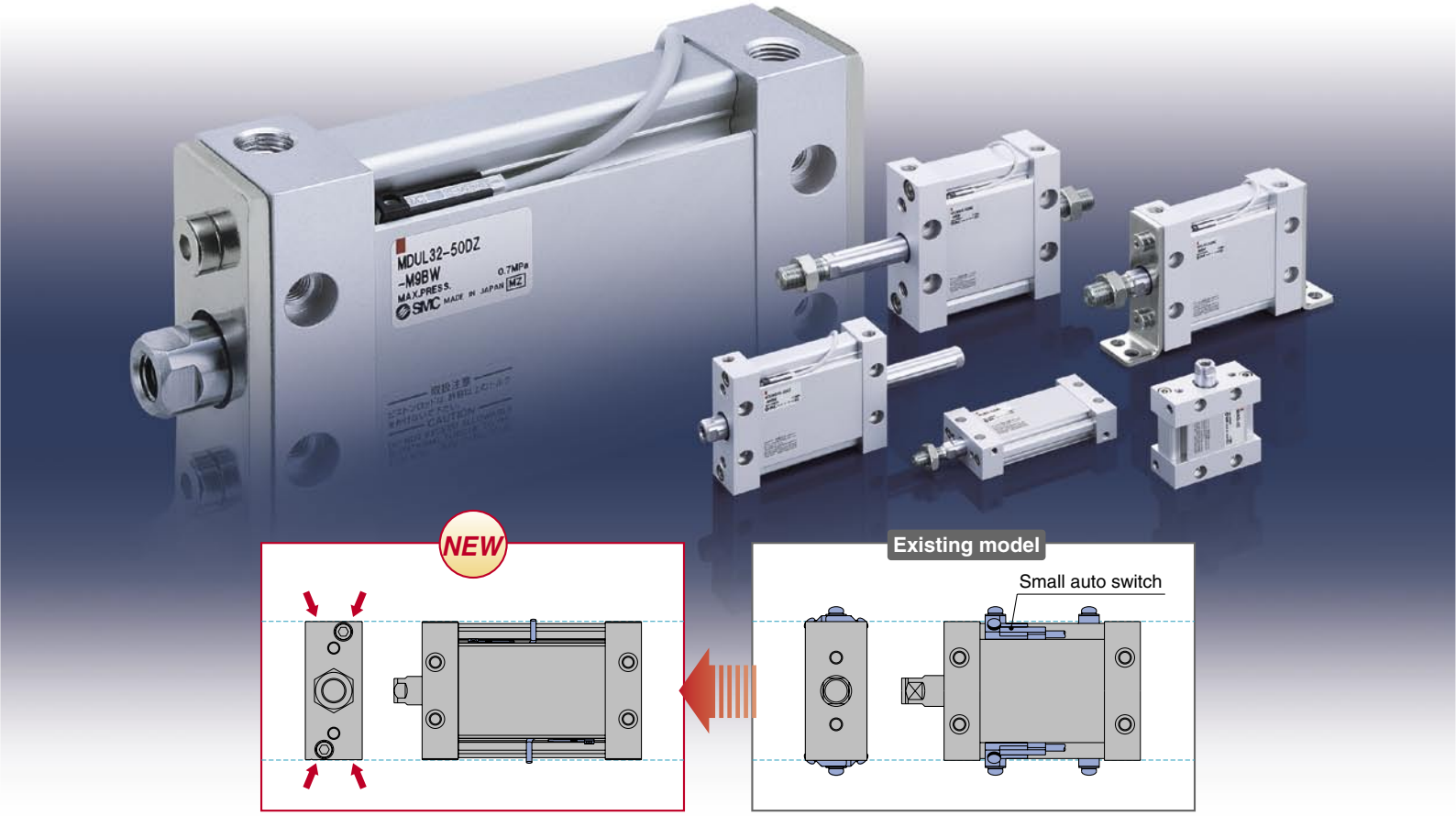
Plate Cylinder

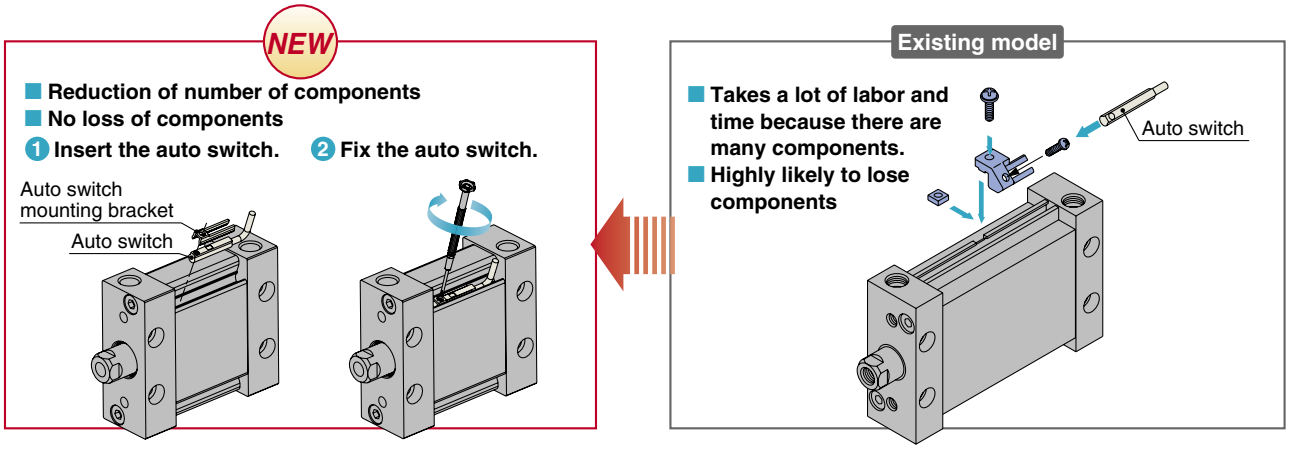
New

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 labor for work



Available with a stroke up to 300 mm

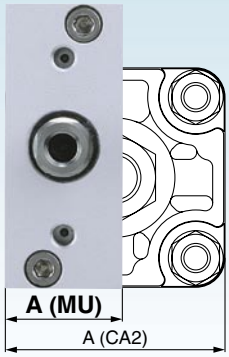
Series MU

SMC

CAT.ES20-208A

Series MU

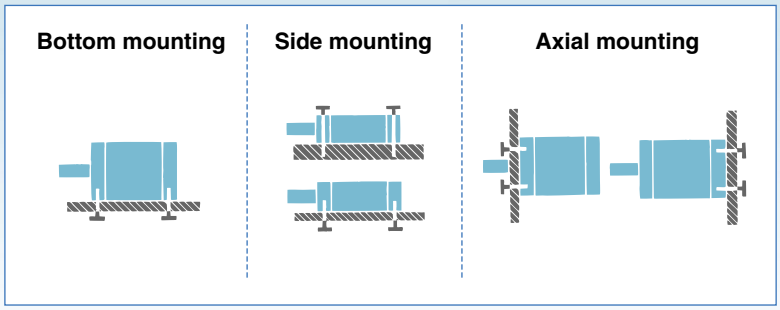
Width: Max. 62% reduction
(in comparison with SMC CA2 cylinder)



A Dimension Comparison (mm)

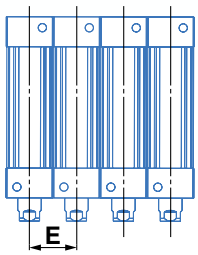
Size	A		
	MU	CA2	Reduction rate
25	**24**	60	**60**%
32	**28**	70	**60**%
40	**32**	85	**62**%
50	**39**	102	**62**%
63	**50**	116	**57**%

Can be mounted without brackets and in flexible ways.



Can be mounted with short pitch.

∗ Without auto switch

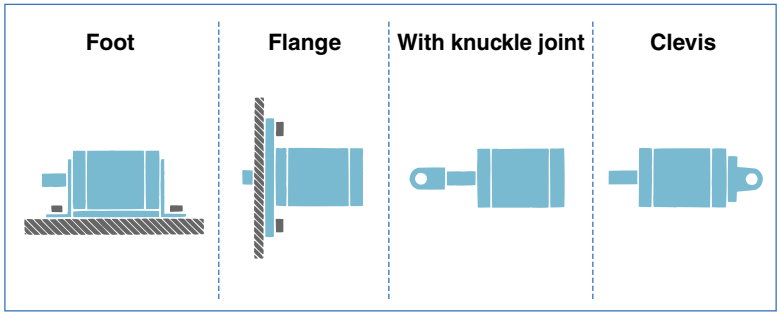


(mm)

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.

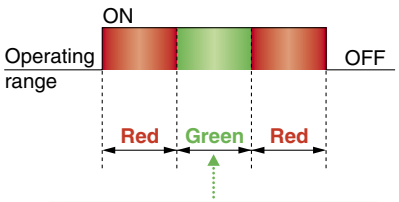
Various brackets are available to accommodate a wide range of applications.



2-Color 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

D-M9□W(V)

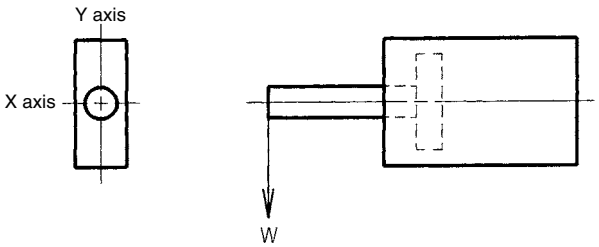
Water resistant type
For environments exposed to water and coolant

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			
Single acting	Spring return, Spring extend	25, 32, 40, 50, 63	5, 10, 15, 20, 25, 30, 35, 40, 45, 50	

Series MU
Rod End Allowable Load



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

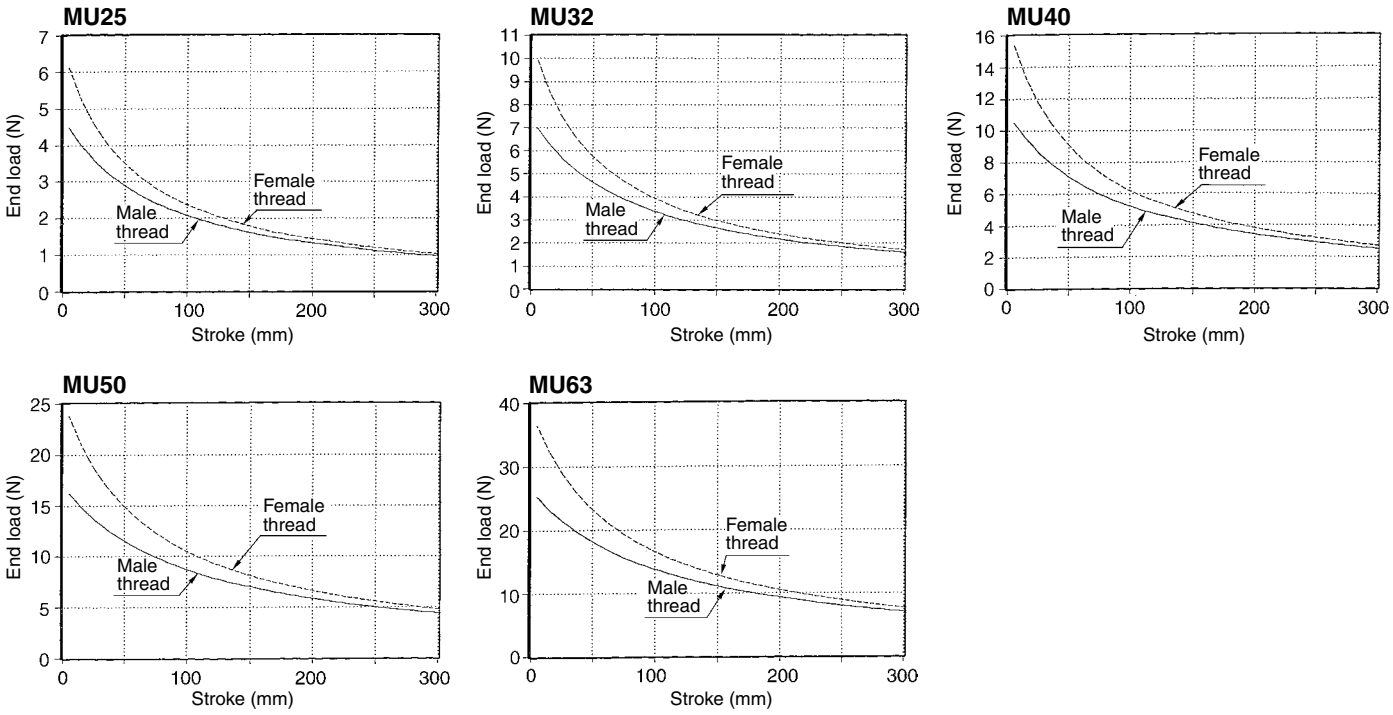


Plate Cylinder Operating Precautions

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

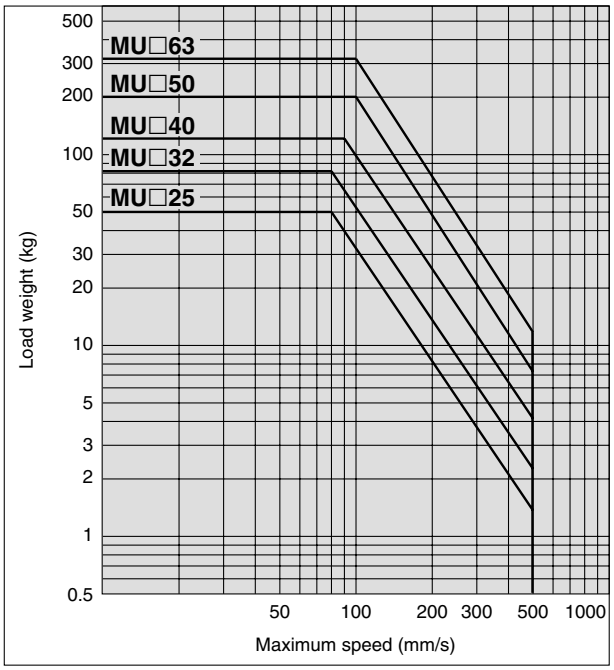


Plate Cylinder:
Double Acting, Single Rod
Series MU
ø25, ø32, ø40, ø50, ø63

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

Nil	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

Nil	Rod end female thread
M	Rod end male thread

Auto switch

Nil	Without auto switch

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

Number of auto switches

Nil	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 (Nil)	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-color 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-color 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-color 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 ·····Nil (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.

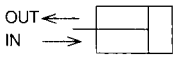
Mounting bracket \ Size	25	32	40	50	63
Foot Note 1)	MU-L02	MU-L03	MU-L04	MU-L05	MU-L06
Flange	MU-F02	MU-F03	MU-F04	MU-F05	MU-F06
Single clevis	MU-C02	MU-C03	MU-C04	MU-C05	MU-C06
Double clevis Note 3)	MU-D02	MU-D03	MU-D04	MU-D05	MU-D06

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

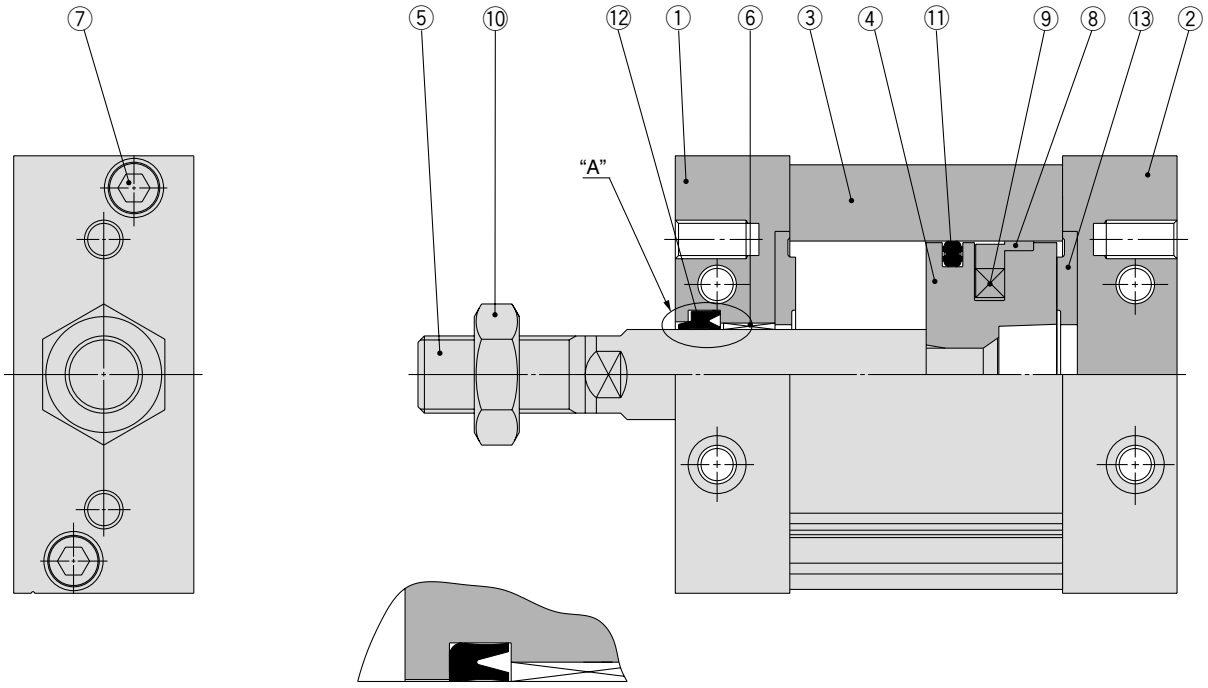
Note) Weight of single clevis and double clevis includes 2 bolts for mounting bracket.

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	Anodized
2	**Head cover**	Aluminum alloy	Anodized
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	**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

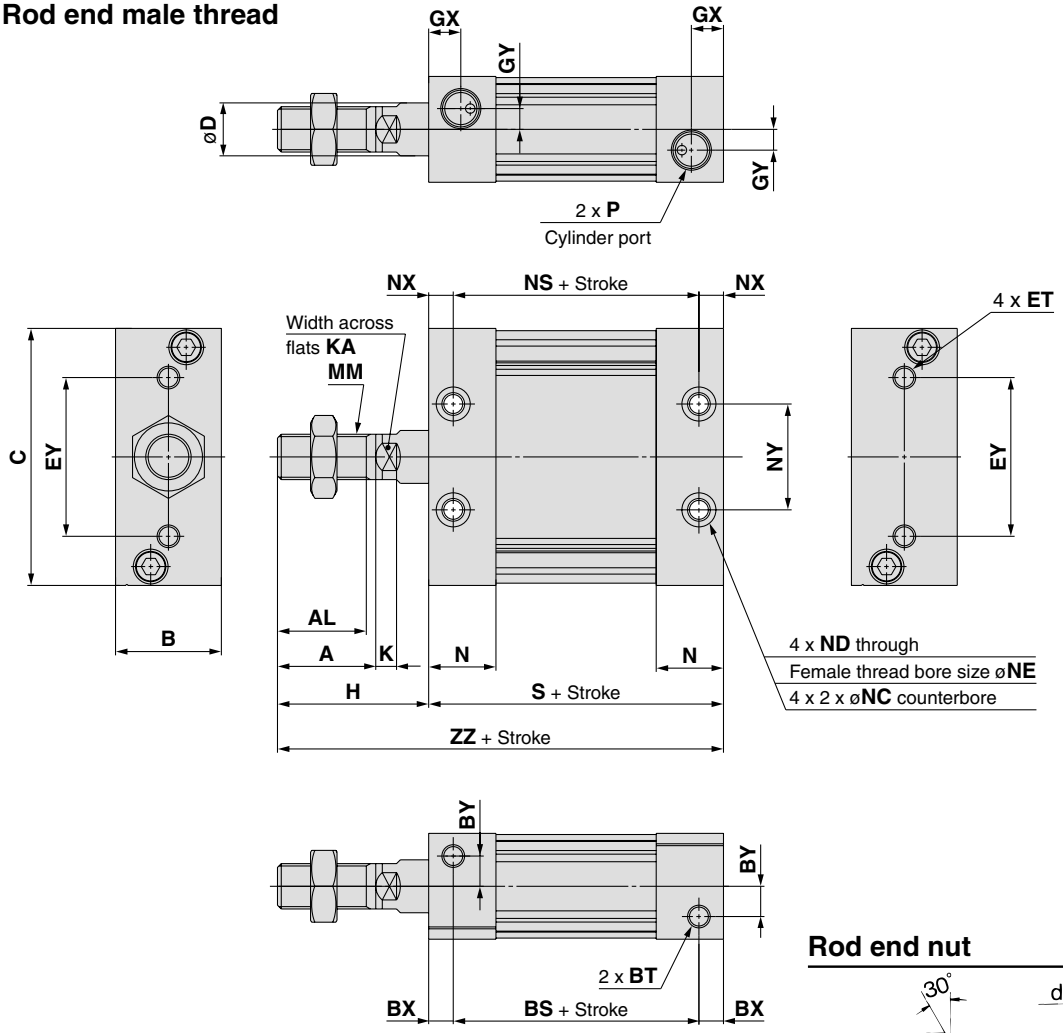
Bore size (mm)	Kit no.	Contents
25	MUB25-PS	Set of nos. above ⑪, ⑫, ⑬
32	MUB32-PS	
40	MUB40-PS	
50	MUB50-PS	
63	MUB63-PS	

∗ Seal kit includes ⑪ to ⑬. Order the seal kit, based on each bore size.

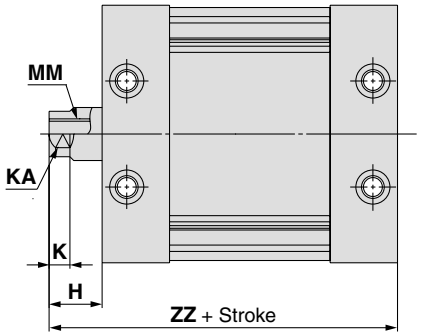
∗ Since the seal kit does not include a grease pack, order it separately.
Grease pack part no.: GR-S-010 (10 g)

Basic: MUB

Rod end male thread

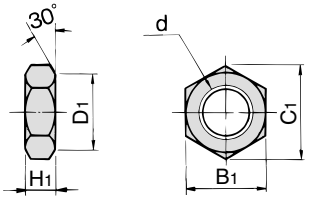


Rod end female thread



∗ 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.

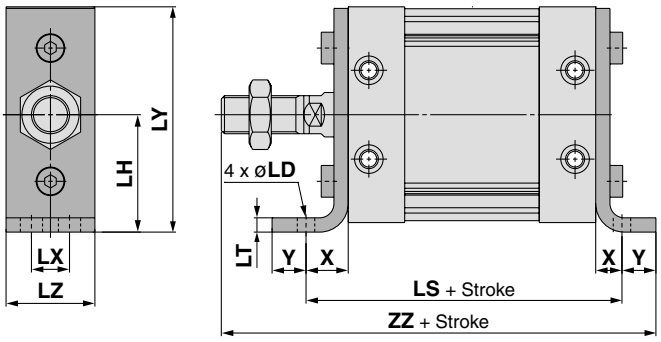
Rod End Female Thread

(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

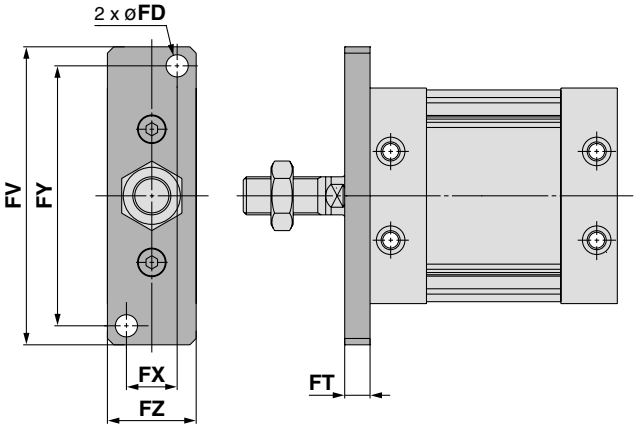


(mm)

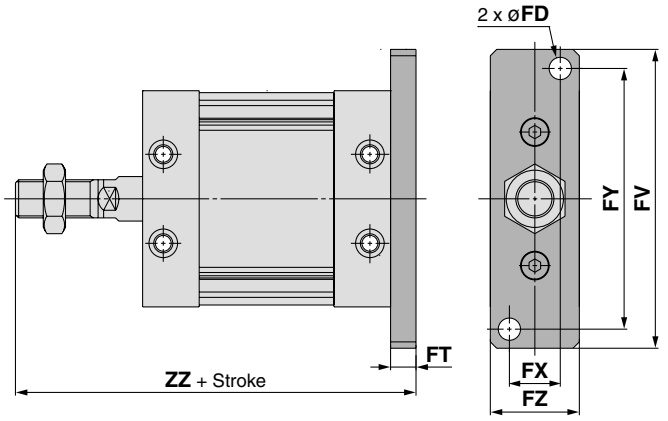
Model	LD	LH	LS	LT	LX	LY	LZ	X	Y	ZZ
MUL25	5.5	29	79	3.2	11	56	23	12	6	109
MUL32	6.6	37	90	4.5	12	71	27	16	8	122
MUL40	9	46	96	4.5	15	89	31	18	10	133
MUL50	11	57	116	5	18	109	37	21	11	159
MUL63	13.5	67	123	6	22	129	48	24	14	169

Foot bracket material: Rolled steel
Surface treatment: Nickel plated

Rod flange



Head flange

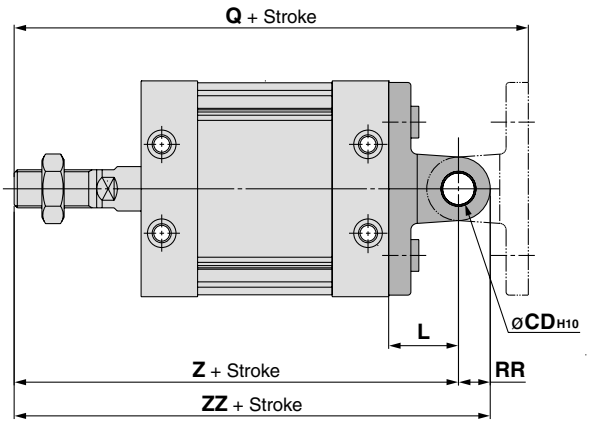


(mm)

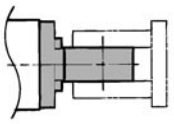
Model	FD	FT	FV	FX	FY	FZ	ZZ
MUF25, MUG25	5.5	8	76	14	66	24	99
MUF32, MUG32	7	8	94	16	82	28	106
MUF40, MUG40	9	9	118	18	102	32	114
MUF50, MUG50	11	12	144	22	126	39	139
MUF63, MUG63	13	14	168	30	148	50	145

Flange bracket material: Carbon steel
Surface treatment: Nickel plated

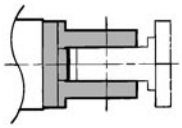
Single clevis
Double clevis

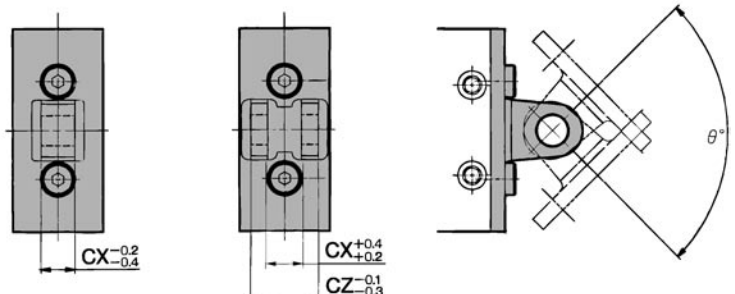


Single clevis



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

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

Nil	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

Nil	Rod end female thread
M	Rod end male thread

Auto switch

Nil	Without auto switch

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

Number of auto switches

Nil	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 (Nil)	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-color 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-color 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-color 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 ·····Nil (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, 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.

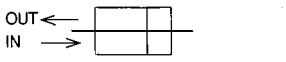
Recommended Tightening Torque for Mounting Bracket on Body

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)

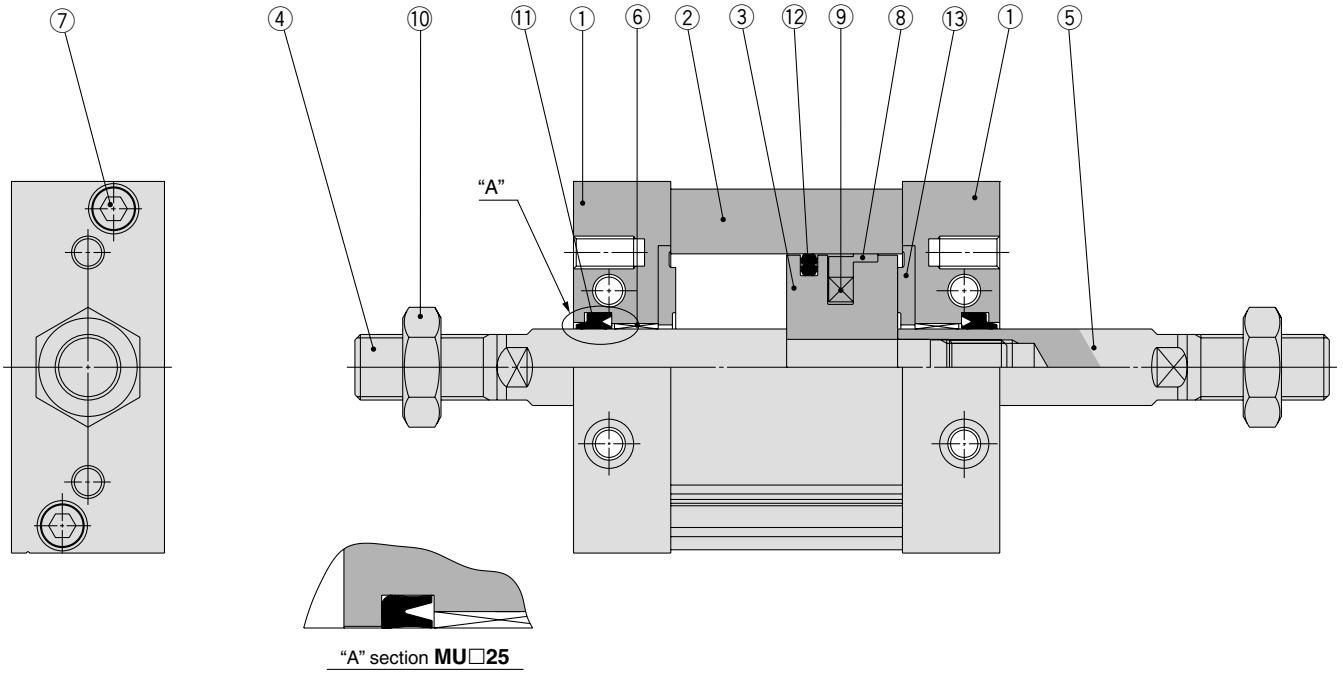
Bore size (mm)		**25**	**32**	**40**	**50**	**63**
Rod end male thread	Male thread	24	46	54	106	106
	Nut	16	20	34	64	64

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	Anodized
2	**Cylinder tube**	Aluminum alloy	Hard anodized
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	

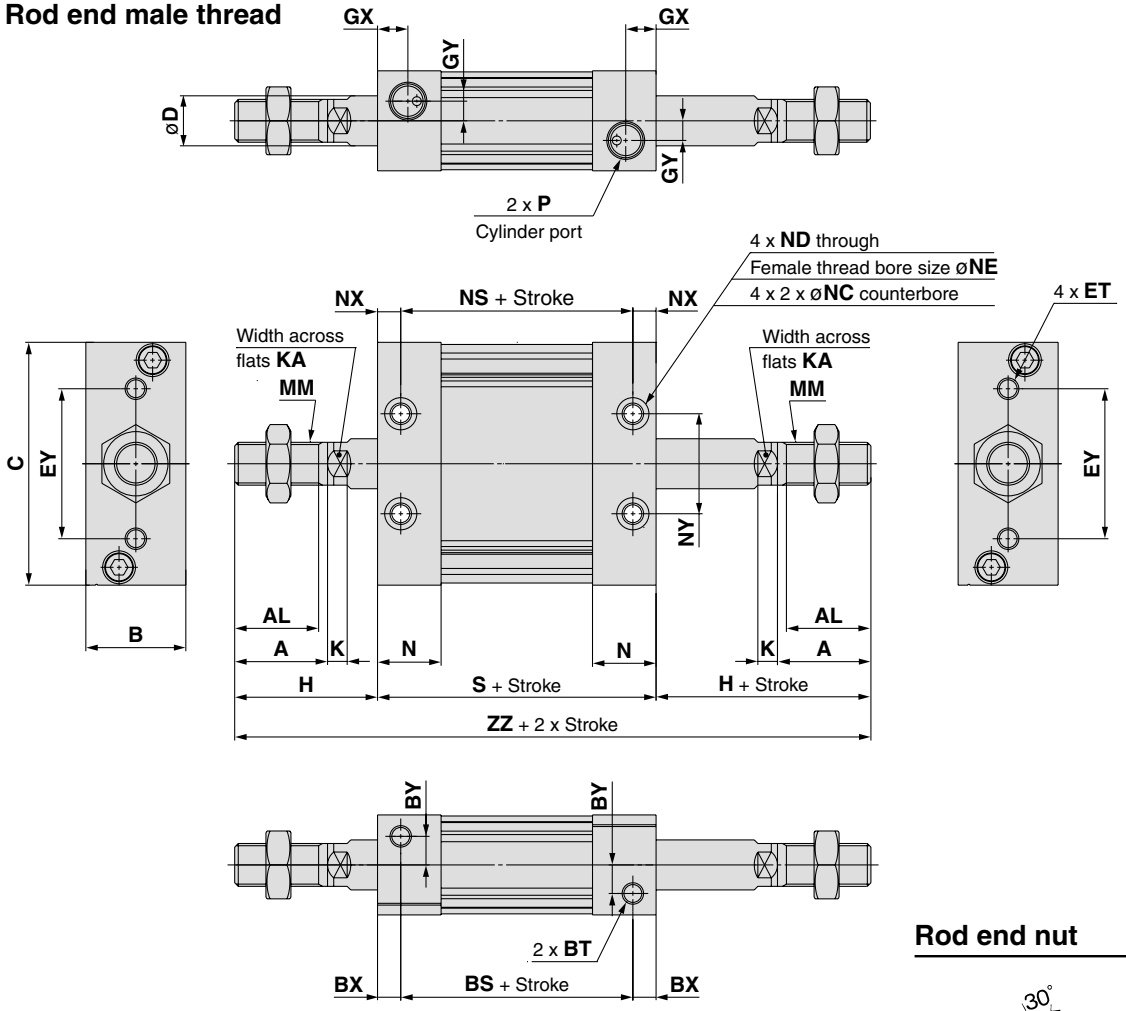
Replacement Parts/Seal Kit

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	

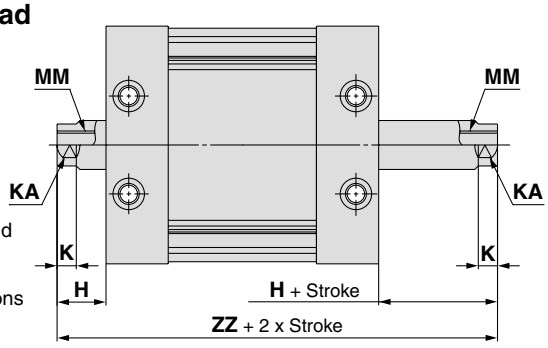
∗ Seal kit includes ⑪ to ⑬. Order the seal kit, based on each bore size.
∗ Since the seal kit does not include a grease pack, order it separately.
Grease pack part no.: GR-S-010 (10 g)

Basic: MUWB

Rod end male thread

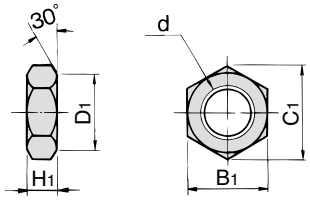


Rod end female thread



∗ 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	H1	B1	C1	D1
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

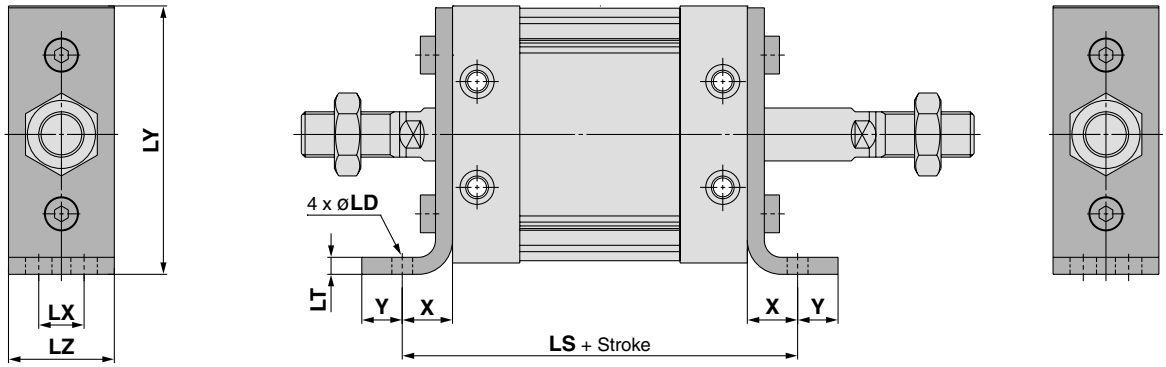
(mm)

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

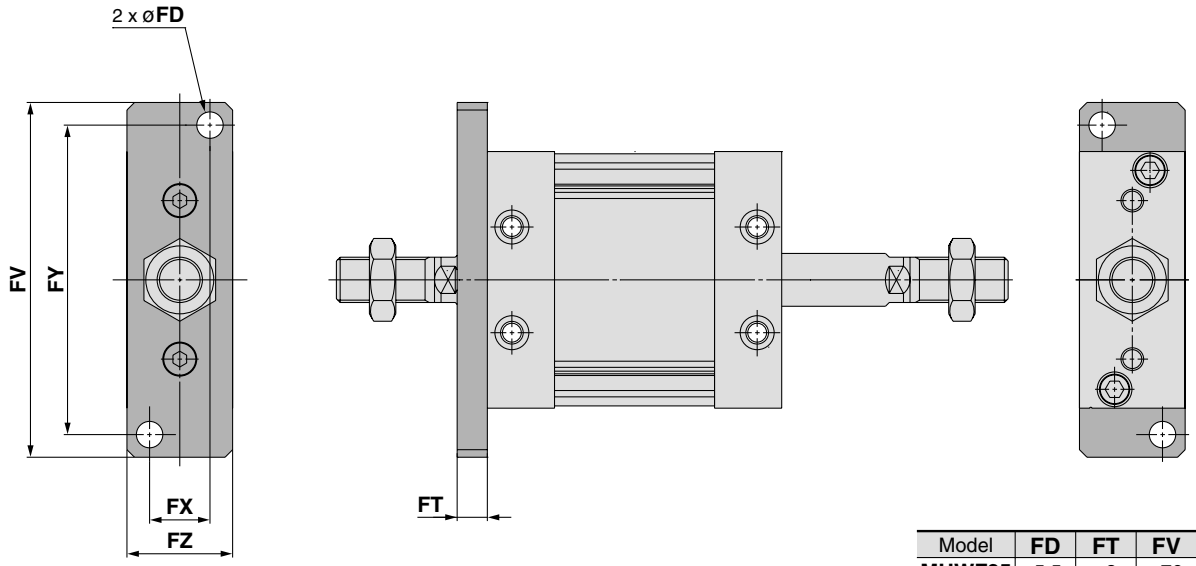


(mm)

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

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

Nil	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

Nil	Rod end female thread
M	Rod end male thread

Auto switch

Nil	Without auto switch

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

Number of auto switches

Nil	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

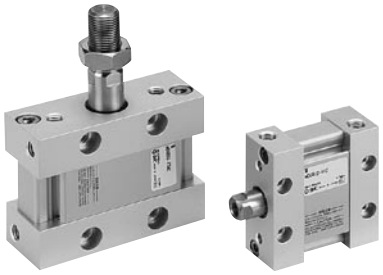
Applicable Auto Switches/Refer to Best Pneumatics No. 2 for further information on auto switches.

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 (Nil)	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-color 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-color 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-color 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 ·····Nil (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.

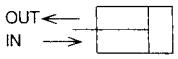
Mounting bracket \ Size	25	32	40	50	63
Foot Note 1)	MU-L02	MU-L03	MU-L04	MU-L05	MU-L06
Flange	MU-F02	MU-F03	MU-F04	MU-F05	MU-F06
Single clevis	MU-C02	MU-C03	MU-C04	MU-C05	MU-C06
Double clevis Note 3)	MU-D02	MU-D03	MU-D04	MU-D05	MU-D06

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:

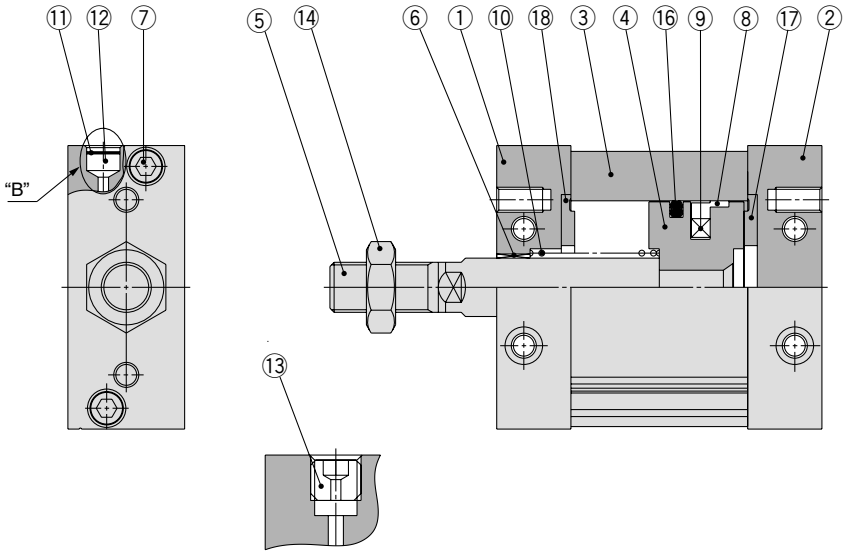
(Example 1) **MUB40-15S(T)Z**
- Basic weight ····· 0.60 kg

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

1.02 + 0.40 = 1.42 kg

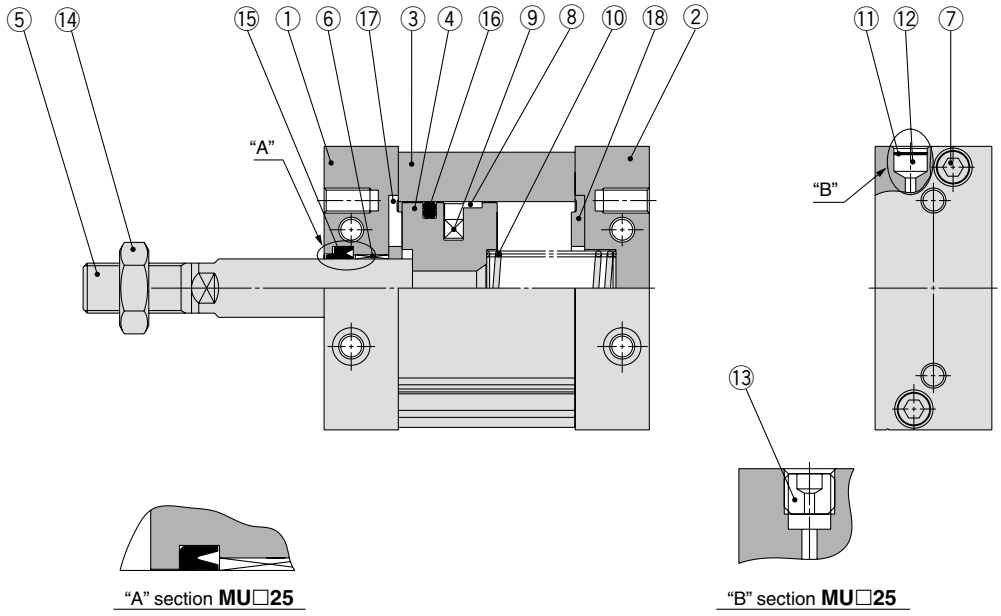
Construction

Spring return



"B" section **MU□25**

Spring extend



"A" section **MU□25**

"B" section **MU□25**

Component Parts

No.	Description	Material	Note
1	**Rod cover**	Aluminum alloy	Anodized
2	**Head cover**	Aluminum alloy	Anodized
3	**Cylinder tube**	Aluminum alloy	Hard anodized
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

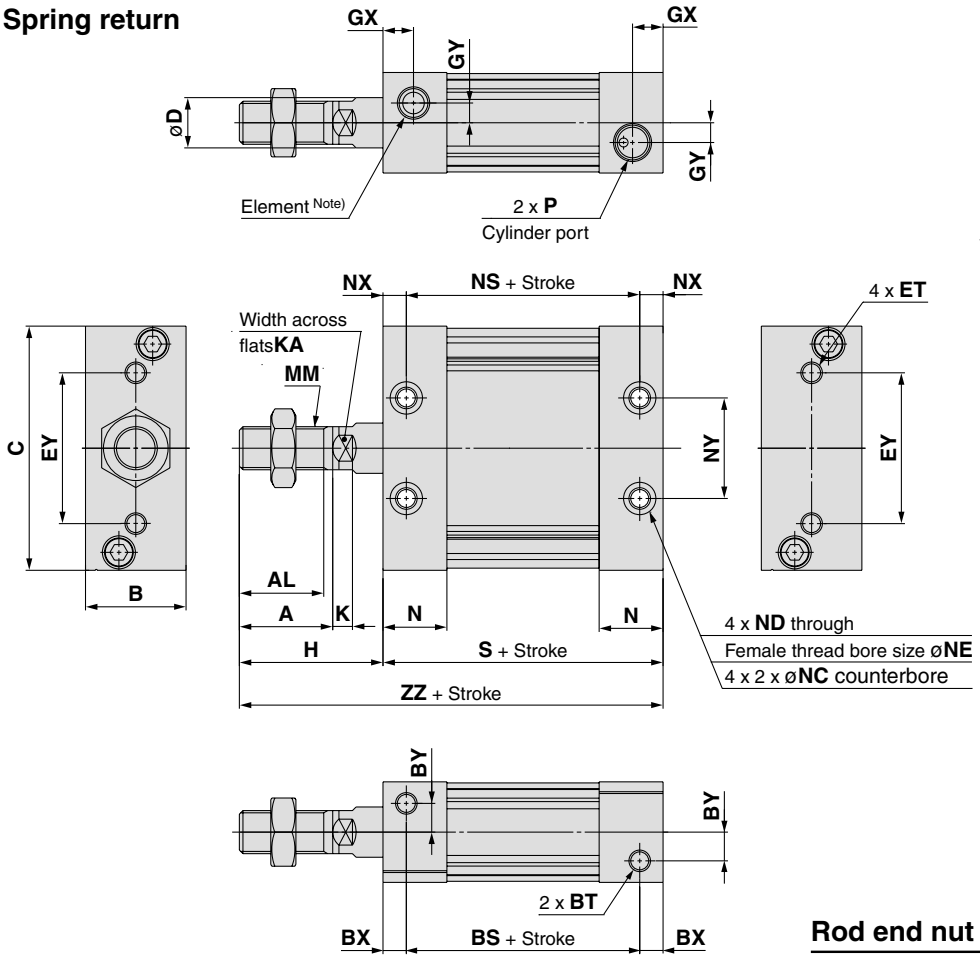
Bore size (mm)	Kit no.		Contents
	Spring return	Spring extend	
25	MU25S-PS	MU25T-PS	For spring return type: ⑯, ⑰, ⑱ as a set For spring extend type: ⑮, ⑯, ⑰, ⑱ as a set
32	MU32S-PS	MU32T-PS	
40	MU40S-PS	MU40T-PS	
50	MU50S-PS	MU50T-PS	
63	MU63S-PS	MU63T-PS	

∗ Seal kit includes ⑮, ⑯, ⑰, ⑱ (excluding ⑮ for spring return type). Order them with a part number for each bore size.

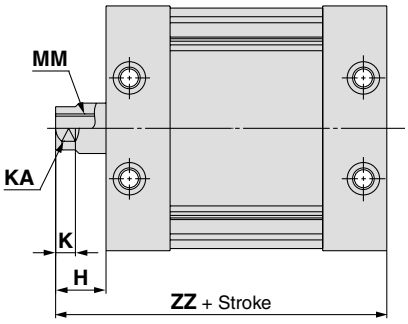
∗ Since the seal kit does not include a grease pack, order it separately.
Grease pack part no.: GR-S-010 (10 g)

Basic

Spring return

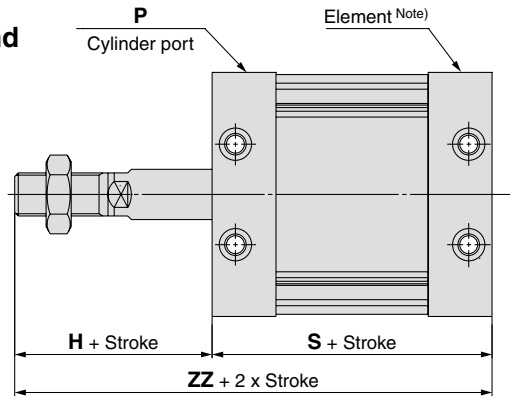


Rod end female thread



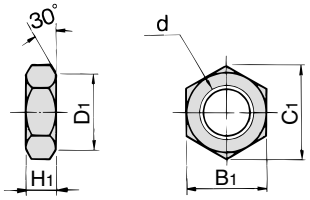
∗ Dimensions except mentioned above are the same as male thread type. However, K and KA dimensions are the same as male thread type.

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

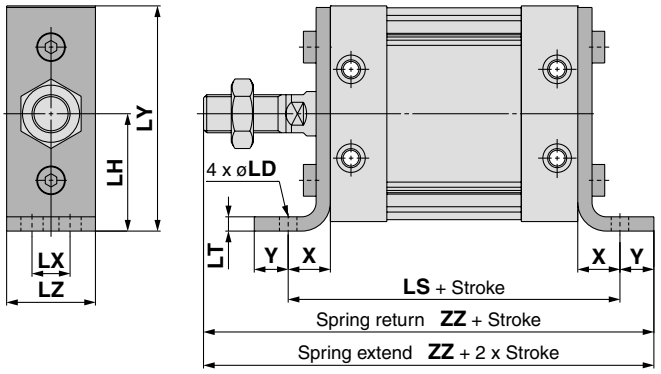
∗ The position of the 4 flats of the piston rod is ±3° in relation to the cylinder side surface.

Rod End Female Thread (mm)

Model	H	MM	ZZ
MUB25	14	M6 x 1 depth 12	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

Dimensions with Mounting Bracket

Foot

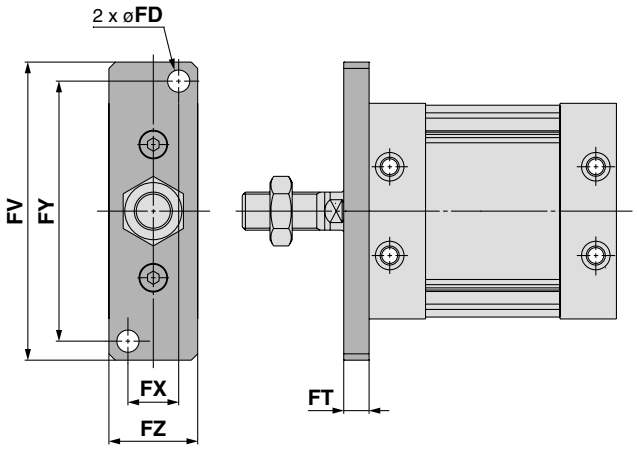


(mm)

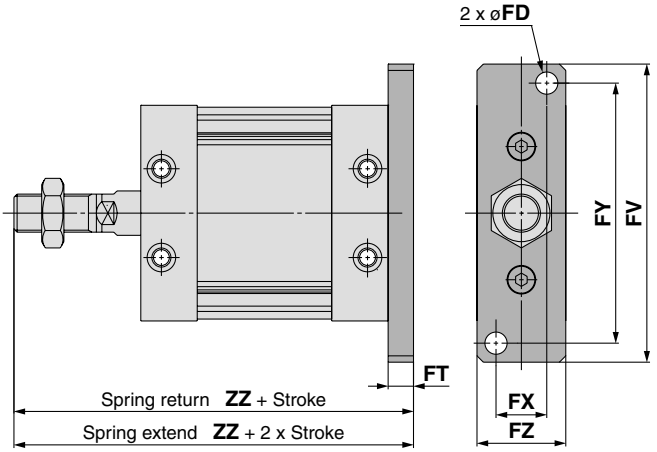
Model	LD	LH	LS	LT	LX	LY	LZ	X	Y	ZZ
MUL25	5.5	29	84	3.2	11	56	23	12	6	114
MUL32	6.6	37	95	4.5	12	71	27	16	8	127
MUL40	9	46	106	4.5	15	89	31	18	10	143
MUL50	11	57	126	5	18	109	37	21	11	169
MUL63	13.5	67	133	6	22	129	48	24	14	179

Foot bracket material: Rolled steel
Surface treatment: Nickel plated

Rod flange



Head flange

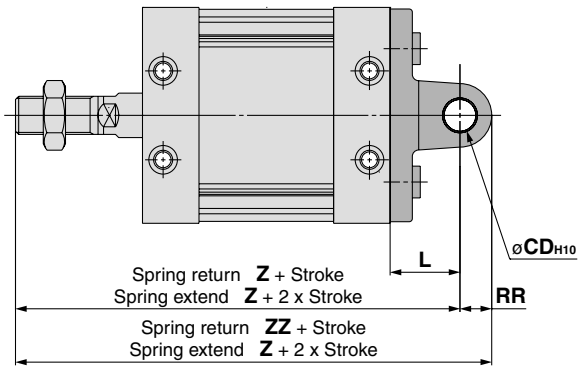


(mm)

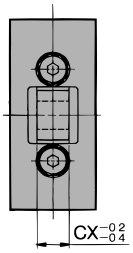
Model	FD	FT	FV	FX	FY	FZ	ZZ
MUF25, MUG25	5.5	8	76	14	66	24	104
MUF32, MUG32	7	8	94	16	82	28	111
MUF40, MUG40	9	9	118	18	102	32	124
MUF50, MUG50	11	12	144	22	126	39	149
MUF63, MUG63	13	14	168	30	148	50	155

Flange bracket material: Carbon steel
Surface treatment: Nickel plated

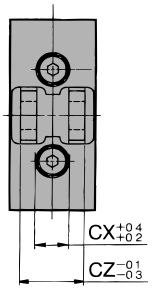
Single clevis
Double clevis



Single clevis



Double clevis



(mm)

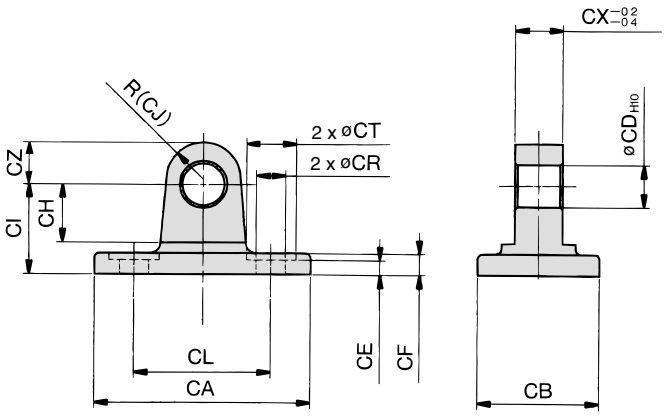
Model	CDH10	CX	CZ	L	RR	Z	ZZ
MUC25, MUD25	$8^{+0.058}_{0}$	9	18	17	8	113	121
MUC32, MUD32	$10^{+0.058}_{0}$	11	22	22	10	125	135
MUC40, MUD40	$10^{+0.058}_{0}$	13	26	27	10	142	152
MUC50, MUD50	$14^{+0.070}_{0}$	16	32	32	14	169	183
MUC63, MUD63	$14^{+0.070}_{0}$	16	32	38	16	179	185

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

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

Accessory Bracket Dimensions

Single Clevis (Double clevis pivot bracket)



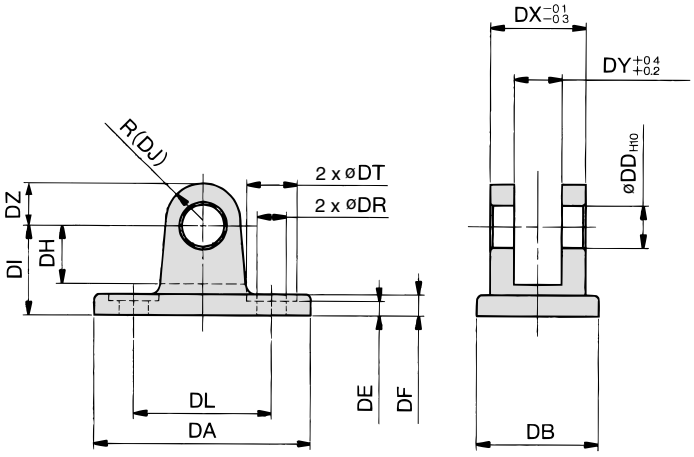
(mm)

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)

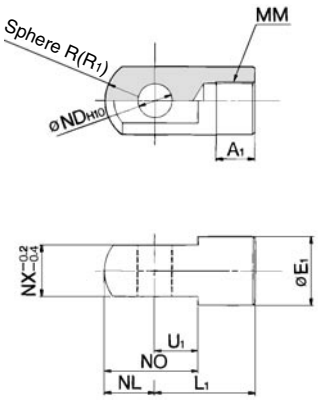
Part no.	Size	DA	DB	DD$_{H10}$	DE	DF	DH	DI	DJ
MU-D02	25	53	23	$8^{+0.058}_{0}$	3.5	4	11	17	7
MU-D03	32	67	27	$10^{+0.058}_{0}$	3.5	7	13	22	10
MU-D04	40	85	31	$10^{+0.058}_{0}$	3.5	10	13	27	10
MU-D05	50	103	37	$14^{+0.070}_{0}$	5.5	12	17	32	14
MU-D06	63	122	48	$14^{+0.070}_{0}$	6	14	19	38	16

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



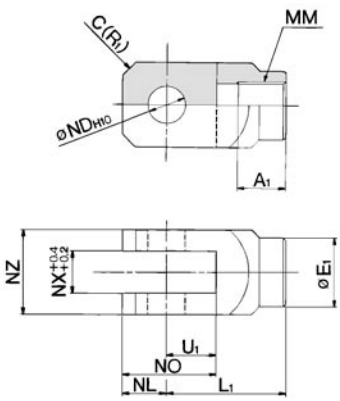
(mm)

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)

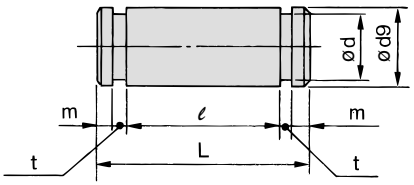
Part no.	Size	A$_1$	E$_1$	L$_1$	MM	ND$_{H10}$
Y-MU02	25	10.5	14	27	M10 x 1.25	$8^{+0.058}_{0}$
Y-MU03	32	12	18	31	M12 x 1.25	$10^{+0.058}_{0}$
Y-MU04	40	14	20	36	M14 x 1.5	$10^{+0.058}_{0}$
Y-MU05	50, 63	18	28	46	M18 x 1.5	$14^{+0.070}_{0}$

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)

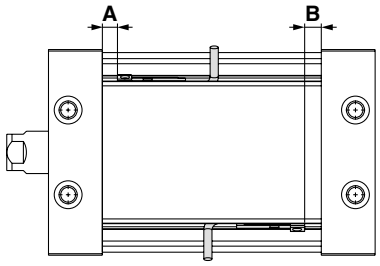
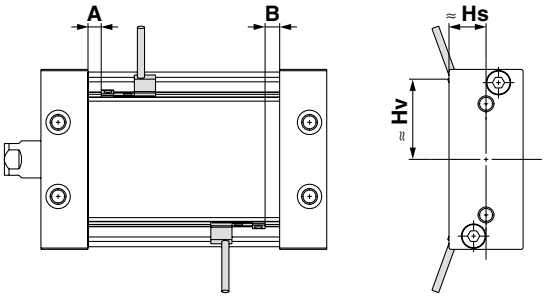
Part no.	Size	Dd9	L	d	ℓ	m	t	Retaining ring
CD-MU02	25	$8^{-0.040}_{-0.076}$	23	7.6	18.2	1.5	0.9	Type C8 for axis
CD-MU03	32	$10^{-0.040}_{-0.076}$	27	9.6	22.2	1.25	1.15	Type C10 for axis
CD-MU04	40	$10^{-0.040}_{-0.076}$	31	9.6	26.2	1.25	1.15	Type C10 for axis
CD-MU05	50, 63	$14^{-0.050}_{-0.093}$	38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

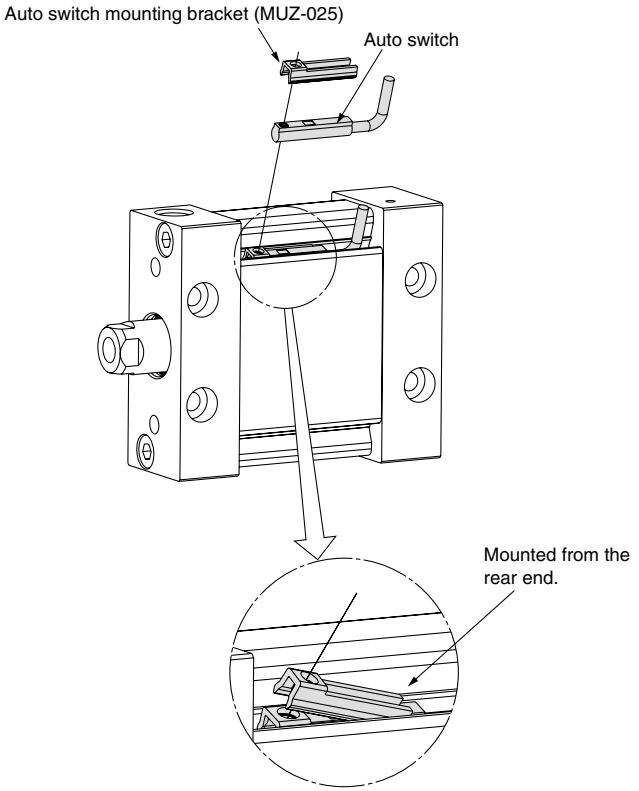
Auto switch model	Size				
	25	**32**	**40**	**50**	**63**
D-M9□/M9□V D-M9□W/M9□WV D-M9□AL/M9□AVL	5.5	5.5	5.5	5	5
D-A9□/A9□V	7.5	8	8	7	6.5

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

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.



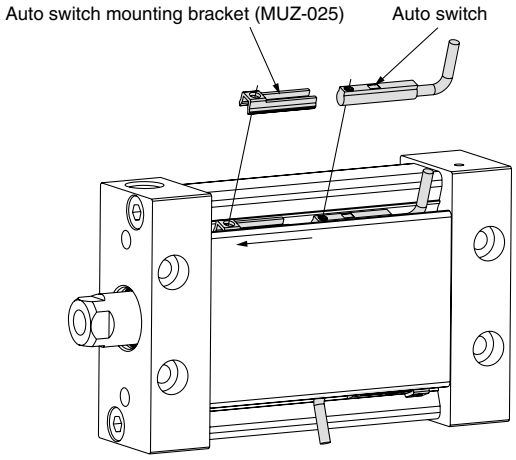
∗ The auto switch mounting bracket should be mounted from the rear end.

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 degree 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

Nil	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

Nil	Rod end female thread
M	Rod end male thread

Auto switch

Nil	None

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

Number of auto switches

Nil	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.

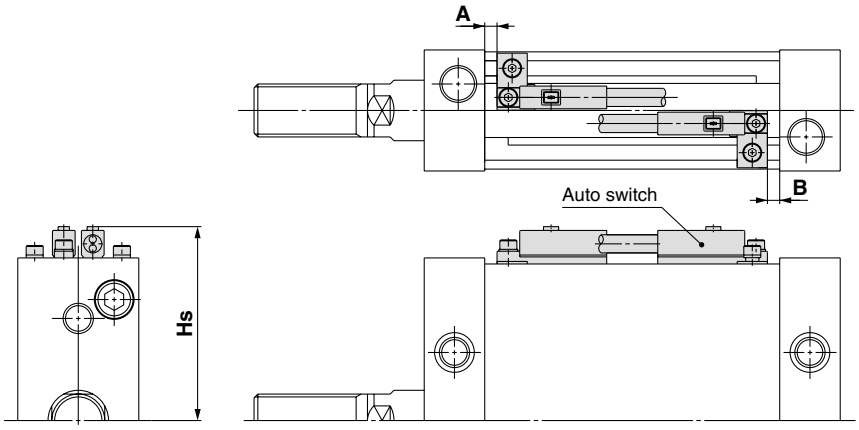
How to order the auto switch independently

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)
Nil	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)

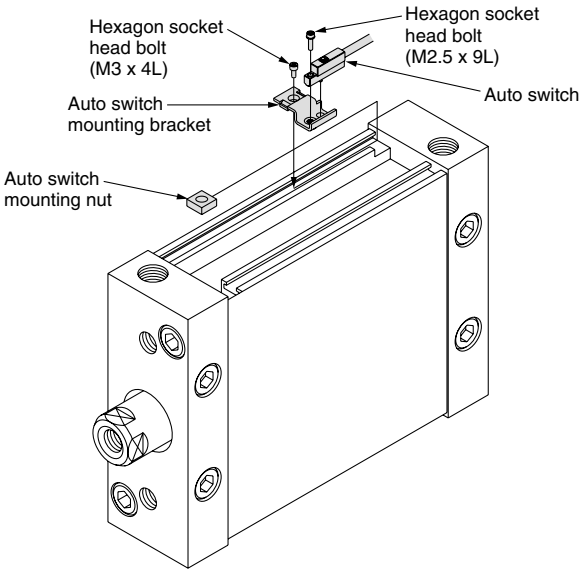
Bore size		
40	50	63
6	6	6

∗ 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)*1), and other safety regulations.

*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 catalog 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 catalog.
   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.∗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.

∗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.

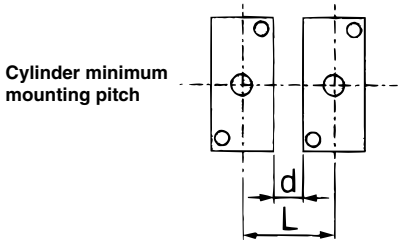
3. Operating the cylinder by connecting the piping directly to the cylinder can cause the piston speed to exceed the maximum operating speed of 500 mm/s. Therefore, to operate the cylinder, make sure to use an SMC speed controller and adjust the piston speed to 500 mm/s or less.

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

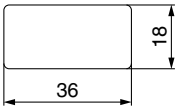
1. If multiple cylinders are operated adjacent to each other, the magnets that are enclosed in the adjacent cylinders could affect the operation of the auto switches, causing the switches to malfunction. Therefore, make sure that the mounting pitch of the cylinders is at least that indicated in the below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



(mm)

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

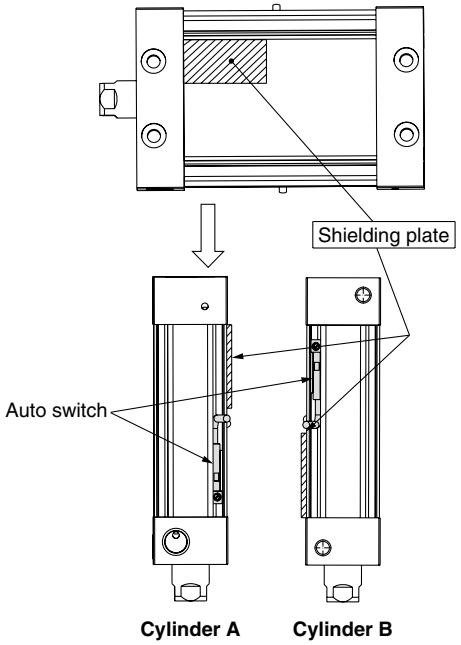
If cylinders are used with a mounting pitch less than shown above, they must be shielded with iron plates or the separately sold magnetic shielding plate (part no.: MU-S025). Please contact SMC for further information.



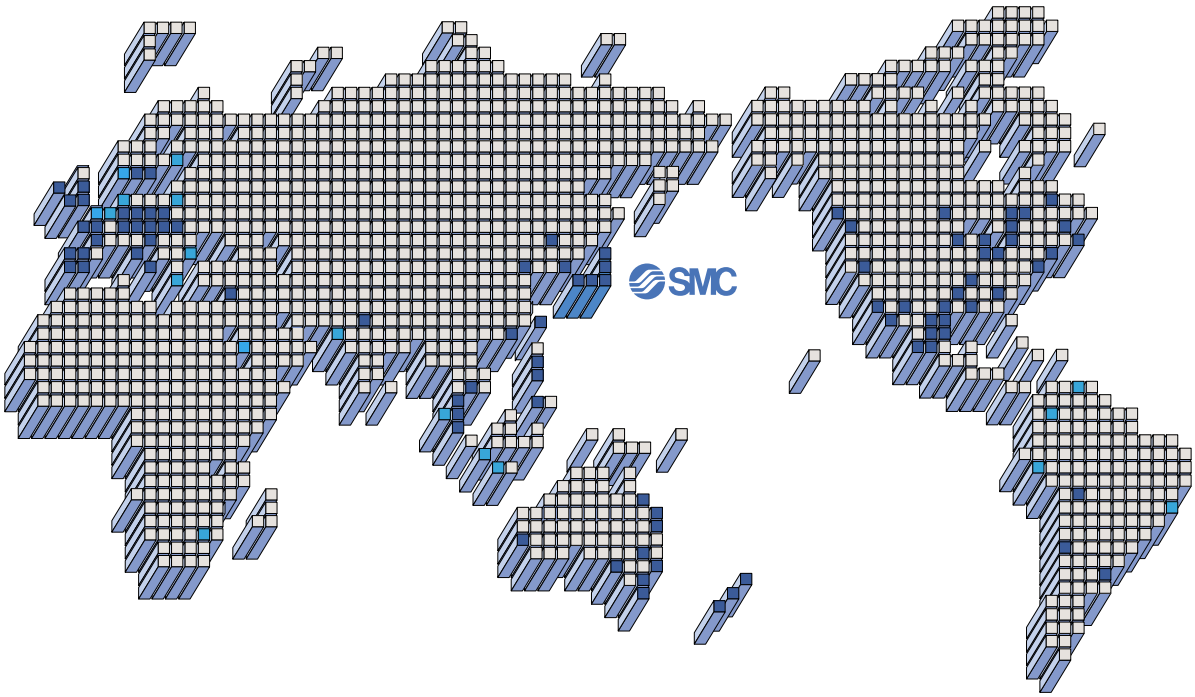
Material: Ferrite stainless steel Thickness: 0.3 mm
Since the back side is treated with adhesive, it can be attached to the cylinder.

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.



SMC'S GLOBAL MANUFACTURING, DISTRIBUTION AND SERVICE NETWORK



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⚠ Safety Instructions	Be sure to read “Handling Precautions for SMC Products” (M-E03-3) before using.

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