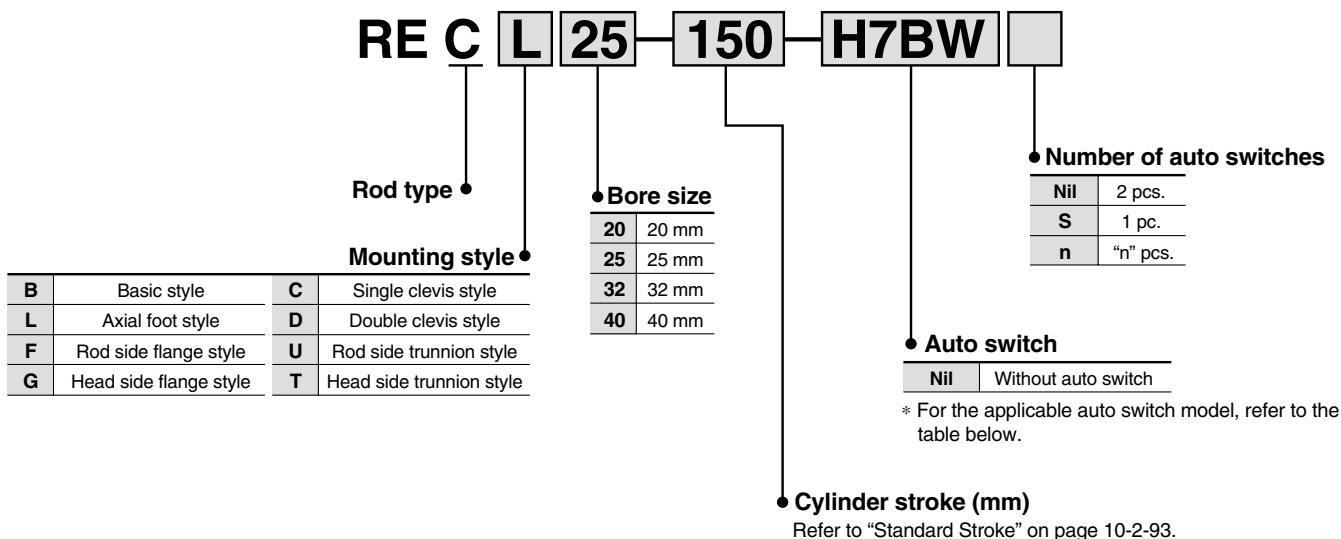


# Sine Cylinder

# Series REC

ø20, ø25, ø32, ø40

## How to Order



### Applicable Auto Switch/Refer to page 10-20-1 for further information on auto switches.

Type	Special function	Electrical entry	Indicator/light	Wiring (Output)	Load voltage		Auto switch model	Lead wire length (m)*				Pre-wire connector	Applicable load				
					DC	AC		0.5 (Nil)	3 (L)	5 (Z)	None (N)						
Reed switch	—	Grommet	Yes	3-wire (NPN equivalent)	—	5 V	—	<b>C76</b>	●	●	—	—	—	IC circuit	—		
				Connector Terminal conduit	24 V	12 V	100 V	—	<b>C73</b>	●	●	●	—	—	—	Relay, PLC	
		100 V, 200 V					—	<b>B54</b>	●	●	●	—	—				
		—					—	<b>C73C</b>	●	●	●	●	—	—	PLC		
		—					—	<b>A33</b>	—	—	—	●	—	—			
		Diagnostic indication (2-color indication)		Grommet	Yes	100 V, 200 V	—	—	<b>A34</b>	—	—	—	●	—	—	Relay, PLC	
—	—		<b>A44</b>			—	—	—	●	—	—						
Solid state switch	—	Grommet	Yes	3-wire (NPN)	—	5 V, 12 V	—	<b>H7A1</b>	●	●	○	—	○	IC circuit	Relay, PLC		
				3-wire (PNP)				<b>H7A2</b>	●	●	○	—	○				
		Connector Terminal conduit		24 V	12 V	<b>H7B</b>	●	●	○	—	○						
						<b>H7C</b>	●	●	●	●	—	—					
		Diagnostic indication (2-color indication)		Grommet	Yes	3-wire (NPN)	—	5 V, 12 V	—	<b>G39</b>	—	—	—	●		—	IC circuit
						2-wire				<b>K39</b>	—	—	—	●		—	—
		Water resistant (2-color indication)		Grommet	Yes	3-wire (NPN)	—	5 V, 12 V	—	<b>H7NW</b>	●	●	○	—		○	IC circuit
						3-wire (PNP)				<b>H7PW</b>	●	●	○	—		○	
		With diagnostic output (2-color indication)		Grommet	Yes	2-wire	—	12 V	—	<b>H7BW</b>	●	●	○	—		○	—
						4-wire (NPN)				<b>H7BA</b>	—	●	○	—		○	
								5 V, 12 V		<b>H7NF</b>	●	●	○	—		○	IC circuit

\* Lead wire length symbols: 0.5 m ..... Nil  
 3 m ..... L  
 5 m ..... Z  
 None ..... N

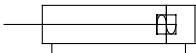
\* Solid state switches marked with "○" are produced upon receipt of order.  
 \* Do not indicate suffix "N" for no lead wire on D-A3□/A44/G39/K39 models.

- Since there are other applicable auto switches than listed, refer to page 10-2-102 for details.
- For details about auto switches with pre-wire connector, refer to page 10-20-66.

## Standard Specifications



### JIS Symbol



Action	Double acting, Single rod
Fluid	Air
Proof pressure	1.5 MPa
Maximum operating pressure	1.0 MPa
Minimum operating pressure	0.2 MPa
Ambient and fluid temperature	-10 to 60°C
Piston speed	50 to 500 mm/s
Cushion	Air cushion
Lubrication	Not required (Non-lube)
Thread tolerance	JIS Class 2
Stroke length tolerance	0 to 250 st: $^{+1.0}_0$ , 251 to 100 st: $^{+1.4}_0$ , 1001 to 1500 st: $^{+1.8}_0$

## Standard Stroke

Bore size (mm)	Minimum stroke (Recommended)	Standard (2) stroke (mm)	Maximum manufacturable stroke (mm)
20	150	Up to 700	1500
25	150	Up to 700	
32	150	Up to 1000	
40	200	Up to 1000	

## Effective Cushioning Stroke

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

Note 1) The cylinder performance may not as expected when stroke is shorter than recommended stroke even they are available.

Note 2) When exceeding the standard strokes, it will be out of warranty.

## 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 bracket, order 2 pieces per cylinder.

\*\* Clevis pin and snap ring (cotter pin for ø40) are packaged together.

### Accessory Bracket

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 page Best Pneumatics Vol. 6.

## Weight

Bore size (mm)		(kg)			
		20	25	32	40
Basic weight	Basic style	0.32	0.47	0.74	1.25
	Axial foot style	0.47	0.63	0.90	1.52
	Flange style	0.38	0.56	0.83	1.37
	Single clevis style	0.36	0.51	0.78	1.34
	Double clevis style	0.37	0.53	0.79	1.38
	Trunnion style	0.36	0.54	0.81	1.35
Additional weight per each 50 mm of stroke		0.05	0.07	0.09	0.13
Mounting bracket	Pivot bracket for clevis (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 (kg)(Foot style ø32)

Additional Weight ..... 0.09 (kg/50 st)

Cylinder stroke ..... 200 (st)

$0.90 + 0.09 \times 200 \div 50 = 1.26 \text{ kg}$

## Auto Switch Mounting Bracket Part No. (Including band and screw)

Applicable auto switch		Bore size (mm)			
		20	25	32	40
Reed	D-C7□, D-C80 D-C73C, D-C80C	BMA2-020	BMA2-025	BMA2-032	BMA2-040
Solid state	D-H7□, D-H7C D-H7□W, D-H7NF, D-H7BAL				
Reed	D-B5□, D-B64, D-B59W	BA-01	BA-02	BA-32	BA-04
Solid state	D-G5NTL				
Reed	D-A3□, D-A44	BD1-01M	BD1-02M	BD1-02	BD1-04M
Solid state	D-G39, D-K39				



\* Mounting screws set made of stainless steel

The following set of mounting screws made of stainless steel is also available. Use it in accordance with the operating environment.

(Please order the mounting band separately, since it is not included.)

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

BBA4: For D-C7/C8/H7

"D-H7BAL" switch is set on the cylinder with the stainless steel screws above when shipped. When the switches are shipped as individual parts, the BBA4 is included.

RE<sub>A</sub>  
B

REC

C□X

C□Y

MQ<sub>M</sub><sup>Q</sup>

RHC

MK(2)

RS<sub>G</sub><sup>Q</sup>

RS<sub>A</sub><sup>H</sup>

RZQ

MI<sub>S</sub><sup>W</sup>

CEP1

CE1

CE2

ML2B

C<sub>5</sub>-S

CV

MVGQ

CC

RB

J

D-

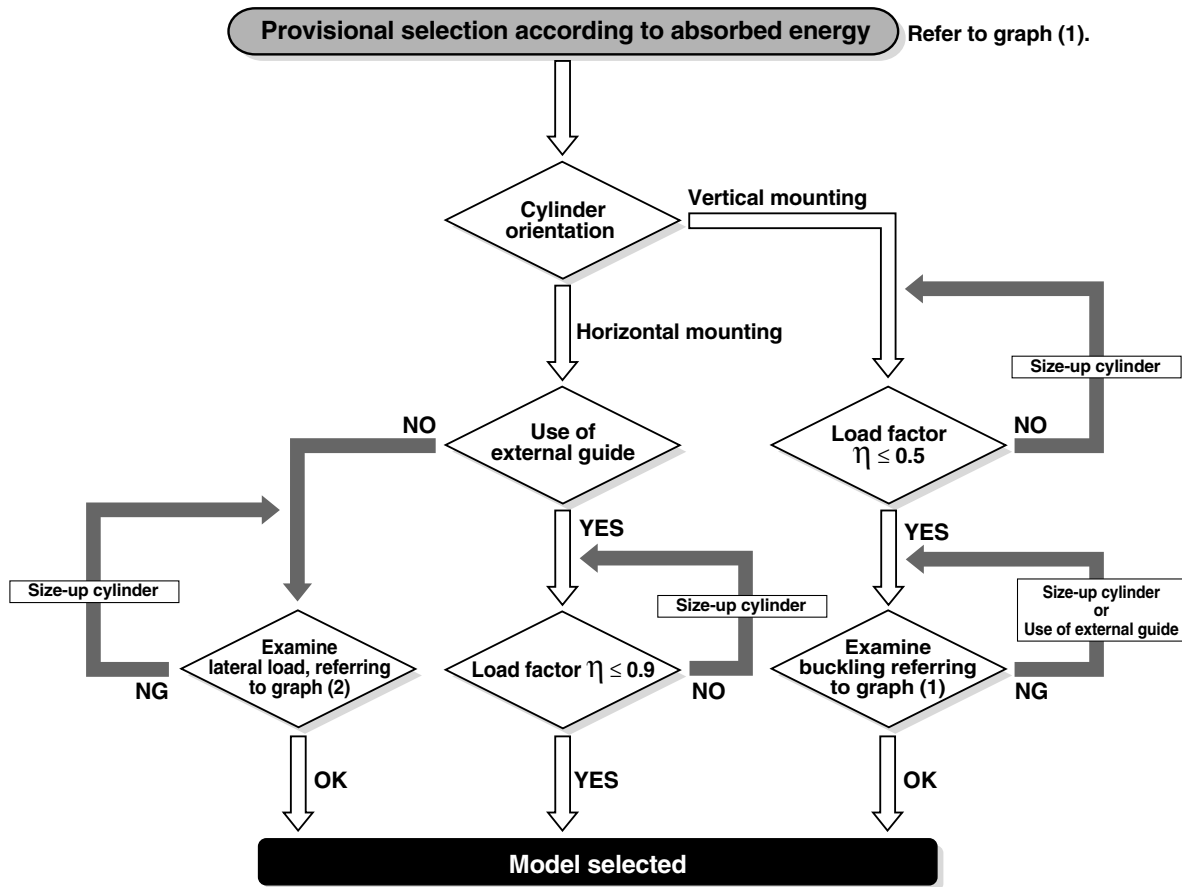
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Data

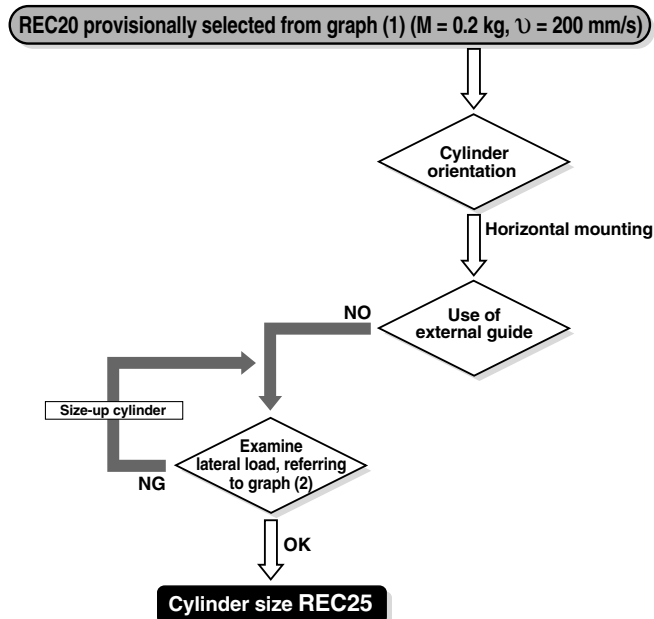
# Series REC Model Selection

## Selection Step



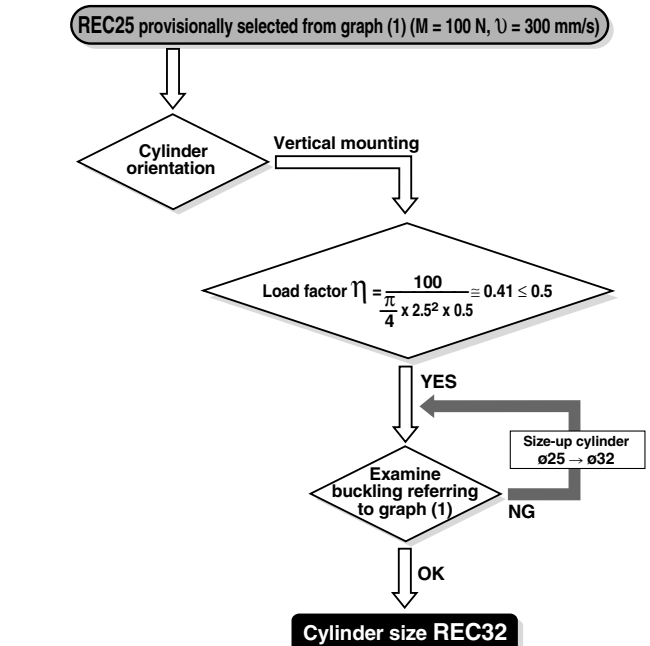
### Selection Example 1

Actuating orientation: Horizontal transfer of work (without external guide)  
 Maximum speed:  $v = 200$  mm/s  
 Supply pressure:  $P = 0.5$  MPa  
 Load weight:  $M = 2$  N  
 Cylinder stroke: 300 mm

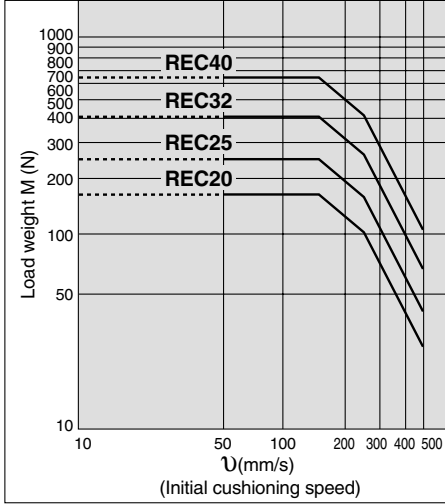


### Selection Example 2

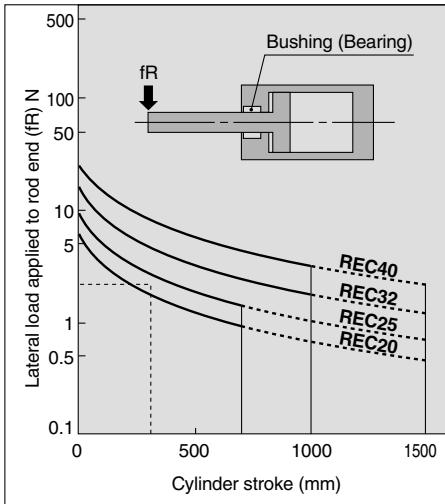
Actuating orientation: Vertical transfer of work (Rod side flange)  
 Maximum speed:  $v = 300$  mm/s  
 Supply pressure:  $P = 0.5$  MPa  
 Load weight:  $M = 100$  N  
 Cylinder stroke: 400 mm



**Graph (1) Absorbed Energy Curve**

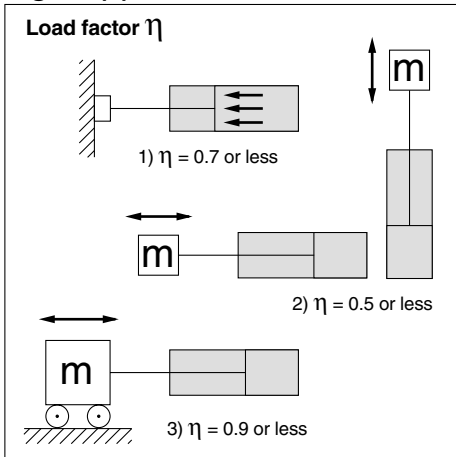


**Graph (2) Applicable Max. Stroke Against Lateral Load\***



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

**Figure (1)**



**Table (1) Relation between Cylinder Size and Max. Stroke** (cm)

Mounting style			Symbol	Operating pressure (MPa)	Applicable max. stroke according to buckling strength					
Mounting bracket symbol and figure					REC					
					ø20	ø25	ø32	ø40		
Foot style : L	Rod side flange style: F	Head side flange style: G	L	0.3	39	50	56	61		
					F	0.5	30	38	43	47
						0.7	24	31	36	39
Clevis style: C, D	Rod side trunnion style: U	Head side trunnion style: T	G	0.3	11	17	19	21		
					D	0.5	7	11	13	13
						0.7	4	7	9	9
Foot style : L	Rod side flange style: F	Head side flange style: G	U	0.3	82	103	116	127		
					T	0.5	62	79	89	97
						0.7	52	66	75	81
Foot style : L	Rod side flange style: F	Head side flange style: G	T	0.3	33	43	49	53		
					F	0.5	23	31	36	39
						0.7	18	25	29	31
Foot style : L	Rod side flange style: F	Head side flange style: G	L	0.3	118	148	167	182		
					F	0.5	90	114	128	140
						0.7	76	95	108	117
Foot style : L	Rod side flange style: F	Head side flange style: G	G	0.3	51	66	75	81		
					F	0.5	37	49	55	60
						0.7	30	39	45	49
Foot style : L	Rod side flange style: F	Head side flange style: G	L	0.3	168	211	237	259		
					F	0.5	129	162	183	199
						0.7	109	136	154	168
Foot style : L	Rod side flange style: F	Head side flange style: G	G	0.3	76	97	110	119		
					F	0.5	56	73	83	90
						0.7	46	60	68	74

- 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

RE<sup>A</sup><sub>B</sub>

REC

C□X

C□Y

MQ<sup>o</sup><sub>M</sub>

RHC

MK(2)

RS<sup>o</sup><sub>G</sub>

RS<sup>H</sup><sub>A</sub>

RZQ

MI<sup>W</sup><sub>S</sub>

CEP1

CE1

CE2

ML2B

C<sup>1/5</sup>-S

CV

MVGQ

CC

RB

J

D-

-X

20-

Data

# Series REC

## Clean Series

**10 - REC** Mounting style    **Bore size**    **Stroke**

### Clean Series

<b>10</b>	Relief type
<b>11</b>	Vacuum type

The type which is applicable for using inside the clean room graded Class 100 by making an actuator's rod section a double seal construction and discharging by relief port directly to the outside of clean room.



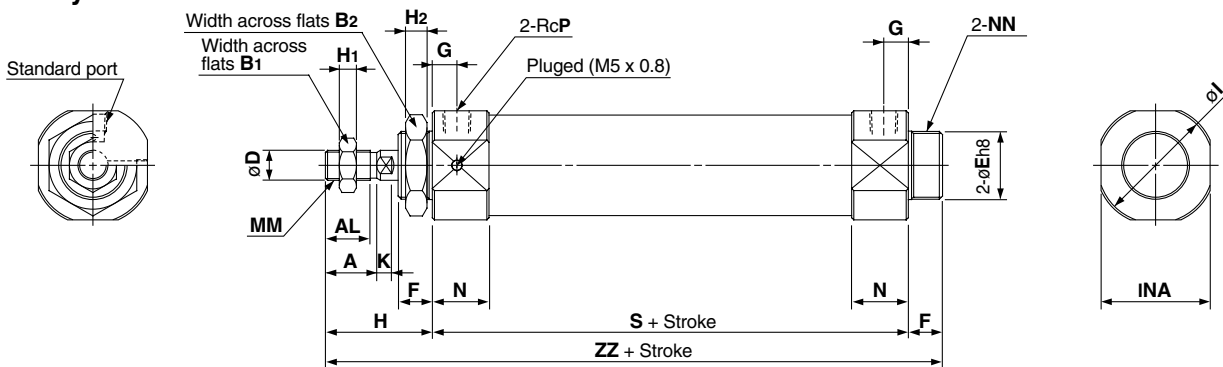
## Specifications

Action	Double acting, Single rod
Bore size (mm)	ø20, ø25, ø32, ø40
Maximum operating pressure	1.0 MPa
Minimum operating pressure	0.2 MPa
Cushion	Air cushion
Piping	Screw-in type
Relief port size	M5 x 0.8
Piston speed	50 to 400 mm/s
Mounting	Basic style, Axial foot style, Rod side flange style, Head side flange style

\* Auto switch can be mounted.

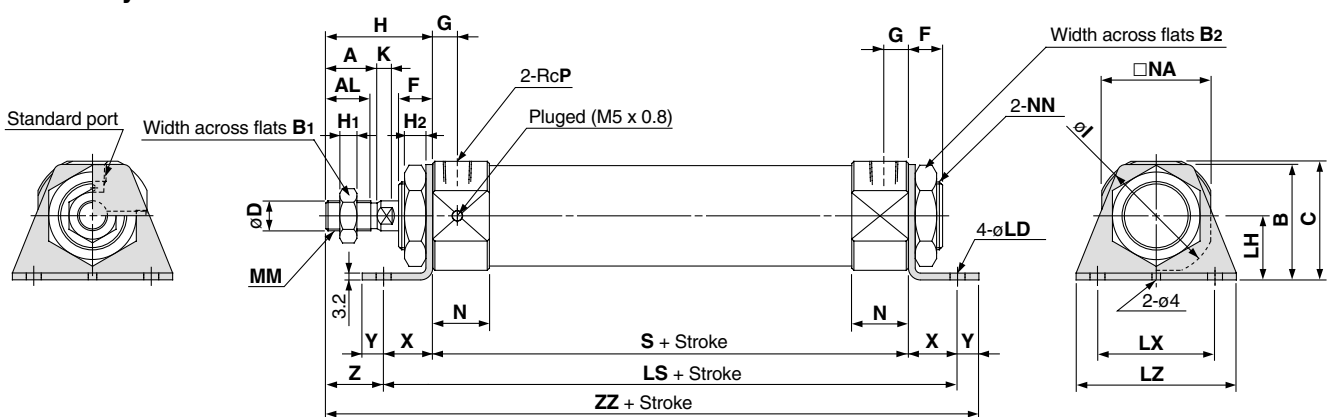
## Dimensions

### Basic style: RECB



Bore (mm)	Stroke range	A	AL	B1	B2	D	E	F	G	H	H1	H2	I	K	MM	N	NA	NN	P	S	ZZ
20	Up 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	Up 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	Up 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	Up to 1000	24	21	22	41	14	32 <sup>0</sup> <sub>-0.039</sub>	16	12.5	50	8	10	56.2	7	M14 x 1.5	26.5	51	M32 x 2	1/4	181	247

### Axial foot style: RECL

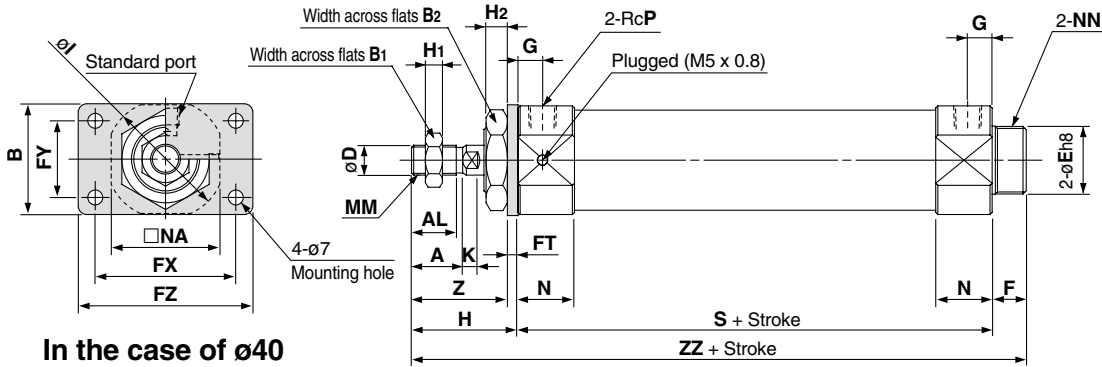


Bore (mm)	Stroke range	A	AL	B	B1	B2	C	D	F	G	H	H1	H2	I	K	LD	LH	LS	LX	LZ	MM	N	NA
20	Up to 700	18	15.5	40	13	26	40	8	13	10	41	5	8	33.5	5	6.8	25	186	40	55	M8 x 1.25	20	30
25	Up to 700	22	19.5	47	17	32	45.5	10	13	10	45	6	8	37.5	5.5	6.8	28	186	40	55	M10 x 1.25	20	34.5
32	Up to 1000	22	19.5	47	17	32	49.5	12	13	11	45	6	8	46.5	5.5	6.8	28	199	40	55	M10 x 1.25	22	42.5
40	Up 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

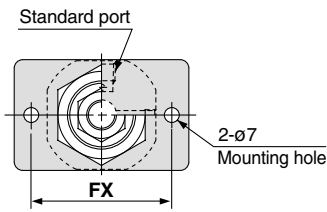
  

Bore (mm)	Stroke range	NN	P	S	X	Y	Z	ZZ
20	Up to 700	M20 x 1.5	1/8	146	20	8	21	215
25	Up to 700	M26 x 1.5	1/8	146	20	8	25	219
32	Up to 1000	M26 x 1.5	1/8	159	20	8	25	232
40	Up to 1000	M32 x 2	1/4	181	23	10	27	264

## Rod side flange style: RECF



In the case of  $\phi 40$



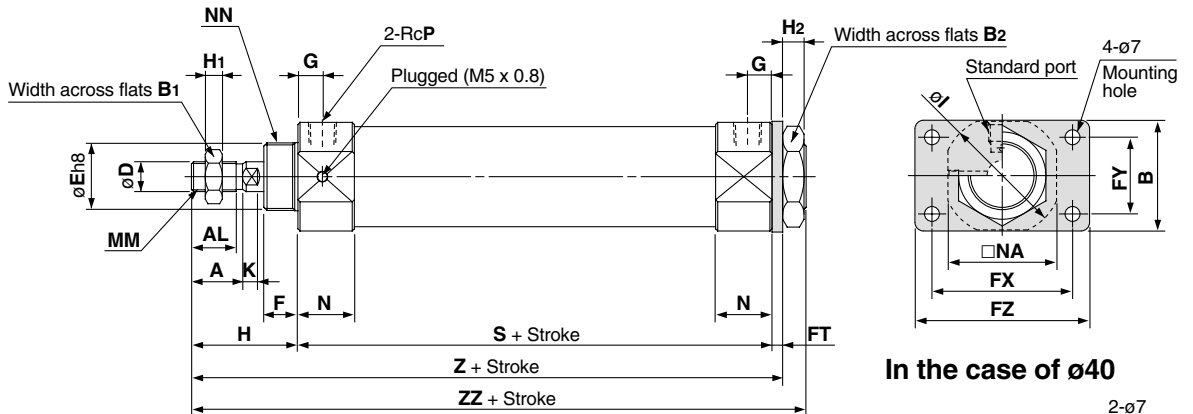
$\phi 20, \phi 25, \phi 32$

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

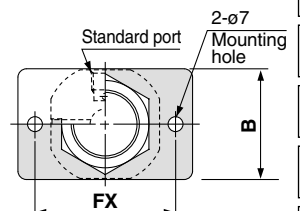
  

Bore (mm)	Stroke range	H1	H2	I	K	MM	N	NA	NN	P	S	Z	ZZ
20	Up to 700	5	8	33.5	5	M8 x 1.25	20	30	M20 x 1.5	1/8	146	37	200
25	Up to 700	6	8	37.5	5.5	M10 x 1.25	20	34.5	M26 x 1.5	1/8	146	41	204
32	Up to 1000	6	8	46.5	5.5	M10 x 1.25	22	42.5	M26 x 1.5	1/8	159	41	217
40	Up to 1000	8	10	56.2	7	M14 x 1.5	26.5	51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

## Rear flange style: RECG



In the case of  $\phi 40$



$\phi 20, \phi 25, \phi 32$

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

Bore (mm)	Stroke range	H1	H2	I	K	MM	N	NA	NN	P	S	Z	ZZ
20	Up to 700	5	8	33.5	5	M8 x 1.25	20	30	M20 x 1.5	1/8	146	191	200
25	Up 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	Up 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	Up to 1000	8	10	56.2	7	M14 x 1.5	26.5	51	M32 x 2	1/4	181	236	247

RE<sup>A</sup><sub>B</sub>

REC

C□X

C□Y

MQ<sup>Q</sup><sub>M</sub>

RHC

MK(2)

RS<sup>Q</sup><sub>G</sub>

RS<sup>H</sup><sub>A</sub>

RZQ

MI<sup>W</sup><sub>S</sub>

CEP1

CE1

CE2

ML2B

C<sub>G</sub><sup>1/5</sup>-S

CV

MVGQ

CC

RB

J

D-

-X

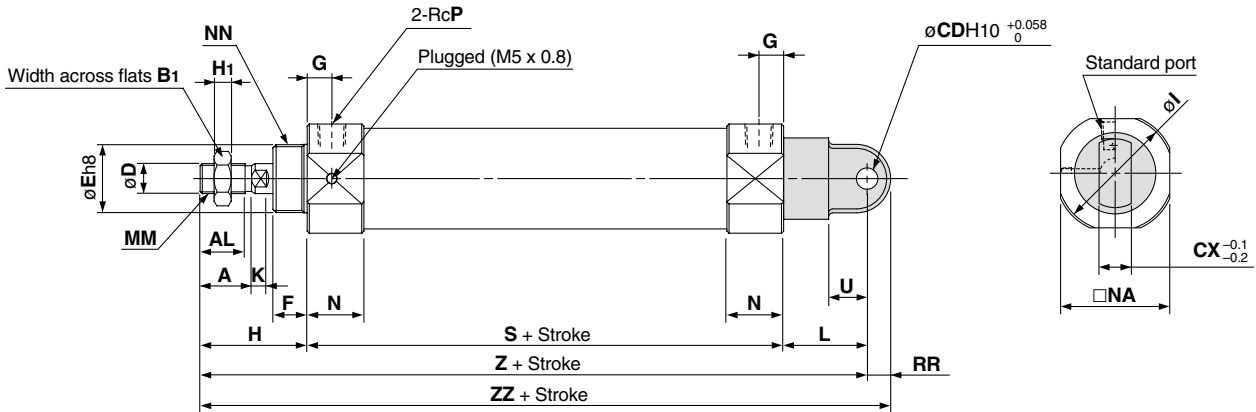
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Data

# Series REC

## Dimensions

### Single clevis style: RECC



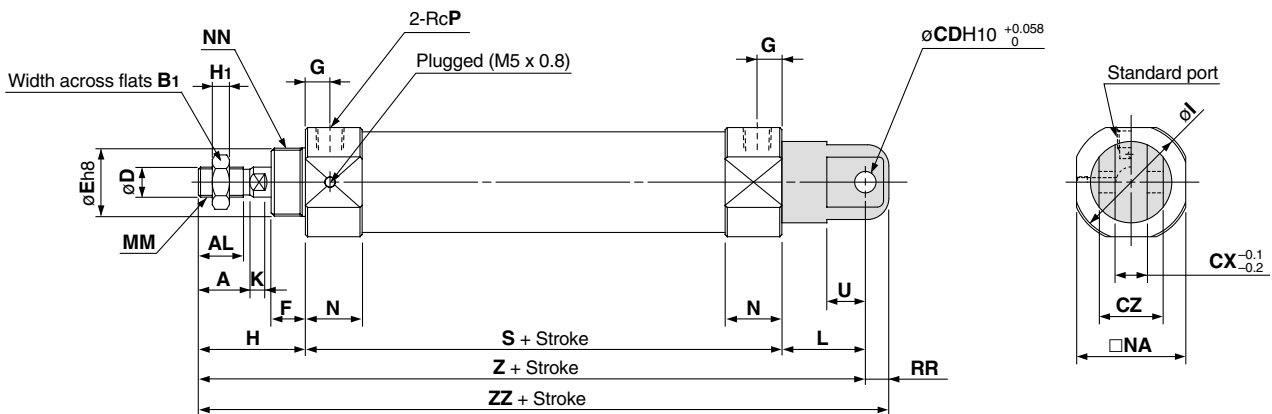
(mm)

Bore (mm)	Stroke range	A	AL	B1	CD	CX	D	E	F	G	H	H1	I	K	L	MM	N	NA
20	Up to 700	18	15.5	13	9	10	8	$20^{0}_{-0.033}$	13	10	41	5	33.5	5	30	M8 x 1.25	20	30
25	Up to 700	22	19.5	17	9	10	10	$26^{0}_{-0.033}$	13	10	45	6	37.5	5.5	30	M10 x 1.25	20	34.5
32	Up to 1000	22	19.5	17	9	10	12	$26^{0}_{-0.033}$	13	11	45	6	46.5	5.5	30	M10 x 1.25	22	42.5
40	Up to 1000	24	21	22	10	15	14	$32^{0}_{-0.039}$	16	12.5	50	8	56.2	7	39	M14 x 1.5	26.5	51

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

### Double clevis style: RECD



(mm)

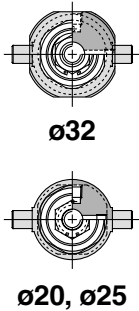
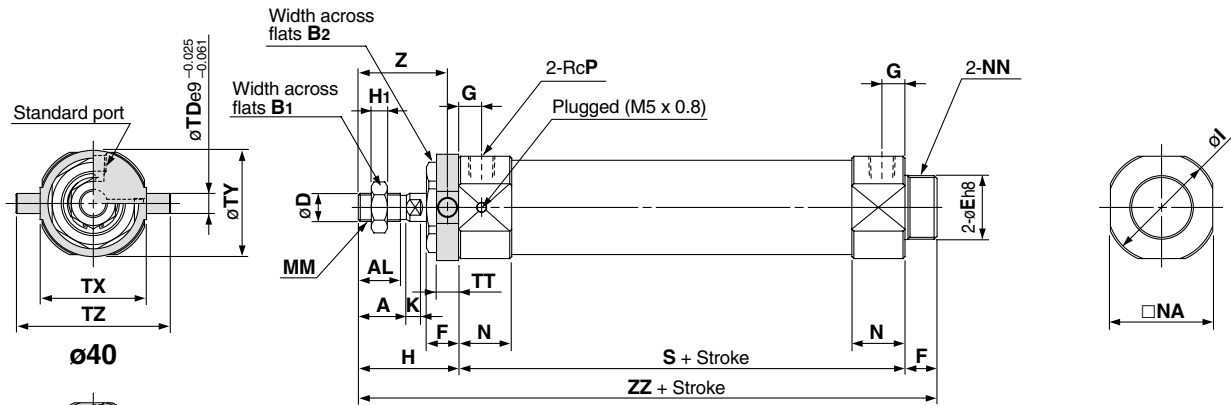
Bore (mm)	Stroke range	A	AL	B1	CD	CX	CZ	D	E	F	G	H	H1	I	K	L	MM	N
20	Up to 700	18	15.5	13	9	10	19	8	$20^{0}_{-0.033}$	13	10	41	5	33.5	5	30	M8 x 1.25	20
25	Up to 700	22	19.5	17	9	10	19	10	$26^{0}_{-0.033}$	13	10	45	6	37.5	5.5	30	M10 x 1.25	20
32	Up to 1000	22	19.5	17	9	10	19	12	$26^{0}_{-0.033}$	13	11	45	6	46.5	5.5	30	M10 x 1.25	22
40	Up to 1000	24	21	22	10	15	30	14	$32^{0}_{-0.039}$	16	12.5	50	8	56.2	7	39	M14 x 1.5	26.5

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



## Rod side trunnion style: RECU



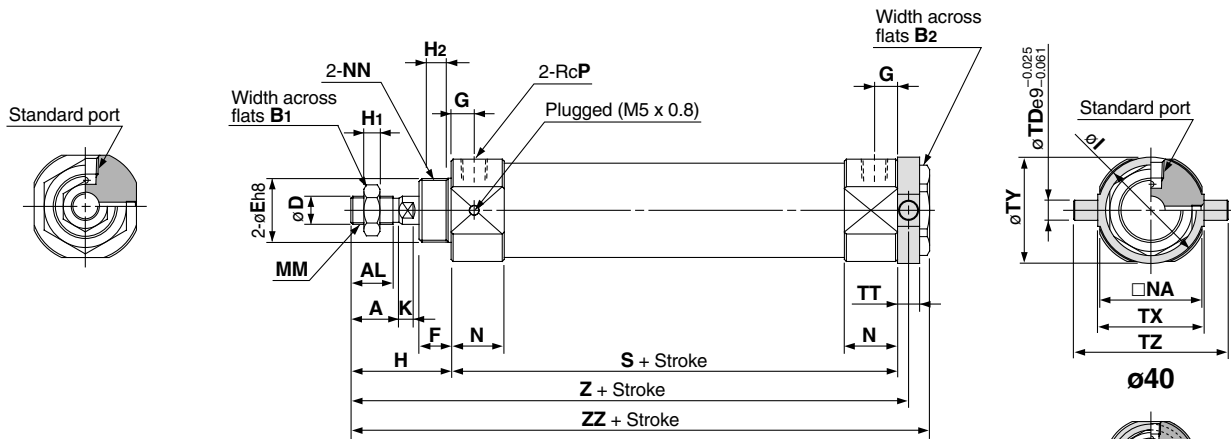
Bore (mm)	Stroke range	A	AL	B1	B2	D	E	F	G	H	H1	I	K	MM
20	Up to 700	18	15.5	13	26	8	20 <sup>0</sup> <sub>-0.033</sub>	13	10	41	5	33.5	5	M8 x 1.25
25	Up to 700	22	19.5	17	32	10	26 <sup>0</sup> <sub>-0.033</sub>	13	10	45	6	37.5	5.5	M10 x 1.25
32	Up to 1000	22	19.5	17	32	12	26 <sup>0</sup> <sub>-0.033</sub>	13	11	45	6	46.5	5.5	M10 x 1.25
40	Up 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 (mm)	Stroke range	N	NA	NN	P	S	TD	TT	TX	TY	TZ	Z	ZZ
20	Up to 700	20	30	M20 x 1.5	1/8	146	8	10	32	32	52	36	200
25	Up to 700	20	34.5	M26 x 1.5	1/8	146	9	10	40	40	60	40	204
32	Up to 1000	22	42.5*	M26 x 1.5	1/8	159	9	10	40*	40	60	40	217
40	Up to 1000	26.5	51	M32 x 2	1/4	181	10	11	53	53	77	44.5	247

\* The dimension □NA(42.5) is wider than dimension TX(40). Use □NA when design pivot bracket.

## Head side trunnion style: RECT



Bore (mm)	Stroke range	A	AL	B1	B2	D	E	F	G	H	H1	H2	I	K	MM
20	Up 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
25	Up 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
32	Up 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
40	Up to 1000	24	21	22	41	14	32 <sup>0</sup> <sub>-0.039</sub>	16	12.5	50	8	10	56.2	7	M14 x 1.5

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

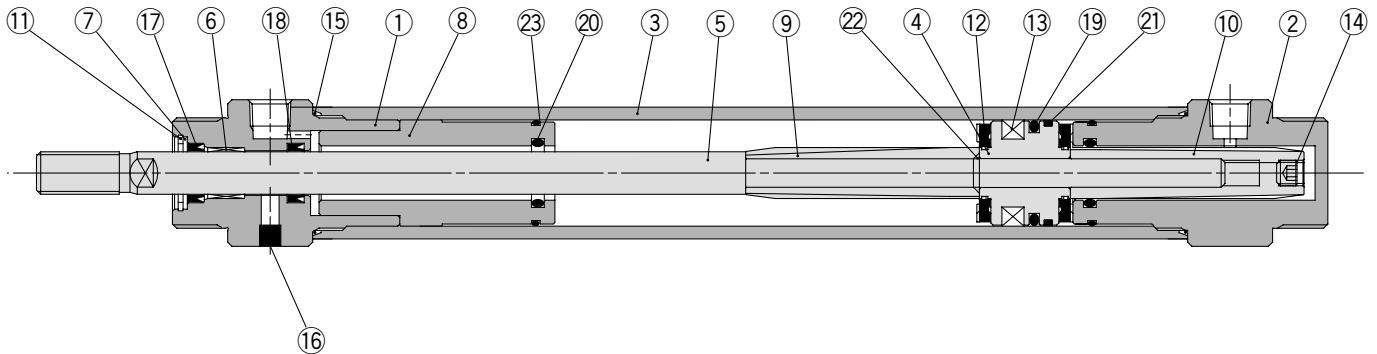
\* The dimension □NA(42.5) is wider than dimension TX(40). Use □NA when design pivot bracket.

- RE<sup>A</sup><sub>B</sub>
- REC
- C□X
- C□Y
- MQ<sup>Q</sup><sub>M</sub>
- RHC
- MK(2)
- RS<sup>Q</sup><sub>G</sub>
- RS<sup>H</sup><sub>A</sub>
- RZQ
- MI<sup>W</sup><sub>S</sub>
- CEP1
- CE1
- CE2
- ML2B
- C<sup>1/2</sup><sub>5-S</sub>
- CV
- MVGQ
- CC
- RB
- J
- D-
- X
- 20-
- Data



# Series REC

## Construction



### Component Parts

No.	Description	Material	Qty.	Note
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 chrome plated
⑥	Bushing	Sintered oil-impregnated bearing	1	
⑦	Seal retainer	Rolled steel	1	
⑧	Cushion seal holder	Aluminum alloy	1	Chromated
⑨	Cushion ring A	Brass	1	Electroless nickel plated
⑩	Cushion ring B	Brass	1	Electroless nickel plated
⑪	Snap ring	Carbon tool steel	1	Nickel plated
⑫	Bumper	Urethane	2	
⑬	Plastic magnet	Resin	1	
⑭	Hexagon socket head set screw	Carbon steel	1	Zinc chromated
⑮	Cylinder tube gasket	NBR	2	
⑯	Hexagon socket head set screw	Carbon steel	1	Nickel plated

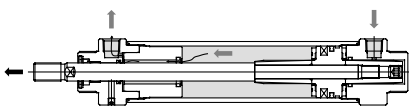
No.	Description	Material	Qty.	Note
⑰	Rod seal A	NBR	1	
⑱	Rod seal B	NBR	1	
⑲	Piston seal	NBR	1	
⑳	Cushion seal	NBR	2	
㉑	Wear ring	Resin	1	
㉒	Piston gasket	NBR	1	
㉓	Holder gasket	NBR	2	

### Replacement Parts: Seal Kit

Bore size (mm).	Kit no.	Contents
20	REC20-PS	Set of nos. above ⑮, ⑰, ⑲, ⑳, ㉑, ㉓
25	REC25-PS	
32	REC32-PS	
40	REC40-PS	

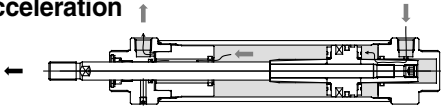
## Working Principle

### 1. Start-up



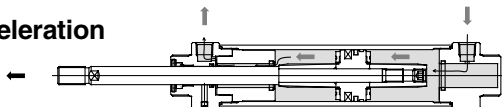
Actuating air passes from cylinder port on head side and enters the right hand side of chamber of the cylinder from space between cushion seal and U-shaped groove on the outer surface of cushion spear. Air in the left hand side of chamber of the cylinder passes through space between cushion seal and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

### 2. In-rush/acceleration



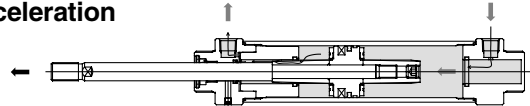
Differential pressure (theoretical force) generated on the left and right sides of piston becomes larger than starting resistance, and piston starts to actuate. With the actuation, U-shaped groove on the cushion spear outer surface gradually becomes deeper, air flow necessary for piston enters the right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

### 3. Acceleration



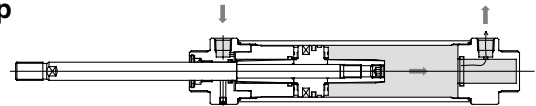
When piston starts to actuate, air can go in and out freely because cushion spear on head side is released from cushion seal. With this actuation, piston speed accelerates (or maintains the same speed).

### 4. Deceleration



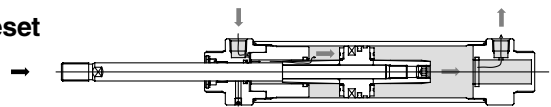
When cushion spear on rod side meets cushion seal, air in cushion chamber on rod side flows through space between cushion spear groove and cushion seal. Since the space is reduced as a SIN function, the cylinder rod decelerates smoothly.

### 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. Start-up".

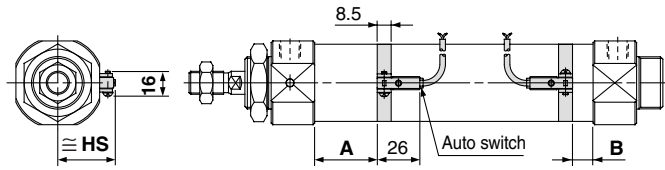
### 6. Reset



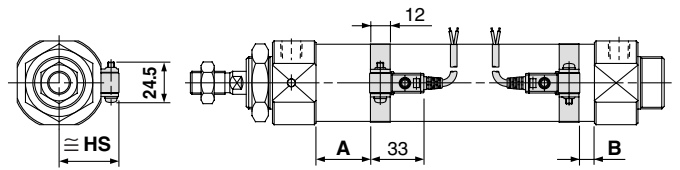
Actuating air passes from cylinder port on rod side and enters the left chamber of the cylinder from space between cushion seal and U-shaped groove on the outer surface of cushion spear. Also, air in right hand side of chamber of piston is exhausted from cylinder port. As U-shaped groove on the cushion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

## Proper Auto Switch Mounting Position (Detection at stroke end) and Its Mounting Height

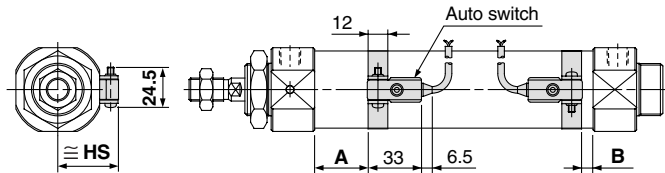
**D-C7□/C80**



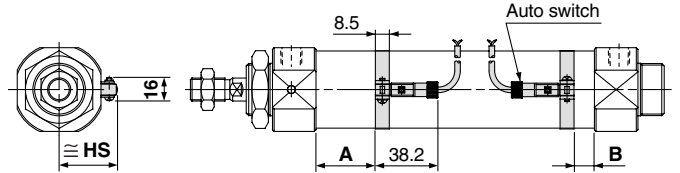
**D-G5NTL**



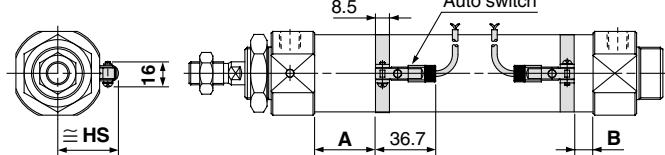
**D-B5□/B64/B59W**



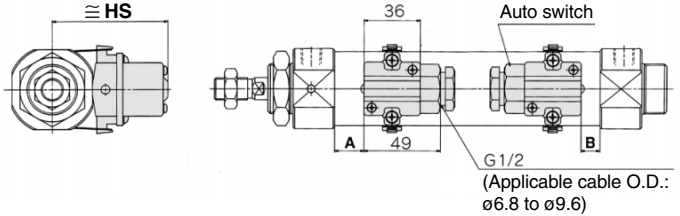
**D-H7C**



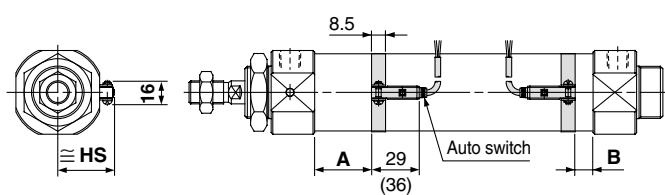
**D-C73C/C80C**



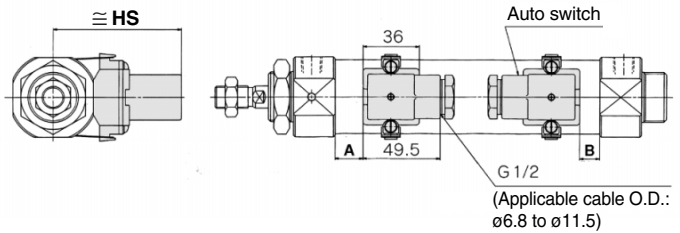
**D-A3□/G39/K39**



**D-H7□/H7□W/H7NF/H7BAL**



**D-A44**



### Proper Auto Switch Mounting Position

Bore size (mm)	D-C7□ D-C80 D-C73C D-C80C		D-B5□ D-B64		D-H7□ D-H7C D-H7NF D-H7□W D-H7BAL		D-G5NTL		D-B59W		D-G39 D-K39 D-A33/A34 D-A44	
	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	53.0	28.5	49.5	25.0
25	56.0	31.5	50.0	25.5	55.0	30.5	51.5	27.0	53.0	28.5	49.5	25.0
32	59.5	36.5	53.5	30.5	58.0	35.5	55.0	32.5	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	67.0	36.5	63.5	33.0

### Auto Switch Mounting Height

Bore size (mm)	D-C7□ D-C80 D-H7□ D-H7□W D-H7NF D-H7BAL	D-B5□ D-B64 D-B59W D-G5NTL D-H7C	D-C73C D-C80C	D-G39 D-K39 D-A33 D-A44	D-A44
	HS	HS	HS	HS	HS
20	24.5	27.5	27	62	72
25	27	30	29.5	64.5	74.5
32	30.5	33.5	33	68	78
40	35	38	37.5	72.5	82.5

### Operating Range

Auto switch model	Bore size (mm)			
	20	25	32	40
D-C7□/C80 D-C73C/C80C	8	10	9	10
D-B5□/B64 D-B59W	8	10	9	10
D-H7□/H7□W/ D-H7NF/H7BAL	4	4	4.5	5
D-H7C	7	8.5	9	10
D-A3□/D-A44	9	10	9	10
D-G39/D-K39	8	9	9	9
D-G5NTL	4	4	4.5	5

\* Since this is a guideline including hysteresis, not meant to be guaranteed. (assuming approximately ±30% dispersion.) There may be the case it will vary substantially depending on an ambient environment.

RE<sup>A</sup><sub>B</sub>

REC

C□X

C□Y

MQ<sup>Q</sup><sub>M</sub>

RHC

MK(2)

RS<sup>Q</sup><sub>G</sub>

RS<sup>H</sup><sub>A</sub>

RZQ

MI<sup>W</sup><sub>S</sub>

CEP1

CE1

CE2

ML2B

C<sub>6</sub><sup>1</sup>/<sub>5</sub>-S

CV

MVGQ

CC

RB

J

D-

-X

20-

Data

# Series REC

## Minimum Stroke for Auto Switch Mounting (mm)

Auto switch model	No. of auto switches mounted				1
	2		n		
	Different sides	Same side	Different sides	Same side	
D-C7□ D-C80	15	50		50 + 45 (n - 2)	10
D-H7□ D-H7□W D-H7BAL D-H7NF	15	60	$15 + 45 \left( \frac{n-2}{2} \right)$ (n = 2, 4, 6, ...)	60 + 45 (n - 2)	10
D-C73C D-C80C DH7C	15	65	$15 + 50 \left( \frac{n-2}{2} \right)$ (n = 2, 4, 6, ...)	65 + 50 (n - 2)	10
D-B5□/B64 D-G5NTL	15	75	$15 + 50 \left( \frac{n-2}{2} \right)$ (n = 2, 4, 6, ...)	75 + 55 (n - 2)	10
D-B59W	20	75	$20 + 50 \left( \frac{n-2}{2} \right)$ (n = 2, 4, 6, ...)		15
D-A3□ D-A44 D-G39 D-K39	35	100	35 + 30 (n - 2)	100 + 100 (n - 2)	10

Other than the applicable auto switches listed in "How to Order", the following auto switches can be mounted. For detailed specifications, refer to page 10-20-1.

Type	Model	Electrical entry	Features
Reed switch	D-C80	Grommet	Without indicator light
	D-C80C	Connector	
	D-B53	Grommet	—
	D-B64	Grommet	Without indicator light
Solid state switch	D-G5NTL	Grommet	With timer

\* With pre-wire connector is available for D-G5NTL type, too. Refer to page 10-20-66 for details.