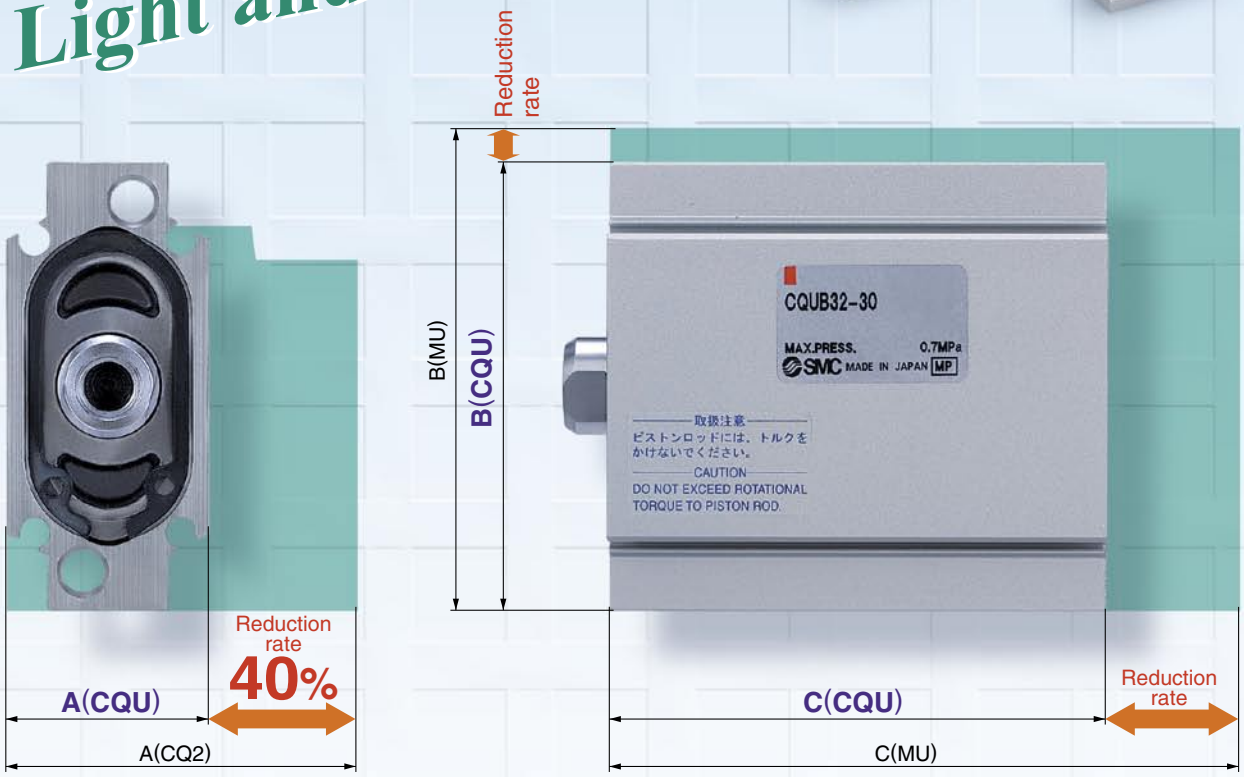
Compact Cylinder

Plate type Size: 20, 25, 32, 40

- Width: Reduced by up to **40%**
  (compared with SMC CQ2 series)
- Total length: Reduced by up to **15%**
- Volume: Reduced by up to **18%**
- Mass: Reduced by up to **36%**
  (compared with SMC MU series with 30 stroke)

Light and compact!



A Dimension Comparison (mm)

Size	A		
	CQU	CQ2	Reduction rate
20	22	36	39%
25	24	40	40%
32	28	45	38%
40	32	52	38%

B/C Dimensions Comparison (mm)

Size	B			C		
	CQU	MU	Reduction rate	CQU	MU	Reduction rate
20	47	—	—	72.5	—	—
25	53	54	2%	72.5	85	15%
32	62	68	9%	79.5	88	10%
40	80	86	7%	79.5	90	12%

* Comparison made with 30 stroke cylinder.

Mass Comparison (g)

Size	Mass		
	CQU	MU	Reduction rate
20	153	—	—
25	180	252	29%
32	272	376	28%
40	351	552	36%

* Comparison made with 30 stroke cylinder.

Series CQU

SMC

Almotion B.V. Nijverheidsweg 14 | 6662 NG Elst (Gld) | The Netherlands t +31 (0)85 0491 777 e info@almotion.nl
www.almotion.nl | www.linearmotion.nl | www.lineairegeleiding.nl

Easy maintenance

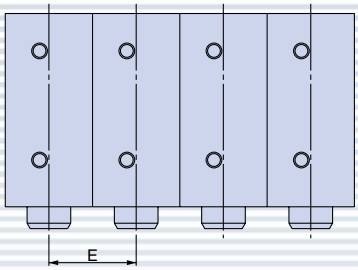
Seals can be replaced easily just by removing the retaining rings.

A small type of auto switch can be mounted from 4 directions. No protrusion of auto switch from the mounting slot

Auto switch can be mounted without removing a support bracket.

Allows smaller mounting pitch.

∗ Without auto switch



(mm)

Size	E
20	22
25	24
32	28
40	32

Note 1) Cylinder tube width tolerance: ±0.2
Note 2) Minimum mounting pitch of auto switch is specified. Refer to back page 3.

Mounting

Variations

Model	Size	Stroke												Cushion	Mounting	Rod end
		5	10	15	20	25	30	35	40	45	50	75	100			
CQU	20	●	●	●	●	●	●	●	●	●	●	—	—	Rubber bumper	Through-hole/Both ends tapped common (Standard) Vertical foot Lateral foot Double clevis	Male thread Female thread
	25	●	●	●	●	●	●	●	●	●	●	—	—			
	32	●	●	●	●	●	●	●	●	●	●	●	●			
	40	●	●	●	●	●	●	●	●	●	●	●	●			

ALMOTION

Compact Cylinder: Plate Type Double Acting, Single Rod

Series CQU

Size: 20, 25, 32, 40

How to Order

CQU **B** **20** – **30** **□** – **M9BW** **□**

Mounting

B	Through-hole/Both ends tapped common (Standard)
L	Vertical foot
M	Lateral foot
D	Double clevis

∗ Support brackets are shipped together, (but not assembled).
∗ Cylinder mounting bolt is not included.
Order it separately from "Mounting Bolt for CQU" on page 3.

Number of auto switches

—	2 pcs.
S	1 pc.
n	"n" pcs.

Auto switch

—	Without auto switch (Built-in magnet)

∗ For applicable auto switch models, refer to the table below.

Size

20	Piston area equivalent to 20 mm
25	Piston area equivalent to 25 mm
32	Piston area equivalent to 32 mm
40	Piston area equivalent to 40 mm

Rod end thread

—	Rod end female thread
M	Rod end male thread

Cylinder stroke (mm)

Size	Stroke
20, 25	5, 10, 15, 20, 25, 30, 35, 40, 45, 50
32, 40	5, 10, 15, 20, 25, 30, 35, 40, 45, 50, 75, 100

Applicable Auto Switches/Refer to pages 13 through to 16 for further information on auto switches.

Type	Special function	Electrical entry	Indicator light	Wiring (Output)	Load voltage DC		Load voltage AC	Auto switch model: Perpendicular	Auto switch model: In-line	Lead wire length (m): 0.5 (Nil)	1 (M)	3 (L)	5 (Z)	Pre-wired connector	Applicable load	
Solid state switch	—	Grommet	Yes	3-wire (NPN)	24 V	5 V, 12 V	—	**M9NV****	**M9N****	●	●	●	○	○	IC circuit	Relay, PLC
				3-wire (PNP)				**M9PV****	**M9P****	●	●	●	○	○		
				2-wire		12 V		**M9BV****	**M9B****	●	●	●	○	○	—	
	Diagnostic indication (2-colour indication)			3-wire (NPN)		5 V, 12 V		**M9NWV**	**M9NW**	●	●	●	○	○	IC circuit	
				3-wire (PNP)				**M9PWV**	**M9PW**	●	●	●	○	○		
				2-wire		12 V		**M9BWV**	**M9BW**	●	●	●	○	○	—	
	Water resistant (2-colour indication)			3-wire (NPN)		5 V, 12 V		**M9NAV*****	**M9NA*****	○	○	●	○	○	IC circuit	
				3-wire (PNP)				**M9PAV*****	**M9PA*****	○	○	●	○	○		
				2-wire		12 V		**M9BAV*****	**M9BA*****	○	○	●	○	○	—	
Reed switch	—	Grommet	Yes	3-wire (NPN equivalent)	—	5 V	—	**A96V**	**A96**	●	—	●	—	—	IC circuit	—
			No	2-wire	24 V	12 V	100 V	**A93V**	**A93**	●	—	●	—	—	—	Relay, PLC
							100 V or less	**A90V**	**A90**	●	—	●	—	—	IC circuit	

∗ Lead wire length symbols: 0.5 m ····· — (Example) M9NW
1 m ····· M (Example) M9NWM
3 m ····· L (Example) M9NWL
5 m ····· Z (Example) M9NWZ

∗ Solid state switches marked with "○" are produced upon receipt of order.

∗ For details about the auto switch with pre-wired connector, refer to Best Pneumatics.
∗ Auto switches are shipped together, (but not assembled).
∗∗ The D-M9□M and M9□VM type (lead wire length: 1 m) will be available with products delivered from August 2008 onwards.
∗∗∗ The water resistant improved D-M9□A and M9□AV type can be mounted, but cylinders are not designed to be water resistant improved construction.
Note) The D-M9□V, M9□WV, M9□AV, and A9□V type cannot be mounted on the port surface depending on the cylinder's stroke and the fitting size for piping. Please confirm with SMC separately.

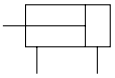
Series CQU

Specifications

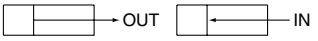
Equivalent bore size (mm)	20	25	32	40
Action	Double acting, Single rod			
Fluid	Air			
Proof pressure	1.0 MPa			
Maximum operating pressure	0.7 MPa			
Minimum operating pressure	0.08 MPa	0.05 MPa		
Ambient and fluid temperature	Without auto switch: –10 to 70°C (No freezing)			
	With auto switch: –10 to 60°C (No freezing)			
Cushion	Rubber bumper			
Rod end thread	Female thread, Male thread			
Stroke length tolerance	$^{+1.4}_{0}$			
Mounting	Through-hole/Both ends tapped common			
Piston speed	50 to 500 mm/s			

∗ The stroke length tolerance does not include the changed amount of the rubber bumper due to compression.

JIS Symbol



Theoretical Output



Unit (N)

Size	Rod size (mm)	Operating direction	Piston area (mm^2)	Operating pressure (MPa)		
				0.3	0.5	0.7
20	10	IN	236	71	118	165
		OUT	314	94	157	220
25	10	IN	412	124	206	288
		OUT	491	147	246	344
32	14	IN	650	195	325	455
		OUT	804	241	402	563
40	14	IN	1103	331	552	772
		OUT	1256	377	628	879

Standard Stroke

Unit (mm)

Size	Standard stroke
20, 25	5, 10, 15, 20, 25, 30, 35, 40, 45, 50
32, 40	5, 10, 15, 20, 25, 30, 35, 40, 45, 50, 75, 100

∗ Other intermediate strokes can be manufactured upon receipt of order. Please contact SMC.

Support Bracket Part No.

Size	Vertical foot Note 1)		Lateral foot		Double clevis
	Rod end	Head end	Rod end	Head end	
20	CQU-LR20	CQU-LH20	CQU-MR20	CQU-MH20	CQU-D20
25	CQU-L25		CQU-M25		CQU-D25
32	CQU-L32		CQU-M32		CQU-D32
40	CQU-L40		CQU-M40		CQU-D40

Note 1) When ordering a foot bracket of size 20, check which end, (rod end or head end), it will be on. For other sizes, the part number is common to both ends.
Note 2) Parts belonging to each bracket are as follows.
Vertical foot, Lateral foot: Body mounting bolt
Double clevis: Clevis pin, C-type retaining ring for shaft, Body mounting bolt

Mass

Unit (g)

Size	Cylinder stroke (mm)											
	5	10	15	20	25	30	35	40	45	50	75	100
20	105	115	125	134	144	153	163	173	182	192	—	—
25	127	138	148	159	169	180	190	201	211	222	—	—
32	199	214	228	243	257	272	286	301	315	330	402	475
40	264	282	299	316	333	351	368	385	403	420	506	593

Additional Mass

Unit (g)

Size		20	25	32	40
Rod end male thread	Male thread	19	19	32	32
	Nut	4	4	10	10
Vertical foot (Including mounting bolt)		84	91	122	162
Lateral foot (Including mounting bolt)		105	113	145	203
Double clevis (Including pin, retaining ring, mounting bolt)		60	76	149	266

How to Calculate
(Example) **CQUD32-50M**
- Basic mass: CQUB32-50 ..... 330 g
- Additional mass: Rod end male thread ..... 42 g
  Double clevis ..... 149 g

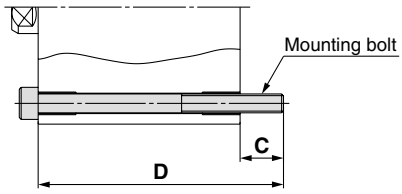
521 g

Mounting Bolt for CQU

How to Mount: Use this bolt for mounting into a through-hole.

How to Order: Add "Bolt" in front of the mounting bolt size.

Example) Bolt M5 x 60 L 2 pcs.



(mm)

Cylinder model	C	D	Mounting bolt size
CQUB20-5	7.5	55	M5 x 55 L
-10		60	x 60 L
-15		65	x 65 L
-20		70	x 70 L
-25		75	x 75 L
-30		80	x 80 L
-35		85	x 85 L
-40		90	x 90 L
-45		95	x 95 L
-50		100	x 100 L

(mm)

Cylinder model	C	D	Mounting bolt size
CQUB25-5	7.5	55	M5 x 55 L
-10		60	x 60 L
-15		65	x 65 L
-20		70	x 70 L
-25		75	x 75 L
-30		80	x 80 L
-35		85	x 85 L
-40		90	x 90 L
-45		95	x 95 L
-50		100	x 100 L

(mm)

Cylinder model	C	D	Mounting bolt size
CQUB32-5	10.5	65	M5 x 65 L
-10		70	x 70 L
-15		75	x 75 L
-20		80	x 80 L
-25		85	x 85 L
-30		90	x 90 L
-35		95	x 95 L
-40		100	x 100 L
-45		105	x 105 L
-50		110	x 110 L
-75		135	x 135 L
-100		160	x 160 L

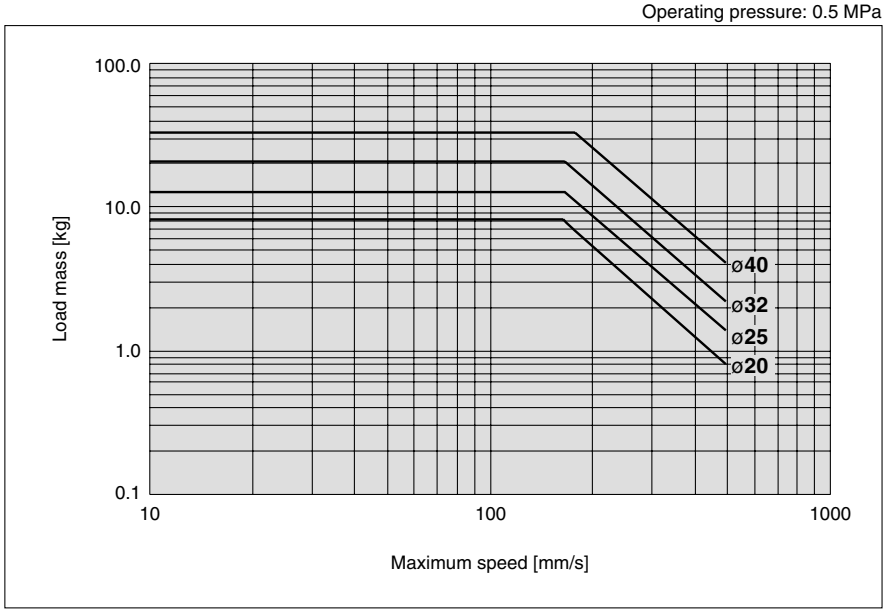
(mm)

Cylinder model	C	D	Mounting bolt size
CQUB40-5	10.5	65	M5 x 65 L
-10		70	x 70 L
-15		75	x 75 L
-20		80	x 80 L
-25		85	x 85 L
-30		90	x 90 L
-35		95	x 95 L
-40		100	x 100 L
-45		105	x 105 L
-50		110	x 110 L
-75		135	x 135 L
-100		160	x 160 L

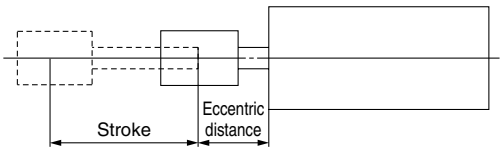
Material: Chromium molybdenum steel Surface treatment: Nickel plated

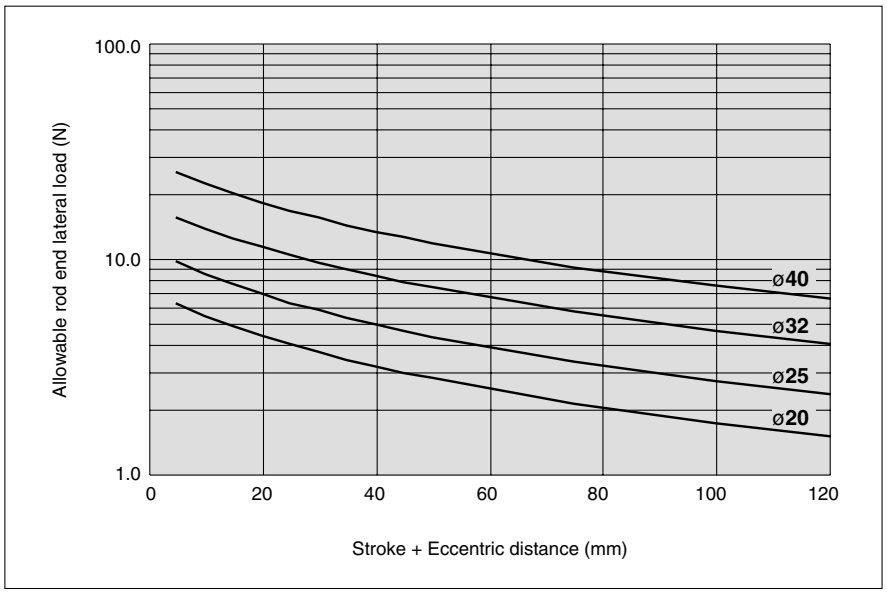
Allowable Kinetic Energy

Operating pressure: 0.5 MPa



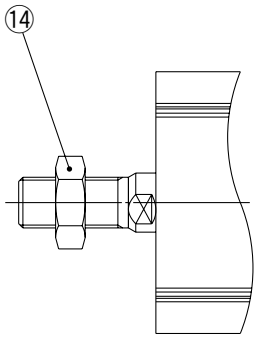
Allowable Rod End Lateral Load



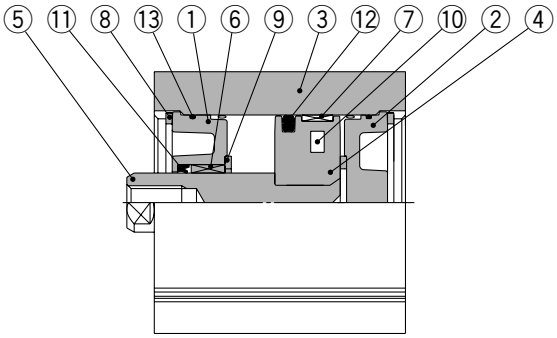


Allowable rod end lateral load can be found from the above graph. Do not apply a load beyond the line on the graph.

Construction



Rod end male thread



Component Parts

No.	Description	Material	Note
1	**Rod cover**	Aluminum die-casted	Chromated
2	**Head cover**	Aluminum die-casted	Chromated
3	**Cylinder tube**	Aluminum alloy	Hard anodized
4	**Piston**	Aluminum die-casted	Chromated
5	**Piston rod**	Carbon steel	Hard chrome plated
6	**Bushing**	Oil-impregnated sintered alloy	
7	**Wear ring**	Fluoropolymer	
8*	**N-type retaining ring**	Carbon tool steel	Phosphate coated
9	**Bumper**	Urethane	
10	**Magnet**	—	
11*	**Rod seal**	NBR	
12*	**Piston seal**	NBR	
13*	**O-ring**	NBR	Nickel plated
14	**Rod end nut**	Carbon steel	

Replacement Parts: Seal Kit

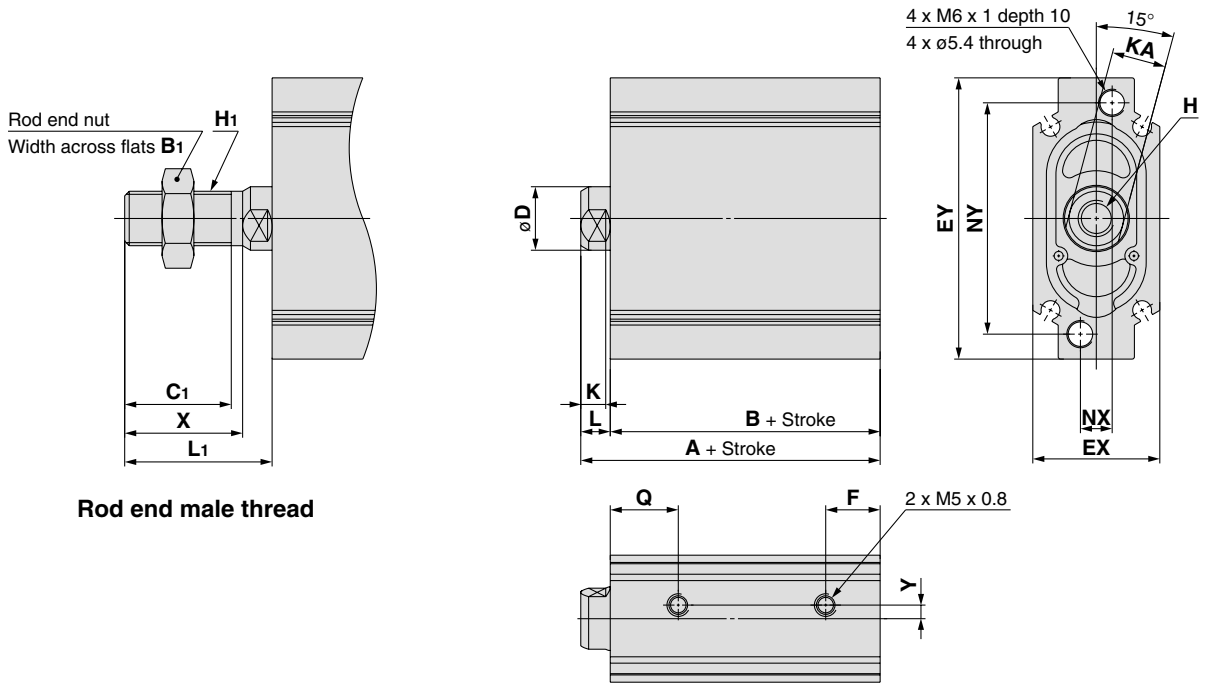
Size	Kit no.	Contents
20	CQUB20-PS	Set of component parts ⑧, ⑪, ⑫, ⑬
25	CQUB25-PS	
32	CQUB32-PS	
40	CQUB40-PS	

* Seal kit includes ⑧, ⑪, ⑫, ⑬. Order the seal kit, based on each size.
* Seal kit does not include a grease package. Order it separately.
* **Grease package part number: GR-S-010** (10 g)

Dimensions

∗ For auto switch mounting position and its mounting height, refer to page 9.

Basic (Through-hole/Both ends tapped common): CQUB



Rod end male thread

Basic

(mm)

Size	Stroke range (mm)	A	B	D	EX	EY	F	H	K	KA	L	NX	NY	Q	Y
20	5 to 50	49	42.5	10	22	47	11.5	M5 x 0.8 depth 8	5	8	6.5	5.5	36	15	3
25	5 to 50	49	42.5	10	24	53	11	M5 x 0.8 depth 8	5	8	6.5	5	41	14.5	4
32	5 to 100	56	49.5	14	28	62	12	M8 x 1.25 depth 13	6	12	6.5	7	51	15	3
40	5 to 100	56	49.5	14	31	80	12	M8 x 1.25 depth 13	6	12	6.5	7	69	15	3

Rod End Male Thread

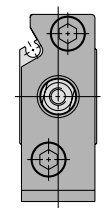
(mm)

Size	X	C1	B1	L1	H1
20	18	15.5	13	24.5	M8 x 1.25
25	18	15.5	13	24.5	M8 x 1.25
32	26	23.5	19	32.5	M12 x 1.25
40	26	23.5	19	32.5	M12 x 1.25

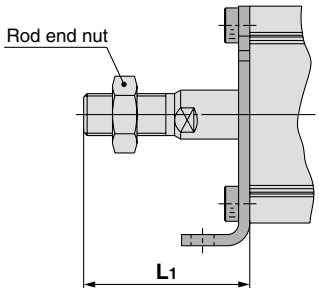
∗ For details about the rod end nut, refer to page 8.

Dimensions

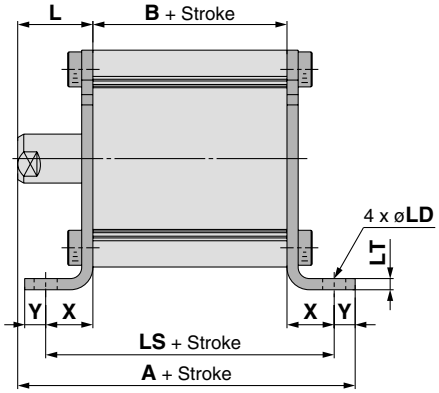
Vertical foot: CQUL

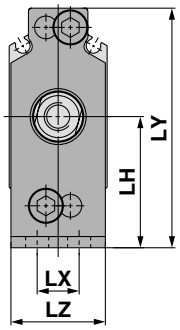


CQUL20



Rod end male thread





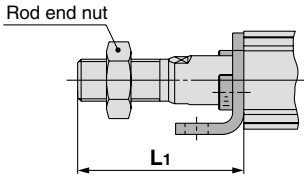
Vertical Foot

(mm)

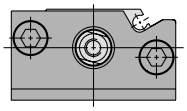
Size	Stroke range	A	B	L	L1	LD	LH	LS	LT	LX	LY	LZ	X	Y
20	5 to 50	82.5	42.5	21.5	39.5	6	30	67.5	3.2	11	53.5	21	12.5	6
25	5 to 50	82.5	42.5	21.5	39.5	6	32.5	67.5	3.2	11	59	23	12.5	6
32	5 to 100	90.5	49.5	21.5	47.5	7	37.5	76.5	3.2	12	68.5	27	13.5	6
40	5 to 100	99	49.5	26.5	52.5	9	46.5	79.5	3.2	15	86.5	30	15	8

Vertical foot bracket material: Carbon steel
Surface treatment: Nickel plated

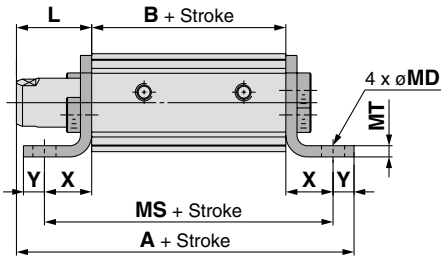
Lateral foot: CQUM

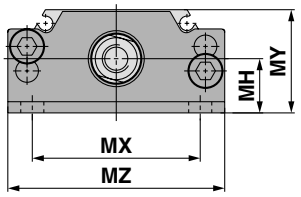


Rod end male thread



CQUM20





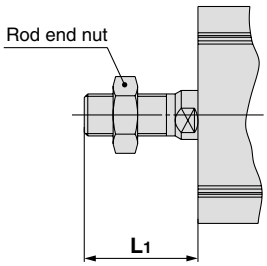
Lateral Foot

(mm)

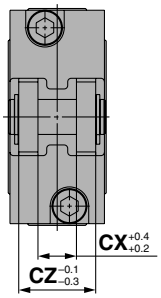
Size	Stroke range	A	B	L	L1	MD	MH	MS	MT	MX	MY	MZ	X	Y
20	5 to 50	82.5	42.5	21.5	39.5	6	15	67.5	3.2	36	26	47	12.5	6
25	5 to 50	82.5	42.5	21.5	39.5	6	14.5	67.5	3.2	42	26.5	53	12.5	6
32	5 to 100	90.5	49.5	21.5	47.5	7	15.5	76.5	3.2	48	29.5	62	13.5	6
40	5 to 100	99	49.5	26.5	52.5	9	16.5	79.5	3.2	63	32	80	15	8

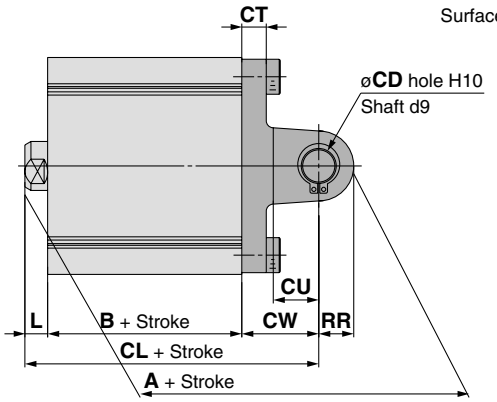
Lateral foot bracket material: Carbon steel
Surface treatment: Nickel plated

Double clevis: CQUD



Rod end male thread





Double Clevis

(mm)

Size	Stroke range	A	B	CD	CL	CT	CU	CW	CX	CZ	L	L1	RR
20	5 to 50	72	42.5	8	64	4	9	15	8	16	6.5	24.5	8
25	5 to 50	74	42.5	8	66	4	11	17	9	18	6.5	24.5	8
32	5 to 100	88	49.5	10	78	7	13	22	11	22	6.5	32.5	10
40	5 to 100	93	49.5	10	83	10	13	27	13	26	6.5	32.5	10

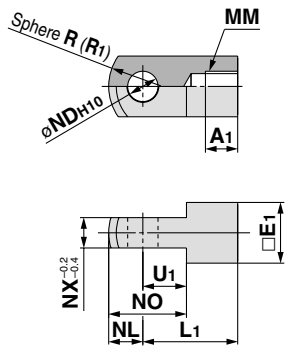
∗ For details about the rod end nut and accessory brackets, refer to page 8.

Double clevis bracket material: Carbon steel
Surface treatment: Metallic painted

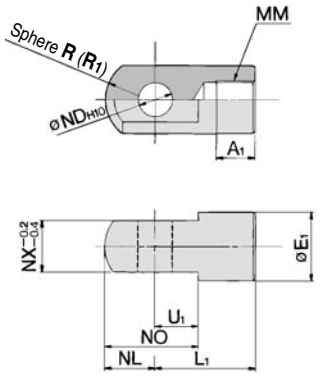
Series CQU
Accessory Brackets

Single Knuckle Joint

CQU20, CQU25



CQU32, CQU40



(mm)

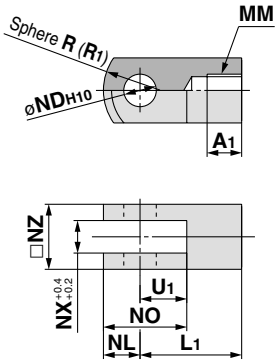
Part no.	Size	A_1	E_1	L_1	MM
I-G02	20, 25	8.5	16	25	M8 x 1.25
I-MU03	32, 40	12	18	31	M12 x 1.25

Part no.	ND_{H10}	NL	NO	NX	R_1	U_1
I-G02	$8^{+0.058}_{0}$	9	20.5	8	10.3	11.5
I-MU03	$10^{+0.058}_{0}$	10	24	11	10	14

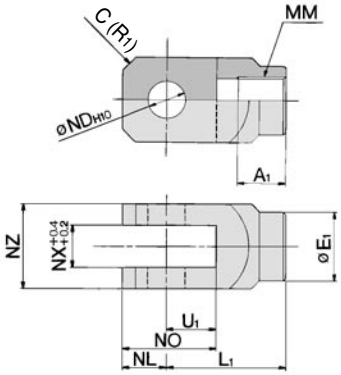
Single knuckle joint material: Rolled steel
Surface treatment: Nickel plated

Double Knuckle Joint

CQU20, CQU25



CQU32, CQU40



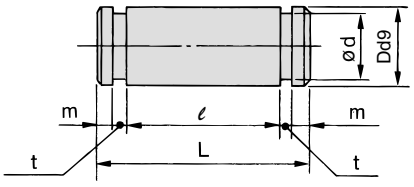
(mm)

Part no.	Size	A_1	E_1	L_1	MM	ND_{H10}
Y-G02	20, 25	8.5	—	25	M8 x 1.25	$8^{+0.058}_{0}$
Y-MU03	32, 40	12	18	31	M12 x 1.25	$10^{+0.058}_{0}$

Part no.	NL	NO	NX	NZ	R_1	U_1
Y-G02	9	20.5	8	16	10.3	11.5
Y-MU03	10	24	11	22	4	14

∗ Knuckle pin and retaining ring are included. Double knuckle joint material: Rolled steel
Surface treatment: Nickel plated

Knuckle Pin (Common with Double Clevis Pin)



(mm)

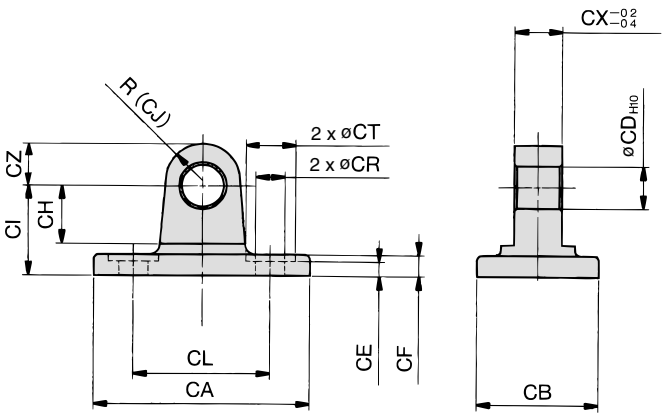
Part no.	Size	Dd9	L	d	ℓ
IY-G02	20	$8^{-0.040}_{-0.076}$	21	7.6	16.2
CD-MU02	25	$8^{-0.040}_{-0.076}$	23	7.6	18.2
CD-MU03	32	$10^{-0.040}_{-0.076}$	27	9.6	22.2
CD-MU04	40	$10^{-0.040}_{-0.076}$	31	9.6	26.2

Part no.	m	t	Applicable retaining ring
IY-G02	1.5	0.9	C-type 8 for shaft
CD-MU02	1.5	0.9	C-type 8 for shaft
CD-MU03	1.25	1.15	C-type 10 for shaft
CD-MU04	1.25	1.15	C-type 10 for shaft

Pin material: Carbon steel

∗ Knuckle pin is included in the double clevis and double knuckle joint as standard.
∗ C-type retaining ring for shaft is included.

Double Clevis Socket



(mm)

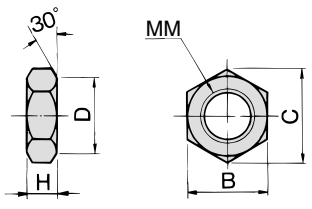
Part no.	Size	CA	CB	CD_{H10}	CE	CF	CH	CI	CJ
MU-C02	25	53	23	$8^{+0.058}_{0}$	3.5	4	11	17	7
MU-C03	32	67	27	$10^{+0.058}_{0}$	3.5	7	13	22	10
MU-C04	40	85	31	$10^{+0.058}_{0}$	3.5	10	13	27	10

Part no.	CL	CR	CT	CX	CZ
MU-C02	26	5.3	9.5	9	8
MU-C03	42	6.4	11	11	10
MU-C04	54	8.4	14	13	10

Double clevis socket material: Cast iron
Surface treatment: Painted

Note) Double clevis socket is available for sizes from 25 to 40.

Rod End Nut



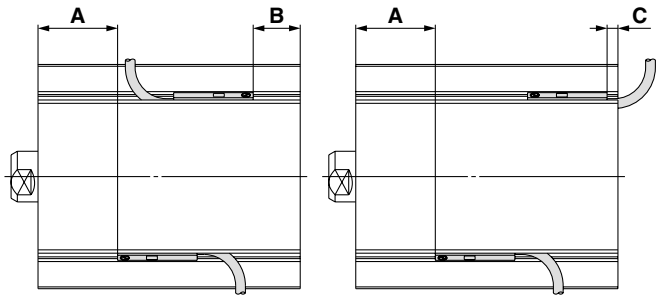
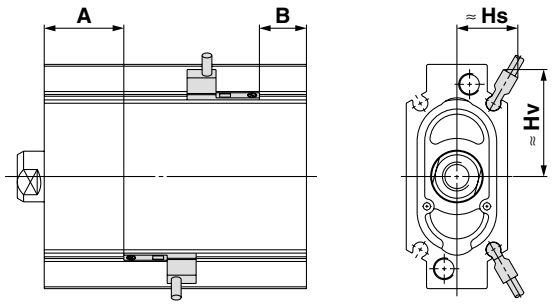
(mm)

Part no.	Size	MM	H	B	C	D
NT-02	20, 25	M8 x 1.25	5	13	15.0	12.5
NT-MU03	32, 40	M12 x 1.25	7	19	21.9	18

∗ A nut is included in the rod end male thread as standard.

Rod end nut material: Carbon steel
Surface treatment: Nickel plated

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

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

(mm)

Size	D-M9□ D-M9□W D-M9□AL			D-M9□V D-M9□WV D-M9□AVL				D-A9□			D-A9□V			
	A	B	C	A	B	Hs	Hv	A	B	C	A	B	Hs	Hv
20	19	11.5	1.5	19	11.5	14	23	15	7.5	5.5 (3)	15	7.5	12.5	20.5
25	19	11.5	1.5	19	11.5	15.5	25	15	7.5	5.5 (3)	15	7.5	14	23
32	22	15	5	22	15	17	30	18.5	11	9 (6.5)	18.5	11	15.5	27.5
40	22	15	5	22	15	17.5	37.5	18.5	11	9 (6.5)	18.5	11	16.5	35

( ): D-A93
∗ For actual setting, check the operation of the auto switch and adjust as necessary.

Minimum Stroke for Auto Switch Mounting

(mm)

Number of auto switches	D-M9□ D-M9□V D-A9□ D-A9□V	D-M9□W D-M9□WV D-M9□AL D-M9□AVL
1 pc.	5	10
2 pcs.	10	15

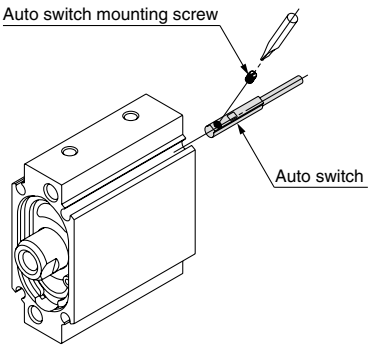
Operating Range

(mm)

Auto switch model	Size			
	20	**25**	**32**	**40**
D-M9□/M9□V Note)	2	2	2	2
D-M9□W/M9□WV **D-M9□AL/M9□AVL**	3	3	3.5	3
D-A9□/A9□V	6.5	6	6	5.5

∗ Since this is a guideline including hysteresis, not meant to be guaranteed. (Assuming approximately ±30% dispersion) Value may greatly change depending on the surrounding environment.
Note) In products delivered from August 2008 onwards, the value will be the same as the D-M9□W, M9□WV, M9□AL, and M9□AVL.

Auto Switch Mounting



Use a watchmaker's screwdriver with a grip diameter of 5 to 6 mm to tighten the auto switch mounting screw.
The tightening torque should be about 0.05 to 0.15 mm.
As a guide, it can be tightened about 90° past the position at which tightening can be felt.

Before Operation
Auto Switch Common Specifications (1)

⚠ Specific Product Precautions

Before handling auto switches, refer to "Handling Precautions for SMC Products" (M-E03-3) for Auto Switches Precautions.

Auto Switch Common Specifications

Type	Reed switch	Solid state switch
Leakage current	None	3-wire: 100 μA or less 2-wire: 0.8 mA or less
Operating time	1.2 ms	1 ms or less
Impact resistance	300 m/s^2	1000 m/s^2
Insulation resistance	50 MΩ or more at 500 VDC Mega (between lead wire and case)	
Withstand voltage	1500 VAC for 1 minute (between lead wire and case)	1000 VAC for 1 minute (between lead wire and case)
Ambient temperature	–10 to 60°C	
Enclosure	IEC60529 standard IP67	

Lead Wire

Lead wire length indication
(Example)

D-M9BW L

Lead wire length

—	0.5 m
M	1 m
L	3 m
Z	5 m

Note 1) 1 m (M): Available D-M9□□(V) only
The D-M9□M and M9□VM (lead wire length: 1 m) will be available with products delivered from August 2008 onwards.
Note 2) Lead wire length (Z): 5 m
Solid state switch: Manufactured upon receipt of order as standard.
Note 3) Tolerance of lead wire length

Lead wire length	Tolerance
0.5 m	±15 mm
1 m	±30 mm
3 m	±90 mm
5 m	±150 mm

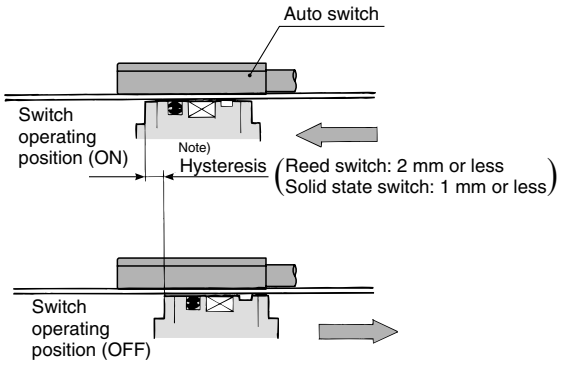
Before Operation
Auto Switch Common Specifications (2)

⚠ Specific Product Precautions

Before handling auto switches, refer to "Handling Precautions for SMC Products" (M-E03-3) for Auto Switches Precautions.

Auto Switch Hysteresis

Hysteresis is the distance between auto switch operating positions ON and OFF. The switch turns on when the piston moves, and it turns off when the piston moves to the opposite side. The operating range values (single side) partly include the hysteresis.



Note) Hysteresis will vary depending on the operating environment and cannot be guaranteed. Please contact SMC if hysteresis will be a problem when using auto switches.

Contact Protection Box: CD-P11, CD-P12

<Applicable switch model>

D-A9/A9□V type

The above auto switch type is not equipped with a built-in contact protection circuit. Also, due to the construction, solid state switches do not require a contact protection box.

① **Where the operation load is an inductive load.**
② **Where the wiring length to load is greater than 5 m.**
③ **Where the load voltage is 100 VAC.**

Use a contact protection box for any of the above cases:
The contact life may be shortened (due to permanent energizing conditions).

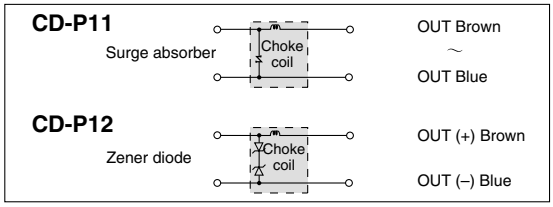
(Where the load voltage is 110 VAC)
When the load voltage is increased by 10% to the rating of applicable auto switches above, use a contact protection box (CD-P11) to reduce the upper limit of the load current by 10% so that it can be set within the range of the load current, enabling to use at 110 VAC.

Specifications

Part no.	CD-P11		CD-P12
Load voltage	100 VAC or less	200 VAC	24 VDC
Max. load current	25 mA	12.5 mA	50 mA

∗ Lead wire length —— Switch connection side 0.5 m
Load connection side 0.5 m

Internal Circuit



Dimensions

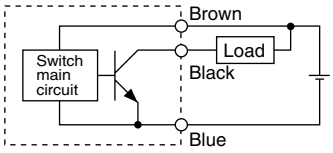
Connection

To connect a switch unit to a contact protection box, connect the lead wire from the side of the contact protection box marked SWITCH to the lead wire coming out of the switch unit. Keep the switch as close as possible to the contact protection box, with a lead wire length of no more than 1 meter.

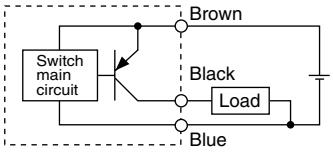
Before Operation
Auto Switch/Connections and Examples

Basic Wiring

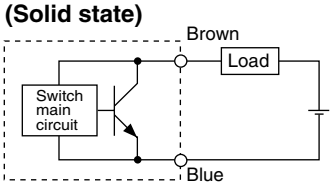
Solid state 3-wire, NPN



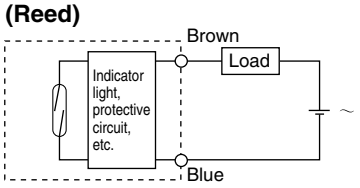
Solid state 3-wire, PNP



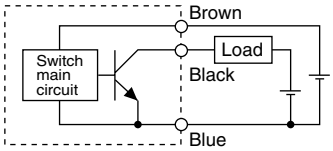
2-wire (Solid state)

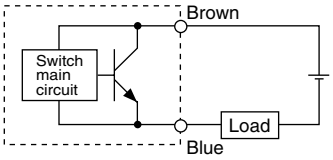


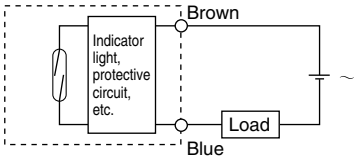
2-wire (Reed)



(Power supplies for switch and load are separate.)



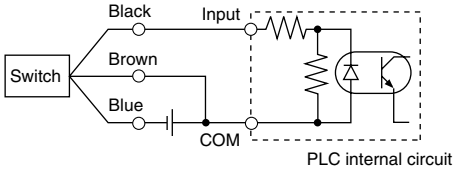




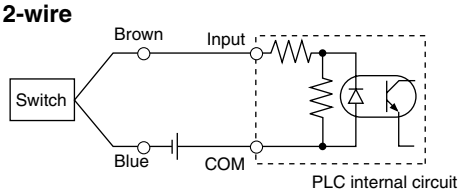
Example of Connection to PLC (Programmable Logic Controller)

• Sink input specification

3-wire, NPN

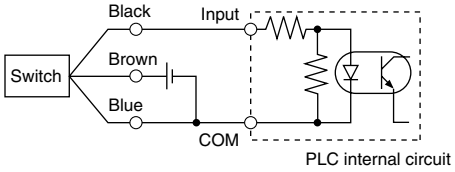


2-wire

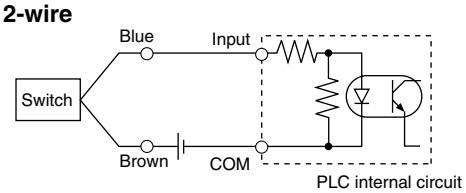


• Source input specification

3-wire, PNP



2-wire

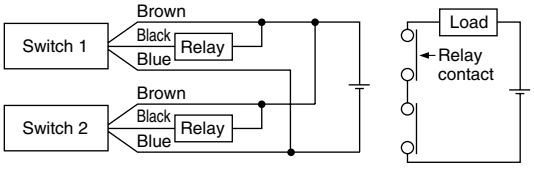


Connect according to the PLC input specifications, since the connection method will differ depending on the PLC input specifications.

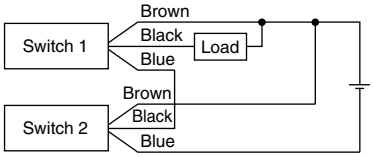
Example of AND (Serial) and OR (Parallel) Connection

• 3-wire

AND connection for NPN output (using relays)

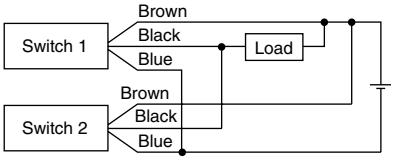


AND connection for NPN output (performed with switches only)



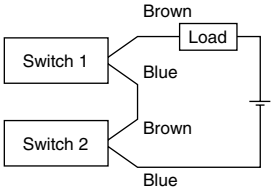
The indicator lights will illuminate when both switches are turned ON.

OR connection for NPN output



• 2-wire

2-switch AND connection

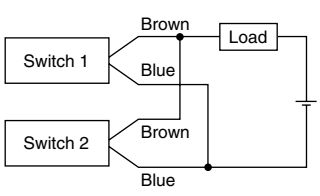


When two switches are connected in series, a load may malfunction because the load voltage will decrease in the ON state.
The indicator lights will illuminate if both switches are turned ON.

Load voltage at ON = $\frac{\text{Power supply voltage} - \text{Residual voltage}}{}$ x 2 pcs.
= 24 V – 4 V x 2 pcs.
= 16 V

Example) Power supply voltage: 24 VDC
Auto switch internal voltage drop: 4 V

2-switch OR connection



(Solid state)
When two switches are connected in parallel, malfunction may occur because the load voltage will increase in the OFF state.

Load voltage at OFF = Leakage current x 2 pcs.
x Load impedance
= 1 mA x 2 pcs. x 3 kΩ
= 6 V

Example) Load impedance: 3 kΩ
Auto switch leakage current: 1 mA

(Reed)
Because there is no leakage current, the load voltage will not increase in the OFF state. However, depending on the number of switches in the ON state, the indicator lights may sometimes dim or not light because of the dispersion and reduction of the current flowing to the switches.

Solid State Switch: Direct Mounting Style
D-M9N(V)/D-M9P(V)/D-M9B(V)

Grommet

- **2-wire load current is reduced (2.5 to 40 mA).**
- **Flexibility is 1.5 times greater than the conventional model (SMC comparison).**
- **Using flexible cable as standard specification**

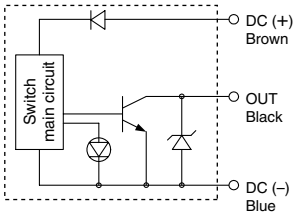
⚠Caution

Precautions

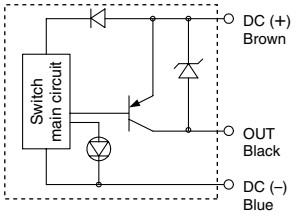
Fix the auto switch with the set screw attached to the auto switch body. The auto switch may be damaged if an unspecified screw is used.

Auto Switch Internal Circuit

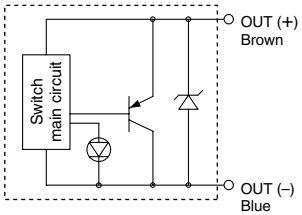
D-M9N(V)



D-M9P(V)



D-M9B(V)



Auto Switch Specifications

For details about certified products conforming to international standards, visit us at www.smcworld.com.

PLC: Programmable Logic Controller

D-M9□(V) (With indicator light)						
Auto switch model	D-M9N	D-M9NV	D-M9P	D-M9PV	D-M9B	D-M9BV
Electrical entry direction	In-line	Perpendicular	In-line	Perpendicular	In-line	Perpendicular
Wiring type	3-wire				2-wire	
Output type	NPN		PNP		—	
Applicable load	IC circuit, Relay, PLC				24 VDC relay, PLC	
Power supply voltage	5, 12, 24 VDC (4.5 to 28 V)				—	
Current consumption	10 mA or less				—	
Load voltage	28 VDC or less		—		24 VDC (10 to 28 VDC)	
Load current	40 mA or less				2.5 to 40 mA	
Internal voltage drop	0.8 V or less at 10 mA (2 V or less at 40 mA)				4 V or less	
Leakage current	100 μA or less at 24 VDC				0.8 mA or less	
Indicator light	Red LED illuminates when turned ON.					
Standard	CE marking					

- Lead wires — Oilproof heavy-duty vinyl cable: ø2.7 x 3.2 ellipse
  D-M9B(V) 0.15 mm² x 2 cores
  D-M9N(V), D-M9P(V) 0.15 mm² x 3 cores

Note 1) Refer to page 10 for solid state switch common specifications.
Note 2) Refer to page 10 for lead wire lengths.

Mass

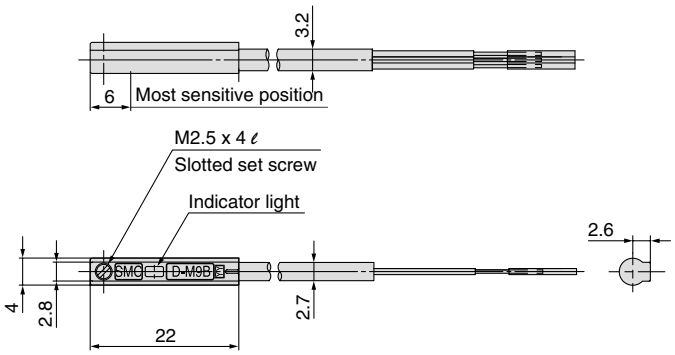
Unit: g

Auto switch model		D-M9N(V)	D-M9P(V)	D-M9B(V)
Lead wire length (m)	0.5	8	8	7
	1	14	14	13
	3	41	41	38
	5	68	68	63

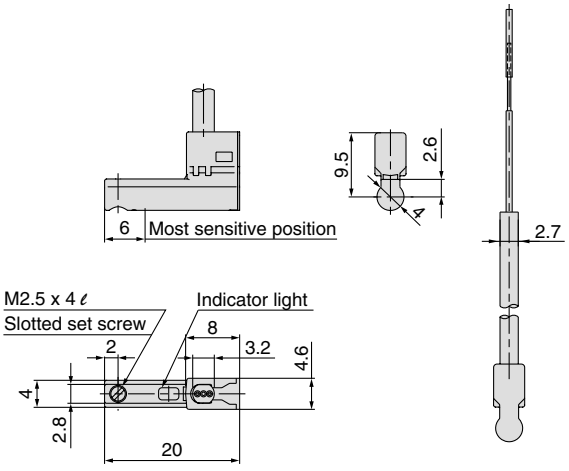
Dimensions

Unit: mm

D-M9□



D-M9□V



2-Colour Indication Solid State Switch: Direct Mounting Style

D-M9NW(V)/D-M9PW(V)/D-M9BW(V)

Grommet

- 2-wire load current is reduced (2.5 to 40 mA).
- Flexibility is 1.5 times greater than the conventional model (SMC comparison).
- Using flexible cable as standard spec.
- The optimum operating position can be determined by the colour of the light. (Red → Green ← Red)

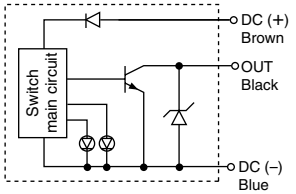
⚠Caution

Precautions

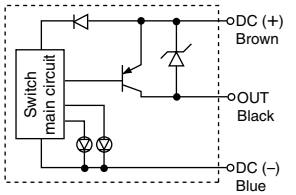
Fix the auto switch with the set screw attached to the auto switch body. The auto switch may be damaged if an unspecified screw is used.

Auto Switch Internal Circuit

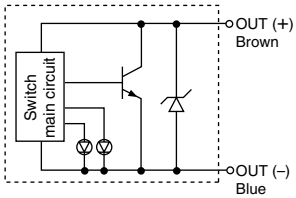
D-M9NW(V)



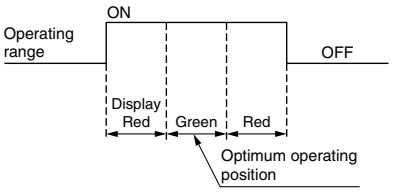
D-M9PW(V)



D-M9BW(V)



Indicator light / Display method



Auto Switch Specifications

For details about certified products conforming to international standards, visit us at www.smcworld.com.

PLC: Programmable Logic Controller

D-M9□W(V) (With indicator light)						
Auto switch model	D-M9NW	D-M9NWV	D-M9PW	D-M9PWV	D-M9BW	D-M9BWV
Electrical entry direction	In-line	Perpendicular	In-line	Perpendicular	In-line	Perpendicular
Wiring type	3-wire				2-wire	
Output type	NPN		PNP		—	
Applicable load	IC circuit, Relay, PLC				24 VDC relay, PLC	
Power supply voltage	5, 12, 24 VDC (4.5 to 28 V)				—	
Current consumption	10 mA or less				—	
Load voltage	28 VDC or less		—		24 VDC (10 to 28 VDC)	
Load current	40 mA or less				2.5 to 40 mA	
Internal voltage drop	0.8 V or less at 10 mA (2 V or less at 40 mA)				4 V or less	
Leakage current	100 μA or less at 24 VDC				0.8 mA or less	
Indicator light	Operating position ····· Red LED illuminates. Optimum operating position ····· Green LED illuminates.					
Standard	CE marking					

- Lead wires — Oilproof flexible heavy-duty vinyl cable: ø2.7 x 3.2 ellipse
  D-M9BW(V) 0.15 mm² x 2 cores
  D-M9NW(V), D-M9PW(V) 0.15 mm² x 3 cores

Note 1) Refer to page 10 for solid state switch common specifications.
Note 2) Refer to page 10 for lead wire lengths.

Mass

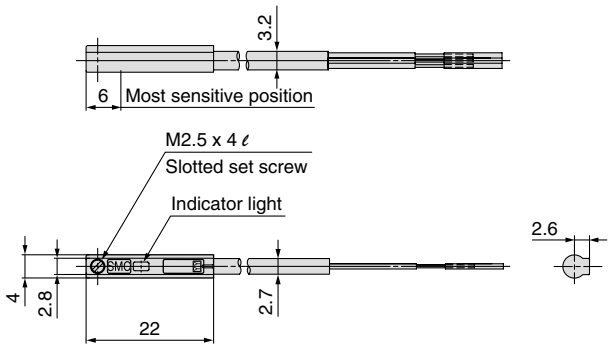
Unit: g

Auto switch model		D-M9NW(V)	D-M9PW(V)	D-M9BW(V)
Lead wire length (m)	0.5	8	8	7
	1	14	14	13
	3	41	41	38
	5	68	68	63

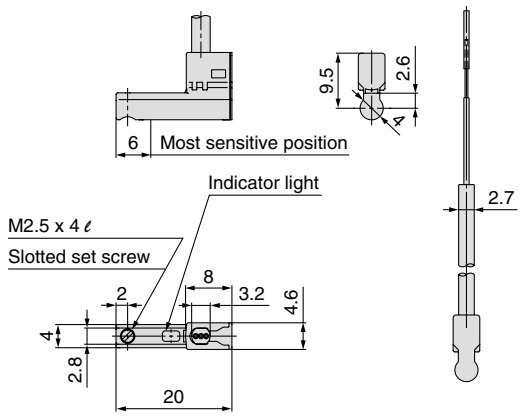
Dimensions

Unit: mm

D-M9□W



D-M9□WV

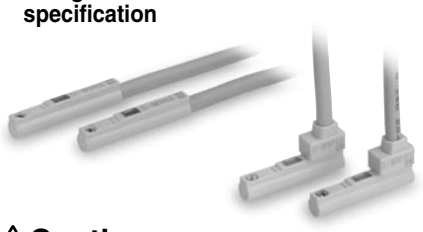


Water Resistant 2-Colour Indication Solid State Switch: Direct Mounting Style

D-M9NA(V)/D-M9PA(V)/D-M9BA(V) CE

Grommet

- Water (coolant) resistant type
- 2-wire load current is reduced (2.5 to 40 mA).
- The optimum operating position can be determined by the colour of the light. (Red → Green ← Red)
- Using flexible cable as standard specification



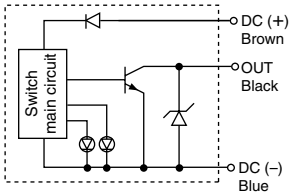
⚠Caution

Precautions

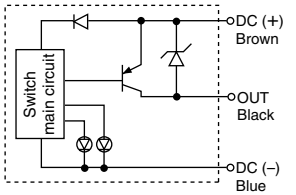
Fix the auto switch with the set screw attached to the auto switch body. The auto switch may be damaged if an unspecified screw is used.

Auto Switch Internal Circuit

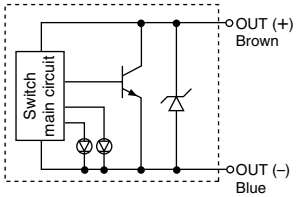
D-M9NA(V)



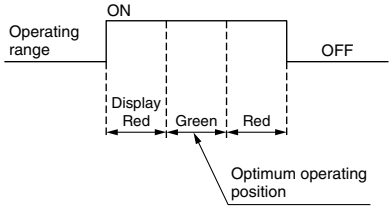
D-M9PA(V)



D-M9BA(V)



Indicator light / Display method



Auto Switch Specifications

PLC: Programmable Logic Controller

D-M9□A(V) (With indicator light)						
Auto switch model	D-M9NA	D-M9NAV	D-M9PA	D-M9PAV	D-M9BA	D-M9BAV
Electrical entry direction	In-line	Perpendicular	In-line	Perpendicular	In-line	Perpendicular
Wiring type	3-wire				2-wire	
Output type	NPN		PNP		—	
Applicable load	IC circuit, Relay, PLC				24 VDC relay, PLC	
Power supply voltage	5, 12, 24 VDC (4.5 to 28 V)				—	
Current consumption	10 mA or less				—	
Load voltage	28 VDC or less		—		24 VDC (10 to 28 VDC)	
Load current	40 mA or less				2.5 to 40 mA	
Internal voltage drop	0.8 V or less at 10 mA (2 V or less at 40 mA)				4 V or less	
Leakage current	100 μA or less at 24 VDC				0.8 mA or less	
Indicator light	Operating position ····· Red LED illuminates. Optimum operating position ····· Green LED illuminates.					
Standard	CE marking					

- Lead wires — Oilproof flexible heavy-duty vinyl cable: ø2.7 x 3.2 ellipse
  D-M9BA(V) 0.15 mm² x 2 cores
  D-M9NA(V), D-M9PA(V) 0.15 mm² x 3 cores

Note 1) Refer to page 10 for solid state switch common specifications.
Note 2) Refer to page 10 for lead wire lengths.

Mass

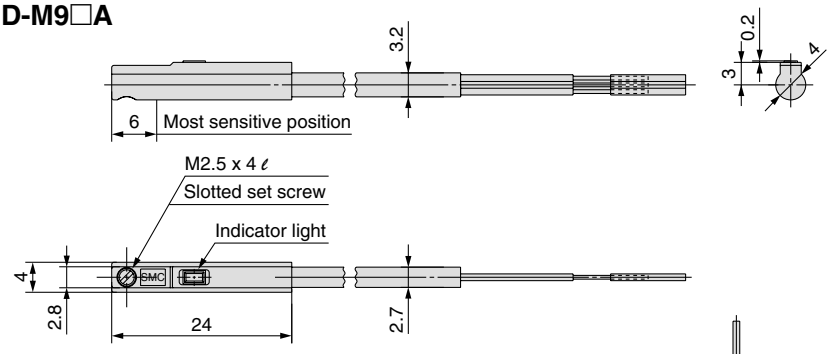
Unit: g

Auto switch model		D-M9NA(V)	D-M9PA(V)	D-M9BA(V)
Lead wire length (m)	0.5	8	8	7
	1	14	14	13
	3	41	41	38
	5	68	68	63

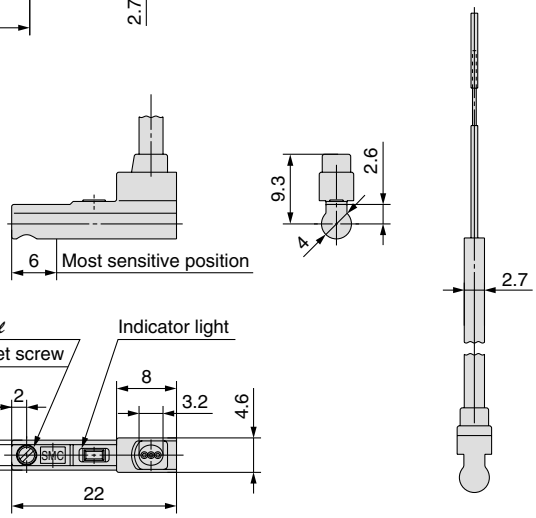
Dimensions

Unit: mm

D-M9□A



D-M9□AV



Reed Switch: Direct Mounting Style
D-A90(V)/D-A93(V)/D-A96(V)

For details about certified products conforming to international standards, visit us at www.smcworld.com.

Grommet

⚠Caution

Precautions

Fix the auto switch with the set screw attached to the auto switch body. The auto switch may be damaged if an unspecified screw is used.

Auto Switch Specifications

PLC: Programmable Logic Controller

D-A90(V) (Without indicator light)			
Auto switch model	D-A90/D-A90V		
Applicable load	IC circuit, Relay, PLC		
Load voltage	24 VAC/DC or less	48 VAC/DC or less	100 VAC/DC or less
Maximum load current	50 mA	40 mA	20 mA
Contact protection circuit	None		
Internal resistance	1 Ω or less (including lead wire length of 3 m)		
Standard	CE marking		

D-A93(V)/D-A96(V) (With indicator light)			
Auto switch model	D-A93/D-A93V		D-A96/D-A96V
Applicable load	Relay, PLC		IC circuit
Load voltage	24 VDC	100 VAC	4 to 8 VDC
Load current range and max. load current Note 3)	5 to 40 mA	5 to 20 mA	20 mA
Contact protection circuit	None		
Internal voltage drop	D-A93 — 2.4 V or less (to 20 mA)/3 V or less (to 40 mA) D-A93V — 2.7 V or less		0.8 V or less
Indicator light	Red LED illuminates when turned ON.		
Standard	CE marking		

● Lead wires
D-A90(V)/D-A93(V) — Oilproof heavy-duty vinyl cable: ø2.7, 0.18 mm² x 2 cores (Brown, Blue), 0.5 m
D-A96(V) — Oilproof heavy-duty vinyl cable: ø2.7, 0.15 mm² x 3 cores (Brown, Black, Blue), 0.5 m

Note 1) Refer to page 10 for reed switch common specifications.
Note 2) Refer to page 10 for lead wire lengths.
Note 3) Under 5 mA, the visuality of an indicator light is worsen. Furthermore, although it could be impossible to recognize it under 2.5 mA, but there would be no problem only with 1 mA or more in terms of the contact output.

Mass

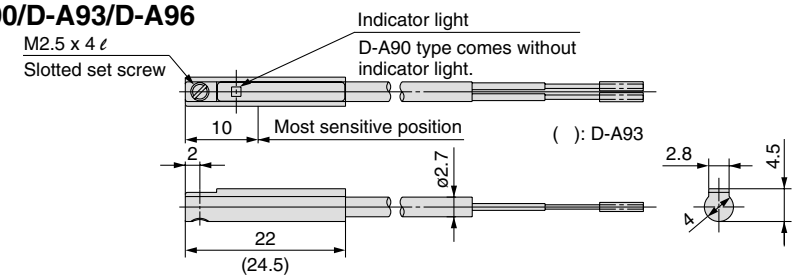
Unit: g

Model		D-A90	D-A90V	D-A93	D-A93V	D-A96	D-A96V
Lead wire length (m)	0.5	6	6	6	6	8	8
	3	30	30	30	30	41	41

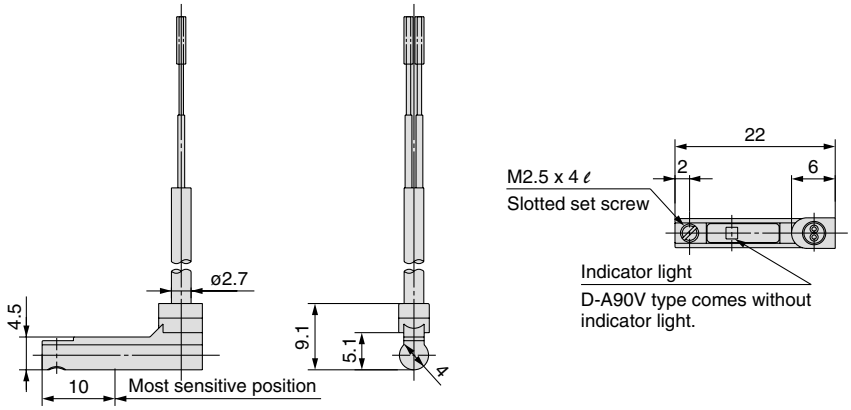
Dimensions

Unit: mm

D-A90/D-A93/D-A96

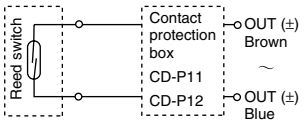


D-A90V/D-A93V/D-A96V

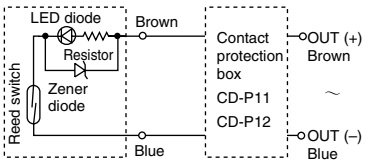


Auto Switch Internal Circuit

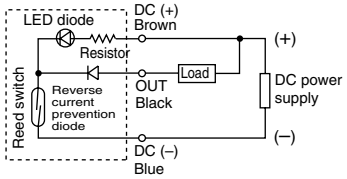
D-A90(V)



D-A93(V)



D-A96(V)



Note) ① In a case where the operation load is an inductive load.
② In a case where the wiring length is greater than 5 m.
③ In a case where the load voltage is 100 VAC.

Use a contact protection box for any of the above cases since the contact life may be shortened. (For details about the contact protection box, refer to page 11.)

Safety Instructions

These safety instructions are intended to prevent hazardous situations and/or equipment damage. These instructions indicate the level of potential hazard with the labels of **"Caution," "Warning"** or **"Danger."** They are all important notes for safety and must be followed in addition to International Standards (ISO/IEC), Japan Industrial Standards (JIS)*1) and other safety regulations*2).

* 1) ISO 4414: Pneumatic fluid power – General rules relating to systems.
ISO 4413: Hydraulic fluid power – General rules relating to systems.
IEC 60204-1: Safety of machinery – Electrical equipment of machines. (Part 1: General requirements)
ISO 10218-1992: Manipulating industrial robots -Safety.
JIS B 8370: General rules for pneumatic equipment.
JIS B 8361: General rules for hydraulic equipment.
JIS B 9960-1: Safety of machinery – Electrical equipment of machines. (Part 1: General requirements)
JIS B 8433-1993: Manipulating industrial robots - Safety.
etc.
* 2) Labour Safety and Sanitation Law, etc.

⚠ Caution: Operator error could result in injury or equipment damage.

⚠ Warning: Operator error could result in serious injury or loss of life.

⚠ Danger : In extreme conditions, there is a possibility of serious injury or loss of life.

⚠ Warning

1. The compatibility of the product is the responsibility of the person who designs the equipment or decides its specifications.

Since the product specified here is used under various operating conditions, its compatibility with specific equipment must be decided by the person who designs the equipment or decides its specifications based on necessary analysis and test results. The expected performance and safety assurance of the equipment will be the responsibility of the person who has determined its compatibility with the product. This person should also continuously review all specifications of the product referring to its latest catalogue information, with a view to giving due consideration to any possibility of equipment failure when configuring the equipment.

2. Only personnel with appropriate training should operate machinery and equipment.

The product specified here may become unsafe if handled incorrectly. The assembly, operation and maintenance of machines or equipment including our products must be performed by an operator who is appropriately trained and experienced.

3. Do not service or attempt to remove product and machinery/equipment until safety is confirmed.

1. The inspection and maintenance of machinery/equipment should only be performed after measures to prevent falling or runaway of the driven objects have been confirmed.
2. When the product is to be removed, confirm that the safety measures as mentioned above are implemented and the power from any appropriate source is cut, and read and understand the specific product precautions of all relevant products carefully.
3. Before machinery/equipment is restarted, take measures to prevent unexpected operation and malfunction.

4. Contact SMC beforehand and take special consideration of safety measures if the product is to be used in any of the following conditions.

1. Conditions and environments outside of the given specifications, or use outdoors or in a place exposed to direct sunlight.
2. Installation on equipment in conjunction with atomic energy, railways, air navigation, space, shipping, vehicles, military, medical treatment, combustion and recreation, or equipment in contact with food and beverages, emergency stop circuits, clutch and brake circuits in press applications, safety equipment or other applications unsuitable for the standard specifications described in the product catalogue.
3. An application which could have negative effects on people, property, or animals requiring special safety analysis.
4. Use in an interlock circuit, which requires the provision of double interlock for possible failure by using a mechanical protective function, and periodical checks to confirm proper operation.

Safety Instructions

⚠Caution

The product is provided for use in manufacturing industries.
The product herein described is basically provided for peaceful use in manufacturing industries.
If considering using the product in other industries, consult SMC beforehand and exchange specifications or a contract if necessary. If anything is unclear, contact your nearest sales branch.

Limited Warranty and Disclaimer/Compliance Requirements

The product used is subject to the following “Limited Warranty and Disclaimer” and “Compliance Requirements”. Read and accept them before using the product.

Limited Warranty and Disclaimer

1. **The warranty period of the product is 1 year in service or 1.5 years after the product is delivered.**＊**3)**
   Also, the product may have specified durability, running distance or replacement parts. Please consult your nearest sales branch.
2. **For any failure or damage reported within the warranty period which is clearly our responsibility, a replacement product or necessary parts will be provided.**
   This limited warranty applies only to our product independently, and not to any other damage incurred due to the failure of the product.
3. **Prior to using SMC products, please read and understand the warranty terms and disclaimers noted in the specified catalogue for the particular products.**

＊ **3) Vacuum pads are excluded from this 1 year warranty.**
A vacuum pad is a consumable part, so it is warranted for a year after it is delivered.
Also, even within the warranty period, the wear of a product due to the use of the vacuum pad or failure due to the deterioration of rubber material are not covered by the limited warranty.

Compliance Requirements

When the product is exported, strictly follow the laws required by the Ministry of Economy, Trade and Industry (Foreign Exchange and Foreign Trade Control Law).

Series CQU
Specific Product Precautions

Be sure to read this before handling.
Refer to back pages 1 and 2 for Safety Instructions, "Handling Precautions for SMC Products" (M-E03-3) for Actuators Precautions.

Precautions

⚠Caution

1. **All loads to piston rod must be applied in axial direction only.**
   - When a lateral load is applied unavoidably, ensure that it should not exceed the allowable lateral load to the rod end as specified on page 4.
   - When installing a cylinder, centring should be required accurately.
   - Adoption of guide mechanism is strongly recommended for the case when the CQU is used as stopper to prevent non-rotating piston rod from side loads.
2. **When a workpiece is secured to the end of the piston rod, ensure that the piston rod is retracted entirely, and place a wrench on the portion of the rod that protrudes beyond the section. Tighten it by giving consideration to prevent the tightening torque from being applied to the non-rotating guide.**
3. **Operating the cylinder by connecting the piping directly to the cylinder can cause the piston speed to exceed the maximum operating speed of 500 mm/s. Therefore, to operate the cylinder, make sure to use an SMC speed controller and adjust the piston speed to 500 mm/s or less.**

Retaining Ring Installation/Removal

⚠Caution

1. **For installation and removal, use an appropriate pair of pliers (tool for installing a C-type retaining ring).**
2. **Even if a proper plier (tool for installing a C-type retaining ring) is used, it is likely to inflict damage to a human body or peripheral equipment, as a retaining ring may be flown out of the tip of a plier (tool for installing a C-type retaining ring). Be much careful with the popping of a retaining ring. Besides, be certain that a retaining ring is placed firmly into the groove of rod cover before supplying air at the time of installment.**
3. **Do not reuse the retaining ring once it has been removed. (The retaining ring is included in the seal kit.)**

SMC Logo

⚠Caution

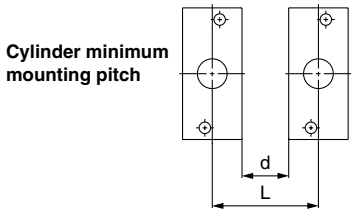
1. **The direction of the SMC logo on the end face of the head cover is not specified in relation to the port position.**

Handing of Auto Switches

Be sure to read this before handling.
Refer to "Handling Precautions for SMC Products" (M-E03-3) for Auto Switches Precautions.

⚠Warning

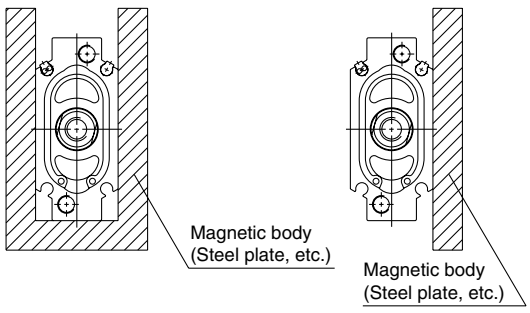
1. **If multiple cylinders are operated adjacent to each other, the magnets that are enclosed in the adjacent cylinders could affect the operation of the auto switches, causing the switches to malfunction. Therefore, make sure that the mounting pitch of the cylinders is at least that indicated in the table below.**



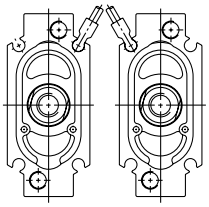
(mm)

Size	20	25	32	40
L	30	29	33	36
d	8	5	5	5

2. **If the cylinder is used in an application in which a magnetic material is placed in close contact around the cylinder as shown in the graph below (including cases in which even one of the sides is in close contact) the operation of auto switches could become unstable. Therefore, please check with SMC for this type of application.**



3. **When multiple cylinders are installed close together and an auto switch with perpendicular entry for lead wire is used, the auto switch will protrude from the end of the tube, so take care to avoid interference. (Refer to page 9.)**



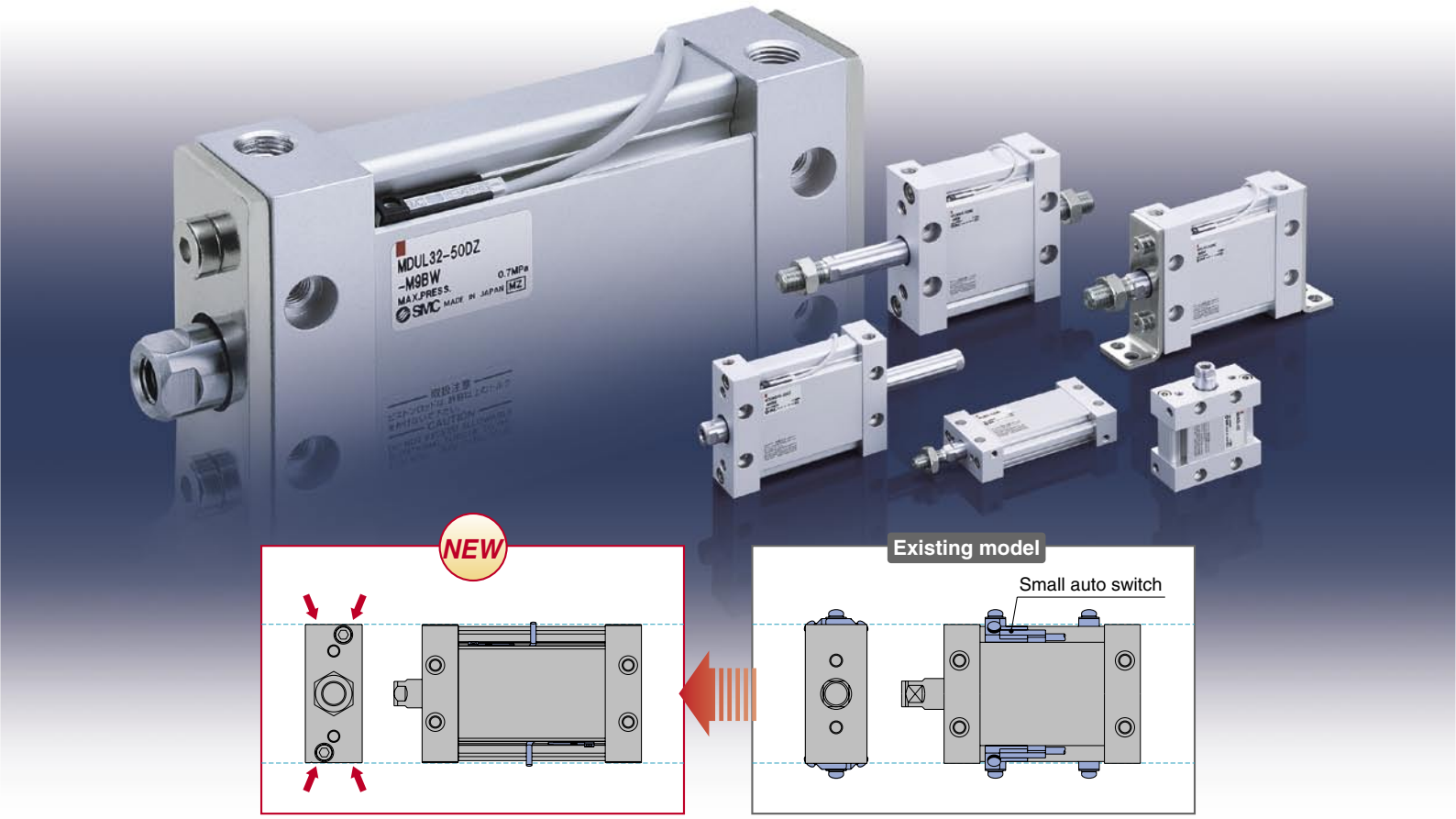
ALMOTION

Plate Cylinder

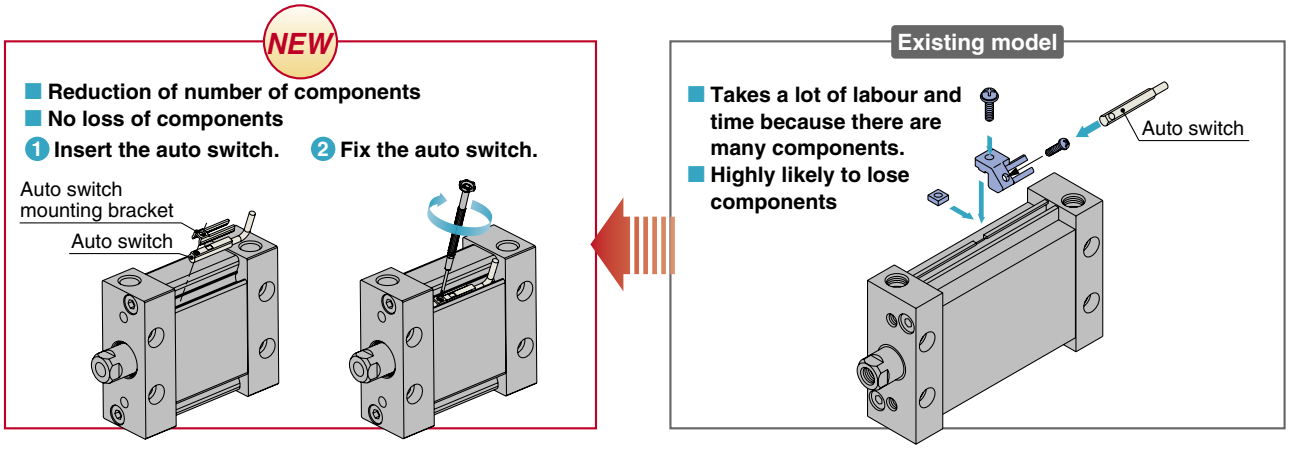
New

NEW **Series MU** ø25, ø32, ø40, ø50, ø63

It is possible to mount small auto switches in 4 directions. No stick-out Easy mounting



Reduction of labour for work



Available with a stroke up to 300 mm

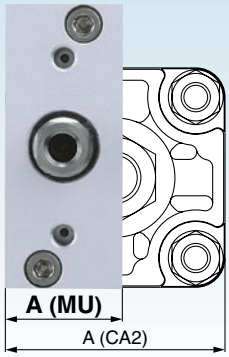
Series MU

SMC

CAT.EUS20-208A-UK

Series MU

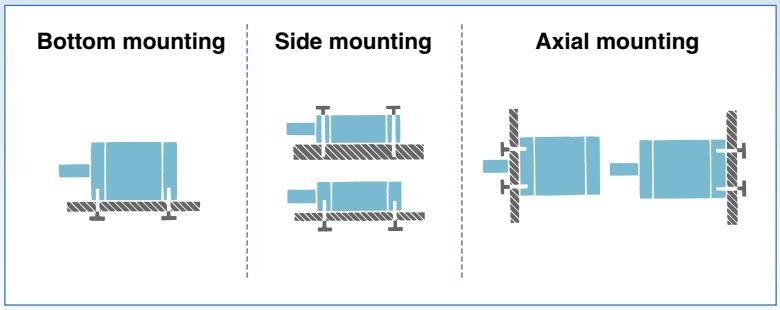
Width: Max. 62% reduction
(in comparison with SMC CA2 cylinder)



A Dimension Comparison (mm)

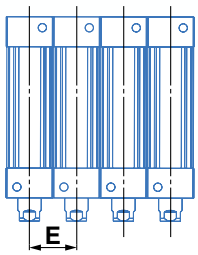
Size	A		
	MU	CA2	Reduction rate
25	**24**	60	**60**%
32	**28**	70	**60**%
40	**32**	85	**62**%
50	**39**	102	**62**%
63	**50**	116	**57**%

Can be mounted without brackets and in flexible ways.



Can be mounted with short pitch.

∗ Without auto switch

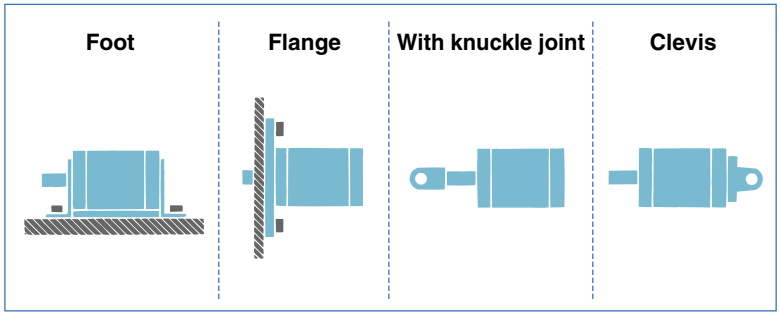


(mm)

Size	E
25	24
32	28
40	32
50	39
63	50

Note) When the auto switch is mounted, the minimum mounting pitch is restricted as shown in back page 3.

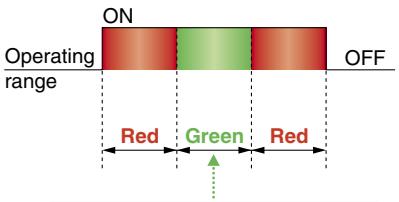
Various brackets are available to accommodate a wide range of applications.



2-Colour Indication Solid State Auto Switch

Appropriate setting of the mounting position can be performed without mistakes.

A **green** light lights up at the optimum operating position.



For general environments

Water resistant type
For environments exposed to water and coolant

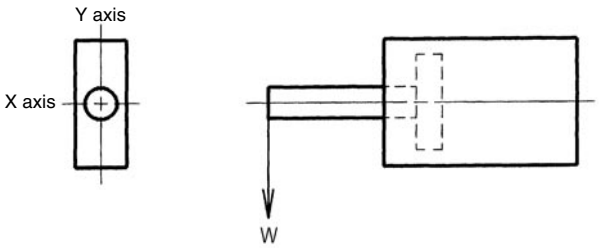
D-M9□W(V)

D-M9□A(V)

Series Variations

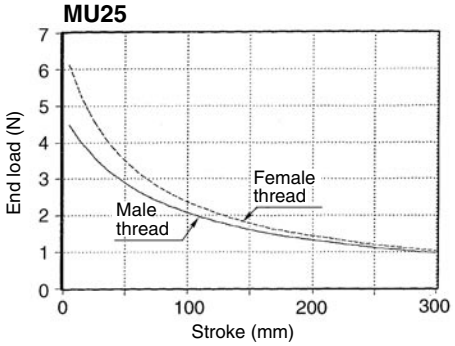
Action	Type	Size	Standard stroke (mm)	Rod end configuration
Double acting	Single rod	25, 32, 40, 50, 63	5, 10, 15, 20, 25, 30, 35, 40, 45, 50, 75, 100, 125, 150, 175, 200, 250, 300	Male thread, Female thread
	Double rod	25, 32, 40, 50, 63		
Single acting	Spring return, Spring extend	25, 32, 40, 50, 63		

Series MU
Rod End Allowable Load

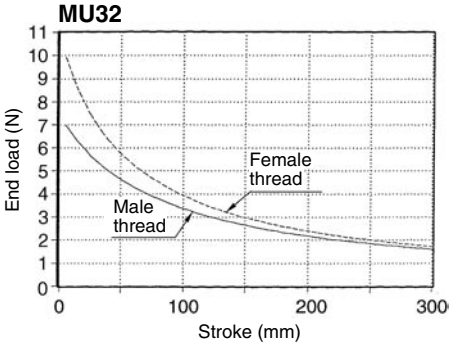


∗ In the case of a plate cylinder, although there is the possibility that a load is applied in both X and Y axis as illustrated, the allowable lateral load is the same.

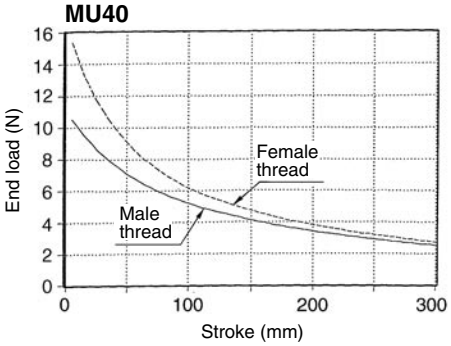
MU25



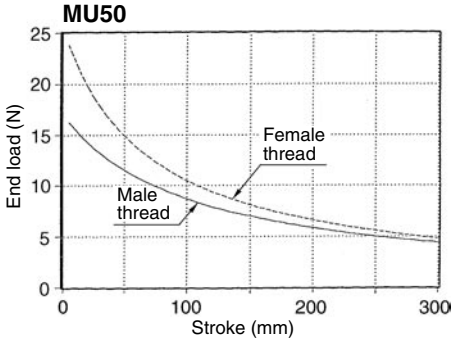
MU32



MU40



MU50



MU63

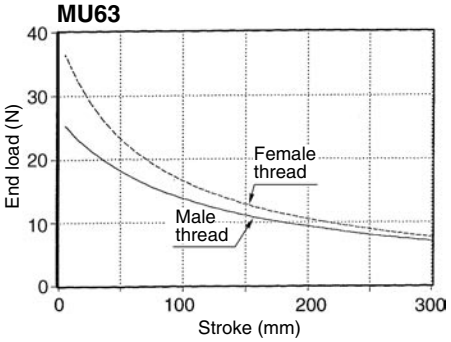


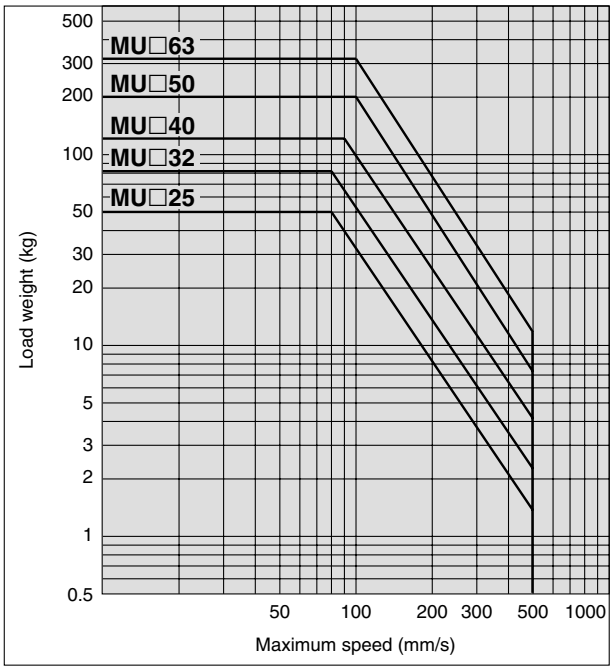
Plate Cylinder Operating Precautions

1. Operating speed

Make sure to connect a speed controller to the cylinder and adjust its speed to 500 mm/s or less.

When a load is applied to the rod end, adjust the speed so that the maximum speed should be no more than that shown in the chart for the corresponding load weight.

<Chart> Series MU



ALMOTION

Plate Cylinder: Double Acting, Single Rod

Series MU

ø25, ø32, ø40, ø50, ø63

How to Order

	MU	B	25		–	30	D	M	Z					
With auto switch	MDU	B	25		–	30	D	M	Z	–	M9BW	S		

With auto switch
(Built-in magnet)

Mounting

B	Basic
L	Foot
F	Rod flange
G	Head flange
C	Single clevis
D	Double clevis

∗Brackets are shipped together, (but not assembled).

Size

25	Equiv. ø25 piston area
32	Equiv. ø32 piston area
40	Equiv. ø40 piston area
50	Equiv. ø50 piston area
63	Equiv. ø63 piston area

Port thread type

—	M thread	ø25
	Rc	ø32, ø40 ø50, ø63
TN	NPT	
TF	G	

Cylinder stroke (mm)
Refer to "Standard Stroke" on page 2.

Action

D	Double acting

Rod end configuration

—	Rod end female thread
M	Rod end male thread

Auto switch

—	Without auto switch

∗ Refer to the below table for applicable auto switch models.

Number of auto switches

—	2 pcs.
S	1 pc.
n	"n" pcs.

Built-in Magnet Cylinder Model

If a built-in magnet cylinder without an auto switch is required, there is no need to enter the symbol for the auto switch.
(Example) MDUL32-30DZ

Applicable Auto Switches/Refer to Best Pneumatics No. 2 for further information on auto switches.

Type	Special function	Electrical entry	Indicator light	Wiring (Output)	Load voltage DC		Load voltage AC	Auto switch model Perpendicular	Auto switch model In-line	Lead wire length (m) 0.5 (—)	1 (M)	3 (L)	5 (Z)	Pre-wired connector	Applicable load	
Solid state auto switch	——	Grommet	Yes	3-wire (NPN)	24 V	5 V, 12 V	—	M9NV	M9N	●	●	●	○	○	IC circuit	Relay, PLC
				3-wire (PNP)				M9PV	M9P	●	●	●	○	○		
				2-wire		12 V		M9BV	M9B	●	●	●	○	○	—	
	Diagnostic indication (2-colour indication)			3-wire (NPN)		5 V, 12 V		M9NWV	M9NW	●	●	●	○	○	IC circuit	
				3-wire (PNP)				M9PWV	M9PW	●	●	●	○	○		
				2-wire		12 V		M9BWV	M9BW	●	●	●	○	○	—	
	Water resistant (2-colour indication)			3-wire (NPN)		5 V, 12 V		M9NAV**	M9NA**	○	○	●	○	○	IC circuit	
				3-wire (PNP)				M9PAV**	M9PA**	○	○	●	○	○		
				2-wire		12 V		M9BAV**	M9BA**	○	○	●	○	○	—	
	Magnetic field resistant (2-colour indication)			2-wire (Non-polar)		—		—	P3DW Note 2)	●	—	●	●	○		
Reed auto switch	——	Grommet	Yes	3-wire (NPN equivalent)	—	5 V	—	A96V	A96	●	—	●	—	—	IC circuit	—
				2-wire	24 V	12 V	100 V	A93V	A93	●	—	●	—	—	—	Relay, PLC
			None				100 V or less	A90V	A90	●	—	●	—	—	IC circuit	

∗ Lead wire length symbols: 0.5 m ····· — (Example) M9NW
1 m ····· M (Example) M9NWM
3 m ····· L (Example) M9NWL
5 m ····· Z (Example) M9NWZ

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

∗ For details about auto switches with pre-wired connector, refer to Best Pneumatics No. 2.
∗ Auto switches are shipped together, (but not assembled).
∗∗ The water resistant auto switch (D-M9□A/M9□AV) can be mounted, but the product itself is not designed to be water resistant.
Note 1) The D-M9□V/M9□WV/M9□AV/A9□V auto switches cannot be mounted on the ported surface with some cylinder strokes and sizes of fittings. This should be checked beforehand.
Note 2) The magnetic field resistant auto switch (D-P3DW□) is available only with ø40 to ø63 of the existing MU series. Refer to page 23 for the how-to-order.

Specifications

Bore size (mm)	25	32	40	50	63
Action	Double acting, Single rod				
Fluid	Air				
Proof pressure	1.05 MPa				
Maximum operating pressure	0.7 MPa				
Minimum operating pressure	0.05 MPa				
Ambient and fluid temperature	–10 to 60°C				
Lubrication	Not required (Non-lube)				
Piston speed	50 to 500 mm/s				
Stroke length tolerance	$^{+1.4}_{0}$				
Cushion	Rubber bumper				
Mounting	Foot, Rod flange, Head flange, Single clevis, Double clevis				
Rod end configuration	Rod end male thread, Rod end female thread				
Allowable rotational torque	0.25 N·m		0.55 N·m	1.25 N·m	2.0 N·m
Rod non-rotating accuracy	±1°	±0.8°	±0.5°		

Standard Stroke

(mm)

Size	Standard stroke (mm)	Maximum manufacturable stroke
25, 32, 40 50, 63	5, 10, 15, 20, 25, 30, 35, 40, 45, 50 75, 100, 125, 150, 175, 200, 250, 300	300

∗ Other intermediate strokes can be manufactured upon receipt of order. Please contact SMC.
∗∗ Strokes longer than 300 mm are not available.

Mounting Bracket/Part No.

Mounting bracket \ Size	25	32	40	50	63
Foot Note 1)	MU-L02	MU-L03	MU-L04	MU-L05	MU-L06
Flange	MU-F02	MU-F03	MU-F04	MU-F05	MU-F06
Single clevis	MU-C02	MU-C03	MU-C04	MU-C05	MU-C06
Double clevis Note 3)	MU-D02	MU-D03	MU-D04	MU-D05	MU-D06

Note 1) When ordering foot bracket, order 2 pieces per cylinder.
Note 2) Accessories for each mounting bracket are as follows.
Foot/Flange/Single clevis: Body mounting bolt
Double clevis: Clevis pin, Type C retaining ring for axis, Body mounting bolt
Note 3) Clevis pin and retaining ring are shipped together with double clevis.
Note 4) The tightening torque for body mounting bolts is shown in the below table.
Note 5) The application of a locking agent (Example: Loctite® 242) to body mounting bolts is recommended.

Recommended Tightening Torque for Mounting Bracket on Body

Bore size	Thread size	Tightening torque (N·m)
MU25	M5 x 0.8	4.9 to 5.9
MU32	M6 x 1	8.28 to 10.12
MU40	M8 x 1.25	19.8 to 24.2
MU50	M10 x 1.5	39.6 to 48.4
MU63	M12 x 1.75	68.4 to 83.6

Theoretical Output

(N)

Size	Rod size (mm)	Operating direction	Piston area (mm^2)	Operating pressure (MPa)					
				0.2	0.3	0.4	0.5	0.6	0.7
25	**12**	OUT	491	98	147	196	246	295	344
		IN	378	76	113	151	189	227	265
32	**14**	OUT	804	161	241	322	402	482	563
		IN	650	130	195	260	325	390	455
40	**16**	OUT	1257	251	377	503	629	754	880
		IN	1056	211	317	422	528	634	739
50	**20**	OUT	1963	393	589	785	982	1178	1374
		IN	1649	330	495	660	824	989	1154
63	**20**	OUT	3117	623	935	1247	1559	1870	2182
		IN	2803	561	841	1121	1402	1682	1962

Note) Theoretical output (N) = Pressure (MPa) x Piston area (mm^2)

Weight

(kg)

Size		**25**	**32**	**40**	**50**	**63**
Basic weight	Basic	0.17	0.27	0.39	0.75	1.16
	Foot	0.24	0.41	0.60	1.09	1.79
	Flange/Rod end, Head end	0.27	0.41	0.62	1.21	1.99
	Single clevis	0.23	0.39	0.61	1.15	1.84
	Double clevis (With pin)	0.24	0.43	0.65	1.22	1.92
Additional weight per each 50 mm of stroke		0.09	0.14	0.19	0.28	0.38
Mounting bracket weight	Single clevis (Double clevis pivot bracket)	0.06	0.12	0.22	0.40	0.68
	Double clevis (With pin) (Single clevis pivot bracket)	0.07	0.16	0.26	0.47	0.76
	Single knuckle joint	0.03	0.04	0.07	0.16	0.16
	Double knuckle joint (With pin)	0.05	0.09	0.14	0.29	0.29

Additional Weight

(g)

Bore size (mm)		**25**	**32**	**40**	**50**	**63**
Rod end male thread	Male thread	12	23	27	53	53
	Nut	8	10	17	32	32

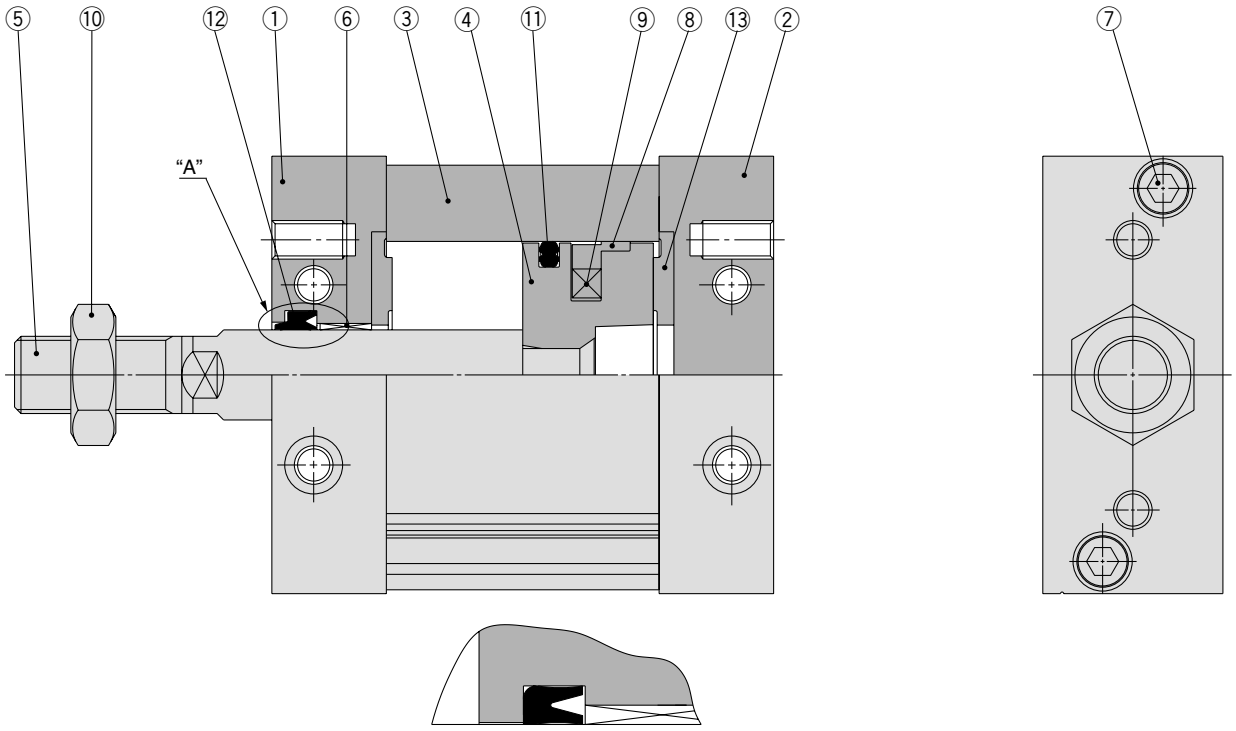
Note) Weight of single clevis and double clevis includes 2 bolts for mounting bracket.

Calculation:
(Example) **MUL32-100DZ**

- Basic weight ····· 0.41 (Foot, Equivalent to ø32)
- Additional weight ····· 0.14/50 stroke
- Stroke ····· 100 stroke

0.41 + 100/50 x 0.14 = 0.69 kg

Construction



“A” section **MU□25**

Component Parts

No.	Description	Material	Note
1	**Rod cover**	Aluminum alloy	Anodised
2	**Head cover**	Aluminum alloy	Anodised
3	**Cylinder tube**	Aluminum alloy	Hard anodised
4	**Piston**	Aluminum die-casted	Chromated
5	**Piston rod**	Carbon steel	Hard chrome plated
6	**Bushing**	Oil-impregnated sintered alloy	
7	**Hexagon socket head bolt**	Stainless steel	
8	**Wear ring**	Resin	
9	**Magnet**	—	Only built-in magnet type
10	**Rod end nut**	Rolled steel	Only attached to rod end male thread
11	**Piston seal**	NBR	
12	**Rod seal**	NBR	
13	**Bumper**	Urethane	

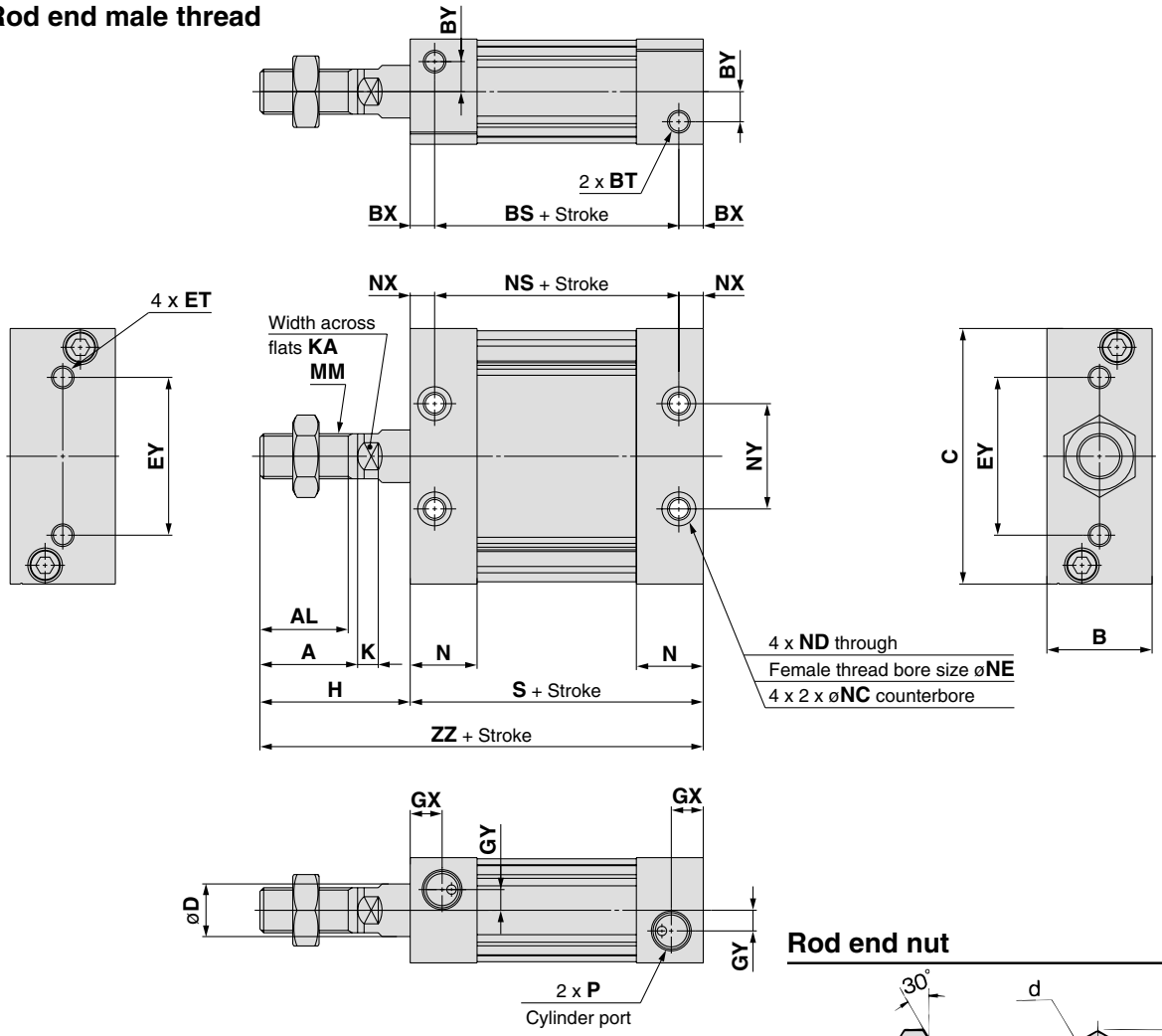
Replacement Parts/Seal Kit

Bore size (mm)	Kit no.	Contents
25	MUB25-PS	Set of nos. above ⑪, ⑫, ⑬
32	MUB32-PS	
40	MUB40-PS	
50	MUB50-PS	
63	MUB63-PS	

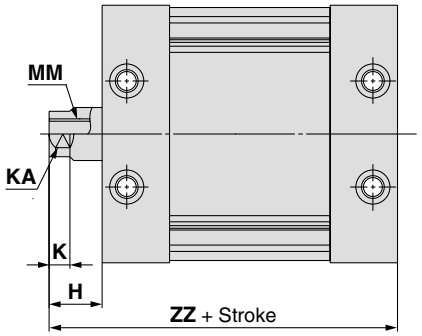
* Seal kit includes ⑪ to ⑬. Order the seal kit, based on each bore size.
* Since the seal kit does not include a grease pack, order it separately.
  Grease pack part no.: GR-S-010 (10 g)

Basic: MUB

Rod end male thread

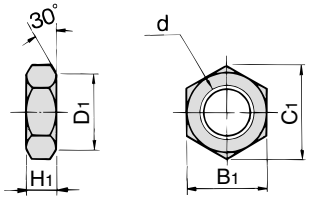


Rod end female thread



∗ Dimensions except mentioned on the right are the same as male thread type.
However, K and KA dimensions are the same as male thread type.

Rod end nut



(mm)

Part no.	Size	d	H_1	B_1	C_1	D_1
NT-03	25	M10 x 1.25	6	17	19.6	16.5
NT-MU03	32	M12 x 1.25	7	19	21.9	18
NT-04	40	M14 x 1.5	8	22	25.4	21
NT-05	50, 63	M18 x 1.5	11	27	31.2	26

∗ A nut is attached to the rod end male thread as standard.

Rod end nut material: Carbon steel
Surface treatment: Nickel plated

(mm)

Model	Stroke range (mm)	A	AL	B	BS	BT	BX	BY	C	D	ET	EY	GX	GY	H	K	KA
MUB25	5 to 300	22	19.5	24	37	M5 x 0.8 depth 7.5	9	7	54	12	M5 x 0.8 depth 11	26	10	5	36	5.5	10
MUB32	5 to 300	26	23.5	28	45	M6 x 1 depth 12	6.5	8	68	14	M6 x 1 depth 11	42	8.5	5.5	40	5.5	12
MUB40	5 to 300	30	27	32	44	M8 x 1.25 depth 13	8	9	86	16	M8 x 1.25 depth 11	54	9	7	45	6	14
MUB50	5 to 300	35	32	39	54	M10 x 1.5 depth 14.5	10	9	104	20	M10 x 1.5 depth 15	64	11.5	8	53	7	18
MUB63	5 to 300	35	32	50	53	M12 x 1.75 depth 18	11	12	124	20	M12 x 1.75 depth 15	72	11.5	10	56	7	18

(mm)

Model	MM	N	NC	ND	NE	NS	NX	NY	P			S	ZZ
									—	TN	TF		
MUB25	M10 x 1.25	16.5	7.5 depth 4.5	M5 x 0.8	4.3	43	6	26	M5 x 0.8	—	—	55	91
MUB32	M12 x 1.25	18	9 depth 5.5	M6 x 1	5.1	45	6.5	28	Rc1/8	NPT1/8	G1/8	58	98
MUB40	M14 x 1.5	18.5	10.5 depth 6.5	M8 x 1.25	6.9	44	8	36	Rc1/8	NPT1/8	G1/8	60	105
MUB50	M18 x 1.5	24	13.5 depth 8.5	M10 x 1.5	8.7	54	10	42	Rc1/4	NPT1/4	G1/4	74	127
MUB63	M18 x 1.5	24	17 depth 10.5	M12 x 1.75	10.5	53	11	46	Rc1/4	NPT1/4	G1/4	75	131

∗ The position of the 4 flats of the piston rod is ±3° in relation to the cylinder side surface.

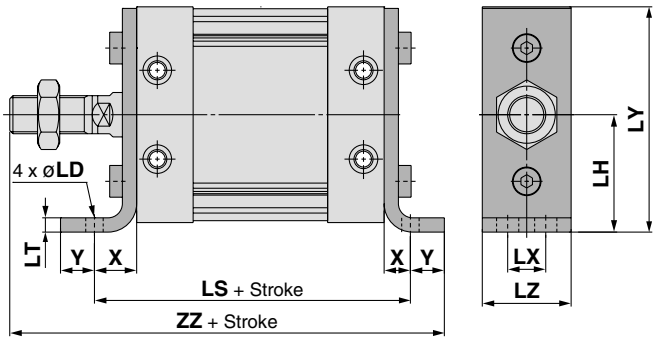
Rod End Female Thread

(mm)

Model	H	MM	ZZ
MUB25	14	M6 x 1 depth 12	69
MUB32	14	M8 x 1.25 depth 13	72
MUB40	15	M8 x 1.25 depth 13	75
MUB50	18	M10 x 1.5 depth 15	92
MUB63	21	M10 x 1.5 depth 15	96

Dimensions with Mounting Bracket

Foot

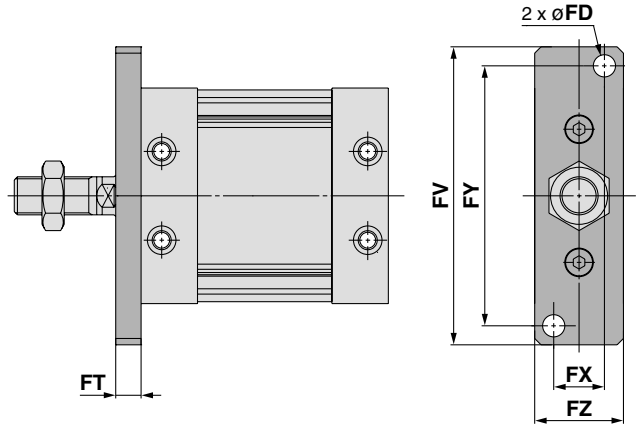


(mm)

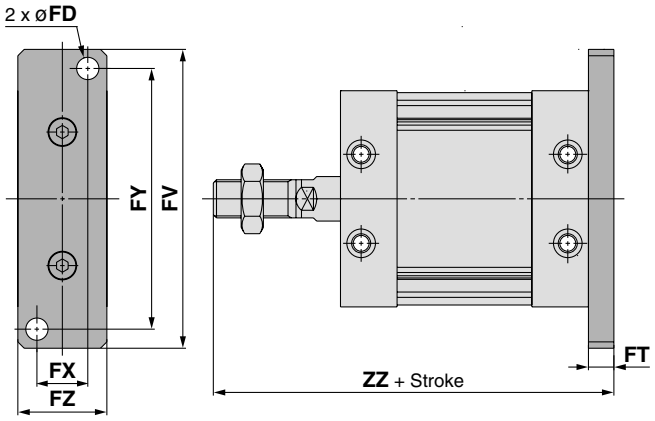
Model	LD	LH	LS	LT	LX	LY	LZ	X	Y	ZZ
MUL25	5.5	29	79	3.2	11	56	23	12	6	109
MUL32	6.6	37	90	4.5	12	71	27	16	8	122
MUL40	9	46	96	4.5	15	89	31	18	10	133
MUL50	11	57	116	5	18	109	37	21	11	159
MUL63	13.5	67	123	6	22	129	48	24	14	169

Foot bracket material: Rolled steel
Surface treatment: Nickel plated

Rod flange



Head flange

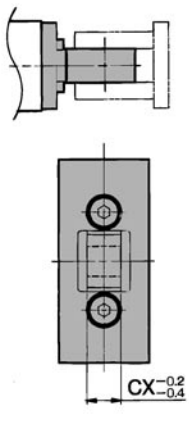


(mm)

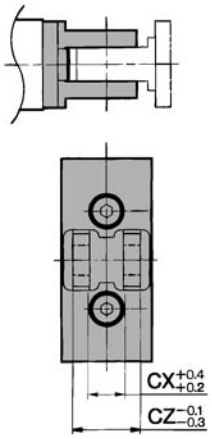
Model	FD	FT	FV	FX	FY	FZ	ZZ
MUF25, MUG25	5.5	8	76	14	66	24	99
MUF32, MUG32	7	8	94	16	82	28	106
MUF40, MUG40	9	9	118	18	102	32	114
MUF50, MUG50	11	12	144	22	126	39	139
MUF63, MUG63	13	14	168	30	148	50	145

Flange bracket material: Carbon steel
Surface treatment: Nickel plated

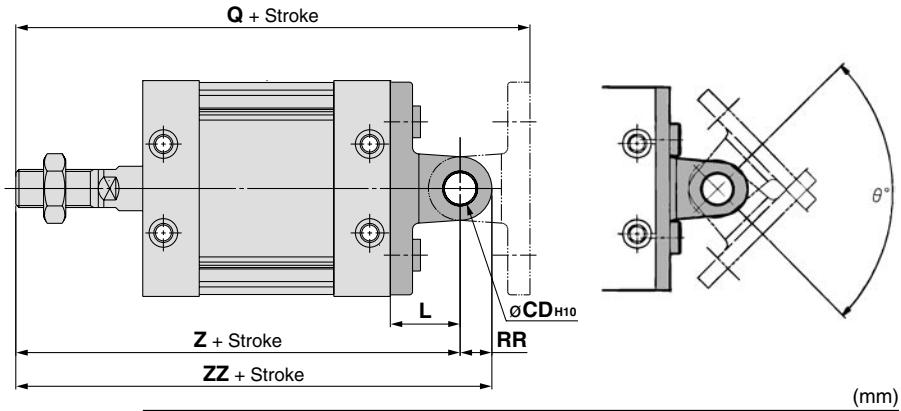
Single clevis



Double clevis



Single clevis
Double clevis



(mm)

Model	CDH10	CX	CZ	L	Q	RR	Z	ZZ	Rotation range (θ°)
MUC25, MUD25	$8^{+0.058}_{0}$	9	18	17	125	8	108	116	100
MUC32, MUD32	$10^{+0.058}_{0}$	11	22	22	142	10	120	130	90
MUC40, MUD40	$10^{+0.058}_{0}$	13	26	27	159	10	132	142	80
MUC50, MUD50	$14^{+0.070}_{0}$	16	32	32	191	14	159	173	80
MUC63, MUD63	$14^{+0.070}_{0}$	16	32	38	207	16	169	185	80

Clevis pin and retaining ring are shipped together with double clevis.

Single/Double clevis material: Cast iron
Surface treatment: Painted

ALMOTION

Plate Cylinder: Double Acting, Double Rod

Series MUW

ø25, ø32, ø40, ø50, ø63

How to Order

MUW B 25 – 30 D M Z

With auto switch: MDUW B 25 – 30 D M Z – M9BW S

With auto switch (Built-in magnet)

Double rod

Mounting

B	Basic
L	Foot
F	Rod flange

∗Brackets are shipped together, (but not assembled).

Size

25	Equiv. ø25 piston area
32	Equiv. ø32 piston area
40	Equiv. ø40 piston area
50	Equiv. ø50 piston area
63	Equiv. ø63 piston area

Port thread type

—	M thread	ø25
	Rc	ø32, ø40 ø50, ø63
TN	NPT	
TF	G	

Cylinder stroke (mm)
Refer to "Standard Stroke" on page 8.

Action

D	Double acting

Rod end configuration

—	Rod end female thread
M	Rod end male thread

Auto switch

—	Without auto switch

∗ Refer to the below table for applicable auto switch models.

Number of auto switches

—	2 pcs.
S	1 pc.
n	"n" pcs.

Built-in Magnet Cylinder Model

If a built-in magnet cylinder without an auto switch is required, there is no need to enter the symbol for the auto switch.
(Example) MDUWL32-30DZ

Applicable Auto Switches/Refer to Best Pneumatics No. 2 for further information on auto switches.

Type	Special function	Electrical entry	Indicator light	Wiring (Output)	Load voltage DC		Load voltage AC	Auto switch model: Perpendicular	Auto switch model: In-line	Lead wire length (m): 0.5 (—)	1 (M)	3 (L)	5 (Z)	Pre-wired connector	Applicable load	
Solid state auto switch	——	Grommet	Yes	3-wire (NPN)	24 V	5 V, 12 V	—	M9NV	M9N	●	●	●	○	○	IC circuit	Relay, PLC
				3-wire (PNP)				M9PV	M9P	●	●	●	○	○		
				2-wire		12 V		M9BV	M9B	●	●	●	○	○	—	
	Diagnostic indication (2-colour indication)			3-wire (NPN)		5 V, 12 V		M9NWV	M9NW	●	●	●	○	○	IC circuit	
				3-wire (PNP)				M9PWV	M9PW	●	●	●	○	○		
				2-wire		12 V		M9BWV	M9BW	●	●	●	○	○	—	
	Water resistant (2-colour indication)			3-wire (NPN)		5 V, 12 V		M9NAV**	M9NA**	○	○	●	○	○	IC circuit	
				3-wire (PNP)				M9PAV**	M9PA**	○	○	●	○	○		
				2-wire		12 V		M9BAV**	M9BA**	○	○	●	○	○	—	
	Magnetic field resistant (2-colour indication)			2-wire (Non-polar)		—		—	P3DW Note 2)	●	—	●	●	○		
Reed auto switch	——	Grommet	Yes	3-wire (NPN equivalent)	—	5 V	—	A96V	A96	●	—	●	—	—	IC circuit	—
			None	2-wire	24 V	12 V	100 V	A93V	A93	●	—	●	—	—	—	Relay, PLC
							100 V or less	A90V	A90	●	—	●	—	—	IC circuit	

∗ Lead wire length symbols: 0.5 m ····· — (Example) M9NW
1 m ····· M (Example) M9NWM
3 m ····· L (Example) M9NWL
5 m ····· Z (Example) M9NWZ

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

∗ For details about auto switches with pre-wired connector, refer to Best Pneumatics No. 2.
∗ Auto switches are shipped together, (but not assembled).
∗∗ The water resistant auto switch (D-M9□A/M9□AV) can be mounted, but the product itself is not designed to be water resistant.
Note 1) The D-M9□V/M9□WV/M9□AV/A9□V auto switches cannot be mounted on the ported surface with some cylinder strokes and sizes of fittings. This should be checked beforehand.
Note 2) The magnetic field resistant auto switch (D-P3DW□) is available only with ø40 to ø63 of the existing MU series. Refer to page 23 for the how-to-order.

SMC

Specifications

Bore size (mm)	25	32	40	50	63
Action	Double acting, Double rod				
Fluid	Air				
Proof pressure	1.05 MPa				
Maximum operating pressure	0.7 MPa				
Minimum operating pressure	0.05 MPa				
Ambient and fluid temperature	–10 to 60°C				
Lubrication	Not required (Non-lube)				
Piston speed	50 to 500 mm/s				
Stroke length tolerance	$^{+1.4}_{0}$				
Cushion	Rubber bumper				
Mounting	Foot, Rod flange				
Allowable rotational torque	0.25 N·m		0.55 N·m	1.25 N·m	2.0 N·m
Rod non-rotating accuracy	±1°	±0.8°	±0.5°		

Standard Stroke

(mm)

Size	Standard stroke (mm)	Maximum manufacturable stroke
25, 32, 40 50, 63	5, 10, 15, 20, 25, 30, 35, 40, 45, 50 75, 100, 125, 150, 175, 200, 250, 300	300

∗ Other intermediate strokes can be manufactured upon receipt of order. Please contact SMC.
∗∗ Strokes longer than 300 mm are not available.

Mounting Bracket/Part No.

Mounting bracket \ Size	25	32	40	50	63
Foot Note 1)	MU-L02	MU-L03	MU-L04	MU-L05	MU-L06
Rod flange	MU-F02	MU-F03	MU-F04	MU-F05	MU-F06

Note 1) When ordering foot bracket, order 2 pieces per cylinder.
Note 2) Body mounting bolts are attached to the foot and rod flange.
Note 3) The tightening torque for body mounting bolts is shown in the below table.
Note 4) The application of a locking agent (Example: Loctite® 242) to body mounting bolts is recommended.

Recommended Tightening Torque for Mounting Bracket on Body

Bore size	Thread size	Tightening torque (N·m)
MU25	M5 x 0.8	4.9 to 5.9
MU32	M6 x 1	8.28 to 10.12
MU40	M8 x 1.25	19.8 to 24.2
MU50	M10 x 1.5	39.6 to 48.4
MU63	M12 x 1.75	68.4 to 83.6

⚠ Warning

When removing or installing a workpiece using rod end threads, do so while securing the width across flats on the removing or installing side.
If applying a torque on the piston rod without securing the width across flats, connection threads inside are loosened, which may cause accidents or malfunctions.

Theoretical Output

(N)

Size	Rod size (mm)	Operating direction	Piston area (mm^2)	Operating pressure (MPa)					
				0.2	0.3	0.4	0.5	0.6	0.7
25	**12**	IN/OUT	378	76	113	151	189	227	265
32	**14**	IN/OUT	650	130	195	260	325	390	455
40	**16**	IN/OUT	1056	211	317	422	528	634	739
50	**20**	IN/OUT	1649	330	495	660	824	989	1154
63	**20**	IN/OUT	2803	561	841	1121	1402	1682	1962

Note) Theoretical output (N) = Pressure (MPa) x Piston area (mm^2)

Weight

(kg)

Size		25	32	40	50	63
Basic weight	Basic	0.18	0.31	0.46	0.87	1.34
	Foot	0.25	0.45	0.67	1.21	1.97
	Rod flange	0.28	0.45	0.69	1.33	2.17
Additional weight per each 50 mm of stroke		0.15	0.22	0.29	0.44	0.55
Mounting bracket weight	Single knuckle joint	0.03	0.04	0.07	0.16	0.16
	Double knuckle joint (With pin)	0.05	0.09	0.14	0.29	0.29

Additional Weight

(g)

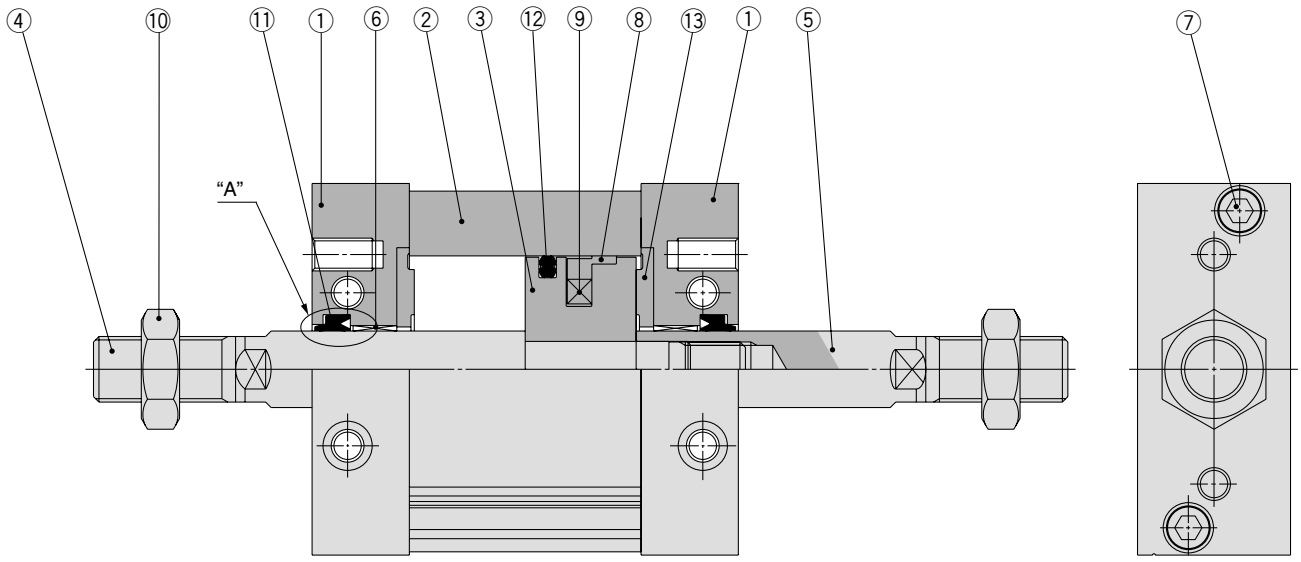
Bore size (mm)		25	32	40	50	63
Rod end male thread	Male thread	24	46	54	106	106
	Nut	16	20	34	64	64

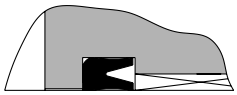
Calculation:
(Example) **MUWL32-100DZ**

- Basic weight ····· 0.45 (Foot, Equivalent to ø32)
- Additional weight ····· 0.22/50 stroke
- Stroke ····· 100 stroke

0.45 + 100/50 x 0.22 = 0.89 kg

Construction





"A" section **MU□25**

Component Parts

No.	Description	Material	Note
1	**Rod cover**	Aluminum alloy	Anodised
2	**Cylinder tube**	Aluminum alloy	Hard anodised
3	**Piston**	Aluminum alloy	Chromated
4	**Piston rod A**	Carbon steel	Hard chrome plated
5	**Piston rod B**	Carbon steel	Hard chrome plated
6	**Bushing**	Oil-impregnated sintered alloy	
7	**Hexagon socket head bolt**	Stainless steel	
8	**Wear ring**	Resin	
9	**Magnet**	—	Only built-in magnet type
10	**Rod end nut**	Rolled steel	Only attached to rod end male thread
11	**Rod seal**	NBR	
12	**Piston seal**	NBR	
13	**Bumper**	NBR	

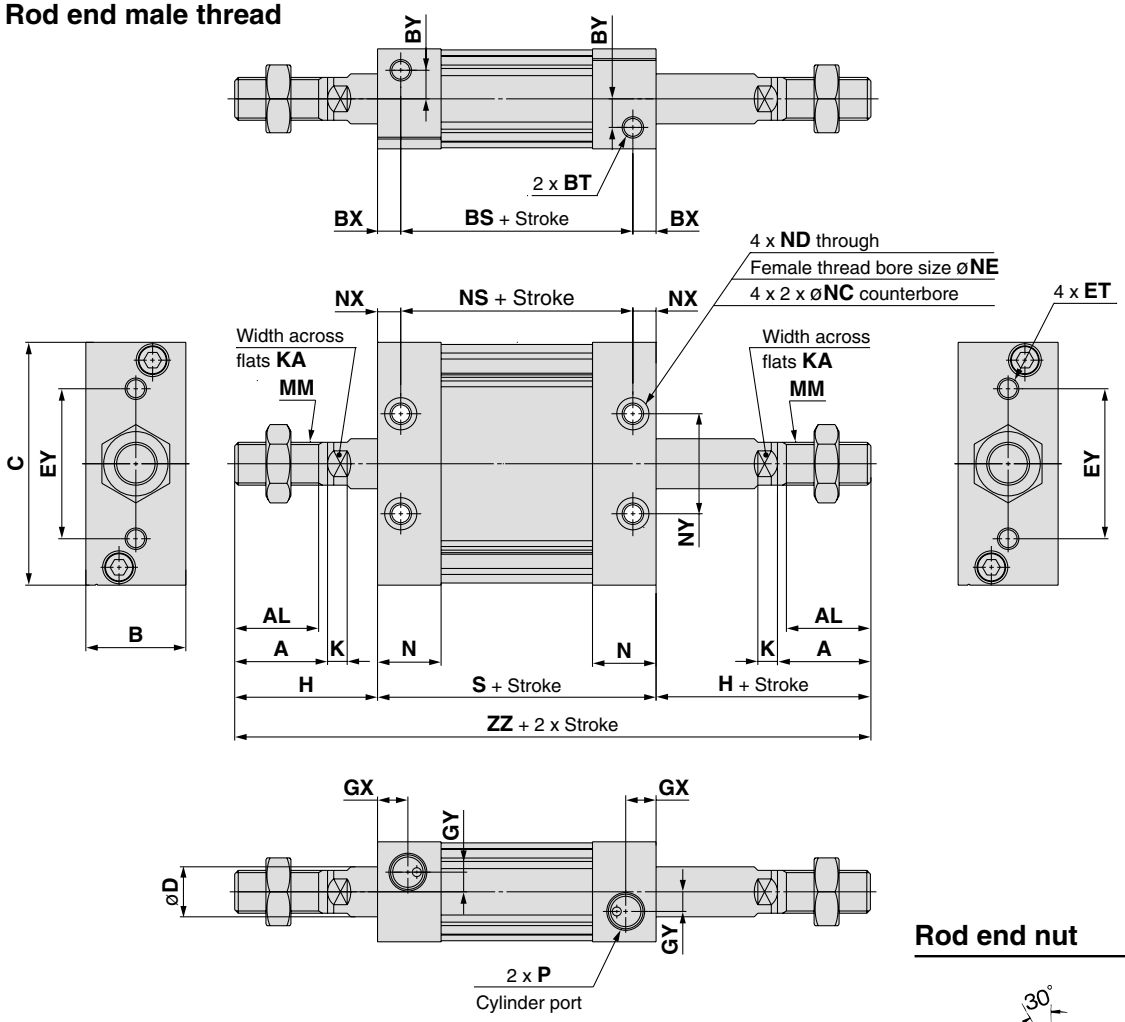
Replacement Parts/Seal Kit

Bore size (mm)	Kit no.	Contents
25	MUW25-PS	Set of nos. above ⑪, ⑫, ⑬
32	MUW32-PS	
40	MUW40-PS	
50	MUW50-PS	
63	MUW63-PS	

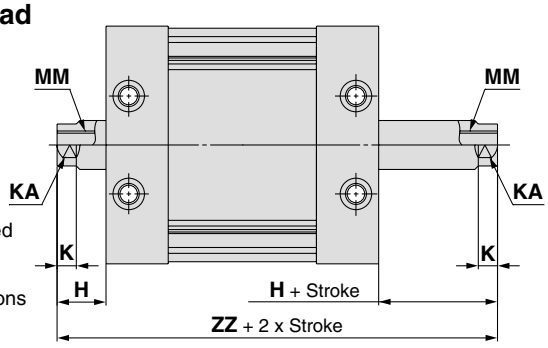
∗ Seal kit includes ⑪ to ⑬. Order the seal kit, based on each bore size.
∗ Since the seal kit does not include a grease pack, order it separately.
Grease pack part no.: GR-S-010 (10 g)

Basic: MUWB

Rod end male thread

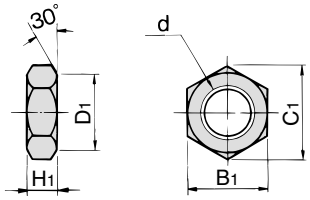


Rod end female thread



∗ Dimensions except mentioned on the right are the same as male thread type. However, K and KA dimensions are the same as male thread type.

Rod end nut



(mm)

Part no.	Size	d	H_1	B_1	C_1	D_1
NT-03	25	M10 x 1.25	6	17	19.6	16.5
NT-MU03	32	M12 x 1.25	7	19	21.9	18
NT-04	40	M14 x 1.5	8	22	25.4	21
NT-05	50, 63	M18 x 1.5	11	27	31.2	26

∗ A nut is attached to the rod end male thread as standard. (2 pieces for double rod type)

Rod end nut material: Carbon steel
Surface treatment: Nickel plated

(mm)

Model	Stroke range (mm)	A	AL	B	BS	BT	BX	BY	C	D	ET	EY	GX	GY	H	K	KA
MUWB25	5 to 300	22	19.5	24	37	M5 x 0.8 depth 7.5	9	7	54	12	M5 x 0.8 depth 11	26	10	5	36	5.5	10
MUWB32	5 to 300	26	23.5	28	45	M6 x 1 depth 12	6.5	8	68	14	M6 x 1 depth 11	42	8.5	5.5	40	5.5	12
MUWB40	5 to 300	30	27	32	44	M8 x 1.25 depth 13	8	9	86	16	M8 x 1.25 depth 11	54	9	7	45	6	14
MUWB50	5 to 300	35	32	39	54	M10 x 1.5 depth 14.5	10	9	104	20	M10 x 1.5 depth 15	64	11.5	8	53	7	18
MUWB63	5 to 300	35	32	50	53	M12 x 1.75 depth 18	11	12	124	20	M12 x 1.75 depth 15	72	11.5	10	56	7	18

(mm)

Model	MM	N	NC	ND	NE	NS	NX	NY	P			S	ZZ
									—	TN	TF		
MUWB25	M10 x 1.25	16.5	7.5 depth 4.5	M5 x 0.8	4.3	43	6	26	M5 x 0.8	—	—	55	127
MUWB32	M12 x 1.25	18	9 depth 5.5	M6 x 1	5.1	45	6.5	28	Rc1/8	NPT1/8	G1/8	58	138
MUWB40	M14 x 1.5	18.5	10.5 depth 6.5	M8 x 1.25	6.9	44	8	36	Rc1/8	NPT1/8	G1/8	60	150
MUWB50	M18 x 1.5	24	13.5 depth 8.5	M10 x 1.5	8.7	54	10	42	Rc1/4	NPT1/4	G1/4	74	180
MUWB63	M18 x 1.5	24	17 depth 10.5	M12 x 1.75	10.5	53	11	46	Rc1/4	NPT1/4	G1/4	75	187

Rod End Female Thread

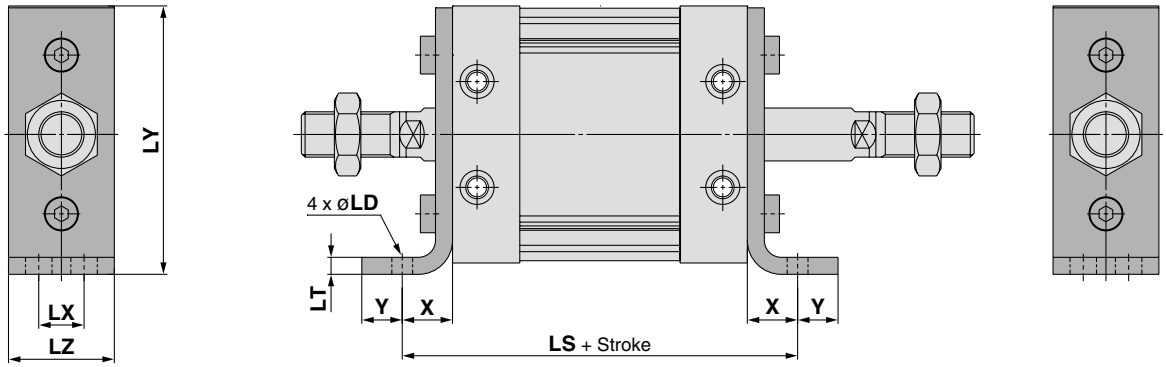
(mm)

Model	H	MM	ZZ
MUWB25	14	M6 x 1 depth 12	83
MUWB32	14	M8 x 1.25 depth 13	86
MUWB40	15	M8 x 1.25 depth 13	90
MUWB50	18	M10 x 1.5 depth 15	110
MUWB63	21	M10 x 1.5 depth 15	117

∗ The position of the 4 flats of the piston rod is different from the above drawing. Position of the 4 flats of the piston rod for double rod type is not the same.

Dimensions with Mounting Bracket

Foot

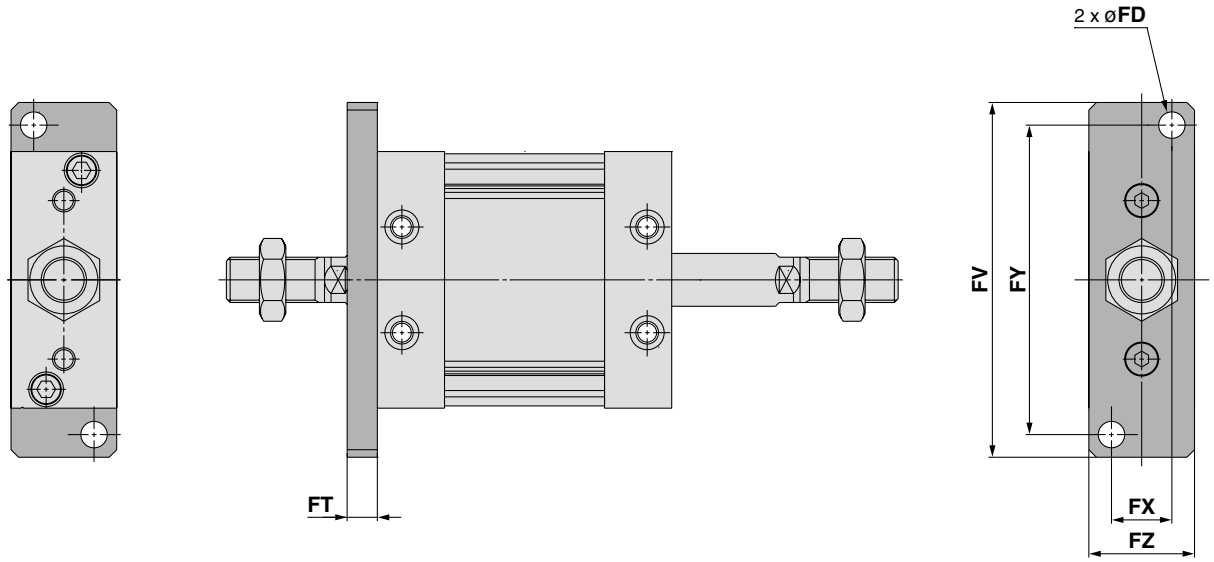


(mm)

Model	LD	LH	LS	LT	LX	LY	LZ	X	Y
MUWL25	5.5	29	79	3.2	11	56	23	12	6
MUWL32	6.6	37	90	4.5	12	71	27	16	8
MUWL40	9	46	96	4.5	15	89	31	18	10
MUWL50	11	57	116	5	18	109	37	21	11
MUWL63	13.5	67	123	6	22	129	48	24	14

Foot bracket material: Rolled steel
Surface treatment: Nickel plated

Rod flange



(mm)

Model	FD	FT	FV	FX	FY	FZ
MUWF25	5.5	8	76	14	66	24
MUWF32	7	8	94	16	82	28
MUWF40	9	9	118	18	102	32
MUWF50	11	12	144	22	126	39
MUWF63	13	14	168	30	148	50

Rod flange bracket material: Carbon steel
Surface treatment: Nickel plated

ALMOTION

Plate Cylinder: Single Acting, Spring Return/Extend

Series MU

ø25, ø32, ø40, ø50, ø63

How to Order

MU B 25 □ – 10 S M Z

With auto switch: MDU B 25 □ – 10 S M Z – M9BW S

With auto switch (Built-in magnet)

Mounting

B	Basic
L	Foot
F	Rod flange
G	Head flange
C	Single clevis
D	Double clevis

∗Brackets are shipped together, (but not assembled).

Size

25	Equiv. ø25 piston area
32	Equiv. ø32 piston area
40	Equiv. ø40 piston area
50	Equiv. ø50 piston area
63	Equiv. ø63 piston area

Port thread type

—	M thread	ø25
	Rc	ø32, ø40 ø50, ø63
TN	NPT	
TF	G	

Cylinder standard stroke (mm)

ø25, ø32	5, 10
ø40, ø50, ø63	5, 10, 15, 20

Action

S	Single acting, Spring return
T	Single acting, Spring extend

Rod end configuration

—	Rod end female thread
M	Rod end male thread

Auto switch

—	Without auto switch

∗ Refer to the below table for applicable auto switch models.

Number of auto switches

—	2 pcs.
S	1 pc.
n	"n" pcs.

Built-in Magnet Cylinder Model

If a built-in magnet cylinder without an auto switch is required, there is no need to enter the symbol for the auto switch.
(Example) MDUL32-10TZ

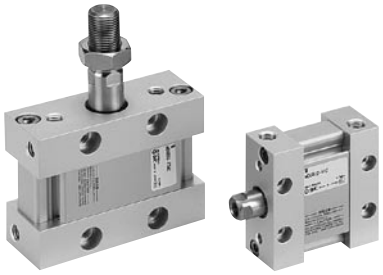
Applicable Auto Switches/Refer to Best Pneumatics No. 2 for further information on auto switches.

Type	Special function	Electrical entry	Indicator light	Wiring (Output)	Load voltage DC		Load voltage AC	Auto switch model: Perpendicular	Auto switch model: In-line	Lead wire length (m): 0.5 (—)	1 (M)	3 (L)	5 (Z)	Pre-wired connector	Applicable load	
Solid state auto switch	——	Grommet	Yes	3-wire (NPN)	24 V	5 V, 12 V	—	M9NV	M9N	●	●	●	○	○	IC circuit	Relay, PLC
				3-wire (PNP)				M9PV	M9P	●	●	●	○	○		
				2-wire		12 V		M9BV	M9B	●	●	●	○	○	—	
	Diagnostic indication (2-colour indication)			3-wire (NPN)		5 V, 12 V		M9NWV	M9NW	●	●	●	○	○	IC circuit	
				3-wire (PNP)				M9PWV	M9PW	●	●	●	○	○		
				2-wire		12 V		M9BWV	M9BW	●	●	●	○	○	—	
	Water resistant (2-colour indication)			3-wire (NPN)		5 V, 12 V		M9NAV**	M9NA**	○	○	●	○	○	IC circuit	
				3-wire (PNP)				M9PAV**	M9PA**	○	○	●	○	○		
				2-wire		12 V		M9BAV**	M9BA**	○	○	●	○	○	—	
	Magnetic field resistant (2-colour indication)			2-wire (Non-polar)		—		—	P3DW Note 2)	●	—	●	●	○		
Reed auto switch	——	Grommet	Yes	3-wire (NPN equivalent)	—	5 V	—	A96V	A96	●	—	●	—	—	IC circuit	—
			None	2-wire	24 V	12 V	100 V	A93V	A93	●	—	●	—	—	—	Relay, PLC
							100 V or less	A90V	A90	●	—	●	—	—	IC circuit	

∗ Lead wire length symbols: 0.5 m ····· — (Example) M9NW
1 m ····· M (Example) M9NWM
3 m ····· L (Example) M9NWL
5 m ····· Z (Example) M9NWZ

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

∗ For details about auto switches with pre-wired connector, refer to Best Pneumatics No. 2.
∗ Auto switches are shipped together, (but not assembled).
∗∗ The water resistant auto switch (D-M9□A/M9□AV) can be mounted, but the product itself is not designed to be water resistant.
Note 1) The D-M9□V/M9□WV/M9□AV/A9□V auto switches cannot be mounted on the ported surface with some cylinder strokes and sizes of fittings. This should be checked beforehand.
Note 2) The magnetic field resistant auto switch (D-P3DW□) is available only with ø40 to ø63 of the existing MU series. Refer to page 23 for the how-to-order.



Specifications

Bore size (mm)	25	32	40	50	63
Action	Single acting, Spring return/Spring extend				
Fluid	Air				
Proof pressure	1.05 MPa				
Maximum operating pressure	0.7 MPa				
Minimum operating pressure	0.18 MPa				
Ambient and fluid temperature	–10 to 60°C				
Lubrication	Not required (Non-lube)				
Piston speed	50 to 500 mm/s				
Stroke length tolerance	$^{+1.4}_{0}$				
Cushion	Rubber bumper				
Mounting	Foot, Rod flange, Head flange, Single clevis, Double clevis				
Allowable rotational torque	0.25 N·m		0.55 N·m	1.25 N·m	2.0 N·m
Rod non-rotating accuracy	±1°	±0.8°	±0.5°		

Standard Stroke

(mm)

Action	Size				
	25	**32**	**40**	**50**	**63**
Spring return/Spring extend	5, 10		5, 10, 15, 20		

∗ For strokes other than above, please contact SMC.

Mounting Bracket/Part No.

Mounting bracket \ Size	25	32	40	50	63
Foot Note 1)	MU-L02	MU-L03	MU-L04	MU-L05	MU-L06
Flange	MU-F02	MU-F03	MU-F04	MU-F05	MU-F06
Single clevis	MU-C02	MU-C03	MU-C04	MU-C05	MU-C06
Double clevis Note 3)	MU-D02	MU-D03	MU-D04	MU-D05	MU-D06

Note 1) When ordering foot bracket, order 2 pieces per cylinder.
Note 2) Accessories for each mounting bracket are as follows.
Foot/Flange/Single clevis: Body mounting bolt
Double clevis: Clevis pin, Type C retaining ring for axis, Body mounting bolt
Note 3) Clevis pin and retaining ring are shipped together with double clevis.
Note 4) The tightening torque for body mounting bolts is shown in the below table.
Note 5) The application of a locking agent (Example: Loctite® 242) to body mounting bolts is recommended.

Recommended Tightening Torque for Mounting Bracket on Body

Bore size	Thread size	Tightening torque (N·m)
MU25	M5 x 0.8	4.9 to 5.9
MU32	M6 x 1	8.28 to 10.12
MU40	M8 x 1.25	19.8 to 24.2
MU50	M10 x 1.5	39.6 to 48.4
MU63	M12 x 1.75	68.4 to 83.6

Theoretical Output

(N)

Action	Size	Rod size (mm)	Operating direction	Piston area (mm^2)	Operating pressure (MPa)						Spring reaction force	
					0.2	0.3	0.4	0.5	0.6	0.7	Secondary	Primary
Spring return	**25**	**12**	OUT	491	68	117	166	216	265	314	30	15
	32	**14**	OUT	804	119	199	280	360	440	521	42	24
	40	**16**	OUT	1257	195	321	447	573	698	824	56	30
	50	**20**	OUT	1963	346	542	738	935	1131	1327	76	47
	63	**20**	OUT	3117	510	822	1134	1446	1757	2069	113	61
Spring extend	**25**	**12**	IN	378	46	83	121	159	197	235	30	15
	32	**14**	IN	650	88	153	218	283	348	413	42	24
	40	**16**	IN	1056	155	261	366	472	578	683	56	30
	50	**20**	IN	1649	283	448	613	777	942	1107	76	47
	63	**20**	IN	2803	448	728	1008	1289	1569	1849	113	61

Note) Theoretical output (N) = Pressure (MPa) x Piston area (mm^2)

Weight

(kg)

Size		**25**	**32**	**40**	**50**	**63**
Basic weight	5 stroke	0.21	0.26	0.55	1.02	1.51
	10 stroke	0.22	0.34	0.58	1.05	1.56
	15 stroke	—	—	0.60	1.08	1.60
	20 stroke	—	—	0.62	1.12	1.65
Mounting bracket weight	Foot	0.07	0.14	0.21	0.34	0.63
	Flange/Rod end, Head end	0.10	0.14	0.23	0.46	0.83
	Single clevis	0.06	0.12	0.22	0.40	0.68
	Double clevis (With pin)	0.07	0.16	0.26	0.47	0.76
Accessory bracket weight	Single clevis (Double clevis pivot bracket)	0.06	0.12	0.22	0.40	0.68
	Double clevis (With pin) (Single clevis pivot bracket)	0.07	0.16	0.26	0.47	0.76
	Single knuckle joint	0.03	0.04	0.07	0.16	0.16
	Double knuckle joint (With pin)	0.05	0.09	0.14	0.29	0.29

Additional Weight

(g)

Bore size (mm)		**25**	**32**	**40**	**50**	**63**
Rod end male thread	Male thread	12	23	27	53	53
	Nut	8	10	17	32	32

Note) Weight of single clevis and double clevis includes 2 bolts for mounting bracket.

Calculation:

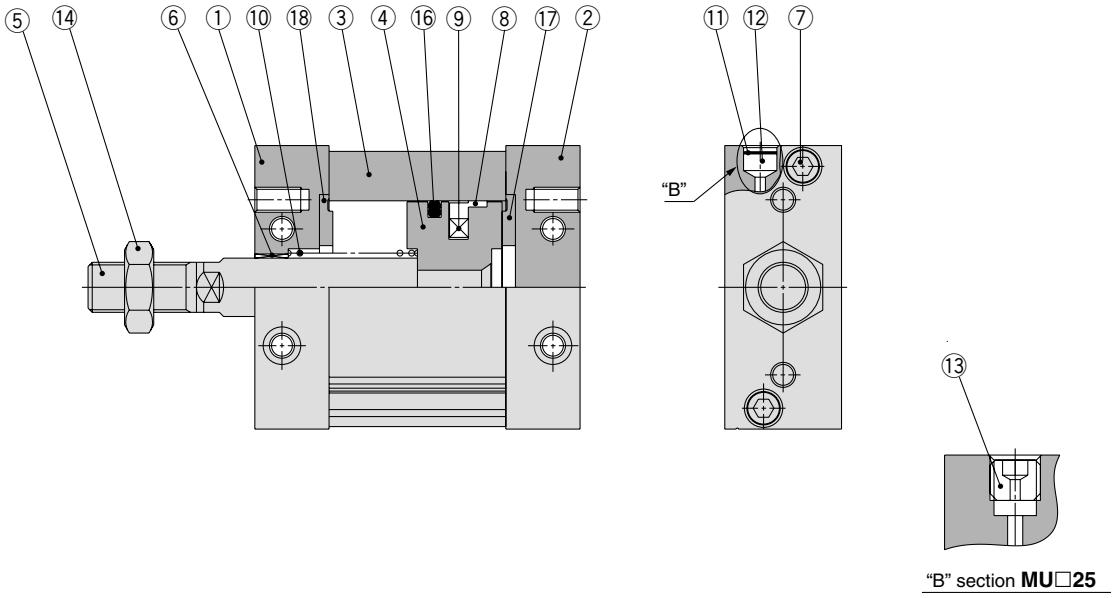
(Example 1) **MUB40-15S(T)Z**
- Basic weight ····· 0.60 kg

(Example 2) **MUC50-5S(T)Z**
- Basic weight ····· 1.02
- Mounting bracket weight ····· 0.40

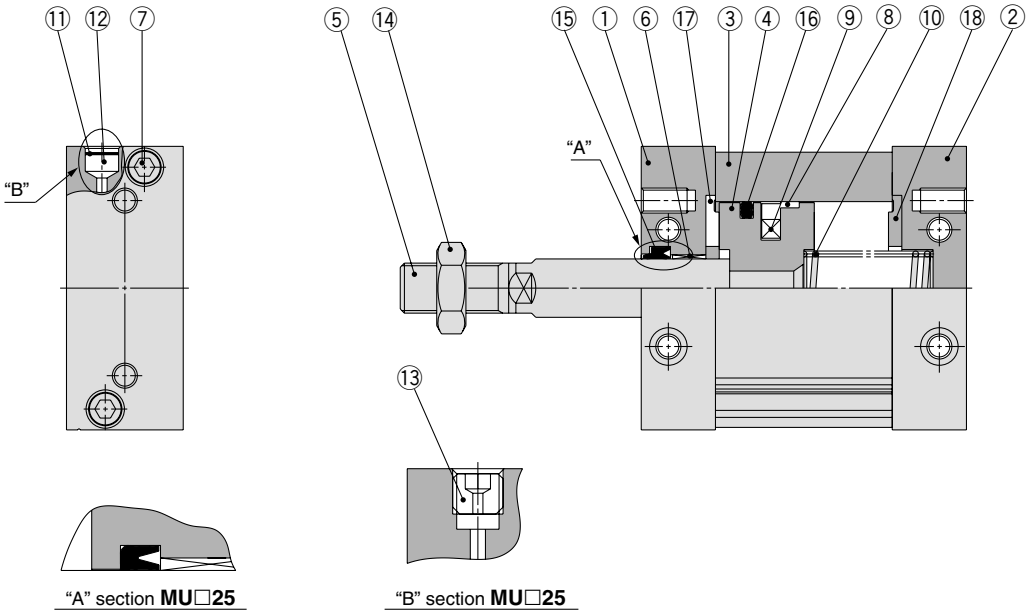
1.02 + 0.40 = 1.42 kg

Construction

Spring return



Spring extend



Component Parts

No.	Description	Material	Note
1	**Rod cover**	Aluminum alloy	Anodised
2	**Head cover**	Aluminum alloy	Anodised
3	**Cylinder tube**	Aluminum alloy	Hard anodised
4	**Piston**	Aluminum alloy	Chromated
5	**Piston rod**	Carbon steel	Hard chrome plated
6	**Bushing**	Oil-impregnated sintered alloy	
7	**Hexagon socket head bolt**	Stainless steel	
8	**Wear ring**	Resin	
9	**Magnet**	—	Only built-in magnet type
10	**Return spring**	Steel wire	Zinc chromated
11	**Element**	Bronze	
12	**Retaining ring**	Spring steel	
13	**Plug**	Chromium molybdenum steel	
14	**Rod end nut**	Rolled steel	Only attached to rod end male thread
15	**Rod seal**	NBR	
16	**Piston seal**	NBR	
17	**Bumper**	Urethane	
18	**Bumper B**	Urethane	

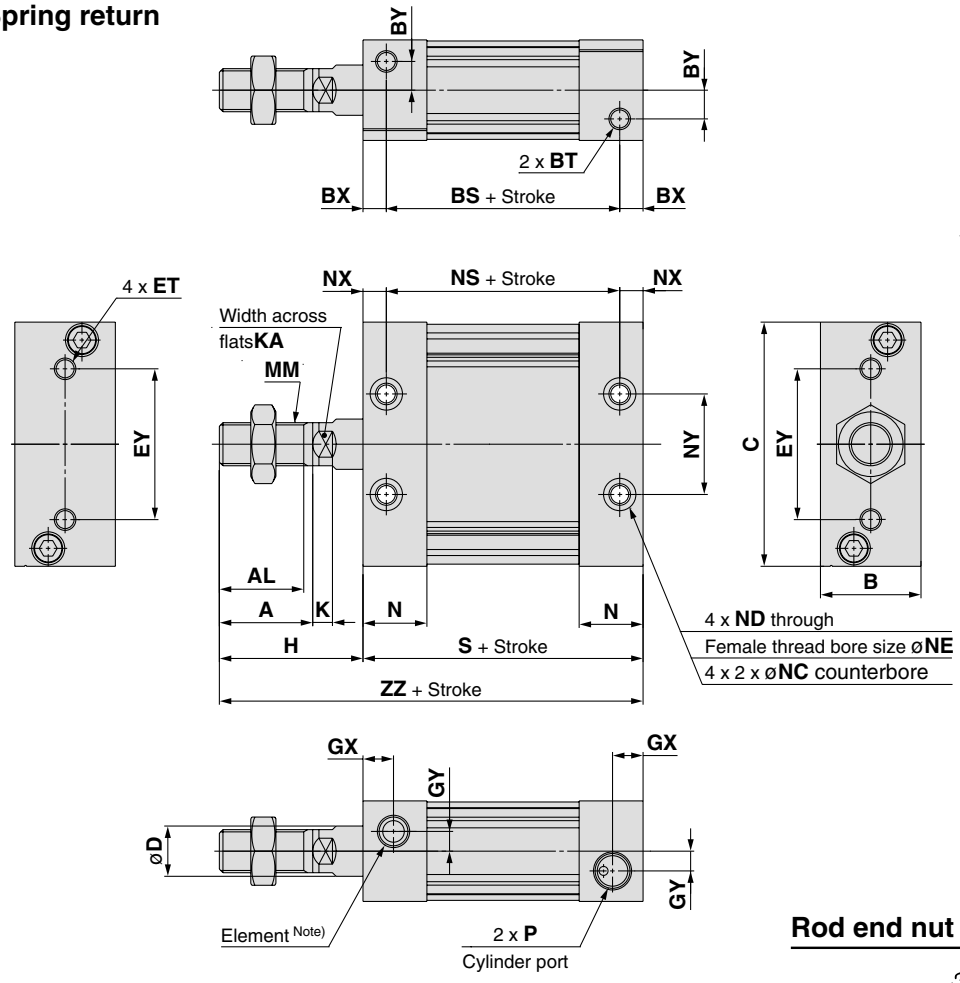
Replacement Parts/Seal Kit

Bore size (mm)	Kit no.		Contents
	Spring return	Spring extend	
25	MU25S-PS	MU25T-PS	For spring return type: ⑯, ⑰, ⑱ as a set For spring extend type: ⑮, ⑯, ⑰, ⑱ as a set
32	MU32S-PS	MU32T-PS	
40	MU40S-PS	MU40T-PS	
50	MU50S-PS	MU50T-PS	
63	MU63S-PS	MU63T-PS	

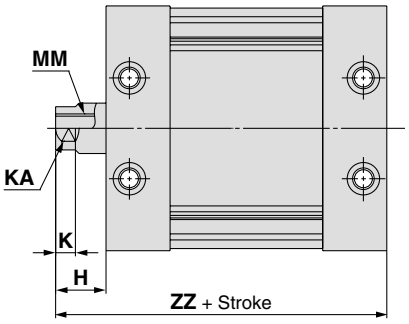
∗ Seal kit includes ⑮, ⑯, ⑰, ⑱ (excluding ⑮ for spring return type). Order them with a part number for each bore size.
∗ Since the seal kit does not include a grease pack, order it separately.
Grease pack part no.: GR-S-010 (10 g)

Basic

Spring return

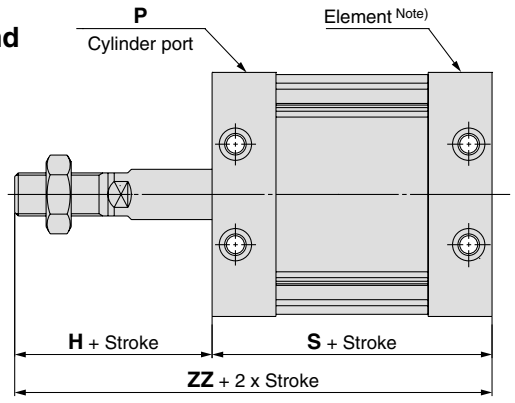


Rod end female thread



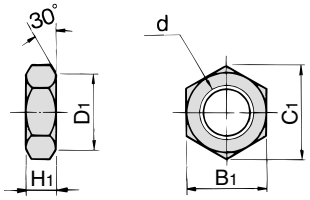
∗ Dimensions except mentioned above are the same as male thread type. However, K and KA dimensions are the same as male thread type.

Spring extend



Note) Plugged for the MUB25

Rod end nut



(mm)

Part no.	Size	d	H_1	B_1	C_1	D_1
NT-03	25	M10 x 1.25	6	17	19.6	16.5
NT-MU03	32	M12 x 1.25	7	19	21.9	18
NT-04	40	M14 x 1.5	8	22	25.4	21
NT-05	50, 63	M18 x 1.5	11	27	31.2	26

∗ A nut is attached to the rod end male thread as standard.

Rod end nut material: Carbon steel
Surface treatment: Nickel plated

(mm)

Model	Standard stroke (mm)	A	AL	B	BS	BT	BX	BY	C	D	ET	EY	GX	GY	H	K	KA
MUB25	5, 10	22	19.5	24	42	M5 x 0.8 depth 7.5	9	7	54	12	M5 x 0.8 depth 11	26	10	5	36	5.5	10
MUB32	5, 10	26	23.5	28	50	M6 x 1 depth 12	6.5	8	68	14	M6 x 1 depth 11	42	8.5	5.5	40	5.5	12
MUB40	5, 10, 15, 20	30	27	32	54	M8 x 1.25 depth 13	8	9	86	16	M8 x 1.25 depth 11	54	9	7	45	6	14
MUB50	5, 10, 15, 20	35	32	39	64	M10 x 1.5 depth 14.5	10	9	104	20	M10 x 1.5 depth 15	64	11.5	8	53	7	18
MUB63	5, 10, 15, 20	35	32	50	63	M12 x 1.75 depth 18	11	12	124	20	M12 x 1.75 depth 15	72	11.5	10	56	7	18

(mm)

Model	MM	N	NC	ND	NE	NS	NX	NY	P			S	ZZ
									—	TN	TF		
MUB25	M10 x 1.25	16.5	7.5 depth 4.5	M5 x 0.8	4.3	48	6	26	M5 x 0.8	—	—	60	96
MUB32	M12 x 1.25	18	9 depth 5.5	M6 x 1	5.1	50	6.5	28	Rc1/8	NPT1/8	G1/8	63	103
MUB40	M14 x 1.5	18.5	10.5 depth 6.5	M8 x 1.25	6.9	54	8	36	Rc1/8	NPT1/8	G1/8	70	115
MUB50	M18 x 1.5	24	13.5 depth 8.5	M10 x 1.5	8.7	64	10	42	Rc1/4	NPT1/4	G1/4	84	137
MUB63	M18 x 1.5	24	17 depth 10.5	M12 x 1.75	10.5	63	11	46	Rc1/4	NPT1/4	G1/4	85	141

Rod End Female Thread

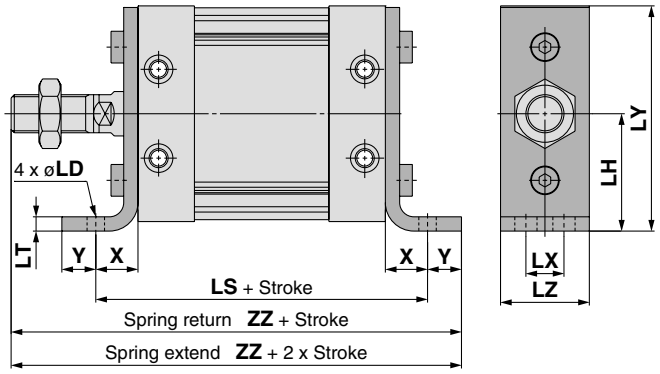
(mm)

Model	H	MM	ZZ
MUB25	14	M6 x 1 depth 12	74
MUB32	14	M8 x 1.25 depth 13	77
MUB40	15	M8 x 1.25 depth 13	85
MUB50	18	M10 x 1.5 depth 15	102
MUB63	21	M10 x 1.5 depth 15	106

∗ The position of the 4 flats of the piston rod is ±3° in relation to the cylinder side surface.

Dimensions with Mounting Bracket

Foot

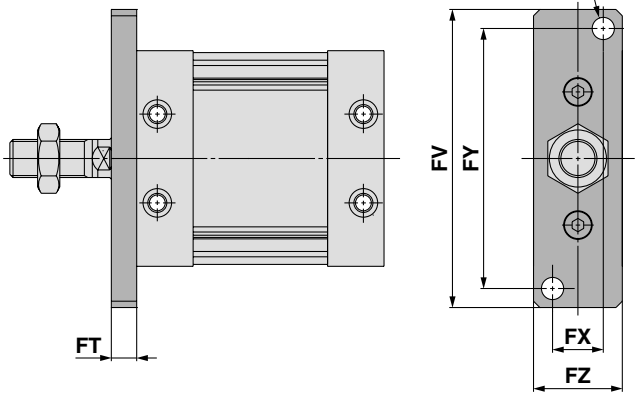


(mm)

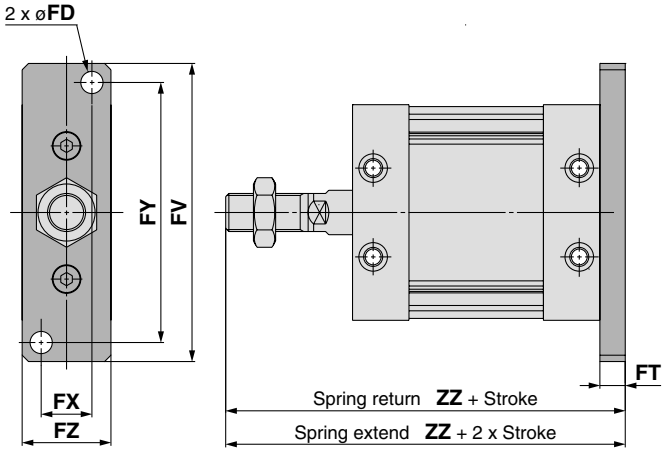
Model	LD	LH	LS	LT	LX	LY	LZ	X	Y	ZZ
MUL25	5.5	29	84	3.2	11	56	23	12	6	114
MUL32	6.6	37	95	4.5	12	71	27	16	8	127
MUL40	9	46	106	4.5	15	89	31	18	10	143
MUL50	11	57	126	5	18	109	37	21	11	169
MUL63	13.5	67	133	6	22	129	48	24	14	179

Foot bracket material: Rolled steel
Surface treatment: Nickel plated

Rod flange



Head flange

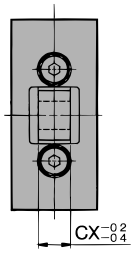


(mm)

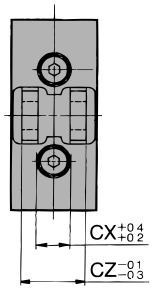
Model	FD	FT	FV	FX	FY	FZ	ZZ
MUF25, MUG25	5.5	8	76	14	66	24	104
MUF32, MUG32	7	8	94	16	82	28	111
MUF40, MUG40	9	9	118	18	102	32	124
MUF50, MUG50	11	12	144	22	126	39	149
MUF63, MUG63	13	14	168	30	148	50	155

Flange bracket material: Carbon steel
Surface treatment: Nickel plated

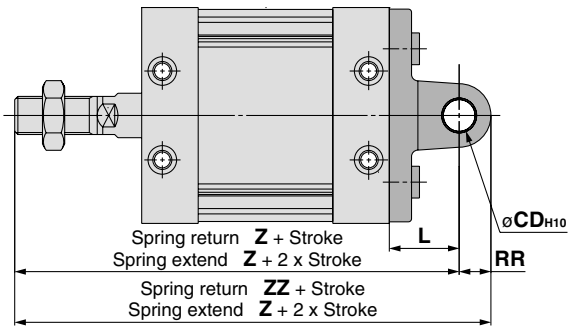
Single clevis



Double clevis



Single clevis
Double clevis



(mm)

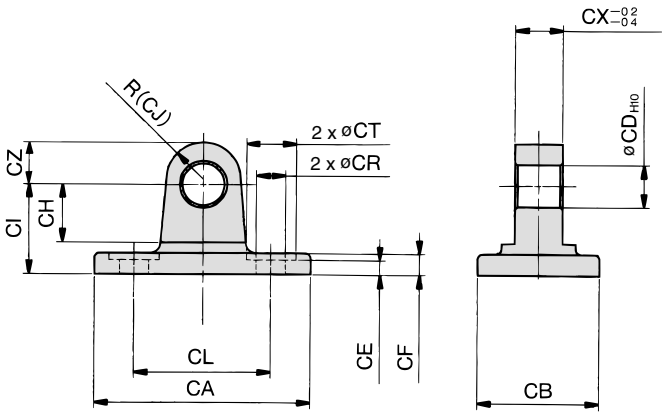
Model	CDH10	CX	CZ	L	RR	Z	ZZ
MUC25, MUD25	$8^{+0.058}_{0}$	9	18	17	8	113	121
MUC32, MUD32	$10^{+0.058}_{0}$	11	22	22	10	125	135
MUC40, MUD40	$10^{+0.058}_{0}$	13	26	27	10	142	152
MUC50, MUD50	$14^{+0.070}_{0}$	16	32	32	14	169	183
MUC63, MUD63	$14^{+0.070}_{0}$	16	32	38	16	179	185

Clevis pin and retaining ring are shipped together with double clevis.

Single/Double clevis material: Cast iron
Surface treatment: Painted

Plate Cylinder
Series MU
Accessory Bracket Dimensions

Single Clevis (Double clevis pivot bracket)



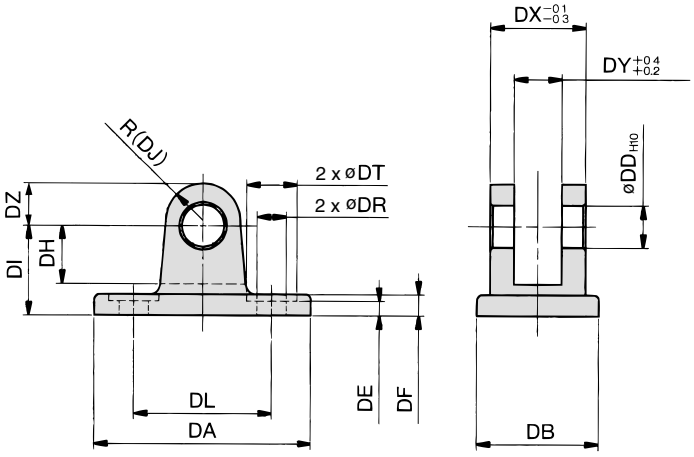
(mm)

Part no.	Size	CA	CB	CD$_{H10}$	CE	CF	CH	CI	CJ
MU-C02	25	53	23	$8^{+0.058}_{0}$	3.5	4	11	17	7
MU-C03	32	67	27	$10^{+0.058}_{0}$	3.5	7	13	22	10
MU-C04	40	85	31	$10^{+0.058}_{0}$	3.5	10	13	27	10
MU-C05	50	103	37	$14^{+0.070}_{0}$	5.5	12	17	32	14
MU-C06	63	122	48	$14^{+0.070}_{0}$	6	14	19	38	16

Part no.	CL	CR	CT	CX	CZ
MU-C02	26	5.3	9.5	9	8
MU-C03	42	6.4	11	11	10
MU-C04	54	8.4	14	13	10
MU-C05	64	10.5	17	16	14
MU-C06	72	13	20	16	16

Material: Cast iron
Surface treatment: Painted

Double Clevis (Single clevis pivot bracket)



(mm)

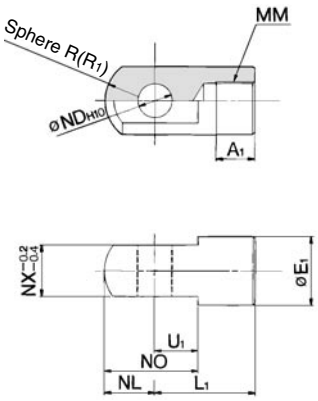
Part no.	Size	DA	DB	DD$_{H10}$	DE	DF	DH	DI	DJ
MU-D02	25	53	23	$8^{+0.058}_{0}$	3.5	4	11	17	7
MU-D03	32	67	27	$10^{+0.058}_{0}$	3.5	7	13	22	10
MU-D04	40	85	31	$10^{+0.058}_{0}$	3.5	10	13	27	10
MU-D05	50	103	37	$14^{+0.070}_{0}$	5.5	12	17	32	14
MU-D06	63	122	48	$14^{+0.070}_{0}$	6	14	19	38	16

Part no.	DL	DR	DT	DX	DY	DZ	Applicable pin
MU-D02	26	5.3	9.5	18	9	8	CD-MU02
MU-D03	42	6.4	11	22	11	10	CD-MU03
MU-D04	54	8.4	14	26	13	10	CD-MU04
MU-D05	64	10.5	17	32	16	14	CD-MU05
MU-D06	72	13	20	32	16	16	CD-MU05

Material: Cast iron
Surface treatment: Painted

Clevis pin and retaining ring are attached to double clevis.

Single Knuckle Joint



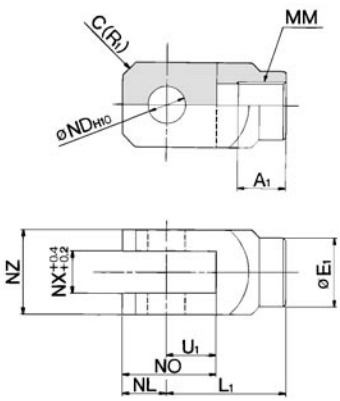
(mm)

Part no.	Size	A$_1$	E$_1$	L$_1$	MM
I-MU02	25	10.5	16	27	M10 x 1.25
I-MU03	32	12	18	31	M12 x 1.25
I-MU04	40	14	20	36	M14 x 1.5
I-MU05	50, 63	18	28	46	M18 x 1.5

Part no.	ND$_{H10}$	NL	NO	NX	R$_1$	U$_1$
I-MU02	$8^{+0.058}_{0}$	8.5	19.5	9	8.5	11
I-MU03	$10^{+0.058}_{0}$	10	24	11	10	14
I-MU04	$10^{+0.058}_{0}$	11	26	13	11	15
I-MU05	$14^{+0.070}_{0}$	16	36	16	16	20

Material: Rolled steel
Surface treatment: Nickel plated

Double Knuckle Joint



(mm)

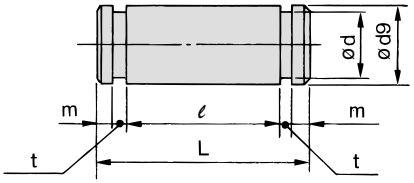
Part no.	Size	A$_1$	E$_1$	L$_1$	MM	ND$_{H10}$
Y-MU02	25	10.5	14	27	M10 x 1.25	$8^{+0.058}_{0}$
Y-MU03	32	12	18	31	M12 x 1.25	$10^{+0.058}_{0}$
Y-MU04	40	14	20	36	M14 x 1.5	$10^{+0.058}_{0}$
Y-MU05	50, 63	18	28	46	M18 x 1.5	$14^{+0.070}_{0}$

Part no.	NL	NO	NX	NZ	R$_1$	U$_1$	Applicable pin
Y-MU02	8	21	9	18	3	13	CD-MU02
Y-MU03	10	24	11	22	4	14	CD-MU03
Y-MU04	10	27	13	26	5	17	CD-MU04
Y-MU05	16	39	16	32	6	23	CD-MU05

∗ Knuckle pin and retaining ring are included.

Material: Rolled steel
Surface treatment: Nickel plated

Clevis Pin/Knuckle Pin



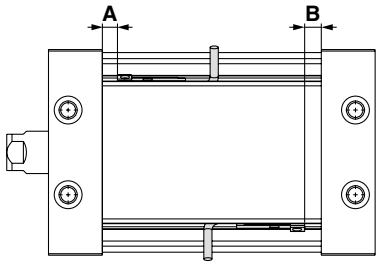
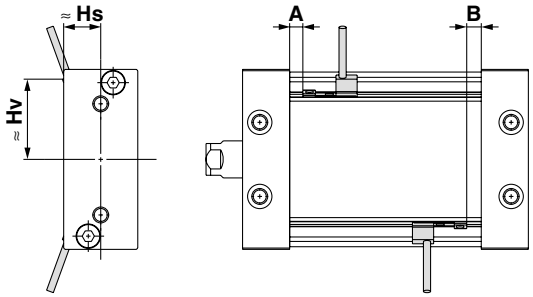
(mm)

Part no.	Size	Dd9	L	d	ℓ	m	t	Retaining ring
CD-MU02	25	$8^{-0.040}_{-0.076}$	23	7.6	18.2	1.5	0.9	Type C8 for axis
CD-MU03	32	$10^{-0.040}_{-0.076}$	27	9.6	22.2	1.25	1.15	Type C10 for axis
CD-MU04	40	$10^{-0.040}_{-0.076}$	31	9.6	26.2	1.25	1.15	Type C10 for axis
CD-MU05	50, 63	$14^{-0.050}_{-0.093}$	38	13.4	32.2	1.75	1.15	Type C14 for axis

Material: Carbon steel

∗ These are provided as standard for double clevis and double knuckle joint.
∗∗ Type C retaining rings for axis are attached.

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

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

Size	D-M9□ D-M9□W D-M9□AL		D-M9□V D-M9□WV D-M9□AVL				D-A9□		D-M9□V D-M9□WV D-M9□AVL			
	A	B	A	B	Hs	Hv	A	B	A	B	Hs	Hv
25	5	5	5	5	7.5	27.5	1	1	1	1	—	—
32	5	5	5	5	14.5	30	1	1	1	1	—	—
40	5.5	5.5	5.5	5.5	16.5	37	1.5	1.5	1.5	1.5	—	—
50	7	7	7	7	—	—	3	3	3	3	—	—
63	7.5	7.5	7.5	7.5	—	—	3.5	3.5	3.5	3.5	—	—

Minimum Stroke for Auto Switch Mounting

Number of auto switches mounted	D-M9□ D-M9□V D-A9□ D-A9□V	D-M9□W D-M9□WV D-A9□AL D-A9□AVL
1	10	10
2	10	15

Operating Range

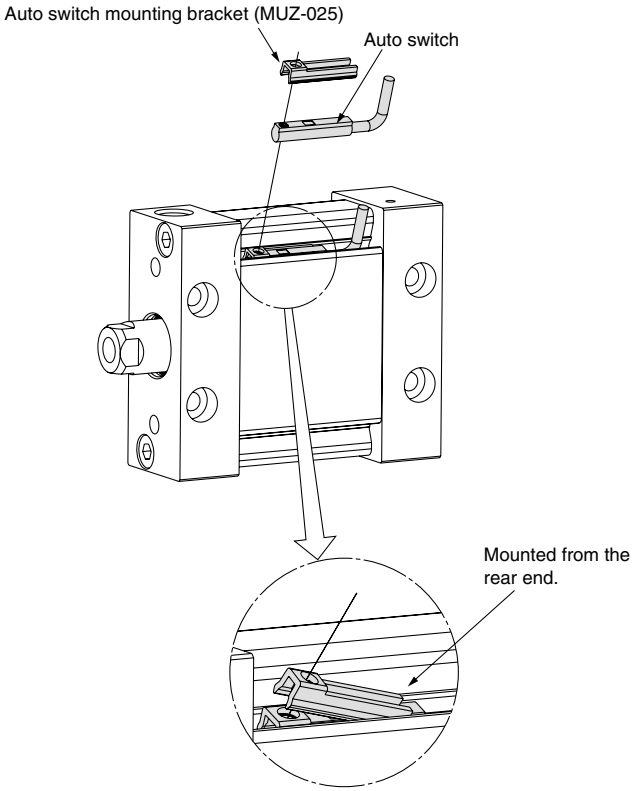
Auto switch model	Size				
	25	**32**	**40**	**50**	**63**
D-M9□/M9□V D-M9□W/M9□WV D-M9□AL/M9□AVL	5.5	5.5	5.5	5	5
D-A9□/A9□V	7.5	8	8	7	6.5

∗ Since the operating range is provided as a guideline including hysteresis, it cannot be guaranteed. (assuming approx. ±30% dispersion)

Mounting and Moving Method of Auto Switch

A Stroke of 20 or less

1. First insert the auto switch into the switch groove.
2. Then, press the auto switch mounting bracket into the switch groove.



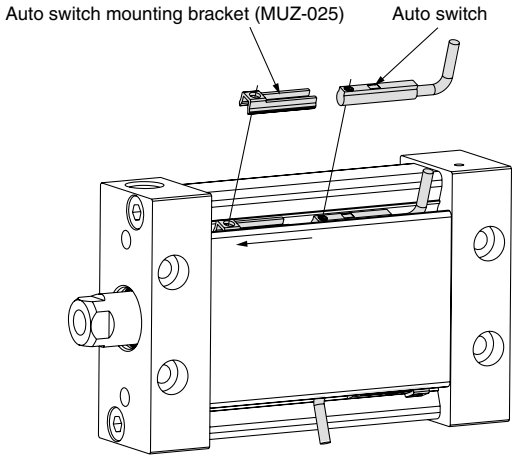
∗ The auto switch mounting bracket should be mounted from the rear end.

3. Confirm where the mounting position is, and tighten the auto switch mounting screw using a flat head screwdriver to fix the auto switch.

B Stroke of 25 or more

1. First press the auto switch mounting bracket into the switch groove.
2. Then, insert the auto switch into the switch groove, and slide it onto the auto switch mounting bracket.

∗ Slide the end of the auto switch under the auto switch mounting bracket.



3. Confirm where the mounting position is, and tighten the auto switch mounting screw using a flat head screwdriver to fix the auto switch.

Auto Switch Mounting Bracket Part No.

Cylinder series	Applicable bore size (mm)				
	25	**32**	**40**	**50**	**63**
MU□-□□Z	MUZ-025				

Note 1) For strokes of 25 or more, mounting method A is also possible.
Note 2) When tightening the auto switch mounting screw, use a watchmaker's screwdriver with the handle diameter of about 5 to 6 mm.
The tightening torque of the mounting screw should be approx. 0.05 to 0.1 N·m.
As a guide, turn an additional 90 degrees from the position where it feels tight.

Mounting of Magnetic Field Resistant Auto Switch (D-P3DW□ series)

When the magnetic field resistant auto switch (D-P3DW□ series) is mounted, only ø40 to ø63 of the existing MU series are available.

How to Order

MDU B 40 □ – 30 D M – P3DWSC □

With auto switch
(Built-in magnet)

Mounting

B	Basic
L	Axial foot
F	Rod flange
G	Head flange
C	Single clevis
D	Double clevis

∗ Brackets are shipped together, (but not assembled).

Size

40	Equiv. ø40 piston area
50	Equiv. ø50 piston area
63	Equiv. ø63 piston area

Port thread type

—	Rc	ø40, ø50, ø63
TN	NPT	
TF	G	

Cylinder stroke (mm)
Refer to "Standard Stroke" on page 2.

Action

D	Double acting

Rod end configuration

—	Rod end female thread
M	Rod end male thread

Auto switch

—	None

∗ For auto switch model, refer to "How to order the auto switch independently."

Number of auto switches

—	2 pcs.
S	1 pc.
n	"n" pcs.

∗ When cylinders/actuators are ordered with an auto switch, the cylinder/actuator, auto switch and auto switch mounting bracket (including screws) are enclosed.
∗ When the auto switch is ordered on its own, the auto switch mounting bracket is not included. In that case, please order it separately.

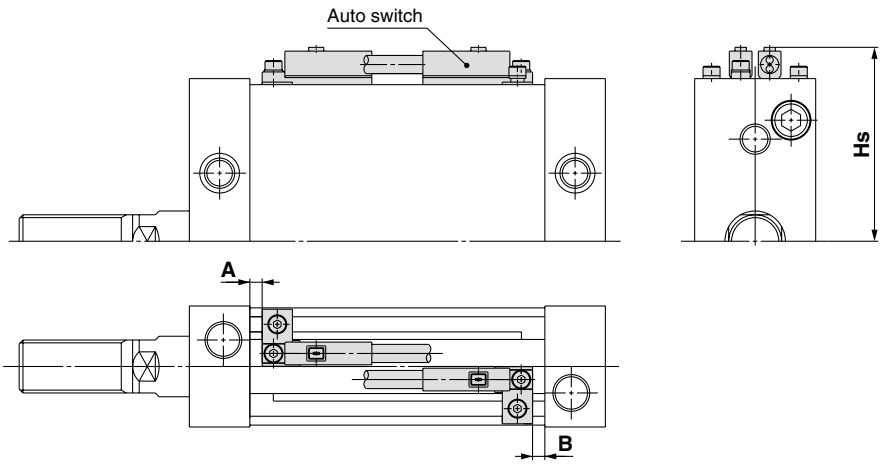
How to order the auto switch independently

D-P3DW SC

Lead wire length

SC	0.3 m (M12 connector type: 3 to 4 pins)
SE	0.3 m (M12 connector type: 1 to 4 pins)
—	0.5 m
L	3 m
Z	5 m

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



Bore size (mm)	A	B	Hs
40	3	3.5	51.5
50	4.5	5	61
63	5	5.5	71

Minimum Stroke for Auto Switch Mounting

Number of auto switches mounted	Same surface	Different surfaces
1	15	
2	15	

Auto Switch Operating Range

(mm)

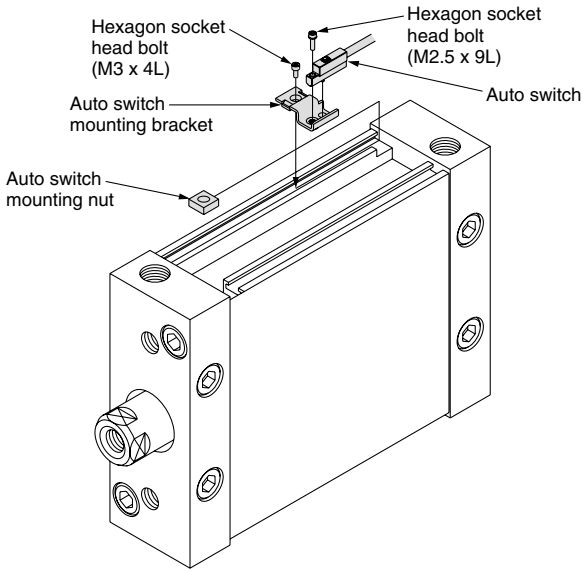
Bore size		
40	50	63
6	6	6

∗ Since the operating range is provided as a guideline including hysteresis, it cannot be guaranteed. (assuming approx. ±30% dispersion)
It may vary substantially depending on the ambient environment.

Mounting and Moving Method of Auto Switch

1. Insert the protrusion on the bottom of the auto switch into the mating part of the auto switch mounting bracket and fix the auto switch and the auto switch mounting bracket temporarily by tightening the hexagon socket head bolt (M2.5 x 9L) 1 to 2 turns.
2. Slide the auto switch mounting nut into the auto switch mounting rail, and place it in the roughly estimated setting position.
3. Fix the auto switch mounting bracket and nut with the hexagon socket head bolts (M3 x 4L) temporarily.
4. Move the auto switch mounting bracket while checking the detection position of the auto switch, and fix it firmly with the hexagon socket head bolts.

Note 1) The torque for tightening the hexagon socket head bolt (M2.5 x 9L) is 0.2 to 0.3 N·m.
Note 2) The torque for tightening the hexagon socket head bolt (M3 x 4L) is 0.5 to 0.7 N·m.



Auto Switch Mounting Bracket Part No. (Including Bracket, Bolt, Nut)

Bore size (mm)		
40	**50**	**63**
MDU25-42-4365M-R		

Safety Instructions

These safety instructions are intended to prevent hazardous situations and/or equipment damage. These instructions indicate the level of potential hazard with the labels of **"Caution," "Warning"** or **"Danger."** They are all important notes for safety and must be followed in addition to International Standards (ISO/IEC)Note 1), and other safety regulations.

Note 1) ISO 4414: Pneumatic fluid power – General rules relating to systems.
ISO 4413: Hydraulic fluid power – General rules relating to systems.
IEC 60204-1: Safety of machinery – Electrical equipment of machines. (Part 1: General requirements)
ISO 10218-1: Manipulating industrial robots - Safety.
etc.

⚠ Caution: **Caution** indicates a hazard with a low level of risk which, if not avoided, could result in minor or moderate injury.

⚠ Warning: **Warning** indicates a hazard with a medium level of risk which, if not avoided, could result in death or serious injury.

⚠ Danger : **Danger** indicates a hazard with a high level of risk which, if not avoided, will result in death or serious injury.

⚠ Warning

1. **The compatibility of the product is the responsibility of the person who designs the equipment or decides its specifications.**
   Since the product specified here is used under various operating conditions, its compatibility with specific equipment must be decided by the person who designs the equipment or decides its specifications based on necessary analysis and test results. The expected performance and safety assurance of the equipment will be the responsibility of the person who has determined its compatibility with the product. This person should also continuously review all specifications of the product referring to its latest catalogue information, with a view to giving due consideration to any possibility of equipment failure when configuring the equipment.
2. **Only personnel with appropriate training should operate machinery and equipment.**
   The product specified here may become unsafe if handled incorrectly. The assembly, operation and maintenance of machines or equipment including our products must be performed by an operator who is appropriately trained and experienced.
3. **Do not service or attempt to remove product and machinery/equipment until safety is confirmed.**
   1. The inspection and maintenance of machinery/equipment should only be performed after measures to prevent falling or runaway of the driven objects have been confirmed.
   2. When the product is to be removed, confirm that the safety measures as mentioned above are implemented and the power from any appropriate source is cut, and read and understand the specific product precautions of all relevant products carefully.
   3. Before machinery/equipment is restarted, take measures to prevent unexpected operation and malfunction.
4. **Contact SMC beforehand and take special consideration of safety measures if the product is to be used in any of the following conditions.**
   1. Conditions and environments outside of the given specifications, or use outdoors or in a place exposed to direct sunlight.
   2. Installation on equipment in conjunction with atomic energy, railways, air navigation, space, shipping, vehicles, military, medical treatment, combustion and recreation, or equipment in contact with food and beverages, emergency stop circuits, clutch and brake circuits in press applications, safety equipment or other applications unsuitable for the standard specifications described in the product catalogue.
   3. An application which could have negative effects on people, property, or animals requiring special safety analysis.
   4. Use in an interlock circuit, which requires the provision of double interlock for possible failure by using a mechanical protective function, and periodical checks to confirm proper operation.

Safety Instructions

⚠Caution

1. The product is provided for use in manufacturing industries.

The product herein described is basically provided for peaceful use in manufacturing industries.
If considering using the product in other industries, consult SMC beforehand and exchange specifications or a contract if necessary.
If anything is unclear, contact your nearest sales branch.

Limited warranty and Disclaimer/Compliance Requirements

The product used is subject to the following “Limited warranty and Disclaimer” and “Compliance Requirements”. Read and accept them before using the product.

Limited warranty and Disclaimer

1. The warranty period of the product is 1 year in service or 1.5 years after the product is delivered.Note 2)
   Also, the product may have specified durability, running distance or replacement parts. Please consult your nearest sales branch.
2. For any failure or damage reported within the warranty period which is clearly our responsibility, a replacement product or necessary parts will be provided.
   This limited warranty applies only to our product independently, and not to any other damage incurred due to the failure of the product.
3. Prior to using SMC products, please read and understand the warranty terms and disclaimers noted in the specified catalog for the particular products.

Note 2) Vacuum pads are excluded from this 1 year warranty.

A vacuum pad is a consumable part, so it is warranted for a year after it is delivered.
Also, even within the warranty period, the wear of a product due to the use of the vacuum pad or failure due to the deterioration of rubber material are not covered by the limited warranty.

Compliance Requirements

1. The use of SMC products with production equipment for the manufacture of weapons of mass destruction (WMD) or any other weapon is strictly prohibited.
2. The exports of SMC products or technology from one country to another are governed by the relevant security laws and regulations of the countries involved in the transaction. Prior to the shipment of a SMC product to another country, assure that all local rules governing that export are known and followed.

Series MU
Specific Product Precautions

Be sure to read before handling.
Refer to back pages 1 and 2 for Safety Instructions, "Handling Precautions for SMC Products" (M-E03-3) for Actuators Precautions.

Mounting

⚠ Caution

1. When a workpiece is secured to the end of the piston rod, ensure that the piston rod is retracted entirely, and place a wrench on the portion of the rod that protrudes beyond the section. Also, tighten in a way that prevents the tightening torque from being applied to the non-rotating guide.

Allowable Torque for Mounting Workpiece (N·m)

Size	25	32	40	50	63
Allowable torque for mounting workpiece	0.25	0.25	0.55	1.25	2.0

2. Operate in such a way that the load to the piston rod is always applied in the axial direction. Furthermore, avoid operations that could apply rotational torque to the piston rod. If rotational torque must be applied due to unavoidable circumstances, make sure the allowable rotational torque is not exceeded.

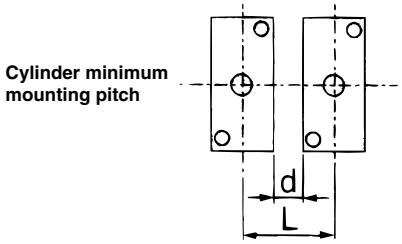
3. Operating the cylinder by connecting the piping directly to the cylinder can cause the piston speed to exceed the maximum operating speed of 500 mm/s. Therefore, to operate the cylinder, make sure to use an SMC speed controller and adjust the piston speed to 500 mm/s or less.

Handing of Auto Switches

Be sure to read before handling.
Refer to "Handling Precautions for SMC Products" (M-E03-3) for Auto Switches Precautions.

⚠ Warning

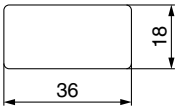
1. If multiple cylinders are operated adjacent to each other, the magnets that are enclosed in the adjacent cylinders could affect the operation of the auto switches, causing the switches to malfunction. Therefore, make sure that the mounting pitch of the cylinders is at least that indicated in the below table.



(mm)

Size	ø25	ø32	ø40	ø50	ø63
L (d)	29 (5)	33 (5)	37 (5)	39 (0)	50 (0)

If cylinders are used with a mounting pitch less than shown above, they must be shielded with iron plates or the separately sold magnetic shielding plate (part no.: MU-S025). Please contact SMC for further information.



Material: Ferrite stainless steel Thickness: 0.3 mm
Since the back side is treated with adhesive, it can be attached to the cylinder.

How to use

In order not to influence the auto switch mounted on cylinder B adjacent to the magnetic force of cylinder A, use a shielding plate to block the magnetic force.