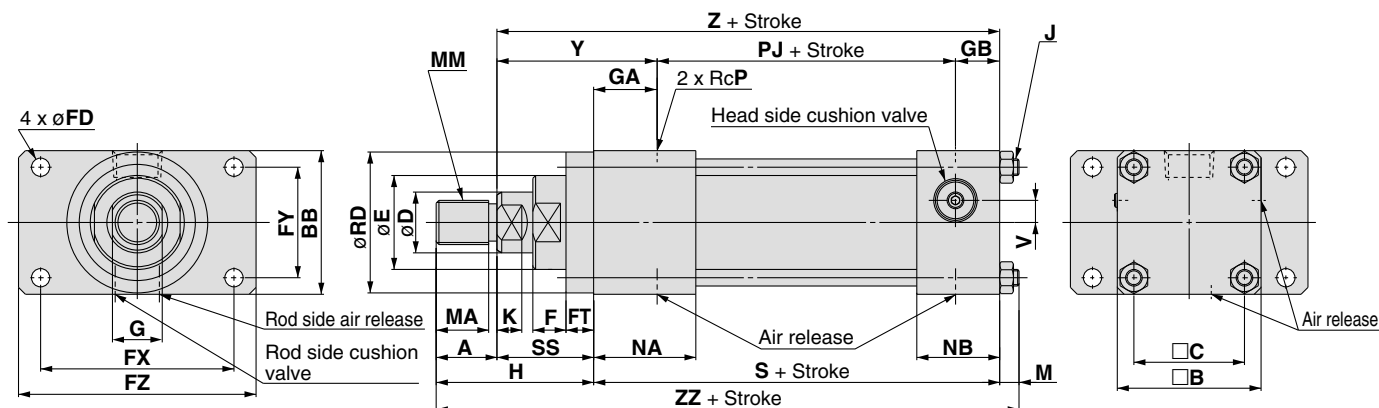


Bore size (mm)	Stroke range	A	B	BB	C	CD	D	E	F	G	GA	GB	H	J	K	LH	LT	LX	LY	M	MA	MM	P	PJ	S	SS
40	25 to 800	22	52	90	40	11	22	34	12	19	33	16	47	M6 x 1	8	25.5	12	70	51.5	7.5	19	M16 x 1.5	3/8	58	107	58
50	25 to 800	28	65	103	50	11	28	42	15	24	34	16	59	M8 x 1	11	32	12	83	64.5	9	25	M20 x 1.5	3/8	58	108	65
63	25 to 800	36	77	115	58	11	36	50	19	30	31	18	74	M8 x 1	13	38	12	95	76.5	9	32	M27 x 2	1/2	66	115	68
80	25 to 800	45	96	147	75	14	45	60	13	41	42	17	80	M10 x 1.25	17	47.5	18	121	95.5	10.5	41	M33 x 2	1/2	74	133	77
100	25 to 1000	56	115	179	90	18	56	72	16	50	38	22	97	M14 x 1.5	19	57	25	145	114.5	14.5	52	M42 x 2	3/4	86	146	79

Bore size (mm)	V	X1	X2	Y	Y1	Y2	ZA	Z	ZZ
40	6.5	13	14	58	33	15	59	132	161.5
50	8	12.5	13.5	65	34	15	59	139	176
63	12	16	16	69	30	17	68	153	198
80	15	15	15	77	42	17	74	168	223.5
100	15	20	20	79	38	22	86	187	257.5



**Rod flange: CHSDFY**



Bore size (mm)	Stroke range	A	B	BB	C	D	E	F	FD	FT	FX	FY	FZ	G	GA	GB	H	J	K	M	MA	MM	NA	NB	P	PJ
40	25 to 800	22	52	52	40	22	34	12	6.6	10	70	40	86	19	23	16	57	M6×1	8	7.5	19	M16×1.5	36	29	3/8	58
50	25 to 800	28	65	65	50	28	42	15	9	10	86	50	105	24	24	16	69	M8×1	11	9	25	M20×1.5	36.5	28.5	3/8	58
63	25 to 800	36	77	77	58	36	50	19	9	10	98	56	118	30	21	18	84	M8×1	13	9	32	M27×2	36	33	1/2	66
80	25 to 800	45	96	96	75	45	60	13	11	16	119	70	143	41	26	17	96	M10×1.25	17	10.5	41	M33×2	41	32	1/2	74
100	25 to 1000	56	115	115	90	56	72	16	13.5	16	138	90	162	50	22	22	113	M14×1.5	19	14.5	52	M42×2	42	42	3/4	86

Bore size (mm)	RD	S	SS	V	Y	Z	ZZ
40	51	97	35	6.5	58	132	161.5
50	62	98	41	8	65	139	176
63	72	105	48	12	69	153	198
80	92	117	51	15	77	168	223.5
100	110	130	57	15	79	187	257.5

CHQ

CHK

CHN

CHM

CHS

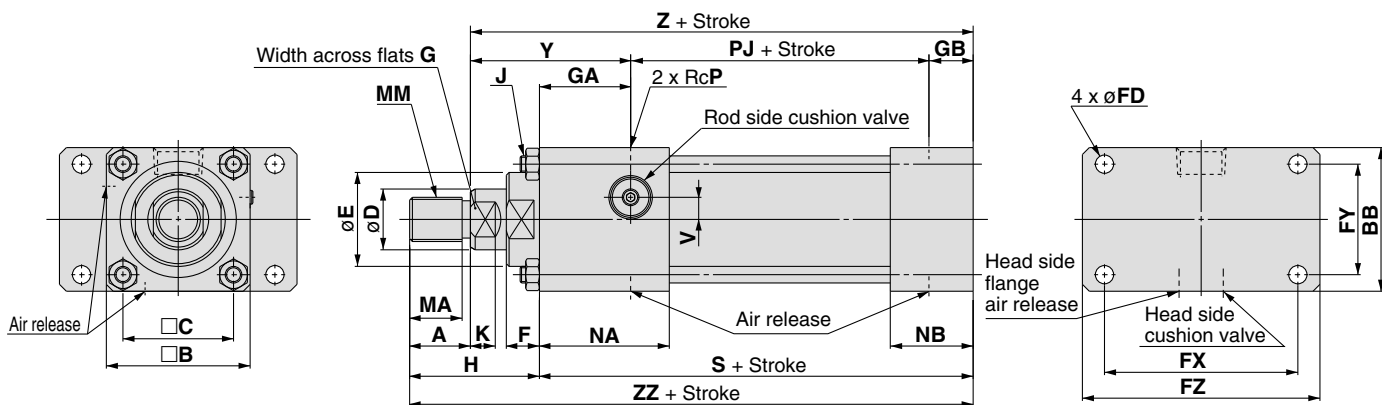
CH2

CHA

Related Equipment

D-

**Head flange: CHSDFZ**

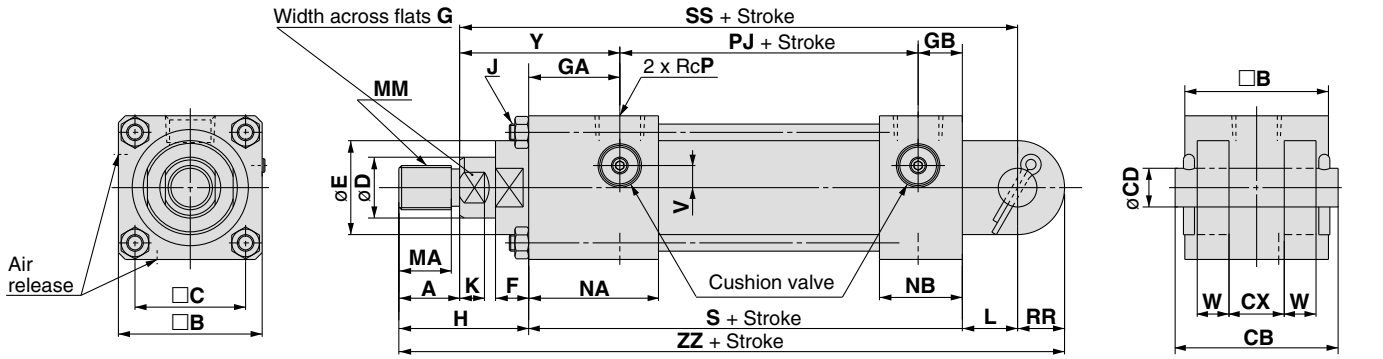


Bore size (mm)	Stroke range	A	B	BB	C	D	E	F	FD	FX	FY	FZ	G	GA	GB	H	J	K	MA	MM	NA	NB	P	PJ	S	V	Y	Z	ZZ
40	25 to 800	22	52	52	40	22	34	12	6.6	70	40	86	19	33	16	47	M6×1	8	19	M16×1.5	46	29	3/8	58	107	6.5	58	132	154
50	25 to 800	28	65	65	50	28	42	15	9	86	50	105	24	34	16	59	M8×1	11	25	M20×1.5	46.5	28.5	3/8	58	108	8	65	139	167
63	25 to 800	36	77	77	58	36	50	19	9	98	56	118	30	31	18	74	M8×1	13	32	M27×2	46	33	1/2	66	115	12	69	153	189
80	25 to 800	45	96	96	75	45	60	13	11	119	70	143	41	42	17	80	M10×1.25	17	41	M33×2	57	32	1/2	74	133	15	77	168	213
100	25 to 1000	56	115	115	90	56	72	16	13.5	138	90	162	50	38	22	97	M14×1.5	19	52	M42×2	58	42	3/4	86	148	15	79	187	243

# Series CHSD

## Dimensions

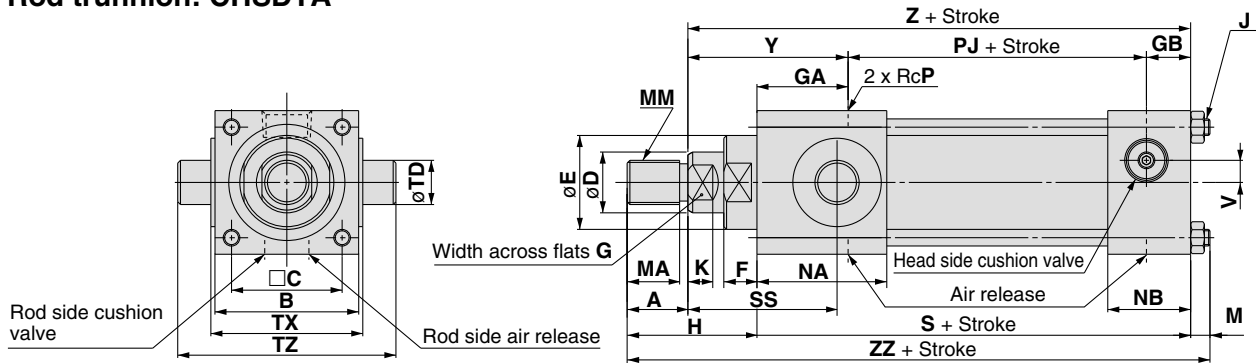
### Double clevis: CHSDCB



Bore size (mm)	Stroke range	A	B	C	CB	CD	CX	D	E	F	G	GA	GB	H	J	K	L	MA	MM	NA	NB	P	PJ	RR	S
40	25 to 800	22	52	40	64	14	20	22	34	12	19	33	16	47	M6 × 1	8	19	19	M16 × 1.5	46	29	3/8	58	17	107
50	25 to 800	28	65	50	64	14 <sup>+0.043</sup>	20	28	42	15	24	34	16	59	M8 × 1	11	19	25	M20 × 1.5	46.5	28.5	3/8	58	17	108
63	25 to 800	36	77	58	93	20	30	36	50	19	30	31	18	74	M8 × 1	13	32	32	M27 × 2	46	33	1/2	66	29	115
80	25 to 800	45	96	75	93	20	30	45	60	13	41	42	17	80	M10 × 1.25	17	32	41	M33 × 2	57	32	1/2	74	29	133
100	25 to 1000	56	115	90	113	28 <sup>+0.052</sup>	40	56	72	16	50	38	22	97	M14 × 1.5	19	39	52	M42 × 2	58	42	3/4	86	34	146

Bore size (mm)	SS	V	W	Y	ZZ
40	151	6.5	11.5	58	190
50	158	8	11.5	65	203
63	185	12	17.5	69	250
80	200	15	17.5	77	274
100	226	15	21.5	79	316

### Rod trunnion: CHSDTA



Bore size (mm)	Stroke range	A	B	C	D	E	F	G	GA	GB	H	J	K	M	MA	MM	NA	NB	P	PJ	S	SS	TD	TX	TZ
40	25 to 800	22	52	40	22	34	12	19	33	16	47	M6 × 1	8	7.5	19	M16 × 1.5	46	29	3/8	58	107	54	16 <sup>-0.016</sup>	55	79
50	25 to 800	28	65	50	28	42	15	24	34	16	59	M8 × 1	11	9	25	M20 × 1.5	46.5	28.5	3/8	58	108	61	20 <sup>-0.043</sup>	68	100
63	25 to 800	36	77	58	36	50	19	30	31	18	74	M8 × 1	13	9	32	M27 × 2	46	33	1/2	66	115	67	25 <sup>-0.020</sup>	80	120
80	25 to 800	45	96	75	45	60	13	41	42	17	80	M10 × 1.25	17	10.5	41	M33 × 2	57	32	1/2	74	133	73	32 <sup>-0.025</sup>	100	150
100	25 to 1000	56	115	90	56	72	16	50	38	22	97	M14 × 1.5	19	14.5	52	M42 × 2	58	42	3/4	86	146	79	40 <sup>-0.064</sup>	120	184

Bore size (mm)	V	Z	ZZ
40	6.5	132	161.5
50	8	139	176
63	12	153	198
80	15	168	223.5
100	15	187	257.5

# Series CHSD Auto Switch Specifications

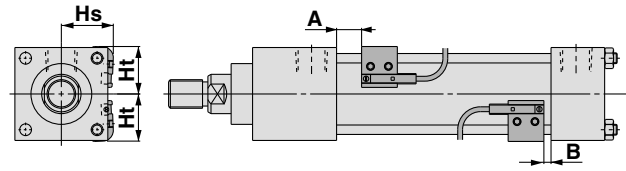
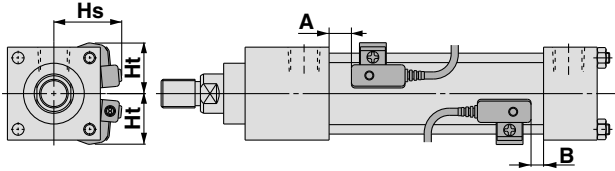
Refer to pages 347 to 406 for detailed specifications.



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

D-A5□/A6□  
D-F5□(W)/J5□(W)/F5BAL

D-M9□/M9□V  
D-M9□W/M9□WV  
D-M9□AL/M9□AVL  
D-Z7□/Z80



### Auto Switch Proper Mounting Position

Bore size (mm)	D-M9□/M9□V D-M9□W/M9□WV D-M9□AL/M9□AVL		D-F5□/J5□ D-F5□W/J59W D-F59F D-F5BAL		D-F5NTL		D-Z7□/Z80		D-A5□/A6□		D-A59W	
	A	B	A	B	A	B	A	B	A	B	A	B
40	11.5	8.5	8	5	13	10	5	2	—	—	—	—
50	13	8	9.5	4.5	14.5	9.5	6.5	1.5	—	—	—	—
63	14.5	9.5	11	6	16	11	8	3	4.5	0	8.5	3.5
80	18.5	13.5	15	10	20	15	12	7	8.5	3.5	12.5	7.5
100	18.5	15.5	15	12.5	20	17.5	12	9.5	8.5	6	12.5	10

Note 1) D-A5□/A6□/A59W cannot be mounted to ø40, ø50.

Note 2) Adjust the auto switch after confirming the operating conditions in the actual setting.

### Auto Switch Mounting Height

Bore size (mm)	D-M9□/M9□V D-M9□W/M9□WV D-M9□AL/M9□AVL		D-M9□V/M9□V D-M9□W/M9□WV D-M9□AL/M9□AVL		D-F5□/J5□ D-F5□W/J59W D-F59F/F5BAL D-F5NTL		D-A5□/A6□ D-A59W		D-Z7□/Z80	
	Ht	Hs	Ht	Hs	Ht	Hs	Ht	Hs	Ht	Hs
40	27	28.5	27	34	35.5	28.5	—	—	29	27
50	33	33.5	33	38.5	39.5	34.5	—	—	33	33
63	38.5	38	38.5	43.5	45	38.5	47.5	38.5	28	37
80	48	47	48	52	51	48	54	48	46.5	46
100	57.5	59	57.5	62.5	63.5	58	66.5	58	59	57

\* D-A5□/A6□/A59W cannot be mounted to ø40, ø50.

### Operating Range

Auto switch model	Bore size (mm)				
	40	50	63	80	100
D-M9□/M9□V D-M9□W/M9□WV D-M9□AL/M9□AVL	4.5	5	6	7.5	9
D-F5□/J5□/F59F D-F5□W/J59W D-F5BAL/F5NTL	4	4.5	4.5	5.5	5.5
D-A5□/A6□	—	—	10.5	12	14.5
D-A59W	—	—	14	16	18
D-Z7□/Z80	8	9	10	12	14.5

\* D-A5□/A6□/A59W cannot be mounted to ø40, 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.

### Minimum Auto Switch Mounting Stroke

Auto switch model	2 pcs. (Different surfaces and same surface), 1 pc.	"n" pcs.
D-M9□ D-M9□W D-M9□AL	20	$20 + 40 \frac{(n-2)}{2}$ (n = 2, 4, 6, 8...)
D-M9□V D-M9□WV D-M9□AVL	20	$20 + 30 \frac{(n-2)}{2}$ (n = 2, 4, 6, 8...)
D-F5□/J5□/F5□W D-J59W/F5BAL D-F59F/A5□/A6□	20	$20 + 55 \frac{(n-2)}{2}$ (n = 2, 4, 6, 8...)
D-D-F5NTL	25	$20 + 55 \frac{(n-2)}{2}$ (n = 2, 4, 6, 8...)
D-A59W	30	$20 + 55 \frac{(n-2)}{2}$ (n = 2, 4, 6, 8...)
D-Z7□/Z80	20	$20 + 40 \frac{(n-2)}{2}$ (n = 2, 4, 6, 8...)

\* D-A5□/A6□/A59W cannot be mounted to ø40, ø50.

Besides the models listed in "How to Order," the following auto switches are applicable.  
Refer to pages 347 to 406 for detailed auto switch specifications.

Auto switch type	Part no.	Electrical entry	Features
Solid state	D-M9NV, M9PV, M9BV	Grommet (perpendicular)	—
	D-M9NWV, M9PWV, M9B WV		Diagnostic indication (2-color display)
	D-M9NAV, M9PAV, M9BAV		Water resistant (2-color display)
	D-F59, F5P, J59	Grommet (in-line)	—
	D-F59W, F5PW, J59W		Diagnostic indication (2-color display)
	D-F5BAL		Water resistant (2-color display)
Reed	D-F5NTL	Grommet (in-line)	With timer
	D-A53, A56		—
	D-A67		Without indicator light

\* Solid state auto switches are also available with pre-wired connector. Contact SMC for detailed auto switch specifications.  
Refer to pages 389 and 390 for details.

## Auto Switch Mounting Brackets: Part Nos.

Auto switch models	Bore size (mm)				
	ø40	ø50	ø63	ø80	ø100
D-M9□/M9□V D-M9□W/M9□WV D-M9□AL/M9□AVL	BMB5-032	BA7-040	BA7-040	BA7-063	BS5-125
D-F5□/J5□ D-F5□W/J59W D-F5BAL/F59F/F5NTL D-A5□/A6□/A59W	BT-03	BT-04	BT-04	BT-06	BT-12
D-Z7□/Z80	BMB4-032	BA4-040	BA4-040	BA4-063	BS4-125

Note 1) D-A5□/A6□/A59W cannot be mounted to ø40, ø50.

### [Stainless steel mounting screw kits]

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

BBA1 : For D-F5/J5/A5/A6 types

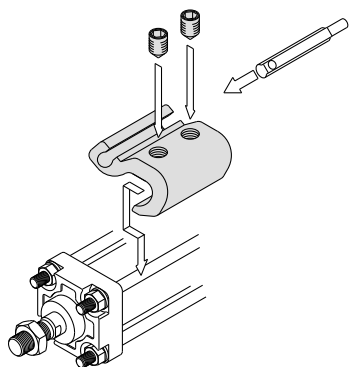
Note 2) Refer to the table below for details on BBA1.

### Stainless mounting screw kit details

Part no.	Contents				Applicable auto switch mounting bracket part nos.	Applicable auto switches
	No.	Description	Size	Pcs.		
BBA1	1	Auto switch mounting screws	M4 x 0.7 x 8L	1	BT-□□	D-A5, A6 D-F5, J5
					BT-03, BT-04, BT-05 BT-06, BT-08, BT-12	
	2	Set screw	M4 x 0.7 x 6L	2	BA4-040, BA4-063, BA4-080 BMB4-032, BMB4-050	D-Z7, Z8 D-Y5, Y6, Y7
					BMB5-032 BA7-040, BA7-063, BA7-080	
	3	Set screw	M4 x 0.7 x 8L	2	BT-16, BT-18A, BT-20	D-A5, A6 D-F5, J5
					BS4-125, BS4-160 BS4-180, BS4-200	
				BS5-125, BS5-160 BS5-180, BS5-200		

When D-F5BAL auto switch is shipped mounted on a cylinder, the above stainless steel screws are used. Also when switches are shipped separately, BBA1 is included.

Note 3) When using D-M9□A(V)L, order stainless mounting screw kit BBA1 instead of the iron auto switch mounting brackets (BMB5-032, BA7-□□□, BS5-125) in the table above, and use the M4 x 6L stainless set screws included.

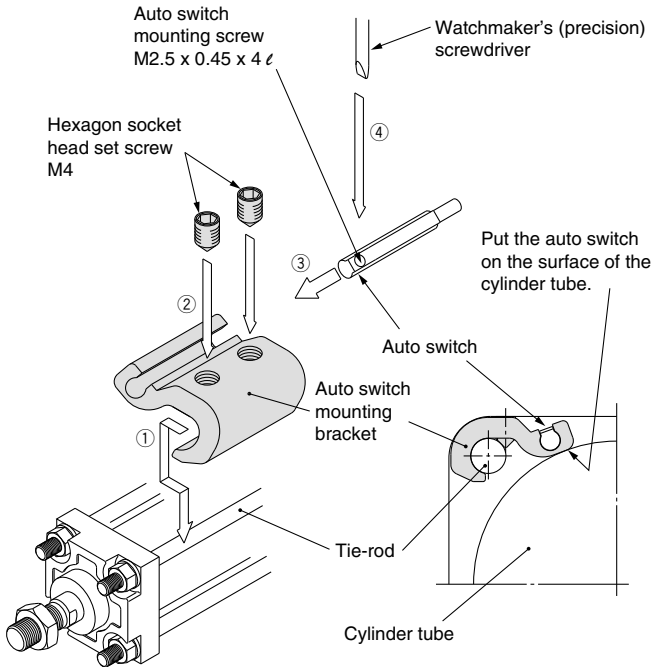


• Mounting example for D-M9□(V), M9□W(V), M9□A(V)L.

## How to Mount and Move the Auto Switch

### <Applicable auto switch>

Solid state ..... D-M9N(V), D-M9P(V), D-M9B(V)  
D-M9NW(V), D-M9PW(V), D-M9BW(V)  
D-M9NA(V), D-M9PA(V), D-M9BA(V)



1. Fix it to the detecting position with a set screw by installing an auto switch mounting bracket in cylinder tie-rod and letting the bottom surface of an auto switch mounting bracket contact the cylinder tube firmly.
2. Fix it to the detecting position with a hexagon socket head set screw (M4).  
(Use a hexagon wrench.)
3. Fit an auto switch into the auto switch mounting groove to set it roughly to the mounting position for an auto switch.
4. After confirming the detecting position, tighten up the mounting screw (M2.5) attached to an auto switch, and secure the auto switch.
5. When changing the detecting position, carry out in the state of 3.

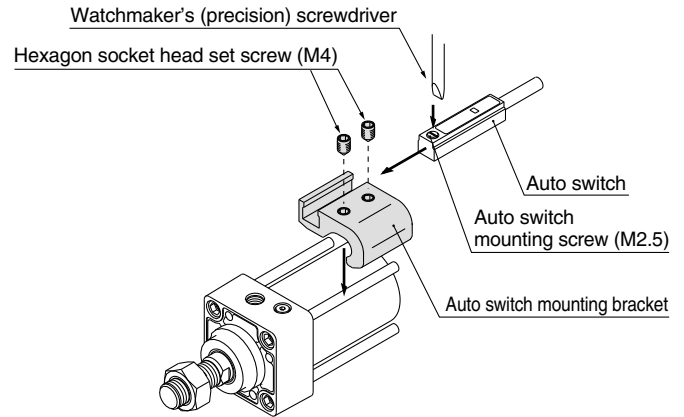
Note 1) To protect auto switches, ensure that main body of an auto switch should be embedded into auto switch mounting groove with a depth of 15 mm or more.

Note 2) Set the tightening torque of a hexagon socket head set screw (M4) to be 1 to 1.2 N·m.

Note 3) When tightening an auto switch mounting screw (M2.5), use a watchmaker's screwdriver with a grip diameter of 5 to 6 mm. Also, set the tightening torque to be 0.05 to 0.15 N·m. As a guide, turn 90° from the position where it comes to feel tight.

### <Applicable auto switch>

Reed ..... D-Z73, D-Z76, D-Z80



1. Fix it to the detecting position with a hexagon socket head set screw (M4) by installing an auto switch mounting bracket in cylinder tie-rod and letting the bottom surface of an auto switch mounting bracket contact the cylinder tube firmly. (Use a hexagon wrench)
2. Fit an auto switch into the auto switch mounting groove to set it roughly to the auto switch mounting position for an auto switch.
3. After confirming the detecting position, tighten up the mounting screw (M2.5) attached to an auto switch, and secure the switch.
4. When changing the detecting position, carry out in the state of 2.

Note 1) To protect auto switches, ensure that main body of an auto switch should be embedded into auto switch mounting groove with a depth of 15 mm or more.

Note 2) Set the tightening torque of a hexagon socket head set screw (M4) to be 1 to 1.2 N·m.

Note 3) When tightening an auto switch mounting screw (M2.5), use a watchmaker's screwdriver with a grip diameter of 5 to 6 mm. Also, set the tightening torque to be 0.05 to 0.15 N·m. As a guide, turn 90° from the position where it comes to feel tight.

CHQ

CHK

CHN

CHM

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CHA

Related Equipment

D-

## How to Mount and Move the Auto Switch

---

### <Applicable auto switch>

Solid state ..... D-F59, D-F5P

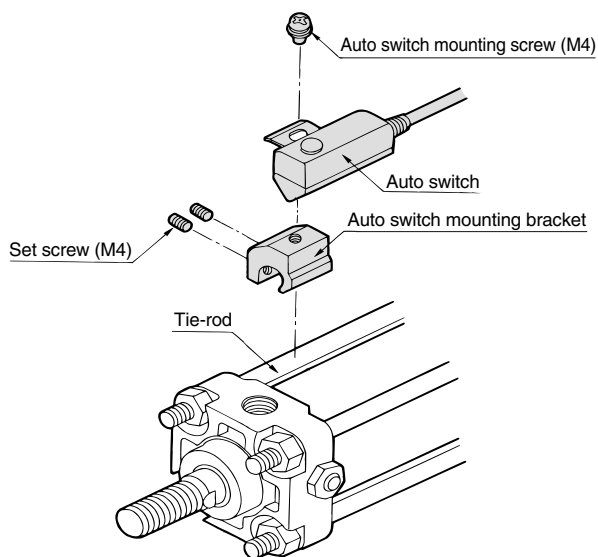
D-J59, D-J51, D-F5BAL

D-F59W, D-F5PW, D-J59W

D-F59F, D-F5NTL

Reed ..... D-A53, D-A54, D-A56, D-A64, D-A67

D-A59W



1. Fix the auto switch on the auto switch mounting bracket with the auto switch mounting screw (M4) and install the set screw.
2. Fit the auto switch mounting bracket into the cylinder tie-rod and then fix the auto switch at the detecting position with the hexagonal wrench. (Be sure to put the auto switch on the surface of cylinder tube.)
3. When changing the detecting position, loosen the set screw to move the auto switch and then re-fix the auto switch on the cylinder tube. (Tightening torque of M4 screw should be 1 to 1.2 N·m.)

# ISO Standard Hydraulic Cylinder

## Series CHSG

16 MPa  
 ø32, ø40, ø50, ø63, ø80, ø100

### How to Order

**CH D SG B 40 - 100 - M9BW**

**Magnet for auto switch**

Nil	Without
D	Built-in

**Series type**

Symbol	Nominal pressure
G	16 MPa

**Mounting style**

B	Basic
LA	Transaxial foot style
FY	Rod rectangular flange style
FZ	Head rectangular flange style
CA	Single clevis
CB	Double clevis
TA	Rod trunnion
TC	Center trunnion

**Bore size**

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

**Port thread type**

Nil	Rc
TN	NPT
TF	GF

**Stroke**

Refer to the standard stroke table on the next page 262.

**Cylinder suffix**

Nil	Without rod end nut
A	With rod end nut
Nil	With cushion on both sides
N	Without cushion
R	With front bumper
H	With rear bumper

**Auto switch**

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

\* Select an applicable auto switch model from the table below.

**Port position**

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

### Built-in Magnet Cylinder Model

If a built-in magnet cylinder without auto switch is required, there is no need to enter the symbol for the auto switch.  
 (Example) CHDSGB50-100

Rod end nut	Nil	Without rod end nut
	A	With rod end nut
Presence of cushion	Nil	With cushion on both sides
	N	Without cushion
	R	With front bumper
	H	With rear bumper

Note) When more than one symbol is to be specified, indicate them in alphabetical order.

### Applicable Auto Switches: Refer to pages 347 to 406 for further details on each auto switch.

Type	Special function	Electrical entry	Indicator light	Wiring (output)	Load voltage		Auto switch model	Lead wire length (m)				Pre-wired connector	Applicable load			
					DC	AC		0.5 (Nil)	1 (M)	3 (L)	5 (Z)					
Solid state switch	Diagnostic indication (2-color display)	Grommet	Yes	3-wire (NPN)	24 V	5 V, 12 V	—	M9N	●	●	●	○	IC circuit			
								—	F59	—	—	○		○		
				3-wire (PNP)	—	12 V	—	M9P	●	●	●	○	○	—		
								—	F5P	—	—	○	○			
				2-wire	—	100 V, 200 V	—	M9B	●	●	●	○	○	—		
	—							J59	●	—	●	○				
	—							J51	●	—	●	○				
	Water resistant (2-color indicator)			—	—	—	3-wire (NPN)	24 V	5 V, 12 V	—	M9NW	●	●	●	○	IC circuit
											—	F59W	—	—	○	
							3-wire (PNP)	—	12 V	—	M9PW	●	●	●	○	○
—		F5PW	—								—	○	○			
2-wire		—	—				—	M9BW	●	●	●	○	○	—		
	—			J59W	●	—		●	○							
Diagnostic output (2-color display)	—	—	—	3-wire (NPN)	24 V	5 V, 12 V	—	M9NA	—	○	○	○	IC circuit			
								—	F59F	—	—	○		○		
				3-wire (PNP)	—	12 V	—	M9PA	—	○	○	○	○	—		
								—	F5BA	—	—	○	○			
				2-wire	—	—	—	—	—	—	—	○	○	—		
—	F59F	●	—					●	○							
Reed switch	Diagnostic output (2-color display)	Grommet	Yes	3-wire (NPN equiv.)	24 V	5 V	—	—	Z76	●	●	●	○	IC circuit		
								—	Z73	●	—	●	○			
								—	Z80	●	—	●	○			
								—	A54	●	—	●	○			
								—	A64	●	—	●	○			
—	—	—	—	2-wire	24 V	12 V	—	—	A54	●	—	●	Relay PLC			
								—	A64	●	—	●				
								—	A59W	●	—	●				

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

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

\* Besides the models in the above table, there are some other auto switches that are applicable. For more information, refer to page 269.

\* For details about auto switches with pre-wired connector, refer to pages 389 and 390.

\* D-M9□, M9□W, M9□AL, Z7□, Z80 auto switches are shipped together, (not assembled). (Only auto switch mounting brackets are packed assembled.)

Symbol	Position	Port and cushion valve location viewed from the side of piston rod end thread
Nil	Port on top, cushion valve on the right	
A	Port on top, cushion valve on the left	
B	Port on top, cushion valve down	
C	Port on the right, cushion valve down	
D	Port on the right, cushion valve on top	
E	Port on the right, cushion valve on the left	

○ Piping port ○ Cushion valve

Note 1) Refer to table 1 for manufacturability.  
 Note 2) Diagrams illustrate the view from the rod on the left side of the cylinder dimensions.  
 Note 3) For mounting types FY, FZ, or TA, indicate port position with the symbol B.

Table 1 Manufacturability Check List by Mounting Type and Port Position

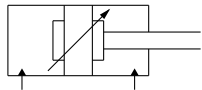
Mounting bracket Port position	B	LA	FY FZ	CA CB	TA	TC
Nil	○	○	○	○	—	○
A	○	○	○	○	—	○
B	○	○	○	○	○	○
C	Note)	—	○	○	—	○
D	Note)	—	○	○	—	○
E	Note)	—	○	○	—	○

○: Standard product ○: Made to order  
 —: Not available due to size limitation.  
 Note) Each of C, D, E is same as the Nil, A, B just turned.

# Series CHSG



JIS Symbol



## Specifications

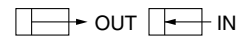
Bore size (mm)		32	40	50	63	80	100
Action		Double Acting: Single Rod					
Fluid		General mineral hydraulic fluid					
Nominal pressure		16 MPa					
Maximum allowable pressure		20 MPa					
Proof pressure		24 MPa					
Minimum operating pressure	With pressure at rod side	0.25 MPa					
	With pressure at head side	0.15 MPa					
Ambient and fluid temperature	Without magnet	-10 to 80°C					
	Built-in magnet	-10 to 60°C					
Piston speed		8 to 300 mm/s					
Cushion		Cushion seal					
Thread tolerance		JIS 6 g/6 H					
Stroke length tolerance	100 mm or less	0 to +0.8 mm					
	101 to 250 mm	0 to +1.0 mm					
	251 to 630 mm	0 to +1.25 mm					
	631 to 1000 mm	0 to +1.4 mm					

Note) Refer to page 134 for definitions of terms related to pressure.

## Standard Stroke

Bore size (mm)	Standard stroke (mm)
32	25 to 800
40	25 to 800
50	25 to 800
63	25 to 800
80	25 to 800
100	25 to 1000

## Theoretical Output



Unit: N

Bore size (mm)	Rod size (mm)	Operating direction	Piston area (mm <sup>2</sup> )	Operating pressure (MPa)			
				3.5	7	10	16
32	18	OUT	804	2814	5628	8040	12864
		IN	549	1922	3843	5490	8784
40	22	OUT	1256	4396	8792	12560	20096
		IN	876	3066	6132	8760	14016
50	28	OUT	1963	6871	13741	19630	31408
		IN	1347	4715	9429	13470	21552
63	36	OUT	3117	10910	21819	31170	49872
		IN	2099	7346	14693	20990	33584
80	45	OUT	5026	17591	35182	50260	80416
		IN	3436	12026	24052	34360	54976
100	56	OUT	7853	27486	54971	78530	125648
		IN	5390	18865	37730	53900	86240

Theoretical output (N) = Pressure (MPa) x Piston area (mm<sup>2</sup>)

## Mass

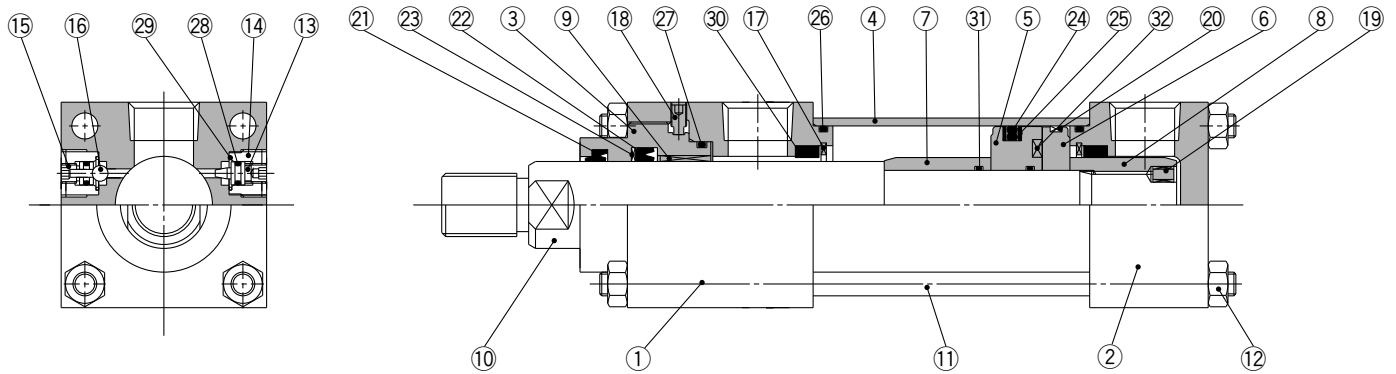
Unit: kg

Bore size (mm)			32	40	50	63	80	100
Basic mass (0 stroke)	Basic	B	1.60	3.20	4.70	7.80	14.7	20.8
	Transaxial foot	LA	1.80	4.00	5.70	8.65	17.0	23.3
	Rod flange	FY	1.90	4.10	6.00	9.10	16.7	22.9
	Head flange	FZ	1.70	3.90	5.60	8.20	16.4	24.8
	Single clevis	CA	1.60	3.40	5.60	8.20	16.4	24.8
	Double clevis	CB	1.60	3.40	5.60	8.20	16.4	24.8
	Rod trunnion	TA	1.70	3.40	5.20	8.40	15.9	22.5
	Center trunnion	TC	1.90	3.90	5.80	9.40	18.2	25.4
Additional mass per 10 strokes			0.05	0.07	0.12	0.18	0.28	0.42



## Construction

CH□SGB



### Parts List

No.	Description	Material
1	Rod cover	Carbon steel
2	Head cover	Carbon steel
3	Seal holder	Carbon steel
4	Cylinder tube	Stainless steel
5	Piston	Stainless steel
6	Magnet plate	Stainless steel
7	Cushion ring	Carbon steel
8	Cushion ring nut	Carbon steel
9	Bushing	Copper alloy
10	Piston rod	Carbon steel
11	Tie-rod	Chromium molybdenum steel
12	Tie-rod nut	Carbon steel
13	Cushion valve	Alloy steel
14	Valve holder	Carbon steel
15	Air release valve	Alloy steel
16	Check ball	Bearing steel

No.	Description	Material
17	Retaining ring	Carbon tool steel
18	Set screw	Alloy steel
19	Pin	Stainless steel
20	Wear ring	Resin
21	Scraper	NBR
22	Rod seal	NBR
23	Back-up ring	Resin
24	Piston seal	NBR
25	Back-up ring	Resin
26	Cylinder tube gasket	NBR
27	Holder gasket	NBR
28	Valve seal	NBR
29	Valve holder gasket	NBR
30	Cushion seal	—
31	Piston gasket	NBR
32	Magnet	—

### Replacement Parts: Seal Kit

Bore size (mm)	Seal kit no.
32	CHSG32-PS
40	CHSG40-PS
50	CHSG50-PS
63	CHSG63-PS
80	CHSG80-PS
100	CHSG100-PS

\* Seal kit consists of items 21 to 26 and 30, and can be ordered by using the seal kit number for each bore size.

CHQ

CHK□

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CHM

CHS□

CH2□

CHA

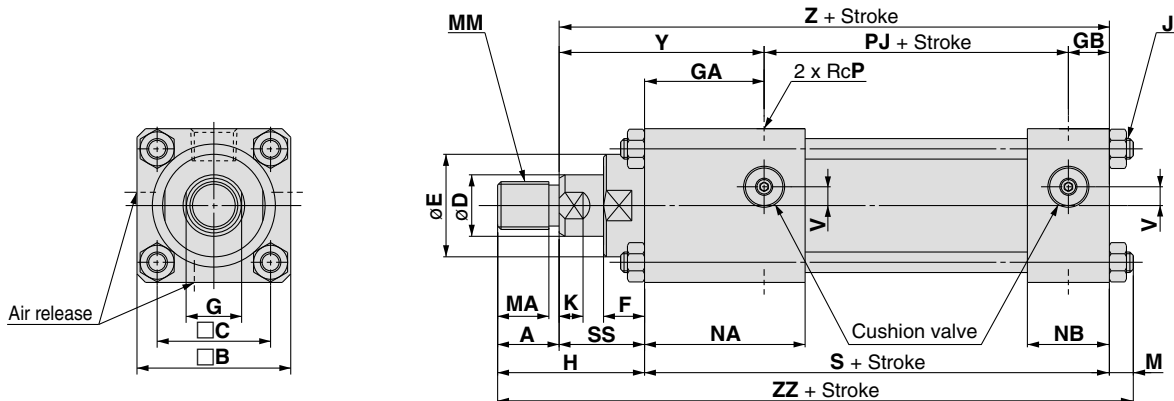
Related Equipment

D-□

# Series CHSG

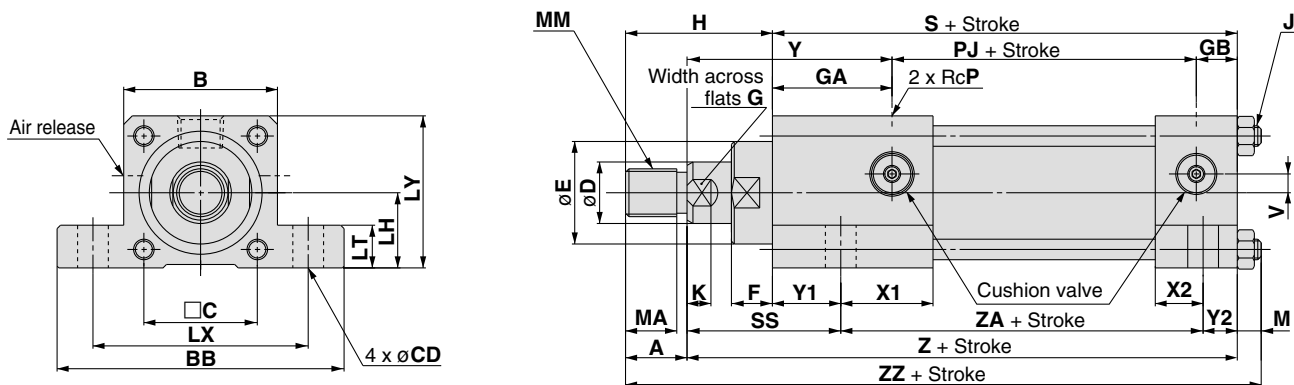
## Dimensions

### Basic: CHSGB



Bore size (mm)	Stroke range	A	B	C	D	E	F	G	GA	GB	H	J	K	M	MA	MM	NA	NB	P	PJ	S	SS	V	Y	Z	ZZ
32	25 to 800	18	45	33.2	18	30	12	14	35	12	43	M6×1	7	7.5	15	M14×1.5	46	23	1/4	56	103	25	5.5	60	128	153.5
40	25 to 800	22	63	41.7	22	34	12	19	37	18	47	M8×1	9	10	19	M16×1.5	51	32	3/8	73	128	25	6.5	62	153	185
50	25 to 800	28	75	52.3	28	42	9	24	42	18	53	M12×1.25	11	12	25	M20×1.5	57	33	1/2	74	134	25	7	67	159	199
63	25 to 800	36	90	64.3	36	50	13	30	39	17	68	M12×1.25	13	12	32	M27×2	55	33	1/2	80	136	32	12	71	168	216
80	25 to 800	45	115	82.7	45	60	9	41	46	20	76	M16×1.5	17	16	41	M33×2	66	40	3/4	93	159	31	15	77	190	251
100	25 to 1000	56	130	96.9	56	72	10	50	47	20	91	M16×1.5	19	16	52	M42×2	67	40	3/4	101	168	35	15	82	203	275

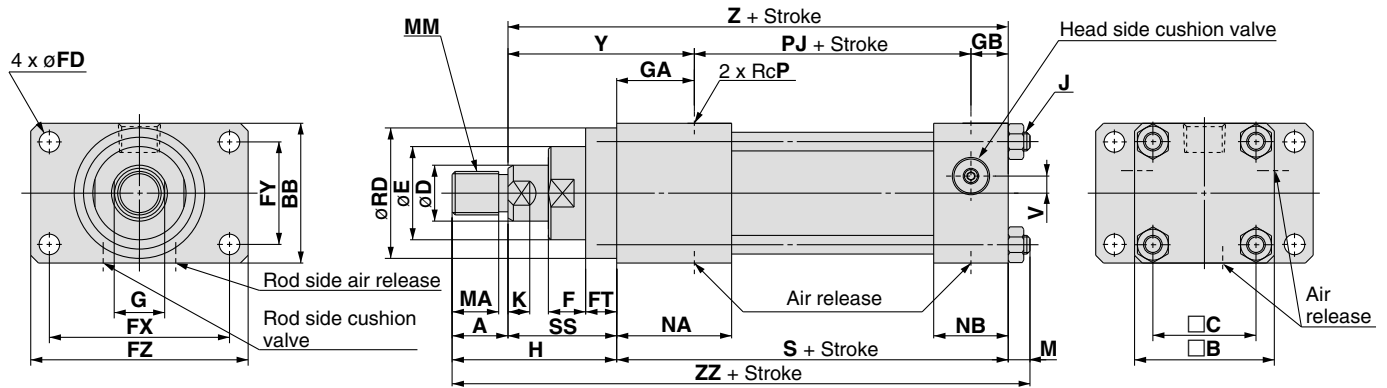
### Transaxial foot: CHSGLA



Bore size (mm)	Stroke range	A	B	BB	C	CD	D	E	F	G	GA	GB	H	J	K	LH	LT	LX	LY	M	MA	MM	P	PJ	S	SS
32	25 to 800	18	45	84	33.2	9	18	30	12	14	35	12	43	M6×1	7	22	12.5	63	44.5	7.5	15	M14×1.5	1/4	56	103	45
40	25 to 800	22	63	103	41.7	11	22	34	12	19	37	18	47	M8×1	9	31	12.5	83	62.5	10	19	M16×1.5	3/8	73	128	45
50	25 to 800	28	75	127	52.3	14	28	42	9	24	42	18	53	M12×1.25	11	37	19	102	74.5	12	25	M20×1.5	1/2	74	134	54
63	25 to 800	36	90	161	64.3	18	36	50	13	30	39	17	68	M12×1.25	13	44	26	124	89	12	32	M27×2	1/2	80	136	65
80	25 to 800	45	115	186	82.7	18	45	60	9	41	46	20	76	M16×1.5	17	57	26	149	114.5	16	41	M33×2	3/4	93	159	68
100	25 to 1000	56	130	216	96.9	26	56	72	10	50	47	20	91	M16×1.5	19	63	32	172	128	16	52	M42×2	3/4	101	168	79

Bore size (mm)	V	X1	X2	Y	Y1	Y2	ZA	Z	ZZ
32	5.5	26	13	60	20	10	73	128	153.5
40	6.5	31	22	62	20	10	98	153	185
50	7	28	20	67	29	13	92	159	199
63	12	22	16	71	33	17	86	168	216
80	15	29	23	77	37	17	105	190	251
100	15	23	18	82	44	22	102	203	275

**Rod flange: CHSGFY**



Bore size (mm)	Stroke range	A	B	BB	C	D	E	F	FD	FT	FX	FY	FZ	G	GA	GB	H	J	K	M	MA	MM	NA	NB	P	PJ
32	25 to 800	18	45	45	33.2	18	30	12	6.6	10	58	33	70	14	25	12	53	M6 x 1	7	7.5	15	M14 x 1.5	36	23	1/4	56
40	25 to 800	22	63	63	41.7	22	34	12	11	10	87	41	110	19	27	18	57	M8 x 1	9	10	19	M16 x 1.5	41	32	3/8	73
50	25 to 800	28	75	75	52.3	28	42	9	14	16	105	52	130	24	26	18	69	M12 x 1.25	11	12	25	M20 x 1.5	41	33	1/2	74
63	25 to 800	36	90	90	64.3	36	50	13	14	16	117	65	145	30	23	17	84	M12 x 1.25	13	12	32	M27 x 2	39	33	1/2	80
80	25 to 800	45	115	115	82.7	45	60	9	18	20	149	83	180	41	26	20	96	M16 x 1.5	17	16	41	M33 x 2	46	40	3/4	93
100	25 to 1000	56	130	130	96.9	56	72	10	18	22	162	97	200	50	25	20	113	M16 x 1.5	19	16	52	M42 x 2	45	40	3/4	101

Bore size (mm)	RD	S	SS	V	Y	Z	ZZ	
32	42	-0.025 -0.064	93	35	5.5	60	128	153.5
40	62	-0.030 -0.076	118	35	6.5	62	153	185
50	74		118	41	7	67	159	199
63	82		120	48	12	71	168	216
80	92	-0.036 -0.090	139	51	15	77	190	251
100	105		146	57	15	82	203	275

CHQ

CHK

CHN

CHM

CHS

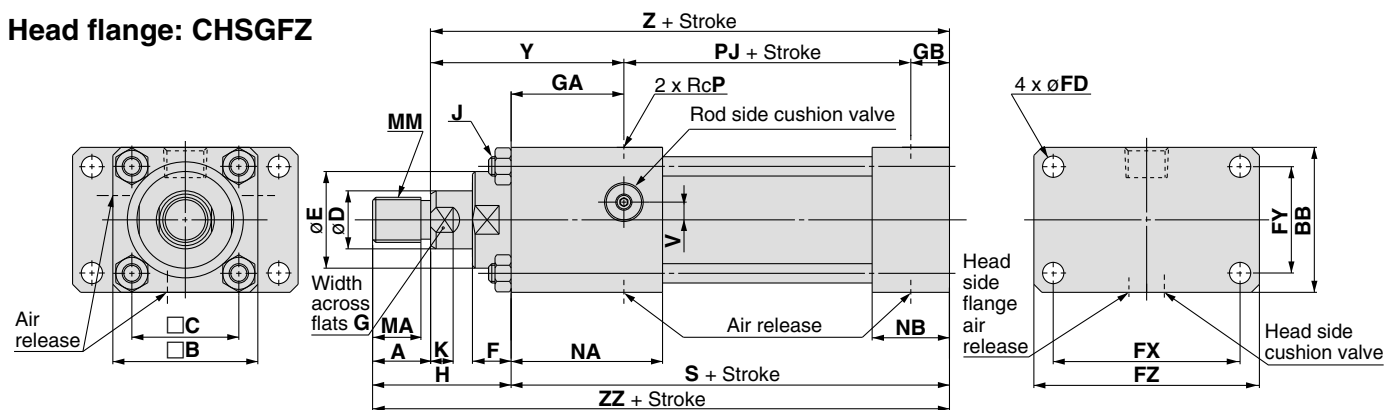
CH2

CHA

Related Equipment

D-

**Head flange: CHSGFZ**

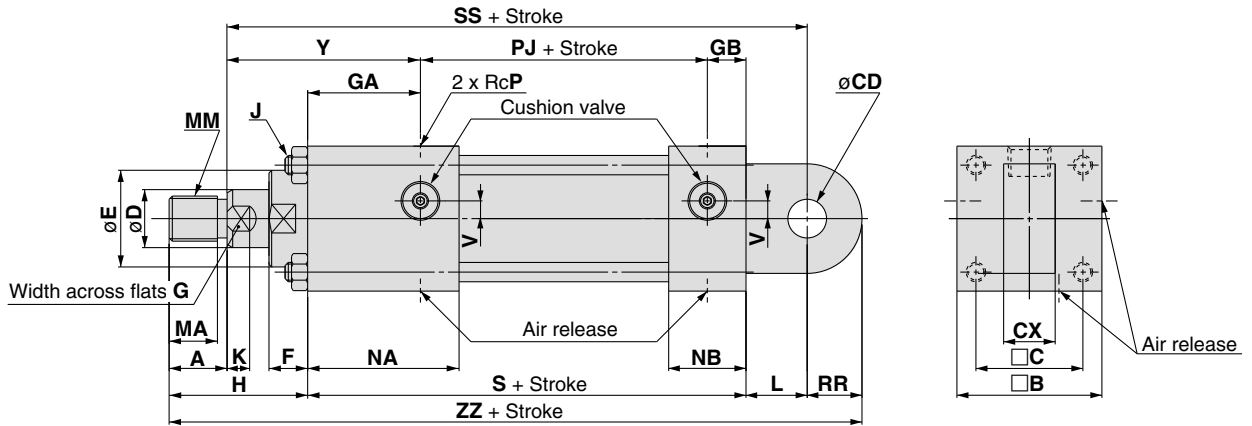


Bore size (mm)	Stroke range	A	B	BB	C	D	E	F	FD	FX	FY	FZ	G	GA	GB	H	J	K	MA	MM	NA	NB	P	PJ	S	V	Y	Z	ZZ
32	25 to 800	18	45	45	33.2	18	30	12	6.6	58	33	70	14	35	12	43	M6 x 1	7	15	M14 x 1.5	46	23	1/4	56	103	5.5	60	128	146
40	25 to 800	22	63	63	41.7	22	34	12	11	87	41	110	19	37	18	47	M8 x 1	9	19	M16 x 1.5	51	32	3/8	73	128	6.5	62	153	175
50	25 to 800	28	75	75	52.3	28	42	9	14	105	52	130	24	42	18	53	M12 x 1.25	11	25	M20 x 1.5	57	33	1/2	74	134	7	67	159	187
63	25 to 800	36	90	90	64.3	36	50	13	14	117	65	145	30	39	17	68	M12 x 1.25	13	32	M27 x 2	55	33	1/2	80	136	12	71	168	204
80	25 to 800	45	115	115	82.7	45	60	9	18	149	83	180	41	46	20	76	M16 x 1.5	17	41	M33 x 2	66	40	3/4	93	159	15	77	190	235
100	25 to 1000	56	130	130	96.9	56	72	10	18	162	97	200	50	47	20	91	M16 x 1.5	19	52	M42 x 2	67	40	3/4	101	168	15	82	203	259

# Series CHSG

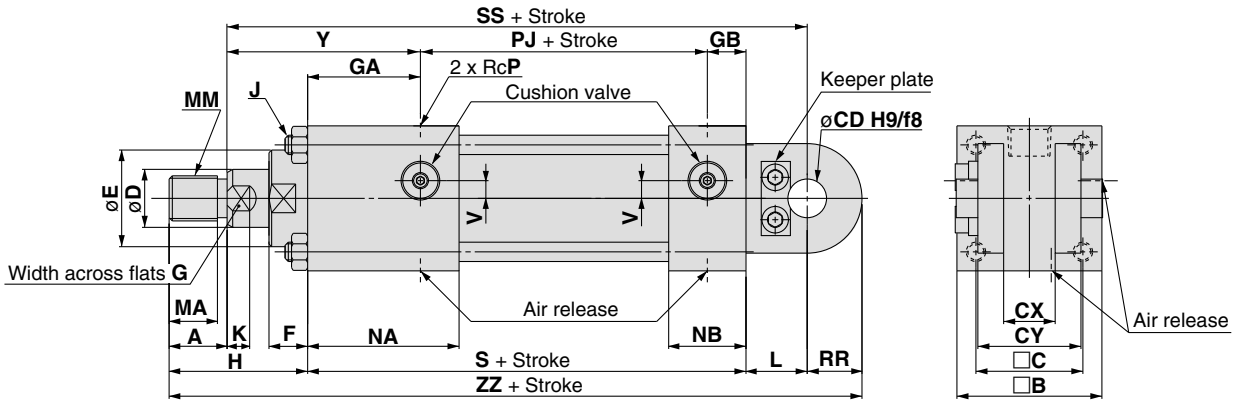
## Dimensions

### Single clevis: CHSGCA



Bore size (mm)	Stroke range	A	B	C	CD	CX	D	E	F	G	GA	GB	H	J	K	L	MA	MM	NA	NB	P	PJ	RR	S	SS	V	Y	ZZ	
32	25 to 800	18	45	33.2	12	<sup>+0.043</sup> <sub>0</sub>	16	18	30	12	14	35	12	43	M6 x 1	7	19	15	M14 x 1.5	46	23	1/4	56	17	103	147	5.5	60	182
40	25 to 800	22	63	41.7	14	<sup>+0.052</sup> <sub>0</sub>	20	22	34	12	19	37	18	47	M8 x 1	9	19	19	M16 x 1.5	51	32	3/8	73	17	128	172	6.5	62	211
50	25 to 800	28	75	52.3	20	<sup>+0.062</sup> <sub>0</sub>	30	28	42	9	24	42	18	53	M12 x 1.25	11	32	25	M20 x 1.5	57	33	1/2	74	29	134	191	7	67	248
63	25 to 800	36	90	64.3	20	<sup>+0.062</sup> <sub>0</sub>	30	36	50	13	30	39	17	68	M12 x 1.25	13	32	32	M27 x 2	55	33	1/2	80	29	136	200	12	71	265
80	25 to 800	45	115	82.7	28	<sup>+0.062</sup> <sub>0</sub>	40	45	60	9	41	46	20	76	M16 x 1.5	17	39	41	M33 x 2	66	40	3/4	93	34	159	229	15	77	308
100	25 to 1000	56	130	96.9	36	<sup>+0.062</sup> <sub>0</sub>	50	56	72	10	50	47	20	91	M16 x 1.5	19	54	52	M42 x 2	67	40	3/4	101	50	168	257	15	82	363

### Double clevis: CHSGCB



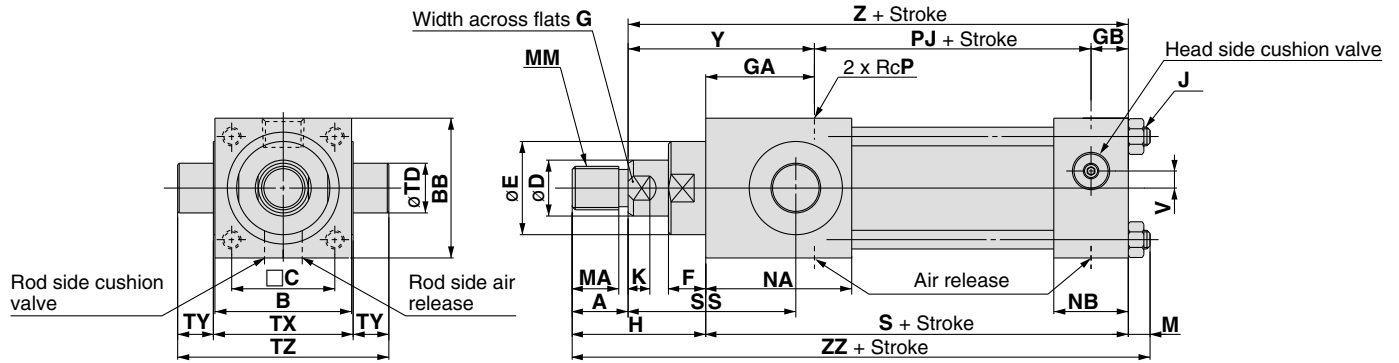
Bore size (mm)	Stroke range	A	B	C	CD	CX	CY	D	E	F	G	GA	GB	H	J	K	L	MA	MM	NA	NB	P	PJ	RR
32	25 to 800	18	45	33.2	12	16	32	18	30	12	14	35	12	43	M6 x 1	7	19	15	M14 x 1.5	46	23	1/4	56	17
40	25 to 800	22	63	41.7	14	20	43	22	34	12	19	37	18	47	M8 x 1	9	19	19	M16 x 1.5	51	32	3/8	73	17
50	25 to 800	28	75	52.3	20	30	60	28	42	9	24	42	18	53	M12 x 1.25	11	32	25	M20 x 1.5	57	33	1/2	74	29
63	25 to 800	36	90	64.3	20	30	60	36	50	13	30	39	17	68	M12 x 1.25	13	32	32	M27 x 2	55	33	1/2	80	29
80	25 to 800	45	115	82.7	28	40	80	45	60	9	41	46	20	76	M16 x 1.5	17	39	41	M33 x 2	66	40	3/4	93	34
100	25 to 1000	56	130	96.9	36	50	100	56	72	10	50	47	20	91	M16 x 1.5	19	54	52	M42 x 2	67	40	3/4	101	50

### Tolerances

Bore size (mm)	S	SS	V	Y	ZZ
32	103	147	5.5	60	182
40	128	172	6.5	62	211
50	134	191	7	67	248
63	136	200	12	71	265
80	159	229	15	77	308
100	168	257	15	82	363

Bore size (mm)	CD	
	H9	f8
32	<sup>+0.043</sup> <sub>0</sub>	-0.016 -0.043
40	<sup>+0.052</sup> <sub>0</sub>	-0.020 -0.053
50	<sup>+0.062</sup> <sub>0</sub>	-0.025 -0.064

**Rod trunnion: CHSGTA**



Bore size (mm)	Stroke range	A	B	BB	C	D	E	F	G	GA	GB	H	J	K	M	MA	MM	NA	NB	P	PJ	TD	TX	TZ	S	SS	V	Y	Z	ZZ
32	25 to 800	18	44	45	33.2	18	30	12	14	35	12	43	M6 × 1	7	7.5	15	M14 × 1.5	46	23	1/4	56	16	45	68	103	54	5.5	60	128	153.5
40	25 to 800	22	61	63	41.7	22	34	12	19	37	18	47	M8 × 1	9	10	19	M16 × 1.5	51	32	3/8	73	20	63	95	128	57	6.5	62	153	185
50	25 to 800	28	75	75	52.3	28	42	9	24	42	18	53	M12 × 1.25	11	12	25	M20 × 1.5	57	33	1/2	74	25	76	116	134	64	7	67	159	199
63	25 to 800	36	87	90	64.3	36	50	13	30	39	17	68	M12 × 1.25	13	12	32	M27 × 2	55	33	1/2	80	32	89	139	136	70	12	71	168	216
80	25 to 800	45	112	115	82.7	45	60	9	41	46	20	76	M16 × 1.5	17	16	41	M33 × 2	66	40	3/4	93	40	114	178	159	76	15	77	190	251
100	25 to 1000	56	125	130	96.9	56	72	10	50	47	20	91	M16 × 1.5	19	16	52	M42 × 2	67	40	3/4	101	50	127	207	168	71	15	82	203	275

CHQ

CHK

CHN

CHM

CHS

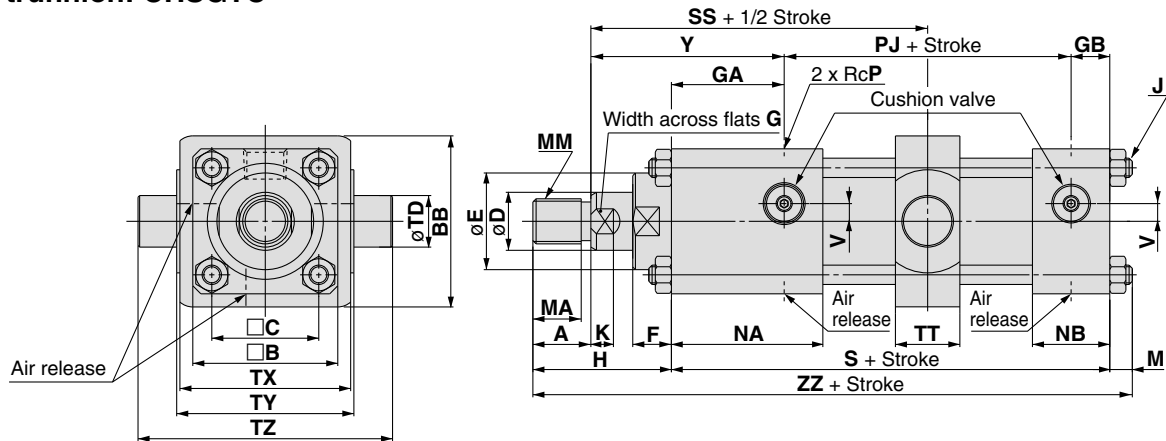
CH2

CHA

Related Equipment

D-

**Center trunnion: CHSGTC**



Bore size (mm)	Stroke range	A	B	BB	C	D	E	F	G	GA	GB	H	J	K	M	MA	MM	NA	NB	P	PJ	S	SS	TD	TT	TX	TY	TZ	V	Y	ZZ
32	25 to 800	18	45	57	33.2	18	30	12	14	35	12	43	M6 × 1	7	7.5	15	M14 × 1.5	46	23	1/4	56	103	88	16	20	53	55	79	5.5	60	153.5
40	25 to 800	22	63	65	41.7	22	34	12	19	37	18	47	M8 × 1	9	10	19	M16 × 1.5	51	32	3/8	73	128	98.5	20	26	72	76	108	6.5	62	185
50	25 to 800	28	75	75	52.3	28	42	9	24	42	18	53	M12 × 1.25	11	12	25	M20 × 1.5	57	33	1/2	74	134	104	25	29	88	89	129	7	67	199
63	25 to 800	36	90	90	64.3	36	50	13	30	39	17	68	M12 × 1.25	13	12	32	M27 × 2	55	33	1/2	80	136	111	32	36	90	100	150	12	71	216
80	25 to 800	45	115	115	82.7	45	60	9	41	46	20	76	M16 × 1.5	17	16	41	M33 × 2	66	40	3/4	93	159	123.5	40	44	123	127	191	15	77	251
100	25 to 1000	56	130	130	96.9	56	72	10	50	47	20	91	M16 × 1.5	19	16	52	M42 × 2	67	40	3/4	101	168	132.5	50	54	130	140	220	15	82	275

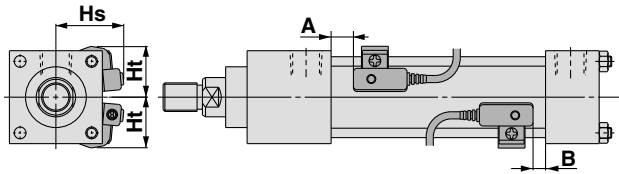
# Series CHSG Auto Switch Specifications

Refer to pages 347 to 406 for detailed specifications.

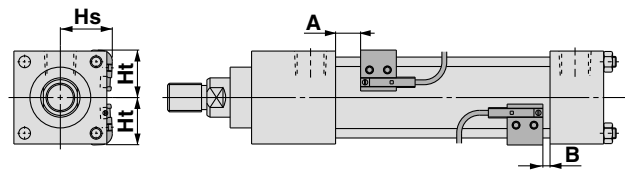


## Auto Switch Proper Mounting Position (Detection at Stroke End) and Its Mounting Height

D-A5□/A6□  
D-F5□(W)/J5□(W)/F5BAL



D-M9□/M9□V  
D-M9□W/M9□WV  
D-M9□AL/M9□AVL  
D-Z7□/Z80



### Proper Auto Switch Mounting Position

Bore size (mm)	D-M9□/M9□V D-M9□W/M9□WV D-M9□AL/M9□AVL		D-F5□/J5□ D-F5□W/J59W D-F59F D-F5BAL		D-F5NTL		D-Z7□/Z80		D-A5□/A6□		D-A59W	
	A	B	A	B	A	B	A	B	A	B	A	B
32	14	8	10.5	4.5	15.5	9.5	—	—	—	—	—	—
40	22.5	10.5	19	7	24	12	16	4	12.5	0.5	16.5	4.5
50	22.5	9.5	19	6	24	11	16	3	12.5	0	16.5	3.5
63	24.5	11.5	21	8	26	13	18	5	14.5	1.5	18.5	5.5
80	27.5	13.5	24	10	29	15	21	7	17.5	3.5	21.5	7.5
100	—	—	27.5	14.5	32.5	19.5	24.5	11.5	21	8	25	12

Note 1) D-M9□, M9□V, M9□W, M9□WV, M9□AL, M9□AVL cannot be mounted to ø100.  
Note 2) D-A5□, A6□, A59W, Z7□, Z80 cannot be mounted to ø32.  
Note 3) Adjust the auto switch after confirming the operating conditions in the actual setting.

### Auto Switch Mounting Height

Bore size (mm)	D-M9□/M9□V D-M9□W/M9□WV D-M9□AL/M9□AVL		D-M9□V/M9□WV D-M9□WV/M9□WV D-M9□AL/M9□AVL		D-F5□/J5□ D-F5□W/J59W D-F59F/F5BAL D-F5NTL		D-A5□/A6□ D-A59W		D-Z7□/Z80	
	Hs	Ht	Hs	Ht	Hs	Ht	Hs	Ht	Hs	Ht
32	25	23	31	23	32.5	25	—	—	—	—
40	29	28.5	34	28.5	36	30	38.5	30	29	28.5
50	37	36	41	36	41	37.5	43.5	37.5	37	36
63	43	42	47.5	42	46.5	43.5	49	43.5	42.5	42
80	54	54	55.5	54	57	56.5	59.5	56.5	54	54.5
100	—	—	—	—	66	64.5	69	64.5	62.5	61.5

Note 1) D-M9□, M9□V, M9□W, M9□WV, M9□AL, M9□AVL cannot be mounted to ø100.  
Note 2) D-A5□, A6□, A59W, Z7□, Z80 cannot be mounted to ø32.

## Operating Range

Auto switch model	Bore size (mm)					
	32	40	50	63	80	100
D-M9□/M9□V D-M9□W/M9□WV D-M9□AL/M9□AVL	4	4.5	5.5	7.5	8.5	—
D-F5□/J5□/F59F D-F5□W/J59W D-F5BAL/F5NTL	4	4.5	5	4	5.5	6.5
D-A5□/A6□	—	9	10	11	14	17.5
D-A59W	—	12.5	13	14.5	17.5	22
D-Z7□/Z80	—	8.5	9.5	10.5	14.5	19.5

\* D-M9□, M9□V, M9□W, M9□WV, M9□AL, M9□AVL cannot be mounted to ø100.  
\* D-A5□, A6□, A59W, Z7□, Z80 cannot be mounted to ø32.  
\* 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.

### Minimum Auto Switch Mounting Stroke

Auto switch model	Auto switch mounting number	Mounting bracket other than center trunnion	Center trunnion					
			32	40	50	63	80	100
D-M9□/M9□W	2 (Different surfaces and same surface), 1	20	85	95	100	105	115	—
	"n" pcs.	$20 + 40 \frac{(n-2)}{2}$ (n = 2, 4, 6, 8...)	$85 + 40 \frac{(n-4)}{2}$ (n = 4, 8, 12, 16...)	$95 + 40 \frac{(n-4)}{2}$ (n = 4, 8, 12, 16...)	$100 + 40 \frac{(n-4)}{2}$ (n = 4, 8, 12, 16...)	$105 + 40 \frac{(n-4)}{2}$ (n = 4, 8, 12, 16...)	$115 + 40 \frac{(n-4)}{2}$ (n = 4, 8, 12, 16...)	—
D-M9□V/M9□WV	2 (Different surfaces and same surface), 1	20	65	75	80	85	95	—
	"n" pcs.	$20 + 30 \frac{(n-2)}{2}$ (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...)	$85 + 30 \frac{(n-4)}{2}$ (n = 4, 8, 12, 16...)	$95 + 30 \frac{(n-4)}{2}$ (n = 4, 8, 12, 16...)	—
D-M9□AL	2 (Different surfaces and same surface), 1	25	100	115	120	125	135	—
	"n" pcs.	$25 + 40 \frac{(n-2)}{2}$ (n = 2, 4, 6, 8...)	$100 + 40 \frac{(n-4)}{2}$ (n = 4, 8, 12, 16...)	$115 + 40 \frac{(n-4)}{2}$ (n = 4, 8, 12, 16...)	$120 + 40 \frac{(n-4)}{2}$ (n = 4, 8, 12, 16...)	$125 + 40 \frac{(n-4)}{2}$ (n = 4, 8, 12, 16...)	$135 + 40 \frac{(n-4)}{2}$ (n = 4, 8, 12, 16...)	—
D-M9□AVL	2 (Different surfaces and same surface), 1	25	100	115	120	125	135	—
	"n" pcs.	$25 + 30 \frac{(n-2)}{2}$ (n = 2, 4, 6, 8...)	$100 + 30 \frac{(n-4)}{2}$ (n = 4, 8, 12, 16...)	$115 + 30 \frac{(n-4)}{2}$ (n = 4, 8, 12, 16...)	$120 + 30 \frac{(n-4)}{2}$ (n = 4, 8, 12, 16...)	$125 + 30 \frac{(n-4)}{2}$ (n = 4, 8, 12, 16...)	$135 + 30 \frac{(n-4)}{2}$ (n = 4, 8, 12, 16...)	—
D-F5□/J5□ D-F5□W/J59W D-F5BAL/F59F	2 (Different surfaces and same surface), 1	20	110	125	130	135	140	150
	"n" pcs.	$20 + 55 \frac{(n-2)}{2}$ (n = 2, 4, 6, 8...)	$110 + 55 \frac{(n-4)}{2}$ (n = 4, 8, 12, 16...)	$125 + 55 \frac{(n-4)}{2}$ (n = 4, 8, 12, 16...)	$130 + 55 \frac{(n-4)}{2}$ (n = 4, 8, 12, 16...)	$135 + 55 \frac{(n-4)}{2}$ (n = 4, 8, 12, 16...)	$140 + 55 \frac{(n-4)}{2}$ (n = 4, 8, 12, 16...)	$150 + 55 \frac{(n-4)}{2}$ (n = 4, 8, 12, 16...)
D-F5NTL	2 (Different surfaces and same surface), 1	25	125	140	145	150	155	165
	"n" pcs.	$25 + 55 \frac{(n-2)}{2}$ (n = 2, 4, 6, 8...)	$125 + 55 \frac{(n-4)}{2}$ (n = 4, 8, 12, 16...)	$140 + 55 \frac{(n-4)}{2}$ (n = 4, 8, 12, 16...)	$145 + 55 \frac{(n-4)}{2}$ (n = 4, 8, 12, 16...)	$150 + 55 \frac{(n-4)}{2}$ (n = 4, 8, 12, 16...)	$155 + 55 \frac{(n-4)}{2}$ (n = 4, 8, 12, 16...)	$165 + 55 \frac{(n-4)}{2}$ (n = 4, 8, 12, 16...)
D-A5□/A6□	2 (Different surfaces and same surface), 1	25	—	120	120	130	135	145
	"n" pcs.	$25 + 55 \frac{(n-2)}{2}$ (n = 2, 4, 6, 8...)	—	$120 + 55 \frac{(n-4)}{2}$ (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...)	$135 + 55 \frac{(n-4)}{2}$ (n = 4, 8, 12, 16...)	$145 + 55 \frac{(n-4)}{2}$ (n = 4, 8, 12, 16...)
D-A59W	2 (Different surfaces and same surface), 1	30	—	125	130	135	145	155
	"n" pcs.	$30 + 55 \frac{(n-2)}{2}$ (n = 2, 4, 6, 8...)	—	$125 + 55 \frac{(n-4)}{2}$ (n = 4, 8, 12, 16...)	$130 + 55 \frac{(n-4)}{2}$ (n = 4, 8, 12, 16...)	$135 + 55 \frac{(n-4)}{2}$ (n = 4, 8, 12, 16...)	$145 + 55 \frac{(n-4)}{2}$ (n = 4, 8, 12, 16...)	$155 + 55 \frac{(n-4)}{2}$ (n = 4, 8, 12, 16...)
D-Z7□/Z80	2 (Different surfaces and same surface), 1	25	—	95	100	105	115	125
	"n" pcs.	$25 + 40 \frac{(n-2)}{2}$ (n = 2, 4, 6, 8...)	—	$95 + 40 \frac{(n-4)}{2}$ (n = 4, 8, 12, 16...)	$100 + 40 \frac{(n-4)}{2}$ (n = 4, 8, 12, 16...)	$105 + 40 \frac{(n-4)}{2}$ (n = 4, 8, 12, 16...)	$115 + 40 \frac{(n-4)}{2}$ (n = 4, 8, 12, 16...)	$125 + 55 \frac{(n-4)}{2}$ (n = 4, 8, 12, 16...)

Note 1) D-M9□, M9□V, M9□W, M9□WV, M9□AL, M9□AVL cannot be mounted to ø100.  
 Note 2) D-A5□, A6□, A59W, Z7□, Z80 cannot be mounted to ø32.

CHQ

CHK□

CHN

CHM

CHS□

CH2□

CHA

Related Equipment

D-□

Besides the models listed in "How to Order," the following auto switches are applicable.  
 Refer to pages 347 to 406 for detailed auto switch specifications.

Auto switch type	Part no.	Electrical entry	Features
Solid state	D-M9NV, M9PV, M9BV	Grommet (perpendicular)	—
	D-M9NWV, M9PWV, M9BWW		Diagnostic indication (2-color display)
	D-M9NAVL, M9PAVL, M9BAVL		Water resistant (2-color display)
	D-F59, F5P, J59	Grommet (in-line)	—
	D-F59W, F5PW, J59W		Diagnostic indication (2-color display)
	D-F5BAL		Water resistant (2-color display)
Reed	D-F5NTL	Grommet (in-line)	With timer
	D-A53, A56		—
	D-A67		Without indicator light

\* Solid state auto switches are also available with pre-wired connector. Contact SMC for detailed auto switch specifications.  
 Refer to pages 389 and 390 for details.

# Series CHSG

## Auto Switch Mounting Brackets: Part Nos.

Auto switch models	Bore size (mm)					
	ø32	ø40	ø50	ø63	ø80	ø100
D-M9□/M9□V D-M9□W/M9□WV D-M9□AL/M9□AVL	BMB5-032	BA7-040	BA7-080	BA7-080	BS5-160	–
D-F5□/J5□ D-F5□W/J59W D-F5BAL/F59F/F5NTL D-A5□/A6□/A59W	BT-03	BT-04	BT-08	BT-08	BT-16	BT-16
D-Z7□/Z80	–	BMB4-050	BA4-080	BA4-080	BS4-160	BS4-160

Note 1) D-M9 cannot be mounted to ø100.

Note 2) D-A5□/A6□/A59W/Z7□/Z80 cannot be mounted to ø32.

### [Stainless steel mounting screw kits]

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

BBA1 : D-F5, J5, A5, A6

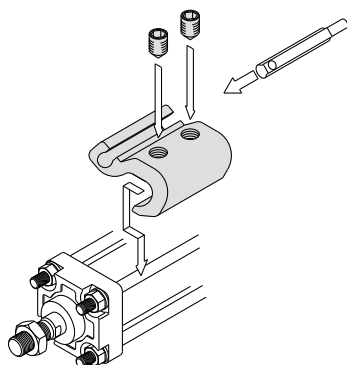
Note 3) Refer to the table below for details on BBA1.

### Stainless mounting screw kit details

Part no.	Contents				Applicable auto switch mounting bracket part nos.	Applicable auto switches
	No.	Description	Size	Pcs.		
BBA1	1	Auto switch mounting screws	M4 x 0.7 x 8L	1	BT-□□	D-A5, A6 D-F5, J5
	2	Set screw	M4 x 0.7 x 6L	2	BT-03, BT-04, BT-05 BT-06, BT-08, BT-12	
					BA4-040, BA4-063, BA4-080 BMB4-032, BMB4-050	D-Z7, Z8 D-Y5, Y6, Y7
	3	Set screw	M4 x 0.7 x 8L	2	BMB5-032 BA7-040, BA7-063, BA7-080	D-A9 D-M9
					BT-16, BT-18A, BT-20	D-A5, A6 D-F5, J5
					BS4-125, BS4-160 BS4-180, BS4-200	D-Z7, Z8 D-Y5, Y6, Y7
					BS5-125, BS5-160 BS5-180, BS5-200	D-A9 D-M9

When D-F5BAL auto switch is shipped mounted on a cylinder, the above stainless steel screws are used. Also when switches are shipped separately, BBA1 is included.

Note 4) When using D-M9□A(V)L, order stainless mounting screw kit BBA1 instead of the iron auto switch mounting brackets (BMB5-032, BA7-□□□, BS5-160) in the table above, and use the M4 x 6L stainless set screws included.



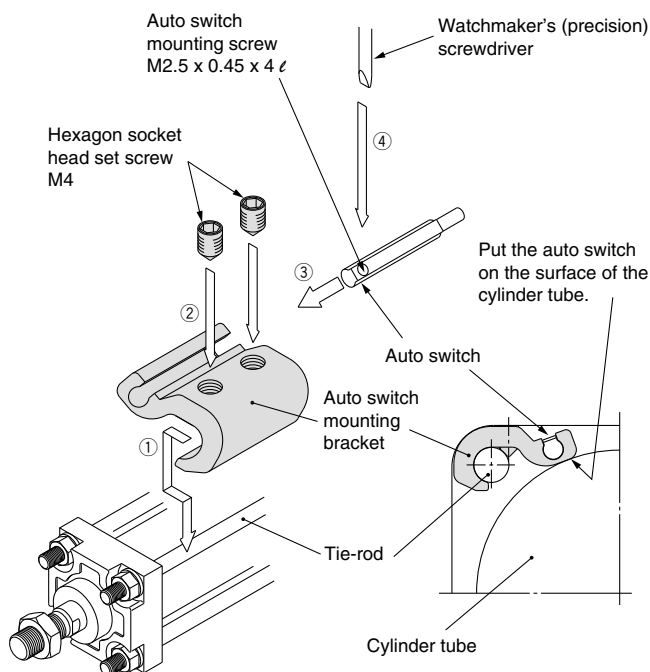
• Mounting example for D-M9□(V), M9□W(V), M9□A(V)L.



## How to Mount and Move the Auto Switch

### <Applicable auto switch>

Solid state ..... D-M9N(V), D-M9P(V), D-M9B(V)  
D-M9NW(V), D-M9PW(V), D-M9BW(V)  
D-M9NA(V), D-M9PA(V), D-M9BA(V)



1. Fix it to the detecting position with a set screw by installing an auto switch mounting bracket in cylinder tie-rod and letting the bottom surface of an auto switch mounting bracket contact the cylinder tube firmly.
2. Fix it to the detecting position with a hexagon socket head set screw (M4).  
(Use a hexagon wrench.)
3. Fit an auto switch into the auto switch mounting groove to set it roughly to the mounting position for an auto switch.
4. After confirming the detecting position, tighten up the mounting screw (M2.5) attached to an auto switch, and secure the auto switch.
5. When changing the detecting position, carry out in the state of 3.

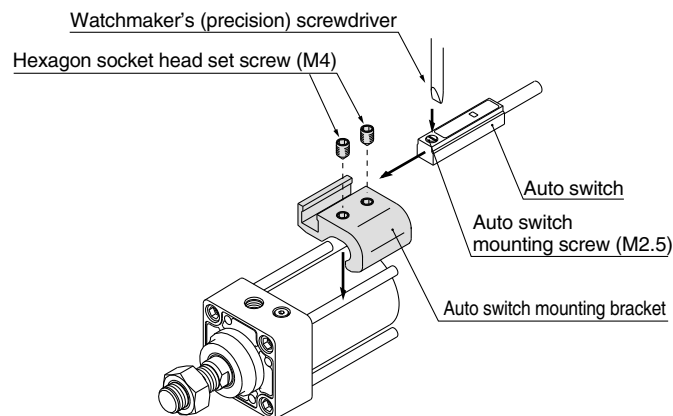
Note 1) To protect auto switches, ensure that main body of an auto switch should be embedded into auto switch mounting groove with a depth of 15 mm or more.

Note 2) Set the tightening torque of a hexagon socket head set screw (M4) to be 1 to 1.2 N·m.

Note 3) When tightening an auto switch mounting screw (M2.5), use a watchmaker's screwdriver with a grip diameter of 5 to 6 mm. Also, set the tightening torque to be 0.05 to 0.15 N·m. As a guide, turn 90° from the position where it comes to feel tight.

### <Applicable auto switch>

Reed ..... D-Z73, D-Z76, D-Z80



1. Fix it to the detecting position with a hexagon socket head set screw (M4) by installing an auto switch mounting bracket in cylinder tie-rod and letting the bottom surface of an auto switch mounting bracket contact the cylinder tube firmly. (Use a hexagon wrench)
2. Fit an auto switch into the auto switch mounting groove to set it roughly to the auto switch mounting position for an auto switch.
3. After confirming the detecting position, tighten up the mounting screw (M2.5) attached to an auto switch, and secure the switch.
4. When changing the detecting position, carry out in the state of 2.

Note 1) To protect auto switches, ensure that main body of an auto switch should be embedded into auto switch mounting groove with a depth of 15 mm or more.

Note 2) Set the tightening torque of a hexagon socket head set screw (M4) to be 1 to 1.2 N·m.

Note 3) When tightening an auto switch mounting screw (M2.5), use a watchmaker's screwdriver with a grip diameter of 5 to 6 mm. Also, set the tightening torque to be 0.05 to 0.15 N·m. As a guide, turn 90° from the position where it comes to feel tight.

CHQ

CHK

CHN

CHM

CHS

CH2

CHA

Related Equipment

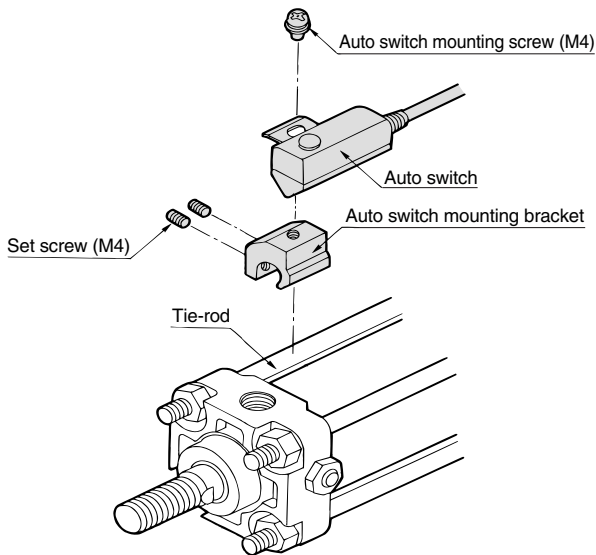
D-

## How to Mount and Move the Auto Switch

---

### <Applicable auto switch>

- Solid state ..... D-F59, D-F5P  
D-J59, D-J51, D-F5BAL  
D-F59W, D-F5PW, D-J59W  
D-F59F, D-F5NTL
- Reed ..... D-A53, D-A54, D-A56, D-A64, D-A67  
D-A59W



1. Fix the auto switch on the auto switch mounting bracket with the auto switch mounting screw (M4) and install the set screw.
2. Fit the auto switch mounting bracket into the cylinder tie-rod and then fix the auto switch at the detecting position with the hexagonal wrench. (Be sure to put the auto switch on the surface of cylinder tube.)
3. When changing the detecting position, loosen the set screw to move the auto switch and then re-fix the auto switch on the cylinder tube. (Tightening torque of M4 screw should be 1 to 1.2 N·m.)

# JIS Standard Hydraulic Cylinder

## Series CH2E/CH2F/CH2G/CH2H

### Series CH2E



Nominal pressure: **3.5 MPa**

Bore size (mm): 32, 40, 50, 63, 80, 100

### Series CH2F



Nominal pressure: **7 MPa**

Bore size (mm): 32, 40, 50, 63, 80, 100

### Series CH2G/CH2H



Nominal pressure: **14 MPa**

Bore size (mm): 32, 40, 50, 63, 80, 100

CHQ

CHK

CHN

CHM

CHS

CH2

CHA

Related  
Equipment

D-

# JIS Standard Hydraulic Cylinder Double Acting/Single Rod

## Series CH2E/CH2F/CH2G/CH2H

ø32, ø40, ø50, ø63, ø80, ø100

3.5 MPa  
7 MPa  
14 MPa

### How to Order

**Series type**

Symbol	Tubing material	Nominal pressure
E	Aluminum alloy	3.5 MPa
F	Stainless steel	7 MPa
G	Steel	14 MPa
H	Stainless steel	14 MPa

**Rod size series**

B	B-series rod size
C	C-series rod size
* ø32 is for B-series rod size only.	

**Cylinder stroke (mm)**  
Refer to the standard stroke table on page 275.  
Refer to page 294 for minimum stroke with auto switch.

**With Auto Switch (built-in magnet)**

**Series type**

Symbol	Tube material	Nominal pressure
E	Aluminum alloy	3.5 MPa
F	Stainless steel	7 MPa
H	Stainless steel	14 MPa

**Mounting style**

B	Basic style	
LA	Transaxial foot style	
LB	Axial foot style	For 3.5 & 7 MPa
FA	Rod rectangular flange style	For 3.5 & 7 MPa
FB	Head rectangular flange style	For 3.5 & 7 MPa
FY	Rod rectangular flange style	For 14 MPa
FZ	Head rectangular flange style	For 14 MPa
FC	Rod square flange style	
FD	Head square flange style	
CA	Single clevis style	
CB	Double clevis style	
TC	Center trunnion style	

**Bore size**

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

**Port and cushion valve positions**  
\* Refer to page 275.

**Cylinder options**

Rod end nut	Nil	Without rod end nut
	A	With rod end nut
Rod boot	Nil	Without rod boot
	J	Nylon tarpaulin
	K	Neoprene cloth
Cushion	Nil	With double-side cushion
	N	Without cushion
	R	With rod cushion
	H	With head cushion

**Made to order specifications**  
For details, refer to page 275.

**Number of auto switches**

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

**Auto switch type**

Nil	Without auto switch
* Select applicable auto switches from the table below.	

**Applicable Auto Switches:** Refer to pages 347 to 406 for further details on each auto switch.

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 mount		Band mount	0.5 (Nil)	1 (M)	3 (L)	5 (Z)			None									
							ø32	ø40 to ø100									ø32	ø40 to ø100							
Solid state auto switch	—	Grommet	—	3-wire (NPN)	24 V	5 V, 12 V	—	—	M9N	●	●	●	○	—	○	IC circuit									
								F59	G59	●	●	●	○	—	○										
				—	M9P	●	●	●	○	—	○	—	○												
		2-wire		12 V	—	—	—	—	—	—	—	—	—	—	—										
		—		—	100 V, 200 V	J59	K59	●	—	●	○	—	○	—	—										
		—		—	—	J51	—	●	—	●	○	—	○	—	—										
	Diagnostic indication (2-color display)	Terminal conduit	Grommet	Yes	3-wire (NPN)	24 V	5 V, 12 V	—	—	G39	—	—	—	—	●	—	IC circuit								
									—	K39	—	—	—	—	●	—	—	—	—						
					2-wire	12 V	—	—	—	—	—	—	—	—	—	—	—	—							
		Grommet			3-wire (NPN)	24 V	5 V, 12 V	—	—	—	—	M9NW	—	●	●	●	○	—	○	IC circuit					
											F59W	G59W	●	—	●	○	—	○	—	○	—	—			
											—	M9PW	—	●	●	●	○	—	○	—	○	—	—		
Water resistant (2-color display)	Grommet	3-wire (PNP)	24 V	12 V	—	—	—	—	M9BW	—	●	●	●	○	—	○	—								
								F5PW	G5PW	●	—	●	○	—	○	—	○	—	—						
								—	M9BW	—	●	●	●	○	—	○	—	○	—	—					
Diagnostic output (2-color display)	Grommet	3-wire (NPN)	24 V	5 V, 12 V	—	—	—	—	M9NA	—	○	○	●	○	—	○	IC circuit								
								—	M9PA	—	○	○	●	○	—	○	—	○	—	—					
								—	M9BA	—	○	○	●	○	—	○	—	○	—	—					
Reed auto switch	—	Grommet	Yes	3-wire (NPN equiv.)	24 V	12 V	—	—	A96*	—	●	—	●	—	—	—	IC circuit								
								—	A93*	—	●	—	●	—	—	—	—	—	—						
				No	100 V	—	A90*	—	●	—	●	—	—	—	—	—	—								
				Yes	100 V or less	—	A90*	—	●	—	●	—	—	—	—	—	—	—							
				No	100 V, 200 V	A54	B54	●	—	●	—	—	—	—	—	—	—	—							
		Terminal conduit		Grommet	Yes	2-wire	24 V	12 V	—	—	—	—	—	—	—	—	—	—	—	—					
											—	—	—	A33	—	—	—	—	—	—	—	—	—		
											—	—	—	A34	—	—	—	—	—	—	—	—	—	—	
											—	—	—	A44	—	—	—	—	—	—	—	—	—	—	—
											—	—	—	A44	—	—	—	—	—	—	—	—	—	—	—
DIN terminal	Grommet	Yes	2-wire	24 V	12 V	—	—	—	—	—	—	—	—	—	—	—	—								
								—	—	—	A44	—	—	—	—	—	—	—	—	—					
Diagnostic indication (2-color display)	Grommet	Yes	2-wire	24 V	12 V	—	—	A59W	B59W	●	—	●	—	—	—	—	—								
								—	—	—	—	—	—	—	—	—	—	—	—	—	—				

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

\* Solid state auto switches marked "○" are produced upon receipt of order.  
\* Auto switch models D-A9□ and D-AP□ cannot be mounted on CHD2E, CHD2H of all bore sizes and CHD2Fø32.

\* Since there are applicable auto switches other than listed, refer to page 296 for details.  
\* For details about auto switches with pre-wired connector, refer to pages 389 and 390.  
\* D-A9□, M9□, M9□W, M9□AL auto switches are shipped together. (not assembled). (Only the auto switch mounting bracket is pre-assembled.)

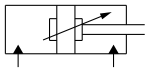
# JIS Standard Hydraulic Cylinder Double Acting/Single Rod **Series CH2E/CH2F/CH2G/CH2H**



**Made to order specifications**  
(For details, refer to page 298)

Symbol	Specifications
-XA□	Change of rod end shape

JIS symbol



## Rod Sizes

		(mm)					
Bore size (mm)		32	40	50	63	80	100
Rod size series *		18	22.4	28	35.5	45	56
B-series		18	22.4	28	35.5	45	56
C-series		—	18	22.4	28	35.5	45

\* Based on JIS B8367.

## Accessories (Optional)

Single knuckle, Double knuckle, Lock nut, Knuckle pin, Rod boot (Nylon tarpaulin, Neoprene cloth) *Note*

*Note*) Maximum operating temperature:  
Nylon tarpaulin (60°C),  
Neoprene cloth (110°C)

## Hydraulic Fluid Compatibility

Hydraulic fluid	Compatibility
Standard mineral hydraulic fluid	Compatible
W/O hydraulic fluid	Compatible
O/W hydraulic fluid	Compatible
Water/Glycol hydraulic fluid	*
Phosphate hydraulic fluid	Not compatible

\* Consult with SMC.

## Cushion Strokes

		(mm)					
Bore size (mm)		32	40	50	63	80	100
Effective cushion stroke		16	16	17	16	20	23

(Front and rear sides)

## Models

Model	CH2E	CH2F	CH2G	CH2H
Tube material	Aluminum alloy	Stainless steel	Steel	Stainless steel
Nominal pressure (MPa)	3.5	7	14	14
Bore size (mm)	32, 40, 50, 63, 80, 100			
Auto switch mounting	Applicable	Applicable	—	Applicable

## Specifications

Model	CH2E	CH2F	CH2G	CH2H
Action	Double acting/Single rod			
Fluid	Hydraulic fluid			
Nominal pressure (MPa)	3.5	7	14	14
Maximum allowable pressure (MPa)	3.5	Head: 9 Rod: B rod 13.5 : C rod 11	Head: 18 Rod: B rod 18 : C rod 14	14
Proof pressure (MPa)	5.0	10.5	21	21
Minimum operating pressure (MPa)	Head: 0.15 Rod: 0.2			
Ambient and fluid temperature	Without auto switch: -10 to 80°C With auto switch: -10 to 60°C			
Piston speed	8 to 300 mm/s			
Cushion	Cushion seal type			
Stroke length tolerance	to 100 st $^{+0.8}_0$ , 101 to 250 st $^{+1.0}_0$ , 251 to 630 st $^{+1.25}_0$ , 631 to 1000 st $^{+1.4}_0$ , 1001 to 1800 st $^{+1.8}_0$			

*Note*) Refer to page 134 for definitions of terms related to pressure.

## Standard Strokes

Cylinder bore size (mm)	Standard strokes (mm)	Long stroke (mm)
32, 40, 50	25 to 800	1800 (1401 or more with tie-rod reinforcing ring) <i>Note</i> 2)
63	25 to 800	1800 (1501 or more with tie-rod reinforcing ring) <i>Note</i> 3)
80, 100	25 to 1000	1800

*Note* 1) Refer to the stroke selection Table in Technical Data 2, starting with pages 151 and 152, to determine stroke limitation depending on the type of mounting brackets that will be used. Then make your selection. Long stroke ranges also differ depending on the type of mounting brackets.

*Note* 2) The long stroke range for Series CH2E, CH2F, and CH2H with flange and clevis type mounting brackets as well as Series CH2G is up to 1400mm.

*Note* 3) The long stroke range for Series CH2E, CH2F, and CH2H with flange and clevis type mounting brackets as well as Series CH2G is up to 1500mm.

## Port and Cushion Valve Positions

Symbol Position Mounting style	Nil	A	C	D	E	F	G	H
	Port: Top Cushion valve: Right	Port: Right Cushion valve: Bottom	Port: Left Cushion valve: Top	Port: Top Cushion valve: Left	Port: Top Cushion valve: Bottom	Port: Right Cushion valve: Top	Port: Right Cushion valve: Left	Port: Left Cushion valve: Right
<b>B</b> (Basic style)								
<b>FA, FB, FC, FD, FY, FZ</b> (Flange style) <b>CA, CB</b> (Single clevis style) <b>TC</b> (Center trunnion style)								
<b>LA, LB</b> (Foot style)								

: Piping port : Cushion valve

\* The cylinder's exterior dimensions represented here are as seen from the rod end of the cylinder.

# Series CH2E/CH2F/CH2G/CH2H

## Mass

Unit: kg

Mounting style		Standard mass (0 stroke)										
		B	LA	FY, FZ	FC, FD	CA	CB	TC	LB	FA, FB	Additional mass (per 10 mm stroke)	
Bore size (mm)	Series	Basic	Transaxial foot	Rectangular flange	Square flange	Single clevis	Double clevis	Center trunnion style	Axial foot	Rectangular flange (7 MPa)		
	B-series rod	32	CH2E	2.50	3.49	—	3.35	2.95	3.06	2.99	3.00	2.94
CH2F			2.49	3.48	—	3.34	2.94	3.05	2.98	2.99	2.93	0.04
CH2G			2.59	3.58	3.12	3.44	3.04	3.15	3.08	—	—	0.06
CH2H			2.60	3.59	3.13	3.45	3.05	3.16	3.09	—	—	0.05
40		CH2E	3.27	4.57	—	4.36	3.91	4.12	3.86	3.85	3.86	0.08
		CH2F	3.33	4.63	—	4.42	3.97	4.18	3.92	3.91	3.92	0.08
		CH2G	3.66	4.96	4.36	4.75	4.30	4.51	4.25	—	—	0.10
		CH2H	3.55	4.85	4.25	4.64	4.19	4.40	4.14	—	—	0.10
50		CH2E	4.90	7.50	—	6.86	6.06	6.07	5.74	5.70	5.98	0.09
		CH2F	4.98	7.58	—	6.94	6.14	6.15	5.82	5.78	6.06	0.10
		CH2G	5.49	8.09	6.98	7.45	6.65	6.66	6.33	—	—	0.14
		CH2H	5.32	7.92	6.81	7.28	6.48	6.49	6.16	—	—	0.14
63		CH2E	7.93	11.81	—	10.83	10.67	10.68	9.47	9.55	9.54	0.17
		CH2F	7.69	11.57	—	10.59	10.43	10.44	9.23	9.31	9.30	0.17
		CH2G	8.49	12.37	10.64	11.39	11.23	11.24	10.03	—	—	0.20
		CH2H	8.43	12.31	10.58	11.33	11.17	11.18	9.97	—	—	0.20
80		CH2E	13.00	18.35	—	17.59	16.40	16.40	15.02	15.36	15.69	0.24
		CH2F	12.89	18.24	—	17.48	16.29	16.29	14.91	15.25	15.58	0.26
		CH2G	14.77	20.12	18.34	19.36	18.17	18.17	16.79	—	—	0.34
		CH2H	14.21	19.56	17.78	18.80	17.61	17.61	16.23	—	—	0.30
100	CH2E	18.97	29.78	—	26.44	25.15	25.15	22.62	22.39	23.57	0.41	
	CH2F	19.37	30.17	—	26.84	25.55	25.55	23.02	22.79	23.97	0.46	
	CH2G	22.17	32.98	28.62	29.64	28.35	28.35	25.82	—	—	0.49	
	CH2H	21.81	32.62	28.26	29.28	27.99	27.99	25.46	—	—	0.54	

Mounting style		Standard mass (0 stroke)										
		B	LA	FY, FZ	FC, FD	CA	CB	TC	LB	FA, FB	Additional mass (per 10 mm stroke)	
Bore size (mm)	Series	Basic	Transaxial foot	Rectangular flange	Square flange	Single clevis	Double clevis	Center trunnion style	Axial foot	Rectangular flange (7 MPa)		
	C-series rod	40	CH2E	3.19	4.49	—	4.28	3.83	4.04	3.78	3.77	3.78
CH2F			3.25	4.55	—	4.34	3.89	4.10	3.84	3.83	3.84	0.07
CH2G			3.58	4.88	4.28	4.67	4.22	4.43	4.17	—	—	0.09
CH2H			3.47	4.77	4.17	4.56	4.11	4.32	4.06	—	—	0.09
50		CH2E	4.74	7.34	—	6.70	5.90	5.91	5.58	5.54	5.82	0.07
		CH2F	4.82	7.42	—	6.78	5.98	5.99	5.66	5.62	5.90	0.08
		CH2G	5.33	7.93	6.82	7.29	6.49	6.50	6.17	—	—	0.12
		CH2H	5.16	7.76	6.65	7.12	6.32	6.33	6.00	—	—	0.12
63		CH2E	7.62	11.50	—	10.52	10.36	10.37	9.16	9.24	9.23	0.14
		CH2F	7.39	11.27	—	10.29	10.13	10.14	8.93	9.01	9.00	0.14
		CH2G	8.19	12.07	10.34	11.09	10.93	10.94	9.73	—	—	0.17
		CH2H	8.13	12.01	10.28	11.03	10.87	10.88	9.67	—	—	0.17
80		CH2E	12.56	17.91	—	17.15	15.96	15.96	14.58	14.92	15.25	0.18
		CH2F	12.45	17.80	—	17.04	15.85	15.85	14.47	14.81	15.14	0.21
		CH2G	14.32	19.67	17.89	18.91	17.72	17.72	16.34	—	—	0.28
		CH2H	13.77	19.12	17.34	18.36	17.17	17.17	15.79	—	—	0.25
100		CH2E	17.91	28.72	—	25.38	24.09	24.09	21.56	21.33	22.51	0.29
		CH2F	18.31	29.12	—	25.78	24.49	24.49	21.96	21.73	22.91	0.30
		CH2G	21.11	31.92	27.56	28.58	27.29	27.29	24.76	—	—	0.42
		CH2H	20.75	31.56	27.20	28.22	26.93	26.93	24.40	—	—	0.38

## Theoretical Output

Unit: N

	Bore size (mm)	Rod size (mm)	Operating direction	Piston area (mm <sup>2</sup> )	Operating pressure (MPa)					
					1	3.5	5	7	10	14
B-series rod	32	18	OUT	804	804	2813	4019	5627	8038	11254
			IN	550	550	1923	2748	3847	5495	7693
	40	22.4	OUT	1256	1256	4396	6280	8792	12560	17584
			IN	862	862	3017	4311	6035	8621	12070
	50	28	OUT	1963	1963	6869	9813	13738	19625	27475
			IN	1347	1347	4715	6735	9429	13471	18859
	63	35.5	OUT	3116	3116	10905	15578	21810	31157	43619
			IN	2126	2126	7442	10632	14885	21264	29769
	80	45	OUT	5024	5024	17584	25120	35168	50240	70336
			IN	3434	3434	12020	17172	24041	34344	48081
	100	56	OUT	7850	7850	27475	39250	54950	78500	109900
			IN	5388	5388	18859	26941	37718	53882	75435
C-series rod	40	18	OUT	1256	1256	4396	6280	8792	12560	17584
			IN	1002	1002	3506	5008	7012	10017	14023
	50	22.4	OUT	1963	1963	6869	9813	13738	19625	27475
			IN	1569	1569	5490	7843	10980	15686	21961
	63	28	OUT	3116	3116	10905	15578	21810	31157	43619
			IN	2500	2500	8751	12501	17502	25002	35003
	80	35.5	OUT	5024	5024	17584	25120	35168	50240	70336
			IN	4035	4035	14121	20174	28243	40347	56486
	100	45	OUT	7850	7850	27475	39250	54950	78500	109900
			IN	6260	6260	21911	31302	43823	62604	87645

## Water Resistant Hydraulic Cylinder

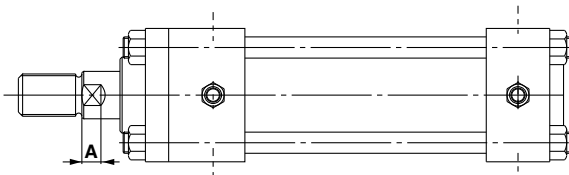
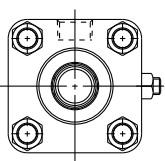
CHD2F **Mounting** **Bore size** **Rod series** **R** - **Stroke** **Cylinders options** - **Port position** - **F5BAL**

• With auto switch (Built-in magnet)  
 • Water resistant cylinder  
 • Water resistant solid state auto switch with 2-color display

<b>R</b>	NBR Seal (Nitrile rubber)
<b>V</b>	FKM Seal (Fluororubber)

\* Piston seals are NBR for both types R and V.

\* Stainless steel for the piston rod is a special order.



## Specifications

<b>Action</b>	Double acting/Single rod
<b>Cylinder bore size (mm)</b>	32, 40, 50, 63, 80, 100
<b>Cushion</b>	Cushion seal
<b>Auto switch mounting</b>	Tie-rod mounting

\* Specifications other than those above are the same as double acting/single rod specifications.

Bore size (mm)	B-series rod	
	<b>A</b>	
32	—	
40	—	
50	—	
63	—	
80	13.5	
100	14.5	

\* Other dimensions are the same as those for the double acting/single rod standard type.

CHQ

CHK

CHN

CHM

CHS

CH2

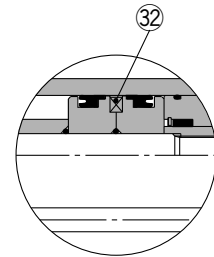
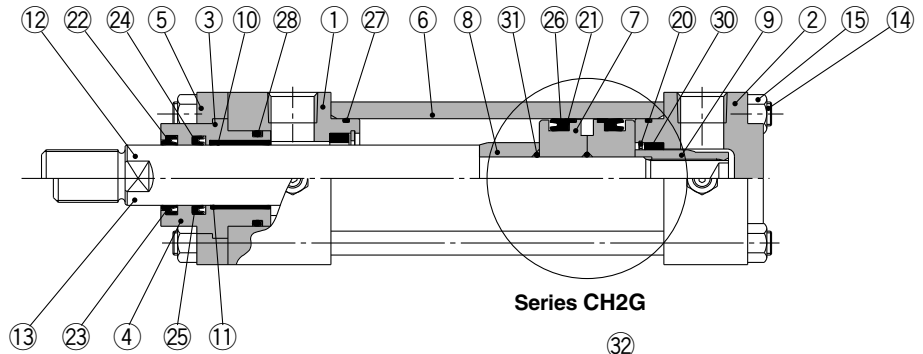
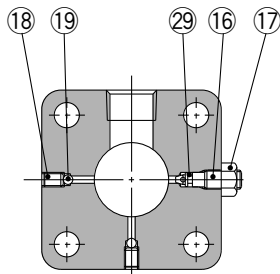
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Related Equipment

D-

# Series CH2E/CH2F/CH2G/CH2H

## Construction



### Parts List

No.	Description	Material	Note
1	Rod cover	Carbon steel	Metallic painted
2	Head cover	Carbon steel	Metallic painted
3	Seal holder (B-series rod)	Carbon steel	Metallic painted
4	Seal holder (C-series rod)	Carbon steel	Metallic painted
5	Retainer	Carbon steel	Metallic painted
6	Cylinder tube	CH2E Aluminum alloy	Hard anodized
		CH2F Stainless steel	
		CH2G Carbon steel	Metallic painted
		CH2H Stainless steel	
7	Piston	CH2E Aluminum alloy	
		CH2F Aluminum alloy	
		CH2G Stainless steel	
		CH2H Stainless steel	
8	Cushion ring	Rolled steel	
9	Cushion ring nut	Rolled steel	
10	Bushing (B-series rod)	Copper alloy	
11	Bushing (C-series rod)	Copper alloy	
12	Piston rod (B-series rod)	Carbon steel	Hard chromium electroplated
13	Piston rod (C-series rod)	Carbon steel	Hard chromium electroplated
14	Tie-rod	Carbon steel	
15	Tie-rod nut	Carbon steel	
16	Cushion valve	Alloy steel	
17	Lock nut	Carbon steel	
18	Air release valve	Alloy steel	
19	Check ball	Bearing steel	
20	Retaining ring	Carbon tool steel	
21	Back-up ring	Resin	
22	Scraper (B-series rod)	NBR	
23	Scraper (C-series rod)	NBR	
24	Rod seal (B-series rod)	NBR	
25	Rod seal (C-series rod)	NBR	
26	Piston seal	NBR	
27	Cylinder tube gasket	NBR	
28	Holder gasket	NBR	
29	Cushion valve seal	NBR	
30	Cushion seal	—	
31	Piston gasket	NBR	
32	Magnet	—	

### Replacement Parts: Seal Kit

Bore size (mm)	Seal kit no.		Content
	B-series rod	C-series rod	
32	CH2E32B-PS	CH2E40C-PS	Nos. ⑳ through ㉓ from the chart at left
	CH2F32B-PS		
	CH2G32B-PS		
	CH2H32B-PS		
40	CH2E40B-PS	CH2E40C-PS	
	CH2F40B-PS	CH2F40C-PS	
	CH2G40B-PS	CH2G40C-PS	
	CH2H40B-PS	CH2H40C-PS	
50	CH2E50B-PS	CH2E50C-PS	
	CH2F50B-PS	CH2F50C-PS	
	CH2G50B-PS	CH2G50C-PS	
	CH2H50B-PS	CH2H50C-PS	
63	CH2E63B-PS	CH2E63C-PS	
	CH2F63B-PS	CH2F63C-PS	
	CH2G63B-PS	CH2G63C-PS	
	CH2H63B-PS	CH2H63C-PS	
80	CH2E80B-PS	CH2E80C-PS	
	CH2F80B-PS	CH2F80C-PS	
	CH2G80B-PS	CH2G80C-PS	
	CH2H80B-PS	CH2H80C-PS	
100	CH2E100B-PS	CH2E100C-PS	
	CH2F100B-PS	CH2F100C-PS	
	CH2G100B-PS	CH2G100C-PS	
	CH2H100B-PS	CH2H100C-PS	

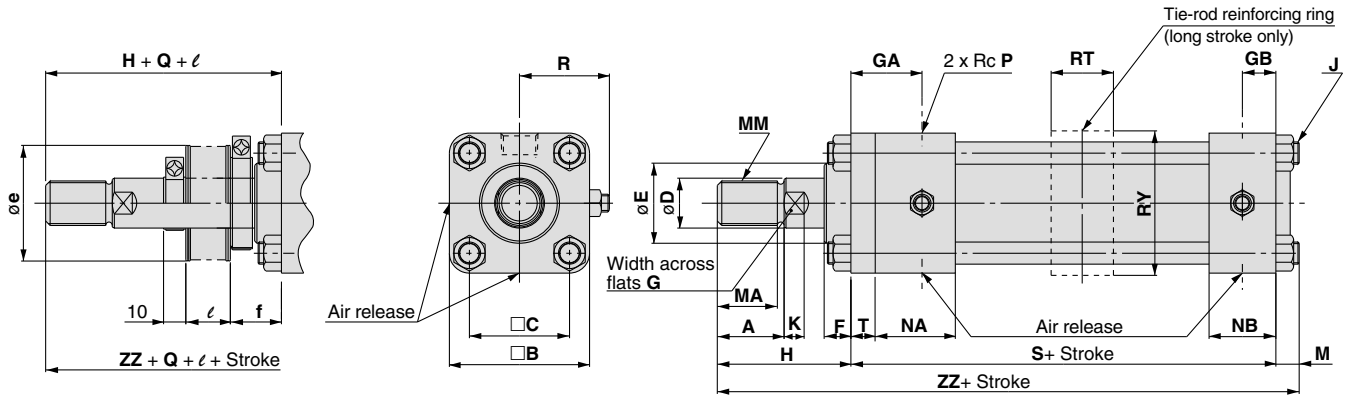
\* Seal kit consists of items ㉑ through ㉓ and can be ordered by using the seal kit number for each bore size.



# JIS Standard Hydraulic Cylinder Double Acting/Single Rod Series CH2E/CH2F/CH2G/CH2H

## Dimensions

Basic style: CH2EB, CH2FB, CH2GB, CH2HB



### Long stroke (with tie-rod reinforcing ring)

Bore size (mm)	Stroke range* (mm)	RT	RY
32	1401 to 1800	28	58
40	1401 to 1800	28	65
50	1401 to 1800	33	75
63	1501 to 1800	43	90
80	—	—	—
100	—	—	—

\* Applicable to Series CH2E, CH2F and CH2H. Contact SMC regarding the Series CH2G with the above strokes.

Bore size (mm)	Stroke range (mm)	B	C	F	GA	GB	J	M	NA	NB	P	R	S	T	With rod boot (mm)					
															e		f	Q	l	
															B-rod	C-rod			B-rod	C-rod
32	25 to 1400	58	38	16	32	15	M10 x 1.25	11	37	31	3/8	39	141	11	52	—	21.5	15	—	—
40	25 to 1400	65	45	12	32	15	M10 x 1.25	11	36	30	3/8	42	141	11	52	52	12	15	1/3.5 stroke	—
50	25 to 1400	76	52	15	40	19	M10 x 1.25	11	43	35	1/2	46	155	13	55	52	15	15	—	—
63	25 to 1500	90	63	15	42	19	M12 x 1.5	14	43	35	1/2	52	163	15	65	55	15	20	—	—
80	25 to 1800	110	80	17	40	22	M16 x 1.5	16	44	44	3/4	65	184	18	80	65	17	20	1/4 stroke	—
100	25 to 1800	135	102	19	42	22	M18 x 1.5	18	44	44	3/4	75	192	20	100	80	19	15	—	—

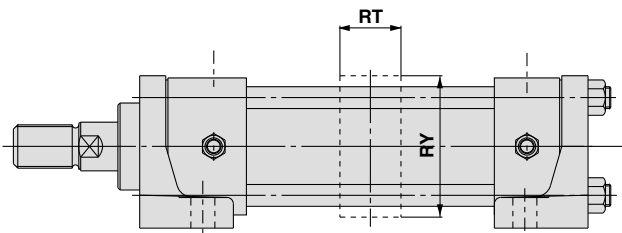
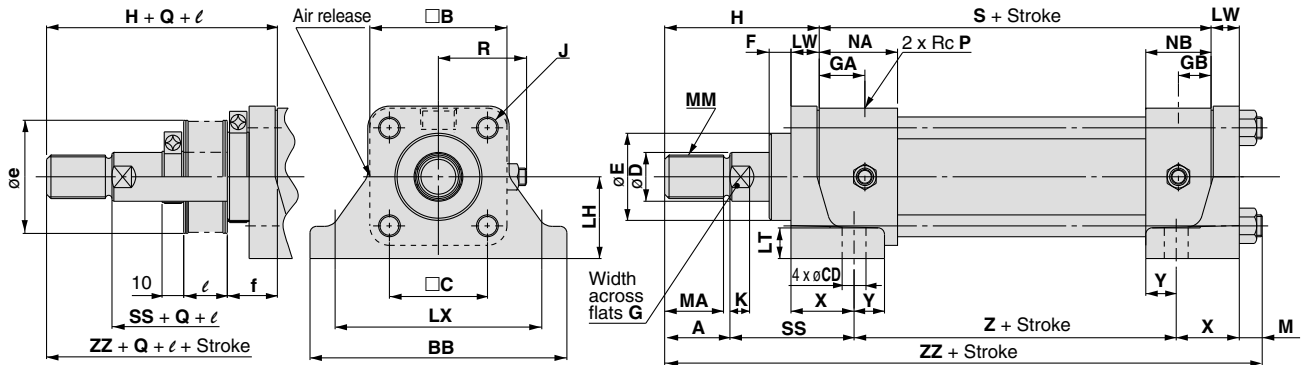
### Rod series

Bore size (mm)	B-series rod										C-series rod									
	MM	A	MA	D	E	K	G	H	ZZ	MM	A	MA	D	E	K	G	H	ZZ		
32	M16 x 1.5	25	22	18	34	7	14	55	207	—	—	—	—	—	—	—	—	—		
40	M20 x 1.5	30	27	22.4	40	9	19	60	212	M16 x 1.5	25	22	18	36	7	14	55	207		
50	M24 x 1.5	35	32	28	46	11	24	65	231	M20 x 1.5	30	27	22.4	40	9	19	60	226		
63	M30 x 1.5	45	42	35.5	55	13	30	80	257	M24 x 1.5	35	32	28	46	11	24	70	247		
80	M39 x 1.5	60	57	45	65	15	41	95	295	M30 x 1.5	45	42	35.5	55	13	30	80	280		
100	M48 x 1.5	75	72	56	80	16	50	115	325	M39 x 1.5	60	57	45	65	15	41	100	310		

# Series CH2E/CH2F/CH2G/CH2H

## Dimensions

Transaxial foot style: CH2ELA, CH2FLA, CH2GLA, CH2HLA



### Long stroke (with tie-rod reinforcing ring)

Bore size (mm)	Stroke range* (mm)	RT	RY
32	1401 to 1800	28	58
40	1401 to 1800	28	65
50	1401 to 1800	33	75
63	1501 to 1800	43	90
80	—	—	—
100	—	—	—

\* Applicable to Series CH2E, CH2F and CH2H. Contact SMC regarding Series CH2G with the above strokes.

Bore size (mm)	Stroke range (mm)	B	BB	C	F	GA	GB	J	M	NA	NB	P	R	S	CD	LH	LT	LW	LX	X	Y	Z	SS	With rod boot					
																								e		f	Q	l	
																								B-rod	C-rod			B-rod	C-rod
32	25 to 1400	58	109	38	14	21	15	M10 x 1.25	11	37	31	3/8	39	130	11	35	13	13	88	29	14	98	57	52	—	34.5	15	—	—
40	25 to 1400	65	118	45	10	21	15	M10 x 1.25	11	36	30	3/8	42	130	11	37.5	14	13	95	29	14	98	57	52	52	23	15	1/3.5	stroke
50	25 to 1400	76	145	52	10	27	19	M10 x 1.25	11	43	35	1/2	46	142	14	45	17	18	115	35	18	108	60	55	52	28	15	—	—
63	25 to 1500	90	165	63	10	27	19	M12 x 1.5	14	43	35	1/2	52	148	18	50	19	20	132	41	19	106	71	65	55	30	20	—	—
80	25 to 1800	110	190	80	11	22	22	M16 x 1.5	16	44	44	3/4	65	166	18	60	24	24	155	45	20	124	74	80	65	35	20	1/4	stroke
100	25 to 1800	135	230	102	11	22	22	M18 x 1.5	18	44	44	3/4	75	172	22	71	27	28	190	53	22	122	85	100	80	39	15	—	—

### Rod series

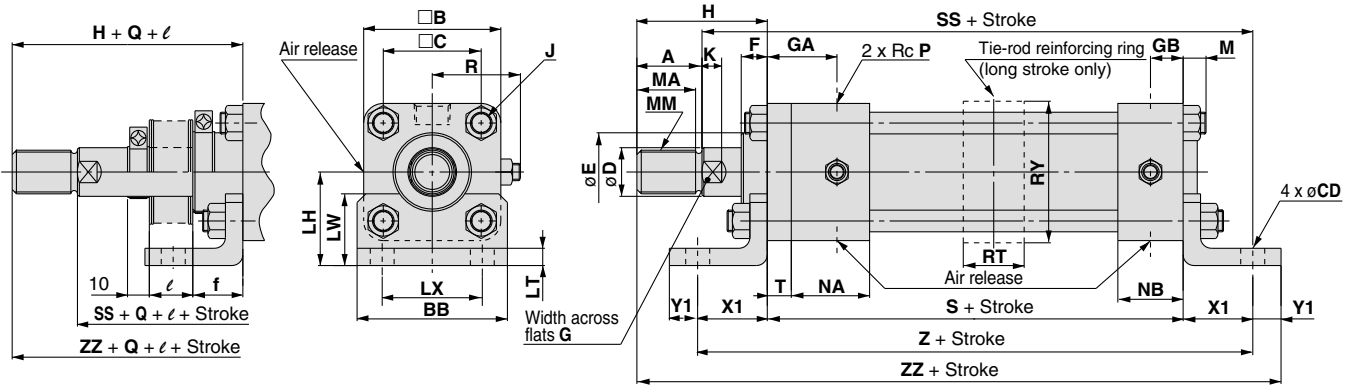
Bore size (mm)	B-series rod										C-series rod									
	MM	A	MA	D	E	K	G	H	ZZ	MM	A	MA	D	E	K	G	H	ZZ		
32	M16 x 1.5	25	22	18	34	7	14	66	220	—	—	—	—	—	—	—	—	—		
40	M20 x 1.5	30	27	22.4	40	9	19	71	225	M16 x 1.5	25	22	18	36	7	14	66	220		
50	M24 x 1.5	35	32	28	46	11	24	78	249	M20 x 1.5	30	27	22.4	40	9	19	73	244		
63	M30 x 1.5	45	42	35.5	55	13	30	95	277	M24 x 1.5	35	32	28	46	11	24	85	267		
80	M39 x 1.5	60	57	45	65	15	41	113	319	M30 x 1.5	45	42	35.5	55	13	30	98	304		
100	M48 x 1.5	75	72	56	80	16	50	135	353	M39 x 1.5	60	57	45	65	15	41	120	338		

### Tolerance

Bore size (mm)	LH	LX
32	±0.15	±0.18
40		
50		
63	±0.25	±0.20
80		
100		

# JIS Standard Hydraulic Cylinder Double Acting/Single Rod Series CH2E/CH2F/CH2G/CH2H

## Axial foot style: CH2ELB, CH2FLB



### Long stroke (with tie-rod reinforcing ring)

Bore size (mm)	Stroke range* (mm)	RT	RY
32	1401 to 1800	28	58
40	1401 to 1800	28	65
50	1401 to 1800	33	75
63	1501 to 1800	43	90
80	—	—	—
100	—	—	—

\* Applicable to Series CH2E, CH2F and CH2H. Contact SMC regarding Series CH2G with the above strokes.

Bore size (mm)	Stroke range (mm)	B	BB	C	F	GA	GB	J	M	NA	NB	P	R	S	T	CD	LH	LT	LX	LW	X1	Y1	SS	Z	With rod boot				
																									e		f	Q	$\ell$
																									B-rod	C-rod			
32	25 to 1400	58	62	38	16	32	15	M10 x 1.25	11	37	31	3/8	39	141	11	11	40	8	40	30	32	13	203	205	52	—	21.5	15	—
40	25 to 1400	65	69	45	12	32	15	M10 x 1.25	11	36	30	3/8	42	141	11	11	43	8	46	33	32	13	203	205	52	52	12	15	1/3.5 stroke
50	25 to 1400	76	85	52	15	40	19	M10 x 1.25	11	43	35	1/2	46	155	13	14	50	8	58	37	35	15	220	225	55	52	15	15	—
63	25 to 1500	90	98	63	15	42	19	M12 x 1.5	14	43	35	1/2	52	163	15	18	60	10	65	45	42	18	240	247	65	55	15	20	—
80	25 to 1800	110	118	80	17	40	22	M16 x 1.5	16	44	44	3/4	65	184	18	18	72	12	87	50	50	20	269	284	80	65	17	20	1/4 stroke
100	25 to 1800	135	150	102	19	42	22	M18 x 1.5	18	44	44	3/4	75	192	20	22	85	12	109	55	55	23	287	302	100	80	19	15	—

### Rod series

Bore size (mm)	B-series rod										C-series rod									
	MM	A	MA	D	E	K	G	H	ZZ	MM	A	MA	D	E	K	G	H	ZZ		
32	M16 x 1.5	25	22	18	34	7	14	55	241	—	—	—	—	—	—	—	—	—		
40	M20 x 1.5	30	27	22.4	40	9	19	60	246	M16 x 1.5	25	22	18	36	7	14	55	241		
50	M24 x 1.5	35	32	28	46	11	24	65	270	M20 x 1.5	30	27	22.4	40	9	19	60	265		
63	M30 x 1.5	45	42	35.5	55	13	30	80	303	M24 x 1.5	35	32	28	46	11	24	70	293		
80	M39 x 1.5	60	57	45	65	15	41	95	349	M30 x 1.5	45	42	35.5	55	13	30	80	334		
100	M48 x 1.5	75	72	56	80	16	50	115	385	M39 x 1.5	60	57	45	65	15	41	100	370		

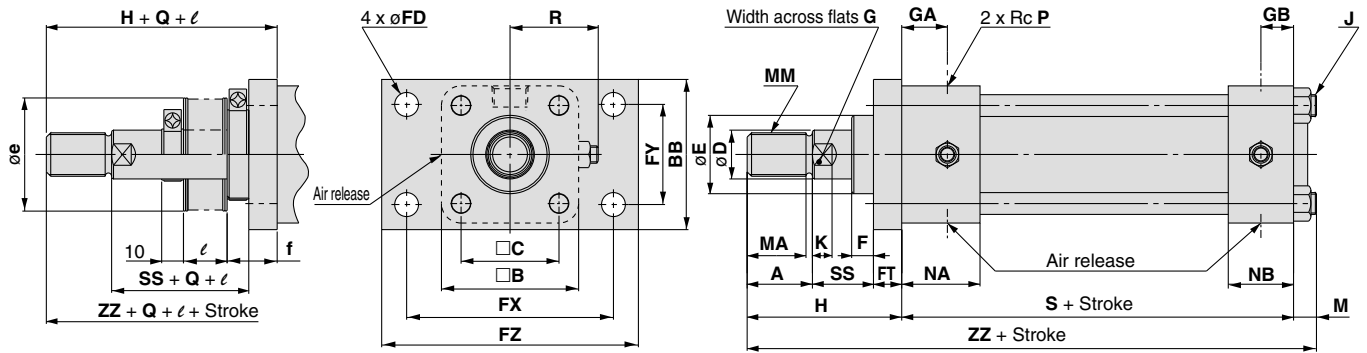
### Tolerance

Bore size (mm)	LH	LX
32	±0.15	±0.13
40		±0.15
50		
63	±0.25	±0.18
80		±0.18
100		



# JIS Standard Hydraulic Cylinder Double Acting/Single Rod **Series CH2E/CH2F/CH2G/CH2H**

## Rod rectangular flange style: CH2GFY, CH2HFY



- CHQ
- CHK
- CHN
- CHM
- CHS
- CH2
- CHA
- Related Equipment
- D-

Bore size (mm)	Stroke range (mm)	B	BB	C	F	GA	GB	J	M	NA	NB	P	R	S	FD	FT	FX	FY	FZ	SS	With rod boot					
																					e		f	Q	l	
																					B-rod	C-rod			B-rod	C-rod
32	25 to 1400	58	62	38	14	21	15	M10 x 1.25	11	37	31	3/8	39	130	11	13	88	40	109	30	52	—	27	15	—	—
40	25 to 1400	65	69	45	10	21	15	M10 x 1.25	11	36	30	3/8	42	130	11	13	95	46	118	30	52	52	23	15	1/3.5 stroke	—
50	25 to 1400	76	85	52	10	27	19	M10 x 1.25	11	43	35	1/2	46	142	14	18	115	58	145	30	55	52	28	15	—	—
63	25 to 1500	90	98	63	10	27	19	M12 x 1.5	14	43	35	1/2	52	148	18	20	132	65	165	35	65	55	30	20	—	—
80	25 to 1800	110	118	80	11	22	22	M16 x 1.5	16	44	44	3/4	65	166	18	24	155	87	190	35	80	65	35	20	1/4 stroke	—
100	25 to 1800	135	150	102	11	22	22	M18 x 1.5	18	44	44	3/4	75	172	22	28	190	109	230	40	100	80	39	15	—	—

### Rod series

Bore size (mm)	B-series rod										C-series rod									
	MM	A	MA	D	E	K	G	H	ZZ	MM	A	MA	D	E	K	G	H	ZZ		
32	M16 x 1.5	25	22	18	34	7	14	68	209	—	—	—	—	—	—	—	—	—		
40	M20 x 1.5	30	27	22.4	40	9	19	73	214	M16 x 1.5	25	22	18	36	7	14	68	209		
50	M24 x 1.5	35	32	28	46	11	24	83	236	M20 x 1.5	30	27	22.4	40	9	19	78	231		
63	M30 x 1.5	45	42	35.5	55	13	30	100	262	M24 x 1.5	35	32	28	46	11	24	90	252		
80	M39 x 1.5	60	57	45	65	15	41	119	301	M30 x 1.5	45	42	35.5	55	13	30	104	286		
100	M48 x 1.5	75	72	56	80	16	50	143	333	M39 x 1.5	60	57	45	65	15	41	128	318		

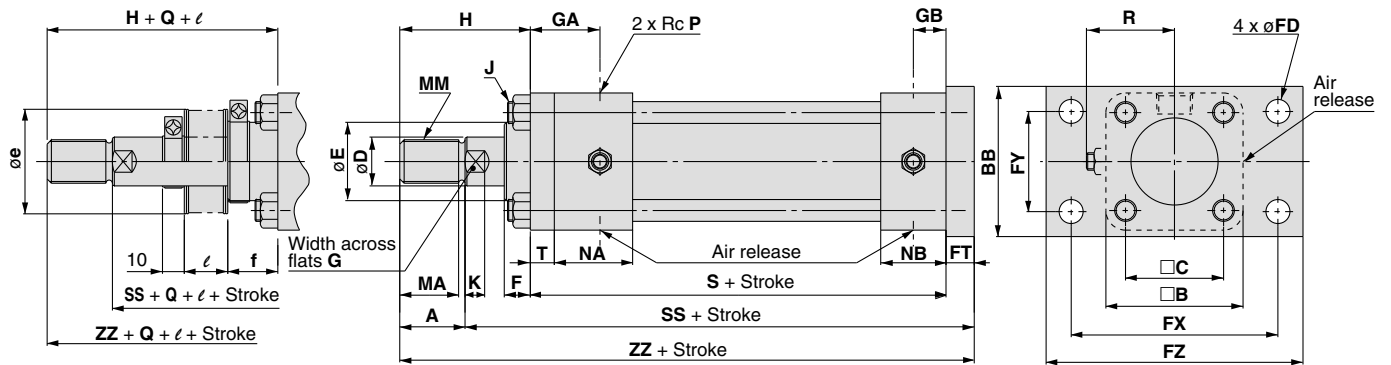
### Tolerance

Bore size (mm)	FT	FX	FY
32	±0.2	±0.18	±0.13
40			
50	±0.3	±0.2	±0.15
63			±0.18
80			
100	±0.23	±0.18	±0.18

# Series CH2E/CH2F/CH2G/CH2H

## Dimensions

Head rectangular flange style: CH2EFB, CH2FFB



Bore size (mm)	Stroke range (mm)	B	BB	C	F	GA	GB	J	NA	NB	P	R	S	T	FD	FT	FX	FY	FZ	SS	With rod boot					
																					e		f	Q	l	
																					B-rod	C-rod			B-rod	C-rod
32	25 to 1400	58	62	38	16	32	15	M10 x 1.25	37	31	3/8	39	141	11	11	11	88	40	109	182	52	—	21.5	15	—	—
40	25 to 1400	65	69	45	12	32	15	M10 x 1.25	36	30	3/8	42	141	11	11	11	95	46	118	182	52	52	12	15	1/3.5 stroke	—
50	25 to 1400	76	85	52	15	40	19	M10 x 1.25	43	35	1/2	46	155	13	14	13	115	58	145	198	55	52	15	15	—	—
63	25 to 1500	90	98	63	15	42	19	M12 x 1.5	43	35	1/2	52	163	15	18	15	132	65	165	213	65	55	15	20	—	—
80	25 to 1800	110	118	80	17	40	22	M16 x 1.5	44	44	3/4	65	184	18	18	18	155	87	190	237	80	65	17	20	1/4 stroke	—
100	25 to 1800	135	150	102	19	42	22	M18 x 1.5	44	44	3/4	75	192	20	22	20	190	109	230	252	100	80	19	15	—	—

### Rod series

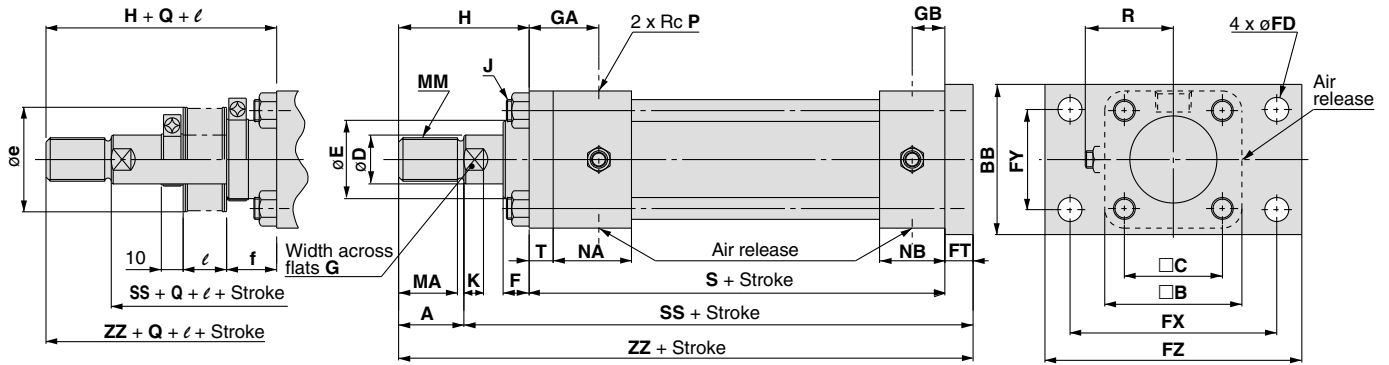
Bore size (mm)	B-series rod										C-series rod									
	MM	A	MA	D	E	K	G	H	ZZ	MM	A	MA	D	E	K	G	H	ZZ		
32	M16 x 1.5	25	22	18	34	7	14	55	207	—	—	—	—	—	—	—	—	—		
40	M20 x 1.5	30	27	22.4	40	9	19	60	212	M16 x 1.5	25	22	18	36	7	14	55	207		
50	M24 x 1.5	35	32	28	46	11	24	65	233	M20 x 1.5	30	27	22.4	40	9	19	60	228		
63	M30 x 1.5	45	42	35.5	55	13	30	80	258	M24 x 1.5	35	32	28	46	11	24	70	248		
80	M39 x 1.5	60	57	45	65	15	41	95	297	M30 x 1.5	45	42	35.5	55	13	30	80	282		
100	M48 x 1.5	75	72	56	80	16	50	115	327	M39 x 1.5	60	57	45	65	15	41	100	312		

### Tolerance

Bore size (mm)	FT	FY	FX
32	—	—	—
40	±0.2	±0.13	±0.18
50	—	±0.15	—
63	—	—	±0.2
80	±0.3	±0.18	—
100	—	—	±0.23

# JIS Standard Hydraulic Cylinder Double Acting/Single Rod **Series CH2E/CH2F/CH2G/CH2H**

## Head rectangular flange style: CH2GFZ, CH2HFZ



- CHQ
- CHK
- CHN
- CHM
- CHS
- CH2
- CHA
- Related Equipment
- D-

Bore size (mm)	Stroke range (mm)	B	BB	C	F	GA	GB	J	NA	NB	P	R	S	T	FD	FT	FX	FY	FZ	SS	With rod boot					
																					e		f	Q	ℓ	
																					B-rod	C-rod			B-rod	C-rod
32	25 to 1400	58	62	38	16	32	15	M10 x 1.25	37	31	3/8	39	141	11	11	13	88	40	109	184	52	—	21.5	15	—	—
40	25 to 1400	65	69	45	12	32	15	M10 x 1.25	36	30	3/8	42	141	11	11	13	95	46	118	184	52	52	12	15	1/3.5 stroke	—
50	25 to 1400	76	85	52	15	40	19	M10 x 1.25	43	35	1/2	46	155	13	14	18	115	58	145	203	55	52	15	15	1/4 stroke	—
63	25 to 1500	90	98	63	15	42	19	M12 x 1.5	43	35	1/2	52	163	15	18	20	132	65	165	218	65	55	15	20	1/4 stroke	—
80	25 to 1800	110	118	80	17	40	22	M16 x 1.5	44	44	3/4	65	184	18	18	24	155	87	190	243	80	65	17	20	1/4 stroke	—
100	25 to 1800	135	150	102	19	42	22	M18 x 1.5	44	44	3/4	75	192	20	22	28	190	109	230	260	100	80	19	15	1/4 stroke	—

### Rod series

Bore size (mm)	B-series rod									C-series rod								
	MM	A	MA	D	E	K	G	H	ZZ	MM	A	MA	D	E	K	G	H	ZZ
32	M16 x 1.5	25	22	18	34	7	14	55	209	—	—	—	—	—	—	—	—	—
40	M20 x 1.5	30	27	22.4	40	9	19	60	214	M16 x 1.5	25	22	18	36	7	14	55	209
50	M24 x 1.5	35	32	28	46	11	24	65	238	M20 x 1.5	30	27	22.4	40	9	19	60	233
63	M30 x 1.5	45	42	35.5	55	13	30	80	263	M24 x 1.5	35	32	28	46	11	24	70	253
80	M39 x 1.5	60	57	45	65	15	41	95	303	M30 x 1.5	45	42	35.5	55	13	30	80	288
100	M48 x 1.5	75	72	56	80	16	50	115	335	M39 x 1.5	60	57	45	65	15	41	100	320

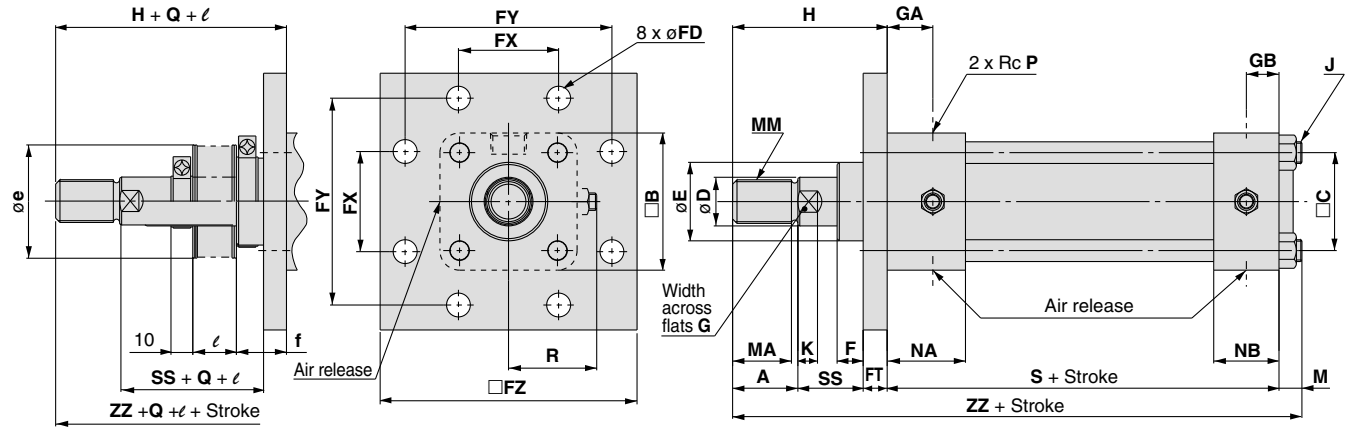
### Tolerance

Bore size (mm)	FT	FX	FY
32	±0.2	±0.18	±0.13
40	±0.2	±0.18	±0.15
50	±0.3	±0.2	±0.18
63	±0.3	±0.2	±0.18
80	±0.3	±0.2	±0.18
100	±0.3	±0.23	±0.18

# Series CH2E/CH2F/CH2G/CH2H

## Dimensions

Rod square flange style: CH2EFC, CH2FFC, CH2GFC, CH2HFC



Bore size (mm)	Stroke range (mm)	B	C	F	GA	GB	J	M	NA	NB	P	R	S	FD	FT	FX	FY	FZ	SS	With rod boot						
																				e		f	Q	l		
																				B-rod	C-rod			B-rod	C-rod	
32	25 to 1400	58	38	16	21	15	M10 x 1.25	11	37	31	3/8	39	130	11	11	40	88	109	30	52	—	27	15	—	—	
40	25 to 1400	65	45	12	21	15	M10 x 1.25	11	36	30	3/8	42	130	11	11	46	95	118	30	52	52	23	15	1/3.5 stroke	—	—
50	25 to 1400	76	52	15	27	19	M10 x 1.25	11	43	35	1/2	46	142	14	13	58	115	145	30	55	52	28	15	—	—	—
63	25 to 1500	90	63	15	27	19	M12 x 1.5	14	43	35	1/2	52	148	18	15	65	132	165	35	65	55	30	20	—	—	—
80	25 to 1800	110	80	17	22	22	M16 x 1.5	16	44	44	3/4	65	166	18	18	87	155	190	35	80	65	35	20	1/4 stroke	—	—
100	25 to 1800	135	102	19	22	22	M18 x 1.5	18	44	44	3/4	75	172	22	20	109	190	230	40	100	80	39	15	—	—	—

### Rod series

Bore size (mm)	B-series rod										C series-rod									
	MM	A	MA	D	E	K	G	H	ZZ	MM	A	MA	D	E	K	G	H	ZZ		
32	M16 x 1.5	25	22	18	34	7	14	66	207	—	—	—	—	—	—	—	—	—		
40	M20 x 1.5	30	27	22.4	40	9	19	71	212	M16 x 1.5	25	22	18	36	7	14	66	207		
50	M24 x 1.5	35	32	28	46	11	24	78	231	M20 x 1.5	30	27	22.4	40	9	19	73	226		
63	M30 x 1.5	45	42	35.5	55	13	30	95	257	M24 x 1.5	35	32	28	46	11	24	85	247		
80	M39 x 1.5	60	57	45	65	15	41	113	295	M30 x 1.5	45	42	35.5	55	13	30	98	280		
100	M48 x 1.5	75	72	56	80	16	50	135	325	M39 x 1.5	60	57	45	65	15	41	120	310		

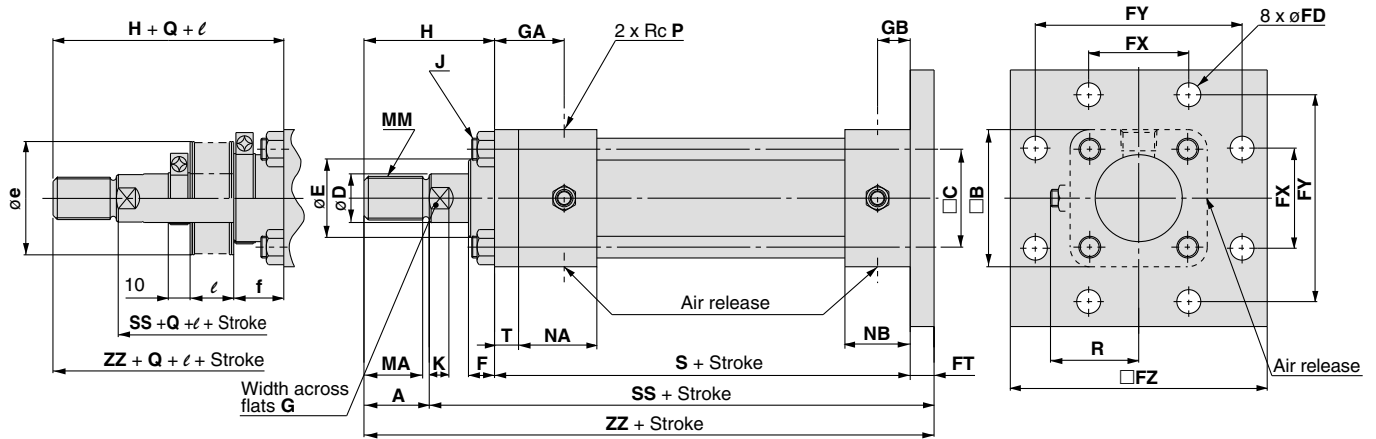
### Tolerance

Bore size (mm)	FT	FX	FY
32	±0.2	±0.13	±0.18
40	±0.2	±0.15	±0.2
50	±0.3	±0.18	±0.23
63	±0.3	±0.18	±0.23
80	±0.3	±0.18	±0.23
100	±0.3	±0.18	±0.23



# JIS Standard Hydraulic Cylinder Double Acting/Single Rod **Series CH2E/CH2F/CH2G/CH2H**

## Head square flange style: CH2EFD, CH2FFD, CH2GFD, CH2HFD



**CHQ**

**CHK**

**CHN**

**CHM**

**CHS**

**CH2**

**CHA**

Related  
Equipment

**D-**

Bore size (mm)	Stroke range (mm)	B	C	F	GA	GB	J	NA	NB	P	R	S	T	FD	FT	FX	FY	FZ	SS	With rod boot					
																				e		f	Q	l	
																				B-rod	C-rod			B-rod	C-rod
32	25 to 1400	58	38	16	32	15	M10 x 1.25	37	31	3/8	39	141	11	11	11	40	88	109	182	52	—	21.5	15	—	—
40	25 to 1400	65	45	12	32	15	M10 x 1.25	36	30	3/8	42	141	11	11	11	46	95	118	182	52	52	12	15	1/3.5	stroke
50	25 to 1400	76	52	15	40	19	M10 x 1.25	43	35	1/2	46	155	13	14	13	58	115	145	198	55	52	15	15	1/4	stroke
63	25 to 1500	90	63	15	42	19	M12 x 1.5	43	35	1/2	52	163	15	18	15	65	132	165	213	65	55	15	20	1/4	stroke
80	25 to 1800	110	80	17	40	22	M16 x 1.5	44	44	3/4	65	184	18	18	18	87	155	190	237	80	65	17	20	1/4	stroke
100	25 to 1800	135	102	19	42	22	M18 x 1.5	44	44	3/4	75	192	20	22	20	109	190	230	252	100	80	19	15	1/4	stroke

### Rod series

Bore size (mm)	B-series rod										C-series rod									
	MM	A	MA	D	E	K	G	H	ZZ	MM	A	MA	D	E	K	G	H	ZZ		
32	M16 x 1.5	25	22	18	34	7	14	55	207	—	—	—	—	—	—	—	—	—		
40	M20 x 1.5	30	27	22.4	40	9	19	60	212	M16 x 1.5	25	22	18	36	7	14	55	207		
50	M24 x 1.5	35	32	28	46	11	24	65	233	M20 x 1.5	30	27	22.4	40	9	19	60	228		
63	M30 x 1.5	45	42	35.5	55	13	30	80	258	M24 x 1.5	35	32	28	46	11	24	70	248		
80	M39 x 1.5	60	57	45	65	15	41	95	297	M30 x 1.5	45	42	35.5	55	13	30	80	282		
100	M48 x 1.5	75	72	56	80	16	50	115	327	M39 x 1.5	60	57	45	65	15	41	100	312		

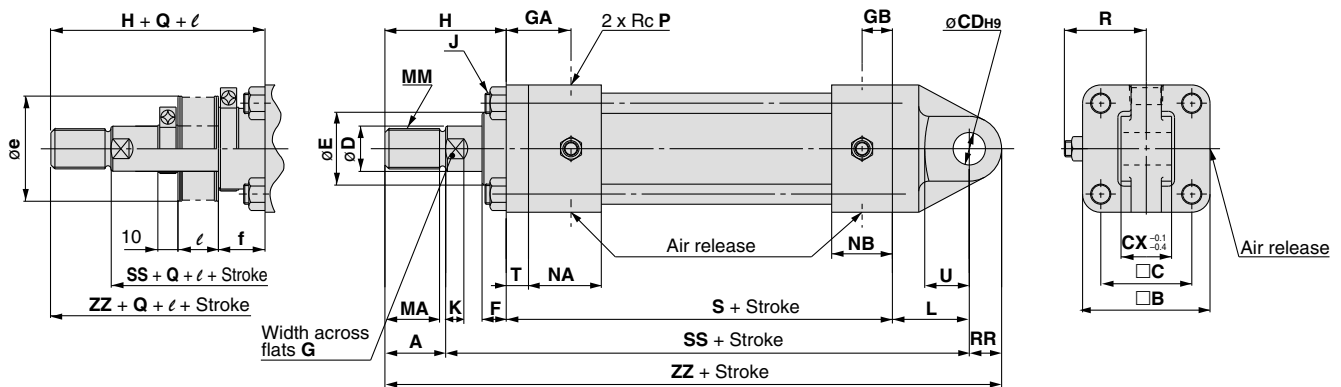
### Tolerance

Bore size (mm)	FT	FX	FY
32	±0.2	±0.13	±0.18
40			
50	±0.3	±0.18	±0.23
63			
80	±0.3	±0.18	±0.23
100			

# Series CH2E/CH2F/CH2G/CH2H

## Dimensions

Single clevis style: CH2ECA, CH2FCA, CH2GCA, CH2HCA



Bore size (mm)	Stroke range (mm)	B	C	F	GA	GB	J	NA	NB	P	R	S	T	CX	CD	RR	SS	U	L	With rod boot					
																				e		f	Q	l	
																				B-rod	C-rod		B-rod	C-rod	
32	25 to 1400	58	38	16	32	15	M10 x 1.25	37	31	3/8	39	141	11	25	16	16	209	22	38	52	—	21.5	15	—	—
40	25 to 1400	65	45	12	32	15	M10 x 1.25	36	30	3/8	42	141	11	25	16	16	209	22	38	52	52	12	15	1/3.5 stroke	—
50	25 to 1400	76	52	15	40	19	M10 x 1.25	43	35	1/2	46	155	13	31.5	20	20	230	25	45	55	52	15	15	—	—
63	25 to 1500	90	63	15	42	19	M12 x 1.5	43	35	1/2	52	163	15	40	31.5	31.5	261	40	63	65	55	15	20	—	—
80	25 to 1800	110	80	17	40	22	M16 x 1.5	44	44	3/4	65	184	18	40	31.5	31.5	291	40	72	80	65	17	20	1/4 stroke	—
100	25 to 1800	135	102	19	42	22	M18 x 1.5	44	44	3/4	75	192	20	50	40	40	316	50	84	100	80	19	15	—	—

### Rod series

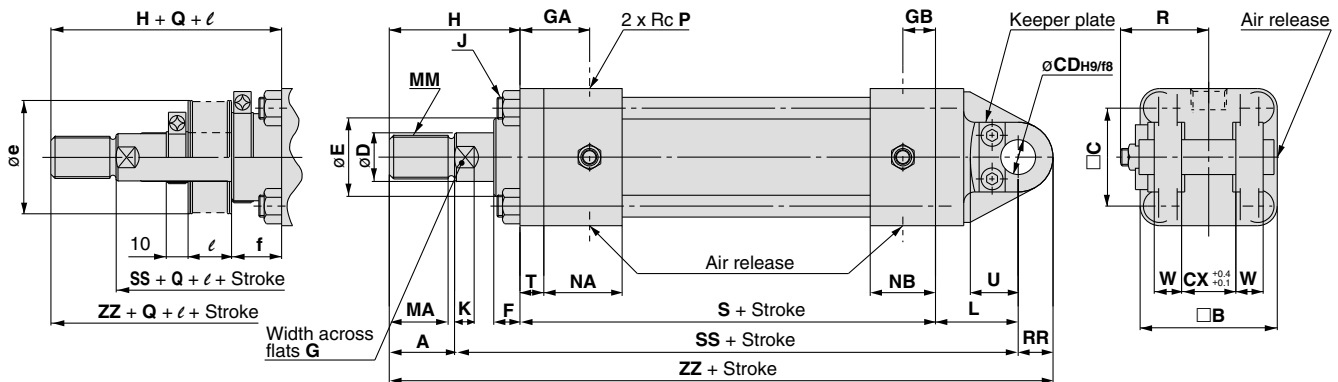
Bore size (mm)	B-series rod										C-series rod									
	MM	A	MA	D	E	K	G	H	ZZ	MM	A	MA	D	E	K	G	H	ZZ		
32	M16 x 1.5	25	22	18	34	7	14	55	250	—	—	—	—	—	—	—	—	—		
40	M20 x 1.5	30	27	22.4	40	9	19	60	255	M16 x 1.5	25	22	18	36	7	14	55	250		
50	M24 x 1.5	35	32	28	46	11	24	65	285	M20 x 1.5	30	27	22.4	40	9	19	60	280		
63	M30 x 1.5	45	42	35.5	55	13	30	80	337.5	M24 x 1.5	35	32	28	46	11	24	70	327.5		
80	M39 x 1.5	60	57	45	65	15	41	95	382.5	M30 x 1.5	45	42	35.5	55	13	30	80	367.5		
100	M48 x 1.5	75	72	56	80	16	50	115	431	M39 x 1.5	60	57	45	65	15	41	100	416		

### Tolerance

Bore size (mm)	CDH9
32	+0.043
40	0
50	+0.052
63	0
80	+0.062
100	0

# JIS Standard Hydraulic Cylinder Double Acting/Single Rod **Series CH2E/CH2F/CH2G/CH2H**

Double clevis style: CH2ECB, CH2FCB, CH2GCB, CH2HCB



- CHQ
- CHK
- CHN
- CHM
- CHS
- CH2
- CHA
- Related Equipment
- D-

Bore size (mm)	Stroke range (mm)	B	C	F	GA	GB	J	NA	NB	P	R	S	T	CX	CD	RR	SS	L	U	W	With rod boot						
																					e		f	Q	l		
																					B-rod	C-rod			B-rod	C-rod	
32	25 to 1400	58	38	16	32	15	M10 x 1.25	37	31	3/8	39	141	11	25	16	16	209	38	22	12.5	52	—	21.5	15	—	—	
40	25 to 1400	65	45	12	32	15	M10 x 1.25	36	30	3/8	42	141	11	25	16	16	209	38	22	12.5	52	52	12	15	1/3.5 stroke	—	—
50	25 to 1400	76	52	15	40	19	M10 x 1.25	43	35	1/2	46	155	13	31.5	20	20	230	45	25	16	55	52	15	15	1/3.5 stroke	—	—
63	25 to 1500	90	63	15	42	19	M12 x 1.5	43	35	1/2	52	163	15	40	31.5	31.5	261	63	40	20	65	55	15	20	1/4 stroke	—	—
80	25 to 1800	110	80	17	40	22	M16 x 1.5	44	44	3/4	65	184	18	40	31.5	31.5	291	72	40	20	80	65	17	20	1/4 stroke	—	—
100	25 to 1800	135	102	19	42	22	M18 x 1.5	44	44	3/4	75	192	20	50	40	40	316	84	50	25	100	80	19	15	1/4 stroke	—	—

### Rod series

Bore size (mm)	B-series rod										C-series rod									
	MM	A	MA	D	E	K	G	H	ZZ	MM	A	MA	D	E	K	G	H	ZZ		
32	M16 x 1.5	25	22	18	34	7	14	55	250	—	—	—	—	—	—	—	—	—		
40	M20 x 1.5	30	27	22.4	40	9	19	60	255	M16 x 1.5	25	22	18	36	7	14	55	250		
50	M24 x 1.5	35	32	28	46	11	24	65	285	M20 x 1.5	30	27	22.4	40	9	19	60	280		
63	M30 x 1.5	45	42	35.5	55	13	30	80	337.5	M24 x 1.5	35	32	28	46	11	24	70	327.5		
80	M39 x 1.5	60	57	45	65	15	41	95	382.5	M30 x 1.5	45	42	35.5	55	13	30	80	367.5		
100	M48 x 1.5	75	72	56	80	16	50	115	431	M39 x 1.5	60	57	45	65	15	41	100	416		

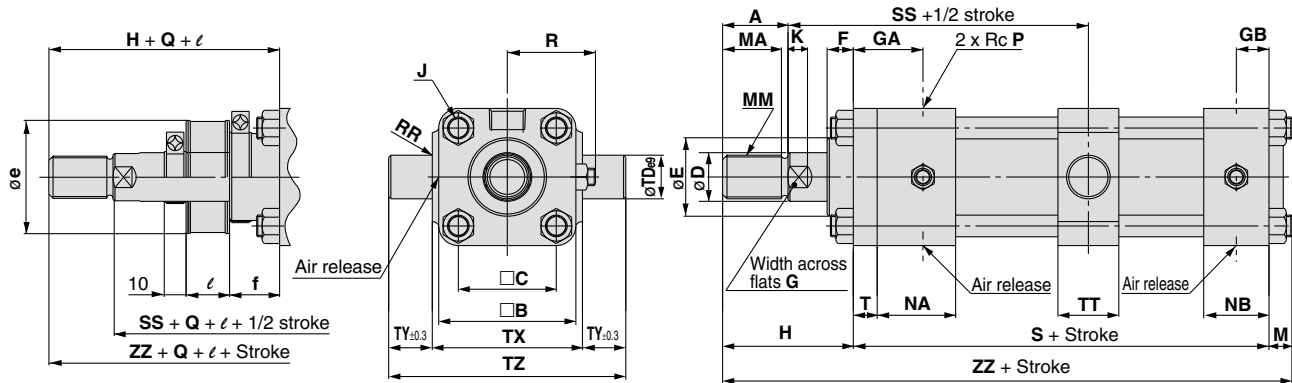
### Tolerance

Bore size (mm)	CD	
	H9	f8
32	+0.043	-0.016
40	0	-0.043
50	+0.052	-0.020
63	0	-0.053
80	+0.062	-0.025
100	0	-0.064

# Series CH2E/CH2F/CH2G/CH2H

## Dimensions

Center trunnion style: CH2ETC, CH2FTC, CH2GTC, CH2HTC



Bore size (mm)	Stroke range (mm)	B	C	F	GA	GB	J	M	NA	NB	P	R	S	T	RR	SS	TD	TT	TX	TY	TZ	With rod boot						
																						e		f	Q	l		
																						B-rod	C-rod			B-rod	C-rod	
32 <sup>+1</sup>	25 to 1800	58	38	16	32	15	M10 x 1.25	11	37	31	3/8	39	141	11	2	113	20	28	58	20	98	52	—	21.5	15	—	—	
40 <sup>+1</sup>	25 to 1800	65	45	12	32	15	M10 x 1.25	11	36	30	3/8	42	141	11	2	113	20	28	69	20	109	52	52	12	15	1/3.5 stroke	—	—
50 <sup>+1</sup>	25 to 1800	76	52	15	40	19	M10 x 1.25	11	43	35	1/2	46	155	13	2.5	121	25	33	85	25	135	55	52	15	15	—	—	—
63 <sup>+2</sup>	25 to 1800	90	63	15	42	19	M12 x 1.5	14	43	35	1/2	52	163	15	2.5	132	31.5	43	98	31.5	161	65	55	15	20	—	—	—
80	25 to 1800	110	80	17	40	22	M16 x 1.5	16	44	44	3/4	65	184	18	2.5	146	31.5	43	118	31.5	181	80	65	17	20	1/4 stroke	—	—
100	25 to 1800	135	102	19	42	22	M18 x 1.5	18	44	44	3/4	75	192	20	3	156	40	53	145	40	225	100	80	19	15	—	—	—

\* 1: CH2GTC is limited to 1400 mm.

\* 2: CH2GTC is limited to 1500 mm.

### Rod series

Bore size (mm)	B-series rod										C-series rod									
	MM	A	MA	D	E	K	G	H	ZZ	MM	A	MA	D	E	K	G	H	ZZ		
32	M16 x 1.5	25	22	18	34	7	14	55	207	—	—	—	—	—	—	—	—	—		
40	M20 x 1.5	30	27	22.4	40	9	19	60	212	M16 x 1.5	25	22	18	36	7	14	55	207		
50	M24 x 1.5	35	32	28	46	11	24	65	231	M20 x 1.5	30	27	22.4	40	9	19	60	226		
63	M30 x 1.5	45	42	35.5	55	13	30	80	257	M24 x 1.5	35	32	28	46	11	24	70	247		
80	M39 x 1.5	60	57	45	65	15	41	95	295	M30 x 1.5	45	42	35.5	55	13	30	80	280		
100	M48 x 1.5	75	72	56	80	16	50	115	325	M39 x 1.5	60	57	45	65	15	41	100	310		

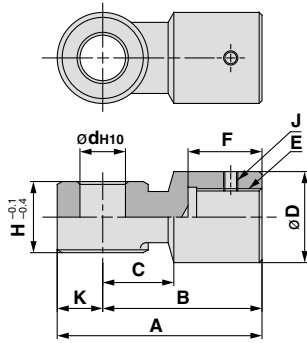
### Tolerance

Bore size (mm)	TD <sub>e9</sub>	TX
32	0	0
40	-0.040 -0.092	-0.3
50	0	0
63	-0.050 -0.112	-0.35
80	0	0
100	0 -0.4	-0.4

# JIS Standard Hydraulic Cylinder Double Acting/Single Rod Series **CH2E/CH2F/CH2G/CH2H**

## Accessories (Optional)

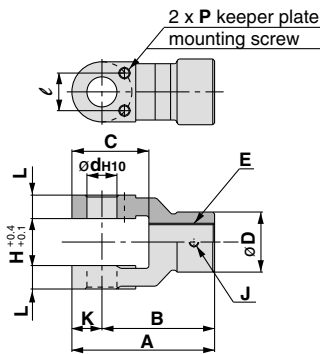
### Single knuckle joint



Material: Cast iron

Rod series	Part no.	Bore size (mm)	A	B	C	D	d	E	F	H	J	K
B-series	IH2-03B	32	76	60	25	32	16 <sup>+0.07/0</sup>	M16 x 1.5	26	25	M5 x 0.8	16
	IH2-04B	40	76	60	25	32	16 <sup>+0.07/0</sup>	M20 x 1.5	31	25	M5 x 0.8	16
	IH2-05B	50	90	70	30	40	20 <sup>+0.084/0</sup>	M24 x 1.5	36	31.5	M5 x 0.8	20
	IH2-06B	63	145	115	45	60	31.5 <sup>+0.1/0</sup>	M30 x 1.5	50	40	M6 x 1.0	30
	IH2-08B	80	145	115	45	60	31.5 <sup>+0.1/0</sup>	M39 x 1.5	61	40	M6 x 1.0	30
C-series	IH2-10B	100	185	145	57	79	40 <sup>+0.1/0</sup>	M48 x 1.5	76	50	M8 x 1.25	40
	IH2-03B	40	76	60	25	32	16 <sup>+0.07/0</sup>	M16 x 1.5	26	25	M5 x 0.8	16
	IH2-05C	50	90	70	30	40	20 <sup>+0.084/0</sup>	M20 x 1.5	31	31.5	M5 x 0.8	20
	IH2-06C	63	145	115	45	60	31.5 <sup>+0.1/0</sup>	M24 x 1.5	40	40	M6 x 1.0	30
	IH2-06B	80	145	115	45	60	31.5 <sup>+0.1/0</sup>	M30 x 1.5	50	40	M6 x 1.0	30
IH2-10C	100	185	145	57	79	40 <sup>+0.1/0</sup>	M39 x 1.5	63	50	M8 x 1.25	40	

### Double knuckle joint

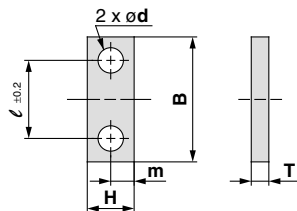


Material: Cast iron

Rod series	Part no.	Bore size (mm)	A	B	C	D	d	E	H	J	K	L	$\ell$	P
B-series	YH2-03B	32	76	60	41	32	16 <sup>+0.07/0</sup>	M16 x 1.5	25	M5 x 0.8	16	12.5	20	M6 x 1.0
	YH2-04B	40	76	60	41	32	16 <sup>+0.07/0</sup>	M20 x 1.5	25	M5 x 0.8	16	12.5	20	M6 x 1.0
	YH2-05B	50	90	70	50	40	20 <sup>+0.084/0</sup>	M24 x 1.5	31.5	M5 x 0.8	20	16	20	M6 x 1.0
	YH2-06B	63	145	115	75	60	31.5 <sup>+0.1/0</sup>	M30 x 1.5	40	M6 x 1.0	30	20	24	M8 x 1.25
	YH2-08B	80	145	115	75	60	31.5 <sup>+0.1/0</sup>	M39 x 1.5	40	M6 x 1.0	30	20	24	M8 x 1.25
C-series	YH2-10B	100	185	145	95	80	40 <sup>+0.1/0</sup>	M48 x 1.5	50	M8 x 1.25	40	25	26	M10 x 1.5
	YH2-03B	40	76	60	41	32	16 <sup>+0.07/0</sup>	M16 x 1.5	25	M5 x 0.8	16	12.5	20	M6 x 1.0
	YH2-05C	50	90	70	50	40	20 <sup>+0.084/0</sup>	M20 x 1.5	31.5	M5 x 0.8	20	16	20	M6 x 1.0
	YH2-06C	63	145	115	75	60	31.5 <sup>+0.1/0</sup>	M24 x 1.5	40	M6 x 1.0	30	20	24	M8 x 1.25
	YH2-06B	80	145	115	75	60	31.5 <sup>+0.1/0</sup>	M30 x 1.5	40	M6 x 1.0	30	20	24	M8 x 1.25
YH2-10C	100	185	145	95	80	40 <sup>+0.1/0</sup>	M39 x 1.5	50	M8 x 1.25	40	25	26	M10 x 1.5	

Note) The pin, keeper plate and cap bolt are included with a double knuckle joint.

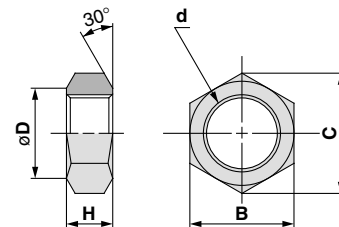
### Keeper plate



Material: Rolled steel

Part no.	Bore size (mm)	B	H	$\ell$	m	T	d	Cap bolt
KP-05	32, 40, 50	32	12	20 $\pm 0.2$	6	4.5	6.5	M6 x 10 $\ell$
KP-08	63, 80	44	18	24 $\pm 0.2$	9	4.5	9	M8 x 12 $\ell$
KP-10	100	44	22	26 $\pm 0.2$	11	6	11.5	M10 x 14 $\ell$

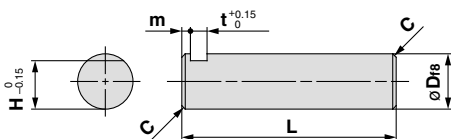
### Rod end nut



Material: Carbon steel

Rod series	Part no.	Bore size (mm)	B	C	D	H	d
B-series	NTH-040	32	22	25.4	21	10	M16 x 1.5
	NTH-050	40	27	31.2	26	12	M20 x 1.5
	NTH-060	50	32	37	31	14	M24 x 1.5
	NTH-080	63	41	47.3	40	17	M30 x 1.5
	NTH-100	80	55	63.5	54	20	M39 x 1.5
C-series	NTH-125	100	70	80.8	69	26	M48 x 1.5
	NTH-040	40	22	25.4	21	10	M16 x 1.5
	NTH-050	50	27	31.2	26	12	M20 x 1.5
	NTH-060	63	32	37	31	14	M24 x 1.5
	NTH-080	80	41	47.3	40	17	M30 x 1.5
NTH-100	100	55	63.5	54	20	M39 x 1.5	

### Double clevis/Double knuckle pin



Material: Rolled steel

Part no.	Bore size (mm)	$D_{f8}$	C	L	m	t	H
CDH-04	32, 40	16 <sup>-0.016/-0.043</sup>	1	62	2.5	4.8	14
CDH-05	50	20 <sup>-0.016/-0.043</sup>	1	76.5	3.5	4.8	18
CDH-08	63, 80	31.5 <sup>-0.016/-0.043</sup>	1.5	93	3.5	4.8	28.5
CDH-10	100	40 <sup>-0.016/-0.043</sup>	2	117	6	6.3	35

CHQ

CHK

CHN

CHM

CHS

CH2

CHA

Related Equipment

D-

# Series CH2E/CH2F/CH2H Auto Switch Specifications

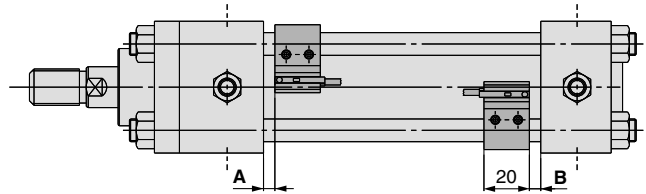
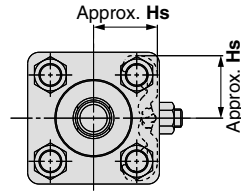
Refer to pages 347 to 406 for detailed specifications.



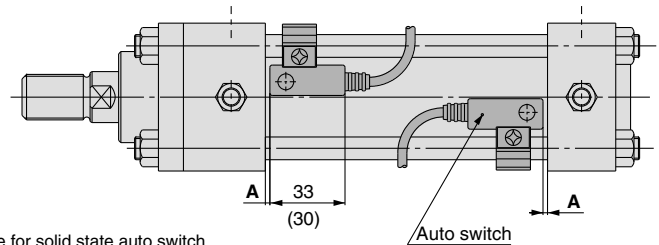
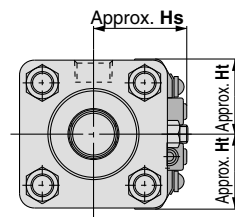
## Auto Switches: Proper Mounting Positions and Mounting Heights for Stroke End Detection

### <Tie-rod mount type>

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



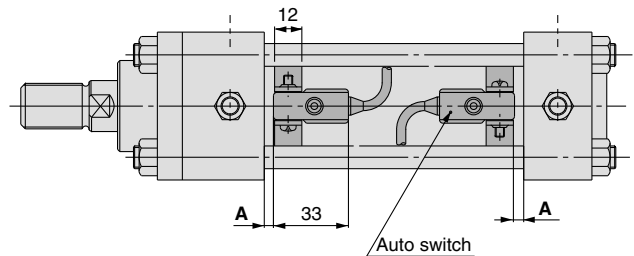
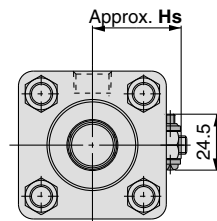
- D-F5□/J5□
- D-F5NTL
- D-F5□W/J59W
- D-F5BAL/F59F
- D-A5□/A6□
- D-A59W



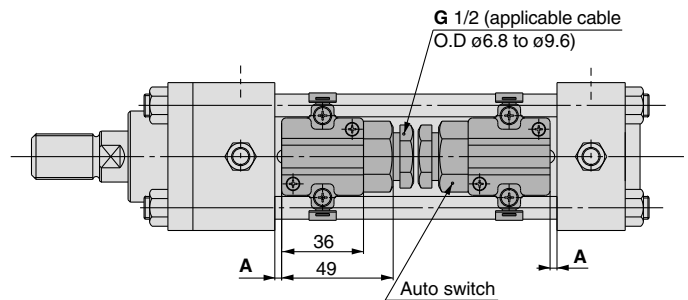
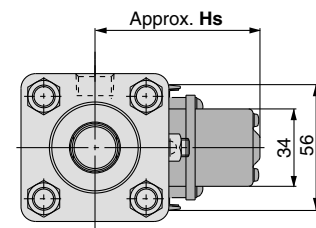
Dimensions inside ( ) are for solid state auto switch.

### <Band mount type>

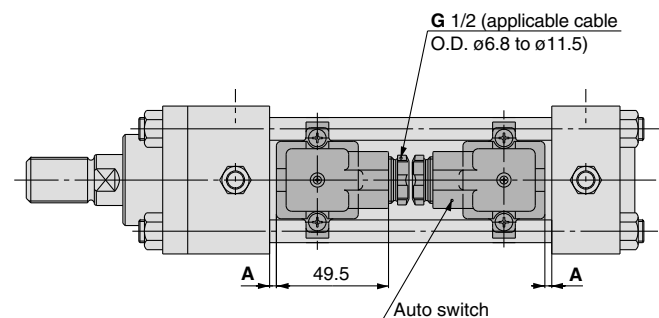
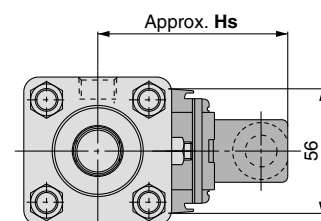
- D-G5□/K59
- D-G5□W/K59W
- D-G5BAL
- D-G59F/G5NNTL
- D-B5□/B64/B59W



- D-G39/K39
- D-A3□



- D-A44



# JIS Standard Hydraulic Cylinder Double Acting/Single Rod *Series CH2E/CH2F/CH2H*

## Auto Switch Proper Mounting Positions

Bore size (mm)	D-M9□/M9□V D-M9□W/M9□WV D-M9□AL/M9□AVL	D-F5□/J5□ D-F5□W/J59W D-F59F/F5BAL	D-F5NTL	D-G5□/K59 D-G5□W/K59W D-G59F/G5BAL D-G5NTL	D-G39□/K39□	<sup>Note2)</sup> D-A9□/A9□V	D-A5□/A6□	D-A59W	D-B5□/B64	D-B59W	D-A3□/A44
	A	A	A	A	A	A	A	A	A	A	A
32	25	21.5	26.5	17	—	—	15	19	15.5	18.5	—
40	26	22.5	27.5	18	16	22	16	20	16.5	19.5	16
50	26	22.5	27.5	18	16	22	16	20	16.5	19.5	16
63	29	25.5	30.5	21	19	25	19	23	19.5	22.5	19
80	33	29.5	34.5	25	23	29	23	27	23.5	26.5	23
100	26	32.5	37.5	28	26	32	26	30	26.5	29.5	26

Note 1) Auto switch models D-G39□, K39□, A3□, A44 cannot be mounted on CH2E, F, Hø32 bore size cylinders.

Note 2) Auto switch models D-A9□ and A9□V cannot be mounted on cylinders with bore sizes CHD2Eø32 to ø100, CHD2Hø32 to ø100, and CHD2Fø32.

Note 3) Adjust the auto switch after confirming the operating conditions in the actual setting.

## Auto Switch Mounting Heights

Unit: mm

Bore size (mm)		D-M9□V/M9□WV D-A9□V <sup>Note1)</sup>	D-F5□/J5□ D-F5□W/J59W D-F59F/F5BAL D-F5NTL		D-A5□/A6□ D-A59W		D-G5□/K59 D-G5□W/K59W D-G59F/G5BAL D-G5NTL D-B5□/B64 D-B59W	D-G39□/K39□ D-A3□ <sup>Note2)</sup>	D-A44 <sup>Note2)</sup>
		Hs	Hs	Ht	Hs	Ht	Hs	Hs	Hs
32	CH2E	32	35	29.5	35	29.5	33.5	—	—
	CH2F	—	34.5	30	34.5	30	32	—	—
	CH2H	31.5	34.5	29.5	34.5	29.5	32.5	—	—
40	CH2E	36	38.5	32.5	38.5	32.5	38	72.5	82.5
	CH2F	—	38	33.5	38	33.5	36.5	71	81
	CH2H	35	38	33	38	33	37	71.5	81.5
50	CH2E	41.5	42	36.5	43	36.5	43.5	78	88
	CH2F	—	41.5	36.5	41.5	36.5	41.5	76	86
	CH2H	40	42	36	42	36	42.5	77	87
63	CH2E	47.5	47	43	48.5	43	50.5	85	95
	CH2F	—	46.5	43	46.5	43	48.5	83	93
	CH2H	47.5	47	43	48.5	43	50.5	85	95
80	CH2E	55.5	57	55.5	58.5	55.5	59	93.5	103.5
	CH2F	—	56.5	55.5	56.5	55.5	57.5	92	102
	CH2H	56	57.5	55.5	59	55.5	59.5	94	104
100	CH2E	65	66.5	67	66.5	67	69.5	104	114
	CH2F	—	65.5	67	65.5	67	68	102.5	112.5
	CH2H	66.5	67.5	67	67.5	67	71	105.5	115.5

Note 1) Auto switch models D-A9□, A9□V cannot be mounted on cylinders with bore sizes CHD2Eø32 to ø100, CHD2Hø32 to ø100, and CHD2Fø32.

Note 2) Auto switch models D-G39□, K39□, A3□, A44 cannot be mounted on cylinders with bore sizes CH2E, F, Hø32.

CHQ

CHK□

CHN

CHM

CHS□

CH2□

CHA

Related Equipment

D-□

# Series CH2E/CH2F/CH2H

## Minimum Auto Switch Mounting Stroke

n: Numbers of auto switched

Auto switch model	Auto switch mounting number	Mounting bracket other than center trunnion		Center trunnion					
		ø32	ø40 to ø100	ø32	ø40	ø50	ø63	ø80	ø100
D-M9□ D-M9□W Note 1)	2 (Different surfaces and same surface), 1	—	15	—	85	90	100		110
	n		$15 + 40 \frac{(n-2)}{2}$ (n = 2, 4, 6, 8...)		$85 + 40 \frac{(n-4)}{2}$ (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-M9□V D-M9□WV Note 1)	2 (Different surfaces and same surface), 1	—	15	—	60	65	75		85
	n		$15 + 30 \frac{(n-2)}{2}$ (n = 2, 4, 6, 8...)		$60 + 30 \frac{(n-4)}{2}$ (n = 4, 8, 12, 16...)	$65 + 30 \frac{(n-4)}{2}$ (n = 4, 8, 12, 16...)	$75 + 30 \frac{(n-4)}{2}$ (n = 4, 8, 12, 16...)		$85 + 30 \frac{(n-4)}{2}$ (n = 4, 8, 12, 16...)
D-M9□AL Note 1)	2 (Different surfaces and same surface), 1	—	15	—	90	95	105		115
	n		$15 + 40 \frac{(n-2)}{2}$ (n = 2, 4, 6, 8...)		$90 + 40 \frac{(n-4)}{2}$ (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...)		$115 + 40 \frac{(n-4)}{2}$ (n = 4, 8, 12, 16...)
D-M9□AVL Note 1)	2 (Different surfaces and same surface), 1	—	15	—	65	70	80		90
	n		$15 + 30 \frac{(n-2)}{2}$ (n = 2, 4, 6, 8...)		$65 + 30 \frac{(n-4)}{2}$ (n = 4, 8, 12, 16...)	$70 + 30 \frac{(n-4)}{2}$ (n = 4, 8, 12, 16...)	$80 + 30 \frac{(n-4)}{2}$ (n = 4, 8, 12, 16...)		$90 + 30 \frac{(n-4)}{2}$ (n = 4, 8, 12, 16...)
D-A9□ Note 2)	2 (Different surfaces and same surface), 1	—	15	—	85	90	100		110
	n		$15 + 40 \frac{(n-2)}{2}$ (n = 2, 4, 6, 8...)		$85 + 40 \frac{(n-4)}{2}$ (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 Note 2)	2 (Different surfaces and same surface), 1	—	15	—	60	65	75		85
	n		$15 + 30 \frac{(n-2)}{2}$ (n = 2, 4, 6, 8...)		$60 + 30 \frac{(n-4)}{2}$ (n = 4, 8, 12, 16...)	$65 + 30 \frac{(n-4)}{2}$ (n = 4, 8, 12, 16...)	$75 + 30 \frac{(n-4)}{2}$ (n = 4, 8, 12, 16...)		$85 + 30 \frac{(n-4)}{2}$ (n = 4, 8, 12, 16...)
D-F5□ D-J5□	2 (Different surfaces), 1	n	15	115	120	130	140		150
	n		$15 + 55 \frac{(n-2)}{2}$ (n = 2, 4, 6, 8...)	$115 + 55 \frac{(n-4)}{2}$ (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...)		$150 + 55 \frac{(n-4)}{2}$ (n = 4, 8, 12, 16...)
D-F5□W D-J59W D-F5BAL D-F59F	2 (Different surfaces), 1	n	15	120	120	135	140		150
	n		$15 + 55 \frac{(n-2)}{2}$ (n = 2, 4, 6, 8...)	$120 + 55 \frac{(n-4)}{2}$ (n = 4, 8, 12, 16...)	$120 + 55 \frac{(n-4)}{2}$ (n = 4, 8, 12, 16...)	$135 + 55 \frac{(n-4)}{2}$ (n = 4, 8, 12, 16...)	$140 + 55 \frac{(n-4)}{2}$ (n = 4, 8, 12, 16...)		$150 + 55 \frac{(n-4)}{2}$ (n = 4, 8, 12, 16...)
D-F5NTL	2 (Different surfaces), 1	n	15	125	130	140	150		160
	n		$15 + 55 \frac{(n-2)}{2}$ (n = 2, 4, 6, 8...)	$125 + 55 \frac{(n-4)}{2}$ (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...)	$150 + 55 \frac{(n-4)}{2}$ (n = 4, 8, 12, 16...)		$160 + 55 \frac{(n-4)}{2}$ (n = 4, 8, 12, 16...)
D-A5□ D-A6□	2 (Different surfaces), 1	n	15	110	115	125	135		145
	n		$15 + 55 \frac{(n-2)}{2}$ (n = 2, 4, 6, 8...)	$110 + 55 \frac{(n-4)}{2}$ (n = 4, 8, 12, 16...)	$115 + 55 \frac{(n-4)}{2}$ (n = 4, 8, 12, 16...)	$125 + 55 \frac{(n-4)}{2}$ (n = 4, 8, 12, 16...)	$135 + 55 \frac{(n-4)}{2}$ (n = 4, 8, 12, 16...)		$145 + 55 \frac{(n-4)}{2}$ (n = 4, 8, 12, 16...)
D-A59W	2 (Different surfaces), 1	n	20	115	125	130	140		150
	n		$20 + 55 \frac{(n-2)}{2}$ (n = 2, 4, 6, 8...)	$115 + 55 \frac{(n-4)}{2}$ (n = 4, 8, 12, 16...)	$125 + 55 \frac{(n-4)}{2}$ (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...)		$150 + 55 \frac{(n-4)}{2}$ (n = 4, 8, 12, 16...)
D-G5□/K59 D-G5□W D-K59W D-G59F D-G5BAL D-G5NTL D-B5□/B64	2	Different surfaces	15	110	115	125	135	145	
		same surface	75						
	n	Different surfaces	$15 + 50 (n-2)$ (n = 2, 4, 6, 8...)	$110 + 50 \frac{(n-4)}{2}$ (n = 4, 8, 12, 16...)	$115 + 50 \frac{(n-4)}{2}$ (n = 4, 8, 12, 16...)	$125 + 50 \frac{(n-4)}{2}$ (n = 4, 8, 12, 16...)	$135 + 50 \frac{(n-4)}{2}$ (n = 4, 8, 12, 16...)	$145 + 50 \frac{(n-4)}{2}$ (n = 4, 8, 12, 16...)	
		same surface	$75 + 50 (n-2)$ (n = 2, 3, 4...)	$90 + 50 (n-2)$ (n = 2, 4, 6, 8...)	$115 + 50 (n-2)$ (n = 2, 4, 6, 8...)	$125 + 50 (n-2)$ (n = 2, 4, 6, 8...)	$135 + 50 (n-2)$ (n = 2, 4, 6, 8...)	$145 + 50 (n-2)$ (n = 2, 4, 6, 8...)	
1		10	110	115	125	135	145		
D-B59W	2	Different surfaces	20	115	130	140	150		
		same surface	75						
	n	Different surfaces	$20 + 50 (n-2)$ (n = 2, 4, 6, 8...)	$115 + 50 \frac{(n-4)}{2}$ (n = 4, 8, 12, 16...)	$130 + 50 \frac{(n-4)}{2}$ (n = 4, 8, 12, 16...)	$140 + 50 \frac{(n-4)}{2}$ (n = 4, 8, 12, 16...)	$150 + 50 \frac{(n-4)}{2}$ (n = 4, 8, 12, 16...)		
		same surface	$75 + 50 (n-2)$ (n = 2, 3, 4...)	$115 + 50 (n-2)$ (n = 2, 4, 6, 8...)	$130 + 50 (n-2)$ (n = 2, 4, 6, 8...)	$140 + 50 (n-2)$ (n = 2, 4, 6, 8...)	$150 + 50 (n-2)$ (n = 2, 4, 6, 8...)		
1		15	115	130	140	150			
D-G39 D-K39 D-A3□ Note 1)	2	Different surfaces	35	—	80		95	105	115
		same surface	100		100				
	n	Different surfaces	$35 + 30 (n-2)$ (n = 2, 3, 4...)	$80 + 30 (n-2)$ (n = 2, 3, 4...)	$95 + 30 (n-2)$ (n = 2, 3, 4...)	$105 + 30 (n-2)$ (n = 2, 3, 4...)	$115 + 30 (n-2)$ (n = 2, 3, 4...)		
		same surface	$100 + 100 (n-2)$ (n = 2, 3, 4...)	$100 + 100 (n-2)$ (n = 2, 3, 4...)		$105 + 100 (n-2)$ (n = 2, 3, 4...)	$115 + 100 (n-2)$ (n = 2, 3, 4...)		
1		10	80	95	105	115			
D-A44 Note 1)	2	Different surfaces	35	—	85		100	110	120
		same surface	55		100				
	n	Different surfaces	$35 + 30 (n-2)$ (n = 2, 3, 4...)	$85 + 30 (n-2)$ (n = 2, 3, 4...)	$100 + 30 (n-2)$ (n = 2, 3, 4...)	$110 + 30 (n-2)$ (n = 2, 3, 4...)	$120 + 30 (n-2)$ (n = 2, 3, 4...)		
		same surface	$55 + 50 (n-2)$ (n = 2, 3, 4...)	$85 + 50 (n-2)$ (n = 2, 3, 4...)	$100 + 50 (n-2)$ (n = 2, 3, 4...)	$110 + 50 (n-2)$ (n = 2, 3, 4...)	$120 + 50 (n-2)$ (n = 2, 3, 4...)		
1		10	85	100	110	120			

Note 1) Auto switch models D-M9□, M9□V, M9□W, M9□WV, M9□AL, M9□AVL, G39□, K39□, A3□, A44 cannot be mounted on cylinders with bore sizes CH2E, F, Hø32.  
 Note 2) Auto switch models D-A9□, A9□V cannot be mounted on cylinders with bore sizes CHD2Eø32 to ø100, CHD2Hø32 to ø100, and CHD2Fø32.



## Operating Range

### CH2E (mm)

Auto switch model	Bore size (mm)					
	32	40	50	63	80	100
D-M9□/M9□V D-M9□W/M9□WV D-M9□AL/M9□AVL	—	5.5	6	7	5.5	6.5
D-F5□/J5□/F59F D-F5□W/J59W D-F5BAL/F5NTL	4.5	4	4.5	4.5	4.5	4.5
D-G5□/K59/G59F D-G5□W/K59W D-G5BAL/G5NTL	4.5	5	5	—	6.5	6.5
D-G39/K39	—	10	10	10.5	9.5	9.5
D-A9□/A9□V	—	—	—	—	—	—
D-A5□/A6□	8	8.5	9.5	9.5	10	11
D-A59W	12	13	13.5	14.5	14.5	15.5
D-B5□/B64	9.5	10.5	11	12.5	13	14.5
D-B59W	11	12	13	14	14	15
D-A3□/A44	—	9.5	10	11	11	12

### CH2H (mm)

Auto switch model	Bore size (mm)					
	32	40	50	63	80	100
D-M9□/M9□V D-M9□W/M9□WV D-M9□AL/M9□AVL	—	5.5	6	7	5.5	6.5
D-F5□/J5□/F59F D-F5□W/J59W D-F5BAL/F5NTL	4.5	4	4.5	4.5	4.5	4.5
D-G5□/K59/G59F D-G5□W/K59W D-G5BAL/G5NTL	4.5	5	5	—	6.5	6.5
D-G39/K39	—	10	10	10.5	9.5	9.5
D-A9□/A9□V	—	—	—	—	—	—
D-A5□/A6□	8	8.5	9.5	9.5	10	11
D-A59W	12	13	13.5	14.5	14.5	15.5
D-B5□/B64	9.5	10.5	11	12.5	13	14.5
D-B59W	11	12	13	14	14	15
D-A3□/A44	—	9.5	10	11	11	12

### CH2F (mm)

Auto switch model	Bore size (mm)					
	32	40	50	63	80	100
D-M9□/M9□V D-M9□W/M9□WV D-M9□AL/M9□AVL	—	5	5	5.5	5	5
D-F5□/J5□/F59F D-F5□W/J59W D-F5BAL/F5NTL	4.5	4	4.5	4.5	4.5	4.5
D-G5□/K59/G59F D-G5□W/K59W D-G5BAL/G5NTL	4.5	5	5	—	6.5	6.5
D-G39/K39	—	10.5	11	11.5	11.5	12.5
D-A9□/A9□V	—	8.5	8.5	9.5	9.5	10.5
D-A5□/A6□	8	8.5	9.5	9.5	10	11
D-A59W	12	13	13.5	14.5	14.5	15.5
D-B5□/B64	9.5	10.5	11	12.5	13	14.5
D-B59W	11	12	13	14	14	15
D-A3□/A44	—	9.5	10	11	11	12

Note 1) Auto switch models D-G39□, K39□, A3□, and A44 cannot be mounted on bore size ø32 cylinders.

Note 2) Auto switch models D-A9□, and A9□V cannot be mounted on cylinders with bore sizes CHD2Eø32 to ø100, CHD2Hø32 to ø100, and CHD2Fø32.

\* 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 Brackets: Part Nos.

### <Tie rod mounting>

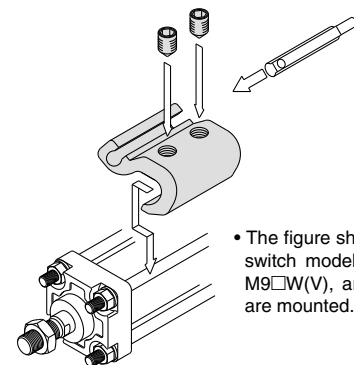
Cylinder model	Auto switch model	Bore size (mm)					
		ø32	ø40	ø50	ø63	ø80	ø100
CH2E/H/F	D-M9□/M9□V D-M9□W/M9□WV D-M9□AL/M9□AVL D-A9□/A9□V (Note)	BA7-063	BA7-063	BA7-063	BA7-080	BS5-160	BS5-180
	D-F5□/J5□ D-F5□W/J59W D-F5BAL/F59F/F5NTL D-A5□/A6□/A59W	BT-06	BT-06	BT-06	BT-08	BT-16	BT-18

### <Band mounting>

Cylinder model	Auto switch model	Bore size (mm)					
		ø32	ø40	ø50	ø63	ø80	ø100
CH2E	D-G39/K39 D-A3□/A44	—	BD1-04M	BD1-05M	BD1-06M	BD1-08M	BD1-10M
	D-G5□/K59 D-G5□W/K59W D-G5BAL/G59F/G5NTL D-B5□/B64/B59W	BA-32	BA-04	BA-05	BA-06	BA-08	BA-10
CH2H	D-G39/K39 D-A3□/A44	—	BD1-04M	BD1-05M	BD1-06M	BH1-080	BH1-100
	D-G5□/K59 D-G5□W/K59W D-G5BAL/G59F/G5NTL D-B5□/B64/B59W	BGS1-032	BH2-040	BH2-050	BA-06	BH2-080	BH2-100
CH2F	D-G39/K39 D-A3□/A44	—	BDS-04M	BDS-05M	BDS-06M	BDS-08M	BDS-10M
	D-G5□/K59 D-G5□W/K59W D-G5BAL/G59F/G5NTL D-B5□/B64/B59W	BAF-32	BAF-04	BAF-05	BAF-06	BAF-08	BAF-10

Note 1) Auto switch models D-G39□, K39□, A3□, and A44 cannot be mounted on CH2E, F, and Hø32 bore sized cylinders.

Note 2) Auto switch models D-A9□ and A9□V cannot be mounted on CHD2Eø32 to ø100, CHD2Hø32 to ø100, and CHD2Fø32 bore sized cylinders.



• The figure shows how auto switch models, D-M9□(V), M9□W(V), and M9□A(V)L are mounted.

### [Stainless steel mounting screw kits]

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

BBA1 : D-F5, J5, A5, and A6  
BBA3 : D-G5, K5, B5, and B6

Note 2) For details on BBA1 and BBA3, refer to page 296.

When D-F5BAL, G5BAL switches are shipped mounted on a cylinder, the above stainless steel screws are used. Also, when switches are shipped separately, BBA1, BBA3 is included.

Note 3) When using the auto switch model, D-M9□A(V), do not use the cast iron set screw included with the auto switch mounting bracket (BA7-□□□, BS5-□□□). Instead, order a separate stainless steel mounting screw kit, and use it after selecting the M4 x 6L stainless steel set screw included in BBA1.

# Series CH2E/CH2F/CH2H

## Stainless Steel Mounting Screw Kit Content Details

Part no.	Content				Applicable auto switch mounting bracket part nos.	Applicable auto switches
	No.	Description	Size	Amount		
BBA1	1	Auto switch mounting screw	M4 x 0.7 x 8L	1	BT-□□	D-A5, A6 D-F5, J5
	2	Set screw	M4 x 0.7 x 6L	2	BT-03, BT-04, BT-05 BT-06, BT-08, BT-12	D-Z7, Z8 D-Y5, Y6, Y7
					BA4-040, BA4-063, BA4-080 BMB4-032, BMB4-050	D-A9 D-M9
					BA7-040, BA7-063, BA7-080	
	3	Set screw	M4 x 0.7 x 8L	2	BT-16, BT-18A, BT-20	D-A5, A6 D-F5, J5
					BS4-125, BS4-160 BS4-180, BS4-200	D-Z7, Z8 D-Y5, Y6, Y7
BS5-125, BS5-160 BS5-180, BS5-200					D-A9 D-M9	
BBA3	4	Auto switch mounting screw	M4 x 0.7 x 22L	1	BA-01, BA-02, BA-32, BA-04 BA-05, BA-06, BA-08, BA-10	D-B5, B6 D-G5, K5
					BA2-020, BA2-025 BA2-032, BA2-040	
					BA5-050, BHN2-025, BSG1-032	
					BH2-040, BH2-050 BH2-080, BH2-100	
					BAF-32, BAF-04, BAF-05 BAF-06, BAF-08, BAF-10	

Besides the models listed in "How to Order," the following auto switches are applicable. Refer to pages 347 to 406 for detailed auto switch specifications.

Auto switch type	Part no.	Electrical entry	Features
Solid state	D-M9NV, M9PV, M9BV	Grommet (perpendicular)	—
	D-M9NWV, M9PWV, M9BWW		Diagnostic indication (2-color display)
	D-M9NAVL, M9PAVL, M9BAVL		Water resistant (2-color display)
	D-F59, F5P, J59	Grommet (in-line)	—
	D-F59W, F5PW, J59W		Diagnostic indication (2-color display)
	D-F5BAL		Water resistant (2-color display)
D-F5NTL, G5NTL		With timer	
Reed	D-A93V, A96V	Grommet (perpendicular)	—
	D-A90V		Without indicator light
	D-A53, A56, B53	Grommet (in-line)	—
	D-A67		Without indicator light

\* Solid state auto switches are also available with pre-wired connector. Refer to pages 389 and 390 for details.

## How to Mount and Move the Auto Switch

### <Applicable auto switch>

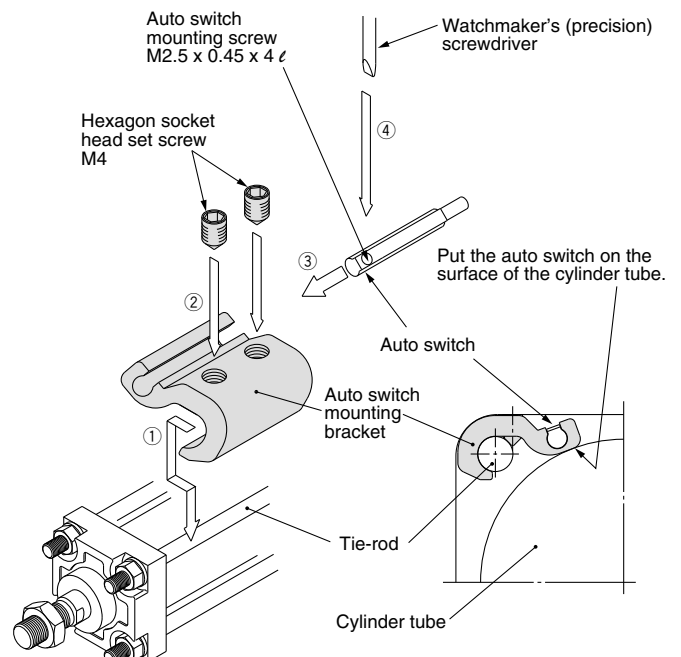
**Solid state** ..... D-M9N(V), D-M9P(V), D-M9B(V)  
D-M9NW(V), D-M9PW(V), D-M9BW(V)  
D-M9NA(V), D-M9PA(V), D-M9BA(V)

- Fix it to the detecting position with a set screw by installing an auto switch mounting bracket in cylinder tie-rod and letting the bottom surface of an auto switch mounting bracket contact the cylinder tube firmly.
- Fix it to the detecting position with a hexagon socket head set screw (M4). (Use a hexagon wrench.)
- Fit an auto switch into the auto switch mounting groove to set it roughly to the mounting position for an auto switch.
- After confirming the detecting position, tighten up the mounting screw (M2.5) attached to an auto switch, and secure the auto switch.
- When changing the detecting position, carry out in the state of 3.

Note 1) To protect auto switches, ensure that main body of an auto switch should be embedded into auto switch mounting groove with a depth of 15 mm or more.

Note 2) Set the tightening torque of a hexagon socket head set screw (M4) to be 1 to 1.2 N·m.

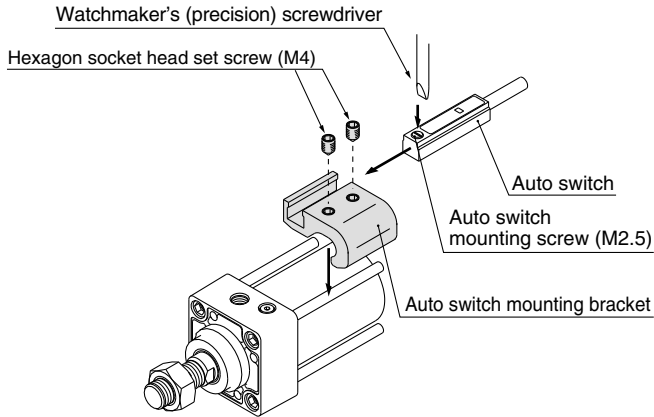
Note 3) When tightening an auto switch mounting screw (M2.5), use a watchmaker's screwdriver with a grip diameter of 5 to 6 mm. Also, set the tightening torque to be 0.05 to 0.15 N·m. As a guide, turn 90° from the position where it comes to feel tight.



## How to Mount and Move the Auto Switch

### <Applicable auto switch>

Reed ..... D-Z73, D-Z76, D-Z80



1. Fix it to the detecting position with a hexagon socket head set screw (M4) by installing an auto switch mounting bracket in cylinder tie-rod and letting the bottom surface of an auto switch mounting bracket contact the cylinder tube firmly. (Use hexagon wrench)
2. Fit an auto switch into the auto switch mounting groove to set it roughly to the auto switch mounting position for an auto switch.
3. After confirming the detecting position, tighten up the mounting screw (M2.5) attached to an auto switch, and secure the switch.
4. When changing the detecting position, carry out in the state of 2.

Note 1) To protect auto switches, ensure that main body of an auto switch should be embedded into auto switch mounting groove with a depth of 15 mm or more.

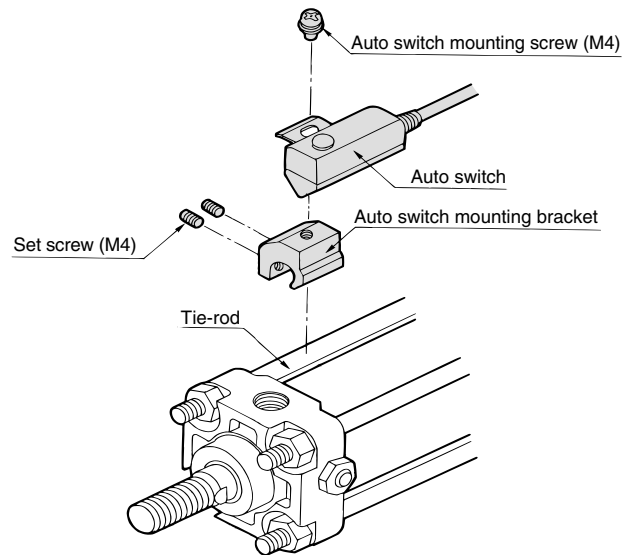
Note 2) Set the tightening torque of a hexagon socket head set screw (M4) to be 1 to 1.2 N·m.

Note 3) When tightening an auto switch mounting screw (M2.5), use a watchmaker's screwdriver with a grip diameter of 5 to 6 mm. Also, set the tightening torque to be 0.05 to 0.15 N·m. As a guide, turn 90° from the position where it comes to feel tight.

### <Applicable auto switch>

Solid state ..... D-F59, D-F5P  
D-J59, D-J51, D-F5BAL  
D-F59W, D-F5PW, D-J59W  
D-F59F, D-F5NTL

Reed ..... D-A53, D-A54, D-A56, D-A64, D-A67  
D-A59W



1. Fix the auto switch on the auto switch mounting bracket with the auto switch mounting screw (M4) and install the set screw.
2. Fit the auto switch mounting bracket into the cylinder tie-rod and then fix the auto switch at the detecting position with the hexagonal wrench. (Be sure to put the auto switch on the surface of cylinder tube.)
3. When changing the detecting position, loosen the set screw to move the auto switch and then re-fix the auto switch on the cylinder tube. (Tightening torque of M4 screw should be 1 to 1.2 N·m.)

CHQ

CHK

CHN

CHM

CHS

CH2

CHA

Related  
Equipment

D-

Please consult with SMC for detailed specifications, delivery and prices.

## 1 Change of Rod End Shape

CH2 Series Mounting type Bore size Rod size series - Stroke Cylinder options - X **A0**

Indicate the rod end shape pattern symbol

<p><b>A1</b></p> <p>Width across flats</p>	<p><b>A2</b></p> <p>C0.5</p>	<p><b>A3</b></p>								
<p><b>A4</b></p> <p>Width across flats</p> <p>Note) Female thread effective depth should be no more than twice the thread diameter.</p>	<p><b>A5</b></p> <p>Width across flats</p> <p>Note) Male thread effective length should be no more than 100 mm.</p>	<p><b>A6</b></p> <p>Width across flats</p> <p>Note) Male thread effective length should be no more than 100 mm.</p>								
<p><b>A7</b></p> <p>Width across flats</p> <p>Note) Male thread effective length should be no more than 100 mm.</p>	<p><b>A0</b></p> <p>When the rod end configuration is the same as the standard type, and only the H dimension or MM dimension is changed, indicate the H dimension or MM dimension.</p> <p>Note 1) Dimensions indicated with an asterisk (*) in the patterns A1, A3, A4 and A5 are provided in the table below.</p> <p>Note 2) The tolerance and finish values not indicated in the figures above are the same as for standard products, or may be at the discretion of SMC.</p> <table border="1"> <thead> <tr> <th>Pattern</th> <th>Dimension for *</th> </tr> </thead> <tbody> <tr> <td><b>A1</b></td> <td rowspan="3">ød-2</td> </tr> <tr> <td><b>A3</b></td> </tr> <tr> <td><b>A4</b></td> </tr> <tr> <td><b>A5</b></td> <td>øD-2</td> </tr> </tbody> </table> <p>If dimensions other than the above are necessary, please indicate as such.</p>		Pattern	Dimension for *	<b>A1</b>	ød-2	<b>A3</b>	<b>A4</b>	<b>A5</b>	øD-2
Pattern	Dimension for *									
<b>A1</b>	ød-2									
<b>A3</b>										
<b>A4</b>										
<b>A5</b>	øD-2									

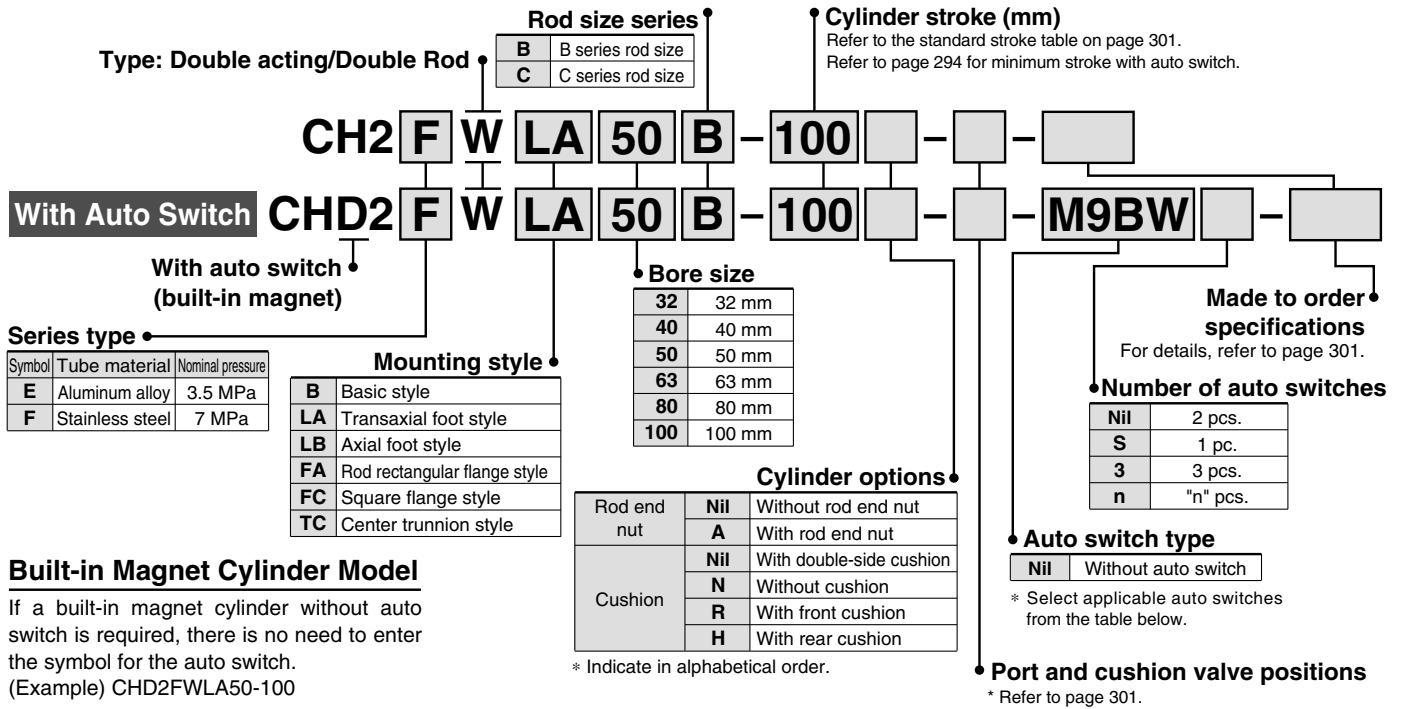
# JIS Standard Hydraulic Cylinder Double Acting/Double Rod

## Series CH2EW/CH2FW

∅32, ∅40, ∅50, ∅63, ∅80, ∅100

3.5 MPa  
7 MPa

### How to Order



### Applicable Auto Switches: Refer to pages 347 to 406 for further details on each auto switch.

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 mount ∅32 ∅40 to ∅100	Band mount ∅32 ∅40 to ∅100	0.5 (Nil)	1 (M)	3 (L)	5 (Z)	None				
Solid state auto switch	—	Terminal conduit	No	3-wire (NPN)	24 V	5 V, 12 V	—	—	M9N	●	●	●	○	—	○	IC circuit	
								F59	G59	●	—	●	○	—	○		
								—	M9P	●	●	●	○	—	○		—
								F5P	G5P	●	—	●	○	—	○		—
								—	M9B	●	●	●	○	—	○		—
								J59	K59	●	—	●	○	—	○		—
	Diagnostic indication (2-color display)	Grommet	Yes	3-wire (NPN)	24 V	5 V, 12 V	—	—	M9NW	●	●	●	○	—	○	IC circuit	
								F59W	G59W	●	—	●	○	—	○		
								—	M9PW	●	●	●	○	—	○		—
								F5PW	G5PW	●	—	●	○	—	○		—
								—	M9BW	●	●	●	○	—	○		—
								J59W	K59W	●	—	●	○	—	○		—
Water resistant (2-color display)	Grommet	No	3-wire (NPN)	24 V	5 V, 12 V	—	—	M9NA	○	○	●	○	—	○	IC circuit		
							—	M9PA	○	○	●	○	—	○			
							—	M9BA	○	○	●	○	—	○		—	
							F5BA	G5BA	—	—	●	○	—	○		—	
							—	M9FA	○	○	●	○	—	○		—	
							J5FA	K5FA	—	—	●	○	—	○		—	
Diagnostic output (2-color display)	Grommet	No	4-wire (NPN)	24 V	5 V, 12 V	—	—	F59F	●	—	●	○	—	○	IC circuit		
							—	G59F	—	—	—	—	—	—		—	
							—	A96*	—	—	●	—	—	—		—	
							—	A93*	—	—	●	—	—	—		—	
							—	A90*	—	—	●	—	—	—		—	
							—	A54	—	—	●	—	—	—		—	
Reed auto switch	—	Terminal conduit	Yes	2-wire	24 V	12 V	—	—	A33	—	—	—	—	●	—		
								—	A34	—	—	—	—	—		●	
								—	A44	—	—	—	—	—		●	
								—	A59W	—	—	—	—	—		—	
								—	B54	—	—	—	—	—		—	
								—	B64	—	—	—	—	—		—	
Diagnostic indication (2-color display)	Grommet	Yes	3-wire (NPN equiv.)	24 V	12 V	—	—	A33	—	—	—	—	●	—			
							—	A34	—	—	—	—	—		●		
							—	A44	—	—	—	—	—		●		
							—	A59W	—	—	—	—	—		—		
							—	B54	—	—	—	—	—		—		
							—	B64	—	—	—	—	—		—		

\* 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 "○" are produced upon receipt of order.  
 \* Auto switch models D-A9□, D-A9□□ cannot be mounted on CHD2E, CHD2H in all bore sizes, and CHD2F∅32.

\* Since there are applicable auto switches other than listed, refer to page 296 for details.  
 \* For details about auto switches with pre-wired connector, refer to pages 389 and 390.  
 \* D-A9□, M9□, M9□□, and M9□AL auto switches are shipped together. (not assembled). (Only the auto switch mounting bracket is pre-assembled).

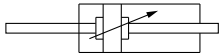
# JIS Standard Hydraulic Cylinder *Series CH2EW/CH2FW*



**Made to order specifications**  
(For details, refer to page 298)

Symbol	Specifications
-XA□	Change of rod end shape

JIS symbol



The auto switch mounting specifications are the same for double acting and single rod. Refer to pages 292 to 297.

- The minimum stroke for mounting auto switch
- Auto switch proper mounting positions (detection at stroke end) and its mounting heights
- Operating range
- Auto switch mounting bracket/Part no.

## Models

Model	CH2EW	CH2FW
<b>Tube material</b>	Aluminum alloy	Stainless steel
<b>Nominal pressure (MPa)</b>	3.5	7
<b>Bore size (mm)</b>	32, 40, 50, 63, 80, 100	

## Specifications

Model	CH2EW	CH2FW
<b>Action</b>	Double acting/Single rod	
<b>Fluid</b>	Hydraulic fluid	
<b>Nominal pressure (MPa)</b>	3.5	7
<b>Maximum allowable pressure (MPa)</b>	3.5	B rod 13.5 C rod 11
<b>Proof pressure (MPa)</b>	5.0	10.5
<b>Minimum operating pressure (MPa)</b>	0.3	
<b>Ambient and fluid temperature</b>	Without auto switch: -10° to 80°C With auto switch: -10° to 60°C	
<b>Piston speed</b>	8 to 300 mm/s	
<b>Cushion</b>	Cushion seal type	
<b>Stroke length tolerance</b>	to 100 st $^{+0.8}_0$ , 101 to 250 st $^{+1.0}_0$ , 251 to 630 st $^{+1.25}_0$ , 631 to 1000 st $^{+1.4}_0$	

Note) Refer to page 134 for definitions of terms related to pressure.

## Standard Strokes

Cylinder bore size (mm)	Standard strokes (mm)
<b>32, 40, 50, 63</b>	25 to 800
<b>80, 100</b>	25 to 1000

Note) Refer to the stroke selection Table in Technical Data 2, starting with pages 151 and 152 determine stroke limitation depending on the type of mounting brackets that will be used. Then make your selection.

## Port and Cushion Valve Positions

Symbol Position	Nil	A	C	D	E	F	G	H
Mounting style Port: Top Cushion valve: Right	Port: Right Cushion valve: Bottom	Port: Left Cushion valve: Top	Port: Top Cushion valve: Left	Port: Top Cushion valve: Bottom	Port: Right Cushion valve: Top	Port: Right Cushion valve: Left	Port: Left Cushion valve: Right	
<b>B</b> (Basic style)								
<b>FA, FB, FC</b> <b>FD, FY, FZ</b> (Flange style) <b>CA, CB</b> (Single clevis style) <b>TC</b> (Center trunnion style)								
<b>LA, LB</b> (Foot style)								

: Piping port : Cushion valve

\* The cylinder's exterior dimensions represented here are as seen from the rod end of the cylinder.

CHK

CHK□

CHN

CHM

CHS□

CH2□

CHA

Related Equipment

D-□

# Series CH2EW/CH2FW

## Rod Sizes

(mm)

Bore size (mm) \ Rod size series *	32	40	50	63	80	100
B-series	18	22.4	28	35.5	45	56
C-series	—	18	22.4	28	35.5	45

\* Based on JIS B8367.

## Accessories (Optional)

Refer to page 291.

Single knuckle, Double Knuckle Lock nut, Knuckle pin

## Hydraulic Fluid Compatibility

Hydraulic fluid	Compatibility
Standard mineral hydraulic fluid	Compatible
W/O hydraulic fluid	Compatible
O/W hydraulic fluid	Compatible
Water/Glycol hydraulic fluid	*
Phosphate hydraulic fluid	Not compatible

\* Consult with SMC.

## Cushion Stroke

(mm)

Bore size (mm)	32	40	50	63	80	100
Effective cushion stroke	16	16	17	16	20	23

## Mass

Unit: kg

Bore size (mm)	Mounting style Series	B	LA	FC	TC	LB	FA	Additional mass (per 10 mm stroke)	
		Basic	Transaxial foot	Square flange	Center trunnion	Axial foot	Rectangular flange (7 MPa)		
B-series rod	32	CH2E	2.94	3.93	3.79	3.43	3.44	3.38	0.04
		CH2F	2.93	3.92	3.78	3.42	3.43	3.37	0.04
	40	CH2E	3.82	5.12	4.91	4.41	4.40	4.41	0.08
		CH2F	3.79	5.09	4.88	4.38	4.37	4.38	0.08
	50	CH2E	6.37	8.97	8.33	7.21	7.17	7.45	0.09
		CH2F	6.27	8.87	8.23	7.11	7.07	7.35	0.10
	63	CH2E	9.75	13.63	12.65	11.29	11.37	11.36	0.17
		CH2F	9.16	13.04	12.06	10.70	10.78	10.77	0.17
	80	CH2E	15.00	20.35	19.59	17.02	17.36	17.69	0.24
		CH2F	14.36	19.71	18.95	16.38	16.72	17.05	0.26
100	CH2E	21.82	32.63	29.29	25.47	25.24	26.42	0.41	
	CH2F	21.26	32.06	28.73	24.91	24.68	25.86	0.46	

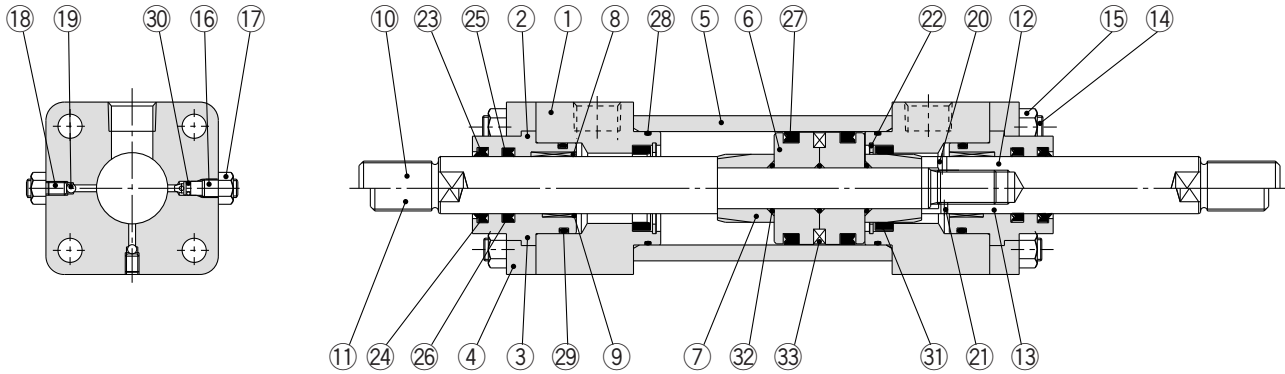
Bore size (mm)	Mounting style Series	B	LA	FC	TC	LB	FA	Additional mass (per 10 mm stroke)	
		Basic	Transaxial foot	Square flange	Center trunnion	Axial foot	Rectangular flange (7 MPa)		
C-series rod	40	CH2E	3.74	5.04	4.83	4.33	4.32	4.33	0.07
		CH2F	3.71	5.01	4.80	4.30	4.29	4.30	0.07
	50	CH2E	6.21	8.81	8.17	7.05	7.01	7.29	0.07
		CH2F	6.11	8.71	8.07	6.95	6.91	7.19	0.08
	63	CH2E	9.44	13.32	12.34	10.98	11.06	11.05	0.14
		CH2F	8.86	12.74	11.76	10.40	10.48	10.47	0.14
	80	CH2E	14.56	19.91	19.15	16.58	16.92	17.25	0.18
		CH2F	13.92	19.27	18.51	15.94	16.28	16.61	0.21
	100	CH2E	20.76	31.57	28.23	24.41	24.18	25.36	0.29
		CH2F	20.20	31.01	27.67	23.85	23.62	24.80	0.30

## Theoretical Output

Unit: N

	Bore size (mm)	Rod size (mm)	Piston area (mm <sup>2</sup> )	Nominal pressure (MPa)			
				1	3.5	5	7
B-series rod	32	18	550	550	1923	2748	3847
	40	22.4	862	862	3017	4311	6035
	50	28	1347	1347	4715	6735	9429
	63	35.5	2126	2126	7442	10632	14885
	80	45	3434	3434	12020	17172	24041
C-series rod	40	18	1002	1002	3506	5008	7012
	50	22.4	1569	1569	5490	7843	10980
	63	28	2500	2500	8751	12501	17502
	80	35.5	4035	4035	14121	20174	28243
	100	45	6260	6260	21911	31302	43823

## Construction



### Parts List

No.	Description	Material	Note
1	Rod cover	Carbon steel	
2	Seal holder (B-series rod)	Carbon steel	
3	Seal holder (C-series rod)	Carbon steel	
4	Retainer	Carbon steel	
5	Cylinder tube	CH2E Aluminum alloy CH2F Stainless steel	Hard anodized
6	Piston	Aluminum alloy	
7	Cushion ring	Rolled steel	
8	Bushing (B-series rod)	Copper alloy	
9	Bushing (C-series rod)	Copper alloy	
10	Piston rod A (B-series rod)	Carbon steel	Hard chromium electroplated
11	Piston rod A (C-series rod)	Carbon steel	Hard chromium electroplated
12	Piston rod B (B-series rod)	Carbon steel	Hard chromium electroplated
13	Piston rod B (C-series rod)	Carbon steel	Hard chromium electroplated
14	Tie-rod	Carbon steel	
15	Tie-rod nut	Carbon steel	
16	Cushion valve	Alloy steel	
17	Lock nut	Carbon steel	
18	Air release valve	Alloy steel	
19	Check ball	Bearing steel	
20	Spring pin (B-series rod)	Carbon tool steel	
21	Spring pin (C-series rod)	Carbon tool steel	
22	Retaining ring	Carbon tool steel	
23	Scraper (B-series rod)	NBR	
24	Scraper (C-series rod)	NBR	
25	Rod seal (B-series rod)	NBR	
26	Rod seal (C-series rod)	NBR	
27	Piston seal	NBR	
28	Cylinder tube gasket	NBR	
29	Holder gasket	NBR	
30	Cushion valve seal	NBR	
31	Cushion seal	—	
32	Gasket	NBR	
33	Magnet	—	

### Replacement Parts: Seal Kit

Bore size (mm)	Seal kit no.		Content
	B-series rod	C-series rod	
40	CH2EW40B-PS CH2FW40B-PS	CH2EW40C-PS CH2FW40C-PS	Nos. 23 through 31 from the chart at left
50	CH2EW50B-PS CH2FW50B-PS	CH2EW50C-PS CH2FW50C-PS	
63	CH2EW63B-PS CH2FW63B-PS	CH2EW63C-PS CH2FW63C-PS	
80	CH2EW80B-PS CH2FW80B-PS	CH2EW80C-PS CH2FW80C-PS	
100	CH2EW100B-PS CH2FW100B-PS	CH2EW100C-PS CH2FW100C-PS	

\* Seal kit consists of items 23 through 31 and can be ordered using the seal kit number for each bore size.

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Related  
Equipment

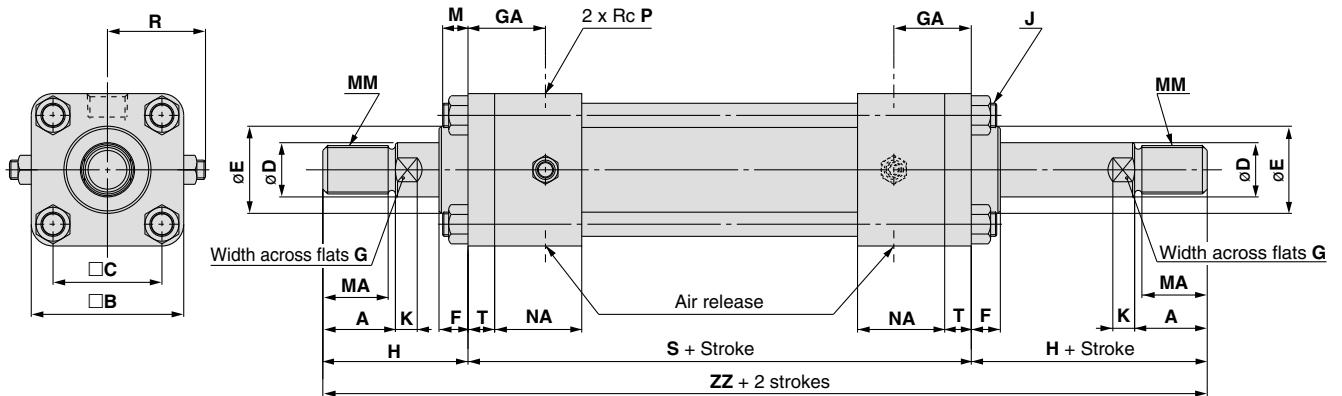
D-



# Series CH2EW/CH2FW

## Dimensions

Basic style: CH2EWB, CH2FWB



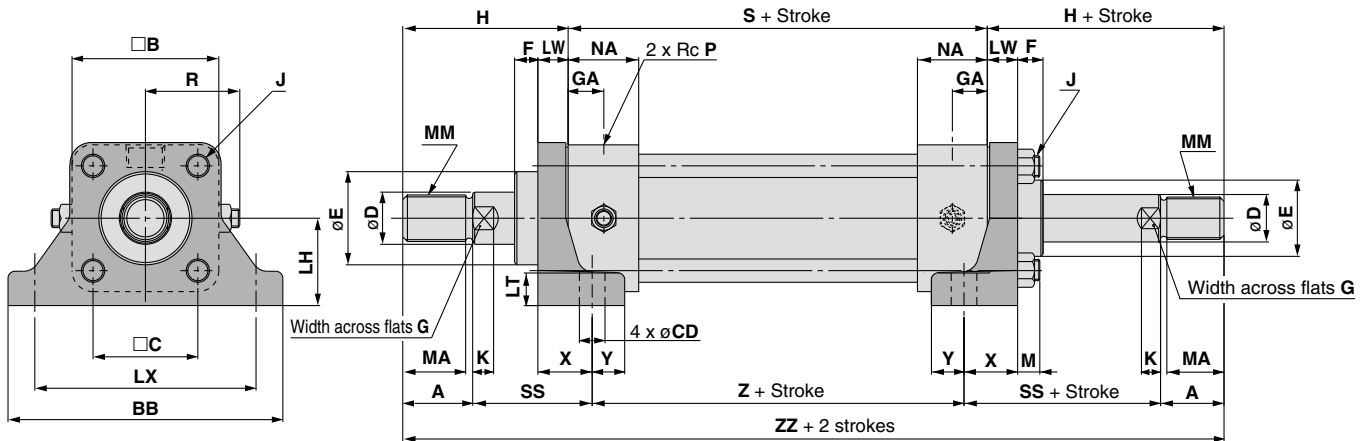
Bore size (mm)	Stroke range (mm)	□B	□C	F	GA	J	M	NA	P	R	S	T
32	25 to 800	58	38	16	32	M10 x 1.25	11	37	3/8	39	158	11
40	25 to 800	65	45	12	32	M10 x 1.25	11	36	3/8	42	158	11
50	25 to 800	76	52	15	40	M10 x 1.25	11	43	1/2	46	176	13
63	25 to 800	90	63	15	42	M12 x 1.5	14	43	1/2	52	186	15
80	25 to 1000	110	80	17	40	M16 x 1.5	16	44	3/4	65	202	18
100	25 to 1000	135	102	19	42	M18 x 1.5	18	44	3/4	75	212	20

### Rod series

Bore size (mm)	B-series rod										C-series rod							
	MM	A	MA	D	E	K	G	H	ZZ	MM	A	MA	D	E	K	G	H	ZZ
32	M16 x 1.5	25	22	18	34	7	14	55	268	—	—	—	—	—	—	—	—	—
40	M20 x 1.5	30	27	22.4	40	9	19	60	278	M16 x 1.5	25	22	18	36	7	14	55	268
50	M24 x 1.5	35	32	28	46	11	24	65	306	M20 x 1.5	30	27	22.4	40	9	19	60	296
63	M30 x 1.5	45	42	35.5	55	13	30	80	346	M24 x 1.5	35	32	28	46	11	24	70	326
80	M39 x 1.5	60	57	45	65	15	41	95	392	M30 x 1.5	45	42	35.5	55	13	30	80	362
100	M48 x 1.5	75	72	56	80	16	50	115	442	M39 x 1.5	60	57	45	65	15	41	100	412

# JIS Standard Hydraulic Cylinder Double Acting/Double Rod *Series CH2EW/CH2FW*

## Transaxial foot style: CH2EWLA, CH2FWLA



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Related Equipment

**D-**

Bore size (mm)	Stroke range (mm)	BB	B	C	CD	F	GA	J	LH	LT	LW	LX	M	NA	P	R	S	SS	X	Y	Z		
32	25 to 800	109	58	38	11	14	21	M10 x 1.25	35	±0.15	14	13	88	±0.18	11	37	3/8	39	136	57	29	14	104
40	25 to 800	118	65	45	11	10	21	M10 x 1.25	37.5		14	13	95		11	36	3/8	42	136	57	29	14	104
50	25 to 800	145	76	52	14	10	27	M10 x 1.25	45		17	18	115		11	43	1/2	46	150	60	35	18	116
63	25 to 800	165	90	63	18	10	27	M12 x 1.5	50	±0.25	19	20	132	±0.20	14	43	1/2	52	156	71	41	19	114
80	25 to 1000	190	110	80	18	11	22	M16 x 1.5	60		24	24	155		16	44	3/4	65	166	74	45	20	124
100	25 to 1000	230	135	102	22	11	22	M18 x 1.5	71		27	28	190		±0.23	18	44	3/4	75	172	85	53	22

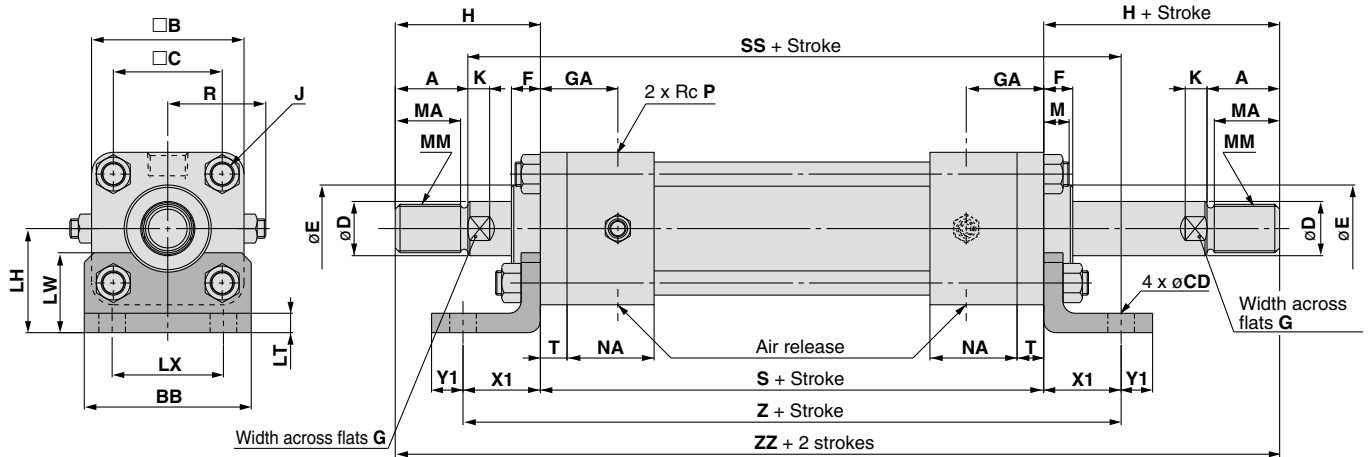
### Rod series

Bore size (mm)	B-series rod									C-series rod									
	MM	A	MA	D	E	K	G	H	ZZ	MM	A	MA	D	E	K	G	H	ZZ	
32	M16 x 1.5	25	22	18	34	7	14	66	268	—	—	—	—	—	—	—	—	—	—
40	M20 x 1.5	30	27	22.4	40					9	19	71	278	M16 x 1.5	25	22	18	36	7
50	M24 x 1.5	35	32	28	46	11	24	78	306	M20 x 1.5	30	27	22.4	40	9	19	73	296	
63	M30 x 1.5	45	42	35.5	55	13	30	95	346	M24 x 1.5	35	32	28	46	11	24	85	326	
80	M39 x 1.5	60	57	45	65	15	41	113	392	M30 x 1.5	45	42	35.5	55	13	30	98	362	
100	M48 x 1.5	75	72	56	80	16	50	135	442	M39 x 1.5	60	57	45	65	15	41	120	412	

# Series CH2EW/CH2FW

## Dimensions

Axial foot style: CH2EWLB, CH2FWLB



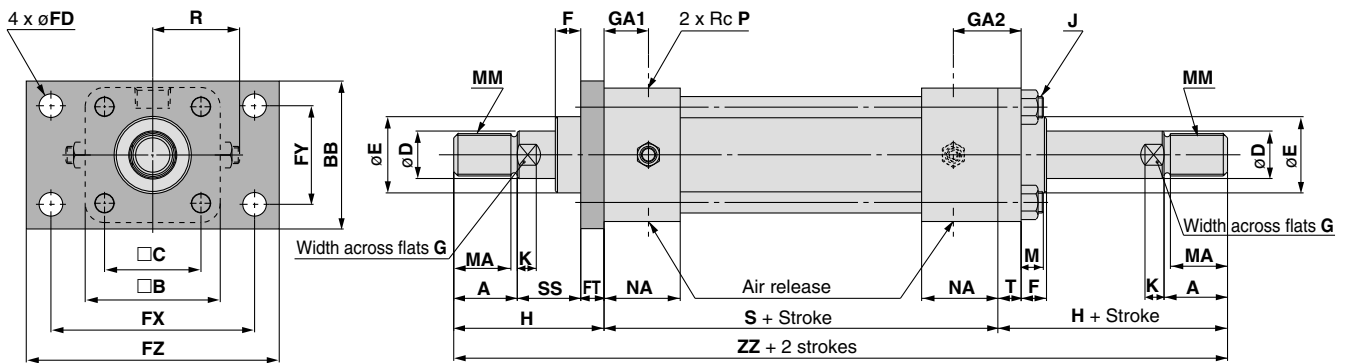
Bore size (mm)	Stroke range (mm)	BB	□B	□C	CD	F	GA	J	LH	LT	LW	LX	M	NA	P	R	S	SS	T	X1	Y1	Z		
32	25 to 800	62	58	38	11	16	32	M10 x 1.25	40	±0.15	8	30	40	±0.13	11	37	3/8	39	158	220	11	32	13	222
40	25 to 800	69	65	45	11	12	32	M10 x 1.25	43		8	33	46		11	36	3/8	42	158	220	11	32	13	222
50	25 to 800	85	76	52	14	15	40	M10 x 1.25	50		8	37	58		11	43	1/2	46	176	241	13	35	15	246
63	25 to 800	98	90	63	18	15	42	M12 x 1.5	60	±0.15	10	45	65	±0.15	14	43	1/2	52	186	263	15	42	18	270
80	25 to 1000	118	110	80	18	17	40	M16 x 1.5	72		12	50	87		16	44	3/4	65	202	287	18	50	20	302
100	25 to 1000	150	135	102	22	19	42	M18 x 1.5	85		12	55	109		18	44	3/4	75	212	307	20	55	23	322

### Rod series

Bore size (mm)	B-series rod										C-series rod									
	MM	A	MA	D	E	K	G	H	ZZ	MM	A	MA	D	E	K	G	H	ZZ		
32	M16 x 1.5	25	22	18	34	-0.025 -0.064	7	14	55	268	—	—	—	—	—	—	—	—		
40	M20 x 1.5	30	27	22.4	40		9	19	60	278	M16 x 1.5	25	22	18	36	7	14	55	268	
50	M24 x 1.5	35	32	28	46	-0.030 -0.076	11	24	65	306	M20 x 1.5	30	27	22.4	40	9	19	60	296	
63	M30 x 1.5	45	42	35.5	55		13	30	80	346	M24 x 1.5	35	32	28	46	11	24	70	326	
80	M39 x 1.5	60	57	45	65	-0.036 -0.090	15	41	95	392	M30 x 1.5	45	42	35.5	55	13	30	80	362	
100	M48 x 1.5	75	72	56	80		16	50	115	442	M39 x 1.5	60	57	45	65	15	41	100	412	

# JIS Standard Hydraulic Cylinder Double Acting/Double Rod *Series CH2EW/CH2FW*

Rod rectangular flange style: CH2EWFA, CH2FWFA



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Related Equipment

D-

Bore size (mm)	Stroke range (mm)	BB	□B	□C	F	FD	FT	FX		FY		FZ	GA1	GA2	J	M	NA	P	R	S	SS	T
								±0.2	±0.18	±0.13	±0.15											
32	25 to 800	62	58	38	16	11	11	88	40	109	21	32	M10 x 1.25	11	37	3/8	39	136	30	11		
40	25 to 800	69	65	45	12	11	11	95	46	118	21	32	M10 x 1.25	11	36	3/8	42	136	30	11		
50	25 to 800	85	76	52	15	14	13	115	58	145	27	40	M10 x 1.25	11	43	1/2	46	150	30	13		
63	25 to 800	98	90	63	15	18	15	132	65	165	27	42	M12 x 1.5	14	43	1/2	52	156	35	15		
80	25 to 1000	118	110	80	17	18	18	155	87	190	22	40	M16 x 1.5	16	44	3/4	65	166	35	18		
100	25 to 1000	150	135	102	19	22	20	190	109	230	22	42	M18 x 1.5	18	44	3/4	75	172	40	20		

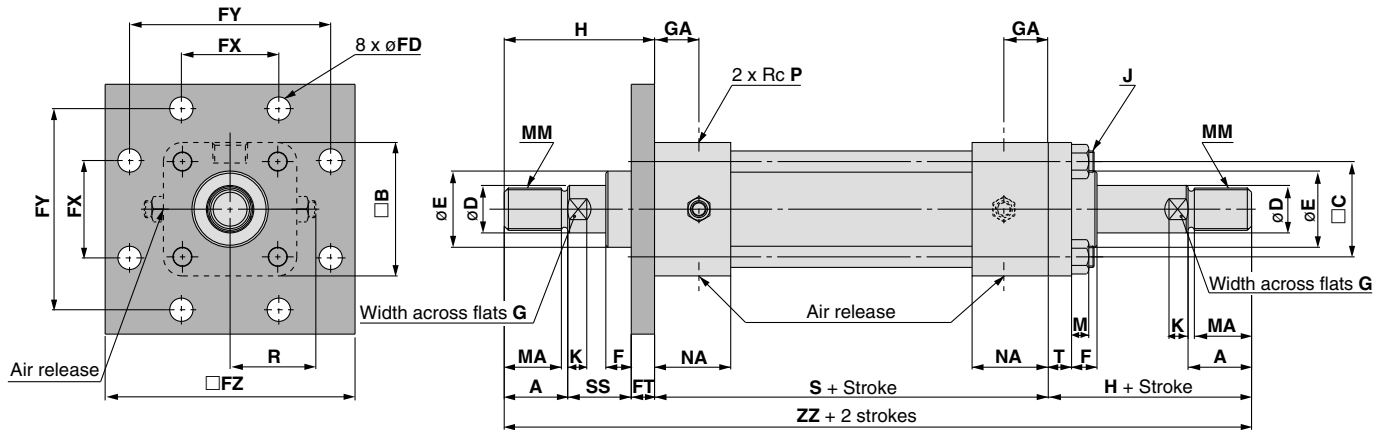
## Rod series

Bore size (mm)	B-series rod										C-series rod									
	MM	A	MA	D	E	K	G	H	ZZ	MM	A	MA	D	E	K	G	H	ZZ		
32	M16 x 1.5	25	22	18	34	7	14	66	268	—	—	—	—	—	—	—	—	—		
40	M20 x 1.5	30	27	22.4	40	9	19	71	278	M16 x 1.5	25	22	18	36	7	14	66	268		
50	M24 x 1.5	35	32	28	46	11	24	78	306	M20 x 1.5	30	27	22.4	40	9	19	73	296		
63	M30 x 1.5	45	42	35.5	55	13	30	95	346	M24 x 1.5	35	32	28	46	11	24	85	326		
80	M39 x 1.5	60	57	45	65	15	41	113	392	M30 x 1.5	45	42	35.5	55	13	30	98	362		
100	M48 x 1.5	75	72	56	80	16	50	135	442	M39 x 1.5	60	57	45	65	15	41	120	412		

# Series CH2EW/CH2FW

## Dimensions

Square flange style: CH2EWFC, CH2FWFC

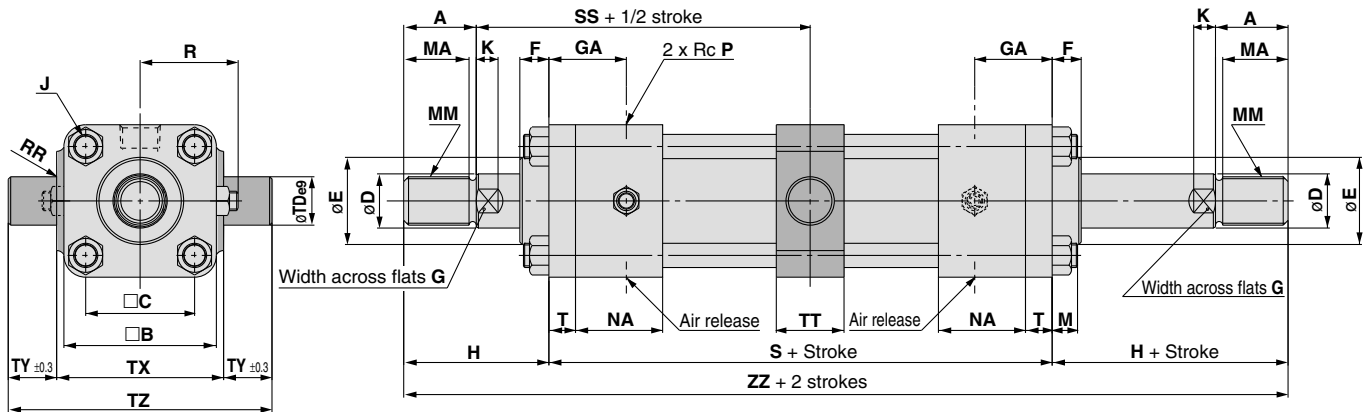


Bore size (mm)	Stroke range (mm)	□B	□C	F	FD	FT	FX		FY		FZ	GA	J	M	NA	P	R	S	SS	T
							40	±0.13	88	±0.18										
32	25 to 800	58	38	16	11	11	40	±0.13	88	±0.18	109	21	M10 x 1.25	11	37	3/8	39	136	30	11
40	25 to 800	65	45	12	11	11	46	±0.13	95	±0.18	118	21	M10 x 1.25	11	36	3/8	42	136	30	11
50	25 to 800	76	52	15	14	13	58	±0.15	115	±0.18	145	27	M10 x 1.25	11	43	1/2	46	150	30	13
63	25 to 800	90	63	15	18	15	65	±0.15	132	±0.2	165	27	M12 x 1.5	14	43	1/2	52	156	35	15
80	25 to 1000	110	80	17	18	18	87	±0.18	155	±0.23	190	22	M16 x 1.5	16	44	3/4	65	166	35	18
100	25 to 1000	135	102	19	22	20	109	±0.18	190	±0.23	230	22	M18 x 1.5	18	44	3/4	75	172	40	20

Bore size (mm)	B-series rod										C-series rod							
	MM	A	MA	D	E	K	G	H	ZZ	MM	A	MA	D	E	K	G	H	ZZ
32	M16 x 1.5	25	22	18	34	7	14	66	268	—	—	—	—	—	—	—	—	—
40	M20 x 1.5	30	27	22.4	40	9	19	71	278	M16 x 1.5	25	22	18	36	7	14	66	268
50	M24 x 1.5	35	32	28	46	11	24	78	306	M20 x 1.5	30	27	22.4	40	9	19	73	296
63	M30 x 1.5	45	42	35.5	55	13	30	95	346	M24 x 1.5	35	32	28	46	11	24	85	326
80	M39 x 1.5	60	57	45	65	15	41	113	392	M30 x 1.5	45	42	35.5	55	13	30	98	362
100	M48 x 1.5	75	72	56	80	16	50	135	442	M39 x 1.5	60	57	45	65	15	41	120	412

# JIS Standard Hydraulic Cylinder Double Acting/Double Rod *Series CH2EW/CH2FW*

Center trunnion style: CH2EWTC, CH2FWTC



CHQ

CHK

CHN

CHM

CHS

CH2

CHA

Related Equipment

D-

Bore size (mm)	Stroke range (mm)	□B	□C	F	GA	J	M	NA	P	R	RR	S	SS	T	TD <sub>e9</sub>	TT	TX	TY	TZ		
																				TD <sub>e9</sub>	TX
32	25 to 800	58	38	16	32	M10 x 1.25	11	37	3/8	39	2	158	113	11	20	-0.040	28	58	0	20	98
40	25 to 800	65	45	12	32	M10 x 1.25	11	36	3/8	42	2	158	113	11	20	-0.092	28	69	-0.3	20	109
50	25 to 800	76	52	15	40	M10 x 1.25	11	43	1/2	46	2.5	176	121	13	25		33	85	0	25	135
63	25 to 800	90	63	15	42	M12 x 1.5	14	43	1/2	52	2.5	186	132	15	31.5		43	98	-0.35	31.5	161
80	25 to 1000	110	80	17	40	M16 x 1.5	16	44	3/4	65	2.5	202	146	18	31.5	-0.050	43	118	0	31.5	181
100	25 to 1000	135	102	19	42	M18 x 1.5	18	44	3/4	75	3	212	156	20	40	-0.112	53	145	-0.4	40	225

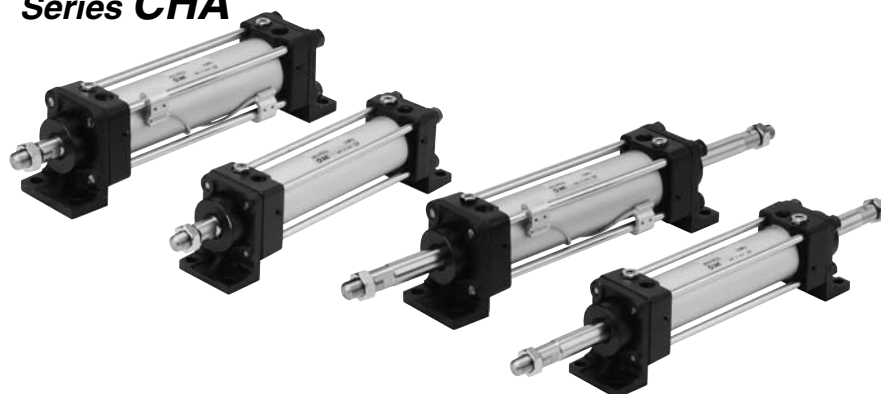
**Rod series**

Bore size (mm)	B-series rod										C-series rod							
	MM	A	MA	D	E	K	G	H	ZZ	MM	A	MA	D	E	K	G	H	ZZ
32	M16 x 1.5	25	22	18	34	7	14	55	268	—	—	—	—	—	—	—	—	—
40	M20 x 1.5	30	27	22.4	40	9	19	60	278	M16 x 1.5	25	22	18	36	7	14	55	268
50	M24 x 1.5	35	32	28	46	11	24	65	306	M20 x 1.5	30	27	22.4	40	9	19	60	296
63	M30 x 1.5	45	42	35.5	55	13	30	80	346	M24 x 1.5	35	32	28	46	11	24	70	326
80	M39 x 1.5	60	57	45	65	15	41	95	392	M30 x 1.5	45	42	35.5	55	13	30	80	362
100	M48 x 1.5	75	72	56	80	16	50	115	442	M39 x 1.5	60	57	45	65	15	41	100	412

# Tie-rod Type Hydraulic Cylinder

## Series *CHA*

Series *CHA*



Nominal pressure: **3.5 MPa**

Bore size (mm): 40, 50, 63, 80, 100, 125, 160

CHQ

CHK

CHN

CHM

CHS

CH2

**CHA**

Related  
Equipment

D-

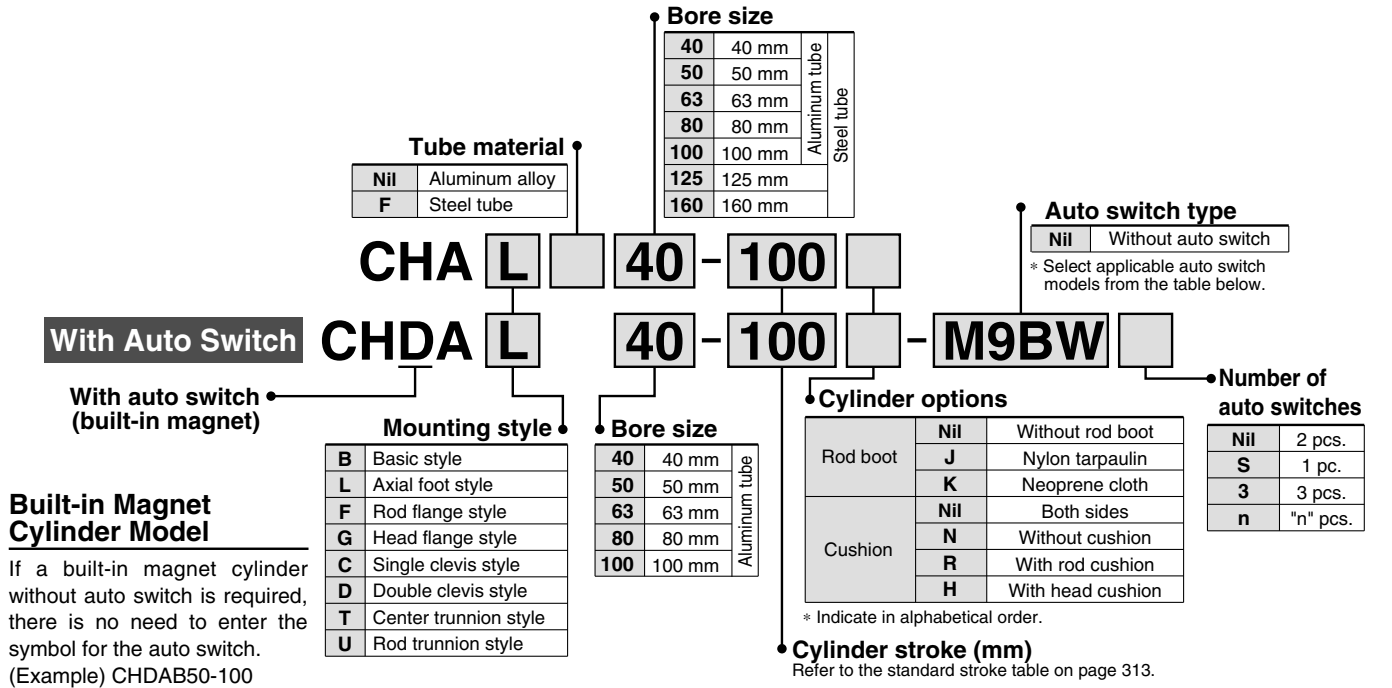
# Tie-rod Type Hydraulic Cylinder Double Acting/Single Rod

## Series *CHA*

3.5 MPa

∅40, ∅50, ∅63, ∅80, ∅100, ∅125, ∅160

### How to Order



### Built-in Magnet Cylinder Model

If a built-in magnet cylinder without auto switch is required, there is no need to enter the symbol for the auto switch.  
(Example) CHDAB50-100

### Applicable Auto Switches: Refer to pages 347 to 406 for further details on each auto switch.

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 mount	Band mount	0.5 (Nil)	1 (M)	3 (L)	5 (Z)	None			
Solid state switch	—	Grommet	—	3-wire (NPN)	24 V	5 V, 12 V	—	M9N	—	●	●	●	○	—	○	IC circuit
								—	G59*	●	●	●	○	—	○	
				3-wire (PNP)	—	●	●	●	○	—	○					
		2-wire		—	●	●	●	○	—	○						
		—		—	100 V, 200 V	J51	—	●	—	●	○	—	—			
		Terminal conduit		—	—	—	—	—	—	—	—	●	—	—		
	Diagnostic indication (2-color display)	Grommet	Yes	3-wire (NPN)	24 V	5 V, 12 V	—	M9NW	—	●	●	●	○	—	○	IC circuit
								—	G59W*	●	●	●	○	—	○	
				3-wire (PNP)	—	●	●	●	○	—	○					
		2-wire		—	●	●	●	○	—	○						
		—		—	100 V, 200 V	M9BW	—	●	●	●	○	—	—			
		Terminal conduit		—	—	—	—	—	—	—	—	●	—	—		
Water resistant (2-color display)	Grommet	—	3-wire (NPN)	24 V	5 V, 12 V	—	M9NA	—	○	○	●	○	—	○	IC circuit	
							—	G59W*	○	○	●	○	—	○		
			3-wire (PNP)	—	○	○	●	○	—	○						
	2-wire		—	○	○	●	○	—	○							
	—		—	100 V, 200 V	M9BA	—	○	○	●	○	—	—				
	Terminal conduit		—	—	—	—	—	—	—	—	●	—	—			
Reed switch	—	Grommet	Yes	3-wire (NPN equiv.)	24 V	5 V	—	A96	—	●	—	●	—	—	—	IC circuit
								—	A93	—	●	—	●	—	—	
				No	—	—	—	—	—	—	—	—	—	—		
		Yes		—	—	—	—	—	—	—	—	—	—			
		No		—	—	—	—	—	—	—	—	—	—			
		Yes		—	—	—	—	—	—	—	—	—	—			
	Diagnostic indication (2-color display)	Grommet	—	3-wire (NPN equiv.)	24 V	12 V	100 V	—	A93	—	●	—	●	—	—	IC circuit
									—	A90	—	●	—	●	—	
				2-wire	—	—	—	—	—	—	—	—	—	—		
		—		—	—	—	—	—	—	—	—	—	—			
		—		—	—	—	—	—	—	—	—	—	—			
		—		—	—	—	—	—	—	—	—	—	—			
Terminal conduit	Grommet	—	3-wire (NPN equiv.)	24 V	12 V	100 V or less	—	A54	—	●	—	●	—	—	IC circuit	
								—	A64	—	●	—	●	—		—
			2-wire	—	—	—	—	—	—	—	—	—	—			
	—		—	—	—	—	—	—	—	—	—	—				
	—		—	—	—	—	—	—	—	—	—	—				
	—		—	—	—	—	—	—	—	—	—	—				
DIN terminal	Grommet	—	3-wire (NPN equiv.)	24 V	12 V	100 V, 200 V	—	A33	—	—	—	—	—	—	IC circuit	
								—	A34	—	—	—	—	—		—
			2-wire	—	—	—	—	—	—	—	—	—	—			
	—		—	—	—	—	—	—	—	—	—	—				
	—		—	—	—	—	—	—	—	—	—	—				
	—		—	—	—	—	—	—	—	—	—	—				
Grommet	Grommet	—	3-wire (NPN equiv.)	24 V	12 V	100 V, 200 V	—	A44	—	—	—	—	—	—	IC circuit	
								—	A59W	—	●	—	●	—		—
			2-wire	—	—	—	—	—	—	—	—	—	—			
	—		—	—	—	—	—	—	—	—	—	—				
	—		—	—	—	—	—	—	—	—	—	—				
	—		—	—	—	—	—	—	—	—	—	—				

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

\* Solid state auto switches marked "○" are produced upon receipt of order.  
\* Types D-G5□, K59, G5□W, K59W, G5BAL, G59F, G5NTL, B5□, B64, and B59W cannot be mounted on ∅63 bore size cylinders.

\* Since there are applicable auto switches other than listed, refer to page 329 for details.

\* For details about auto switches with pre-wired connector, refer to pages 389 and 390.

\* D-A9□, M9□, M9□W, M9□AL auto switches are shipped together (not assembled). (Only auto switch mounting brackets are packed assembled.)



# Tie-rod Type Hydraulic Cylinder Double Acting/Single Rod **Series CHA**

## Models



JIS symbol



Model	Tube material	Bore size (mm)
CHA	Aluminum alloy	40, 50, 63, 80, 100
CHAF	Steel	40, 50, 63, 80, 100, 125, 160

## Specifications

Action	Double acting/Single rod
Fluid	Hydraulic fluid
Nominal pressure	3.5 MPa
Proof pressure	5.0 MPa
Maximum allowable pressure	3.5 MPa
Minimum operating pressure	0.25 MPa
Ambient and fluid temperature	Without auto switch: -10° to 80°C
	With auto switch: -10° to 60°C
Piston speed	8 to 300 mm/s
Cushion	Cushion seal
Stroke length tolerance	to 100st $^{+0.8}_0$ , 100 to 250st $^{+1.0}_0$ , 250 to 630st $^{+1.25}_0$ 630 to 1000st $^{+1.4}_0$ , 1000 to 1500st $^{+1.8}_0$
Mounting	Basic style (B), Axial foot style (L), Rod flange style (F) Head flange style (G), Single clevis style (C), Double clevis style (D), Center trunnion style (T), Rod trunnion style (U)

Note) Refer to page 134 for definitions of terms related to pressure.

## Standard Strokes

Bore size (mm)	Standard strokes (mm)
40	25 to 1000
50	25 to 1000
63	25 to 1000
80	25 to 1300
100	25 to 1500
125	50 to 1300
160	50 to 1500

Note) Refer to the stroke selection Table in Technical Data 2, starting with pages 153 and 154 to determine stroke limitation depending on the type of mounting brackets that will be used. Then make your selection.

## Cushion Strokes (For Rod Side and Head Side)

Bore size (mm)	Effective cushion stroke (mm)
40	15
50	15
63	17
80	20
100	20
125	20
160	22

## Hydraulic Fluid Compatibility

Hydraulic fluid	Compatibility
Standard mineral hydraulic fluid	Compatible
W/O hydraulic fluid	Compatible
O/W hydraulic fluid	Compatible
Water/Glycol hydraulic fluid	Not compatible
Phosphate hydraulic fluid	Not compatible

## Accessories (Options)

Knuckle bracket, Single knuckle Double knuckle, Bracket pin, Knuckle pin Rod boot <sup>Note)</sup> ( Nylon tarpaulin ) ( Neoprene cloth )
---

Note) Maximum ambient temperature:  
Nylon tarpaulin (60°C)  
Neoprene cloth (110°C)

CHQ

CHK

CHN

CHM

CHS

CH2

**CHA**

Related  
Equipment

D-

## Theoretical Output

Unit: N

Bore size (mm)	Rod size (mm)	Operating direction	Piston area (mm <sup>2</sup> )	Operating pressure (MPa)					
				1	1.5	2	2.5	3	3.5
40	18	OUT	1257	1257	1886	2514	3143	3771	4400
		IN	1002	1002	1503	2004	2505	3006	3507
50	20	OUT	1963	1963	2945	3926	4908	5889	6871
		IN	1649	1649	2474	3298	4123	4947	5772
63	22.4	OUT	3117	3117	4676	6234	7793	9351	10910
		IN	2723	2723	4085	5446	6808	8169	9531
80	28	OUT	5027	5027	7541	10054	12568	15081	17595
		IN	4411	4411	6617	8822	11028	13233	15439
100	35.5	OUT	7854	7854	11781	15708	19635	23562	27489
		IN	6864	6864	10296	13728	17160	20592	24024
125	35.5	OUT	12272	12272	18408	24544	30680	36816	42952
		IN	11282	11282	16923	22564	28205	33846	39487
160	45	OUT	20106	20106	30159	40212	50265	60318	70371
		IN	18516	18516	27774	37032	46290	55548	64806

## Mass

### Series CHA (Built-in magnet)

Unit: kg

Bore size (mm)		40	50	63	80	100
(0 mm stroke)	Basic mass					
	Basic style (B)	1.3	2.0	2.6	4.3	6.5
	Axial foot style (L)	1.8	2.9	3.8	6.4	10.0
	Flange style (F, G)	1.6	2.4	3.2	5.2	8.2
	Single clevis style (C)	1.7	2.6	3.6	5.8	9.0
	Double clevis style (D)	1.8	2.9	3.8	6.5	9.9
	Rod trunnion style (U)	1.6	2.4	3.1	6.0	9.4
	Center trunnion style (T)	1.7	2.8	3.4	5.8	9.2
Additional mass per 10 mm stroke		0.05	0.07	0.09	0.12	0.16

 Calculation (Example) **CHAL50-100**

- Basic mass ..... 2.9 (foot type, ø50)
- Additional mass ..... 0.07/10 mm stroke
- Cylinder stroke ..... 100 mm

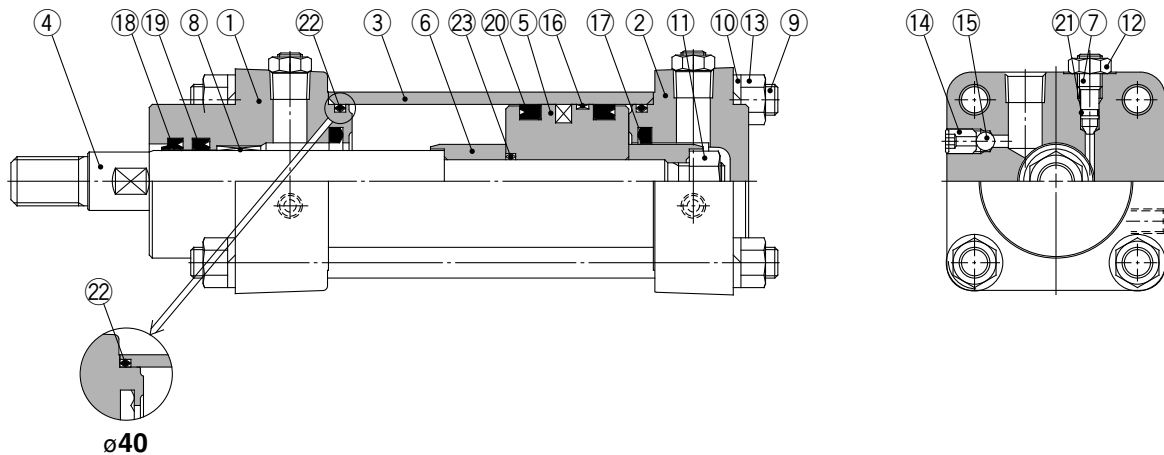
$$2.9 + 0.07 \times 100 / 10 = 3.6 \text{ kg}$$

### Series CHA□F (Steel tube)

Unit: kg

Bore size (mm)		40	50	63	80	100	125	160
(0 mm stroke)	Basic mass							
	Basic style (B)	1.5	2.1	2.7	4.7	7.1	9.2	15.8
	Axial foot style (L)	2.0	3.1	3.9	6.8	10.6	15.8	26.5
	Flange style (F, G)	1.7	2.6	3.2	5.7	8.8	12.1	26.7
	Single clevis style (C)	1.9	2.8	3.6	6.3	9.6	13.0	22.9
	Double clevis style (D)	2.0	3.1	3.9	7.0	10.5	14.7	25.6
	Rod trunnion style (U)	1.7	2.6	3.2	6.5	10.0	13.7	23.6
	Center trunnion style (T)	1.9	2.9	3.4	6.2	9.8	12.9	22.7
Additional mass per 10 mm stroke		0.09	0.08	0.10	0.19	0.24	0.31	0.47

## Construction



### Parts List

No.	Description	Material	Note
1	Rod cover	Aluminum alloy	70% flat black
2	Head cover	Aluminum alloy	70% flat black
3	Cylinder tube	Aluminum alloy Carbon steel	Hard anodized
4	Piston rod	Carbon steel	Hard chromium electroplated
5	Piston	Aluminum alloy	
6	Cushion ring	Rolled steel	
7	Needle valve	Rolled steel	
8	Bushing	Lead bronze	
9	Tie-rod	Carbon steel	
10	Tie-rod washer	Steel wire	
11	Piston nut	Rolled steel	
12	Needle valve nut	Carbon steel	
13	Tie-rod nut	Carbon steel	
14	Air release valve	Alloy steel	
15	Check ball	Bearing steel	
16	Wear ring	Resin	
17	Cushion seal	—	
18	Wiper ring	NBR	
19	Rod seal	NBR	
20	Piston seal	NBR	
21	Needle valve seal	NBR	
22	Cylinder tube gasket	NBR	
23	Piston gasket	NBR	

### Replacement Parts: Seal Kit

Bore size (mm)	Seal kit no.	Content
40	CHA40-PS	Nos. ⑰ to ⑳ from the chart at left
50	CHA50-PS	
63	CHA63-PS	
80	CHA80-PS	
100	CHA100-PS	
125	CHA125-PS	
160	CHA160-PS	

\* Seal kit consists of items ⑰ through ⑳ and can be ordered using the seal kit number for each bore size.

CHQ

CHK

CHN

CHM

CHS

CH2

**CHA**

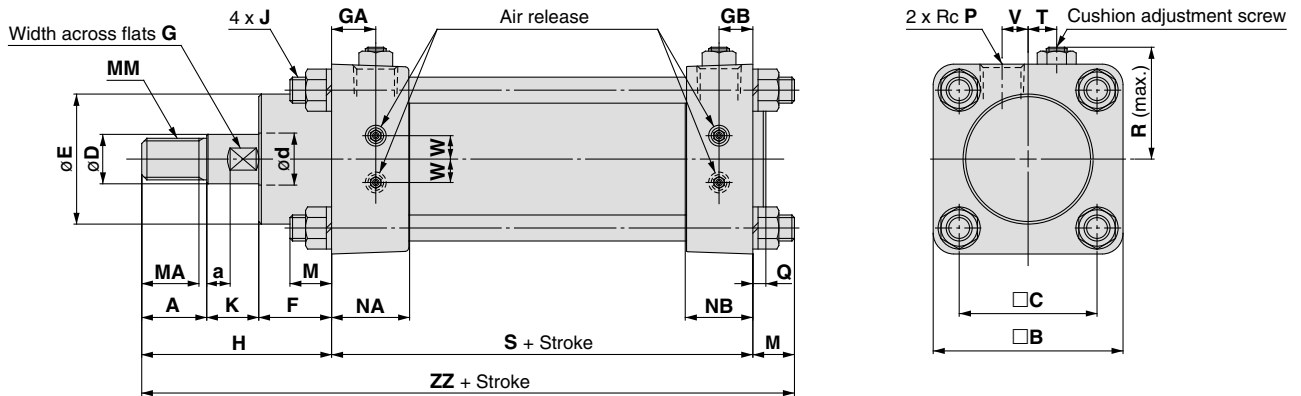
Related Equipment

D-

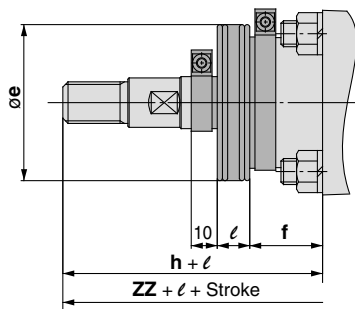
# Series CHA

## Dimensions

### Basic style: CHAB



#### With rod boot

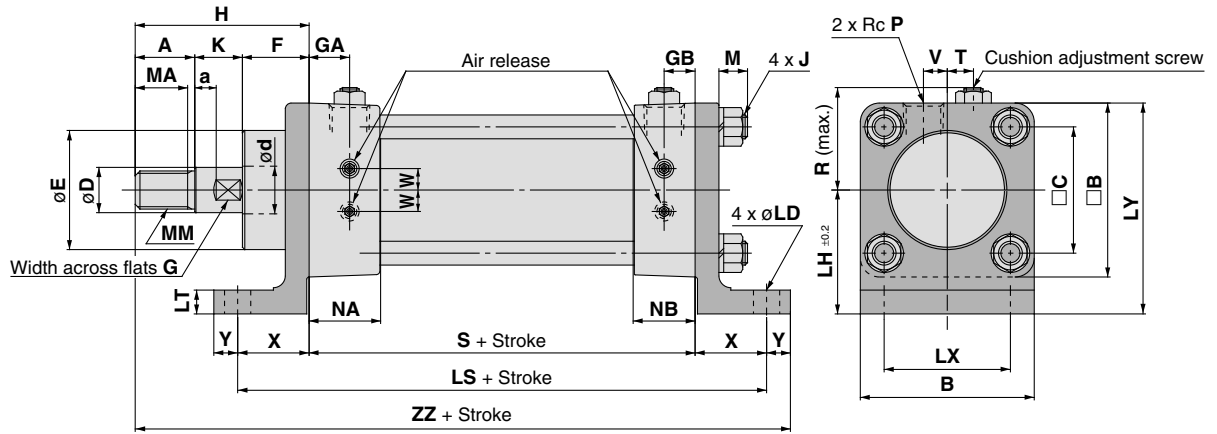


Bore size (mm)	A	a	$\square B$	$\square C$	D	d	E	F	G	GA	GB	J	K	M	MA	MM	NA	NB	P	Q	R	S	T	V	W
40	23	10	60	44	$17 \begin{smallmatrix} 0 \\ -0.018 \end{smallmatrix}$	18	$45 \begin{smallmatrix} 0 \\ -0.062 \end{smallmatrix}$	25	14	17.5	9.5	M8 x 1.25	18	13	20	M14 x 1.5	30	22	1/4	5	37	106	11	7.5	8
50	25	9	73	53	$19 \begin{smallmatrix} 0 \\ -0.021 \end{smallmatrix}$	20	$50 \begin{smallmatrix} 0 \\ -0.062 \end{smallmatrix}$	28	17	17	13	M10 x 1.5	20	16	22	M16 x 1.5	30	26	3/8	5	43	112	11	10	9
63	28	8	80	60	$21 \begin{smallmatrix} 0 \\ -0.021 \end{smallmatrix}$	22.4	$55 \begin{smallmatrix} 0 \\ -0.074 \end{smallmatrix}$	30	17	17	13	M10 x 1.5	22	16	25	M18 x 1.5	30	26	3/8	5	47	116	11	12	10
80	32	8	100	75	$26 \begin{smallmatrix} 0 \\ -0.021 \end{smallmatrix}$	28	$65 \begin{smallmatrix} 0 \\ -0.074 \end{smallmatrix}$	32	22	20	15	M12 x 1.75	26	19	29	M22 x 1.5	35	30	1/2	5	57	127	11	16	13
100	38	6.5	118	90	$34 \begin{smallmatrix} 0 \\ -0.025 \end{smallmatrix}$	35.5	$80 \begin{smallmatrix} 0 \\ -0.074 \end{smallmatrix}$	35	27	19	16	M12 x 1.75	27	21	34	M27 x 2	35	32	1/2	8	66	137	12	20	16
125	38	6.5	140	112	$34 \begin{smallmatrix} 0 \\ -0.025 \end{smallmatrix}$	35.5	$80 \begin{smallmatrix} 0 \\ -0.074 \end{smallmatrix}$	35	27	19	16	M14 x 2	27	24	34	M27 x 2	35	32	1/2	8	77	137	12	20	16
160	42	9	174	140	$43 \begin{smallmatrix} 0 \\ -0.025 \end{smallmatrix}$	45	$100 \begin{smallmatrix} 0 \\ -0.087 \end{smallmatrix}$	38	36	22	18	M16 x 2	28	27	38	M33 x 2	40	36	3/4	8	94	155	12	24	20

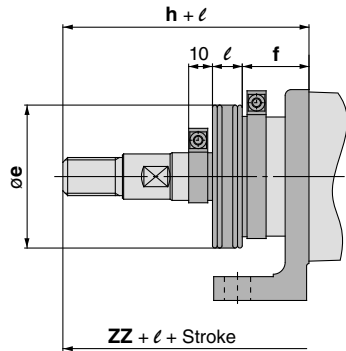
(mm)

Bore size (mm)	Without rod boot		With rod boot				
	H	ZZ	e	f	h	$\ell$	ZZ
40	66	185	55	25	92	1/4 stroke	211
50	73	201	60	28	99		227
63	80	212	65	30	106		238
80	90	236	80	32	116		262
100	100	258	100	35	123	1/5 stroke	281
125	100	261	100	35	123		284
160	108	290	120	38	131		313

Foot style: CHAL



With rod boot



CHQ

CHK

CHN

CHM

CHS

CH2

CHA

Related Equipment

D-

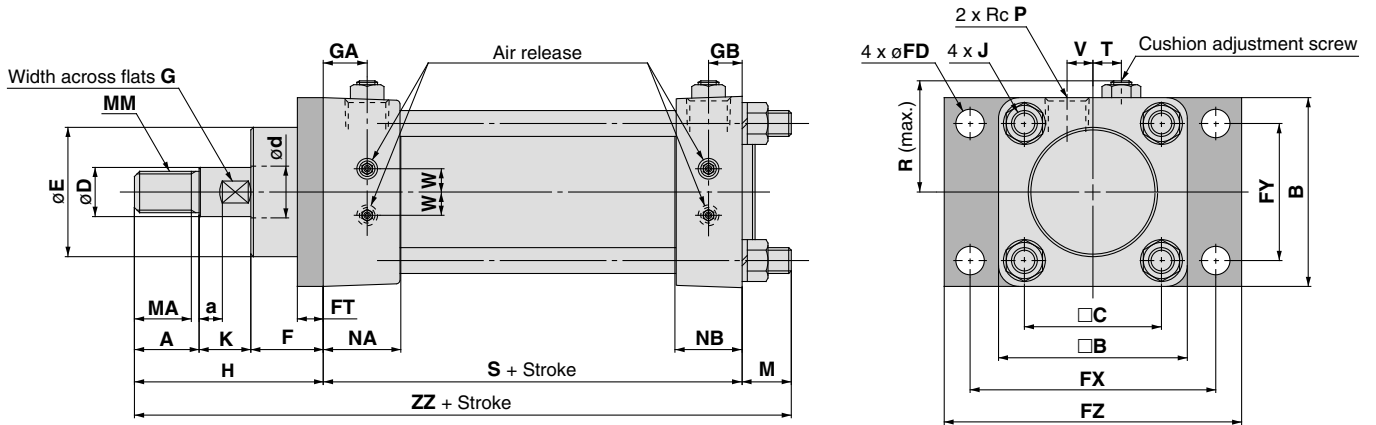
Bore size (mm)	(mm)																								
	A	a	B	□B	□C	D	d	E	F	G	GA	GB	J	K	LD	LH	LS	LT	LX	LY	M	MA	MM	NA	NB
40	23	10	60	60	44	17 <sup>0</sup> <sub>-0.018</sub>	18	45 <sup>0</sup> <sub>-0.062</sub>	25	14	17.5	9.5	M8 x 1.25	18	9	47	160	8	44	77	10	20	M14 x 1.5	30	22
50	25	9	73	73	53	19 <sup>0</sup> <sub>-0.021</sub>	20	50 <sup>0</sup> <sub>-0.062</sub>	28	17	17	13	M10 x 1.5	20	11	52	172	10	53	88.5	12	22	M16 x 1.5	30	26
63	28	8	80	80	60	21 <sup>0</sup> <sub>-0.021</sub>	22.4	55 <sup>0</sup> <sub>-0.074</sub>	30	17	17	13	M10 x 1.5	22	11	55	190	10	60	95	12	25	M18 x 1.5	30	26
80	32	8	100	100	75	26 <sup>0</sup> <sub>-0.021</sub>	28	65 <sup>0</sup> <sub>-0.074</sub>	32	22	20	15	M12 x 1.75	26	13	65	207	12	75	115	14	29	M22 x 1.5	35	30
100	38	6.5	118	118	90	34 <sup>0</sup> <sub>-0.025</sub>	35.5	80 <sup>0</sup> <sub>-0.074</sub>	35	27	19	16	M12 x 1.75	27	13	80	231	14	90	139	14	34	M27 x 2	35	32
125	38	6.5	140	140	112	34 <sup>0</sup> <sub>-0.025</sub>	35.5	80 <sup>0</sup> <sub>-0.074</sub>	35	27	19	16	M14 x 2	27	15	100	247	16	112	170	16	34	M27 x 2	35	32
160	42	9	174	174	140	43 <sup>0</sup> <sub>-0.025</sub>	45	100 <sup>0</sup> <sub>-0.087</sub>	38	36	22	18	M16 x 2	28	17	110	275	18	140	197	18	38	M33 x 2	40	36

Bore size (mm)	(mm)															
	P	R	S	T	V	W	X	Y	Without rod boot		With rod boot					
									H	ZZ	e	f	h	l	ZZ	
40	1/4	37	106	11	7.5	8	27	8	66	207	55	25	92	1/4 stroke	233	
50	3/8	43	112	11	10	9	30	10	73	225	60	28	99		251	
63	3/8	47	116	11	12	10	37	10	80	243	65	30	106		269	
80	1/2	57	127	11	16	13	40	13	90	270	80	32	116		296	
100	1/2	66	137	12	20	16	47	13	100	297	100	35	123	1/5 stroke	322	
125	1/2	77	137	12	20	16	55	15	100	307	100	35	123		328	
160	3/4	94	155	12	24	20	60	20	108	343	120	38	131		366	

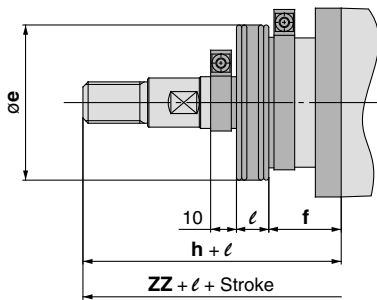
# Series CHA

## Dimensions

### Rod flange style: CHAF



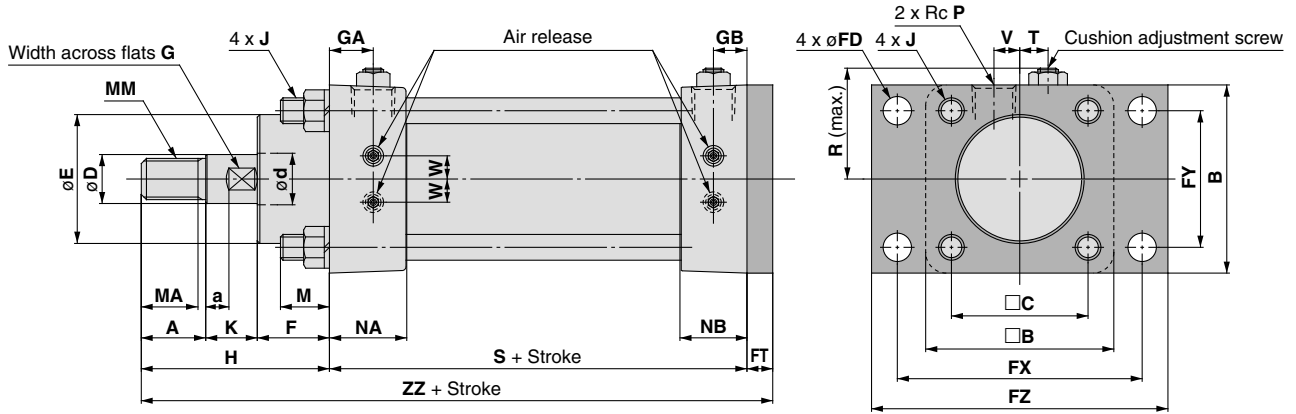
### With rod boot



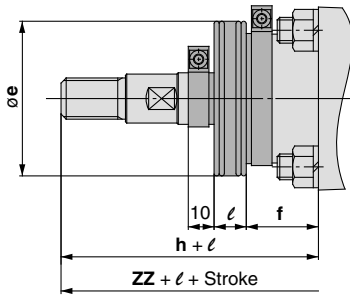
Bore size (mm)	A	a	B	□B	□C	D	d	E	F	FD	FT	FX	FY	FZ	G	GA	GB	J	K	M	MA	MM	NA	NB	P
40	23	10	60	60	44	17 <sup>0</sup> <sub>-0.018</sub>	18	45 <sup>0</sup> <sub>-0.062</sub>	25	9	10	77	44	95	14	17.5	9.5	M8 x 1.25	18	16	20	M14 x 1.5	30	22	1/4
50	25	9	73	73	53	19 <sup>0</sup> <sub>-0.021</sub>	20	50 <sup>0</sup> <sub>-0.062</sub>	28	11	10	95	53	115	17	17	13	M10 x 1.5	20	22	22	M16 x 1.5	30	26	3/8
63	28	8	80	80	60	21 <sup>0</sup> <sub>-0.021</sub>	22.4	55 <sup>0</sup> <sub>-0.074</sub>	30	11	12	102	60	122	17	17	13	M10 x 1.5	22	20	25	M18 x 1.5	30	26	3/8
80	32	8	100	100	75	26 <sup>0</sup> <sub>-0.021</sub>	28	65 <sup>0</sup> <sub>-0.074</sub>	32	13	12	130	75	155	22	20	15	M12 x 1.75	26	26	29	M22 x 1.5	35	30	1/2
100	38	6.5	118	118	90	34 <sup>0</sup> <sub>-0.025</sub>	35.5	80 <sup>0</sup> <sub>-0.074</sub>	35	13	16	145	90	172	27	19	16	M12 x 1.75	27	26	34	M27 x 2	35	32	1/2
125	38	6.5	140	140	112	34 <sup>0</sup> <sub>-0.025</sub>	35.5	80 <sup>0</sup> <sub>-0.074</sub>	35	15	18	170	112	200	27	19	16	M14 x 2	27	30	34	M27 x 2	35	32	1/2
160	42	9	174	174	140	43 <sup>0</sup> <sub>-0.025</sub>	45	100 <sup>0</sup> <sub>-0.087</sub>	38	17	20	205	140	240	36	22	18	M16 x 2	28	34	38	M33 x 2	40	36	3/4

Bore size (mm)	R	S	T	V	W	Without rod boot		With rod boot				
						H	ZZ	e	f	h	ℓ	ZZ
40	37	106	11	7.5	8	66	188	55	25	92	1/4 stroke	214
50	43	112	11	10	9	73	207	60	28	99		233
63	47	116	11	12	10	80	216	65	30	106		242
80	57	127	11	16	13	90	243	80	32	116		269
100	66	137	12	20	16	100	263	100	35	123	1/5 stroke	286
125	77	137	12	20	16	100	267	100	35	123		290
160	94	155	12	24	20	108	297	120	38	131		320

Head flange style: CHAG



With rod boot



CHQ

CHK

CHN

CHM

CHS

CH2

CHA

Related Equipment

D-

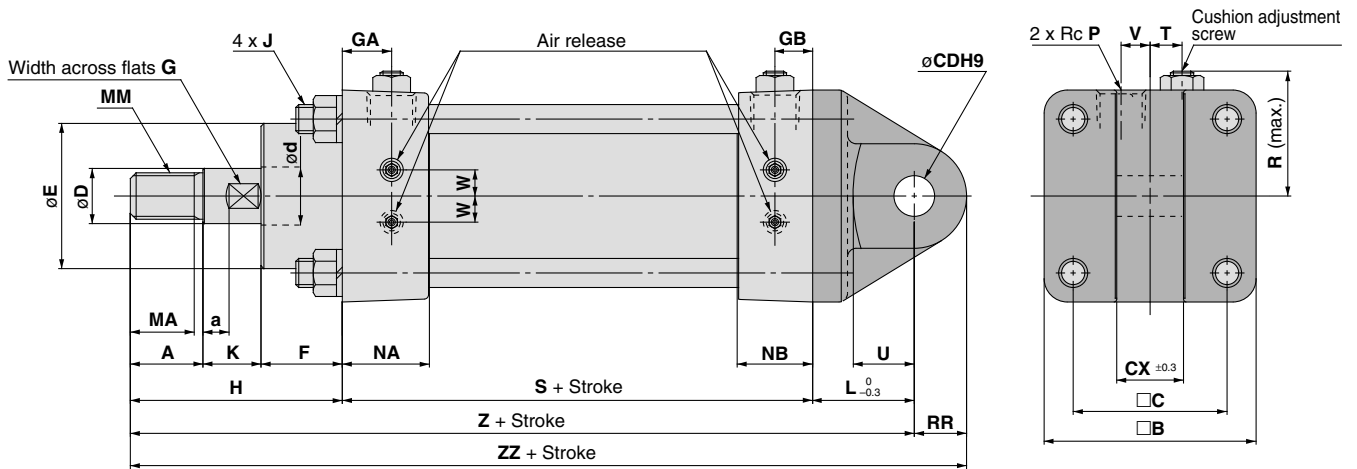
Bore size (mm)	(mm)																								
	A	a	□B	□C	D	d	E	F	FD	FT	FX	FY	FZ	G	GA	GB	J	K	M	MA	MM	NA	NB	P	R
40	23	10	60	44	17 <sup>0</sup> <sub>-0.018</sub>	18	45 <sup>0</sup> <sub>-0.062</sub>	25	9	10	77	44	95	14	17.5	9.5	M8 x 1.25	18	16	20	M14 x 1.5	30	22	1/4	37
50	25	9	73	53	19 <sup>0</sup> <sub>-0.021</sub>	20	50 <sup>0</sup> <sub>-0.062</sub>	28	11	10	95	53	115	17	17	13	M10 x 1.5	20	22	22	M16 x 1.5	30	26	3/8	43
63	28	8	80	60	21 <sup>0</sup> <sub>-0.021</sub>	22.4	55 <sup>0</sup> <sub>-0.074</sub>	30	11	12	102	60	122	17	17	13	M10 x 1.5	22	20	25	M18 x 1.5	30	26	3/8	47
80	32	8	100	75	26 <sup>0</sup> <sub>-0.021</sub>	28	65 <sup>0</sup> <sub>-0.074</sub>	32	13	12	130	75	155	22	20	15	M12 x 1.75	26	26	29	M22 x 1.5	35	30	1/2	57
100	38	6.5	118	90	34 <sup>0</sup> <sub>-0.025</sub>	35.5	80 <sup>0</sup> <sub>-0.074</sub>	35	13	16	145	90	172	27	19	16	M12 x 1.75	27	26	34	M27 x 2	35	32	1/2	66
125	38	6.5	140	112	34 <sup>0</sup> <sub>-0.025</sub>	35.5	80 <sup>0</sup> <sub>-0.074</sub>	35	15	18	170	112	200	27	19	16	M14 x 2	27	30	34	M27 x 2	35	32	1/2	77
160	42	9	174	140	43 <sup>0</sup> <sub>-0.025</sub>	45	100 <sup>0</sup> <sub>-0.087</sub>	38	17	20	205	140	240	36	22	18	M16 x 2	28	34	38	M33 x 2	40	36	3/4	94

Bore size (mm)	(mm)										
	S	T	V	W	Without rod boot		With rod boot				
					H	ZZ	e	f	h	ℓ	ZZ
40	106	11	7.5	8	66	182	55	25	92	1/4 stroke	208
50	112	11	10	9	73	195	60	28	99		221
63	116	11	12	10	80	208	65	30	106		234
80	127	11	16	13	90	229	80	32	116		255
100	137	12	20	16	100	253	100	35	123	1/5 stroke	276
125	137	12	20	16	100	255	100	35	123		278
160	155	12	24	20	108	283	120	38	131		306

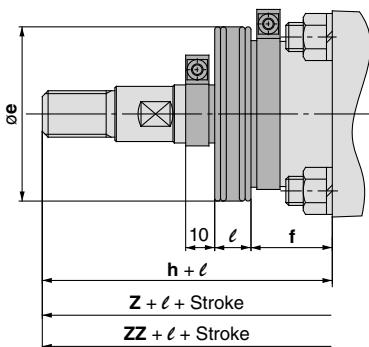
# Series CHA

## Dimensions

### Single clevis style: CHAC



#### With rod boot



Bore size (mm)	(mm)																							
	A	a	□B	□C	CDH9	CX	D	d	E	F	G	GA	GB	J	K	L	MA	MM	NA	NB	P	R	RR	S
40	23	10	60	44	12 <sup>+0.043</sup> <sub>0</sub>	21	17 <sup>0</sup> <sub>-0.018</sub>	18	45 <sup>0</sup> <sub>-0.062</sub>	25	14	17.5	9.5	M8 x 1.25	18	32	20	M14 x 1.5	30	22	1/4	37	15	106
50	25	9	73	53	14 <sup>+0.043</sup> <sub>0</sub>	23	19 <sup>0</sup> <sub>-0.021</sub>	20	50 <sup>0</sup> <sub>-0.062</sub>	28	17	17	13	M10 x 1.5	20	35	22	M16 x 1.5	30	26	3/8	43	18	112
63	28	8	80	60	16 <sup>+0.043</sup> <sub>0</sub>	27	21 <sup>0</sup> <sub>-0.021</sub>	22.4	55 <sup>0</sup> <sub>-0.074</sub>	30	17	17	13	M10 x 1.5	22	40	25	M18 x 1.5	30	26	3/8	47	20	116
80	32	8	100	75	18 <sup>+0.043</sup> <sub>0</sub>	31	26 <sup>0</sup> <sub>-0.021</sub>	28	65 <sup>0</sup> <sub>-0.074</sub>	32	22	20	15	M12 x 1.75	26	45	29	M22 x 1.5	35	30	1/2	57	22	127
100	38	6.5	118	90	20 <sup>+0.052</sup> <sub>0</sub>	35	34 <sup>0</sup> <sub>-0.025</sub>	35.5	80 <sup>0</sup> <sub>-0.074</sub>	35	27	19	16	M12 x 1.75	27	50	34	M27 x 2	35	32	1/2	66	24	137
125	38	6.5	140	112	22 <sup>+0.052</sup> <sub>0</sub>	41	34 <sup>0</sup> <sub>-0.025</sub>	35.5	80 <sup>0</sup> <sub>-0.074</sub>	35	27	19	16	M14 x 2	27	55	34	M27 x 2	35	32	1/2	77	26	137
160	42	9	174	140	25 <sup>+0.052</sup> <sub>0</sub>	54	43 <sup>0</sup> <sub>-0.025</sub>	45	100 <sup>0</sup> <sub>-0.087</sub>	38	36	22	18	M16 x 2	28	65	38	M33 x 2	40	36	3/4	94	30	155

Bore size (mm)	(mm)													
	T	U	V	W	Without rod boot					With rod boot				
					H	Z	ZZ	e	f	h	l	Z	ZZ	
40	11	18	7.5	8	66	204	219	55	25	92	1/4 stroke	230	245	
50	11	21	10	9	73	220	238	60	28	99		246	264	
63	11	23	12	10	80	236	258	65	30	106		262	284	
80	11	26	16	13	90	262	284	80	32	116		288	310	
100	12	30	20	16	100	287	311	100	35	123	1/5 stroke	310	334	
125	12	30	20	16	100	292	318	100	35	123		315	341	
160	12	40	24	20	108	328	358	120	38	131		351	381	

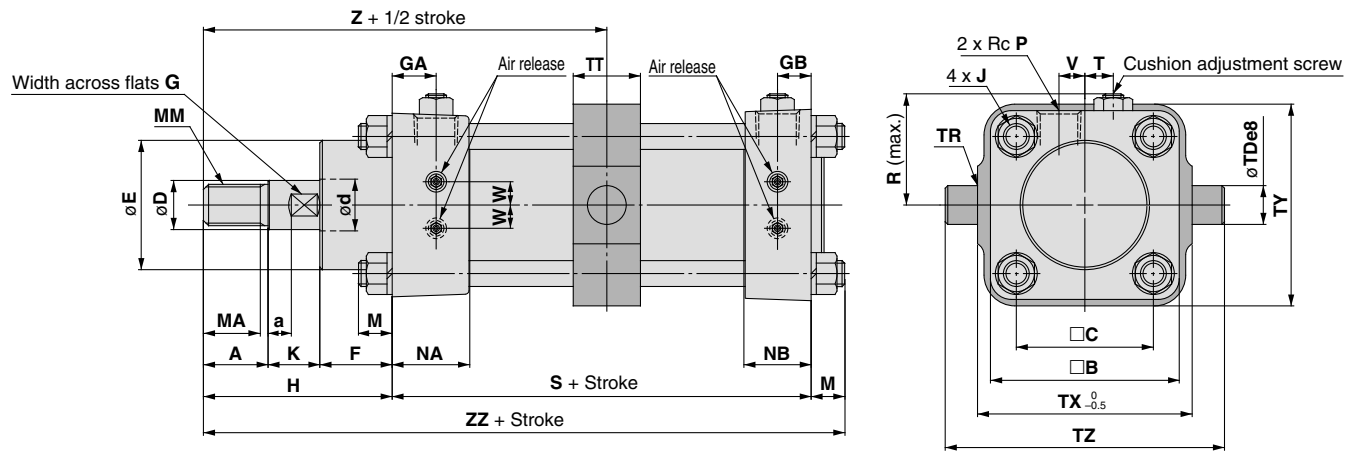




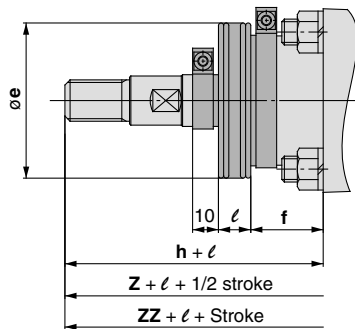
# Series CHA

## Dimensions

### Center trunnion style: CHAT



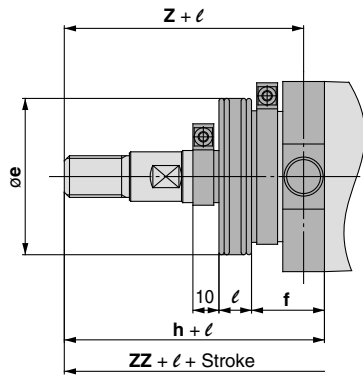
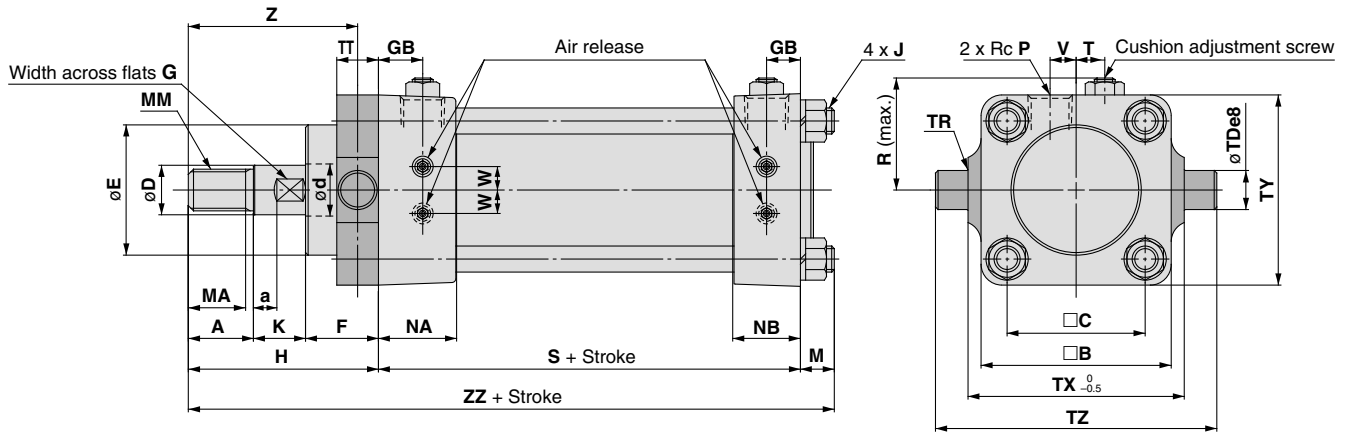
#### With rod boot



Bore size (mm)	A	a	□B	□C	D	d	E	F	G	GA	GB	J	K	M	MA	MM	NA	NB	P	R	S	T	Tde8
40	23	10	60	44	17 <sup>0</sup> <sub>-0.018</sub>	18	45 <sup>0</sup> <sub>-0.062</sub>	25	14	17.5	9.5	M8 x 1.25	18	10	20	M14 x 1.5	30	22	1/4	37	106	11	15 <sup>-0.032</sup> <sub>-0.059</sub>
50	25	9	73	53	19 <sup>0</sup> <sub>-0.021</sub>	20	50 <sup>0</sup> <sub>-0.062</sub>	28	17	17	13	M10 x 1.5	20	10	22	M16 x 1.5	30	26	3/8	43	112	11	15 <sup>-0.032</sup> <sub>-0.059</sub>
63	28	8	80	60	21 <sup>0</sup> <sub>-0.021</sub>	22.4	55 <sup>0</sup> <sub>-0.074</sub>	30	17	17	13	M10 x 1.5	22	10	25	M18 x 1.5	30	26	3/8	47	116	11	15 <sup>-0.032</sup> <sub>-0.059</sub>
80	32	8	100	75	26 <sup>0</sup> <sub>-0.021</sub>	28	65 <sup>0</sup> <sub>-0.074</sub>	32	22	20	15	M12 x 1.75	26	13	29	M22 x 1.5	35	30	1/2	57	127	11	25 <sup>-0.040</sup> <sub>-0.073</sub>
100	38	6.5	118	90	34 <sup>0</sup> <sub>-0.025</sub>	35.5	80 <sup>0</sup> <sub>-0.074</sub>	35	27	19	16	M12 x 1.75	27	13	34	M27 x 2	35	32	1/2	66	137	12	32 <sup>-0.050</sup> <sub>-0.089</sub>
125	38	6.5	140	112	34 <sup>0</sup> <sub>-0.025</sub>	35.5	80 <sup>0</sup> <sub>-0.074</sub>	35	27	19	16	M14 x 2	27	15	34	M27 x 2	35	32	1/2	77	137	12	32 <sup>-0.050</sup> <sub>-0.089</sub>
160	42	9	174	140	43 <sup>0</sup> <sub>-0.025</sub>	45	100 <sup>0</sup> <sub>-0.087</sub>	38	36	22	18	M16 x 2	28	17	38	M33 x 2	40	36	3/4	94	155	12	36 <sup>-0.050</sup> <sub>-0.089</sub>

Bore size (mm)	TR	TT	TX	TY	TZ	V	W	Without rod boot			With rod boot					
								H	Z	ZZ	e	f	h	l	Z	ZZ
40	R0.5	24	70	65	95	7.5	8	66	123	182	55	25	92		149	208
50	R0.5	26	83	78	108	10	9	73	131	195	60	28	99	1/4 stroke	157	221
63	R0.5	26	90	86	115	12	10	80	140	206	65	30	106		166	232
80	R2.5	36	112	106	162	16	13	90	156	230	80	32	116		182	256
100	R2.5	42	140	130	204	20	16	100	170	250	100	35	123	1/5 stroke	193	273
125	R2.5	42	170	162	234	20	16	100	170	252	100	35	123		193	275
160	R2.5	52	212	200	284	24	20	108	187.5	280	120	38	131		210.5	303

Rod trunnion style: CHAU



- CHQ
- CHK
- CHN
- CHM
- CHS
- CH2
- CHA
- Related Equipment
- D-

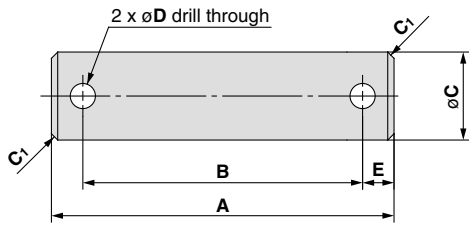
Bore size (mm)	A	a	□B	□C	D	d	E	F	G	GA	GB	J	K	M	MA	MM	NA	NB	P	R	S	T	Tde8
40	23	10	60	44	17 <sup>0</sup> <sub>-0.018</sub>	18	45 <sup>0</sup> <sub>-0.062</sub>	25	14	17.5	9.5	M8 x 1.25	18	10	20	M14 x 1.5	30	22	1/4	37	106	11	15 <sup>-0.032</sup> <sub>-0.059</sub>
50	25	9	73	53	19 <sup>0</sup> <sub>-0.021</sub>	20	50 <sup>0</sup> <sub>-0.062</sub>	28	17	17	13	M10 x 1.5	20	16	22	M16 x 1.5	30	26	3/8	43	112	11	15 <sup>-0.032</sup> <sub>-0.059</sub>
63	28	8	80	60	21 <sup>0</sup> <sub>-0.021</sub>	22.4	55 <sup>0</sup> <sub>-0.074</sub>	30	17	17	13	M10 x 1.5	22	16	25	M18 x 1.5	30	26	3/8	47	116	11	15 <sup>-0.032</sup> <sub>-0.059</sub>
80	32	8	100	75	26 <sup>0</sup> <sub>-0.021</sub>	28	65 <sup>0</sup> <sub>-0.074</sub>	32	22	20	15	M12 x 1.75	26	13	29	M22 x 1.5	35	30	1/2	57	127	11	25 <sup>-0.040</sup> <sub>-0.073</sub>
100	38	6.5	118	90	34 <sup>0</sup> <sub>-0.025</sub>	35.5	80 <sup>0</sup> <sub>-0.074</sub>	35	27	19	16	M12 x 1.75	27	13	34	M27 x 2	35	32	1/2	66	137	12	32 <sup>-0.050</sup> <sub>-0.089</sub>
125	38	6.5	140	112	34 <sup>0</sup> <sub>-0.025</sub>	35.5	80 <sup>0</sup> <sub>-0.074</sub>	35	27	19	16	M14 x 2	27	15	34	M27 x 2	35	32	1/2	77	137	12	32 <sup>-0.050</sup> <sub>-0.089</sub>
160	42	9	174	140	43 <sup>0</sup> <sub>-0.025</sub>	45	100 <sup>0</sup> <sub>-0.087</sub>	38	36	22	18	M16 x 2	28	17	38	M33 x 2	40	36	3/4	94	155	12	36 <sup>-0.050</sup> <sub>-0.089</sub>

Bore size (mm)	TR	TT	TX	TY	TZ	V	W	Without rod boot						With rod boot			
								H	Z	ZZ	e	f	h	ℓ	Z	ZZ	
40	R0.5	16	70	60	95	7.5	8	66	58	182	55	25	92		84	208	
50	R0.5	16	83	73	108	10	9	73	65	201	60	28	99	1/4 stroke	91	227	
63	R0.5	16	90	80	115	12	10	80	72	212	65	30	106		98	238	
80	R2.5	30	112	100	162	16	13	90	75	230	80	32	116		101	256	
100	R2.5	34	140	118	204	20	16	100	83	250	100	35	123	1/5 stroke	106	273	
125	R2.5	34	170	140	234	20	16	100	83	252	100	35	123		106	275	
160	R2.5	38	212	174	284	24	20	108	89	280	120	38	131		112	303	

# Series CHA

## Accessories (Options)

### Bracket pin

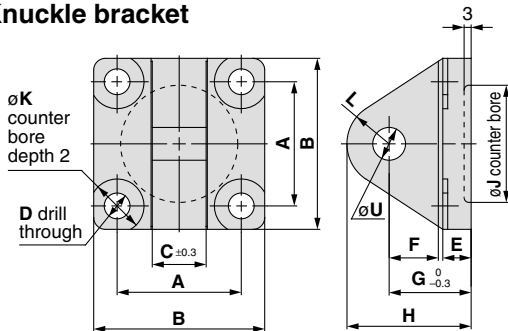


Material: Carbon steel

Bore size (mm)	A	B	C (f8)		D	E	Flat washer	Cotter pin	Applicable cylinder type	Order no.
			Size	Tolerance						
40	80	70	12	$\begin{matrix} -0.016 \\ -0.043 \end{matrix}$	3	5	Polished round 12SPCC	$\phi 3 \times 18\ell$ SWRM	$\phi 40$ clevis type	AC-C1-bore size
50	94	84	14	$\begin{matrix} -0.016 \\ -0.043 \end{matrix}$	4	5	Polished round 14SPCC	$\phi 4 \times 22\ell$ SWRM	$\phi 50$ clevis type	
63	102	92	16	$\begin{matrix} -0.016 \\ -0.043 \end{matrix}$	4	5	Polished round 16SPCC	$\phi 4 \times 22\ell$ SWRM	$\phi 63$ clevis type	
80	123	113	18	$\begin{matrix} -0.016 \\ -0.043 \end{matrix}$	5	5	Polished round 18SPCC	$\phi 5 \times 28\ell$ SWRM	$\phi 80$ clevis type	
100	147	132	20	$\begin{matrix} -0.020 \\ -0.053 \end{matrix}$	5	7.5	Polished round 20SPCC	$\phi 5 \times 30\ell$ SWRM	$\phi 100$ clevis type	
125	169	154	22	$\begin{matrix} -0.020 \\ -0.053 \end{matrix}$	5	7.5	Polished round 22SPCC	$\phi 5 \times 35\ell$ SWRM	$\phi 125$ clevis type	
160	205	190	25	$\begin{matrix} -0.020 \\ -0.053 \end{matrix}$	5	7.5	Polished round 24SPCC	$\phi 5 \times 35\ell$ SWRM	$\phi 160$ clevis type	

Note) Does not come with other accessories.

### Knuckle bracket

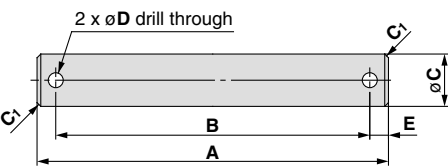


Material: Cast iron

Bore size (mm)	A	B	C	D	E	F	G	H	J	K	L	U(H8)		Hexagon mounting bolt	Applicable cylinder type	Order no.
												Size	Tolerance			
40	44	60	21	9	12	18	32	47	45	19	R15	12	$\begin{matrix} +0.027 \\ 0 \end{matrix}$	M8 x 20	$\phi 40$ double clevis type	AC-A1-bore size
50	53	73	23	11	12	21	35	53	50	23	R18	14	$\begin{matrix} +0.027 \\ 0 \end{matrix}$	M10 x 22	$\phi 50$ double clevis type	
63	60	80	27	11	15	23	40	60	55	23	R20	16	$\begin{matrix} +0.027 \\ 0 \end{matrix}$	M10 x 25	$\phi 63$ double clevis type	
80	75	100	31	13	16	26	45	67	65	28	R22	18	$\begin{matrix} +0.027 \\ 0 \end{matrix}$	M12 x 28	$\phi 80$ double clevis type	
100	90	118	35	13	17	30	50	74	80	28	R24	20	$\begin{matrix} +0.033 \\ 0 \end{matrix}$	M12 x 32	$\phi 100$ double clevis type	
125	112	140	41	15	20	30	55	81	90	31	R26	22	$\begin{matrix} +0.033 \\ 0 \end{matrix}$	M14 x 36	$\phi 125$ double clevis type	
160	140	174	54	17	22	40	65	95	100	34	R30	25	$\begin{matrix} +0.033 \\ 0 \end{matrix}$	M16 x 40	$\phi 160$ double clevis type	

Note) Does not come with other accessories.

### Knuckle pin

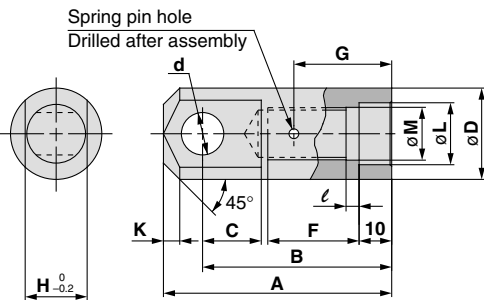


Material: Carbon steel

Bore size (mm)	A	B	C (f8)		D	E	Flat washer	Cotter pin	Applicable cylinder type	Order no.
			Size	Tolerance						
40	51.5	41.5	13	$\begin{matrix} -0.016 \\ -0.043 \end{matrix}$	3	5	Polished round 12SPCC	$\phi 3 \times 18\ell$ SWRM	$\phi 40$ all types	AC-D1-bore size
50	54.5	44.5	13	$\begin{matrix} -0.016 \\ -0.043 \end{matrix}$	3	5	Polished round 14SPCC	$\phi 3 \times 18\ell$ SWRM	$\phi 50$ all types	
63	64.5	54.5	16	$\begin{matrix} -0.016 \\ -0.043 \end{matrix}$	4	5	Polished round 16SPCC	$\phi 4 \times 22\ell$ SWRM	$\phi 63$ all types	
80	71.5	61.5	16	$\begin{matrix} -0.016 \\ -0.043 \end{matrix}$	4	5	Polished round 18SPCC	$\phi 4 \times 22\ell$ SWRM	$\phi 80$ all types	
100	82	72	20	$\begin{matrix} -0.020 \\ -0.053 \end{matrix}$	5	5	Polished round 20SPCC	$\phi 5 \times 30\ell$ SWRM	$\phi 100, \phi 125$ all types	
160	94	79	20	$\begin{matrix} -0.020 \\ -0.053 \end{matrix}$	5	7.5	Polished round 22SPCC	$\phi 5 \times 30\ell$ SWRM	$\phi 160$ all types	

Note) Does not come with other accessories.

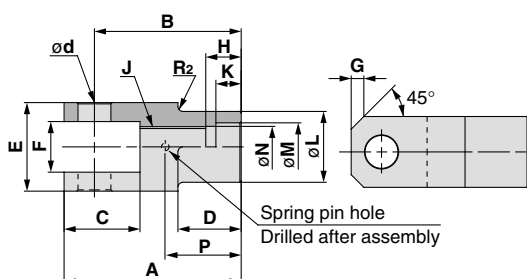
### Knuckle



Material: Carbon steel

Bore size (mm)	A	B	C	D	d (H8)		E	F	Reference G	H	K	L (F8)		M	$\ell$	Spring pin	Applicable cylinder type	Order no.
					Size	Tolerance						Size	Tolerance					
40	67	55	15	25	13	$\begin{matrix} +0.027 \\ 0 \end{matrix}$	M14 x 1.5	26	28	17	4	17	$\begin{matrix} +0.043 \\ +0.016 \end{matrix}$	14.2	4	3 x 25AW	$\phi 40$ all types	AC-B1-bore size
50	70	58	18	28	13	$\begin{matrix} +0.027 \\ 0 \end{matrix}$	M16 x 1.5	28	30	19	5	19	$\begin{matrix} +0.053 \\ +0.020 \end{matrix}$	16.2	4	3 x 28AW	$\phi 50$ all types	
63	80	65	20	30	16	$\begin{matrix} +0.027 \\ 0 \end{matrix}$	M18 x 1.5	32	32	22	6	21	$\begin{matrix} +0.053 \\ +0.020 \end{matrix}$	18.3	4	4 x 28AW	$\phi 63$ all types	
80	95	78	22	35	16	$\begin{matrix} +0.027 \\ 0 \end{matrix}$	M22 x 1.5	40	36	27	7	26	$\begin{matrix} +0.053 \\ +0.020 \end{matrix}$	22.3	4	4 x 36AW	$\phi 80$ all types	
100	110	90	26	42	20	$\begin{matrix} +0.033 \\ 0 \end{matrix}$	M27 x 2	45	40	32	8	34	$\begin{matrix} +0.064 \\ +0.025 \end{matrix}$	27.5	5	5 x 40AW	$\phi 100, \phi 125$ all types	
160	120	100	30	50	22	$\begin{matrix} +0.033 \\ 0 \end{matrix}$	M33 x 2	50	44	36	10	43	$\begin{matrix} +0.064 \\ +0.025 \end{matrix}$	34	5	5 x 50AW	$\phi 160$ all types	

### Y-type knuckle



Material: Carbon steel

Bore size (mm)	A	B	C	D	d (H8)		E	F		G	H	J	K	L	M		N	P	Spring pin	Applicable cylinder type	Order no.
					Size	Tolerance		Size	Tolerance						Size	Tolerance					
40	67	55	27	29	13	$\begin{matrix} +0.027 \\ 0 \end{matrix}$	32	18	$\begin{matrix} +0.2 \\ 0 \end{matrix}$	4	14	M14 x 1.5	10	25	17	$\begin{matrix} +0.043 \\ +0.016 \end{matrix}$	14.2	28	3 x 25 AW	$\phi 40$ all types	AC-3Y-bore size
50	70	58	30	25	13	$\begin{matrix} +0.027 \\ 0 \end{matrix}$	35	20	$\begin{matrix} +0.2 \\ 0 \end{matrix}$	5	14	M16 x 1.5	10	28	19	$\begin{matrix} +0.053 \\ +0.020 \end{matrix}$	16.2	30	3 x 28 AW	$\phi 50$ all types	
63	80	65	35	30	16	$\begin{matrix} +0.027 \\ 0 \end{matrix}$	43	23	$\begin{matrix} +0.2 \\ 0 \end{matrix}$	6	14	M18 x 1.5	10	30	21	$\begin{matrix} +0.053 \\ +0.020 \end{matrix}$	18.3	32	4 x 28 AW	$\phi 63$ all types	
80	95	78	39	35	16	$\begin{matrix} +0.027 \\ 0 \end{matrix}$	50	28	$\begin{matrix} +0.2 \\ 0 \end{matrix}$	7	14	M22 x 1.5	10	35	26	$\begin{matrix} +0.053 \\ +0.020 \end{matrix}$	22.3	36	4 x 36 AW	$\phi 80$ all types	
100	110	90	46	43	20	$\begin{matrix} +0.033 \\ 0 \end{matrix}$	59	33	$\begin{matrix} +0.2 \\ 0 \end{matrix}$	8	15	M27 x 2	10	42	34	$\begin{matrix} +0.064 \\ +0.025 \end{matrix}$	27.5	40	5 x 40 AW	$\phi 100, \phi 125$ all types	
160	120	100	50	45	22	$\begin{matrix} +0.033 \\ 0 \end{matrix}$	66	37	$\begin{matrix} +0.2 \\ 0 \end{matrix}$	10	15	M33 x 2	10	50	43	$\begin{matrix} +0.064 \\ +0.025 \end{matrix}$	34	44	5 x 50 AW	$\phi 160$ all types	

# Series CHA Auto Switch Specifications

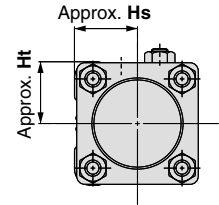
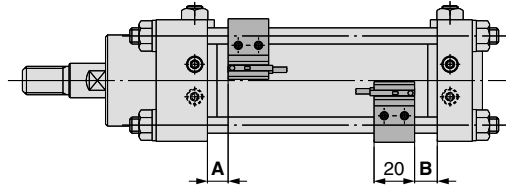
Refer to pages 347 to 406 for detailed specifications.



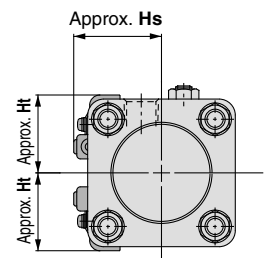
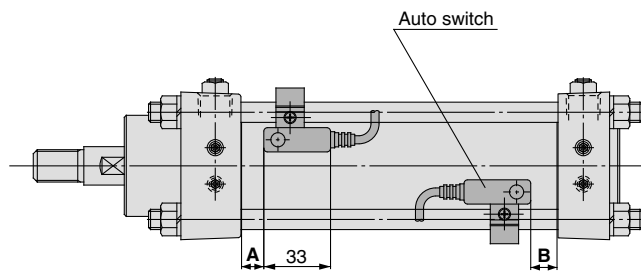
## Auto Switches: Proper Mounting Positions and Mounting Heights for Stroke End Detection

### <Tie-rod mount type>

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

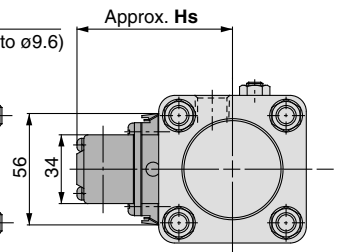
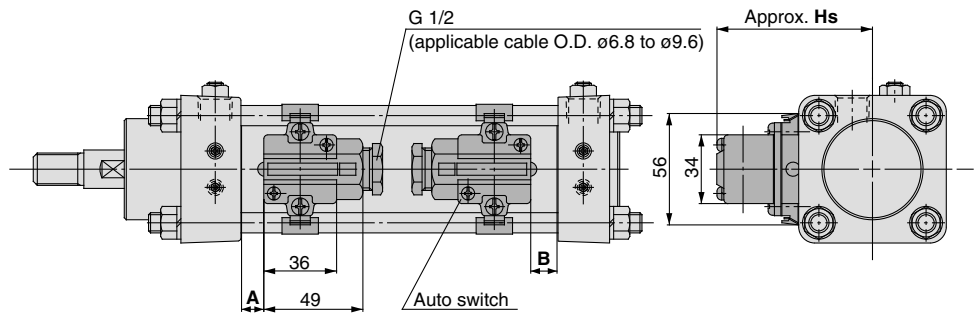


- D-F5□/J5□
- D-F5NTL
- D-F5□W/J59W
- D-F5BAL/F59F
- D-A5□/A6□
- D-A59W

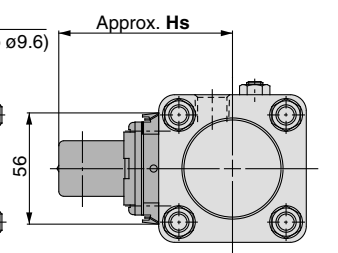
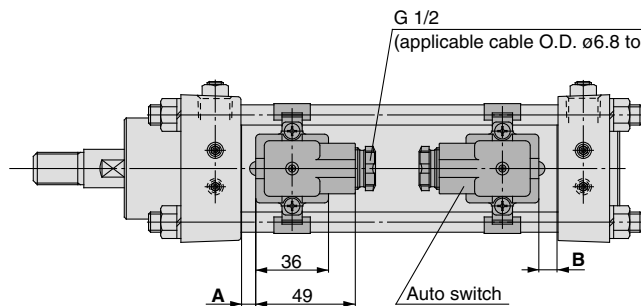


### <Band mount type>

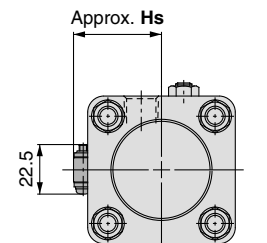
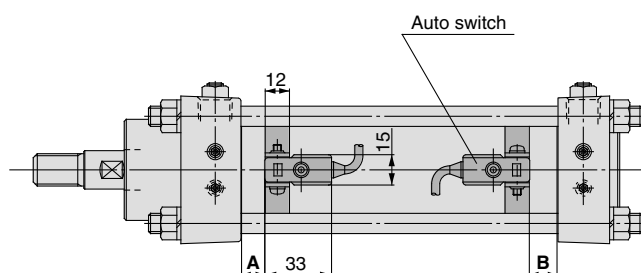
- D-G39/K39
- D-A3□



- D-A44



- D-B5□/B6□



### Auto Switch Proper Mounting Positions

(mm)

Bore size (mm)	D-M9□/M9□V D-M9□W/M9□WV D-M9□AL/M9□AVL		D-F5□/J5□ D-F5□W/J59W D-F59F/F5BAL		D-F5NTL		D-G5□/K59 D-G5□W/K59W D-G59F/G5BAL D-G5NTL		D-G39□/K39□		D-A9□/A9□V		D-A5□/A6□		D-A59W		D-B5□/B64		D-B59W		D-A3□/A44	
	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B
40	20.5	21.5	17	18	22	23	12.5	13.5	10.5	11.5	16.5	17.5	10.5	11.5	14.5	15.5	11	12	13.5	15	10.5	11.5
50	21	23	17.5	19.5	22.5	24.5	13	15	11	13	17	19	11	13	15	17	11.5	13.5	14	16.5	11	13
63	23.5	24.5	20	21	25	26	—	—	13.5	14.5	19.5	20.5	13.5	14.5	17.5	18.5	—	—	—	—	13.5	14.5
80	23.5	26.5	20	23	25	28	15.5	18.5	13.5	16.5	19.5	22.5	13.5	16.5	17.5	20.5	14	17	16.5	20	13.5	16.5
100	27	31	23.5	27.5	28.5	32.5	19	23	17	21	23	27	17	21	21	25	17.5	21.5	20	24.5	17	21

Note 1) The auto switches listed below cannot be mounted on ø63.

D-G5□, K59, G5□W, K59W, G5BAL, G59F, G5NTL, B5□, B64, and B59W

Note 2) Adjust the auto switch after confirming the operating conditions in the actual setting.

### Auto Switch Mounting Heights

(mm)

Bore size (mm)	D-M9□/M9□W D-A9□AL D-A9□		D-M9□V/M9□WV D-M9□AVL D-A9□V		D-F5□/J5□ D-F5□W/J59W D-F59F/F5BAL D-F5NTL		D-A5□/A6□ D-A59W		D-G5□/K59 D-G5□W/K59W D-G59F/G5BAL D-G5NTL D-B5□/B64 D-B59W		D-G39□/K39□ D-A3□	D-A44
	Hs	Ht	Hs	Ht	Hs	Ht	Hs	Ht	Hs	Hs	Hs	Hs
40	31	31	36	31	38	33.5	39.5	33.5	38	72.5	82.5	
50	36.5	36.5	40	36.5	43	39	44	39	43.5	78	88	
63	40	40	45	40	48.5	43	50	43	—	85	95	
80	50	50	55.5	50	56	51	57	51	59	93.5	104	
100	59	59	63	59	63.5	58.5	65	58.5	70	104	114	

\* The auto switches listed below cannot be mounted on ø63.

D-G5□, K59, G5□W, K59W, G5BAL, G59F, G5NTL, B5□, B64, and B59W

### Operating Range

(mm)

Auto switch model	Bore size				
	40	50	63	80	100
D-M9□/M9□V D-M9□W/M9□WV D-M9□AL/M9□AVL	3.5	3.5	5	4.5	5.5
D-F5□/J5□/F59F D-F5□W/J59W D-F5BAL/F5NTL	4.5	4	4.5	4.5	4.5
D-G5□/K59/G59F D-G5□W/K59W D-G5BAL/G5NTL	5	5	—	6.5	6.5
D-G39/K39	9.5	9.5	10	10	10
D-A9□/A9□V	7.5	8	8.5	9	9
D-A5□/A6□	9	9	9.5	9.5	9.5
D-A59W	13.5	13.5	14	14	14
D-B5□/B64	11.5	12	—	13.5	14.5
D-B59W	12	12.5	—	14.5	15
D-A3□/A44	10	10	11.5	11.5	12

\* The auto switches listed below cannot be mounted on ø63.

D-G5□, K59, G5□W, K59W, G5BAL, G59F, G5NTL, B5□, B64, and B59W

\* 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.

CHQ

CHK□

CHN

CHM

CHS□

CH2□

CHA

Related  
Equipment

D-□

# Series CHA

## Minimum Strokes for Auto Switch Mounting

n: Number of auto switches

Auto switch types	Number of auto switches	Mounting brackets other than center trunnion	Center trunnion type				
			ø40	ø50	ø63	ø80	ø100
D-M9□/M9□W	1 or 2 pcs. (different surfaces/same surface)	15	80	80	85	90	95
	"n" pcs. (same surface)	$15 + 40 \frac{(n-2)}{2}$ (n = 2, 4, 6, 8 ...)	$80 + 40 \frac{(n-4)}{2}$ (n = 4, 8, 12, 16 ...)	$80 + 40 \frac{(n-4)}{2}$ (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 ...)
D-M9□V/M9□VW	1 or 2 pcs. (different surfaces/same surface)	10	55	55	60	65	70
	"n" pcs. (same surface)	$10 + 30 \frac{(n-2)}{2}$ (n = 2, 4, 6, 8 ...)	$55 + 30 \frac{(n-4)}{2}$ (n = 4, 8, 12, 16 ...)	$55 + 30 \frac{(n-4)}{2}$ (n = 4, 8, 12, 16 ...)	$60 + 30 \frac{(n-4)}{2}$ (n = 4, 8, 12, 16 ...)	$65 + 30 \frac{(n-4)}{2}$ (n = 4, 8, 12, 16 ...)	$70 + 30 \frac{(n-4)}{2}$ (n = 4, 8, 12, 16 ...)
D-M9□AL	1 or 2 pcs. (different surfaces/same surface)	15	85	85	90	95	100
	"n" pcs. (same surface)	$15 + 40 \frac{(n-2)}{2}$ (n = 2, 4, 6, 8 ...)	$85 + 40 \frac{(n-4)}{2}$ (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 ...)	$100 + 40 \frac{(n-4)}{2}$ (n = 4, 8, 12, 16 ...)
D-M9□AVL	1 or 2 pcs. (different surfaces/same surface)	15	60	65	65	75	75
	"n" pcs. (same surface)	$15 + 30 \frac{(n-2)}{2}$ (n = 2, 4, 6, 8 ...)	$60 + 30 \frac{(n-4)}{2}$ (n = 4, 8, 12, 16 ...)	$65 + 30 \frac{(n-4)}{2}$ (n = 4, 8, 12, 16 ...)	$65 + 30 \frac{(n-4)}{2}$ (n = 4, 8, 12, 16 ...)	$75 + 30 \frac{(n-4)}{2}$ (n = 4, 8, 12, 16 ...)	$75 + 30 \frac{(n-4)}{2}$ (n = 4, 8, 12, 16 ...)
D-A9□	1 or 2 pcs. (different surfaces/same surface)	15	75	75	80	85	90
	"n" pcs. (same surface)	$15 + 40 \frac{(n-2)}{2}$ (n = 2, 4, 6, 8 ...)	$75 + 40 \frac{(n-4)}{2}$ (n = 4, 8, 12, 16 ...)	$75 + 40 \frac{(n-4)}{2}$ (n = 4, 8, 12, 16 ...)	$80 + 40 \frac{(n-4)}{2}$ (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 ...)
D-A9□V	1 or 2 pcs. (different surfaces/same surface)	10	50	50	55	60	65
	"n" pcs. (same surface)	$10 + 30 \frac{(n-2)}{2}$ (n = 2, 4, 6, 8 ...)	$50 + 30 \frac{(n-4)}{2}$ (n = 4, 8, 12, 16 ...)	$50 + 30 \frac{(n-4)}{2}$ (n = 4, 8, 12, 16 ...)	$55 + 30 \frac{(n-4)}{2}$ (n = 4, 8, 12, 16 ...)	$60 + 30 \frac{(n-4)}{2}$ (n = 4, 8, 12, 16 ...)	$65 + 30 \frac{(n-4)}{2}$ (n = 4, 8, 12, 16 ...)
D-A5□, A6□ D-F5□, J5□	1 or 2 pcs. (different surfaces/same surface)	10	100	100	100	110	120
	"n" pcs. (same surface)	$10 + 55 \frac{(n-2)}{2}$ (n = 2, 4, 6, 8 ...)	$100 + 55 \frac{(n-4)}{2}$ (n = 4, 8, 12, 16 ...)	$100 + 55 \frac{(n-4)}{2}$ (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 pcs. (different surfaces/same surface)	20	100	100	100	110	120
	"n" pcs. (same surface)	$20 + 55 \frac{(n-2)}{2}$ (n = 2, 4, 6, 8 ...)	$100 + 55 \frac{(n-4)}{2}$ (n = 4, 8, 12, 16 ...)	$100 + 55 \frac{(n-4)}{2}$ (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 pc.	15	100	100	100	110	120
D-F5□W, J59W D-F5BA D-F59F D-F5NT	1 or 2 pcs. (different surfaces/same surface)	15	120	120	120	130	140
	"n" pcs. (same surface)	$15 + 55 \frac{(n-2)}{2}$ (n = 2, 4, 6, 8 ...)	$120 + 55 \frac{(n-4)}{2}$ (n = 4, 8, 12, 16 ...)	$120 + 55 \frac{(n-4)}{2}$ (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	2 pcs.	Different surfaces	15	90	—	120	—
		Same surface	75	90	—	120	—
	"n" pcs.	Different surfaces	$15 + 50 \frac{(n-2)}{2}$ (n = 2, 4, 6, 8 ...)	$90 + 50 \frac{(n-4)}{2}$ (n = 4, 8, 12, 16 ...)	—	$120 + 50 \frac{(n-4)}{2}$ (n = 4, 8, 12, 16 ...)	—
		Same surface	$75 + 50 (n-2)$ (n = 2, 3, 4 ...)	$90 + 50 (n-2)$ (n = 2, 4, 6, 8 ...)	—	$120 + 50 (n-2)$ (n = 2, 4, 6, 8 ...)	—
	1 pc.	10	90	—	120	—	
D-B59W	2 pcs.	Different surfaces	20	90	—	120	—
		Same surface	75	90	—	120	—
	"n" pcs.	Different surfaces	$20 + 50 \frac{(n-2)}{2}$ (n = 2, 4, 6, 8 ...)	$90 + 50 \frac{(n-4)}{2}$ (n = 4, 8, 12, 16 ...)	—	$120 + 50 \frac{(n-4)}{2}$ (n = 4, 8, 12, 16 ...)	—
		Same surface	$75 + 50 (n-2)$ (n = 2, 3, 4 ...)	$90 + 50 (n-2)$ (n = 2, 4, 6, 8 ...)	—	$120 + 50 (n-2)$ (n = 2, 4, 6, 8 ...)	—
	1 pc.	15	90	—	120	—	
D-A3□ D-G39 D-K39	2 pcs.	Different surfaces	35	75	80	90	90
		Same surface	100				
	"n" pcs.	Different surfaces	$35 + 30 (n-2)$ (n = 2, 3, 4 ...)	$75 + 30 (n-2)$ (n = 2, 4, 6, 8 ...)	$80 + 30 (n-2)$ (n = 2, 4, 6, 8 ...)	$90 + 30 (n-2)$ (n = 2, 4, 6, 8 ...)	—
		Same surface	$100 + 100 (n-2)$ (n = 2, 3, 4 ...)	$100 + 100 (n-2)$ (n = 2, 4, 6, 8 ...)			—
	1 pc.	10	75	80	90	—	
D-A44	2 pcs.	Different surfaces	35	75	80	90	90
		Same surface	55	75	80	90	90
	"n" pcs.	Different surfaces	$35 + 30 (n-2)$ (n = 2, 3, 4 ...)	$75 + 30 (n-2)$ (n = 2, 4, 6, 8 ...)	$80 + 30 (n-2)$ (n = 2, 4, 6, 8 ...)	$90 + 30 (n-2)$ (n = 2, 4, 6, 8 ...)	—
		Same surface	$55 + 50 (n-2)$ (n = 2, 3, 4 ...)	$75 + 50 (n-2)$ (n = 2, 4, 6, 8 ...)	$80 + 50 (n-2)$ (n = 2, 6, 8 ...)	$90 + 50 (n-2)$ (n = 2, 4, 6, 8 ...)	—
	1 pc.	10	75	80	90	—	

## Auto Switch Mounting Brackets: Part Nos.

### <Tie-rod mounting>

Auto switch models	Bore size (mm)				
	ø40	ø50	ø63	ø80	ø100
D-M9□/M9□V/M9□W/M9□WV D-M9□AL/M9□AVL/A9□/A9□V	BA7-040	BA7-063	BA7-063	BA7-080	BA7-080
D-F5□/J5□/F5□W/J59W D-F5BAL/F59F/F5NTL D-A5□/A6□/A59W	BT-04	BT-06	BT-06	BT-08	BT-08

### <Band mounting>

Auto switch models	Bore size (mm)				
	ø40	ø50	ø63	ø80	ø100
D-G39/K39/A3□/A44	BD1-04M	BD1-05M	BD1-06M	BD1-08M	BD1-10M
D-G5□/K59 D-G5□W/K59W/G5BAL/G59F D-G5NTL/B5□/B64/B59W <small>Note 1)</small>	BA-04	BA-05	—	BA-08	BA-10

Note 1) The auto switches listed below cannot be mounted on ø63.

D-G5□, K59, G5□W, K59W, G5BAL, G59F, G5NTL, B5□, B64, and B59W

### [Stainless steel mounting screw kits]

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

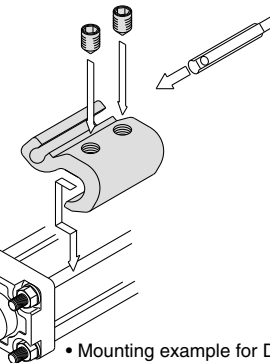
BBA1 : D-F5, J5, A5, A6

BBA3 : D-G5, K5, B5, B6

Note 2) Refer to the table below for details on BBA1, BBA3.

### Stainless mounting screw kit details

Part no.	Contents				Applicable auto switch mounting bracket part nos.	Applicable auto switches
	No.	Description	Size	Pcs.		
BBA1	1	Auto switch mounting screws	M4 x 0.7 x 8L	1	BT-□□ BT-03, BT-04, BT-05 BT-06, BT-08, BT-12	D-A5, A6 D-F5, J5
	2	Set screw	M4 x 0.7 x 6L	2	BA4-040, BA4-063, BA4-080 BMB4-032, BMB4-050 BMB5-032 BA7-040, BA7-063, BA7-080	D-Z7, Z8 D-Y5, Y6, Y7 D-A9 D-M9
	3	Set screw	M4 x 0.7 x 8L	2	BT-16, BT-18A, BT-20 BS4-125, BS4-160 BS4-180, BS4-200 BS5-125, BS5-160 BS5-180, BS5-200	D-A5, A6 D-F5, J5 D-Z7, Z8 D-Y5, Y6, Y7 D-A9 D-M9
BBA3	4	Auto switch mounting screws	M4 x 0.7 x 22L	1	BA-01, BA-02, BA-32, BA-04 BA-05, BA-06, BA-08, BA-10 BA2-020, BA2-025 BA2-032, BA2-040 BA5-050, BHN2-025, BSG1-032 BH2-040, BH2-050 BH2-080, BH2-100 BAF-32, BAF-04, BAF-05 BAF-06, BAF-08, BAF-10	D-B5, B6 D-G5, K5



• Mounting example for D-M9□(V), M9□W(V), M9□A(V)L.

When D-F5BAL and G5BAL auto switches are shipped mounted on a cylinder, the above stainless steel screws are used. Also when switches are shipped separately, BBA1, BBA3 are included.

Note 3) When using D-M9□A(V)L, order stainless mounting screw kit BBA1 instead of the iron auto switch mounting brackets (BA7-□□□, BS5-□□□) in the table above, and use the M4 x 6L stainless set screws included.

Besides the models listed in "How to Order," the following auto switches are applicable. Refer to pages 347 to 406 for detailed auto switch specifications.

Auto switch type	Part no.	Electrical entry	Features
Solid state	D-M9NV, M9PV, M9BV	Grommet (perpendicular)	—
	D-M9NWV, M9PWV, M9BWV		Diagnostic indication (2-color display)
	D-M9NAVL, M9PAVL, M9BAVL		Water resistant (2-color display)
	D-F59, F5P, J59	Grommet (in-line)	—
	D-F59W, F5PW, J59W		Diagnostic indication (2-color display)
	D-F5BAL		Water resistant (2-color display)
D-F5NTL, G5NTL		With timer	
Reed	D-A93V, A96V	Grommet (perpendicular)	—
	D-A90V		Without indicator light
	D-A53, A56, B53	Grommet (in-line)	—
	D-A67		Without indicator light

\* Solid state auto switches are also available with pre-wired connector. Refer to pages 389 and 390 for details.

\* Normally closed (N.C. = b contact), solid state auto switches (D-F9G, F9H) are also available. For details, refer to page 365.

CHQ

CHK□

CHN

CHM

CHS□

CH2□

CHA

Related Equipment

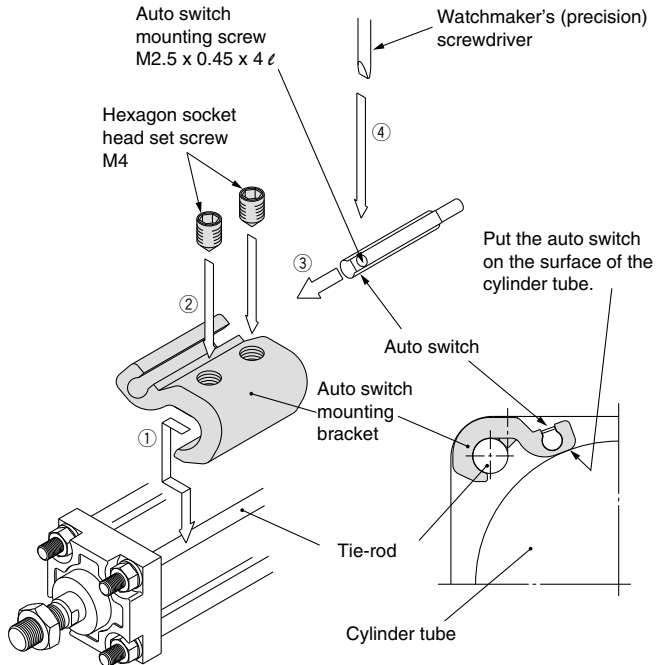
D-□



## How to Mount and Move the Auto Switch

### <Applicable auto switch>

Solid state ..... D-M9N(V), D-M9P(V), D-M9B(V)  
 D-M9NW(V), D-M9PW(V), D-M9BW(V)  
 D-M9NA(V), D-M9PA(V), D-M9BA(V)



1. Fix it to the detecting position with a set screw by installing an auto switch mounting bracket in cylinder tie-rod and letting the bottom surface of an auto switch mounting bracket contact the cylinder tube firmly.
2. Fix it to the detecting position with a hexagon socket head set screw (M4).  
(Use a hexagon wrench.)
3. Fit an auto switch into the auto switch mounting groove to set it roughly to the mounting position for an auto switch.
4. After confirming the detecting position, tighten up the mounting screw (M2.5) attached to an auto switch, and secure the auto switch.
5. When changing the detecting position, carry out in the state of 3.

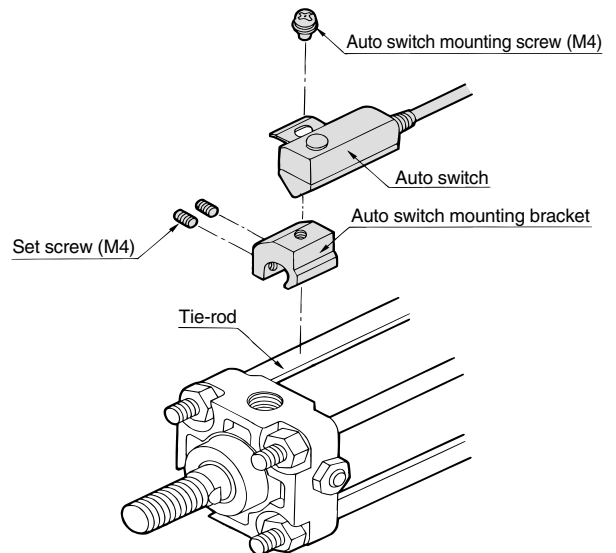
Note 1) To protect auto switches, ensure that main body of an auto switch should be embedded into auto switch mounting groove with a depth of 15 mm or more.

Note 2) Set the tightening torque of a hexagon socket head set screw (M4) to be 1 to 1.2 N·m.

Note 3) When tightening an auto switch mounting screw (M2.5), use a watchmaker's screwdriver with a grip diameter of 5 to 6 mm. Also, set the tightening torque to be 0.05 to 0.15 N·m. As a guide, turn 90° from the position where it comes to feel tight.

### <Applicable auto switch>

Solid state ..... D-F59, D-F5P  
 D-J59, D-J51, D-F5BAL  
 D-F59W, D-F5PW, D-J59W  
 D-F59F, D-F5NTL  
 Reed ..... D-A53, D-A54, D-A56, D-A64, D-A67  
 D-A59W



1. Fix the auto switch on the auto switch mounting bracket with the auto switch mounting screw (M4) and install the set screw.
2. Fit the auto switch mounting bracket into the cylinder tie-rod and then fix the auto switch at the detecting position with the hexagonal wrench. (Be sure to put the auto switch on the surface of cylinder tube.)
3. When changing the detecting position, loosen the set screw to move the auto switch and then re-fix the auto switch on the cylinder tube. (Tightening torque of M4 screw should be 1 to 1.2 N·m.)

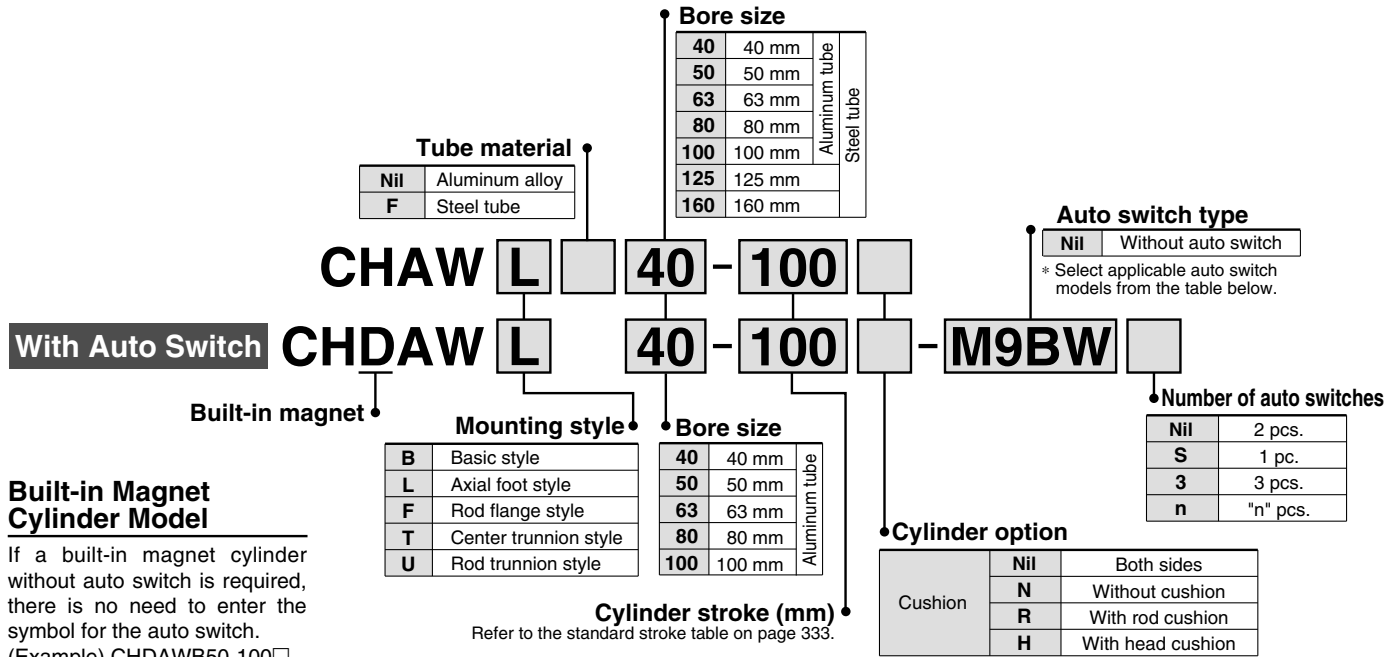
# Tie-rod Type Hydraulic Cylinder Double Acting/Double Rod

# Series CHAW

3.5 MPa

∅40, ∅50, ∅63, ∅80, ∅100, ∅125, ∅160

## How to Order



## Applicable Auto Switches: Refer to pages 347 to 406 for further details on each auto switch.

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 mount	Band mount	0.5 (Nil)	1 (M)	3 (L)	5 (Z)	None								
Solid state switch	—	Grommet	—	3-wire (NPN)	24 V	5 V, 12 V	—	M9N	—	●	●	●	○	—	○	IC circuit					
								—	G59*	●	—	●	○	—	○						
				3-wire (PNP)	—	●	●	●	○	—	○										
		2-wire		—	●	—	●	○	—	○											
		—		—	●	—	●	○	—	○											
		—		—	●	—	●	○	—	○											
	Terminal conduit	—	—	—	3-wire (NPN)	—	5 V, 12 V	100 V, 200 V	J51	—	●	—	●	○	—	○	IC circuit				
									—	G39	—	—	—	—	●	—					
					2-wire	—	—	—	—	—	—	—	●	—	—						
	Diagnostic indication (2-color display)	—	Grommet	Yes	3-wire (NPN)	24 V	5 V, 12 V	—	M9NW	—	●	●	●	○	—	○	IC circuit				
									—	G59W*	●	—	●	○	—	○					
					3-wire (PNP)	—	●	●	●	○	—	○									
2-wire					—	●	—	●	○	—	○										
—					—	●	—	●	○	—	○										
—					—	●	—	●	○	—	○										
Water resistant (2-color display)	—	Grommet	—	3-wire (NPN)	24 V	5 V, 12 V	—	M9NA	—	○	○	●	○	—	○	IC circuit					
								3-wire (PNP)	—	○	○	●	○	—	○						
				2-wire	—	—	—	—	—	—	—	○	—	—							
Diagnostic output (2-color display)	—	Grommet	—	4-wire (NPN)	—	5 V, 12 V	—	F59F	G59F*	●	—	●	○	—	○	IC circuit					
								—	—	●	—	●	○	—	○						
Reed switch	—	Grommet	Yes	3-wire (NPN equiv.)	24 V	5 V	—	A96	—	●	—	●	—	—	—	IC circuit					
								—	A93	—	●	—	●	—	—		—				
				Terminal conduit	—	—	—	2-wire	24 V	12 V	—	100 V	—	●	—	●	—	—	IC circuit		
												100 V or less	A90	—	●	—	●	—		—	—
												100 V, 200 V	A54	—	●	—	●	—		—	—
		DIN terminal		—	—	—	2-wire	24 V	12 V	—	200 V or less	A64	—	●	—	●	—	—			
											—	—	—	—	—	—	—		—	—	
		Diagnostic indication (2-color display)		—	Grommet	Yes	—	—	—	—	—	A33	—	—	—	—	●	—			
											—	A34	—	—	—	—	—		●	—	
											—	A44	—	—	—	—	—		—	●	—
—	—	—	—	—	—	—	—	A59W	B59W*	●	—	●	—	—	Relay PLC						

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

\* Solid state auto switches marked "○" are produced upon receipt of order.  
 \* Types D-G5□, K59, G5□W, K59W, G5BAL, G59F, G5NTL, B5□, B64, and B59W cannot be mounted on ∅63 bore size cylinders.

\* Since there are applicable auto switches other than listed, refer to page 329 for details.  
 \* For details about auto switches with pre-wired connector, refer to pages 389 and 390.  
 \* D-A9□, M9□, M9□W, M9□AL auto switches are shipped together (not assembled). (Only auto switch mounting brackets are packed assembled.)



# Tie-rod Type Hydraulic Cylinder Double Acting/Double Rod **Series CHAW**

## Light

Principle parts are light weight aluminum alloy.

## Easy position detection: with auto switches

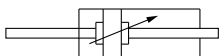
Aluminum cylinder sizes  $\phi 40$  to  $\phi 100$  are auto switch capable for easy stroke position detection.

## Smooth cushioning

Cushioning nearly equal to a shock absorber is achieved with a unique cushion ring configuration and cushion seal design.



## JIS symbol



Specifications with included auto switch are the same for Double Acting/Single Rod. Refer to pages 326 to 331.

- Minimum Strokes for Auto Switch Mounting
- Auto Switches: Proper Mounting Positions and Mounting Heights for Stroke End Detection
- Operating Range
- Auto Switch Mounting Brackets: Part Nos.

## Models

Model	Tube material	Bore size (mm)
CHAW	Aluminum alloy	40, 50, 63, 80, 100
CHAFW	Steel	40, 50, 63, 80, 100, 125, 160

## Specifications

Action	Double acting/Double rod
Fluid	Hydraulic fluid
Nominal pressure	3.5 MPa
Proof pressure	5.0 MPa
Maximum allowable pressure	3.5 MPa
Minimum operating pressure	0.25 MPa
Ambient and fluid temperature	Without auto switch: $-10^{\circ}$ to $80^{\circ}\text{C}$
	With auto switch: $-10^{\circ}$ to $60^{\circ}\text{C}$
Piston speed	8 to 300 mm/s
Cushion	Cushion seal
Stroke length tolerance	to 100st $^{+0.8}_0$ , 100 to 250st $^{+1.0}_0$ , 250 to 630st $^{+1.25}_0$ 630 to 1000st $^{+1.4}_0$ , 1000 to 1200st $^{+1.8}_0$
Mounting	Basic style (B), Axial foot style (L), Rod flange style (F) Center trunnion style (T), Rod trunnion style (U)

Note) Refer to page 134 for definitions of terms related to pressure.

## Standard Strokes

Bore size (mm)	Standard strokes (mm)
40	25 to 800
50	25 to 800
63	25 to 800
80	25 to 1000
100	25 to 1000
125	50 to 1000
160	50 to 1200

Note) Refer to the stroke selection Table in Technical Data 2, starting with pages 153 and 154 to determine stroke limitation depending on the type of mounting brackets that will be used. Then make your selection.

## Cushion Strokes (For Rod Side and Head Side)

Bore size (mm)	Effective cushion stroke (mm)
40	15
50	15
63	17
80	20
100	20
125	20
160	22

## Hydraulic Fluid Compatibility

Hydraulic fluid	Compatibility
Standard mineral hydraulic fluid	Compatible
W/O hydraulic fluid	Compatible
O/W hydraulic fluid	Compatible
Water/Glycol hydraulic fluid	Not compatible
Phosphate hydraulic fluid	Not compatible

## Accessories (Options)

Refer to page 324.

Knuckle bracket, Single knuckle  
Double knuckle, Bracket pin, Knuckle pin  
Rod boot <sup>Note)</sup>  
( Nylon tarpaulin )  
( Neoprene cloth )

Note) Maximum ambient temperature:  
Nylon tarpaulin ( $60^{\circ}\text{C}$ )  
Neoprene cloth ( $110^{\circ}\text{C}$ )

# Series CHAW

## Mass

### Aluminum tube

Unit: kg

Bore size (mm)		40	50	63	80	100
(0 mm stroke) Basic mass	Basic style	1.44	2.16	2.78	4.58	6.90
	Foot style	1.95	3.08	4.02	6.71	10.34
	Flange style	1.69	2.56	3.35	5.54	8.60
	Rod trunnion style	1.71	2.57	3.28	3.40	9.80
	Center trunnion style	1.86	2.89	3.55	3.67	9.59
Additional mass per 10 mm stroke		0.1	0.14	0.18	0.24	0.32

Calculation (Example) **CHAWL50-100**

• Basic mass ..... 3.08 (foot type, ø50)

• Additional mass ..... 0.14/10 mm stroke

• Cylinder stroke ..... 100 mm

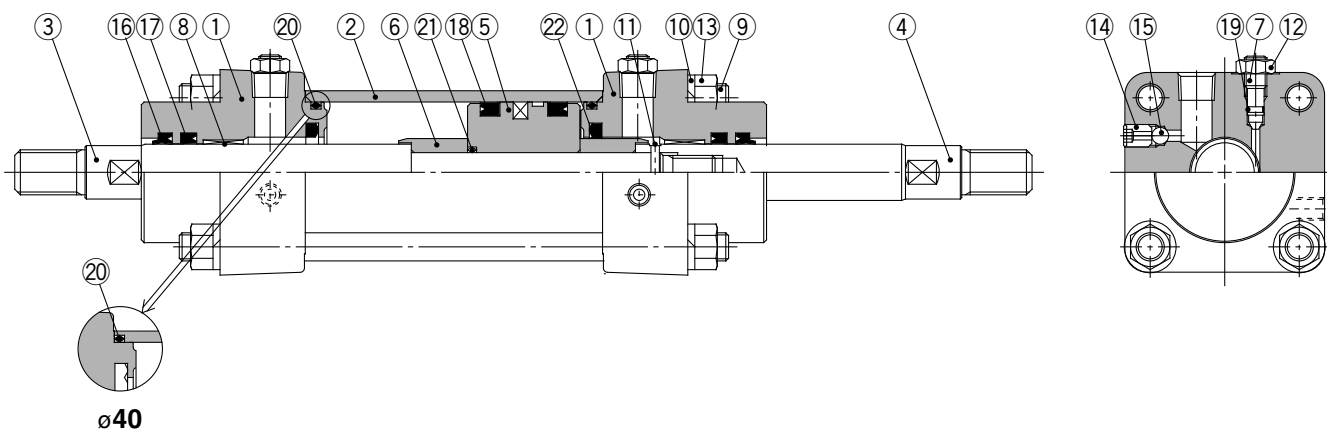
$$3.08 + 0.14 \times 100/10 = 4.48 \text{ kg}$$

### Steel tube

Unit: kg

Bore size (mm)		40	50	63	80	100	125	160
(0 mm stroke) Basic mass	Basic style	1.59	2.27	2.85	5.01	7.49	9.55	16.55
	Foot style	2.10	3.23	4.09	7.14	10.93	16.14	27.25
	Flange style	1.84	2.71	3.42	5.97	9.19	12.51	27.42
	Rod trunnion style	1.86	2.72	3.35	6.77	10.39	14.05	24.39
	Center trunnion style	2.01	2.99	3.62	6.52	10.18	13.31	23.46
Additional mass per 10 mm stroke		0.18	0.16	0.20	0.38	0.48	0.62	0.94

## Construction



### Parts List

No.	Description	Material	Note
1	Rod cover	Aluminum alloy	70% flat black
2	Cylinder tube	Aluminum alloy	Hard anodized
		Carbon steel	
3	Piston rod A	Carbon steel	Hard chromium electronplated
4	Piston rod B	Carbon steel	Hard chromium electronplated
5	Piston	Aluminum alloy	
6	Cushion ring	Rolled steel	
7	Needle valve	Rolled steel	
8	Bushing	Lead bronze	
9	Tie-rod	Carbon steel	
10	Tie-rod washer	Steel wire	
11	Spring pin	Rolled steel	
12	Needle valve nut	Carbon steel	
13	Tie-rod nut	Carbon steel	
14	Air release valve	Alloy steel	
15	Check ball	Bearing steel	
16	Wiper ring	NBR	
17	Rod seal	NBR	
18	Piston seal	NBR	
19	Needle valve seal	NBR	
20	Cylinder tube gasket	NBR	
21	Piston gasket	NBR	
22	Cushion seal	—	

### Replacement Parts: Seal Kit

Bore size (mm)	Seal kit no.	Content
40	CHAW40-PS	Nos. 16 through 20 and 22 from the chart at left
50	CHAW50-PS	
63	CHAW63-PS	
80	CHAW80-PS	
100	CHAW100-PS	
125	CHAW125-PS	
160	CHAW160-PS	

\* Seal kit consists of items of 16 through 20 and 22 and can be ordered by using the seal kit number for each bore size.

**CHQ**

**CHK**

**CHN**

**CHM**

**CHS**

**CH2**

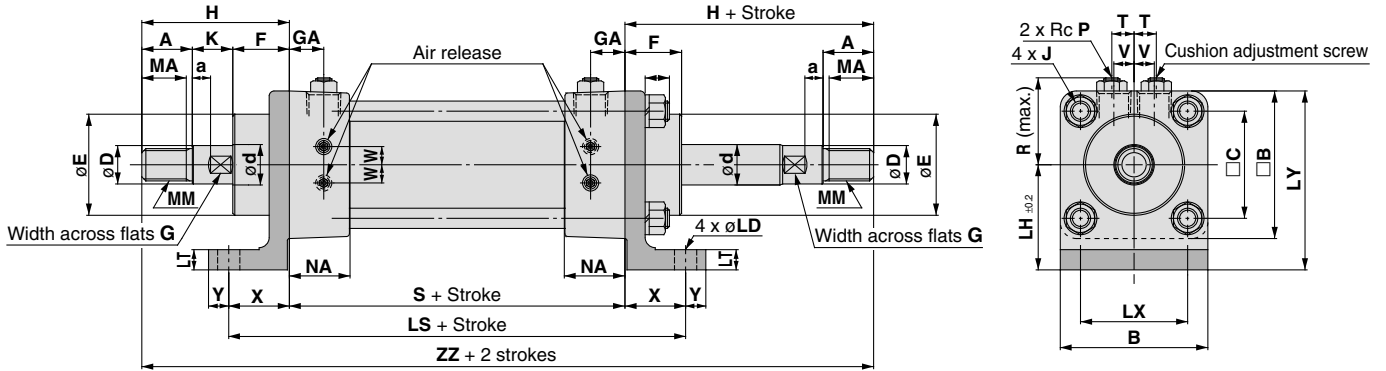
**CHA**

Related Equipment

**D-**



Foot style: CHAWL



CHQ

CHK

CHN

CHM

CHS

CH2

CHA

Related Equipment

D-

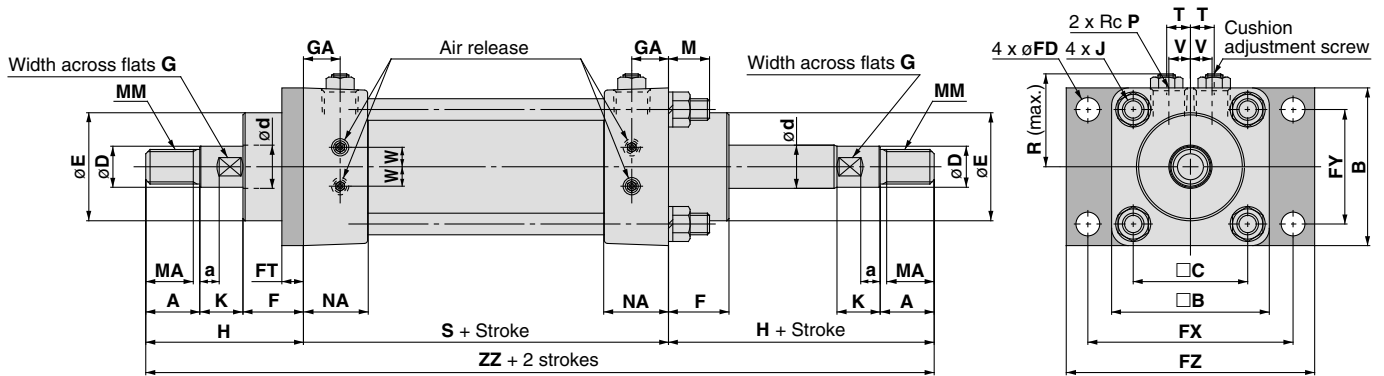
Bore size (mm)	A	a	B	□B	□C	D	d	E	F	G	GA	H	J	K	LD	LH	LS	LT	LX	LY	M	MA	MM	NA
40	23	10	60	60	44	17 <sup>0</sup> <sub>-0.018</sub>	18	45 <sup>0</sup> <sub>-0.062</sub>	25	14	17.5	66	M8 x 1.25	18	9	47	168	8	44	77	10	20	M14 x 1.5	30
50	25	9	73	73	53	19 <sup>0</sup> <sub>-0.021</sub>	20	50 <sup>0</sup> <sub>-0.062</sub>	28	17	17	73	M10 x 1.5	20	11	52	176	10	53	88.5	12	22	M16 x 1.5	30
63	28	8	80	80	60	21 <sup>0</sup> <sub>-0.021</sub>	22.4	55 <sup>0</sup> <sub>-0.074</sub>	30	17	17	80	M10 x 1.5	22	11	55	194	10	60	95	12	25	M18 x 1.5	30
80	32	8	100	100	75	26 <sup>0</sup> <sub>-0.021</sub>	28	65 <sup>0</sup> <sub>-0.074</sub>	32	22	20	90	M12 x 1.75	26	13	65	212	12	75	115	14	29	M22 x 1.5	35
100	38	6.5	118	118	90	34 <sup>0</sup> <sub>-0.025</sub>	35.5	80 <sup>0</sup> <sub>-0.074</sub>	35	27	19	100	M12 x 1.75	27	13	80	234	14	90	139	14	34	M27 x 2	35
125	38	6.5	140	140	112	34 <sup>0</sup> <sub>-0.025</sub>	35.5	80 <sup>0</sup> <sub>-0.074</sub>	35	27	19	100	M14 x 2	27	15	100	250	16	112	170	16	34	M27 x 2	35
160	42	9	174	174	140	43 <sup>0</sup> <sub>-0.025</sub>	45	100 <sup>0</sup> <sub>-0.087</sub>	38	36	22	108	M16 x 2	28	17	110	279	18	140	197	18	38	M33 x 2	40

Bore size (mm)	P	R	S	T	V	W	X	Y	ZZ
40	1/4	37	114	11	7.5	8	27	8	246
50	3/8	43	116	11	10	9	30	10	262
63	3/8	47	120	11	12	10	37	10	280
80	1/2	57	132	11	16	13	40	13	312
100	1/2	66	140	12	20	16	47	13	340
125	1/2	77	140	12	20	16	55	15	340
160	3/4	94	159	12	24	20	60	20	375

# Series CHAW

## Dimensions

### Rod flange style: CHAWF



Bore size (mm)	A	a	B	□B	□C	D	d	E	F	FD	FT	FX	FY	FZ	G	GA	H	J	K	M	MA	MM	NA	P
40	23	10	60	60	44	17 <sup>0</sup> <sub>-0.018</sub>	18	45 <sup>0</sup> <sub>-0.062</sub>	25	9	10	77	44	95	14	17.5	66	M8 x 1.25	18	16	20	M14 x 1.5	30	1/4
50	25	9	73	73	53	19 <sup>0</sup> <sub>-0.021</sub>	20	50 <sup>0</sup> <sub>-0.062</sub>	28	11	10	95	53	115	17	17	73	M10 x 1.5	20	22	22	M16 x 1.5	30	3/8
63	28	8	80	80	60	21 <sup>0</sup> <sub>-0.021</sub>	22.4	55 <sup>0</sup> <sub>-0.074</sub>	30	11	12	102	60	122	17	17	80	M10 x 1.5	22	20	25	M18 x 1.5	30	3/8
80	32	8	100	100	75	26 <sup>0</sup> <sub>-0.021</sub>	28	65 <sup>0</sup> <sub>-0.074</sub>	32	13	12	130	75	155	22	20	90	M12 x 1.75	26	26	29	M22 x 1.5	35	1/2
100	38	6.5	118	118	90	34 <sup>0</sup> <sub>-0.025</sub>	35.5	80 <sup>0</sup> <sub>-0.074</sub>	35	13	16	145	90	172	27	19	100	M12 x 1.75	27	26	34	M27 x 2	35	1/2
125	38	6.5	140	140	112	34 <sup>0</sup> <sub>-0.025</sub>	35.5	80 <sup>0</sup> <sub>-0.074</sub>	35	15	18	170	112	200	27	19	100	M14 x 2	27	30	34	M27 x 2	35	1/2
160	42	9	174	174	140	43 <sup>0</sup> <sub>-0.025</sub>	45	100 <sup>0</sup> <sub>-0.087</sub>	38	17	20	205	140	240	36	22	108	M16 x 2	28	34	38	M33 x 2	40	3/4

Bore size (mm)	R	S	T	V	W	ZZ
40	37	114	11	7.5	8	246
50	43	116	11	10	9	262
63	47	120	11	12	10	280
80	57	132	11	16	13	312
100	66	140	12	20	16	340
125	77	140	12	20	16	340
160	94	159	12	24	20	375

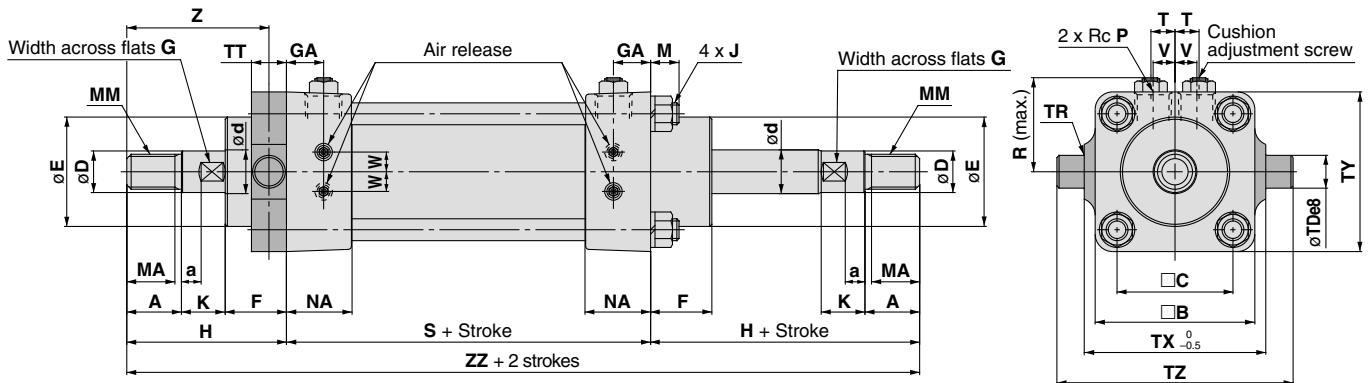




# Series CHAW

## Dimensions

### Rod trunnion style: CHAWU



Bore size (mm)	A	a	□B	□C	D	d	E	F	G	GA	H	J	K	M	MA	MM	NA	P	R	S	T	TDe8	TR
40	23	10	60	44	17 <sup>0</sup> <sub>-0.018</sub>	18	45 <sup>0</sup> <sub>-0.062</sub>	25	14	17.5	66	M8 x 1.25	18	10	20	M14 x 1.5	30	1/4	37	114	11	15 <sup>-0.032</sup> <sub>-0.059</sub>	R0.5
50	25	9	73	53	19 <sup>0</sup> <sub>-0.021</sub>	20	50 <sup>0</sup> <sub>-0.062</sub>	28	17	17	73	M10 x 1.5	20	13	22	M16 x 1.5	30	3/8	43	116	11	15 <sup>-0.032</sup> <sub>-0.059</sub>	R0.5
63	28	8	80	60	21 <sup>0</sup> <sub>-0.021</sub>	22.4	55 <sup>0</sup> <sub>-0.074</sub>	30	17	17	80	M10 x 1.5	22	15	25	M18 x 1.5	30	3/8	47	120	11	15 <sup>-0.032</sup> <sub>-0.059</sub>	R0.5
80	32	8	100	75	26 <sup>0</sup> <sub>-0.021</sub>	28	65 <sup>0</sup> <sub>-0.074</sub>	32	22	20	90	M12 x 1.75	26	13	29	M22 x 1.5	35	1/2	57	132	11	25 <sup>-0.040</sup> <sub>-0.073</sub>	R2.5
100	38	6.5	118	90	34 <sup>0</sup> <sub>-0.025</sub>	35.5	80 <sup>0</sup> <sub>-0.074</sub>	35	27	19	100	M12 x 1.75	27	13	34	M27 x 2	35	1/2	66	140	12	32 <sup>-0.050</sup> <sub>-0.089</sub>	R2.5
125	38	6.5	140	112	34 <sup>0</sup> <sub>-0.025</sub>	35.5	80 <sup>0</sup> <sub>-0.074</sub>	35	27	19	100	M14 x 2	27	15	34	M27 x 2	35	1/2	77	140	12	32 <sup>-0.050</sup> <sub>-0.089</sub>	R2.5
160	42	9	174	140	43 <sup>0</sup> <sub>-0.025</sub>	45	100 <sup>0</sup> <sub>-0.087</sub>	38	36	22	108	M16 x 2	28	17	38	M33 x 2	40	3/4	94	159	12	36 <sup>-0.050</sup> <sub>-0.089</sub>	R2.5

Bore size (mm)	TT	TX	TY	TZ	V	W	Z	ZZ
40	16	70	60	95	7.5	8	58	246
50	16	83	73	108	10	9	65	262
63	16	90	80	115	12	10	72	280
80	30	112	100	162	16	13	75	312
100	34	140	118	204	20	16	83	340
125	34	170	140	234	20	16	83	340
160	38	212	174	284	24	20	89	375

# Hydraulic Related Equipment

# Air-Hydro Booster

Made to Order

**Converts air pressure to hydraulic pressure for high pressure hydraulic cylinder actuation.**

- Generates 3.5 to 14 MPa hydraulic pressure with 0.5 MPa air pressure.
- No hydraulic pump is required. High hydraulic pressure can easily be obtained.
- Hydraulic pressure can be steplessly controlled by only adjusting the air pressure using the regulator.
- There is no trouble due to temperature rise even under the condition of continuous pressurization.
- You can select from two types of pressurization methods (direct type and pre-load type) according to the application.

## Applications

- For lifting work pieces
- For automatic clamping devices
- Hydraulic pressure source for low profile hydraulic cylinders

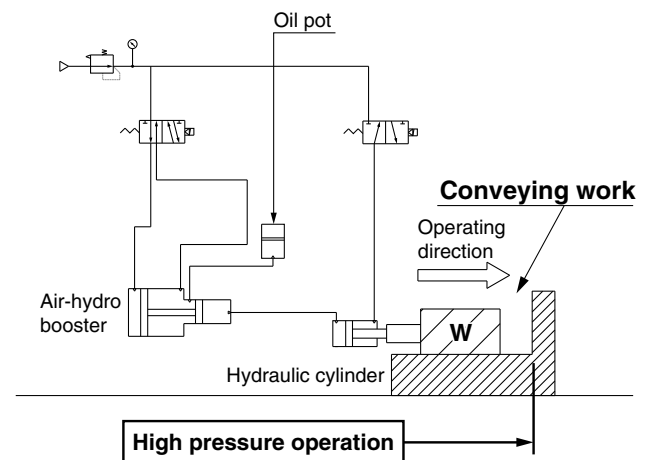


## Pressurization Methods

There are two types of air-hydro boosters: direct type and pre-load type.

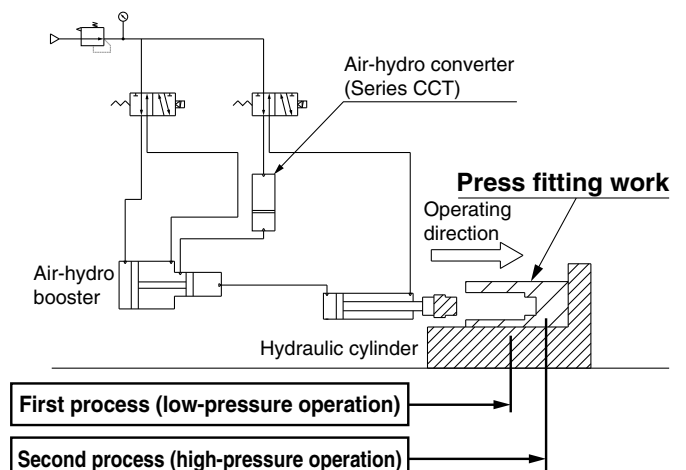
### 1 Direct Type

This is suitable when high power is required over the entire stroke, such as moving a work piece in a short distance.



### 2 Pre-load Type

This is suitable when pressurizing a work piece after moving it in position using a hydraulic cylinder. The pre-load type requires an air-hydro converter (Series CCT).



CHK

CHK

CHN

CHM

CHS

CH2

CHA

Related Equipment

D-

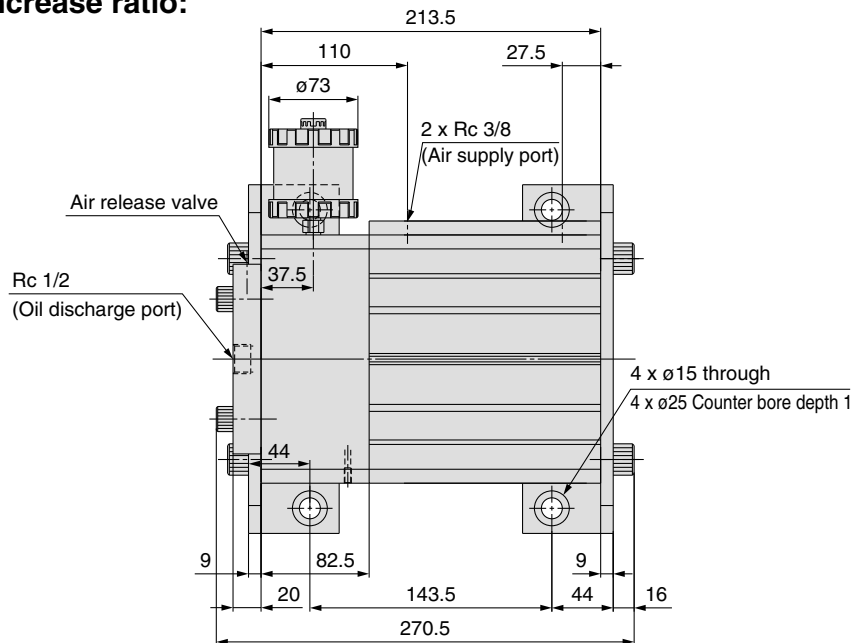
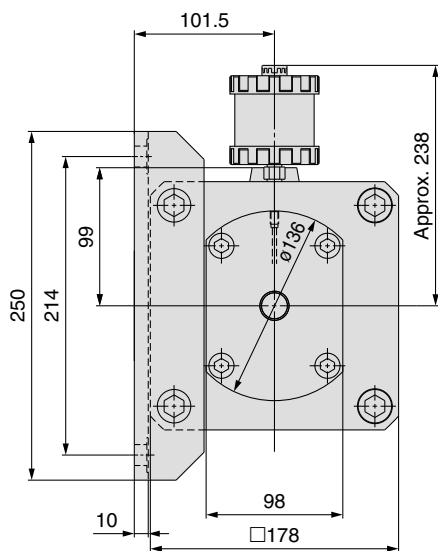
# Hydraulic Related Equipment / Air-Hydro Booster

## Specifications

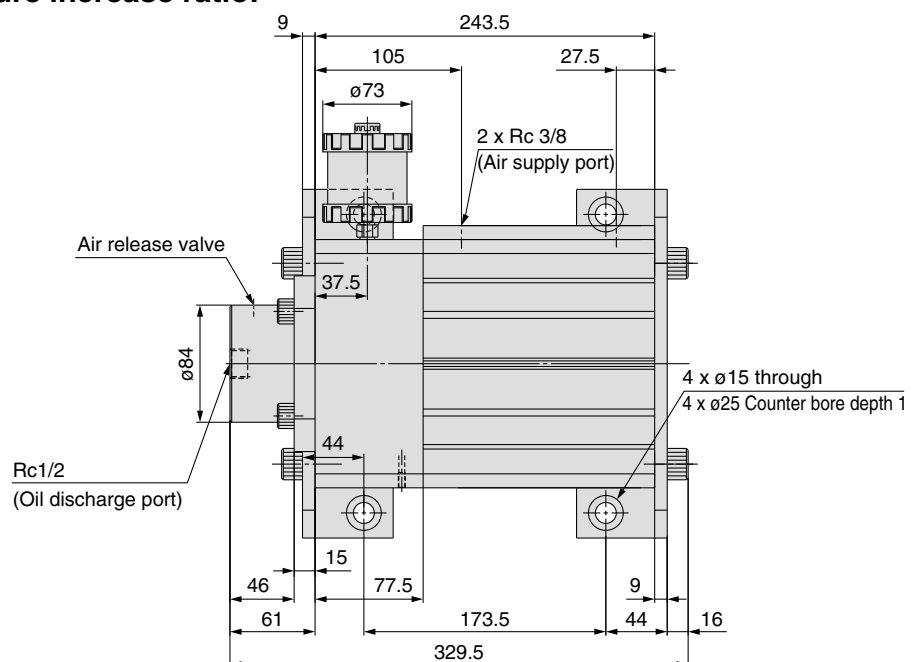
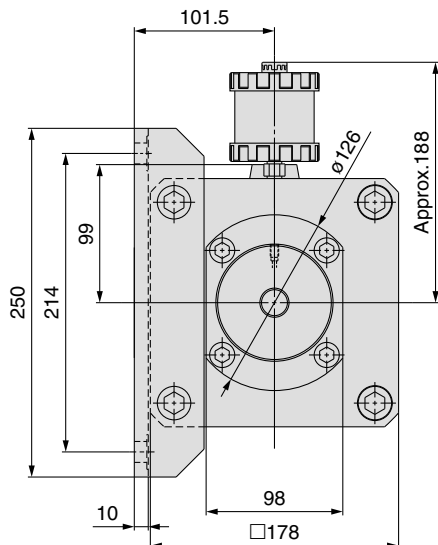
Part number	CQ2L160-DCG5643G-17	CQ2L160-DCG5644G-101	CQ2L100-Z4195-60	CQ2L140-DCG5645G-17	CQ2F100-Z4239-60	CQ2LH160-DCG864AG-105	CQ2LH160-20-DCI9145I
Air pressure cylinder diameter	ø160	ø160	ø100	ø140	ø100	ø160	ø160
Pressure increase ratio	1 : 7	1 : 10	1 : 13	1 : 15	1 : 16	1 : 25	1 : 32.6
Amount of discharged oil	17 cm <sup>3</sup>	101 cm <sup>3</sup>	60 cm <sup>3</sup>	17 cm <sup>3</sup>	60 cm <sup>3</sup>	105 cm <sup>3</sup>	20 cm <sup>3</sup>
Maximum working pressure (air pressure)	1.0 MPa				0.87 MPa	0.56 MPa	0.43 MPa
Generated hydraulic pressure (with 0.5 MPa air pressure)	3.5 MPa	5.0 MPa	6.5 MPa	7.5 MPa	8.0 MPa	12.5 MPa	14 MPa
Fluid	Air						
	Turbine oil class 1 (ISO VG32)						
Ambient and fluid temperature	5 to 60°C						
Oil pot	With oil pot	With oil pot	With oil pot	With oil pot	Without oil pot	Without oil pot	With oil pot

## Dimensions

### CQ2L160-DCG5643G-17 (pressure increase ratio: 1 to 7) / Wall mount type



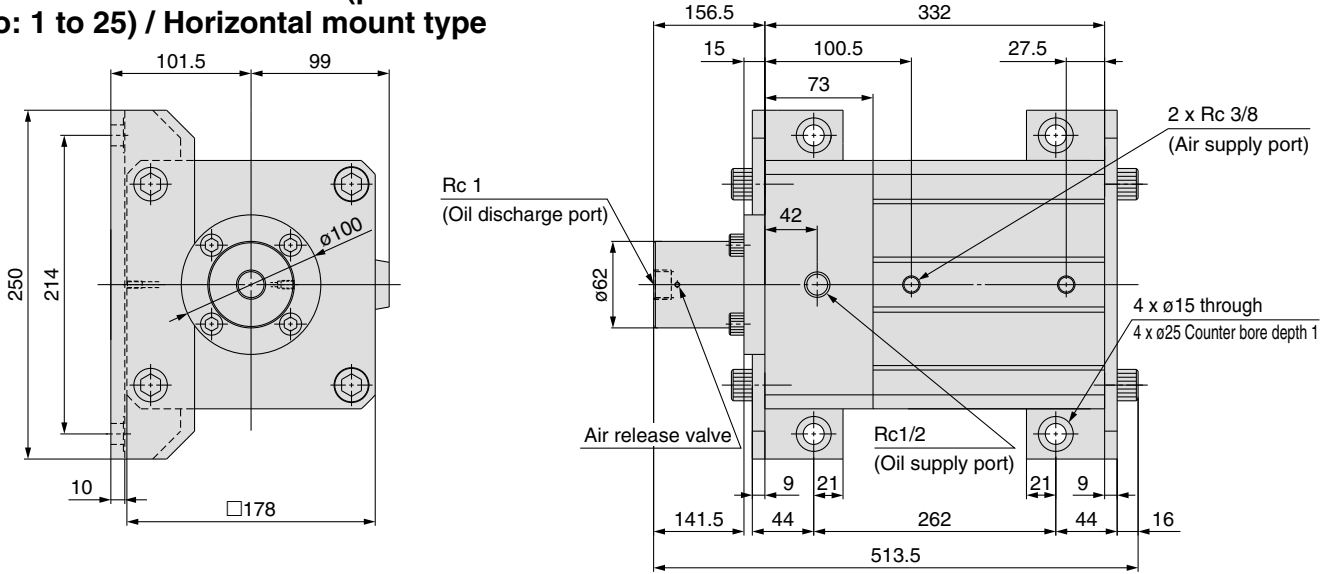
### CQ2L160-DCG5644G-101 (pressure increase ratio: 1 to 10) / Wall mount type



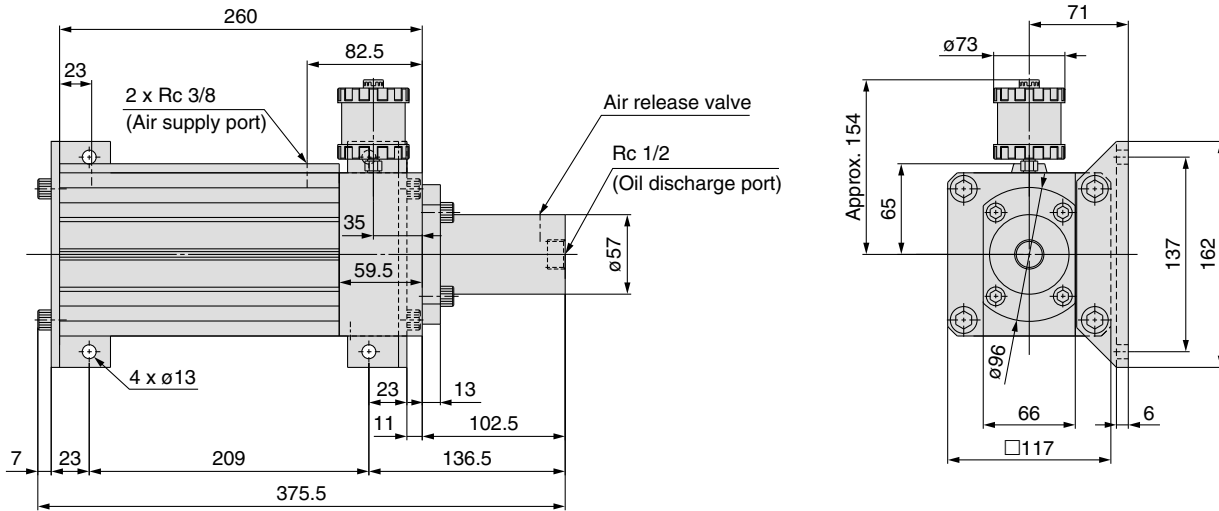
# Hydraulic Related Equipment / Air-Hydro Booster

## Dimensions

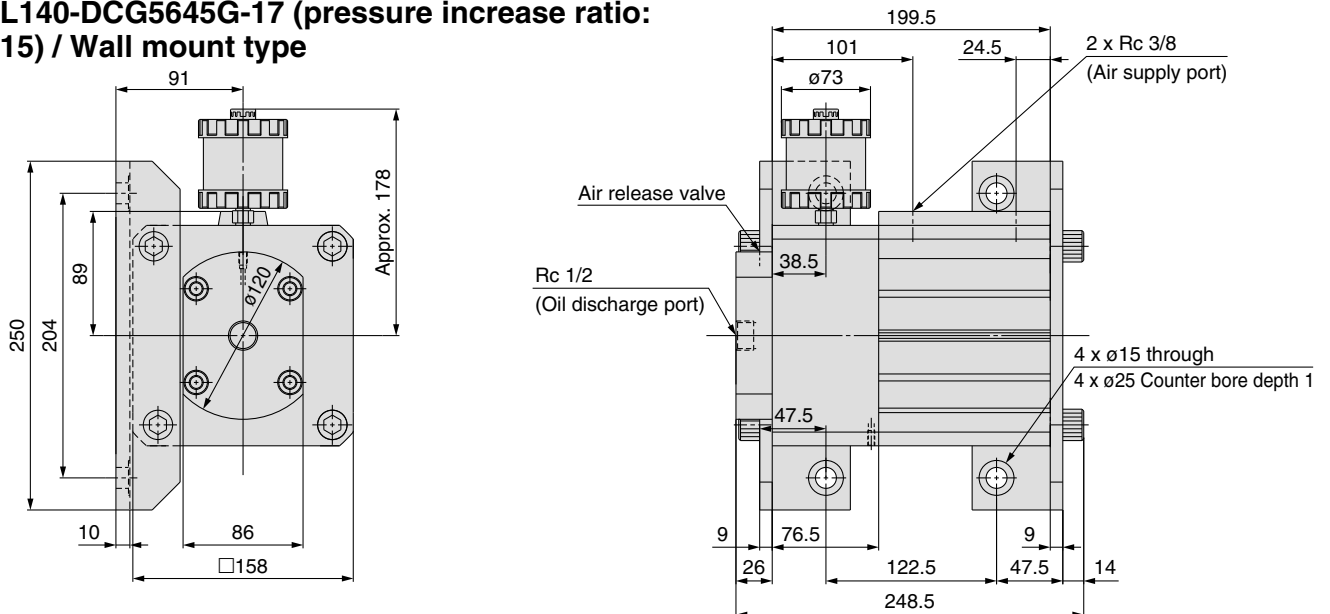
**CQ2LH160-DCG864AG-105 (pressure increase ratio: 1 to 25) / Horizontal mount type**



**CQ2L100-Z4195-60 (pressure increase ratio: 1 to 13) / Wall mount type**



**CQ2L140-DCG5645G-17 (pressure increase ratio: 1 to 15) / Wall mount type**



CHQ

CHK

CHN

CHM

CHS

CH2

CHA

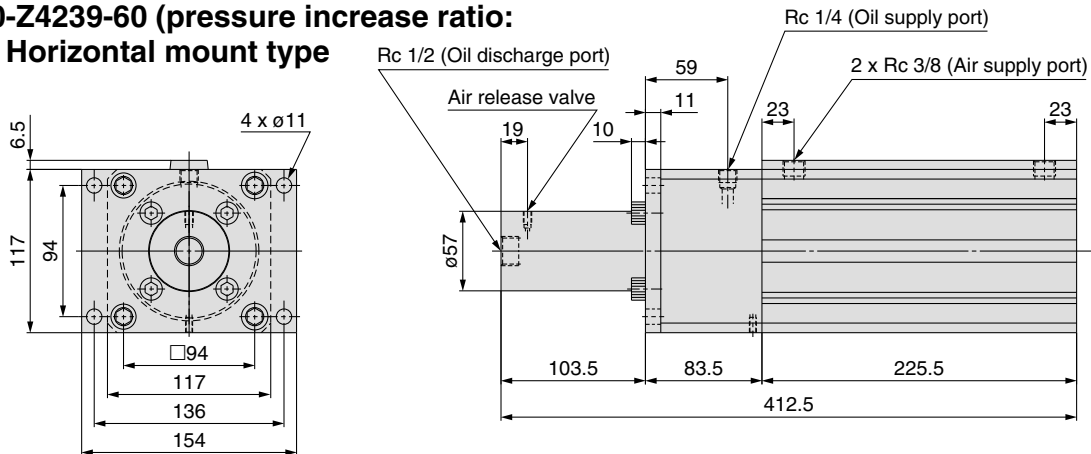
Related Equipment

D-

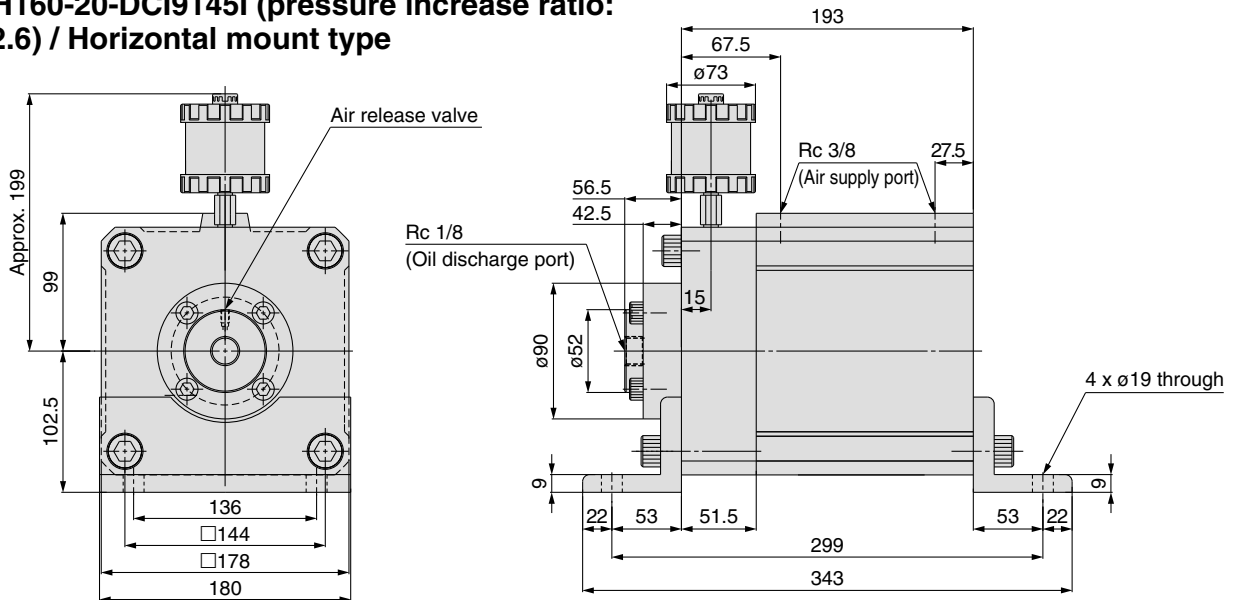
# Hydraulic Related Equipment / Air-Hydro Booster

## Dimensions

**CQ2F100-Z4239-60 (pressure increase ratio: 1 to 16) / Horizontal mount type**



**CQ2LH160-20-DCI9145I (pressure increase ratio: 1 to 32.6) / Horizontal mount type**



Special order products other than those listed here are available. Please contact SMC for details.

## ⚠ Product Specific Precautions

Be sure to read before handling. Refer to front matters 30 and 31 for Safety Instructions, and pages 134 to 142 for Hydraulic Cylinders and Auto Switches Precautions.

1. The hydraulic fluid in the oil pot or the air-hydro converter of the air-hydro booster (hereafter referred to as "the booster") may become black and cloudy. This is caused by the mixing in of powder from the initial abrasion of the seals in the booster (minimal abrasion that does not affect the performance of the seals), and a phenomenon that cannot be avoided. The performance of the booster is not compromised with the hydraulic fluid black and cloudy.

### ⚠ Caution

1. The oil level in the oil pot and the air-hydro converter may become higher than the initial level when the booster is stopped for a long period of time after a long period of operation. This is caused because air is accumulated in the piping between the booster and the hydraulic cylinder and the volume of the entire piping is increased. In this case, please release the air from the hydraulic piping. Otherwise, oil may spout from the breathing hole of the oil supply plug when the booster is started.

### ⚠ Caution

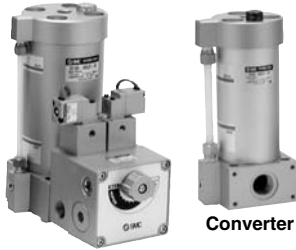
2. It is recommended that the booster is installed in a location higher than that of the hydraulic cylinder. If it is necessary to install the booster in a location lower than that of the hydraulic cylinder, or if you install piping with many bends, install an air release valve at the uppermost location in the piping. Then, please release the air periodically.

3. If your air-hydro booster is one with an oil pot, the oil supply plug of the oil pot has a breathing hole and oil may leak from the hole depending on the mounting orientation. If such oil leakage is assumed due to the mounting orientation of the air-hydro booster, reconnect the oil pot using a pipe or fitting so that the oil pot is vertical and facing up. Then, please release the air periodically.

# Hydraulic Related Equipment

## Air-Hydro Unit CC

Refer to Best Pneumatics No. 2 for details.



Air-hydro unit

Converter

Type	Series	Nominal diameter (mm)
Air-hydro unit	CC	63, 100, 160
Converter	CCT	40, 63, 100, 160
Valve unit	CCV	—
Features	<ul style="list-style-type: none"> <li>By converting air pressure into hydraulic pressure, functions that are the same as those of a hydraulic unit can be obtained while using pneumatic equipment.</li> </ul>	

CHQ

CHK□

CHN

CHM

CHS□

CH2□

CHA

Related Equipment

D-□