

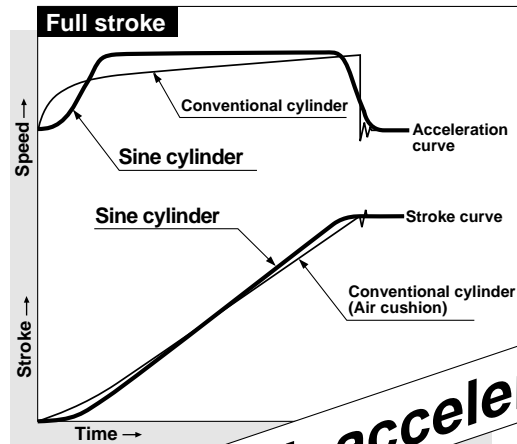
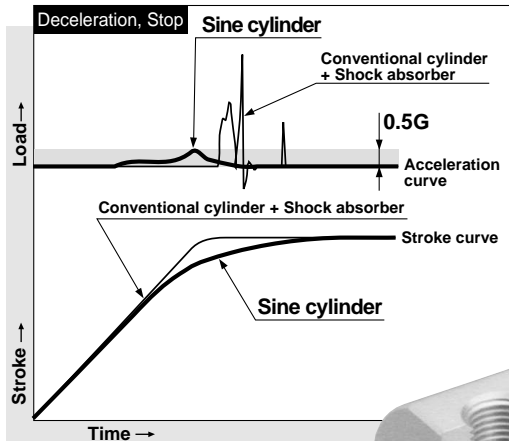
# Sine Cylinder

## Series REC

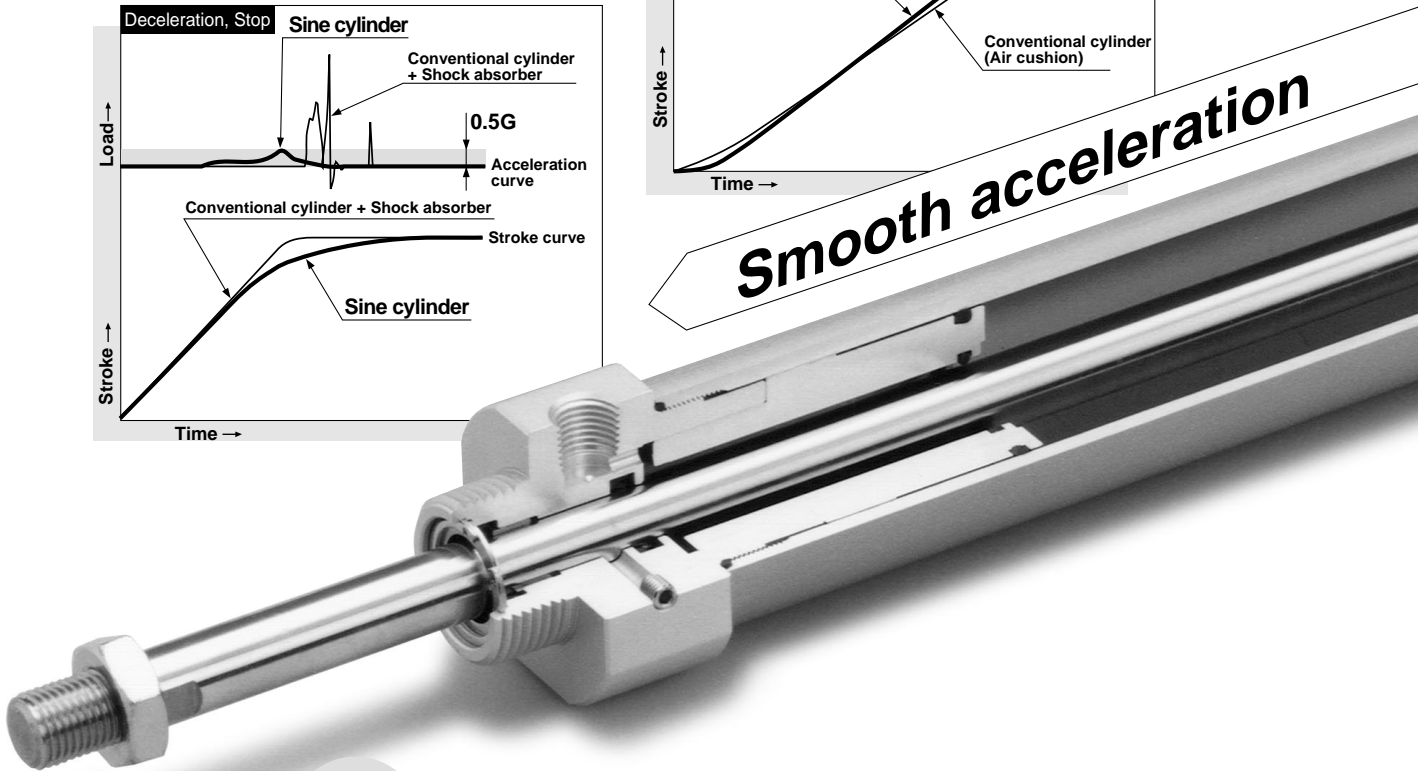
ø20, ø25, ø32, ø40

Allows rapid transfer of work

Comparison of sine rodless cylinder with a cylinder with shock absorber in terms of motion



Smooth acceleration



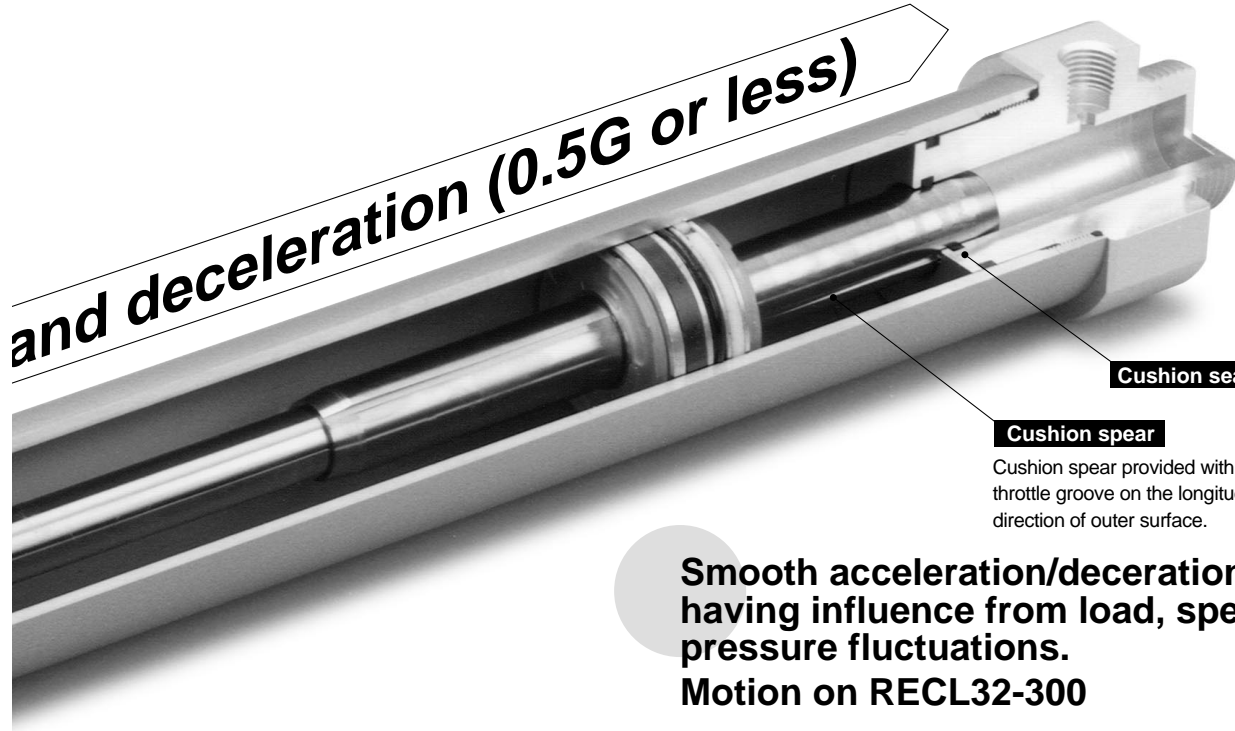
Comparison to shockless transfer systems

Conventional system				Sine cylinder
Control method	Speed control by a flow control valve which can variable throttle flow according to indicated current.	Shock absorber	Multistage speed control by combining speed controllers and a directional control valve.	Cushion whose depth of throttle groove varies with changes in stroke, in a SINE function.
System construction	<p>Symbol</p> <p>Conventional System 1</p>			
Acceleration	Smooth operation	Same start up as inrush of standard cylinder due to lack of slow controlled start function.	Smooth speed control cannot be achieved by digital control, and sudden speed changes are associated with it.	Smooth operation without sudden speed changes
Deceleration	Smooth operation	Initial impact is large. (Initial force against shock absorber)	Smooth speed control cannot be achieved by digital control, and sudden speed changes are associated with it.	Smooth operation without sudden speed changes
Construction	Complex	Simple	Complex	Simple

Applicable to clean room class 100  
(Refer to p.4.9-10)

REC for clean room specification removes dust generated inside body by applying vacuum to relieving port.

# with dramatically reduced shock/impact

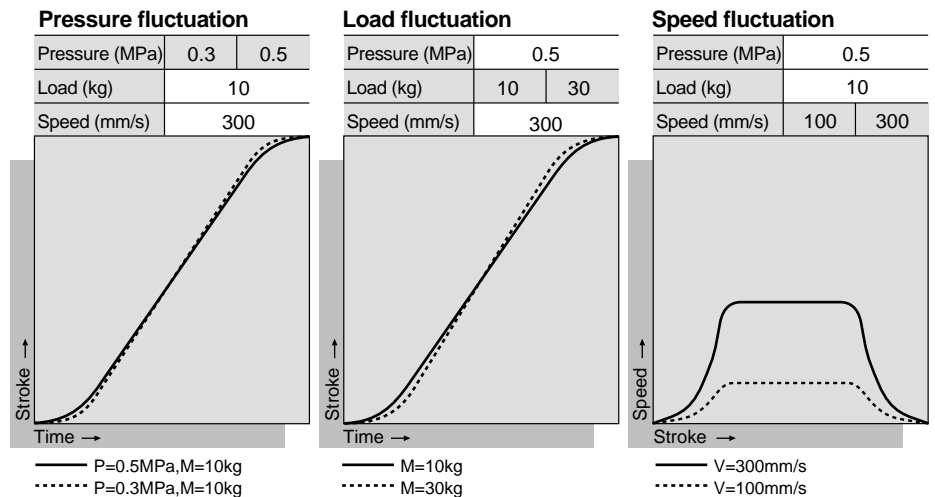


and deceleration (0.5G or less)

Smooth acceleration/deceleration without having influence from load, speed or even pressure fluctuations.  
Motion on RECL32-300

## Reducing actuation cycle time

Max. 500mm/s of high speed transfer is possible.  
Cycle time can be drastically reduced compared with existing low speed cylinder (10 to 30 mm/s).



## Variations

Bore size (mm)	Standard stroke (mm)	Max. stroke (mm)	Applicable auto switch	Mounting
20	150 to 700	1500	Reed switch: D-C7, C8 D-B5, B6 Solid state switch: D-H7, D-G5, D-G3, K3	Basic: B Axial foot: L Front flange: F Rear flange: G Single clevis: C Double clevis: D Front trunnion: U Rear trunnion: T
25				
32	150 to 1000			
40	200 to 1000			

### ⚠ Caution

Use SMC recommended speed controller. (Refer to p.4.9-5)

## ⚠ Caution

### Recommended SMC speed controller

Model	Model		
	Elbow	Straight	In-line
<b>REC20</b>	AS2201F-01-06-X214	AS2301F-01-06-X214	AS2001F-06-X214
<b>REC25</b>	AS2201F-01-06-X214	AS2301F-01-06-X214	AS2001F-06-X214
<b>REC32</b>	AS3201F-01-08-X214	AS3201F-01-08-X214	AS3001F-08-X214
<b>REC40</b>	AS3201F-02-08-X214	AS3301F-02-08-X214	AS3001F-08-X214

MK/MK2

RSQ/RSG

RSH

CE1

CE2

ML2B

ML1C

REA

**REC**

RHC

MTS

CC



# Series REC/Precautions

Be sure to read before handling.

Refer to p.0-39 to 0-43 for Safety Instructions and precautions for actuator.

## ⚠ Caution

### Speed control

- ① Throttle speed controller, such as SMC AS series, is recommended for speed regulation.

#### Recommended SMC speed controller

Model	Model		
	Elbow	Straight	In-line
<b>REC20</b>	AS2201F-01-06-X214	AS2301F-01-06-X214	AS2001F-06-X214
<b>REC25</b>	AS2201F-01-06-X214	AS2301F-01-06-X214	AS2001F-06-X214
<b>REC32</b>	AS3201F-01-08-X214	AS3301F-01-08-X214	AS3001F-08-X214
<b>REC40</b>	AS3201F-02-08-X214	AS3301F-02-08-X214	AS3001F-08-X214

- ② Speed control is possible with meter-in and meter-out styles of speed controllers. However, smooth acceleration and deceleration may not be obtained by these speed controllers.
- ③ For installation other than horizontal mounting, it is recommended to use a system with reduced pressure supply circuit on the downward side. (This system is also effective for a start delay at rise and air reduction.)

### Cushion adjustment

Cushion adjustment mechanism is not designed.  
Cushion adjustment is not necessary because the model can perform smooth acceleration and deceleration in a wide range of strokes without an adjusting cushion.

### Relieving port

In general specifications, relieving port is blocked with a hexagon socket set screw. This screw should not be removed, because dust may enter inside through the relieving port. Hexagon socket set screw is not prepared for clean room specifications, and use it as relieving port accordingly.

### Cycle time

Due to the nature of its construction, this cylinder starts and stops gradually. Therefore, the length of time for the stroke could be longer than that of ordinary cylinders.

MK/MK2

RSQ/RSG

RSH

CE1

CE2

ML2B

ML1C

REA

**REC**

RHC

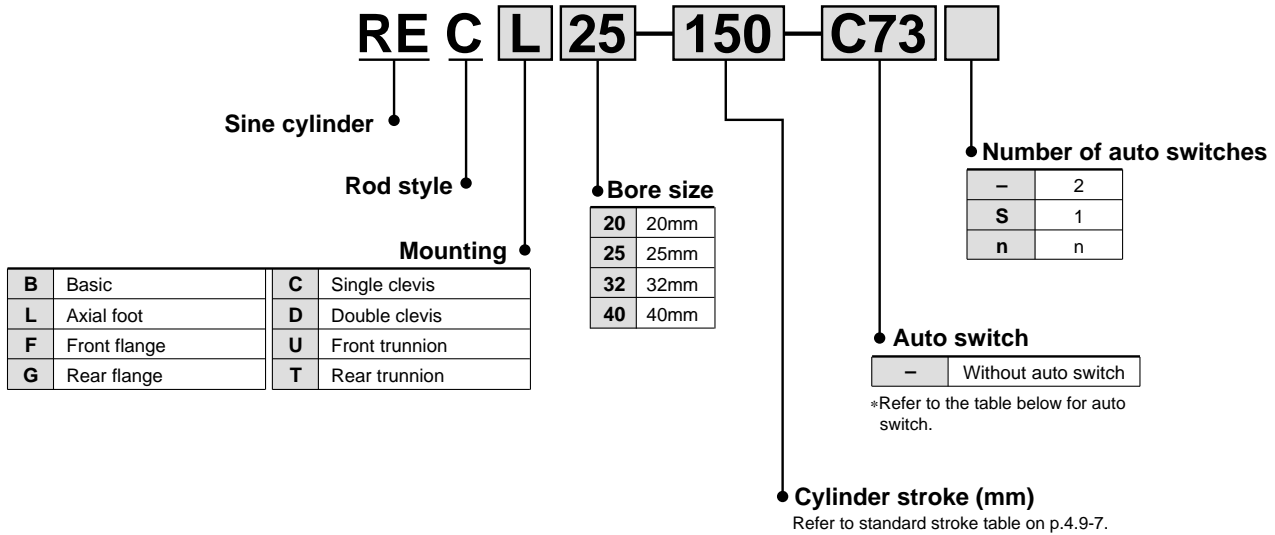
MTS

CC

# Series REC

ø20, ø25, ø32, ø40

## How to Order



### Applicable Auto Switches / Refer to p.5.3-2 for further information on auto switch.

Style	Special function	Electrical entry	Indicator	Wiring (Output)	Load voltage		Auto switch model	Lead wire length* (m)				Applicable load								
					DC	AC		0.5 (-)	3 (L)	5 (Z)	- (N)									
Reed switch	—	Grommet	Yes	3 wire (Equiv. to NPN)	—	5V	—	C76	●	●	—	—	IC circuit	—						
									No	24V	12V	100V	C73	●	●	●	—	—	Relay PLC	
			Yes	2 wire	12V	≤100V	C80	●						●	—	—	IC circuit	PLC		
								No	12V	100V, 200V	B53	●	●	●	—	—	Relay PLC			
												Yes	12V	≤200V	B64			●	●	—
								No	12V	—	C73C					●	●	●	●	IC circuit
			Yes	12V	≤24V	C80C	●					●	●	●	IC circuit	PLC				
							Terminal conduit	12V	—	A33	—	—	—	●	—	Relay PLC				
			DIN element	12V	100V, 200V	A34					—	—	—	●						
							Diagnostic indication (2 color)	Grommet	Yes	12V	100V, 200V	A44	—	—	—	●	—	Relay PLC		
—	—	B59W	●	●	—	—														
			Solid state switch	—	Grommet	Yes	3 wire (NPN)	24V	5V, 12V	—	H7A1	●	●	○	—	IC circuit	Relay PLC			
3 wire (PNP)	12V	H7A2										●	●	○	—					
												2 wire	5V, 12V	H7B	●			●	○	—
															12V			H7C	●	●
												3 wire (NPN)	5V, 12V	G39					—	—
															2 wire			12V	K39	—
												3 wire (NPN)	5V, 12V	H7NW						●
															3 wire (PNP)			12V	H7PW	●
												2 wire	5V, 12V	H7BW						●
															3 wire (NPN)			12V	H7BA	—
												3 wire (PNP)	5V, 12V	G5NT						—
															2 wire			12V	H7NF	●
												3 wire (NPN)	5V, 12V	H7LF						●
															4 wire (NPN)			—	—	—

\*Lead wire length 0.5m..... (Example) C80C 0.5m..... Z (Example) C80CZ  
 3m..... L C80CL — ..... N C80CN

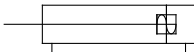
\*Solid state switches marked with "O" is manufactured upon receipt of order.

\*D-A3□, A44, G39 : Not indicate the symbol "N" for lead wire length.

## Standard Specifications



Symbol



Action	Double acting single rod
Fluid	Air
Proof pressure	1.5MPa
Max. operating pressure	1.0MPa
Min. operating pressure	0.2MPa
Ambient and fluid temperature	-10 to 60°C
Piston speed	50 to 500mm/s
Cushion	Air cushion
Lubrication	Not required (Non-lube)
Thread tolerance	JIS class 2
Stroke length tolerance	+1.4 0

## Standard Stroke

Bore size (mm)	Standard stroke (mm)	Max.* manufacturable stroke (mm)
20	150 to 700	1500
25		
32	150 to 1000	
40	200 to 1000	

\*Please consult SMC representative for availability of stroke other than standard.

## Effective Cushioning Stroke

Bore size (mm)	Effective cushioning stroke (mm)
20	45
25	45
32	50
40	60

## Cylinder Mounting Bracket/Part No.

Bore size (mm)	20	25	32	40
Axial foot *	CM-L020B	CM-L032B	CM-L040B	
Flange	CM-F020B	CM-F032B	CM-F040B	
Single clevis	CM-C020B	CM-C032B	CM-C040B	
Double clevis (with pin) **	CM-D020B	CM-D032B	CM-D040B	
Trunnion (with nut)	CM-T020B	CM-T032B	CM-T040B	

\*When ordering foot brackets for one cylinder, indicate quantity as 2 pcs.

\*\*Clevis pin and retaining ring (cotter pin in case of ø40) are enclosed.

## Accessories

Part numbers of single knuckle joint, double knuckle joint, double clevis pin, double knuckle joint pin, rod end nut, mounting nut and trunnion nut are the same as series CM2. Refer to p.1.4-19 and 1.4-20.

## Weight

Bore size (mm)		20	25	32	40
Basic weight	Basic	0.32	0.47	0.74	1.25
	Axial foot	0.47	0.63	0.90	1.52
	Flange	0.38	0.56	0.83	1.37
	Single clevis	0.36	0.51	0.78	1.34
	Double clevis	0.37	0.53	0.79	1.38
	Trunnion	0.36	0.54	0.81	1.35
	Additional weight per 50 stroke	0.05	0.07	0.09	0.13
Accessories	Clevis bracket (with pin)	0.07	0.07	0.14	0.14
	Single knuckle joint	0.06	0.06	0.06	0.23
	Double knuckle joint (with pin)	0.07	0.07	0.07	0.20

\*Calculation example: **REC32-200**

Basic weight ..... 0.90 (Foot style ø 32)

Additional Weight ..... 0.09/50 stroke

Cylinder stroke..... 200 stroke

**0.90+0.09 X 200/50=1.26kg**

## Auto Switch Mounting Bracket (including band and screw)

Applicable auto switch		Bore size (mm)			
		20	25	32	40
Reed	<b>D-C73, D-C76, D-C80</b> <b>D-C73C, D-C80C</b>	BMA2-020	BMA2-025	BMA2-032	BMA2-040
Solid state	<b>D-H7B, D-H7C, D-H7A1, D-H7A2</b> <b>D-H7NW, D-H7PW, D-H7BW</b> <b>D-H7LF, D-H7NF, D-F7BAL</b>				
Reed	<b>D-B53, D-B54, D-B64, D-B59W</b>	BA-01	BA-02	BA-32	BA-04
Solid state	<b>D-G5NTL</b>				



\*Mounting screw set made of stainless steel

Use the following mounting screw set made of stainless steel according to operating environment.

(Switch mounting band is not included. Therefore, please order separately.)

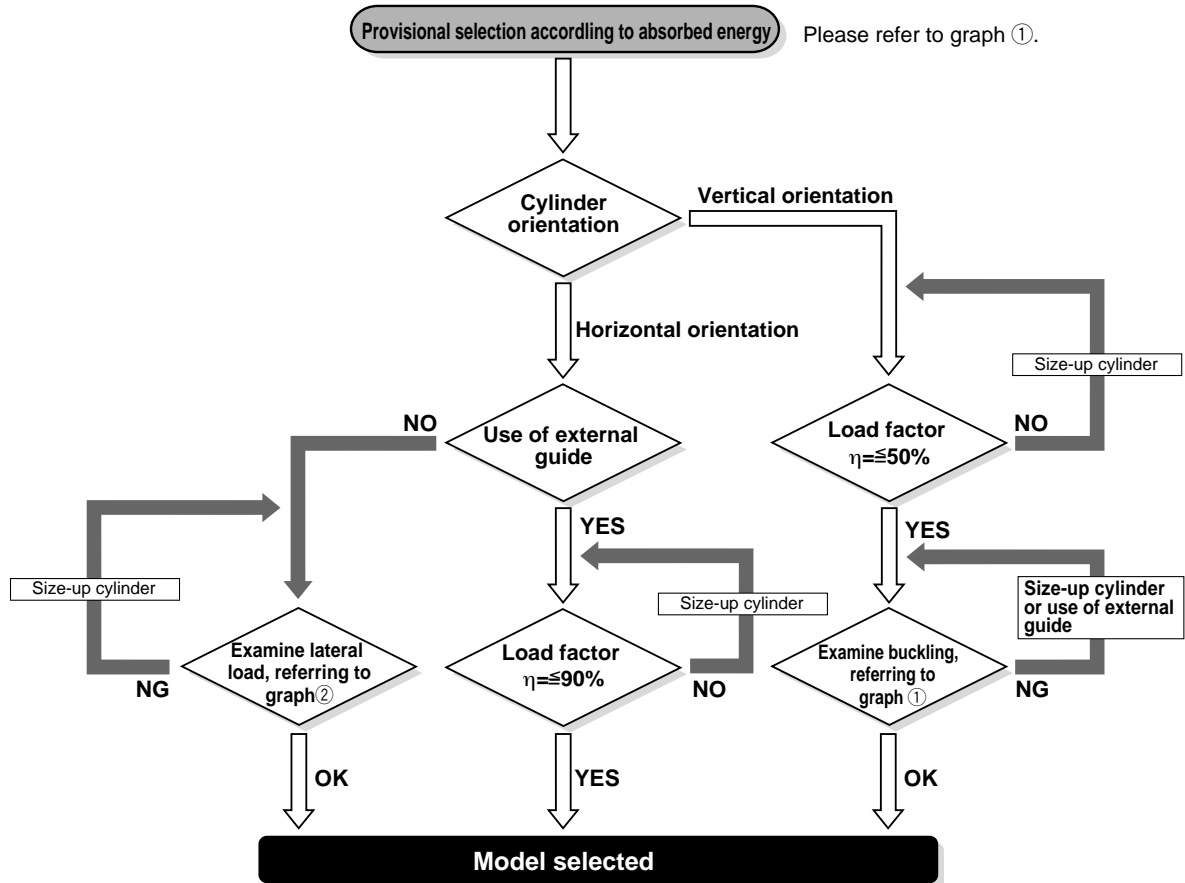
BBA3: For D-B5/B6/G5/K5

BBA4: For D-C7/C8/H7

The above screw made of stainless steel is used for D-H7BAL switch when cylinder mounting is shipped. BBA4 is attached when switch is shipped.

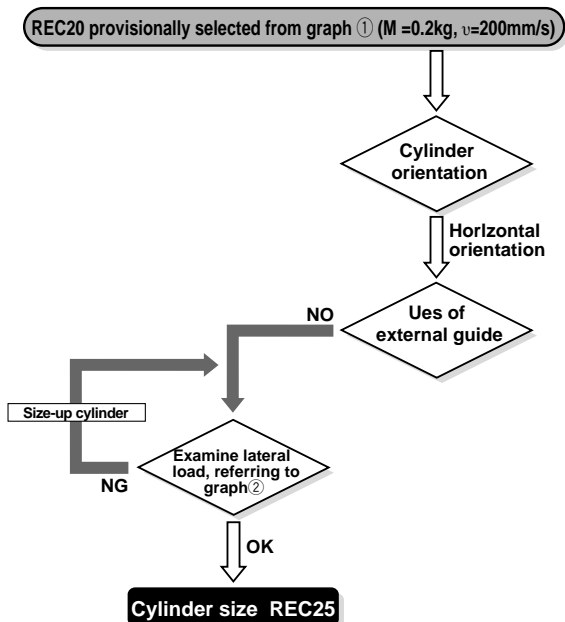
# How to Select Model

## Selection Procedures



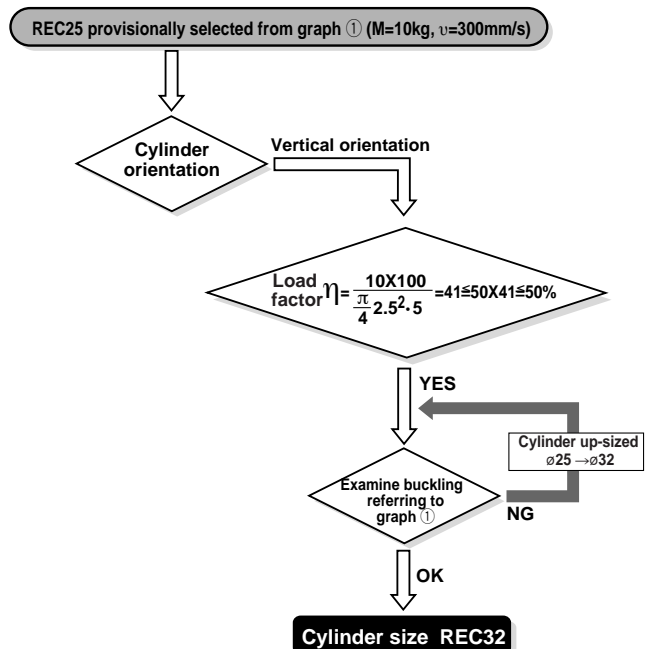
### Selection Example 1

Actuating orientation: Horizontal transfer of work (without external guide)  
 Max. speed:  $v=200\text{mm/s}$   
 Supply pressure:  $P=0.5\text{MPa}$   
 Load weight:  $M=0.2\text{kg} \rightarrow 2\text{N}$   
 Cylinder stroke: 300mm

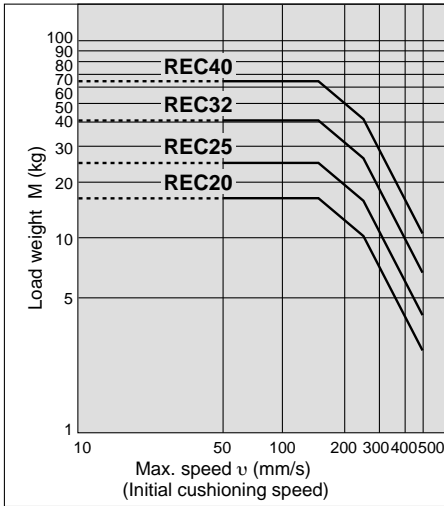


### Selection Example 2

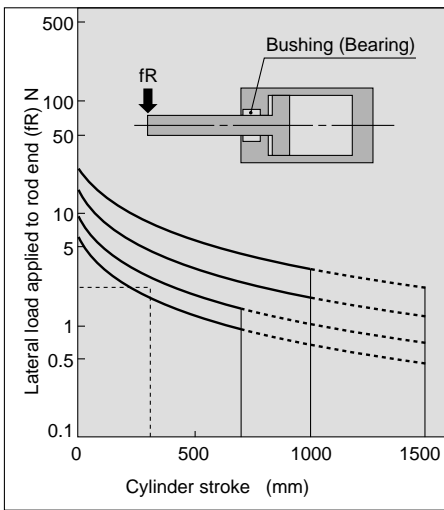
Actuating orientation: Vertical transfer of work (Rear flange)  
 Max. speed:  $v=300\text{mm/s}$   
 Supply pressure:  $P=0.5\text{MPa}$   
 Load weight:  $M=10\text{kg}$   
 Cylinder stroke: 500m



**Graph ① Absorbed energy curve**

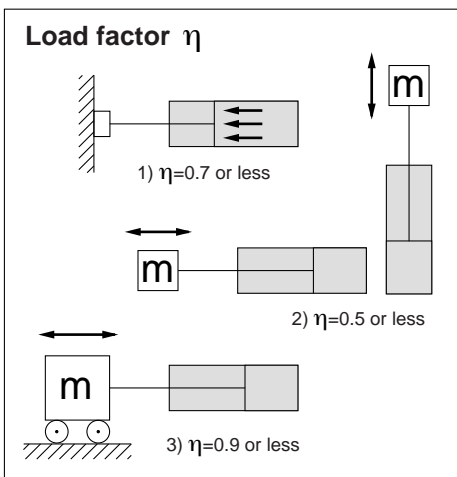


**Graph ② Applicable max. stroke against lateral load\***



\*The above curve in the graph refers to P=0.5MPa of supply pressure.  
 If supply pressure is other than P=0.5MPa, please figure out a max. stroke, using proportional calculation.  
 Example) If P=0.6MPa, a max. stroke =the respective stroke in the graph  $\times \frac{0.6}{0.5}$

**Figure ①**



- 1) In the case where cylinder is used for static action: Load factor  $\eta=0.7$  or less
- 2) In the case where cylinder is used for dynamic action: Load factor  $\eta=0.5$  or less
- 3) In the case where guide is used in horizontal orientation: Load factor  $\eta=0.9$  or less

**Table ① Relation between cylinder size and a max. stroke**

(cm)

Mounting bracket			Symbol	Operating pressure MPa	Applicable max. stroke according to buckling strength			
Mounting bracket symbol and figure					REC			
Foot: L	Front flange: F	Rear flange: G			ø20	ø25	ø32	ø40
			L	0.3	39	50	56	61
				0.5	30	38	43	47
			F	0.7	24	31	36	39
				G	0.3	11	17	19
			0.5		7	11	13	13
			0.7	4	7	9	9	
			C	0.3	32	42	48	52
				0.5	22	30	35	37
			D	0.7	17	24	27	29
				U	0.3	82	103	116
			0.5		62	79	89	97
			0.7	52	66	75	81	
			L	0.3	118	148	167	182
				0.5	90	114	128	140
			F	0.7	76	95	108	117
				G	0.3	51	66	75
			0.5		37	49	55	60
			0.7	30	39	45	49	
			L	0.3	168	211	237	259
				0.5	129	162	183	199
			F	0.7	109	136	154	168
				G	0.3	76	97	110
			0.5		56	73	83	90
			0.7	46	60	68	74	

MK/MK2

RSQ/RSG

RSH

CE1

CE2

ML2B

ML1C

REA

**REC**

RHC

MTS

CC



# Series REC

## SMC Clean Series

10 - REC    Mounting    Bore size    Stroke

- SMC Clean Series
- 10 Relieving port style
- 11 Vacuum suction style

This model can be used in class 100 clean room, with special design of double layer seal structure on rod and relieving port, exhausting directly outside.



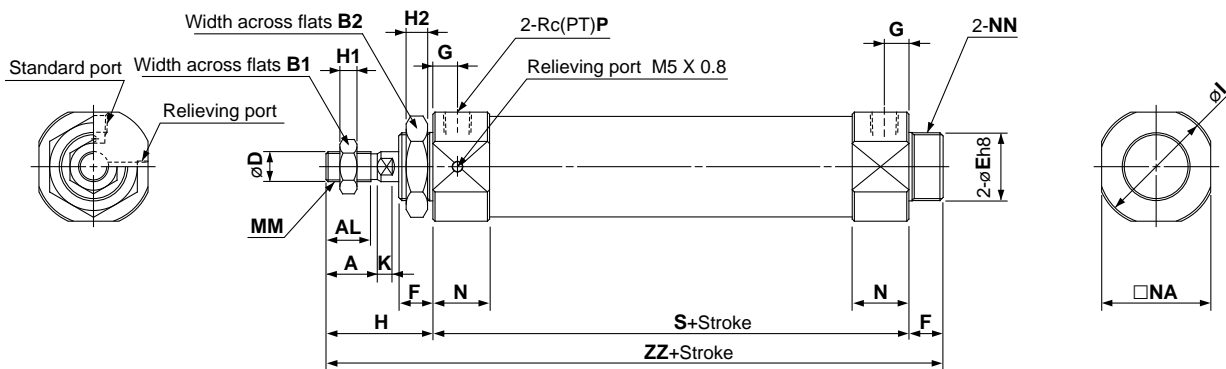
### Specifications

Action	Double acting single rod
Bore size	ø20, ø25, ø32, ø40
Max. operating pressure	1.0MPa
Min. operating pressure	0.2MPa
Cushion	Air cushion
Piping	Screw-in
Relieving port size	M5 X 0.8
Piston speed	50 to 500mm/s
Mounting	Basic, Axial foot, Front flange, Rear flange

\*Auto switch attachable

## Dimensions

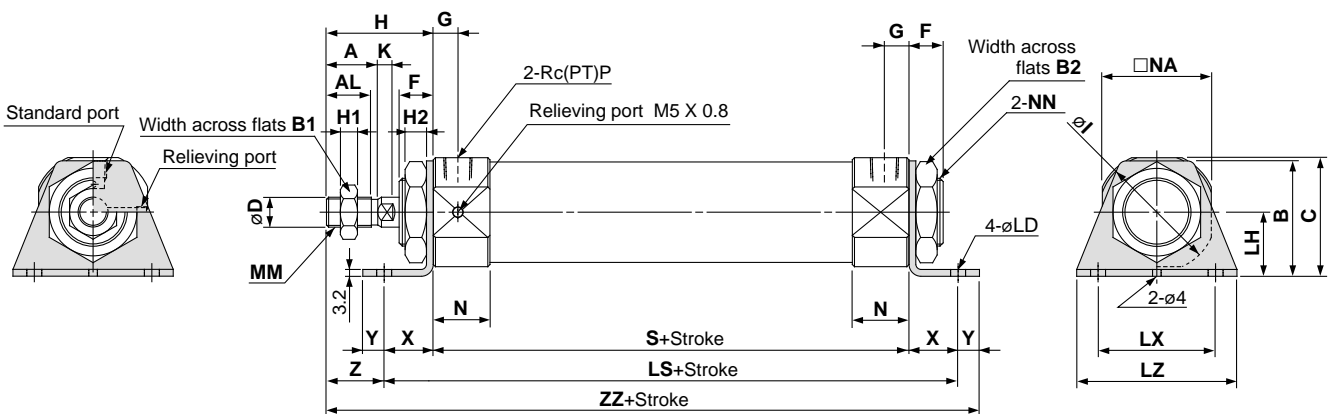
### REC B/Basic



(mm)

Bore size	Stroke range	A	AL	B1	B2	D	E	F	G	H	H1	H2	I	K	MM	N	NA	NN	P	S	ZZ
20	150 to 700	18	15.5	13	26	8	20 <sup>0</sup> <sub>0.033</sub>	13	10	41	5	8	33.5	5	M8 X 1.25	20	30	M20 X 1.5	1/8	146	200
25	150 to 700	22	19.5	17	32	10	26 <sup>0</sup> <sub>0.033</sub>	13	10	45	6	8	37.5	5.5	M10 X 1.25	20	34.5	M26 X 1.5	1/8	146	204
32	150 to 1000	22	19.5	17	32	12	26 <sup>0</sup> <sub>0.033</sub>	13	11	45	6	8	46.5	5.5	M10 X 1.25	22	42.5	M26 X 1.5	1/8	159	217
40	200 to 1000	24	21	22	41	14	32 <sup>0</sup> <sub>0.039</sub>	16	12.5	50	8	10	56	7	M14 X 1.5	26.5	51	M32 X 2	1/4	181	247

### REC L/Axial foot



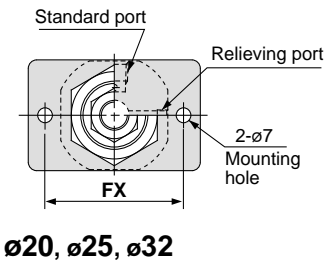
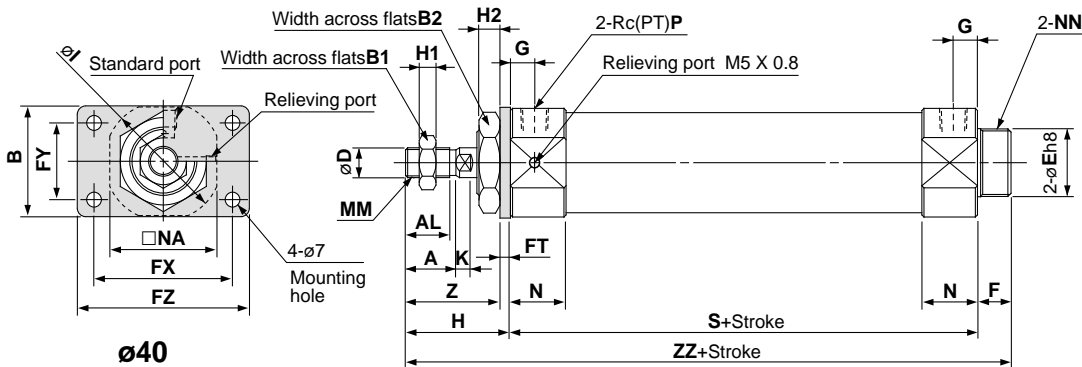
(mm)

Bore size	Stroke range	A	AL	B	B1	B2	C	D	F	G	H	H1	H2	I	K	LD	LH	LS	LX	LZ	MM	N	NA
20	150 to 700	18	15.5	40	13	26	40	8	13	10	41	5	8	33.5	5	6.8	25	186	40	55	M8 X 1.25	20	30
25	150 to 700	22	19.5	47	17	32	45.5	10	13	10	45	6	8	37.5	5.5	6.8	28	186	40	55	M10 X 1.25	20	34.5
32	150 to 1000	22	19.5	47	17	32	49.5	12	13	11	45	6	8	46.5	5.5	6.8	28	199	40	55	M10 X 1.25	22	42.5
40	200 to 1000	24	21	54	22	41	55.5	14	16	12.5	50	8	10	56.2	7	7	30	227	55	75	M14 X 1.5	26.5	51

Bore size	Stroke range	NN	P	S	X	Y	Z	ZZ
20	150 to 700	M20 X 1.5	1/8	146	20	8	21	215
25	150 to 700	M26 X 1.5	1/8	146	20	8	25	219
32	150 to 1000	M26 X 1.5	1/8	159	20	8	25	232
40	200 to 1000	M32 X 2	1/4	181	23	10	27	264



**REC F/Front flange**



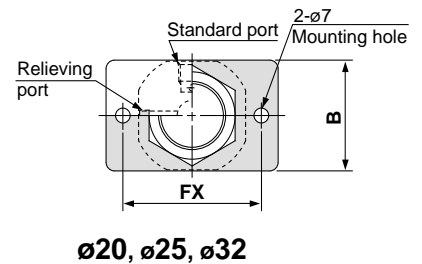
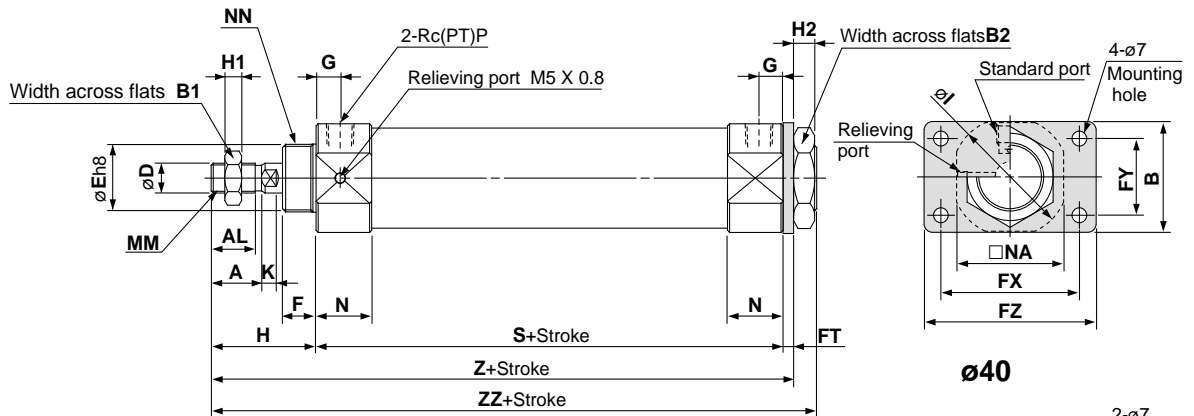
Bore size	Stroke range	A	AL	B	B1	B2	D	E	F	FT	FX	FY	FZ	G	H
20	150 to 700	18	15.5	34	13	26	8	20 <sup>0</sup> <sub>-0.033</sub>	13	4	60	—	75	10	41
25	150 to 700	22	19.5	40	17	32	10	26 <sup>0</sup> <sub>-0.033</sub>	13	4	60	—	75	10	45
32	150 to 1000	22	19.5	40	17	32	12	26 <sup>0</sup> <sub>-0.033</sub>	13	4	60	—	75	11	45
40	200 to 1000	24	21	52	22	41	14	32 <sup>0</sup> <sub>-0.039</sub>	16	5	66	36	82	12.5	50

Bore size	Stroke range	H1	H2	I	K	MM	N	NA	NN	P	S	Z	ZZ
20	150 to 700	5	8	33.5	5	M8 X 1.25	20	30	M20 X 1.5	1/8	146	37	200
25	150 to 700	6	8	37.5	5.5	M10 X 1.25	20	34.5	M26 X 1.5	1/8	146	41	204
32	150 to 1000	6	8	46.5	5.5	M10 X 1.25	22	42.5	M26 X 1.5	1/8	159	41	217
40	200 to 1000	8	10	56.2	7	M14 X 1.5	26.5	51	M32 X 2	1/4	181	45	247

- MK/MK2
- RSQ/RSG
- RSH
- CE1
- CE2
- ML2B
- ML1C
- REA
- REC**
- RHC
- MTS
- CC

**REC G/Rear flange**



Bore size	Stroke range	A	AL	B	B1	B2	D	E	F	FT	FX	FY	FZ	G	H
20	150 to 700	18	15.5	34	13	26	8	20 <sup>0</sup> <sub>-0.033</sub>	13	4	60	—	75	10	41
25	150 to 700	22	19.5	40	17	32	10	26 <sup>0</sup> <sub>-0.033</sub>	13	4	60	—	75	10	45
32	150 to 1000	22	19.5	40	17	32	12	26 <sup>0</sup> <sub>-0.033</sub>	13	4	60	—	75	11	45
40	200 to 1000	24	21	52	22	41	14	32 <sup>0</sup> <sub>-0.039</sub>	16	5	66	36	82	12.5	50

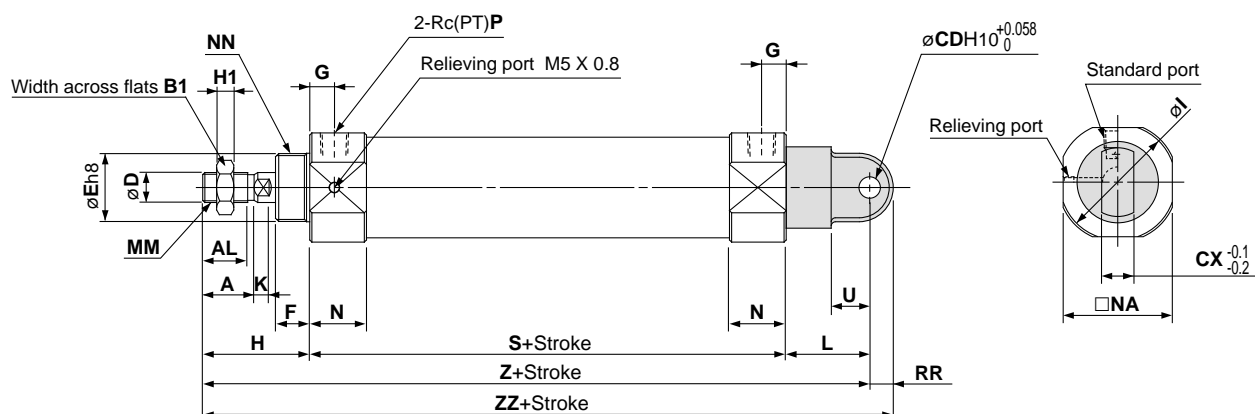
  

Bore size	Stroke range	H1	H2	I	K	MM	N	NA	NN	P	S	Z	ZZ
20	150 to 700	5	8	33.5	5	M8 X 1.25	20	30	M20 X 1.5	1/8	146	191	200
25	150 to 700	6	8	37.5	5.5	M10 X 1.25	20	34.5	M26 X 1.5	1/8	146	195	204
32	150 to 1000	6	8	46.5	5.5	M10 X 1.25	22	42.5	M26 X 1.5	1/8	159	208	217
40	200 to 1000	8	10	56.2	7	M14 X 1.5	26.5	51	M32 X 2	1/4	181	236	247

# Series REC

## Dimensions

### REC C/Single clevis

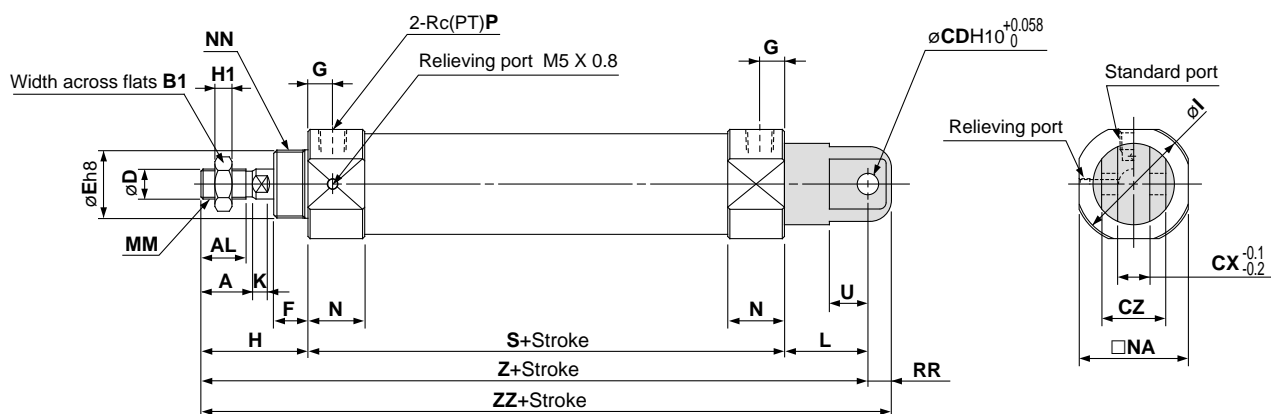


(mm)

Bore size	Stroke range	A	AL	B1	CD	CX	D	E	F	G	H	H1	I	K	L	MM	N	NA
20	150 to 700	18	15.5	13	9	10	8	20 <sup>0</sup> <sub>-0.033</sub>	13	10	41	5	33.5	5	30	M8 X 1.25	20	30
25	150 to 700	22	19.5	17	9	10	10	26 <sup>0</sup> <sub>-0.033</sub>	13	10	45	6	37.5	5.5	30	M10 X 1.25	20	34.5
32	150 to 1000	22	19.5	17	9	10	12	26 <sup>0</sup> <sub>-0.033</sub>	13	11	45	6	46.5	5.5	30	M10 X 1.25	22	42.5
40	200 to 1000	24	21	22	10	15	14	32 <sup>0</sup> <sub>-0.039</sub>	16	12.5	50	8	56.2	7	39	M14 X 1.5	26.5	51

Bore size	Stroke range	NN	P	RR	S	U	Z	ZZ
20	150 to 700	M20 X 1.5	1/8	9	146	14	217	226
25	150 to 700	M26 X 1.5	1/8	9	146	14	221	230
32	150 to 1000	M26 X 1.5	1/8	9	159	14	234	243
40	200 to 1000	M32 X 2	1/4	11	181	18	270	281

### REC D/Double clevis

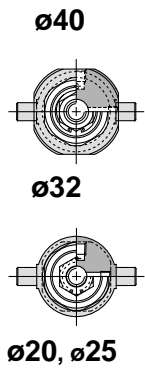
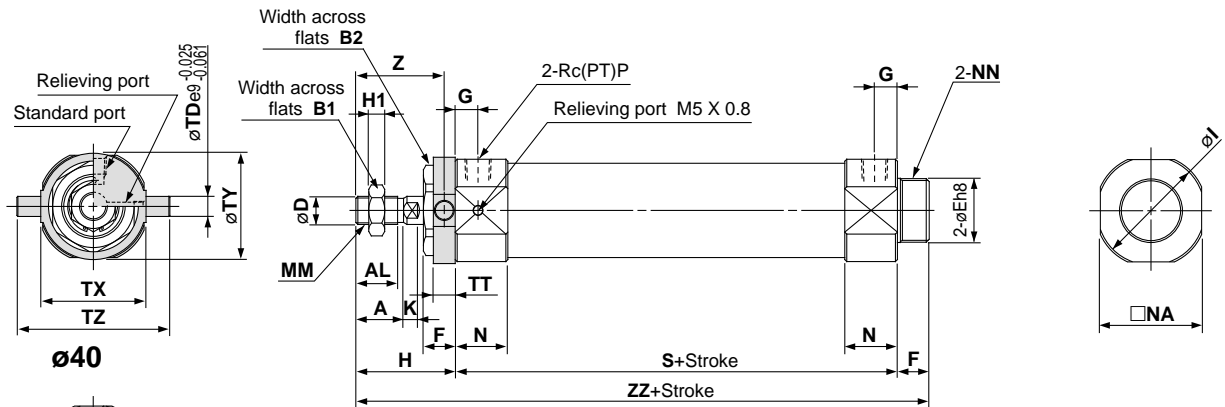


(mm)

Bore size	Stroke range	A	AL	B1	CD	CX	CZ	D	E	F	G	H	H1	I	K	L	MM	N
20	150 to 700	18	15.5	13	9	10	19	8	20 <sup>0</sup> <sub>-0.033</sub>	13	10	41	5	33.5	5	30	M8 X 1.25	20
25	150 to 700	22	19.5	17	9	10	19	10	26 <sup>0</sup> <sub>-0.033</sub>	13	10	45	6	37.5	5.5	30	M10 X 1.25	20
32	150 to 1000	22	19.5	17	9	10	19	12	26 <sup>0</sup> <sub>-0.033</sub>	13	11	45	6	46.5	5.5	30	M10 X 1.25	22
40	200 to 1000	24	21	22	10	15	30	14	32 <sup>0</sup> <sub>-0.039</sub>	16	12.5	50	8	56.2	7	39	M14 X 1.5	26.5

Bore size	Stroke range	NA	NN	P	RR	S	U	Z	ZZ
20	150 to 700	30	M20 X 1.5	1/8	9	146	14	217	226
25	150 to 700	34.5	M26 X 1.5	1/8	9	146	14	221	230
32	150 to 1000	42.5	M26 X 1.5	1/8	9	159	14	234	243
40	200 to 1000	51	M32 X 2	1/4	11	181	18	270	281

**REC U/**Front trunnion



(mm)

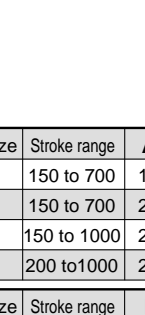
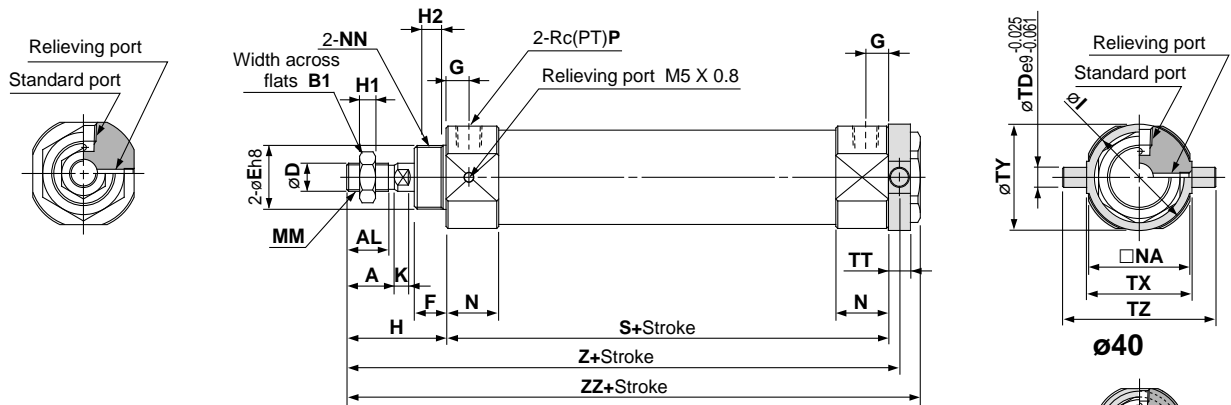
Bore size	Stroke range	A	AL	B1	B2	D	E	F	G	H	H1	I	K	MM
20	150 to 700	18	15.5	13	26	8	20 <sup>0</sup> <sub>-0.033</sub>	13	10	41	5	33.5	5	M8 X 1.25
25	150 to 700	22	19.5	17	32	10	26 <sup>0</sup> <sub>-0.033</sub>	13	10	45	6	37.5	5.5	M10 X 1.25
32	150 to 1000	22	19.5	17	32	12	26 <sup>0</sup> <sub>-0.033</sub>	13	11	45	6	46.5	5.5	M10 X 1.25
40	200 to 1000	24	21	22	41	14	32 <sup>0</sup> <sub>-0.039</sub>	16	12.5	50	8	56.2	7	M14 X 1.5

Bore size	Stroke range	N	NA	NN	P	S	TD	TT	TX	TY	TZ	Z	ZZ
20	150 to 700	20	30	M20 X 1.5	1/8	146	8	10	32	32	52	36	200
25	150 to 700	20	34.5	M26 X 1.5	1/8	146	9	10	40	40	60	40	204
32	150 to 1000	22	42.5	M26 X 1.5	1/8	159	9	10	40	40	60	40	217
40	200 to 1000	26.5	51	M32 X 2	1/4	181	10	11	53	53	77	44.5	247

- MK/MK2
- RSQ/RSG
- RSH
- CE1
- CE2
- ML2B
- ML1C
- REA
- REC**
- RHC
- MTS
- CC

**REC T/**Rear trunnion



(mm)

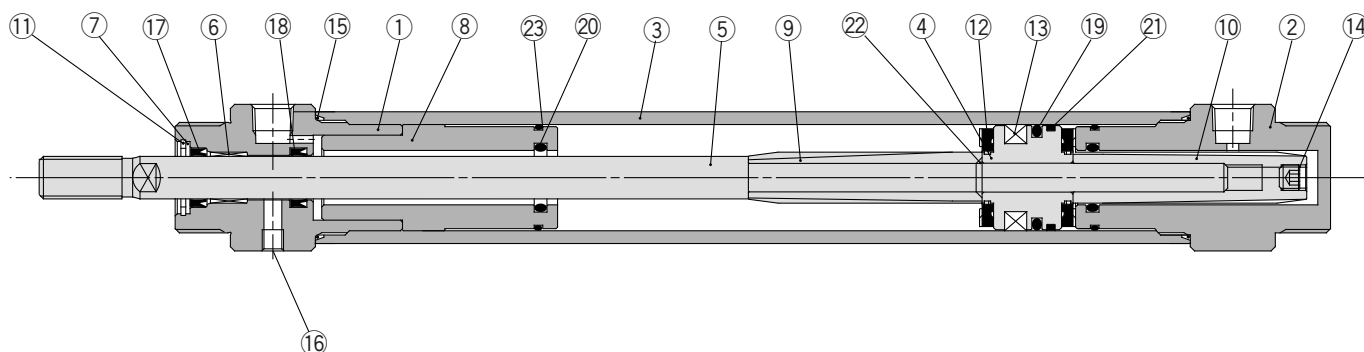
Bore size	Stroke range	A	AL	B1	D	E	F	G	H	H1	H2	I	K	MM
20	150 to 700	18	15.5	13	8	20 <sup>0</sup> <sub>-0.033</sub>	13	10	41	5	8	33.5	5	M8 X 1.25
25	150 to 700	22	19.5	17	10	26 <sup>0</sup> <sub>-0.033</sub>	13	10	45	6	8	37.5	5.5	M10 X 1.25
32	150 to 1000	22	19.5	17	12	26 <sup>0</sup> <sub>-0.033</sub>	13	11	45	6	8	46.5	5.5	M10 X 1.25
40	200 to 1000	24	21	22	14	32 <sup>0</sup> <sub>-0.039</sub>	16	12.5	50	8	10	56.2	7	M14 X 1.5

Bore size	Stroke range	N	NA	NN	P	S	TD	TT	TX	TY	TZ	Z	ZZ
20	150 to 700	20	30	M20 X 1.5	1/8	146	8	10	32	32	52	192	202
25	150 to 700	20	34.5	M26 X 1.5	1/8	146	9	10	40	40	60	196	206
32	150 to 1000	22	42.5	M26 X 1.5	1/8	159	9	10	40	40	60	209	219
40	200 to 1000	26.5	51	M32 X 2	1/4	181	10	11	53	53	77	236.5	247

# Series REC

## Construction



### Component Parts

No.	Description	Material	Qty	Remarks
①	Rod cover	Aluminum alloy	1	White anodized
②	Head cover	Aluminum alloy	1	White anodized
③	Cylinder tube	Aluminum alloy	1	Hard anodized
④	Piston	Aluminum alloy	1	Chromated
⑤	Piston rod	Stainless steel	1	Hard chromate plated
⑥	Bushing	Sintered oil-impregnated bearing	1	
⑦	Seal holder	Rolled steel	1	
⑧	Cushion seal holder	Aluminum alloy	1	Chromated

### Component Parts

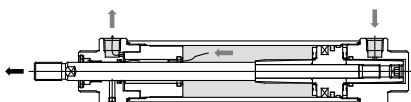
No.	Description	Material	Qty	Remarks
⑨	Cushion spear A	Brass	1	Electroless nickel plated
⑩	Cushion spear B	Brass	1	Electroless nickel plated
⑪	Retaining ring	Carbon tooling steel	1	Nickel plated
⑫	Bumper	Urethane	2	
⑬	Magnet	Resin	1	
⑭	Hexagon socket head screw	Carbon steel	1	Zinc chromated
⑮	Cylinder tube gasket	NBR	2	
⑯	Hexagon socket head screw	Carbon steel	1	Nickel plated

### Replacement Parts (except No. 22 Piston gasket)

No.	Description	Material	Qty	Bore size (mm)			
				20	25	32	40
⑰	Rod seal A	NBR	1	PDU-8Z	PDU-10Z	PDU-12LZ	PDU-14LZ
⑱	Rod seal B	NBR	1	PRY-8	PRY-10	PRY-12	PRY-14
⑲	Piston seal	NBR	1	NLP-20A	NLP-25-19A	NLP-32A	NLP-40A
⑳	Cushion seal	NBR	2	P-10AE	P-12E	P-16E	P-18E
㉑	Wear ring	Resin	1	CM-20-07-301A	CM-025-07-302A	CM-032-07-304A	C1A040-07-305A
㉒	Piston gasket	NBR	1	ø5.79 X ø1.02	ø6.50 X ø1.0	ø8.50 X ø1.0	ø10.4 X ø1.0
㉓	Holder gasket	NBR	2	ø17.1 X ø1.6	ø22.1 X ø1.6	ø27.6 X ø2.4	SO-031-4

## Operation Principles

### 1. In-rush



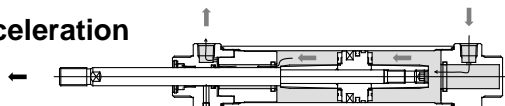
Actuating air passes from cylinder head and enters the right chamber of the cylinder from space between cushion seal and U-shaped groove on the outer surface of cushion spear. Air in the left chamber of the cylinder passes through space between cushion seal and piston rod, and is released to the cylinder port on rod side.

### 2. In-rush / acceleration



Differential pressure (theoretical thrust) generated on the left and right sides of piston becomes larger than starting resistance, and piston starts to actuate. With the actuation, U-shaped groove on the cushion spear outer surface gradually becomes deeper, air flow necessary for piston enters the right chamber of the cylinder, and piston accelerates. This acceleration process can be achieved smoothly (as a SINE function) by using a cushion spear on which a U-shaped groove is machined.

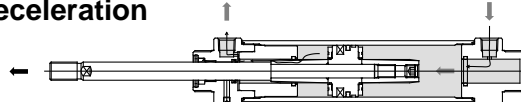
### 3. Acceleration



When piston starts to actuate, air can go in and out freely because cushion spear on head side is released from cushion seal. With this actuation, piston speed accelerates (or maintains the same speed).

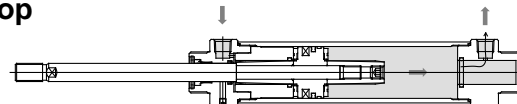
### 4.9-14

### 4. Deceleration



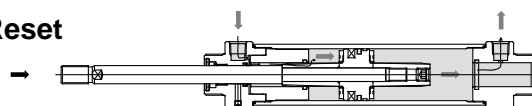
When cushion spear on rod side meets cushion packing, air in cushion chamber on rod side flows through space between cushion spear groove and cushion seal. Since the space is reduced as a SINE function, the cylinder rod decelerates smoothly.

### 5. Stop



The piston stops at the stroke end on rod side with smooth cushioning. Air flow which is switched by solenoid valve is reversed from the one indicated in the above "1 In-rush".

### 6. Reset



Air enters left chamber of piston from cylinder port on rod side through space between cushion packing and U-shaped groove on outer surface of cushion seal. Also, air in right chamber of piston is exhausted from cylinder port. As U-shaped groove on the cushion spear outer surface gradually becomes deeper, the cylinder accelerates.

# Series REC Auto Switch Specifications

Refer to p.5.3-2 for the detailed specifications of auto switch.



## Reed Switch Specifications

PLC: Programmable Logic Controller

Auto switch model	Supply voltage	Max. load current and load current range	Indicator light (Light at ON) ◎ 2 color indication	Contact protection circuit	Applications
D-C73	24V DC	5 to 40	●	—	Relay, PLC
	100V AC	5 to 20			
D-C76	4 to 8V DC	20	●	—	IC circuit
D-C80	24V or less <sup>AC</sup> <sub>DC</sub>	50	—	—	IC circuit, Relay, PLC
	48V <sup>AC</sup> <sub>DC</sub>	40			
	100V <sup>AC</sup> <sub>DC</sub>	20			
D-C73C	24V DC	5 to 40	●	—	PLC
D-C80C	24V or less <sup>AC</sup> <sub>DC</sub>	50	—	—	IC circuit, Relay, PLC
D-B53,A33	24V DC	5 to 50	●	●	Relay, PLC
D-B54	24V DC	5 to 50			
D-A34	100V AC	5 to 25			
D-A44	200V AC	5 to 12.5	—	—	PLC
D-B64	24V or less <sup>AC</sup> <sub>DC</sub>	50	—	●	Relay, PLC
	100V AC	25			
	200V AC	12.5			
D-B59W	24V DC	5 to 40	◎ 2 color**	●	

\* Use contact protection box when using "D-C7" or "D-C8" type in the following conditions.

- Induction load
- Lead wire length greater than 5m (Standard model: 0.5m)
- 100VAC

\*\*In case of "D-B59W", red light illuminates at sensitive position and green illuminates at most sensitive position.

## Solid State Switch Specifications (Load voltage: ≤ 28V DC)

Auto switch model	Wiring output	Max. load current and load current range	Internal voltage drop/Load current at 10mA	Indicator light (Light at ON) ◎ 2 color	Function	Applications
D-H7B	2 wire	40mA or less	3V or less	●	—	24V DC relay, PLC
D-H7C					—	
D-H7NW	3 wire NPN	80mA or less	0.8V or less	◎	—	Relay, IC circuit, PLC
D-H7PW	3 wire PNP				—	
D-H7BW	2 wire	40mA or less	4V or less	◎	—	24V DC relay, PLC
D-H7BAL					Water resistant	
D-H7NF	4 wire NPN	40mA or less	—	◎	With diagnostic output	Relay, IC circuit, PLC
D-H7LF					Latching with diagnostic output	
D-H7A1	3 wire NPN	80mA or less	0.8V or less	●	—	Relay, IC circuit, PLC
D-H7A2	3 wire PNP				—	
D-G39	3 wire NPN	40mA or less	3V or less	●	—	24V DC relay, PLC
D-K39	2 wire				—	
D-G5NTL	3 wire NPN	80mA or less	0.8V or less	◎	Built-in OFF delay timer	PLC

\*Leakage current of 2 wire type at OFF: 1mA or less

## Under Oily Atmospheres

Using in coolant, washing solvent or various oils have an adverse effect on auto switches. Contact SMC if used under above conditions.

MK/MK2

RSQ/RSG

RSH

CE1

CE2

ML2B

ML1C

REA

REC

RHC

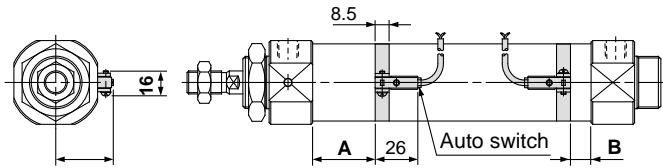
MTS

CC

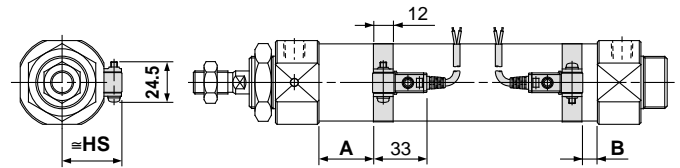
# Series REC

## Auto Switch Setting Position/Mounting Height

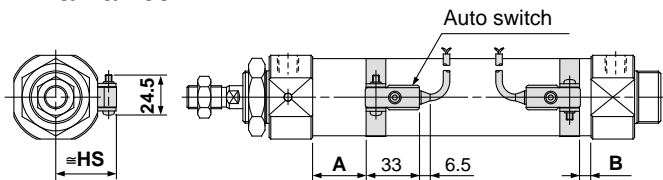
**D-C7/C8**



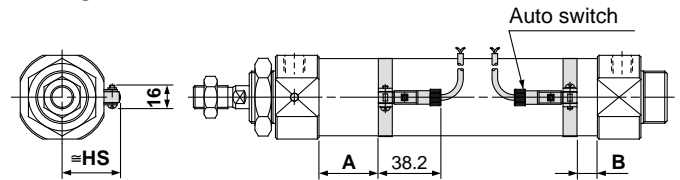
**D-G5NTL**



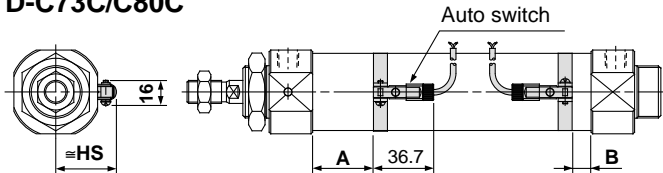
**D-B5/B6/B59W**



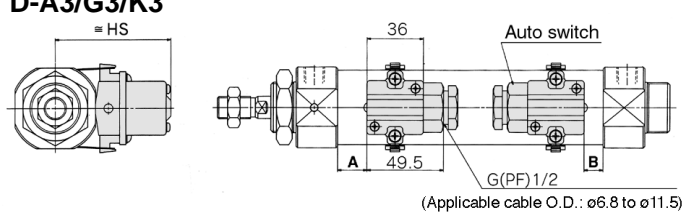
**D-H7C**



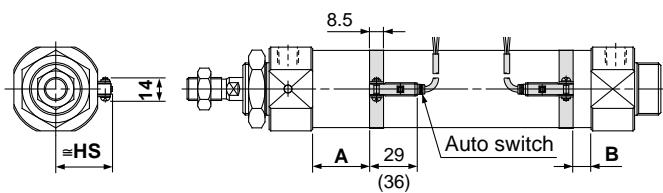
**D-C73C/C80C**



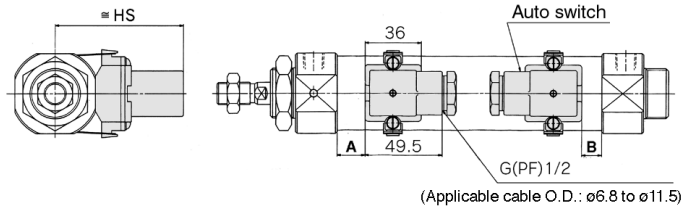
**D-A3/G3/K3**



**D-H7□/H7□W/H7□F/H7BAL**



**D-A4**



\*( ): In case of D-H7LF

### Auto Switch Setting Position

(mm)

Bore size (mm)	D-C7 D-C8 D-C73C D-C80C		D-B5 D-B6		D-H7□ D-H7C		D-G5NTL		D-H7□W D-H7□F D-H7BAL		D-B59W		D-G39 D-K39 D-A33, A34 D-A44	
	A	B	A	B	A	B	A	B	A	B	A	B	A	B
20	56.0	31.5	50.0	25.5	55.0	30.5	51.5	27.0	53.5	29.0	53.0	28.5	49.5	25.0
25	56.0	31.5	50.0	25.5	55.0	30.5	51.5	27.0	53.5	29.0	53.0	28.5	49.5	25.0
32	59.5	36.5	53.5	30.5	58.0	35.5	55.0	32.5	57.0	34.0	56.5	33.5	53.0	30.0
40	70.0	39.5	64.0	33.5	69.0	38.5	65.5	35.5	67.5	37.0	67.0	36.5	63.5	33.0

### Auto Switch Mounting Height

(mm)

Bore size (mm)	D-C7 D-C8 D-H7 D-H7□W D-H7□F D-H7BAL	D-B5 D-B6 D-B59W D-G5NTL D-H7C	D-C73C D-C80C	D-G39 D-K39 D-A33 D-A34	D-A44
	HS	HS	HS	HS	HS
20	24.5	27.5	27	62	69.5
25	27	30	29.5	64.5	72
32	30.5	33.5	33	68	75.5
40	35	38	37.5	72.5	80.0