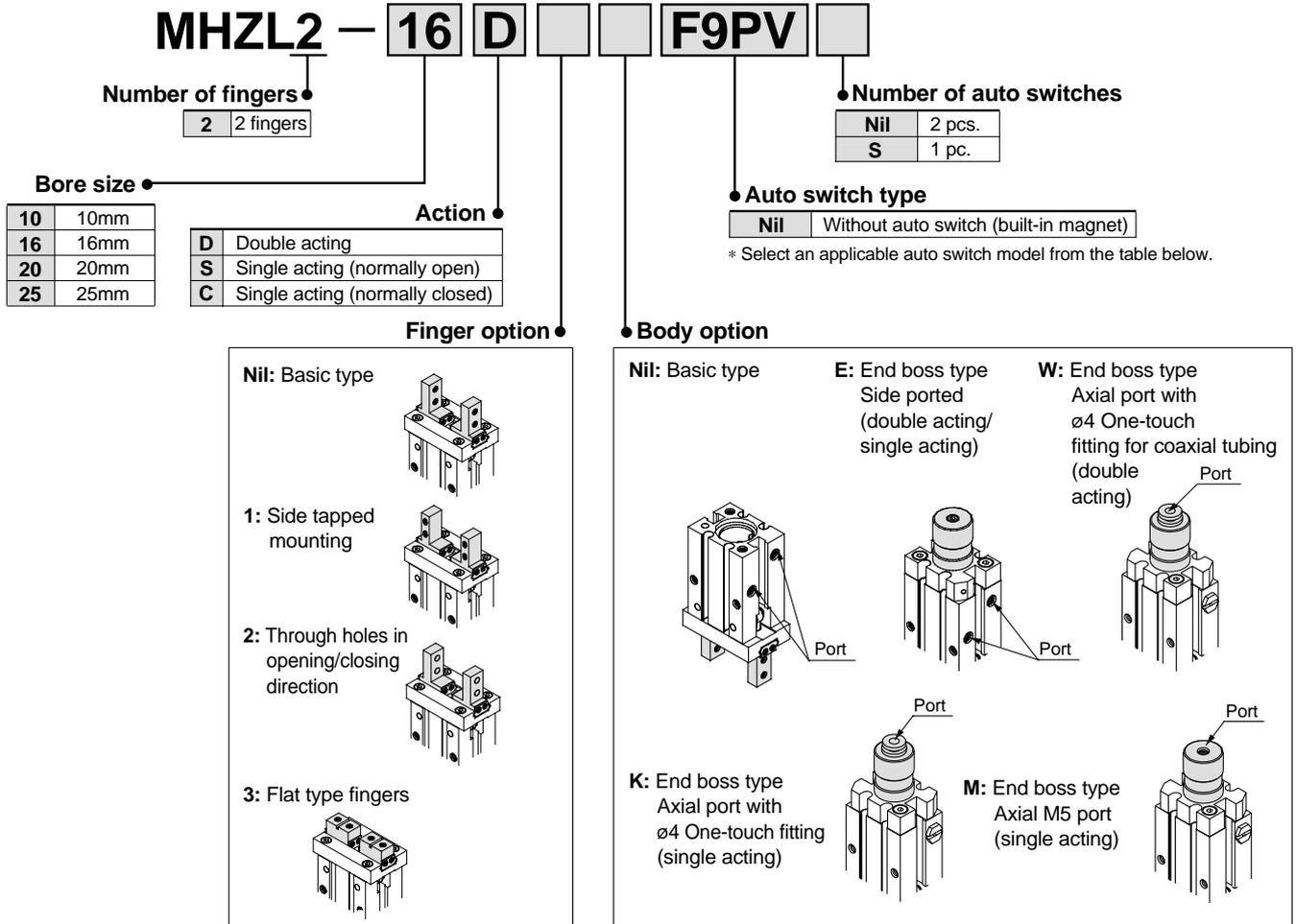


# Series MHZL2

## How to Order



**Applicable auto switches/**\* Refer to pages 48 through 60 for detailed auto switch specifications.

Type	Special function	Electrical entry	Indicator light	Wiring (output)	Load voltage		Auto switch part no.		Lead wire length (m) <sup>1)</sup>			Flexible lead wire (-61) <sup>Note 2)</sup>	Applicable load	Applicable model								
					DC	AC	Perpendicular	In-line	0.5 (Nil)	3 (L)	5 (Z)			ø10	ø16	ø20	ø25					
Solid state switch	—	Grommet	Yes	3 wire (NPN)	24V	—	Y69A	Y59A	●	●	○	Standard	IC circuit	●	●	●	●					
							F9NV	F9N	●	●	—			○	●	●	●	●				
							F8N	—	●	●	○			○	●	●	●	●				
							Y7PV	Y7P	●	●	○			Standard	IC circuit	●	●	●	●			
				3 wire (PNP)	24V	—	F9PV	F9P	●	●	—	○	○	○	○	○	○	○	○	○	○	
							F8P	—	●	●	○	○	○	○	○	○	○	○	○	○	○	
							Y69B	Y59B	●	●	○	○	○	○	○	○	○	○	○	○	○	○
							F9BV	F9B	●	●	—	○	○	○	○	○	○	○	○	○	○	○
				Diagnostic indication (2 color indicator)	Grommet	Yes	2 wire	24V	—	F8B	—	●	●	○	○	○	○	○	○	○	○	
										Y7NWV	Y7NW	●	●	○	Standard	IC circuit	○	○	○	○	○	○
	F9NWV	F9NW	●							●	○	○	○	○	○	○	○	○	○	○		
	Y7PWV	Y7PW	●							●	○	Standard	IC circuit	○	○	○	○	○	○	○		
	Diagnostic indication (2 color indicator)	Grommet	Yes	2 wire	24V	—	F9PWV	F9PW	●	●	○	○	○	○	○	○	○	○				
							Y7BWV	Y7BW	●	●	○	Standard	○	○	○	○	○	○	○			
F9BWV							F9BW	●	●	○	○	○	○	○	○	○	○	○				
F9BWW							F9BW	●	●	○	○	○	○	○	○	○	○	○				

\* Lead wire length symbols: 0.5m ..... Nil (Example) F9N  
3m ..... L (Example) F9NL  
5m ..... Z (Example) Y59AZ

Note 2) Add "-61" at the end of the part number for the flexible lead wire.  
(Examples)

\* Auto switches marked with a "○" symbol are produced upon receipt of order.

Note 1) Use caution regarding hysteresis in the 2 color indicator types. When using this type, refer to "Auto Switch Hysteresis" on page 56.

Note 3) Through hole mounting is not possible when using auto switch types D-Y59, D-Y69, or D-Y7.

When ordering with an air gripper

MHZ -16D-F9NVS-

Flexible lead wire ●

When ordering auto switches only

D-F9PL-

Flexible lead wire ●

### Specifications

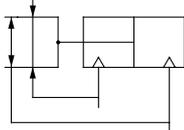


<b>Fluid</b>		Air	
<b>Operating pressure</b>	<b>Double acting</b>	$\phi 10$ : 0.2 to 0.7MPa $\phi 16$ to $\phi 25$ : 0.1 to 0.7MPa	
	<b>Single acting</b>	<b>Normally open</b>	$\phi 10$ : 0.35 to 0.7MPa
		<b>Normally closed</b>	$\phi 16$ to $\phi 25$ : 0.25 to 0.7MPa
<b>Ambient and fluid temperature</b>		-10 to 60°C	
<b>Repeatability</b>		$\pm 0.01$ mm	
<b>Maximum operating frequency</b>		120c.p.m.	
<b>Lubrication</b>		Non-lube	
<b>Action</b>		Double acting, Single acting	
<b>Auto switch (option)</b> <small>Note)</small>		Solid state switch (3 wire, 2 wire)	

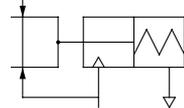
Note) Refer to pages 48 through 60 for details regarding auto switch specifications.

### Symbols:

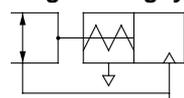
#### Double acting type



#### Single acting type, normally open



#### Single acting type, normally closed



### Models

Action	Model	Bore size (mm)	Gripping force <small>Note 1)</small>		Opening/Closing stroke (both sides) mm	<small>Note 2)</small> Weight g	
			Gripping force per finger Effective value N				
			External gripping force	Internal gripping force			
Double acting	<b>MHZL2-10D</b>	10	11	17	8	60	
	<b>MHZL2-16D</b>	16	34	45	12	135	
	<b>MHZL2-20D</b>	20	42	66	18	270	
	<b>MHZL2-25D</b>	25	65	104	22	470	
Single acting	Normally open	<b>MHZL2-10S</b>	10	7.1	—	8	70
		<b>MHZL2-16S</b>	16	27		12	145
		<b>MHZL2-20S</b>	20	33		18	290
		<b>MHZL2-25S</b>	25	50		22	515
	Normally closed	<b>MHZL2-10C</b>	10	—	13	8	70
		<b>MHZL2-16C</b>	16		38	12	140
		<b>MHZL2-20C</b>	20		57	18	290
		<b>MHZL2-25C</b>	25		85	22	515

Note 1) Values based on pressure of 0.5MPa, gripping point L = 20mm, at center of stroke.

Note 2) Values excluding weight of auto switch.

### Options

#### • Body options/End boss type

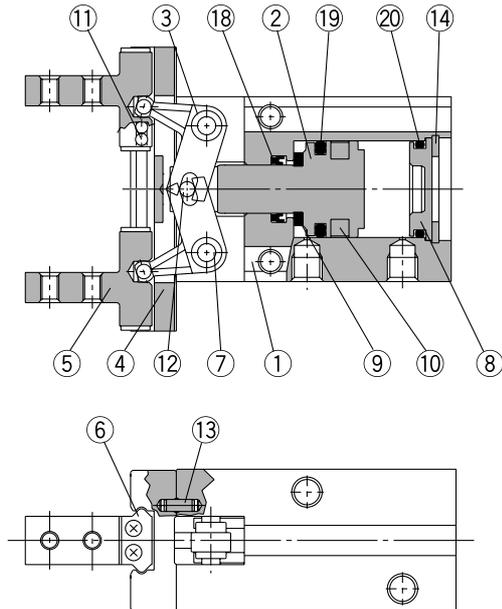
Symbol	Piping port position	Type of piping port				Applicable model	
		<b>MHZL2-10</b>	<b>MHZL2-16</b>	<b>MHZL2-20</b>	<b>MHZL2-25</b>	Double acting	Single acting
Nil	Basic type	M3 x 0.5	M5 x 0.8			●	●
<b>E</b>	Side ported	M3 x 0.5	M5 x 0.8			●	●
<b>W</b>	Axial port	With $\phi 4$ One-touch fitting for coaxial tube				●	—
<b>K</b>	Axial port	With $\phi 4$ One-touch fitting				—	●
<b>M</b>	Axial port	M5 x 0.8				—	●

\* For detailed body option specifications, refer to option specifications on pages 35 and 36.

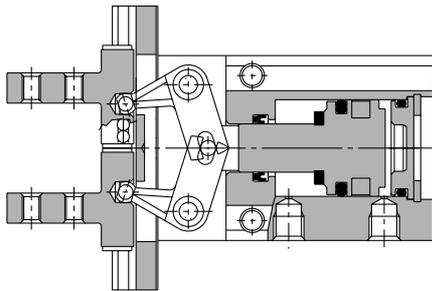
# Series MHZL2

## Construction/MHZL2-10□ to 25□

### Double acting/with fingers open



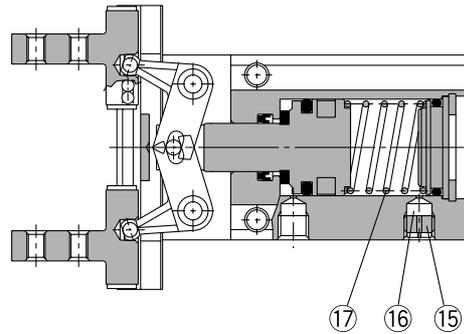
### Double acting/with fingers closed



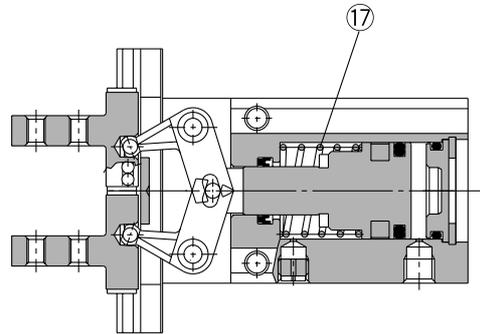
#### Parts list

No.	Description	Material	Note
1	<b>Body</b>	Aluminum alloy	Hard anodized
2	<b>Piston</b>	ø10, ø16: Stainless steel ø20, ø25: Aluminum alloy	ø20, ø25: Hard anodized
3	<b>Lever</b>	Stainless steel	Heat treated
4	<b>Guide</b>	Stainless steel	Heat treated
5	<b>Finger</b>	Stainless steel	Heat treated
6	<b>Roller stopper</b>	Stainless steel	
7	<b>Lever shaft</b>	Stainless steel	Nitrided
8	<b>Cap</b>	Aluminum alloy	Clear anodized
9	<b>Bumper</b>	Urethane rubber	
10	<b>Rubber magnet</b>	Synthetic rubber	

### Single acting/normally open



### Single acting/normally closed



#### Parts list

No.	Description	Material	Note
11	<b>Steel balls</b>	High carbon chromium bearing steel	
12	<b>Needle roller</b>	High carbon chromium bearing steel	
13	<b>Parallel pin</b>	Stainless steel	
14	<b>C type snap ring</b>	Carbon steel	Nickel plated
15	<b>Exhaust plug A</b>	Brass	Electroless nickel plated
16	<b>Exhaust filter A</b>	Polyvinyl formal	
17	<b>Spring</b>	Stainless steel spring wire	
18	<b>Rod seal</b>	NBR	
19	<b>Piston seal</b>	NBR	
20	<b>O-ring</b>	NBR	

#### Replacement parts: Seal kits

Seal kit no.				Description
MHZL2-10D	MHZL2-16D	MHZL2-20D	MHZL2-25D	Kits include items 18, 19 and 20 from the table above.
MHZL10-PS	MHZL16-PS	MHZL20-PS	MHZL25-PS	

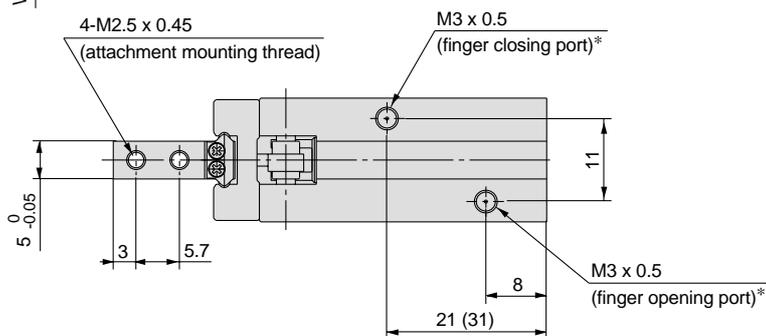
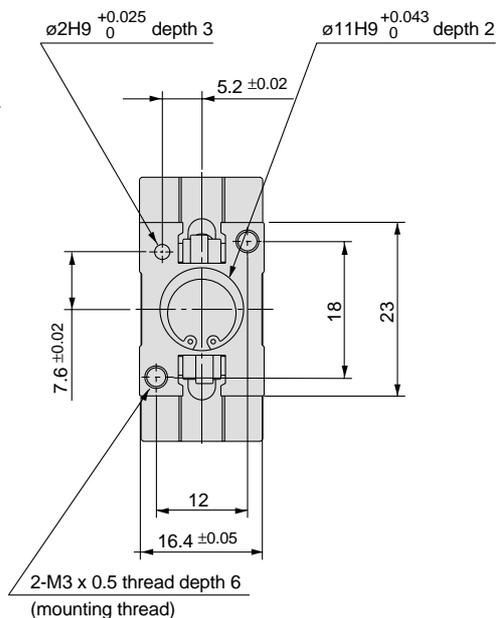
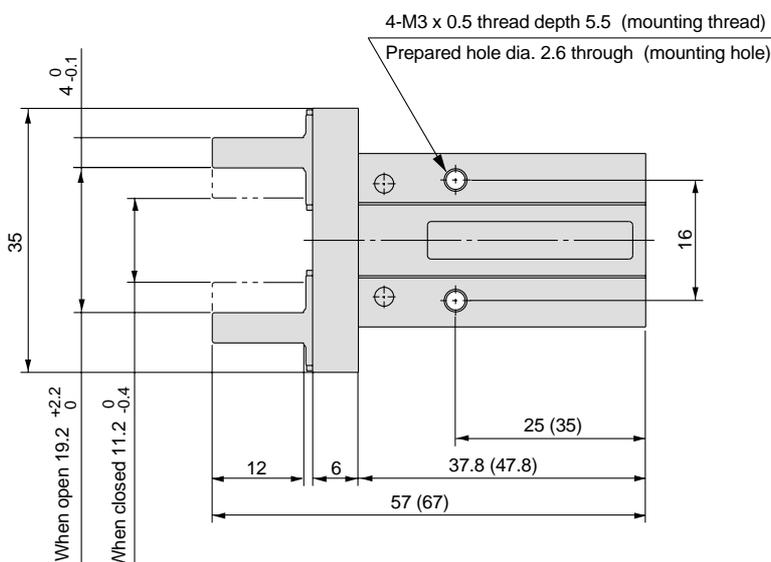
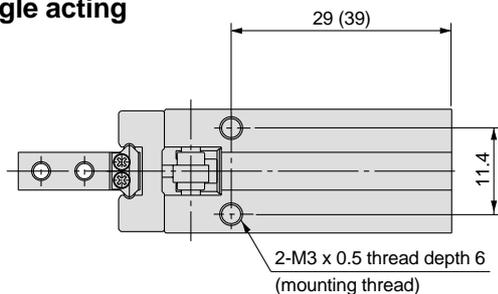
\* Seal kits consist of items 18, 19 and 20 in one kit, and can be ordered using the seal kit number for each cylinder bore size.

## Dimensions

### MHZL2-10□ Double acting/Single acting Basic type

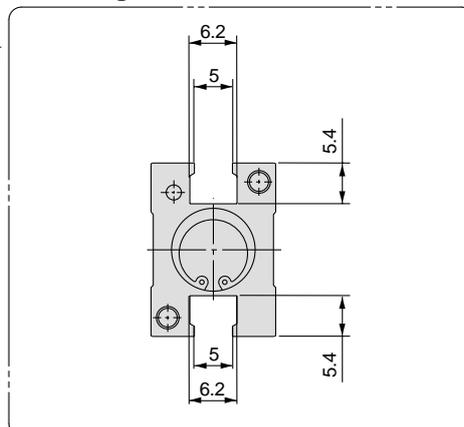
**Scale: 100%**

The values inside ( ) are dimensions for the single acting type.



\* For single action, the port on one side is a breathing hole.

### Auto switch mounting groove dimensions



(Noe) When using auto switches D-Y59, D-Y69 and D-Y7, through hole mounting is not possible.

# Series MHZL2

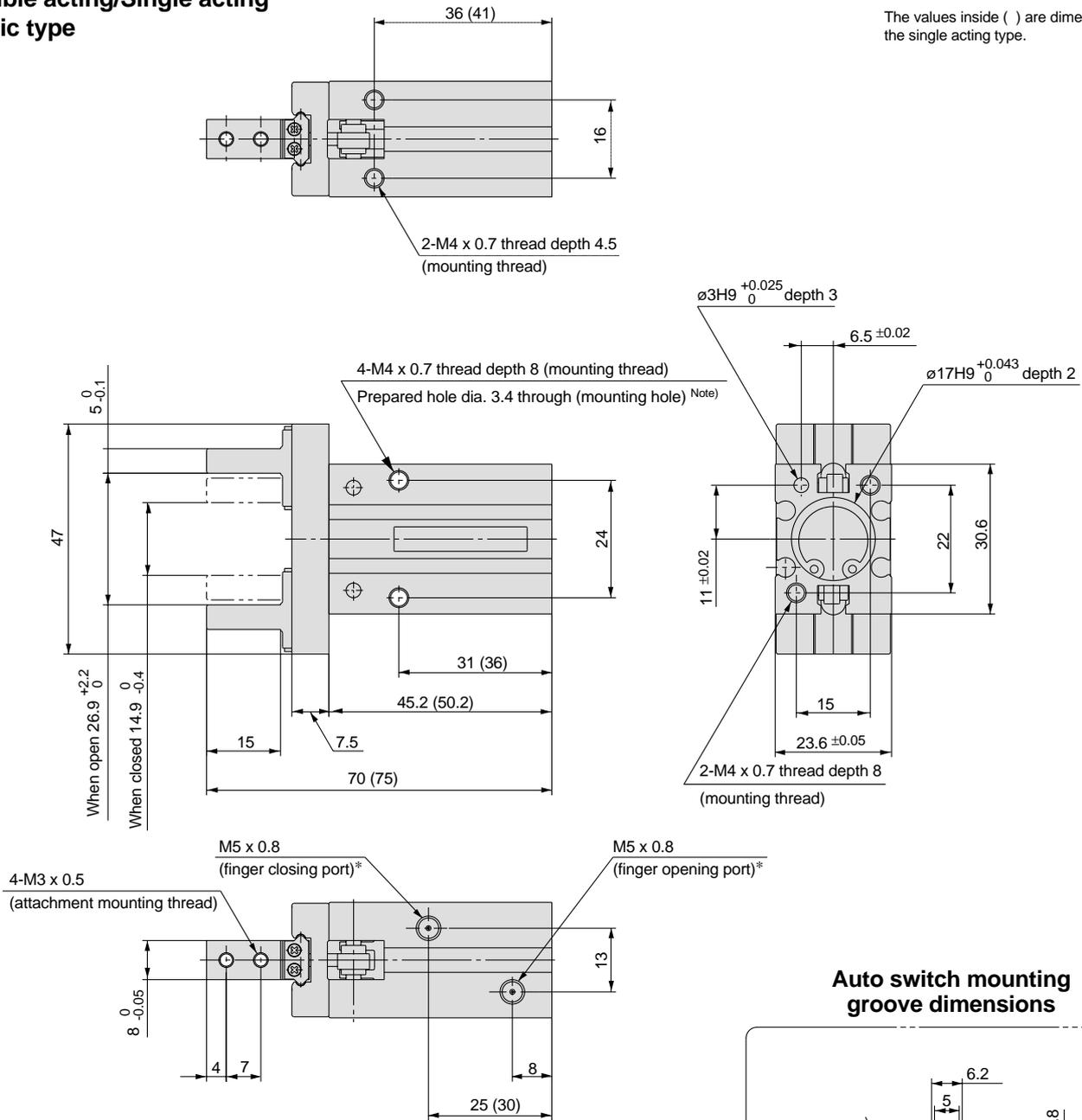
## Dimensions

MHZL2-16□

Double acting/Single acting  
Basic type

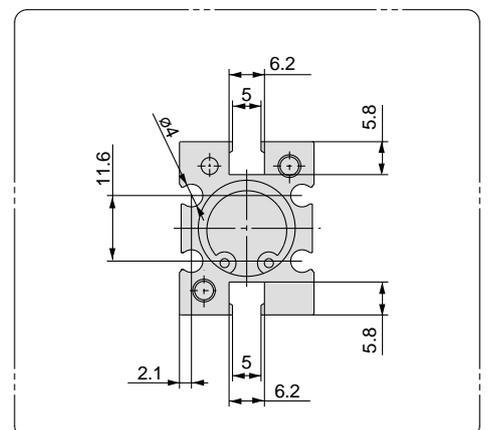
Scale: 75%

The values inside ( ) are dimensions for the single acting type.



\* For single action, the port on one side is a breathing hole.

### Auto switch mounting groove dimensions

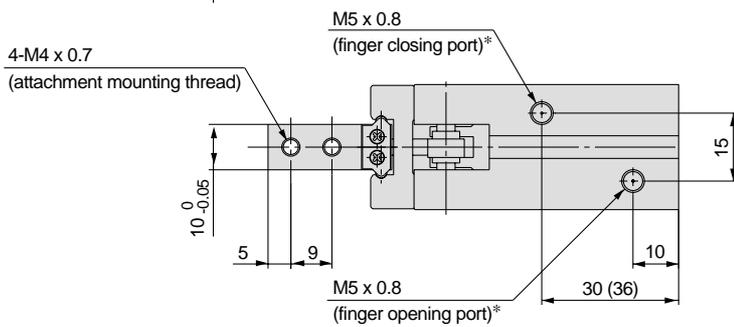
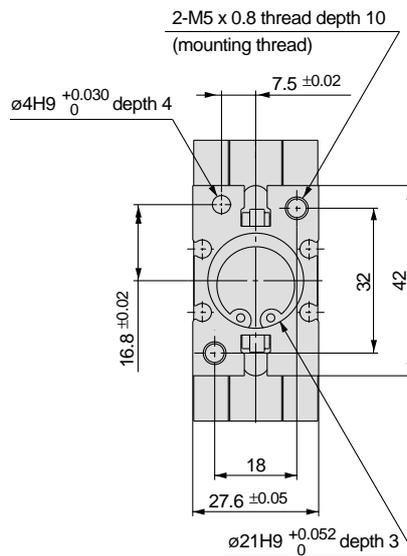
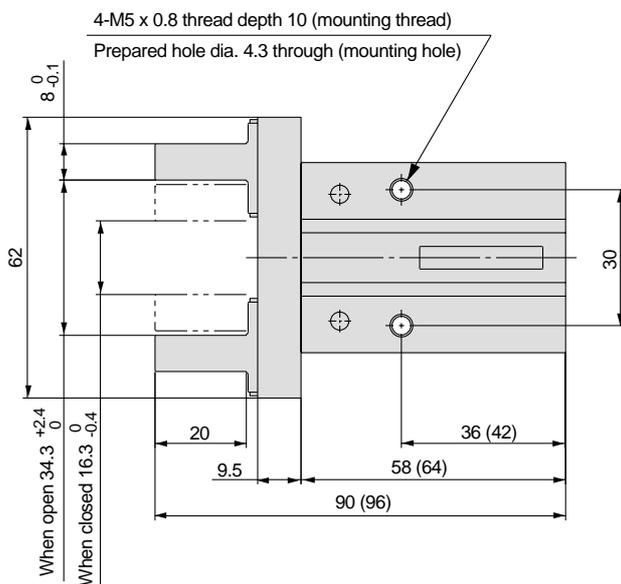
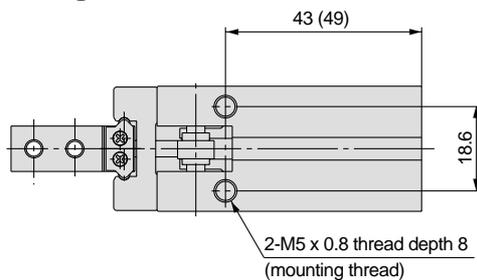


Note) When using D-Y59, D-Y69 and D-Y7 type auto switches, through hole mounting is not possible.

**MHZL2-20**  
Double acting/Single acting  
Basic type

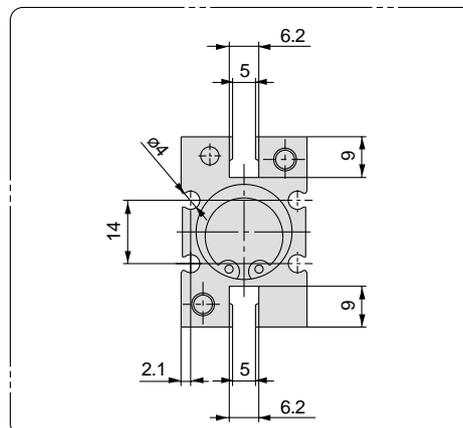
**Scale: 60%**

The values inside ( ) are dimensions for the single acting type.



\* For single action, the port on one side is a breathing hole.

**Auto switch mounting groove dimensions**



Note) When using D-Y59, D-Y69 and D-Y7 type auto switches, through hole mounting is not possible.

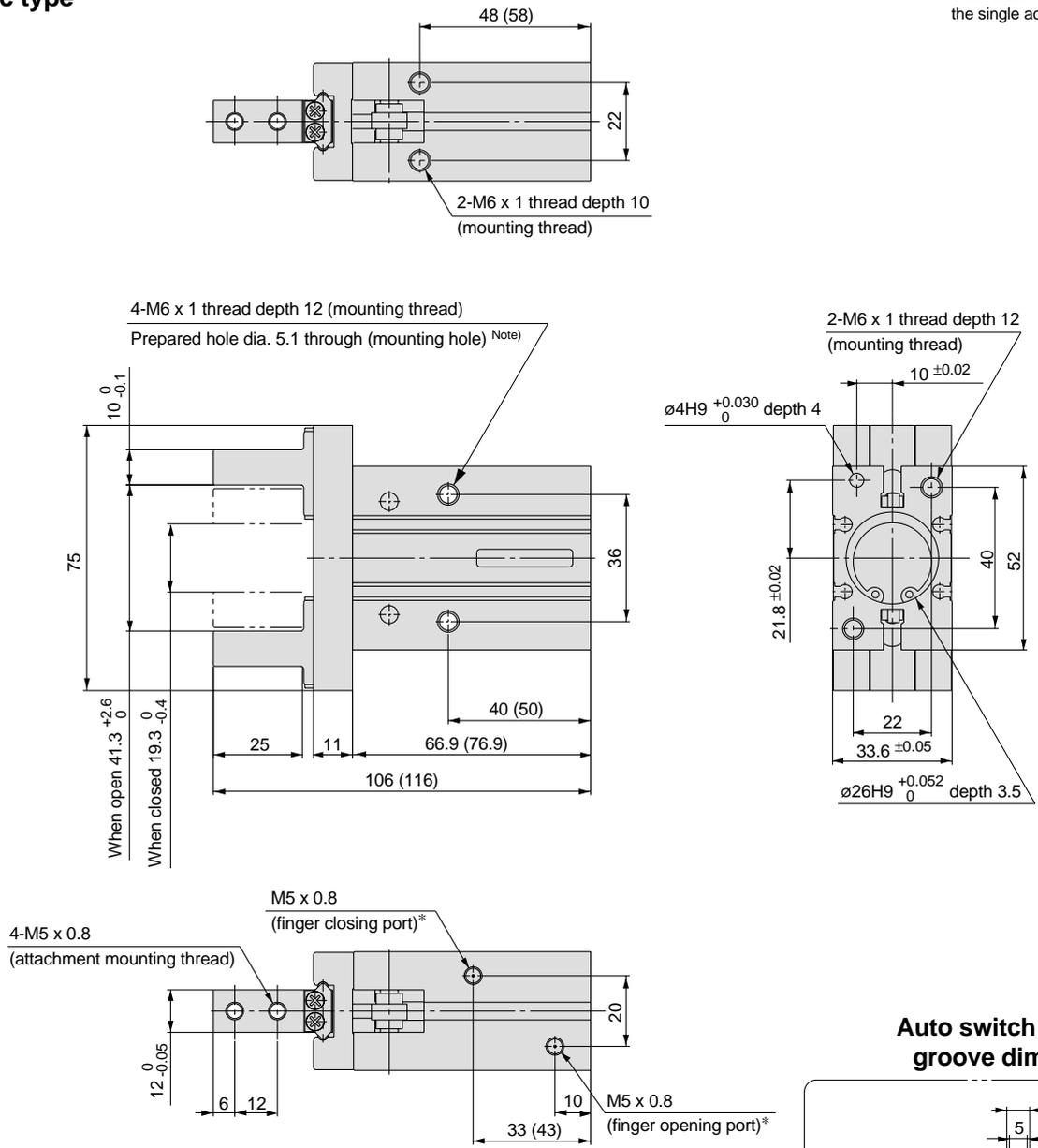
# Series MHZL2

## Dimensions

### MHZL2-25□ Double acting/Single acting Basic type

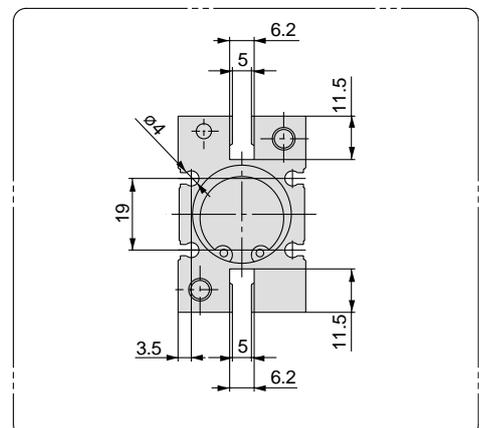
**Scale: 50%**

The values inside ( ) are dimensions for the single acting type.



\* For single action, the port on one side is a breathing hole.

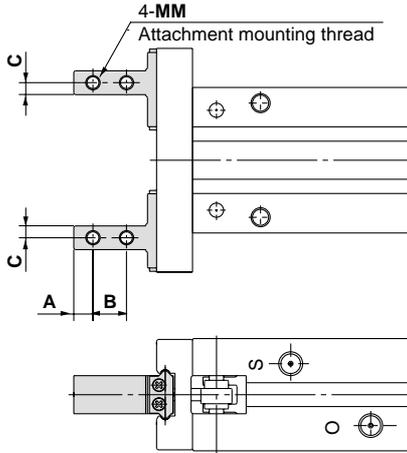
### Auto switch mounting groove dimensions



Note) When using D-Y59, D-Y69 and D-Y7 type auto switches, through hole mounting is not possible.

# Long Stroke/Series MHZL2 Finger Options

## Side Tapped Mounting [1]

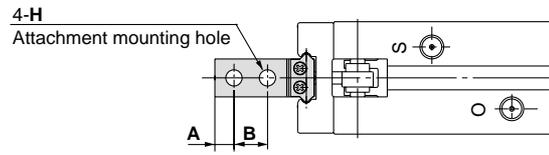
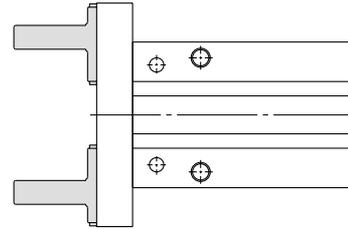


Unit: mm

Model	A	B	C	MM
MHZL2-10□1□	3	5.7	2	M2.5 x 0.45
MHZL2-16□1□	4	7	2.5	M3 x 0.5
MHZL2-20□1□	5	9	4	M4 x 0.7
MHZL2-25□1□	6	12	5	M5 x 0.8

\* Specifications and dimensions other than the above are the same as the basic type.

## Through Holes in Opening/Closing Direction [2]

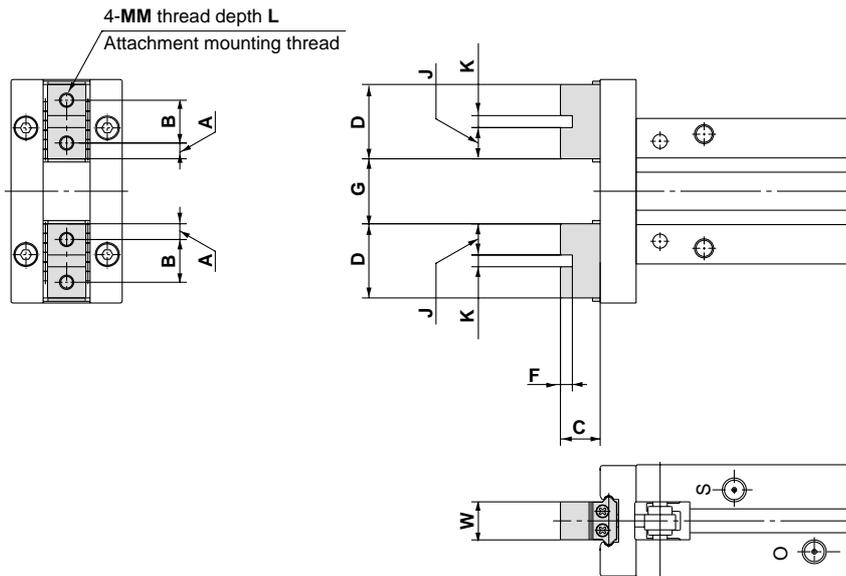


Unit: mm

Model	A	B	H
MHZL2-10□2□	3	5.7	2.9
MHZL2-16□2□	4	7	3.4
MHZL2-20□2□	5	9	4.5
MHZL2-25□2□	6	12	5.5

\* Specifications and dimensions other than the above are the same as the basic type.

## Flat Type Fingers [3]



Unit: mm

Model	A	B	C	D	F	G		J	K	MM	L	W	Weight g	
						Open	Closed						Double acting	Single acting
MHZL2-10□3□	2.45	7	5.2	11.9	2	9.4 <sup>+2.2</sup> <sub>0</sub>	1.4 <sup>0</sup> <sub>-0.2</sub>	4.95	2H9 <sup>+0.025</sup> <sub>0</sub>	M2.5 x 0.45	5	5 <sup>0</sup> <sub>-0.05</sub>	60	70
MHZL2-16□3□	3.3	9	8.3	15.6	2.5	13.4 <sup>+2.2</sup> <sub>0</sub>	1.4 <sup>0</sup> <sub>-0.2</sub>	6.55	2.5H9 <sup>+0.025</sup> <sub>0</sub>	M3 x 0.5	6	8 <sup>0</sup> <sub>-0.05</sub>	135	145
MHZL2-20□3□	3.95	12	10.5	19.9	3	19.6 <sup>+2.4</sup> <sub>0</sub>	1.6 <sup>0</sup> <sub>-0.2</sub>	8.45	3H9 <sup>+0.025</sup> <sub>0</sub>	M4 x 0.7	8	10 <sup>0</sup> <sub>-0.05</sub>	270	290
MHZL2-25□3□	4.9	14	13.1	23.8	4	24 <sup>+2.6</sup> <sub>0</sub>	2 <sup>0</sup> <sub>-0.2</sub>	9.9	4H9 <sup>+0.030</sup> <sub>0</sub>	M5 x 0.8	10	12 <sup>0</sup> <sub>-0.05</sub>	460	505

\* Specifications and dimensions other than the above are the same as the basic type.

Compact Series  
MHZA2-6/MHZAJ2-6

Standard Type  
MHZ2

Long Stroke  
MHZL2

With Dust Cover  
MHZJ2

Auto Switches

Order Made

Model Selection

Precautions

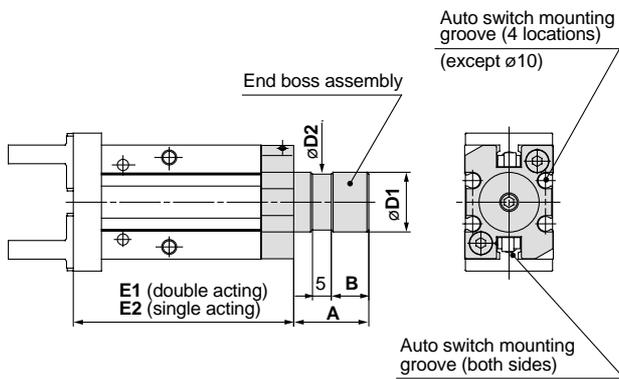
# Long Stroke/Series MHZL2

## Body Options: End Boss Type

### Applicable Models

Symbol	Piping port position	Type of Piping Port				Applicable model		
		MHZL2-10	MHZL2-16	MHZL2-20	MHZL2-25	Double acting	Single acting	
		M3 x 0.5		M5 x 0.8			Normally open	Normally closed
E	Side ported	M3 x 0.5		M5 x 0.8		●	●	●
W	Axial port	With ø4 One-touch fitting for coaxial tube				●	—	—
K		With ø4 One-touch fitting				—	●	●
M		M5 x 0.8				—	●	●

### Side Ported [E]



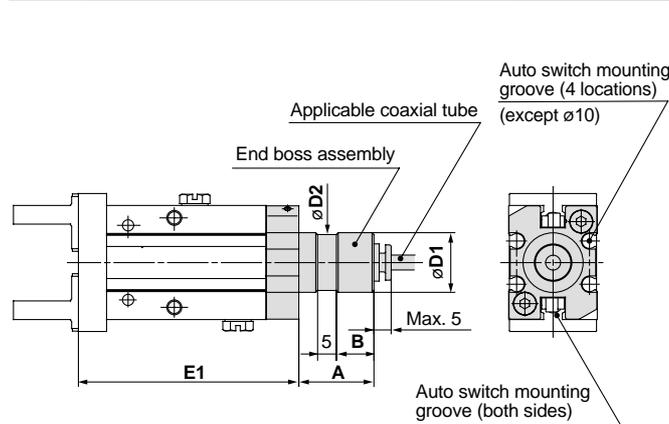
- \* Refer to the dimension table.
- \* When auto switches are used, side mounting with through holes is not possible.

Unit: mm

Model	A	B	D1	D2	E1	E2
MHZL2-10□□	15	7	12f8 <sup>-0.016</sup> <sub>-0.043</sub>	11	52.8	62.8
MHZL2-16□□	20	10	16f8 <sup>-0.016</sup> <sub>-0.043</sub>	15	61.4	66.4
MHZL2-20□□	22	12	20f8 <sup>-0.020</sup> <sub>-0.053</sub>	19	75.7	81.7
MHZL2-25□□	25	15	25f8 <sup>-0.020</sup> <sub>-0.053</sub>	24	86.2	96.2

Other dimensions and specifications correspond to the standard type.

### Axial Port (One-touch Fitting for Coaxial Tubing) [W]



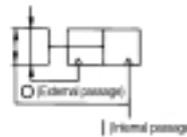
- \* Refer to the dimension table.
- \* When auto switches are used, side mounting with through holes is not possible.

Unit: mm

Model	A	B	D1	D2	E1
MHZL2-10□□	15	7	12f8 <sup>-0.016</sup> <sub>-0.043</sub>	11	52.8
MHZL2-16□□	20	10	16f8 <sup>-0.016</sup> <sub>-0.043</sub>	15	61.4
MHZL2-20□□	22	12	20f8 <sup>-0.020</sup> <sub>-0.053</sub>	19	75.7
MHZL2-25□□	25	15	25f8 <sup>-0.020</sup> <sub>-0.053</sub>	24	86.2

Other dimensions and specifications correspond to the standard type.

#### Reference symbol

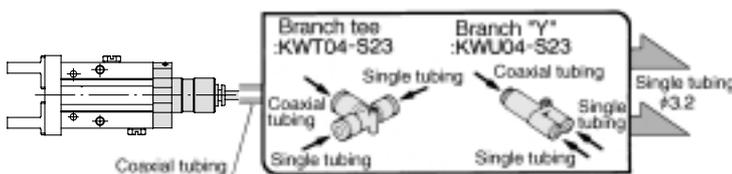


#### Applicable coaxial tubing

Specification	Model	TW04B-20
Outside diameter		4mm
Max. operating pressure		0.6MPa
Min. bending radius		10mm
Operating temperature		-20 to 60°C
Material		Nylon 12

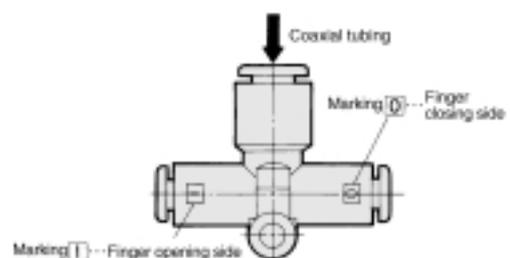
### Changing from Coaxial to Single Tubing

Changing to single tubing is possible by using a branch "Y" or branch tee fitting. In this case particularly, single tube fittings and tubing for ø3.2 will be necessary.

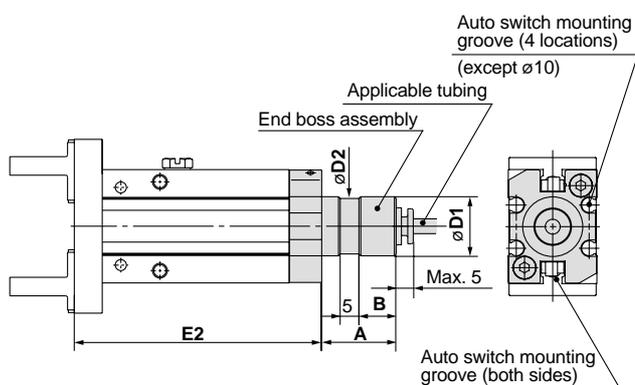


### Branch tee, Different diameter tee, Branch "Y", Male run tee

Refer to catalog CAT.E004-A "Coaxial Air Tubing System" regarding coaxial tubing.



## Axial Port (with One-touch Fitting) [K]



- \* Refer to the dimension table.
- \* When auto switches are used, side mounting with through holes is not possible.

Unit: mm

Model	A	B	D1	D2	E2
MHZL2-10□□	15	7	12f8 <sup>-0.016</sup> <sub>-0.043</sub>	11	62.8
MHZL2-16□□	20	10	16f8 <sup>-0.016</sup> <sub>-0.043</sub>	15	66.4
MHZL2-20□□	22	12	20f8 <sup>-0.020</sup> <sub>-0.053</sub>	19	81.7
MHZL2-25□□	25	15	25f8 <sup>-0.020</sup> <sub>-0.053</sub>	24	96.2

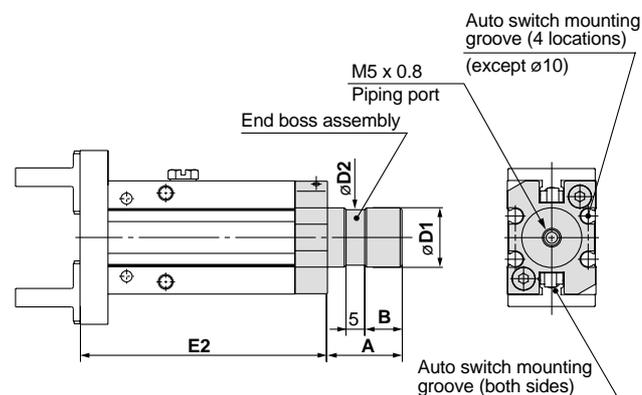
Other dimensions and specifications correspond to the standard type.

### Applicable tubing

Description Model	Nylon tubing	Soft nylon tubing	Polyurethane tubing	Polyurethane coiled tubing
	Specification	T0425	TS0425	TU0425
Outside diameter mm	4	4	4	4
Max. operating pressure MPa	1.0	0.8	0.5	0.5
Min. bending radius mm	13	12	10	—
Operating temperature °C	-20 to 60	-20 to 60	-20 to 60	-20 to 60
Material	Nylon 12	Nylon 12	Polyurethane	Polyurethane

Refer to catalog CAT. 501-B "Air Fittings and Tubing" regarding One-touch fittings and tubing.

## Axial Port (M5 Port) [M]



- \* Refer to the dimension table.
- \* When auto switches are used, side mounting with through holes is not possible.

Unit: mm

Model	A	B	D1	D2	E2
MHZL2-10□□	15	7	12f8 <sup>-0.016</sup> <sub>-0.043</sub>	11	62.8
MHZL2-16□□	20	10	16f8 <sup>-0.016</sup> <sub>-0.043</sub>	15	66.4
MHZL2-20□□	22	12	20f8 <sup>-0.020</sup> <sub>-0.053</sub>	19	81.7
MHZL2-25□□	25	15	25f8 <sup>-0.020</sup> <sub>-0.053</sub>	24	96.2

Other dimensions and specifications correspond to the standard type.

## Weights

Unit: g

Model	End boss type (symbol)				
	E		W	K	M
	Double acting	Single acting			
MHZL2□-10□□	70	80	70	80	80
MHZL2□-16□□	170	180	170	180	180
MHZL2□-20□□	310	330	310	330	330
MHZL2□-25□□	535	580	535	580	580

## Solid-state Auto Switches for Direct Mounting Series D-M9N(V)/D-M9P(V)/D-M9B(V)



### Grommet

- Reduced load currents for two-wire model (2.5 to 40 mA)
- Compliance with lead-free requirements
- Use of UL-approved lead wires (style 2844)



### Auto Switch Specifications

PLC: Programmable Logic Controller

D-M9□/D-M9□V (with Indicator light)						
Model number	D-M9N	D-M9NV	D-M9P	D-M9PV	D-M9B	D-M9BV
Electrical entry	In-line	Perpendicular	In-line	Perpendicular	In-line	Perpendicular
Wiring	Three-wire			Two-wire		
Output	NPN		PNP		—	
Applicable load	Integrated circuit, relay and PLC				24 V DC relay and PLC	
Power voltage	5, 12, or 24 V DC (4.5 to 28 V DC)				—	
Current consumption	10 mA or less				—	
Load voltage	28 V DC or less		—		24 V DC (10 to 28 V DC)	
Load current	40 mA or less				2.5 to 40 mA	
Internal voltage drop	0.8 V or less				4 V or less	
Leakage current	100 μA max. at 24 V DC				0.8 mA or less	
Indicator light	Red LED lights when ON.					

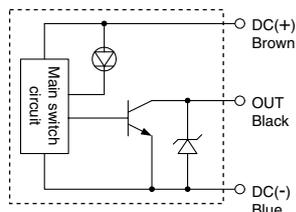
- Lead wire: oil-proof heavy-duty vinyl cable  
 2.7 x 3.2 with elliptic cross-section, 0.15 mm<sup>2</sup>, two cores (D-M9B),  
 or three cores (D-M9N and D-M9P)

### Solid state switch specifications

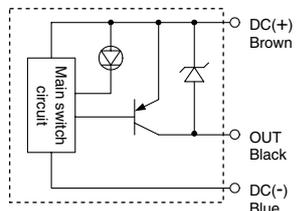
Leakage current	3-wire: 100 μA or less; 2-wire: 0.8 mA max.
Operating time	1 ms or less
Impact resistance	1000 m/s <sup>2</sup>
Insulation resistance	50 MΩ or more at 500 V DC (between lead wire and case)
Withstand voltage	1000 V AC for 1 min. (between lead wire and case)
Ambient temperature	-10°C to 60°C
Enclosure	IEC529 standard IP67, JIS C 0920 watertight construction

### Internal circuits

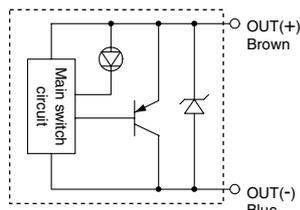
#### D-M9N/M9NV



#### D-M9P/M9PV



#### D-M9B/M9BV



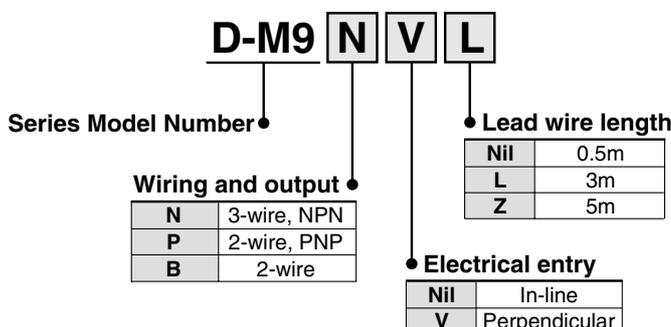
### Weight

Unit: g

Model	D-M9N(V)	D-M9P(V)	D-M9B(V)
Lead wire length (m)	0.5	8	7
	3	41	38
	5	68	63

### How to Order

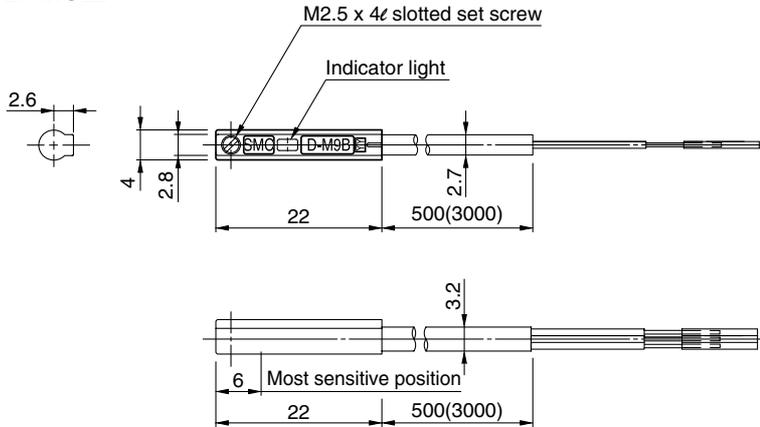
#### Standard Model Number



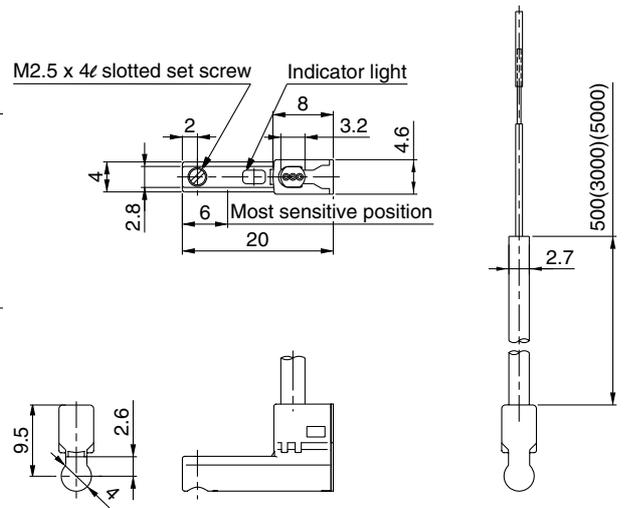
# Series D-M9

## Auto Switch Dimensions

### D-M9□



### D-M9□V



## ⚠ Specific Product Precautions

Be sure to read before handling. Contact SMC when the required specification is out of range.

### Handling

## ⚠ Caution

Observe the following precautions when handling the product.

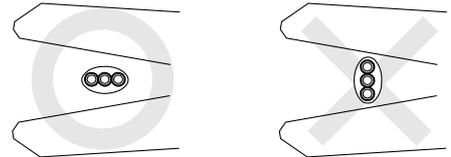
- The D-M9 series of auto switches is not overcurrent-protected. Faulty wiring or short circuit may result in breakage or burning-out of the switch.
- When stripping the cable clad, be careful about the orientation of the cable being stripped. The insulator may be accidentally torn or damaged depending on the orientation, as shown on the right.

- We recommend the following tools

Manufacturer	Product name	Product number
VESSEL	Wire stripper	No 3000G
Tokyo Ideal	Strip master	45-089

\* The stripper for the round shape cords (ø2.0) is for a 2-wire style.

- Please do not attach the switch with any other screws than those already attached to the auto switch body.



## The operation range is shorter than that of the conventional models.

If the auto switch replaces the conventional model, it may not function depending on its application because the operation range is shorter. Refer to the examples below.

- In an application where at the end, the stopping position shifting range is larger than the operation range. For example, pushing a work against something, or pressing a work into a hole, or clamping a work.
- In an application where the auto switch is used to detect an intermediate stopping position. (Detecting time is shortened.)

Note) Please contact SMC for the operation range details for each actuator.

The switch is damaged instantly when a load is shortened since short circuit protection is not built-in. Pay special attention to avoid reversing the connection of the brown lead of the power supply line and the black output line connection.