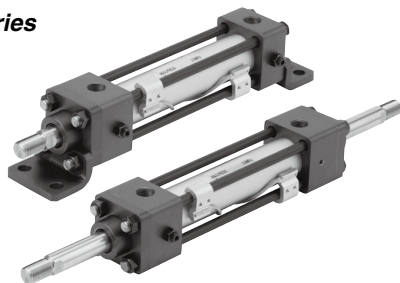


JIS Standard Hydraulic Cylinder

CH2E/CH2F/CH2G/CH2H Series

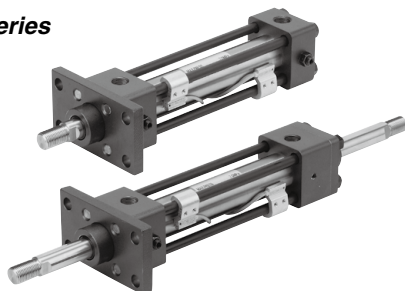
CH2E Series



Nominal pressure: **3.5 MPa**

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

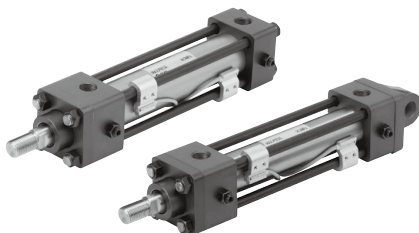
CH2F Series



Nominal pressure: **7 MPa**

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

CH2G/CH2H Series



Nominal pressure: **14 MPa**

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

CHQ

CHK

CHN

CHM

CHS

CH2

CHA

Related
Products

D-

3.5 MPa
7 MPa
14 MPa

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

ø32, ø40, ø50, ø63, ø80, ø100

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

Symbol	Series rod size
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 359.
Refer to page 378 for minimum stroke with auto switch.

With Auto Switch CHD2 H B 50 B - 100 - - - M9BW - - -

With auto switch (built-in magnet) CHD2 H B 50 B - 100 - - - M9BW - - -

Series type

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

Mounting type

Symbol	Basic type
LA	Transaxial foot type
LB	Axial foot type
FA	Rod rectangular flange type
FB	Head rectangular flange type
FY	Rod rectangular flange type
FZ	Head rectangular flange type
FC	Rod square flange type
FD	Head square flange type
CA	Single clevis type
CB	Double clevis type
TC	Center trunnion type

Bore size

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

Port and cushion valve positions
* Refer to page 359.

Cylinder options

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

Made to Order specifications
For details, refer to page 359.

Number of auto switches

Symbol	Number of auto switches
Nil	2 pcs.
S	1 pc.
3	3 pcs.
n	"n" pcs.

Auto switch type

Symbol	Without auto switch
Nil	Without auto switch

* Select applicable auto switches from the table below.

* Indicate in alphabetical order.

Applicable Auto Switches

Refer to pages 431 to 490 for further details on each auto switch.

Type	Special function	Electrical entry	Indication light	Wiring (output)	Load voltage		Auto switch model				Lead wire length (m)				Pre-wired connector	Applicable load
					DC	AC	Tie-rod mount ø32	Band mount ø32	0.5 (Nil)	1 (M)	3 (L)	5 (Z)	None			
Solid state auto switch	Diagnostic indication (2-color indicator)	Grommet	Yes	3-wire (NPN)	5 V, 12 V	—	—	M9N	—	●	●	○	○	○	IC circuit	Relay PLC
				3-wire (PNP)			F59	G59	●	●	○	○				
				2-wire			F5P	G5P	●	●	○	○				
		Terminal conduit	Yes	3-wire (NPN)	—	—	G39	—	—	—	●	—	—	—	IC circuit	
				2-wire	—	—	K39	—	—	—	●	—	—	—	—	
				3-wire (NPN)	—	—	M9NW	—	—	—	—	●	●	○	○	
	Water resistant (2-color indicator)	Grommet	Yes	3-wire (PNP)	5 V, 12 V	—	—	F59W	G59W	●	●	○	○	○	IC circuit	
				2-wire			F5PW	G5PW	●	●	○	○	—			
				3-wire (NPN)			—	—	M9BW	—	—	—	—	●	●	○
		Terminal conduit	Yes	3-wire (NPN)	5 V, 12 V	—	—	M9NA*1	—	—	○	○	○	○	—	IC circuit
				3-wire (PNP)			—	M9PA*1	—	—	○	○	○	○	—	—
				2-wire			—	M9BA*1	—	—	○	○	○	○	—	—
Diagnostic output (2-color indicator)	Grommet	Yes	4-wire (NPN)	5 V, 12 V	—	—	F5BA*1	G5BA*1	●	●	○	○	○	IC circuit		
			2-wire (NPN equiv.)			—	F59F	G59F	●	●	○	○	—	IC circuit		
			2-wire			—	A96**	—	●	●	○	○	—	—		
	Terminal conduit	Yes	100 V	—	—	A93**	—	—	●	●	○	○	—	IC circuit		
			100 V or less	—	—	A90**	—	—	●	●	○	○	—	IC circuit		
			100 V, 200 V	—	—	A54	B54	●	●	○	○	—	Relay PLC			
DIN terminal	Yes	200 V or less	—	—	A64	B64	●	●	○	○	—	—				
		100 V, 200 V	—	—	A33	—	—	—	●	—	—	PLC				
		—	—	—	A34	—	—	—	●	—	—					
Grommet	Yes	—	—	—	A44	—	—	—	●	—	—	—				
		—	—	—	A59W	B59W	●	●	○	○	—	Relay PLC				

*1 Water resistant type auto switches can be mounted on the above models, but in such case SMC cannot guarantee water resistance.
The water resistant type CH2F series is recommended for use in an environment which requires water resistance. Consult with SMC regarding the water resistant type CH2E, CH2G and CH2H series.

* 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-APCIV cannot be mounted on CHD2E, CHD2H of all bore sizes and CHD2Fø32.

* Since there are applicable auto switches other than listed, refer to page 380 for details.
* For details about auto switches with pre-wired connector, refer to pages 474 and 475.
* D-A9□, M9□, M9□W, M9□A auto switches are shipped together. (not assembled). (Only the auto switch mounting bracket is pre-assembled.)

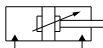
JIS Standard Hydraulic Cylinder Double Acting/Single Rod **CH2E/CH2F/CH2G/CH2H Series**



Made to order specifications
(For details, refer to pages 382 to 383-1)

Symbol	Specifications
-XA□	Change of rod end shape
-XC14	Change of trunnion bracket mounting position
-X2967	Short stroke specifications (5 to 24 mm)

* For the -X2967, only the type without a cushion is applicable.



Rod Sizes

Rod size series*	Bore size (mm)					
	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 (Option)

Single knuckle, Double knuckle, Lock nut, Knuckle pin, Rod boot (Nylon tarpulin, Heat resistant tarpulin) (Note)

Note) Maximum operating temperature:
Nylon tarpulin (60°C),
Heat resistant tarpulin (110°C)

* Refer to page 375 for part numbers and dimensions.
(For rod boot, refer to the dimensions.)

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

Bore size (mm)	Stroke (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	
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	
Proof pressure (MPa)	5.0	10.5	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 214 for definitions of terms related to pressure.

Standard Strokes

Cylinder bore size (mm)	Standard strokes (mm)	Max. stroke (mm)
32, 40, 50	25 to 1400	1800 (1401 or more with tie-rod reinforcing ring) (Note 2)
63	25 to 1500	1800 (1501 or more with tie-rod reinforcing ring) (Note 2)
80, 100	25 to 1800	—

Note 1) Refer to pages 230 and 231, to determine stroke limitation depending on the type of mounting brackets that will be used. Then make your selection.

Note 2) Max. stroke ranges differ depending on the type of mounting brackets.

The long stroke range for the CH2E, CH2F, and CH2H series with flange and clevis type mounting brackets as well as the CH2G series is 25 to 1400 mm.

The long stroke range for the CH2E, CH2F, and CH2H series with flange and clevis type mounting brackets as well as the CH2G series is 25 to 1500 mm.

Note 3) For the CH2F series, the cylinder tube is thicker for the following stroke lengths.

For cylinder bore sizes $\phi 32$ to $\phi 63$: strokes from 801 mm

For cylinder bore sizes $\phi 80$ and $\phi 100$: strokes from 1001 mm

In addition, refer to page 379 for details on auto switch mounting brackets.

Port and Cushion Valve Positions

Symbol	Nil	A	C	D	E	F	G	H
Position	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
Mounting type								
B (Basic type)								
FA, FB, FC FD, FY, FZ (Flange type) CA, CB (Single clevis type) TC (Center trunnion type)								
LA, LB (Foot type)								

: 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 Products

D-□

CH2E/CH2F/CH2G/CH2H Series

Weight

Unit: kg

Bore size (mm)		Standard weight (0 stroke)											
		Mounting type		B	LA	FY, FZ	FC, FD	CA	CB	TC	LB	FA, FB	Additional weight (per 10 mm stroke)
		Series	Basic	Transaxial foot	Rectangular flange	Square flange	Single clevis	Double clevis	Center trunnion type	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	0.04	
		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	

Bore size (mm)		Standard weight (0 stroke)											
		Mounting type		B	LA	FY, FZ	FC, FD	CA	CB	TC	LB	FA, FB	Additional weight (per 10 mm stroke)
		Series	Basic	Transaxial foot	Rectangular flange	Square flange	Single clevis	Double clevis	Center trunnion type	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	0.07	
		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	

JIS Standard Hydraulic Cylinder *CH2E/CH2F/CH2G/CH2H Series*

Theoretical Output

Unit: N

	Bore size (mm)	Rod size (mm)	Operating direction	Piston area (mm ²)	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

CHQ

 CHK

CHN

CHM

 CHS

 CH2

CHA

Related Products

 D-

Water Resistant Hydraulic Cylinder

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

 With auto switch
(Built-in magnet)

Water resistant cylinder

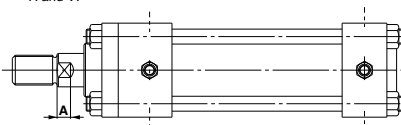
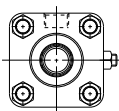
R	NBR Seal (Nitrile rubber)
V	FKM Seal (Fluororubber)

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

Port position

 Water resistant solid state
auto switch with 2-color display

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



Specifications

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

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

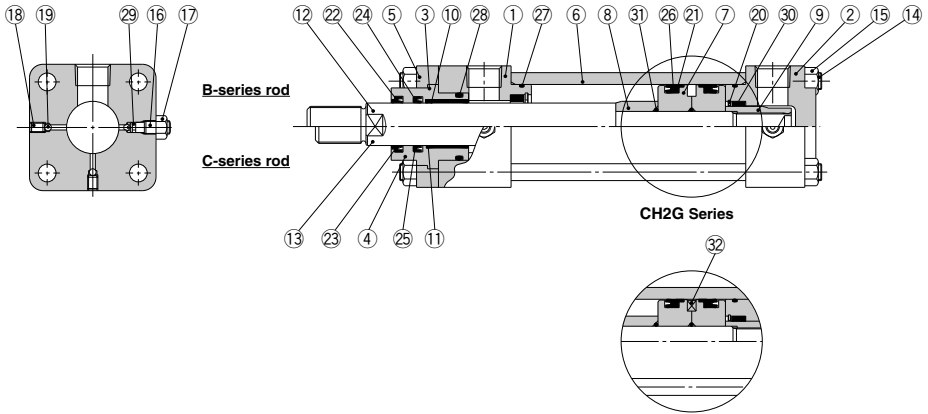
Bore size (mm)	B-series rod
	A
32	—
40	—
50	—
63	—
80	13.5
100	14.5

* Some of the parts are different from the dimensions of the double acting, single rod type.

Refer to Best Pneumatics No. 2-1 for details.

CH2E/CH2F/CH2G/CH2H Series

Construction



Parts List

No.	Description	Material	Note
1	Rod cover	Carbon steel	Trivalent black zinc chromated
2	Head cover	Carbon steel	Trivalent black zinc chromated
3	Seal holder (B-series rod)	Carbon steel	Trivalent black zinc chromated
4	Seal holder (C-series rod)	Carbon steel	Trivalent black zinc chromated
5	Retainer	Carbon steel	Trivalent black zinc chromated
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	—	

CH2E, CH2F, CH2H Series

Replacement Parts: Seal Kit

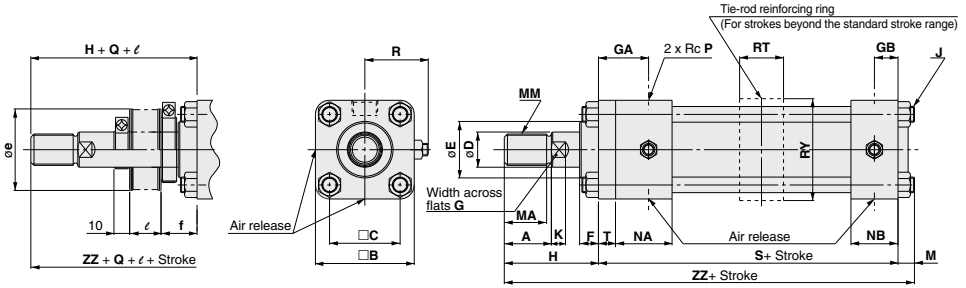
Bore size (mm)	Seal kit no.		Content
	B-series rod	C-series rod	
32	CH2E32B-PS	CH2E40C-PS CH2F40C-PS CH2G40C-PS CH2H40C-PS	Nos. ② through ⑩ from the chart at left
	CH2F32B-PS		
	CH2G32B-PS		
	CH2H32B-PS		
40	CH2E40B-PS	CH2E50C-PS CH2F50C-PS CH2G50C-PS CH2H50C-PS	Nos. ② through ⑩ from the chart at left
	CH2F40B-PS		
	CH2G40B-PS		
	CH2H40B-PS		
50	CH2E50B-PS	CH2E63C-PS CH2F63C-PS CH2G63C-PS CH2H63C-PS	Nos. ② through ⑩ from the chart at left
	CH2F50B-PS		
	CH2G50B-PS		
	CH2H50B-PS		
63	CH2E63B-PS	CH2E80C-PS CH2F80C-PS CH2G80C-PS CH2H80C-PS	Nos. ② through ⑩ from the chart at left
	CH2F63B-PS		
	CH2G63B-PS		
	CH2H63B-PS		
80	CH2E80B-PS	CH2E100C-PS CH2F100C-PS CH2G100C-PS CH2H100C-PS	Nos. ② through ⑩ from the chart at left
	CH2F80B-PS		
	CH2G80B-PS		
	CH2H80B-PS		
100	CH2E100B-PS	—	Nos. ② through ⑩ from the chart at left
	CH2F100B-PS		
	CH2G100B-PS		
	CH2H100B-PS		

* For the B-series rod, 1 seal kit includes ②①, ②②, ②③, and ②④ to ②⑩. For the C-series rod, 1 seal kit includes ③①, ③②, and ③③ to ③⑩. They can be ordered using the part number for each bore size.

JIS Standard Hydraulic Cylinder **CH2E/CH2F/CH2G/CH2H Series**

Dimensions

Basic type: CH2EB, CH2FB, CH2GB, CH2HB



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 the CH2E, CH2F and CH2H series. Contact SMC regarding the CH2G series 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					
															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	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	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	—	—

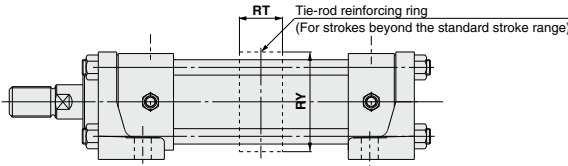
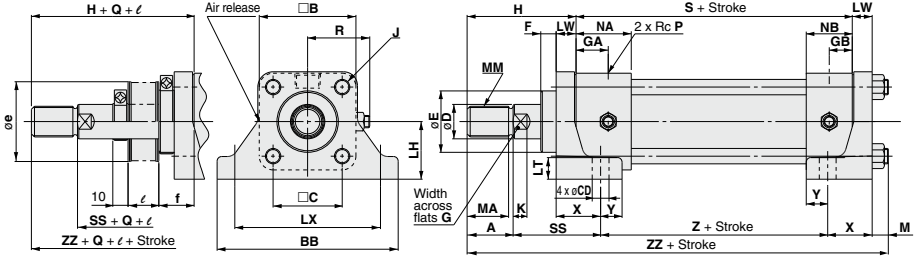
Rod series

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	—	

CH2E/CH2F/CH2G/CH2H Series

Dimensions

Transaxial foot type: CH2ELA, CH2FLA, CH2GLA, CH2HLA



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 the CH2E, CH2F and CH2H series. Contact SMC regarding the CH2G series 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
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

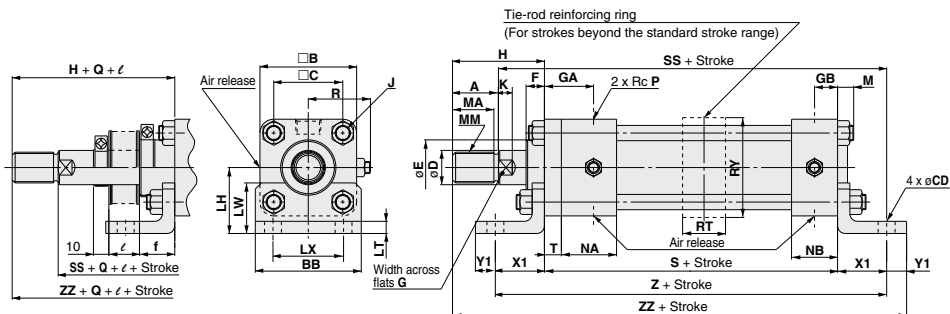
Bore size (mm)	B-series rod										C-series rod									
	MM	A	MA	D	E	K	G	H	ZZ	MM	A	MA	D	E	K	G	H	ZZ		
32	M16 x 1.5	25	22	18	34	7	14	66	220	—	—	—	—	—	—	—	—	—		
40	M20 x 1.5	30	27	22.4	40	9	19	71	225	M16 x 1.5	25	22	18	36	—	—	—	—		
50	M24 x 1.5	35	32	28	46	11	24	78	249	M20 x 1.5	30	27	22.4	40	-0.025	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	-0.064	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	-0.030	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	-0.076	15	41	120	338	

Tolerance

Bore size (mm)	LH	LX
32	±0.15	±0.18
40		
50		
63	±0.20	±0.23
80		
100	±0.25	±0.23

JIS Standard Hydraulic Cylinder *CH2E/CH2F/CH2G/CH2H Series*

Axial foot type: CH2ELB, CH2FLB



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 the CH2E, CH2F and CH2H series. Contact SMC regarding the CH2G series 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	ℓ		
																									B-rod	C-rod	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	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	15	1/3.5 stroke
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	20	1/4 stroke
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	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	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	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				

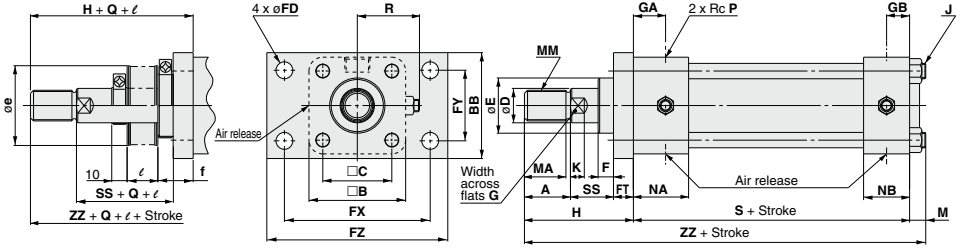
Tolerance

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

CH2E/CH2F/CH2G/CH2H Series

Dimensions

Rod rectangular flange type: CH2EFA, CH2FFA



Bore size (mm)	Stroke range (mm)																			With rod boot						
		B	BB	C	F	GA	GB	J	M	NA	NB	P	R	S	FD	FT	FX	FY	FZ	SS	e		f	Q	l	
		B-rod	C-rod																			B-rod	C-rod	B-rod	C-rod	
32	25 to 1400	58	62	38	16	21	15	M10 x 1.25	11	37	31	3/8	39	130	11	11	88	40	109	30	52	—	27	15	—	—
40	25 to 1400	65	69	45	12	21	15	M10 x 1.25	11	36	30	3/8	42	130	11	11	95	46	118	30	52	52	23	15	—	1/3.5 stroke
50	25 to 1400	76	85	52	15	27	19	M10 x 1.25	11	43	35	1/2	46	142	14	13	115	58	145	30	55	52	28	15	—	1/3.5 stroke
63	25 to 1500	90	98	63	15	27	19	M12 x 1.5	14	43	35	1/2	52	148	18	15	132	65	165	35	65	55	30	20	—	1/4 stroke
80	25 to 1800	110	118	80	17	22	22	M16 x 1.5	16	44	44	3/4	65	166	18	18	155	87	190	35	80	65	35	20	—	1/4 stroke
100	25 to 1800	135	150	102	19	22	22	M18 x 1.5	18	44	44	3/4	75	172	22	20	190	109	230	40	100	80	39	15	—	1/4 stroke

Rod series

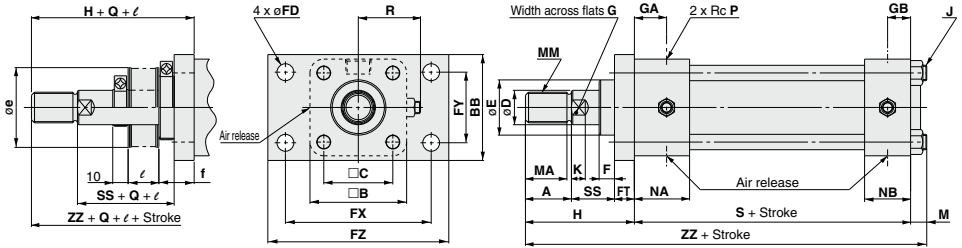
Bore size (mm)	B-series rod										C-series rod									
	MM	A	MA	D	E	K	G	H	ZZ		MM	A	MA	D	E	K	G	H	ZZ	
32	M16 x 1.5	25	22	18	34	7	14	66	207	—	—	—	—	—	—	—	—	—	—	—
40	M20 x 1.5	30	27	22.4	40	9	19	71	212	M16 x 1.5	25	22	18	36	—	7	14	66	207	—
50	M24 x 1.5	35	32	28	46	11	24	78	231	M20 x 1.5	30	27	22.4	40	-0.025 -0.064	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	-0.030 -0.076	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	-0.030 -0.076	15	41	120	310	—

Tolerance

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

JIS Standard Hydraulic Cylinder *CH2E/CH2F/CH2G/CH2H Series*

Rod rectangular flange type: CH2GFY, CH2HFY



- CHQ
- CHK
- CHN
- CHM
- CHS
- CH2
- CHA
- Related Products
- 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	—	—	1/4 stroke
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	—	—	1/4 stroke
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	—	—	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	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		

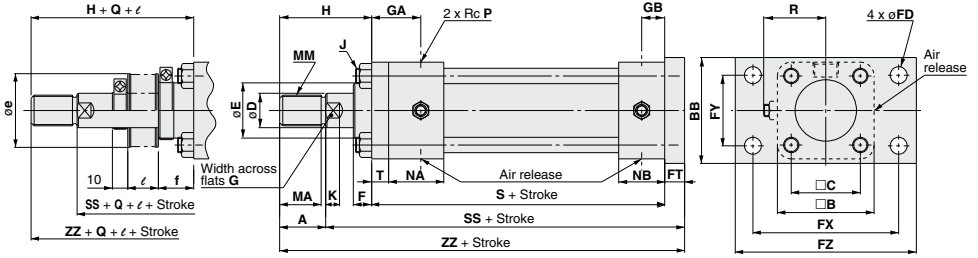
Tolerance

Bore size (mm)	FT	FX	FY
32	±0.2	±0.18	±0.13
40	±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

CH2E/CH2F/CH2G/CH2H Series

Dimensions

Head rectangular flange type: CH2EFB, CH2FFB



Bore size (mm)	Stroke range (mm)																		With rod boot								
		B	BB	C	F	GA	GB	J	NA	NB	P	R	S	T	FD	FT	FX	FY	FZ	SS	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	—	—	1/3.5 stroke
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	—	—	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	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	—	—	1/4 stroke

Rod series

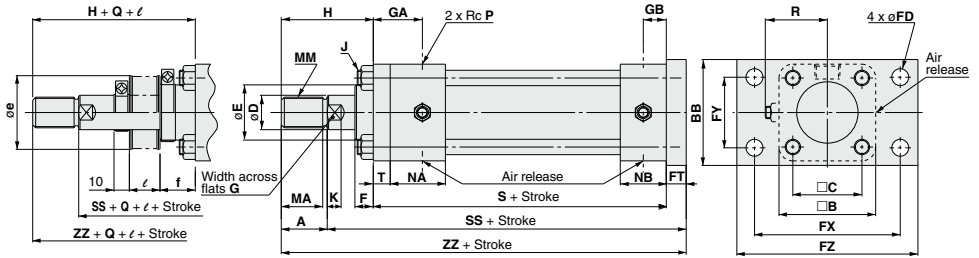
Bore size (mm)	B-series rod										C-series rod									
	MM	A	MA	D	E	K	G	H	ZZ	MM	A	MA	D	E	K	G	H	ZZ		
32	M16 x 1.5	25	22	18	34	7	14	55	207	—	—	—	—	—	—	—	—	—		
40	M20 x 1.5	30	27	22.4	40	9	19	60	212	M16 x 1.5	25	22	18	36	7	14	55	207		
50	M24 x 1.5	35	32	28	46	11	24	65	233	M20 x 1.5	30	27	22.4	40	9	19	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	FY	FX
32	±0.13	±0.13	±0.18
40	±0.2	±0.15	±0.18
50	±0.2	±0.15	±0.2
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 *CH2E/CH2F/CH2G/CH2H Series*

Head rectangular flange type: CH2GFZ, CH2HFZ



CHK

CHK

CHN

CHM

CHS

CH2

CHA

Related Products

D-

Bore size (mm)	Stroke range (mm)																			With rod boot						
		B	BB	C	F	GA	GB	J	NA	NB	P	R	S	T	FD	FT	FX	FY	FZ	SS	e		f	Q	l	
		B-rod	C-rod	B-rod	C-rod	B-rod	C-rod	B-rod	C-rod	B-rod	C-rod	B-rod	C-rod	B-rod	C-rod	B-rod	C-rod	B-rod	C-rod	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	—	1/3.5 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

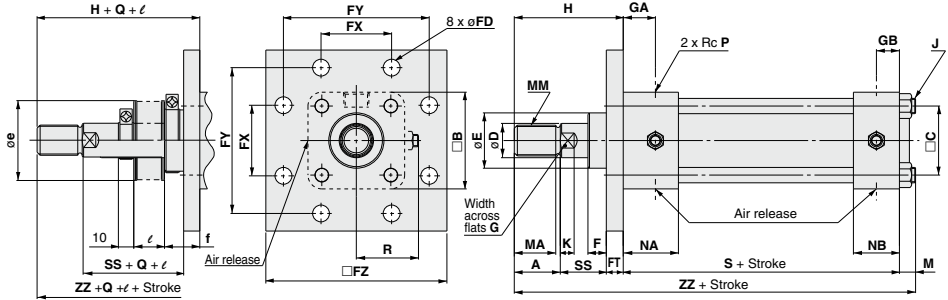
Rod series

Bore size (mm)	B-series rod										C-series rod										Tolerance			
	MM	A	MA	D	E	K	G	H	ZZ		MM	A	MA	D	E	K	G	H	ZZ		Bore size (mm)	FT	FX	FY
32	M16 x 1.5	25	22	18	34	7	14	55	209	—	—	—	—	—	—	—	—	—	—	—	32	±0.2	±0.18	±0.13
40	M20 x 1.5	30	27	22.4	40	9	19	60	214	M16 x 1.5	25	22	18	36	—	—	—	—	—	—	40	±0.2	±0.18	±0.13
50	M24 x 1.5	35	32	28	46	11	24	65	238	M20 x 1.5	30	27	22.4	40	—	—	—	—	—	—	50	±0.3	±0.2	±0.15
63	M30 x 1.5	45	42	35.5	55	13	30	80	263	M24 x 1.5	35	32	28	46	—	—	—	—	—	—	63	±0.3	±0.2	±0.15
80	M39 x 1.5	60	57	45	65	15	41	95	303	M30 x 1.5	45	42	35.5	55	—	—	—	—	—	—	80	±0.3	±0.2	±0.18
100	M48 x 1.5	75	72	56	80	16	50	115	335	M39 x 1.5	60	57	45	65	—	—	—	—	—	—	100	±0.3	±0.23	±0.18

CH2E/CH2F/CH2G/CH2H Series

Dimensions

Rod square flange type: 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			
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

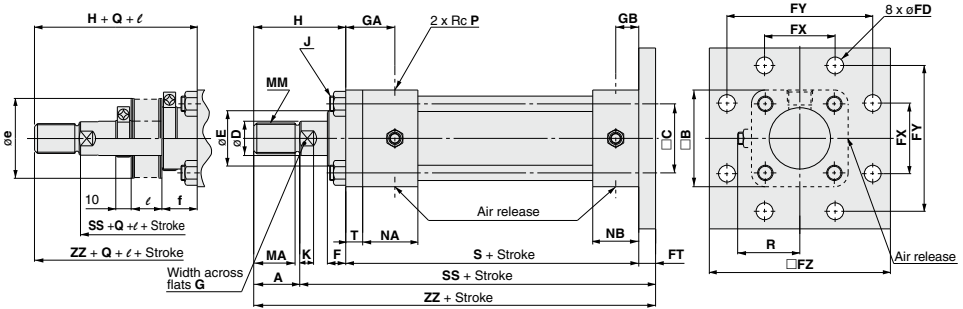
Bore size (mm)	B-series rod										C series-rod									
	MM	A	MA	D	E	K	G	H	ZZ	MM	A	MA	D	E	K	G	H	ZZ		
32	M16 x 1.5	25	22	18	34	7	14	66	207	—	—	—	—	—	—	—	—	—		
40	M20 x 1.5	30	27	22.4	40	9	19	71	212	M16 x 1.5	25	22	18	36	7	14	66	207		
50	M24 x 1.5	35	32	28	46	11	24	78	231	M20 x 1.5	30	27	22.4	40	9	19	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	—	—	—
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 *CH2E/CH2F/CH2G/CH2H Series*

Head square flange type: CH2EFD, CH2FFD, CH2GFD, CH2HFD



- CHQ
- CHK
- CHN
- CHM
- CHS
- CH2
- CHA
- Related Products
- 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		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

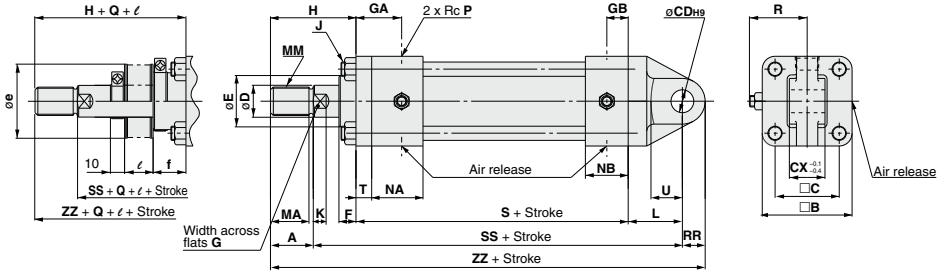
Rod series

Bore size (mm)	B-series rod										C-series rod										Tolerance		
	MM	A	MA	D	E	K	G	H	ZZ	MM	A	MA	D	E	K	G	H	ZZ	Bore size (mm)	FT	FX	FY	
32	M16 x 1.5	25	22	18	34	7	14	55	207	—	—	—	—	—	—	—	—	—	32	±0.2	±0.13	±0.18	
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	40				
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	50	±0.15	±0.2	±0.23	
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	63				
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	80	±0.3	±0.18	±0.23	
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	100				

CH2E/CH2F/CH2G/CH2H Series

Dimensions

Single clevis type: CH2ECA, CH2FCA, CH2GCA, CH2HCA



Bore size (mm)	Stroke range (mm)																				With rod boot			
		B	C	F	GA	GB	J	NA	NB	P	R	S	T	CX	CD	RR	SS	U	L	e		f	Q	l
																				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

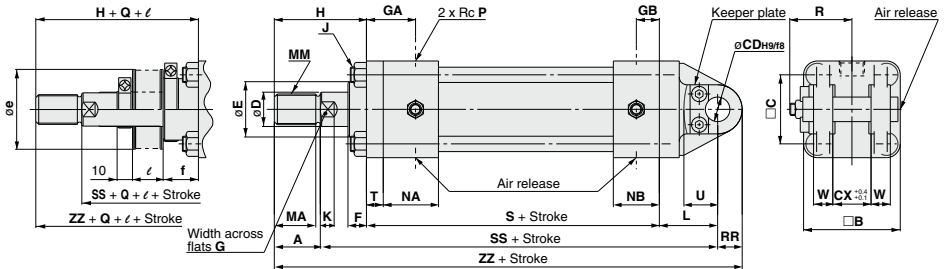
Bore size (mm)	B-series rod										C-series rod									
	MM	A	MA	D	E	K	G	H	ZZ	MM	A	MA	D	E	K	G	H	ZZ		
32	M16 x 1.5	25	22	18	34	7	14	55	250	—	—	—	—	—	—	—	—	—		
40	M20 x 1.5	30	27	22.4	40	9	19	60	255	M16 x 1.5	25	22	18	36	7	14	55	250		
50	M24 x 1.5	35	32	28	46	11	24	65	285	M20 x 1.5	30	27	22.4	40	9	19	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 *CH2E/CH2F/CH2G/CH2H Series*

Double clevis type: CH2ECB, CH2FCB, CH2GCB, CH2HCB



- CHQ**
- CHK**
- CHN**
- CHM**
- CHS**
- CH2**
- CHA**
- Related Products
- D**

Bore size (mm)	Stroke range (mm)																				With rod boot						
		B	C	F	GA	GB	J	NA	NB	P	R	S	T	CX	CD	RR	SS	L	U	W	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	—	—	—
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	—	—	—
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	—	—	—

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	327.5	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		

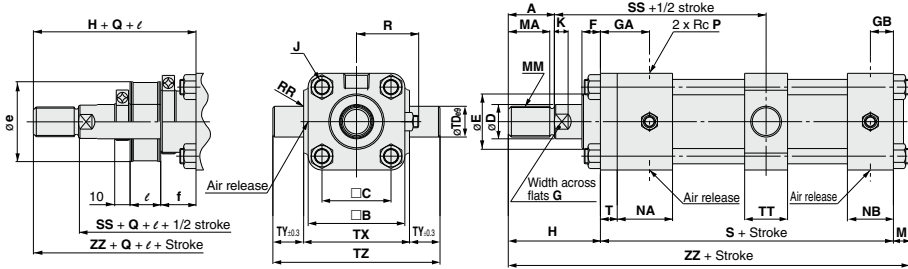
Tolerance

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

CH2E/CH2F/CH2G/CH2H Series

Dimensions

Center trunnion type: 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	B-rod	C-rod	B-rod	C-rod
32 ^{*1}	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 ^{*1}	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 ^{*1}	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	—	—	1/4 stroke	
63 ^{*2}	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	—	—	1/4 stroke	
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	—	—	1/4 stroke	

* 1: CH2GTC is limited to 1400 mm. * 2: CH2GTC is limited to 1500 mm.

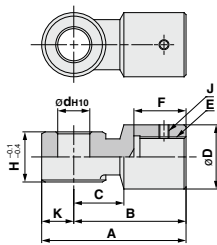
Rod series

Bore size (mm)	B-series rod										C-series rod										Tolerance		
	MM	A	MA	D	E	K	G	H	ZZ	MM	A	MA	D	E	K	G	H	ZZ	Bore size (mm)	TDe ₉	TX		
32	M16 x 1.5	25	22	18	34	7	14	55	207	—	—	—	—	—	—	—	—	—	32	—	0		
40	M20 x 1.5	30	27	22.4	40	9	19	60	212	M16 x 1.5	25	22	18	36	—	—	—	—	40	-0.040	-0.3		
50	M24 x 1.5	35	32	28	46	11	24	65	231	M20 x 1.5	30	27	22.4	40	-0.025	-0.064	7	14	55	207	50	—	0
63	M30 x 1.5	45	42	35.5	55	13	30	80	257	M24 x 1.5	35	32	28	46	-0.064	—	11	24	70	247	63	-0.050	-0.35
80	M39 x 1.5	60	57	45	65	15	41	95	295	M30 x 1.5	45	42	35.5	55	-0.030	-0.076	13	30	80	280	80	-0.112	0
100	M48 x 1.5	75	72	56	80	16	50	115	325	M39 x 1.5	60	57	45	65	-0.076	—	15	41	100	310	100	—	-0.4

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

Accessories (Optional)

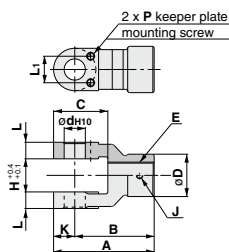
Single knuckle joint



Material: Cast iron

Rod series	Part no.	Bore size (mm)	A	B	C	D	ϕd_{H10}	E	F	H	J	K
B-series	IH2-03B	32	76	60	25	32	16 ^{+0.07} ₀	M16 x 1.5	26	25	M5 x 0.8	16
	IH2-04B	40	76	60	25	32	16 ^{+0.07} ₀	M20 x 1.5	31	25	M5 x 0.8	16
	IH2-05B	50	90	70	30	40	20 ^{+0.084} ₀	M24 x 1.5	36	31.5	M5 x 0.8	20
	IH2-06B	63	145	115	45	60	31.5 ^{+0.1} ₀	M30 x 1.5	50	40	M6 x 1.0	30
	IH2-08B	80	145	115	45	60	31.5 ^{+0.1} ₀	M39 x 1.5	61	40	M6 x 1.0	30
	IH2-10B	100	185	145	57	79	40 ^{+0.1} ₀	M48 x 1.5	76	50	M8 x 1.25	40
C-series	IH2-03B	40	76	60	25	32	16 ^{+0.07} ₀	M16 x 1.5	26	25	M5 x 0.8	16
	IH2-05C	50	90	70	30	40	20 ^{+0.084} ₀	M20 x 1.5	31	31.5	M5 x 0.8	20
	IH2-06C	63	145	115	45	60	31.5 ^{+0.1} ₀	M24 x 1.5	40	40	M6 x 1.0	30
	IH2-06B	80	145	115	45	60	31.5 ^{+0.1} ₀	M30 x 1.5	50	40	M6 x 1.0	30
	IH2-10C	100	185	145	57	79	40 ^{+0.1} ₀	M39 x 1.5	63	50	M8 x 1.25	40

Double knuckle joint

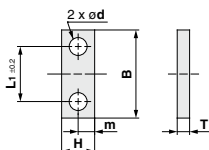


Material: Cast iron

Rod series	Part no.	Bore size (mm)	A	B	C	D	ϕd_{H10}	E	H	J	K	L	L1	P
B-series	YH2-03B	32	76	60	41	32	16 ^{+0.07} ₀	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 ^{+0.07} ₀	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 ^{+0.084} ₀	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 ^{+0.1} ₀	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 ^{+0.1} ₀	M39 x 1.5	40	M6 x 1.0	30	20	24	M8 x 1.25
	YH2-10B	100	185	145	95	80	40 ^{+0.1} ₀	M48 x 1.5	50	M8 x 1.25	40	25	26	M10 x 1.5
C-series	YH2-03B	40	76	60	41	32	16 ^{+0.07} ₀	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 ^{+0.084} ₀	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 ^{+0.1} ₀	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 ^{+0.1} ₀	M30 x 1.5	40	M6 x 1.0	30	20	24	M8 x 1.25
	YH2-10C	100	185	145	95	80	40 ^{+0.1} ₀	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.

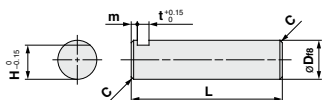
Keeper plate



Material: Rolled steel

Part no.	Bore size (mm)	B	H	L1	m	T	d	Cap bolt
KP-05	32, 40, 50	32	12	20 ± 0.2	6	4.5	6.5	M6 x 10 L
KP-08	63, 80	44	18	24 ± 0.2	9	4.5	9	M8 x 12 L
KP-10	100	44	22	26 ± 0.2	11	6	11.5	M10 x 14 L

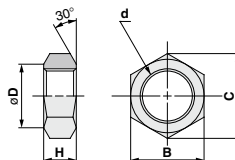
Double clevis/Double knuckle pin



Material: Rolled steel

Part no.	Bore size (mm)	D_s	C	L	m	t	H
CDH-04	32, 40	16 ^{-0.016} _{-0.043}	1	62	2.5	4.8	14
CDH-05	50	20 ^{-0.020} _{-0.053}	1	76.5	3.5	4.8	18
CDH-08	63, 80	31.5 ^{-0.025} _{-0.064}	1.5	93	3.5	4.8	28.5
CDH-10	100	40 ^{-0.025} _{-0.064}	2	117	6	6.3	35

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
	NTH-125	100	70	80.8	69	26	M48 x 1.5
C-series	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

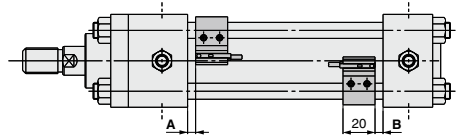
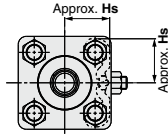
CH2E/CH2F/CH2H Series Auto Switch Mounting

Refer to pages 431 to 490 for detailed specifications.

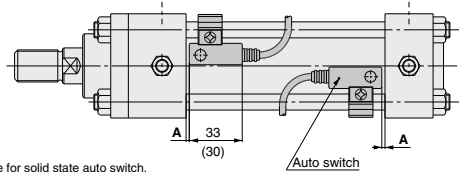
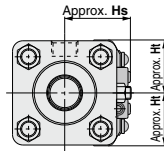
Auto Switches: Proper Mounting Positions and Mounting Heights for Stroke End Detection

<Tie-rod mount type>

- D-M9□/M9□V
- D-M9□W/M9□WV
- D-M9□A/M9□AV
- D-A9□/A9□V



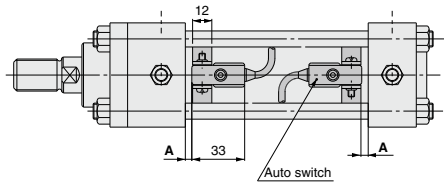
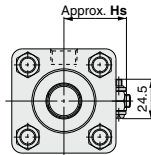
- D-F5□/J59
- D-F5NT
- D-F5□W/J59W
- D-F5BA/F59F
- D-A5□/A6□
- D-A59W



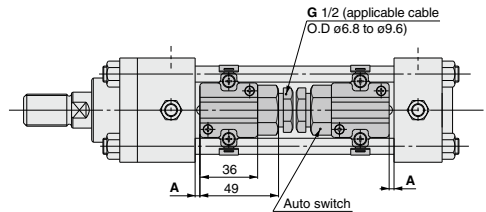
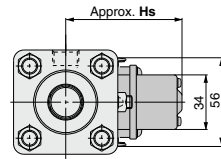
Dimensions inside () are for solid state auto switch.

<Band mount type>

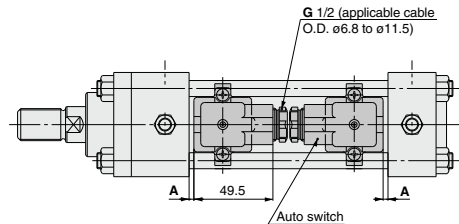
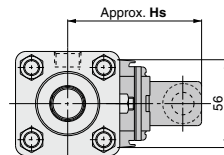
- D-G5□/K59
- D-G5□W/K59W
- D-G5BA
- D-G59F/G59NT
- D-B5□/B64/B59W



- D-G39/K39
- D-A3□



- D-A44



Auto Switch Proper Mounting Positions

Bore size (mm)	D-M9□/M9□V D-M9□W/M9□WV D-M9□A/M9□AV	D-F5□/J59 D-F5□W/J59W D-F59F/F5BA	D-F5NT	D-G5□/K59 D-G5□W/K59W D-G59F/G5BA D-G5NT	D-G39□/K39□	D-A9□/A9□V ^{Note2)}	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, Ho32 bore size cylinders.

Note 2) Auto switch models D-A9□ and A9□V cannot be mounted on cylinders with bore sizes CHD2Eø32 to ø100, CHD2Ho32 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□/M9□WV D-A9□V ^{Note1)}		D-F5□/J59 D-F5□W/J59W D-F59F/F5BA D-F5NT		D-A5□/A6□ D-A59W		D-G5□/K59 D-G5□W/K59W D-G59F/G5BA D-G5NT D-B5□/B64 D-B59W		D-G39□/K39□ D-A3□ ^{Note2)}		D-A44 ^{Note2)}	
		Hs		Hs	Ht	Hs	Ht	Hs	Hs	Hs	Hs		
		CH2E	CH2F	CH2E	CH2F	CH2E	CH2F	CH2E	CH2F	CH2E	CH2F	CH2E	CH2F
32	CH2E	32	—	35	30	35	30	35	32	—	—	—	—
	CH2F	—	34.5	35	30	34.5	30	32	—	—	—	—	—
40	CH2E	31.5	—	34.5	30	34.5	30	32.5	—	—	—	—	—
	CH2F	36	38.5	32.5	38.5	32.5	38	38	72.5	82.5	—	—	—
50	CH2E	—	38	33.5	38	33.5	36.5	71	81	—	—	—	—
	CH2F	35	38	33	38	33	37	71.5	81.5	—	—	—	—
63	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	—	—	—	—
80	CH2E	40	42	36	42	36	42.5	77	87	—	—	—	—
	CH2F	47.5	47	43	48.5	43	50.5	85	95	—	—	—	—
100	CH2E	—	46.5	43	46.5	43	48.5	83	93	—	—	—	—
	CH2F	47.5	47	43	48.5	43	50.5	85	95	—	—	—	—
32	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	—	—	—	—
40	CH2E	56	57.5	55.5	59	55.5	59.5	94	104	—	—	—	—
	CH2F	65	66.5	67	66.5	67	69.5	104	114	—	—	—	—
50	CH2E	—	65.5	67	65.5	67	68	102.5	112.5	—	—	—	—
	CH2F	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, CHD2Ho32 to ø100, and CHD2Fø32.

Note 2) Auto switch models D-G39□, K39□, A3□, A44 cannot be mounted on cylinders with bore sizes CH2E, F, Ho32.

CHQ

CHK□

CHN

CHM

CHS□

CH2□

CHA

Related Products

D-□

CH2E/CH2F/CH2H Series

Minimum Auto Switch Mounting Stroke

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	
n: Numbers of auto switched											
D-M9□ D-M9□W (Note 1)	2 (Different surfaces and same surface), 1	n	—	15 $15 + 40 \frac{(n-2)}{2}$ (n = 2, 4, 6, 8, ...) Note 3	—	85 $85 + 40 \frac{(n-4)}{2}$ (n = 4, 8, 12, 16, ...) Note 4	90 $90 + 40 \frac{(n-4)}{2}$ (n = 4, 8, 12, 16, ...) Note 4	100 $100 + 40 \frac{(n-4)}{2}$ (n = 4, 8, 12, 16, ...) Note 4	100	85 $85 + 30 \frac{(n-4)}{2}$ (n = 4, 8, 12, 16, ...) Note 4	110 $110 + 40 \frac{(n-4)}{2}$ (n = 4, 8, 12, 16, ...) Note 4
D-M9□V D-M9□WV (Note 1)	2 (Different surfaces and same surface), 1	n	—	15 $15 + 30 \frac{(n-2)}{2}$ (n = 2, 4, 6, 8, ...) Note 3	—	60 $60 + 30 \frac{(n-4)}{2}$ (n = 4, 8, 12, 16, ...) Note 4	65 $65 + 30 \frac{(n-4)}{2}$ (n = 4, 8, 12, 16, ...) Note 4	75 $75 + 30 \frac{(n-4)}{2}$ (n = 4, 8, 12, 16, ...) Note 4	100	85 $85 + 30 \frac{(n-4)}{2}$ (n = 4, 8, 12, 16, ...) Note 4	110 $110 + 40 \frac{(n-4)}{2}$ (n = 4, 8, 12, 16, ...) Note 4
D-M9□A (Note 1)	2 (Different surfaces and same surface), 1	n	—	15 $15 + 40 \frac{(n-2)}{2}$ (n = 2, 4, 6, 8, ...) Note 3	—	90 $90 + 40 \frac{(n-4)}{2}$ (n = 4, 8, 12, 16, ...) Note 4	95 $95 + 40 \frac{(n-4)}{2}$ (n = 4, 8, 12, 16, ...) Note 4	105 $105 + 40 \frac{(n-4)}{2}$ (n = 4, 8, 12, 16, ...) Note 4	100	115 $115 + 40 \frac{(n-4)}{2}$ (n = 4, 8, 12, 16, ...) Note 4	120 $120 + 40 \frac{(n-4)}{2}$ (n = 4, 8, 12, 16, ...) Note 4
D-M9□AV (Note 1)	2 (Different surfaces and same surface), 1	n	—	15 $15 + 30 \frac{(n-2)}{2}$ (n = 2, 4, 6, 8, ...) Note 3	—	65 $65 + 30 \frac{(n-4)}{2}$ (n = 4, 8, 12, 16, ...) Note 4	70 $70 + 30 \frac{(n-4)}{2}$ (n = 4, 8, 12, 16, ...) Note 4	80 $80 + 30 \frac{(n-4)}{2}$ (n = 4, 8, 12, 16, ...) Note 4	100	90 $90 + 30 \frac{(n-4)}{2}$ (n = 4, 8, 12, 16, ...) Note 4	100 $100 + 40 \frac{(n-4)}{2}$ (n = 4, 8, 12, 16, ...) Note 4
D-A9□ (Note 2)	2 (Different surfaces and same surface), 1	n	—	15 $15 + 40 \frac{(n-2)}{2}$ (n = 2, 4, 6, 8, ...) Note 3	—	85 $85 + 40 \frac{(n-4)}{2}$ (n = 4, 8, 12, 16, ...) Note 4	90 $90 + 40 \frac{(n-4)}{2}$ (n = 4, 8, 12, 16, ...) Note 4	100 $100 + 40 \frac{(n-4)}{2}$ (n = 4, 8, 12, 16, ...) Note 4	100	110 $110 + 40 \frac{(n-4)}{2}$ (n = 4, 8, 12, 16, ...) Note 4	120 $120 + 40 \frac{(n-4)}{2}$ (n = 4, 8, 12, 16, ...) Note 4
D-A9□V (Note 2)	2 (Different surfaces and same surface), 1	n	—	15 $15 + 30 \frac{(n-2)}{2}$ (n = 2, 4, 6, 8, ...) Note 3	—	60 $60 + 30 \frac{(n-4)}{2}$ (n = 4, 8, 12, 16, ...) Note 4	65 $65 + 30 \frac{(n-4)}{2}$ (n = 4, 8, 12, 16, ...) Note 4	75 $75 + 30 \frac{(n-4)}{2}$ (n = 4, 8, 12, 16, ...) Note 4	100	85 $85 + 30 \frac{(n-4)}{2}$ (n = 4, 8, 12, 16, ...) Note 4	100 $100 + 40 \frac{(n-4)}{2}$ (n = 4, 8, 12, 16, ...) Note 4
D-F5□ D-J59	2 (Different surfaces), 1	n	—	15 $15 + 55 \frac{(n-2)}{2}$ (n = 2, 4, 6, 8, ...) Note 3	115 $115 + 55 \frac{(n-4)}{2}$ (n = 4, 8, 12, 16, ...) Note 4	120 $120 + 55 \frac{(n-4)}{2}$ (n = 4, 8, 12, 16, ...) Note 4	130 $130 + 55 \frac{(n-4)}{2}$ (n = 4, 8, 12, 16, ...) Note 4	140 $140 + 55 \frac{(n-4)}{2}$ (n = 4, 8, 12, 16, ...) Note 4	130	140 $140 + 55 \frac{(n-4)}{2}$ (n = 4, 8, 12, 16, ...) Note 4	150 $150 + 55 \frac{(n-4)}{2}$ (n = 4, 8, 12, 16, ...) Note 4
D-F5□W D-J59W D-F5BA D-F59F	2 (Different surfaces), 1	n	—	15 $15 + 55 \frac{(n-2)}{2}$ (n = 2, 4, 6, 8, ...) Note 3	120 $120 + 55 \frac{(n-4)}{2}$ (n = 4, 8, 12, 16, ...) Note 4	120 $120 + 55 \frac{(n-4)}{2}$ (n = 4, 8, 12, 16, ...) Note 4	135 $135 + 55 \frac{(n-4)}{2}$ (n = 4, 8, 12, 16, ...) Note 4	140 $140 + 55 \frac{(n-4)}{2}$ (n = 4, 8, 12, 16, ...) Note 4	135	140 $140 + 55 \frac{(n-4)}{2}$ (n = 4, 8, 12, 16, ...) Note 4	150 $150 + 55 \frac{(n-4)}{2}$ (n = 4, 8, 12, 16, ...) Note 4
D-F5NT	2 (Different surfaces), 1	n	—	15 $15 + 55 \frac{(n-2)}{2}$ (n = 2, 4, 6, 8, ...) Note 3	125 $125 + 55 \frac{(n-4)}{2}$ (n = 4, 8, 12, 16, ...) Note 4	130 $130 + 55 \frac{(n-4)}{2}$ (n = 4, 8, 12, 16, ...) Note 4	140 $140 + 55 \frac{(n-4)}{2}$ (n = 4, 8, 12, 16, ...) Note 4	150 $150 + 55 \frac{(n-4)}{2}$ (n = 4, 8, 12, 16, ...) Note 4	140	150 $150 + 55 \frac{(n-4)}{2}$ (n = 4, 8, 12, 16, ...) Note 4	160 $160 + 55 \frac{(n-4)}{2}$ (n = 4, 8, 12, 16, ...) Note 4
D-A5□ D-A6□	2 (Different surfaces), 1	n	—	15 $15 + 55 \frac{(n-2)}{2}$ (n = 2, 4, 6, 8, ...) Note 3	110 $110 + 55 \frac{(n-4)}{2}$ (n = 4, 8, 12, 16, ...) Note 4	115 $115 + 55 \frac{(n-4)}{2}$ (n = 4, 8, 12, 16, ...) Note 4	125 $125 + 55 \frac{(n-4)}{2}$ (n = 4, 8, 12, 16, ...) Note 4	135 $135 + 55 \frac{(n-4)}{2}$ (n = 4, 8, 12, 16, ...) Note 4	125	145 $145 + 55 \frac{(n-4)}{2}$ (n = 4, 8, 12, 16, ...) Note 4	155 $155 + 55 \frac{(n-4)}{2}$ (n = 4, 8, 12, 16, ...) Note 4
D-A59W	2 (Different surfaces), 1	n	—	20 $20 + 55 \frac{(n-2)}{2}$ (n = 2, 4, 6, 8, ...) Note 3	115 $115 + 55 \frac{(n-4)}{2}$ (n = 4, 8, 12, 16, ...) Note 4	125 $125 + 55 \frac{(n-4)}{2}$ (n = 4, 8, 12, 16, ...) Note 4	130 $130 + 55 \frac{(n-4)}{2}$ (n = 4, 8, 12, 16, ...) Note 4	140 $140 + 55 \frac{(n-4)}{2}$ (n = 4, 8, 12, 16, ...) Note 4	130	145 $145 + 55 \frac{(n-4)}{2}$ (n = 4, 8, 12, 16, ...) Note 4	150 $150 + 55 \frac{(n-4)}{2}$ (n = 4, 8, 12, 16, ...) Note 4
D-G5□/K59 D-G5□W D-K59W D-G59F D-G5BA D-G5NT D-B5□/B64	2 n	Different surfaces same surface	1 n	15 75 $15 + 50 \frac{(n-2)}{2}$ (n = 2, 4, 6, 8, ...) Note 3 $75 + 50 \frac{(n-2)}{2}$ (n = 2, 3, 4, ...)	110 110 $110 + 50 \frac{(n-4)}{2}$ (n = 4, 8, 12, 16, ...) Note 4 $90 + 50 \frac{(n-2)}{2}$ (n = 2, 4, 6, 8, ...) Note 3	115 115 $115 + 50 \frac{(n-4)}{2}$ (n = 4, 8, 12, 16, ...) Note 4 $115 + 50 \frac{(n-2)}{2}$ (n = 2, 4, 6, 8, ...) Note 3	125 125 $125 + 50 \frac{(n-4)}{2}$ (n = 4, 8, 12, 16, ...) Note 4 $125 + 50 \frac{(n-2)}{2}$ (n = 2, 4, 6, 8, ...) Note 3	135 135 $135 + 50 \frac{(n-4)}{2}$ (n = 4, 8, 12, 16, ...) Note 4 $135 + 50 \frac{(n-2)}{2}$ (n = 2, 4, 6, 8, ...) Note 3	125 125 $125 + 50 \frac{(n-4)}{2}$ (n = 4, 8, 12, 16, ...) Note 4 $125 + 50 \frac{(n-2)}{2}$ (n = 2, 4, 6, 8, ...) Note 3	135 135 $135 + 50 \frac{(n-4)}{2}$ (n = 4, 8, 12, 16, ...) Note 4 $135 + 50 \frac{(n-2)}{2}$ (n = 2, 4, 6, 8, ...) Note 3	145 145 $145 + 50 \frac{(n-4)}{2}$ (n = 4, 8, 12, 16, ...) Note 4 $145 + 50 \frac{(n-2)}{2}$ (n = 2, 4, 6, 8, ...) Note 3
D-B59W	2 n	Different surfaces same surface	1 n	20 75 $20 + 50 \frac{(n-2)}{2}$ (n = 2, 4, 6, 8, ...) Note 3 $75 + 50 \frac{(n-2)}{2}$ (n = 2, 3, 4, ...)	115 115 $115 + 50 \frac{(n-4)}{2}$ (n = 4, 8, 12, 16, ...) Note 4 $115 + 50 \frac{(n-2)}{2}$ (n = 2, 4, 6, 8, ...) Note 3	115 115 $115 + 50 \frac{(n-4)}{2}$ (n = 4, 8, 12, 16, ...) Note 4 $115 + 50 \frac{(n-2)}{2}$ (n = 2, 4, 6, 8, ...) Note 3	130 130 $130 + 50 \frac{(n-4)}{2}$ (n = 4, 8, 12, 16, ...) Note 4 $130 + 50 \frac{(n-2)}{2}$ (n = 2, 4, 6, 8, ...) Note 3	140 140 $140 + 50 \frac{(n-4)}{2}$ (n = 4, 8, 12, 16, ...) Note 4 $140 + 50 \frac{(n-2)}{2}$ (n = 2, 4, 6, 8, ...) Note 3	130 130 $130 + 50 \frac{(n-4)}{2}$ (n = 4, 8, 12, 16, ...) Note 4 $130 + 50 \frac{(n-2)}{2}$ (n = 2, 4, 6, 8, ...) Note 3	145 145 $145 + 50 \frac{(n-4)}{2}$ (n = 4, 8, 12, 16, ...) Note 4 $145 + 50 \frac{(n-2)}{2}$ (n = 2, 4, 6, 8, ...) Note 3	
D-G39 D-K39 D-A3□ (Note 1)	2 n	Different surfaces same surface	1 n	35 100 $35 + 30 \frac{(n-2)}{2}$ (n = 2, 3, 4, ...) $100 + 100 \frac{(n-2)}{2}$ (n = 2, 3, 4, ...)	—	80 80 $80 + 30 \frac{(n-2)}{2}$ (n = 2, 3, 4, ...) $100 + 100 \frac{(n-2)}{2}$ (n = 2, 3, 4, ...)	95 95 $95 + 30 \frac{(n-2)}{2}$ (n = 2, 3, 4, ...)	105 105 $105 + 30 \frac{(n-2)}{2}$ (n = 2, 3, 4, ...)	105 105 $105 + 30 \frac{(n-2)}{2}$ (n = 2, 3, 4, ...)	115 115 $115 + 30 \frac{(n-2)}{2}$ (n = 2, 3, 4, ...)	120 120 $120 + 30 \frac{(n-2)}{2}$ (n = 2, 3, 4, ...)
D-A44 (Note 1)	2 n	Different surfaces same surface	1 n	10 35 55 $35 + 30 \frac{(n-2)}{2}$ (n = 2, 3, 4, ...) $55 + 50 \frac{(n-2)}{2}$ (n = 2, 3, 4, ...)	—	85 85 $85 + 30 \frac{(n-2)}{2}$ (n = 2, 3, 4, ...) $85 + 50 \frac{(n-2)}{2}$ (n = 2, 3, 4, ...)	100 100 $100 + 30 \frac{(n-2)}{2}$ (n = 2, 3, 4, ...)	110 110 $110 + 30 \frac{(n-2)}{2}$ (n = 2, 3, 4, ...)	100 100 $100 + 30 \frac{(n-2)}{2}$ (n = 2, 3, 4, ...)	110 110 $110 + 30 \frac{(n-2)}{2}$ (n = 2, 3, 4, ...)	120 120 $120 + 30 \frac{(n-2)}{2}$ (n = 2, 3, 4, ...)

Note 1) Auto switch models D-M9□, M9□V, M9□W, M9□WV, M9□A, M9□AV, 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.
 Note 3) When "n" is an odd number, an even number that is one larger than this odd number is used for the calculation. Note 4) When "n" is an odd number, a multiple of 4 that is larger than this odd number is used for the calculation.



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□A/M9□AV	—	5.5	6	7	5.5	6.5
D-F5□/J59/F59F D-F5□W/J59W D-F5BA/F5NT	4.5	4	4.5	4.5	4.5	4.5
D-G5□/K59/G59F D-G5□W/K59W D-G5BA/G5NT	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□A/M9□AV	—	5	5	5.5	5	5
D-F5□/J59/F59F D-F5□W/J59W D-F5BA/F5NT	4.5	4	4.5	4.5	4.5	4.5
D-G5□/K59/G59F D-G5□W/K59W D-G5BA/G5NT	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

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□A/M9□AV	—	5.5	6	7	5.5	6.5
D-F5□/J59/F59F D-F5□W/J59W D-F5BA/F5NT	4.5	4	4.5	4.5	4.5	4.5
D-G5□/K59/G59F D-G5□W/K59W D-G5BA/G5NT	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

CHQ

CHK□

CHN

CHM

CHS□

CH2□

CHA

Related Products

D-□

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/HF	D-M9□/M9□V D-M9□W/M9□WV D-M9□A/M9□AV D-A9□/A9□V (Note 2)	—	BA7-063	BA7-063	BA7-080	B5S-160	B5S-180
	D-F5□/J59 D-F5□W/J59W D-F5BA/F59F/F5NT D-A5□/A6□/A59W	BT-06	BT-06	BT-06	BT-08	BT-16	BT-18A

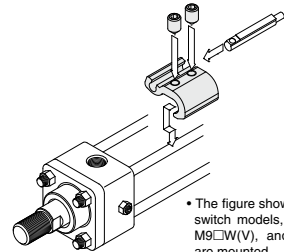
<Band mounting>

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-G5BA/G59F/G5NT D-B5□/B64/B59W	BA-32	BA-04	BA-05	BA-06	BA-08	BA-10
	D-G39/K39 D-A3□/A44	—	BD1-04M	BD1-05M	BD1-06M	BH1-080	BH1-100
	D-G5□/K59 D-G5□W/K59W D-G5BA/G59F/G5NT D-B5□/B64/B59W	BGS1-032	BH2-040	BH2-050	BA-06	BH2-080	BH2-100
CH2H	D-G39/K39 D-A3□/A44	—	BDS-04M	BDS-05M	BDS-06M	BDS-08M	BDS-10M
	D-G5□/K59 D-G5□W/K59W D-G5BA/G59F/G5NT 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.

Note 3) CHD2F: For bore sizes ø32 to ø63 with strokes from 801 mm and bore sizes ø80 to ø100 with strokes from 1001 mm, mount with the band for the CH2H.



* The figure shows how auto switch models, D-M9□(V), M9□(V), and M9□A(V) 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 1) For details on BBA1 and BBA3, refer to page 380.

When D-F5BA, G5BA 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 2) 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-□□□, B5S-□□□). 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.

CH2E/CH2F/CH2H Series

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-□□ 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	BMB5-032 BA7-040, BA7-063, BA7-080	D-A9 D-M9
	3	Set screw	M4 x 0.7 x 8L	2	BT-16, BT-18A, BT-20 BS5-125, BS5-160 BS5-180, BS5-200	D-A5, A6 D-F5, J5 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 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

Besides the models listed in "How to Order," the following auto switches are applicable. Refer to pages 431 to 490 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 indicator)
	D-M9NAV, M9PAV, M9BAV		Water resistant (2-color indicator)
	D-F59, F5P, J59	Grommet (in-line)	—
	D-F59W, F5PW, J59W		Diagnostic indication (2-color indicator)
	D-F5BA		Water resistant (2-color indicator)
Reed	D-F5NT, G5NT	Grommet (perpendicular)	With timer
	D-A93V, A96V		—
	D-A90V	Grommet (in-line)	Without indicator light
	D-A53, A56, B53		—
	D-A67		Without indicator light

* Solid state auto switches are also available with pre-wired connector. Refer to pages 474 and 475 for details.

How to Mount and Move the Auto Switch

<Applicable auto switch>

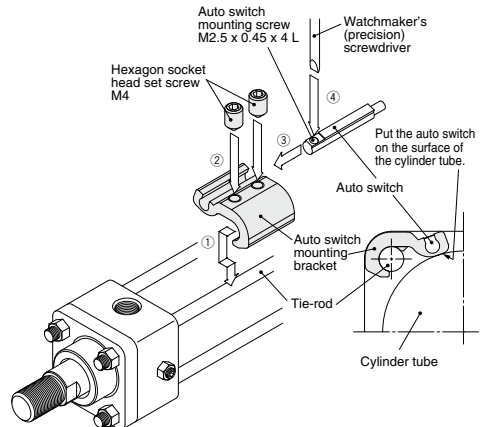
Solid state D-M9N(V), D-M9P(V), D-M9B(V)
D-M9NW(V), D-M9PW(V), D-M9BW(V)
D-M9NA(V), D-M9PA(V), D-M9BA(V)

- 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.

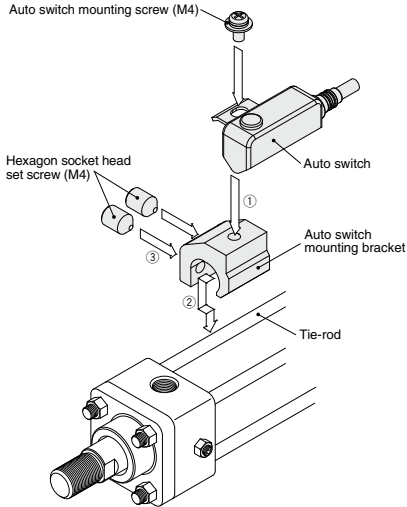
Note 3) When tightening an auto switch mounting screw (M2.5), use a watchmaker's screwdriver with a grip diameter of 5 to 6 mm. Also, set the tightening torque to be 0.05 to 0.15 N·m. As a guide, turn 90° from the position where it comes to feel light.



How to Mount and Move the Auto Switch

<Applicable auto switch>

- Solid state D-F59, D-F5P
 D-J59, D-F5BA
 D-F59W, D-F5PW, D-J59W
 D-F59F, D-F5NT
- 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 Products

D-

CH2E/CH2F/CH2G/CH2H Series

Simple Specials:

These changes are dealt with Simple Specials System.



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>A0</p> <p>Note) Male thread effective length should be no more than 100 mm.</p>	<p>A1</p> <p>Note) Male thread effective length should be no more than 100 mm.</p>	<p>A2</p> <p>Note) Male thread effective length should be no more than 100 mm.</p>									
<p>A3</p> <p>Note) Female thread effective depth should be no more than twice the thread diameter.</p>	<p>A4</p> <p>Note) Female thread effective depth should be no more than twice the thread diameter.</p>	<p>A5</p> <p>Note) Male thread effective length should be no more than 100 mm.</p>									
<p>A6</p> <p>Note) Male thread effective length should be no more than 100 mm.</p>	<p>A7</p> <p>Note) Male thread effective length should be no more than 100 mm.</p>	<p>Note 1) Dimensions indicated with an asterisk (*) in the patterns A1, A2, 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>A1</td> <td rowspan="4">ød-2</td> </tr> <tr> <td>A2</td> </tr> <tr> <td>A3</td> </tr> <tr> <td>A4</td> </tr> <tr> <td>A5</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 *	A1	ød-2	A2	A3	A4	A5	øD-2
Pattern	Dimension for *										
A1	ød-2										
A2											
A3											
A4											
A5	øD-2										

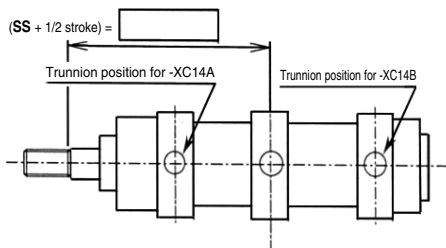
CH2E/CH2F/CH2G/CH2H Series

Simple Specials



2 Change of Trunnion Bracket Mounting Position

CH2 Series Mounting type Bore size Rod size series - Stroke Suffix for auto switch - XC14 Trunnion position



Precautions

1. Specify "SS + 1/2 stroke" in the case the trunnion bracket position is not -XC14A, B or trunnion is not a center trunnion.
2. SMC will make appropriate arrangements if no dimension, tolerance, or finish instructions are given in the diagram.
3. The possible range of trunnion bracket mounting position is indicated in the table below.
4. Some trunnion mounting positions do not allow auto switch mounting. Please consult with SMC for more information.

CH2 Series

(mm)

Bore size	Symbol	SS + 1/2 stroke				
		For -XC14A	For -XC14B	For -XC14		Reference Standard (Center trunnion)
				Minimum	Maximum	
32	92	126 + stroke	92.5	125.5 + stroke	113 + 1/2 stroke	25
40	91	127 + stroke	91.5	126.5 + stroke	113 + 1/2 stroke	25
50	102.5	133.5 + stroke	103	133 + stroke	121 + 1/2 stroke	25
63	114.5	141.5 + stroke	115	141 + stroke	132 + 1/2 stroke	25
80	118.5	153.5 + stroke	119	153 + stroke	146 + 1/2 stroke	25
100	130.5	161.5 + stroke	131	161 + stroke	156 + 1/2 stroke	25

CHQ

CHK

CHN

CHM

CHS

CH2

CHA

Related Products

D-

CH2E/CH2F/CH2G/CH2H Series

Made to Order



1 Short Stroke Specifications (5 to 24 mm)

Symbol
-X2967

Applicable to strokes outside of the standard stroke range (5 to 24 mm)
* This made-to-order product is only applicable to the type without a cushion.

How to Order

CH□2 Series Mounting type Bore size Rod size series - Stroke With or without a rod end nut N - Auto switch -X2967

Specifications

Dimensions	Same as standard type
Additional specifications	Same as standard type (Except with air cushion, with rod boot)

Note) For details on mounting auto switches, refer to Auto Switch Mounting on pages 376 to 381.

CHQ

CHK□

CHN

CHM

CHS□

CH2□

CHA

Related Products

D-□

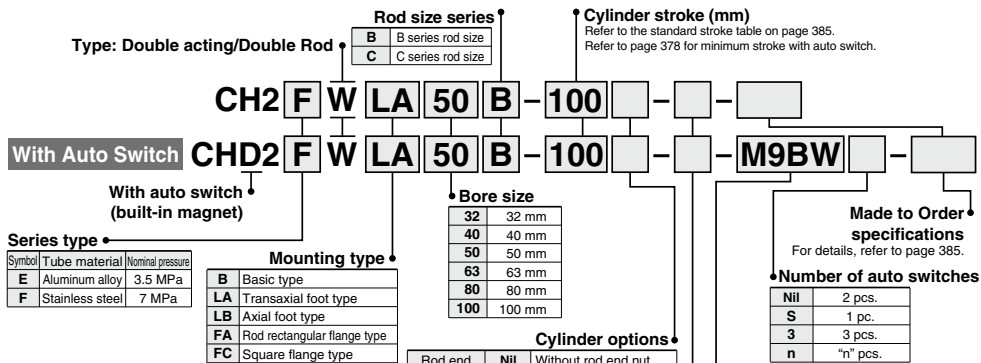
JIS Standard Hydraulic Cylinder Double Acting/Double Rod

CH2EW/CH2FW Series

ø32, ø40, ø50, ø63, ø80, ø100

3.5 MPa
7 MPa

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) CHD2FWLA50-100

Applicable Auto Switches

Refer to pages 431 to 490 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 ø32	Band mount ø32	0.5 (Nil)	1 (M)	3 (L)	5 (Z)	None								
Solid state auto switch	Diagnostic indication (2-color indicator)	Grommet	Yes	3-wire (NPN)	24 V	5 V, 12 V	—	M9N	F59	G59	●	●	○	○	○	IC circuit	Relay PLC				
				3-wire (PNP)				F5P	G5P	●	●	○	○								
				2-wire				M9B	K59	●	●	○	○								
		Terminal conduit		3-wire (NPN)				5 V, 12 V	—	—	G39	—	—	●	—			○	IC circuit		
		2-wire		12 V				—	—	K39	—	—	●	—	○			—			
		Water resistant (2-color indicator)		Grommet				Yes	3-wire (NPN)	24 V	5 V, 12 V	—	M9NW	F59W	G59W			●	●	○	○
	3-wire (PNP)		M9PW		—	—	—		—				—	—	—	—					
	2-wire		F5PW		G5PW	●	●		○				○	○							
	Terminal conduit		2-wire	12 V	—	—	M9BW		J59W				K59W	●	●	○		○	○	—	
			3-wire (NPN)	5 V, 12 V	—	—	M9NA*1		—				—	○	○	○		○	IC circuit		
			3-wire (PNP)	12 V	—	—	M9PA*1		—				—	○	○	○		○			
	Diagnostic output (2-color indicator)	Grommet	Yes	2-wire	24 V	5 V, 12 V	—	F5BA*1	G5BA*1	●	●	○	○	○	IC circuit						
4-wire (NPN)				F59F				G59F	●	●	○	○	○								
Reed auto switch	Diagnostic indication (2-color indicator)	Grommet	Yes	2-wire (NPN equiv.)	24 V	12 V	—	A96**	A93**	—	●	●	○	○	IC circuit	Relay PLC					
				100 V				A90**	—	—	—	—	—	—			—	—			
				100 V or less				A54	B54	●	●	○	○	○							
		100 V, 200 V		A64				B64	●	●	○	○	○								
		200 V or less		—				A33	—	—	—	—	—	—			—	—			
		Terminal conduit		2-wire				12 V	—	—	A34	—	—	—			—	—	—		
	DIN terminal	100 V, 200 V	—	—	A44	—	—	—	—	—	—										
		Grommet	—	—	A59W	B59W	●	●	○	○	○	—									

*1 Water resistant type auto switches can be mounted on the above models, but in such case SMC cannot guarantee water resistance.

Consult with SMC regarding water resistant types with the above model numbers.

* Lead wire length symbols: 0.5 m Nil (Example) M9NW

1 m M (Example) M9NWM

3 m L (Example) M9NLW

5 m Z (Example) M9NZW

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

** Auto switch models D-A9C, D-A9V cannot be mounted on CHD2E,

CHD2H in all bore sizes, and CHD2F32.

* Since there are applicable auto switches other than listed, refer to page 380 for details.

* For details about auto switches with pre-wired connector, refer to pages 474 and 475.

* D-A9C, M9C, M9CW, and M9CA auto switches are shipped together. (not assembled). (Only the auto switch mounting bracket is pre-assembled).

JIS Standard Hydraulic Cylinder *CH2EW/CH2FW Series*



Made to Order

Made to order specifications
(For details, refer to page 382)

Symbol	Specifications
-XA <input type="checkbox"/>	Change of rod end shape



Models

Model	CH2EW	CH2FW
Tube material	Aluminum alloy	Stainless steel
Nominal pressure (MPa)	3.5	7
Bore size (mm)	32, 40, 50, 63, 80, 100	

Specifications

Model	CH2EW	CH2FW
Action	Double acting/Single rod	
Fluid	Hydraulic fluid	
Nominal pressure (MPa)	3.5	7
Maximum allowable pressure (MPa)	3.5	B rod 13.5 C rod 11
Proof pressure (MPa)	5.0	10.5
Minimum operating pressure (MPa)	0.3	
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 $^{+1.4}_0$	

Note) Refer to page 214 for definitions of terms related to pressure.

Standard Strokes

Cylinder bore size (mm)	Standard strokes (mm)
32, 40, 50, 63	25 to 800
80, 100	25 to 1000

Note) Refer to pages 230 and 231 determine stroke limitation depending on the type of mounting brackets that will be used. Then make your selection.

The auto switch mounting specifications are the same for double acting and single rod. Refer to pages 376 to 381.

- 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.

Port and Cushion Valve Positions

Symbol Position Mounting type	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 (Basic type)								
FA, FC (Flange type) TC (Center trunnion type)								
LA, LB (Foot type)								

: 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 Products

D-

CH2EW/CH2FW Series

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 (Option)

Single knuckle, Double Knuckle Lock nut, Knuckle pin

* Refer to page 375 for part numbers and dimensions.

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

Weight

Unit: kg

Bore size (mm)	Mounting type \ Series	B	LA	FC	TC	LB	FA	Additional weight (per 10 mm stroke)	
		Basic	Transaxial foot	Square flange	Center trunnion	Axial foot	Rectangular flange (7 MPa)		
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 type \ Series	B	LA	FC	TC	LB	FA	Additional weight (per 10 mm stroke)	
		Basic	Transaxial foot	Square flange	Center trunnion	Axial foot	Rectangular flange (7 MPa)		
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	

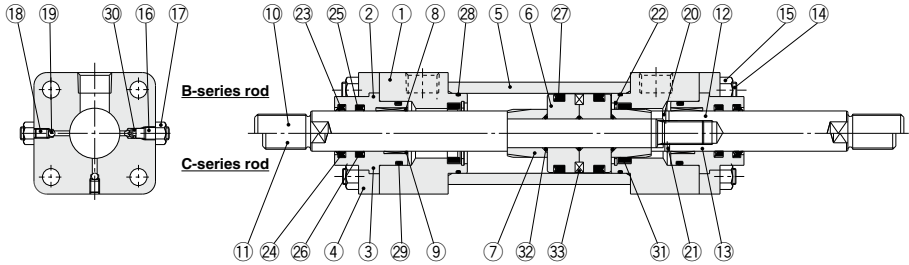
Theoretical Output

Unit: N

Bore size (mm)	Rod size (mm)	Piston area (mm ²)	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
	100	56	5388	5388	18859	26941	37718
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

JIS Standard Hydraulic Cylinder Double Acting/Double Rod **CH2EW/CH2FW Series**

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	CH2EW100C-PS	
	CH2FW100B-PS	CH2FW100C-PS	

* For the B-series rod, 1 seal kit includes 23, 25, and 27 to 31. For the C-series rod, 1 seal kit includes 24, 26, and 27 to 31. They can be ordered using the part number for each bore size.

CHQ

CHK

CHN

CHM

CHS

CH2

CHA

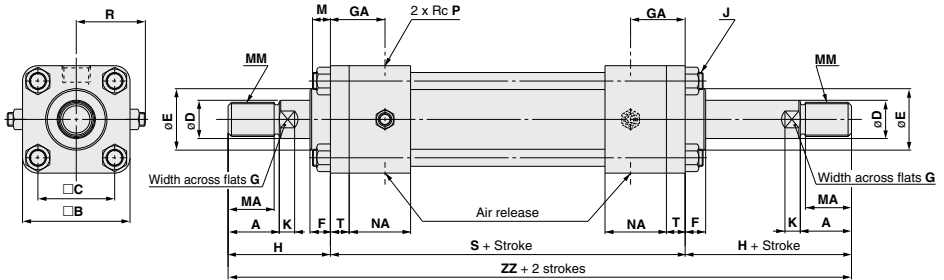
Related Products

D-

CH2EW/CH2FW Series

Dimensions

Basic type: CH2EWB, CH2FWB



(mm)

Bore size (mm)	Stroke range (mm)	$\square B$	$\square C$	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

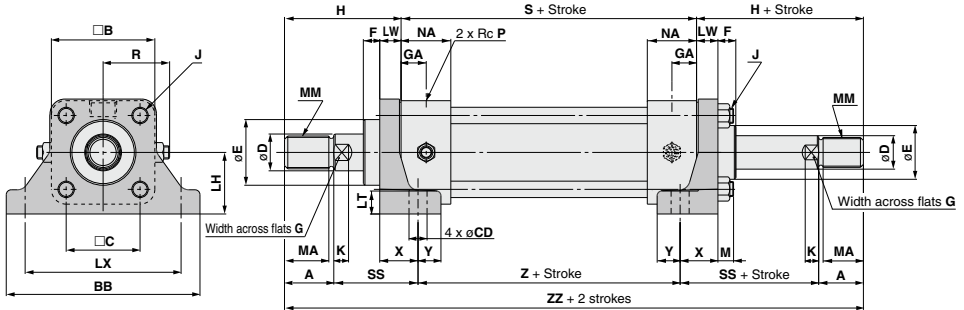
Rod series

(mm)

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	-0.025 -0.064	9	19	60	278	M16 x 1.5	25	22	18	36	-0.025	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	-0.064	9	19	60	296
63	M30 x 1.5	45	42	35.5	55	-0.030 -0.076	13	30	80	346	M24 x 1.5	35	32	28	46	-0.064	11	24	70	326
80	M39 x 1.5	60	57	45	65	-0.030 -0.076	15	41	95	392	M30 x 1.5	45	42	35.5	55	-0.030	13	30	80	362
100	M48 x 1.5	75	72	56	80	-0.030 -0.076	16	50	115	442	M39 x 1.5	60	57	45	65	-0.076	15	41	100	412

JIS Standard Hydraulic Cylinder *CH2EW/CH2FW Series*

Transaxial foot type: CH2EWLA, CH2FWLA



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	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	±0.18	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	±0.20	19	20	132	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	±0.23	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		18	44	3/4	75	172	85	53	22	122	

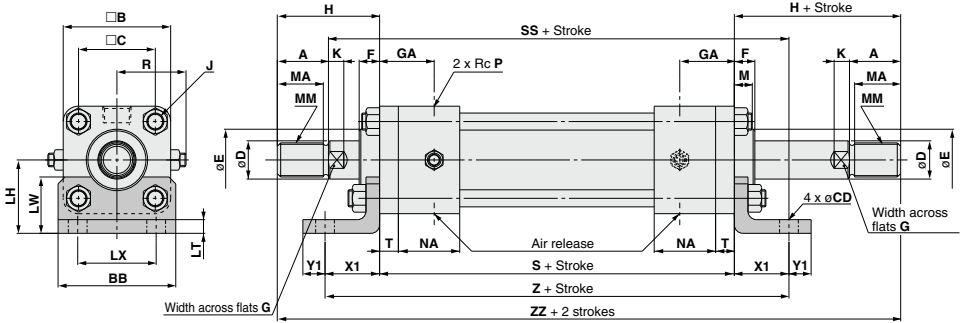
Rod series

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	-0.025 -0.064	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	-0.025 -0.064	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	-0.030 -0.076	15	41	113	392	M30 x 1.5	45	42	35.5	55	-0.030 -0.076	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	

CH2EW/CH2FW Series

Dimensions

Axial foot type: 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	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	±0.13	11	36	3/8	42	158	220	11	32	13
50	25 to 800	85	76	52	14	15	40	M10 x 1.25	50	±0.15	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		10	45	65	±0.15	14	43	1/2	52	186	263	15	42	18
80	25 to 1000	118	110	80	18	17	40	M16 x 1.5	72	±0.25	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	±0.18	18	44	3/4	75	212	307	20	55	23

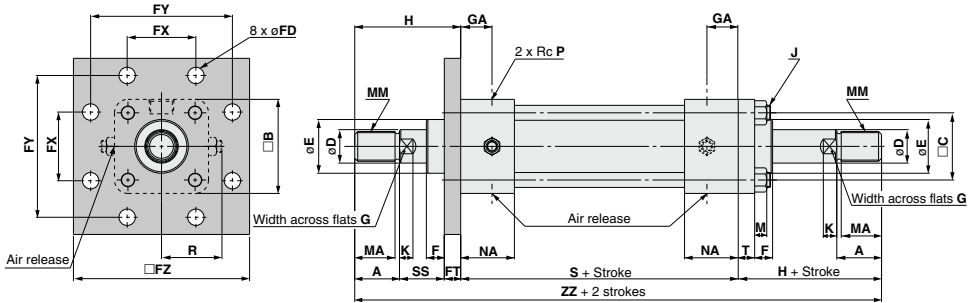
Rod series

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	-0.025 -0.064	9	19	60	278	M16 x 1.5	25	22	18	36	-0.025 -0.064	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	-0.030 -0.076	9	19	60	296
63	M30 x 1.5	45	42	35.5	55	-0.030 -0.076	13	30	80	346	M24 x 1.5	35	32	28	46	-0.030 -0.076	11	24	70	326
80	M39 x 1.5	60	57	45	65	-0.030 -0.076	15	41	95	392	M30 x 1.5	45	42	35.5	55	-0.030 -0.076	13	30	80	362
100	M48 x 1.5	75	72	56	80	-0.030 -0.076	16	50	115	442	M39 x 1.5	60	57	45	65	-0.030 -0.076	15	41	100	412

CH2EW/CH2FW Series

Dimensions

Square flange type: CH2EWFC, CH2FWFC



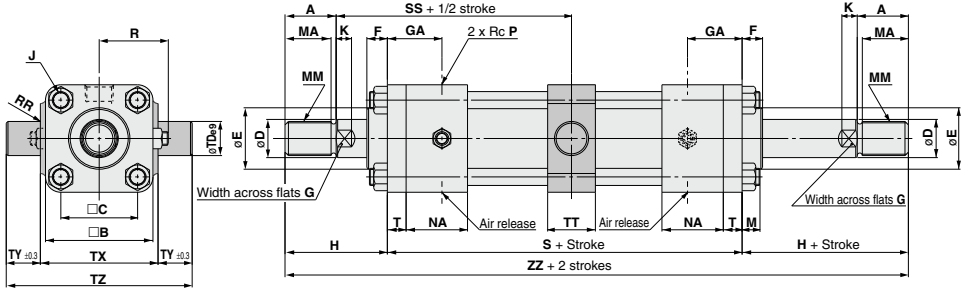
Bore size (mm)	Stroke range (mm)	□B	□C	F	FD	FT	FX	FY	FZ	GA	J	M	NA	P	R	S	SS	T	(mm)	
																			±0.2	±0.3
32	25 to 800	58	38	16	11	11	40	88	109	21	M10 x 1.25	11	37	3/8	39	136	30	11		
40	25 to 800	65	45	12	11	11	46	95	118	21	M10 x 1.25	11	36	3/8	42	136	30	11		
50	25 to 800	76	52	15	14	13	58	115	145	27	M10 x 1.25	11	43	1/2	46	150	30	13		
63	25 to 800	90	63	15	18	15	65	132	165	27	M12 x 1.5	14	43	1/2	52	156	35	15		
80	25 to 1000	110	80	17	18	18	87	155	190	22	M16 x 1.5	16	44	3/4	65	166	35	18		
100	25 to 1000	135	102	19	22	20	109	190	230	22	M18 x 1.5	18	44	3/4	75	172	40	20		

Rod series

Bore size (mm)	B-series rod										C-series rod										(mm)	
	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 *CH2EW/CH2FW Series*

Center trunnion type: CH2EWTC, CH2FWTC



- CHQ**
- CHK
- CHN**
- CHM**
- CHS
- CH2**
- CHA**
- Related Products
- D-

Bore size (mm)	Stroke range (mm)	B	C	F	GA	J	M	NA	P	R	RR	S	SS	T	TD _{±0.3}	TT	TX	TY	TZ		
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		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	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	-0.35	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	40	225

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	-0.025 -0.064	9	19	60	278	M16 x 1.5	25	22	18	36	-0.025	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	-0.064	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	-0.030	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	-0.076	15	41	100	412