

# Water Resistant Cylinder (Pneumatic/Hydraulic)

*Pneumatic: Series CM2/CG1/MB/MB1/CQ2/CA2/MGP/MGG*

*Hydraulic: Series CHDKB/CH2F*

## Compatible with an operating environment with coolants.



Anti-coolant performance has been improved compared to the standard cylinders.

Applicable for an operating environment where water splashes.



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CG5

HY

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D-

-X

Individual  
-X

Technical  
data

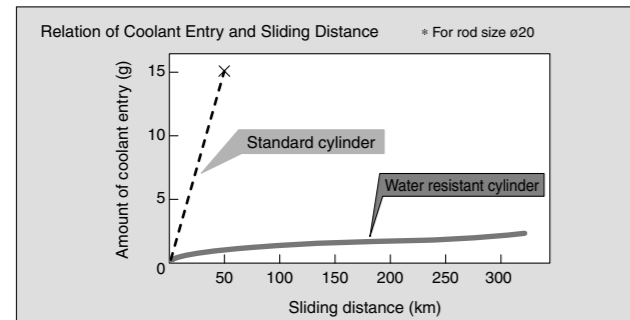
# Water Resistant Air Cylinders (Pneumatic/Hydraulic)

Suitable for using under the atmosphere having coolant in the machine tools.

Also, compatible with environments where water is splashed on the food machinery, or car washing machines, etc

## Special scraper

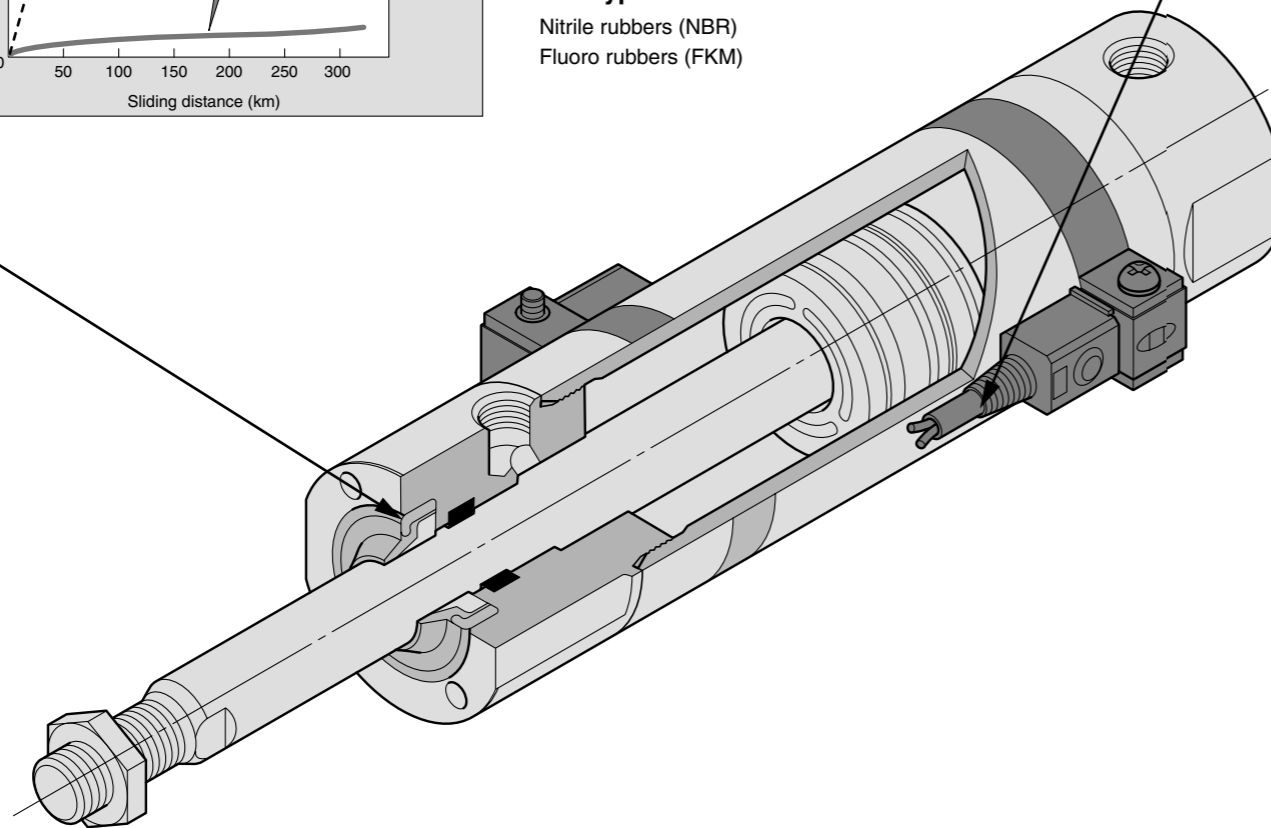
- Dramatically improved water resistance compared to standard cylinders



**Conditions**  
 Operating conditions..... Air  
 Pressure ..... 0.5 MPa  
 Coolant ..... Water-soluble  
 Piston speed ..... 200 mm/sec  
 Operating cycle ..... 60 cpm

- Two types of standard seal material

Nitrile rubbers (NBR)  
 Fluoro rubbers (FKM)



## Applicable Cylinder

### Air Cylinder

**Series CM2**  
ø20 to ø40



**Series CG1**  
ø32 to ø100



**Air cylinder Series MB**  
ø32 to ø100



**Square tube type air cylinder Series MB1**  
ø32 to ø100



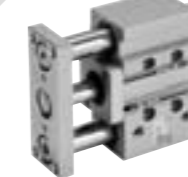
**Compact cylinder Series CQ2**  
ø20 to ø100



**Series CA2**  
ø40 to ø100



**Compact guide cylinder Series MGP**  
ø20 to ø100



**Guide cylinder Series MGG**  
ø32 to ø100



## Water resistant 2-color indication solid state auto switch

Water resistance improved 10 times by improving the waterproof effect of the switch substrate through a change of the internal structure. (SMC comparison)

Model	Applicable cylinder	Lead wire
<b>D-F7BA(V)L/ Rail mounting</b> 	<b>CQ2(ø20 to ø100)</b>	Oilproof vinyl cabtire cord: ø3.4 0.2 mm <sup>2</sup> , 2 cores (Brown, Blue), 3 m (standard)
<b>D-F5BAL/ Tie-rod mounting</b> 	<b>CH2F(ø32 to ø100)</b> <b>CA2(ø40 to ø100)</b> <b>MB(ø32 to ø100)</b>	Oilproof vinyl cabtire cord: ø4, 0.3 mm <sup>2</sup> 2 cores (Brown, Blue), 3 m (standard)
<b>D-H7BAL/ Band mounting</b> 	<b>CM2, CG1(ø32 to ø63)</b> <b>MGG(ø32 to ø63)</b>	Oilproof vinyl cabtire cord: ø3.4 0.2 mm <sup>2</sup> , 2 cores (Brown, Blue), 3 m (standard)
<b>D-G5BAL/ Band mounting</b> 	<b>CG1(ø80, ø100)</b> <b>MGG(ø80, ø100)</b>	Oilproof vinyl cabtire cord: ø4, 0.3 mm <sup>2</sup> 2 cores (Brown, Blue), 3 m (standard)
<b>D-Y7BAL/ Direct mounting</b> <small>Note 1)</small> 	<b>CA2(ø40 to ø100)</b> <b>MB(ø32 to ø100)</b> <b>MB1(ø32 to ø100)</b> <b>MGP(ø20 to ø100)</b> <b>CHKDB(ø32 to ø100)</b>	Oilproof vinyl cabtire cord: ø3.4 0.15mm <sup>2</sup> , 2 cores (Brown, Blue), 3 m (standard)
<b>D-M9□A(V)L/Direct mounting</b> <small>Note 1)</small> 	<b>CQ2(ø20 to ø100)</b> <b>CHKDB(ø20 to ø100)</b> <b>CA2(ø40 to ø100)</b> <b>MB(ø32 to ø100)</b> <b>MB1(ø32 to ø100)</b> <b>MGP(ø20 to ø100)</b>	Oilproof vinyl cabtire cord: 2.7 x 3.2 Elliptical shape, 0.15 mm <sup>2</sup> , 2 cores (D-M9BA(V)), 3 cores (D-M9NA(V),D-M9PA(V))

Note 1) Tie-rod mounting for CA2 and MB

Note 2) This product is not made to be used in water.

Refer to pages 1263 to 1371 for the detailed specifications of auto switches.

## Hydraulic Cylinders

Compact hydraulic cylinder conforming to JIS/10 MPa

**Series CHKDB**  
ø20 to ø100



Hydraulic cylinder conforming to JIS/7 MPa

**Series CH2F**  
ø32 to ø100



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Individual

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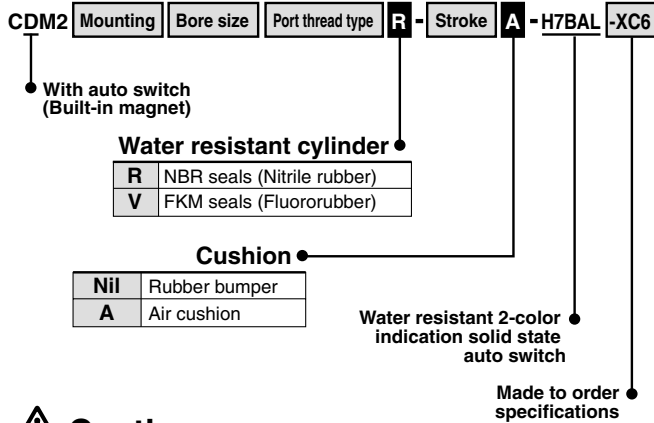
Technical data

# Air Cylinders

Series **CM2**  $\varnothing 20$  to  $\varnothing 40$



## How to Order



### Caution

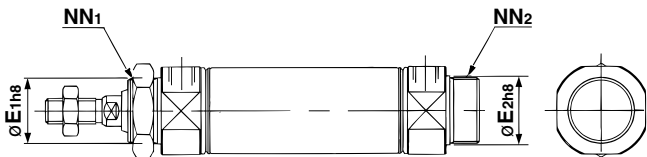
Rod seals and scrapers are not replaceable. The above parts cannot be replaced since the scraper is press-fit in the rod cover.

## Specifications

Action	Double acting, Single rod
Bore size (mm)	20, 25, 32, 40
Cushion	Rubber bumper, Air cushion
Auto switch mounting	Band mounting
Made to order	Piston rod, rod end nut made of stainless steel (-XC6)

\* Specifications other than above are the same as standard, basic style.

## Dimensions



Bore size (mm)	E1	E2*	NN1	NN2*
20	22 <sup>0</sup> <sub>-0.033</sub>	20 <sup>0</sup> <sub>-0.033</sub>	M22 x 1.5	M20 x 1.5

\* Other specifications are the same as the double acting, single rod standard type. (An asterisk means it is the same as the standard type.)

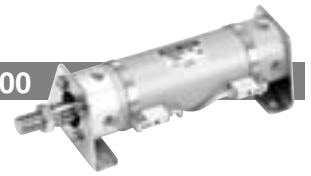
### Mounting Bracket\*: Part No.

Mounting bracket	Min. order qty.	Bore size (mm)	Description (At min. order qty.)
Axial foot style**	2	CM-L020C	2 feet, 1 mounting nut
Flange	1	CM-F020C	1 flange, 1 mounting nut
Trunnion (with nuts)	1	CM-T020C	1 trunnion, 1 trunnion nut

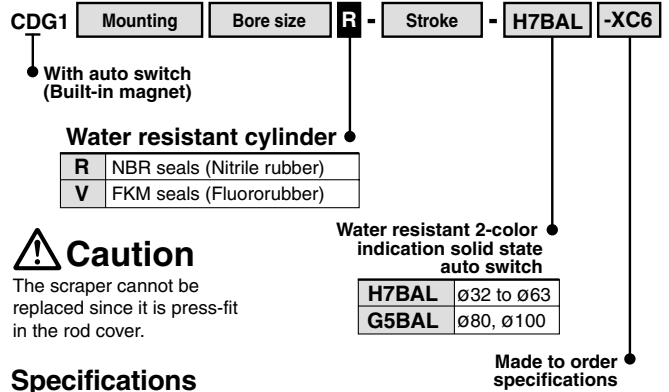
\* The brackets for  $\varnothing 25$  to  $\varnothing 40$  are the same for the standard type.

\*\* Order 2 foot brackets for each cylinder unit.

Series **CG1**  $\varnothing 32$  to  $\varnothing 100$



## How to Order



### Caution

The scraper cannot be replaced since it is press-fit in the rod cover.

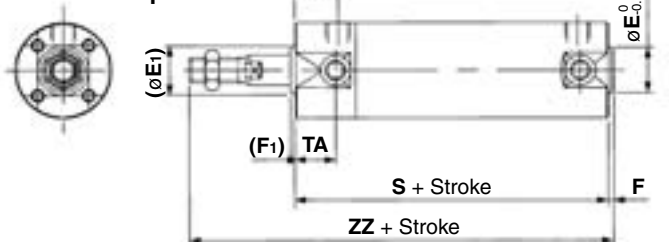
## Specifications

Action	Double acting, Single rod
Bore size (mm)	32, 40, 50, 63, 80, 100
Cushion	Rubber bumper, Air cushion
Auto switch mounting	Band mounting
Made to order	Piston rod, rod end nut made of stainless steel (-XC6)

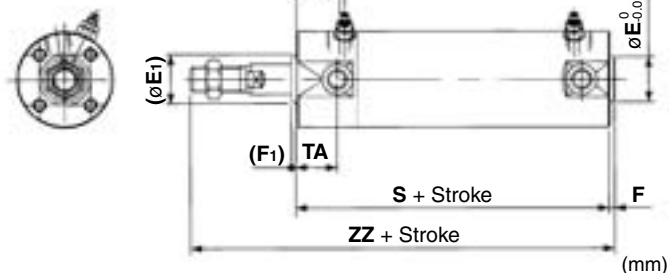
\* Specifications other than above are the same as standard, basic style.

## Dimensions

### Rubber bumper



### Air cushion



Bore size (mm)	(E1)	E*	(F1)	F*	GA	S	TA	WA	ZZ
32	17	18	2	2	18	77 (85)	17	22	119 (127)
40	21	25	2	2	19	84 (93)	18	22	136 (145)
50	26	30	2	2	21	97 (109)	20	25	157 (169)
63	26	32	2	2	21	97 (109)	20	25	157 (169)
80	32	40	3	3	28	116 (130)	—	30	190 (204)
100	37	50	3	3	29	117 (131)	—	31	191 (205)

\* Other specifications are the same as the double acting, single rod standard type. (An asterisk means it is the same as the standard type.)

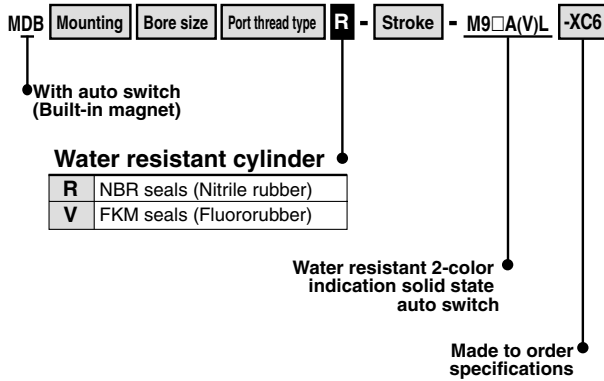
( ): For the long stroke type

# Air Cylinders

Series **MB**  $\varnothing 32$  to  $\varnothing 100$



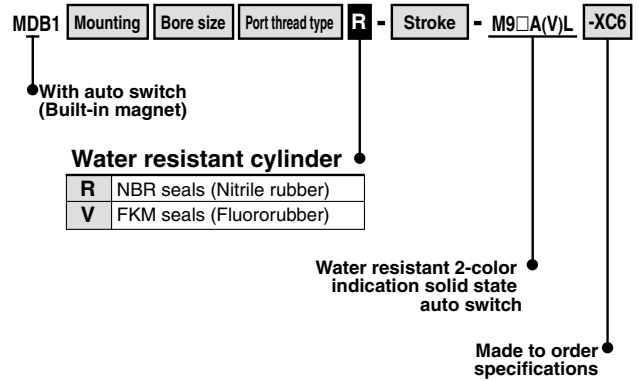
## How to Order



Series **MB1**  $\varnothing 32$  to  $\varnothing 100$



## How to Order

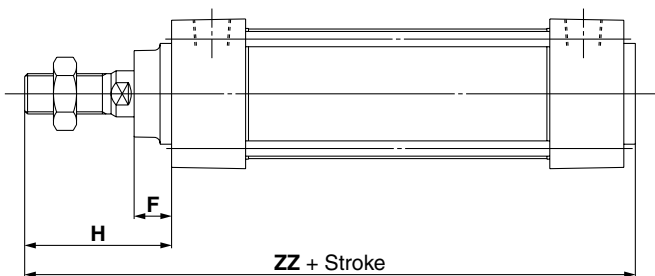


## Specifications

Action	Double acting, Single rod
Bore size (mm)	$\varnothing 32, 40, 50, 63, 80, 100$
Cushion	Air cushion
Auto switch mounting	Tie rod mounting
Made to order	Piston rod, rod end nut made of stainless steel (-XC6)

\* Specifications other than above are the same as standard, basic style.

## Dimensions



Bore size (mm)	F	H	ZZ
32	15	47	135 (141)
40	17	58	146 (152)
50	19	67	165 (173)
63	19	67	165 (173)
80	25	81	199 (209)
100	25	81	199 (209)

\* Other specifications are the same as the double acting, single rod standard type.

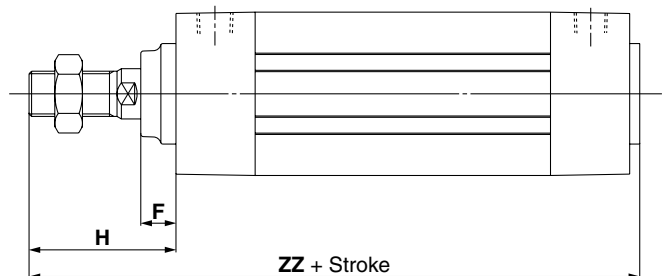
\* ( ): For the type without an air cushion

## Specifications

Action	Double acting, Single rod
Bore size (mm)	$\varnothing 32, 40, 50, 63, 80, 100$
Cushion	Air cushion
Auto switch mounting	Tie rod mounting
Made to order	Piston rod, rod end nut made of stainless steel (-XC6)

\* Specifications other than above are the same as standard, basic style.

## Dimensions



Bore size (mm)	F	H	ZZ
32	15	47	135 (141)
40	17	58	146 (152)
50	19	67	165 (173)
63	19	67	165 (173)
80	25	81	199 (209)
100	25	81	199 (209)

\* Other specifications are the same as the double acting, single rod standard type.

\* ( ): For the type without an air cushion

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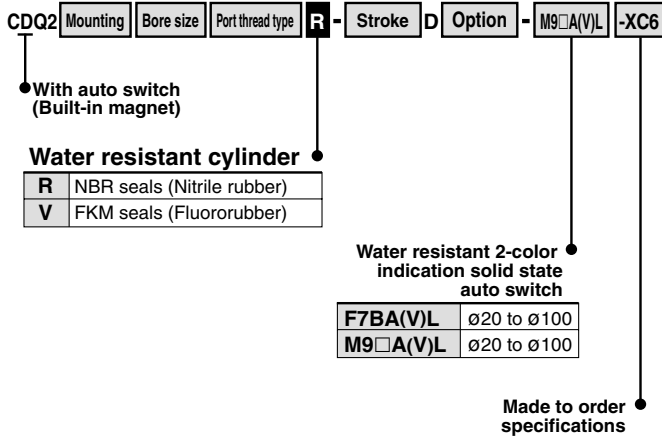
# Air Cylinders

## Compact Cylinder

Series **CQ2**  $\varnothing 20$  to  $\varnothing 100$



### How to Order



### Specifications

Action	Double acting, Single rod
Bore size (mm)	20, 25, 32, 40, 50, 63, 80, 100
Mounting	$\varnothing 20$ to $\varnothing 32$ ..... B (through-hole) only $\varnothing 40$ to $\varnothing 100$ ..... B (through-hole), F (rod side flange) A (both ends tapped), G (head side flange) L (foot), D (double clevis)
Cushion	None
Auto switch mounting	Rail mounting (D-F7BAL/F7BAVL)/Direct mounting (D-M9□A(V)L) Use auto switch brackets for $\varnothing 20$ , $\varnothing 25$
Made to order	Retaining ring, piston rod, rod end nut made of stainless steel(-XC6)

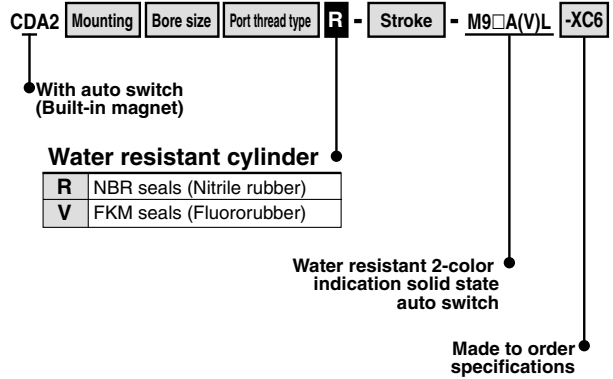
\* Specifications other than above are the same as standard, basic style.

Refer to page 747 for details.

Series **CA2**  $\varnothing 40$  to  $\varnothing 100$



### How to Order



### Specifications

Action	Double acting, Single rod
Bore size (mm)	40, 50, 63, 80, 100
Cushion	Air cushion
Auto switch mounting	Tie-rod mounting style
Made to order	Piston rod/Rod end nut material: Stainless steel (-XC6)

\* Specifications other than above are the same as standard, basic style.  
Note 1) Air-hydro type, rod boot specifications of Series CA2 are excluded.  
Note 2) Combination of auto switches and steel tube is not available.

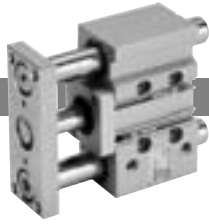
### Dimensions

\* Other specifications are the same as the double acting, single rod standard type.

# Air Cylinders

## Compact guide cylinder

Series **MGP**  $\varnothing 20$  to  $\varnothing 100$



### How to Order

MGPM Bore size Port thread type **R** - Stroke - M9□A(V)L

Slide bearing

Water resistant cylinder

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

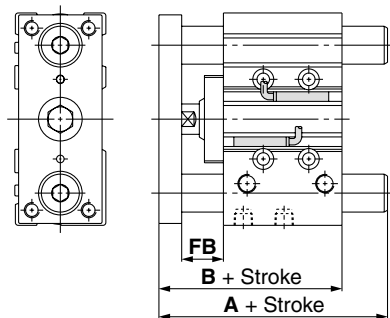
Water resistant 2-color indication solid state auto switch

- \* Piston rods and guide rods are made of stainless steel.
- \* Iron parts made of stainless steel are available as made to order.

### Specifications

Action		Double acting
Bearing type		Slide bearing
Bore size (mm)		20, 25, 32, 40, 50, 63, 80, 100
Cushion	MGPM□□ <b>R</b>	Rubber bumper
	MGPM□□ <b>V</b>	Without cushion
Auto switch mounting		Direct mounting

### Dimensions

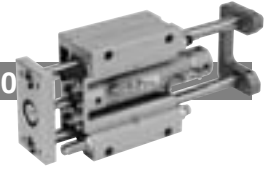


Bore size (mm)	A			B	FB
	Below 50 strokes	Between 50 and 200 strokes	Over 200 strokes		
20	66	97.5	135	66	19
25	67.5	99	136	67.5	20
32	109	114	152	71.5	22
40	109	114	152	78	22
50	117.5	129	172	83	23
63	117.5	129	172	88	23
80	121	148	199	102.5	24
100	141	166	207	120	29

\* Other specifications are the same as the standard type.

## Guide cylinder

Series **MGG**  $\varnothing 32$  to  $\varnothing 100$



### How to Order

MGGM Mounting Bore size Port thread type **R** - Stroke - H7BAL -XC6□

Slide bearing

Water resistant cylinder

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

Water resistant 2-color indication solid state auto switch

<b>H7BAL</b>	$\varnothing 32$ to $\varnothing 63$
<b>G5BAL</b>	$\varnothing 80$ , $\varnothing 100$

Made to order specifications

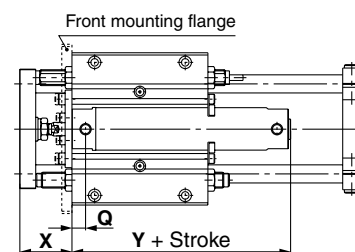
### Specifications

Action		Double acting
Bore size (mm)		32, 40, 50, 63, 80, 100
Bearing type		Slide bearing
Cushion		Built-in rubber bumper and shock absorber
Auto switch mounting		Band mounting
Made to order	-XC6	Piston rod and rod end nut made of stainless steel
	-XC6A	Stainless steel used on all iron parts
	-XC6B	Stainless steel rod end moving parts
	-XC6C	Stainless steel rods

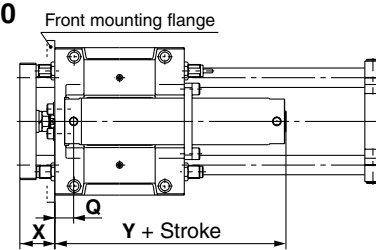
- \* Specifications other than above are the same as standard, basic style.
- Note 1) RBL (anti-coolant) type is used for shock absorbers.

### Dimensions (Dimensions other than the below are the same as the standard type.)

$\varnothing 32$  to  $\varnothing 50$



$\varnothing 63$  to  $\varnothing 100$



Bore size (mm)	Q	X	Y
32	16	48	77 (85)
40	17	58	84 (93)
50	19	69	97 (109)
63	34	56	112 (124)
80	46	68	137 (151)
100	47	68	138 (152)

\* ( ): For the long stroke type.

CJ5  
CG5

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M□

D-□

-X□

Individual  
-X□

Technical  
data

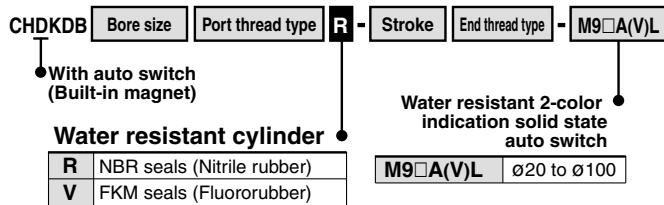
# Hydraulic Cylinders

Compact hydraulic cylinder  
conforming to JIS/10 MPa

Series **CHDKB**  $\varnothing 20$  to  $\varnothing 100$



## How to Order

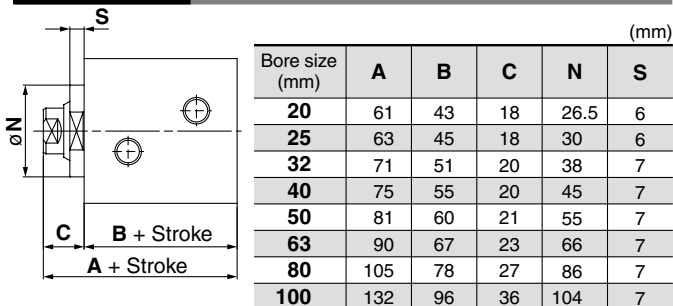


## Specifications

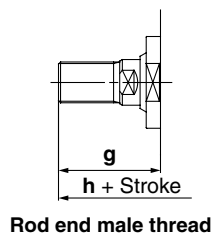
Action	Double acting, Single rod
Bore size (mm)	20, 25, 32, 40, 50, 63, 80, 100
Cushion	None
Auto switch mounting	Direct mounting

\* Specifications other than above are the same as standard, basic style.

## Dimensions



\* Other specifications are the same as the double acting, single rod standard type.



Rod end male thread

Bore size (mm)	g	h
20	33	76
25	36	81
32	45	96
40	50	105
50	56	116
63	68	135
80	87	165
100	111	207

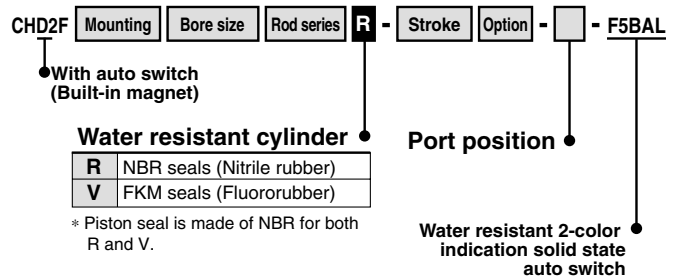
\* Other specifications are the same as the double acting, single rod standard type.

Hydraulic cylinder conforming to JIS/7 MPa

Series **CH2F**  $\varnothing 32$  to  $\varnothing 100$



## How to Order



Water resistant 2-color indication solid state auto switch

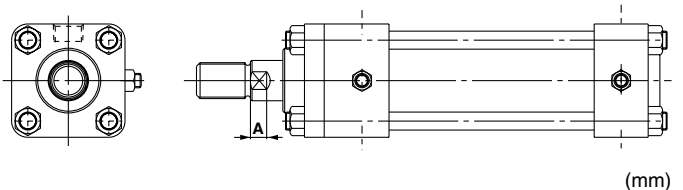
\* Stainless steel piston rods are available as made to order.

## Specifications

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

\* Specifications other than above are the same as standard, basic style.

## Dimensions



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

\* Other specifications are the same as the double acting, single rod standard type.



# Water Resistant Air Cylinder/Water Resistant Hydraulic Cylinder Specific Product Precautions

Be sure to read before handling. Refer to front matters 54 and 55 for Safety Instructions and pages 3 to 11 for Actuator and Auto Switch Precautions.

## Handling Precautions

1. Before installing a cylinder, thoroughly flush out the piping to prevent dust or cutting chips from entering the cylinder. For the hydraulic cylinder, use the air bleed valve to bleed the air inside the cylinder.
2. Eccentric loads applied to the piston rod dramatically shorten the service life. Use the piston rod by always applying a load in an axial direction.
3. Make sure not to scratch or gouge the sliding portion of the piston rod, as this could damage the seals and lead to leaks.
4. When the cylinder is used in a place where the liquid from the piston rod is lightly splashed, and exposed to dust or sand, use a heavy duty scraper (-XC4).
5. If there is a possibility that liquid splashes on cylinder fittings when using an air cylinder, use insert fittings, self-align fittings, piping, etc. Consider the compatibility of liquid components and piping materials before using.
6. When selecting seals, generally use NBR (nitrile rubber) seals with liquids that do not contain chlorine and sulfur, and use FKM (fluororubber) seals with liquids that contain chlorine and sulfur. However, depending on the type and the brand of liquid that splashes on the cylinder, the operating life of seals may be reduced dramatically (such as coolant liquid). In cases where special additives are used, or where liquid caused trouble with the conventional nitrile or fluororubber seals in the past, request an investigation or set up a test period for the use of the seals.

### Examples of coolants

Shimiron, PA-O-5	(Daido Chemical Industry Co., Ltd.)	(NBR seals)
Noritake Cool, AFG-S	(Noritake Co., Ltd.)	(NBR seals)
Yushiroken, S-46S	(Yushiro Chemical Industry Co., Ltd.)	(NBR seals)
Yushiroken, EC-50-T3	(Yushiro Chemical Industry Co., Ltd.)	(NBR seals)
Yushiron Oil, No. 23	(Yushiro Chemical Industry Co., Ltd.)	(FKM seals)
Daphne Cut, Hs-1	(Idemitsu Kosan Co., Ltd.)	(FKM seals)

7. Please consult with SMC separately when liquid contains sulfur, which is used for cylinders with a guide (MGP, MGG).

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