SMC

CE

e-Actuator

e-Rodless Actuator

New

- **Remote control type**
- **5-point stoppable type has been added.**

Integrated control type

Positioning repeatability

Both ends: **± 0.01 mm**

Intermediate: **± 0.1 mm**

Remote control type

Cam follower guide type
*Series **E-MY2C***
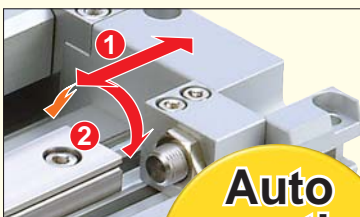
High precision guide type
*Series **E-MY2H***

No programming required

Realising electric controllability similar to that of an air cylinder by 3 step operation

1 **2** **3**

Stroke adjustment

❶ Movable stroke adjusting unit
❷ Small incremental adjustments can be made by using an adjusting bolt

Auto operation
Possible to operate by using the same signals as those for a solenoid valve (with a PLC)
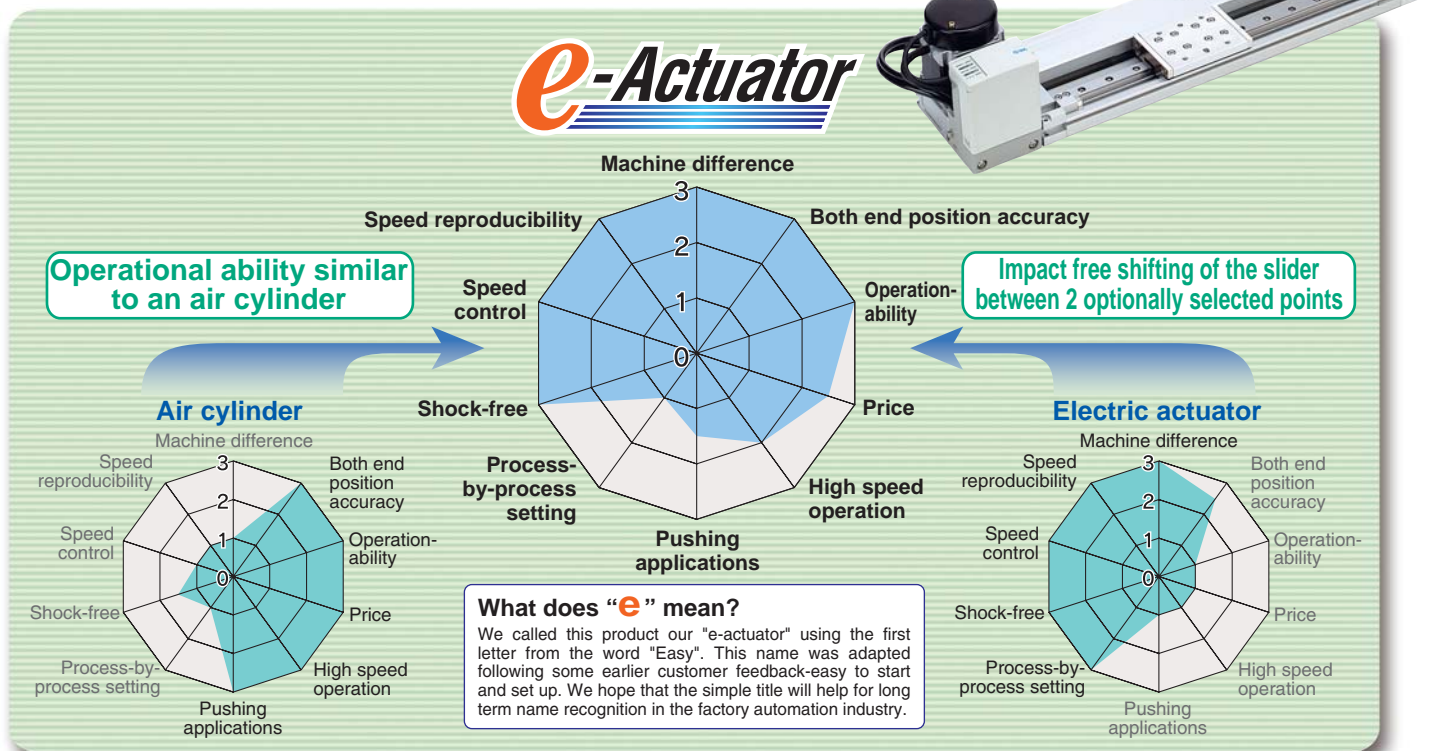
Stroke learning

Press STROKE STUDY switch

MIDDLE PWR
MOTOR
ALM
END

Speed and acceleration setting

Adjust SPEED, ACCELERATION
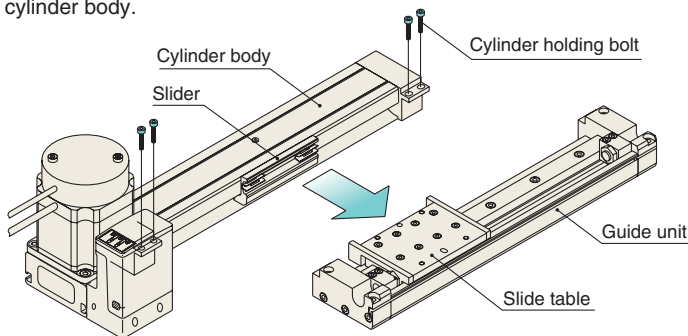
Push

MIDDLE PWR
MOTOR
ALM
END

SPEED ACCELERATION

Having both the operational ability of an air cylinder and the speed controllability of an electric actuator
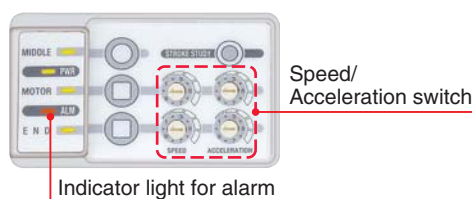
New actuator concept

e-Actuator

Operational ability similar to an air cylinder

Impact free shifting of the slider between 2 optionally selected points

Radar chart (center)
Machine difference
Both end position accuracy
Operation-ability
Price
High speed operation
Pushing applications
Process-by-process setting
Shock-free
Speed control
Speed reproducibility

Air cylinder
Machine difference
Both end position accuracy
Operation-ability
Price
High speed operation
Pushing applications
Process-by-process setting
Shock-free
Speed control
Speed reproducibility

Electric actuator
Machine difference
Both end position accuracy
Operation-ability
Price
High speed operation
Pushing applications
Process-by-process setting
Shock-free
Speed control
Speed reproducibility

What does "e" mean?
We called this product our "e-actuator" using the first letter from the word "Easy". This name was adapted following some earlier customer feedback-easy to start and set up. We hope that the simple title will help for long term name recognition in the factory automation industry.

Easy Maintenance

The actuating part and the guide unit can be separated from the cylinder body.

Cylinder holding bolt
Cylinder body
Slider
Guide unit
Slide table

Motor Placement: Mounting position of the motor is user selectable and can either be on the top, bottom, left, or right of the actuator.

Motor
Controller

TA   TB
DA   DB

Motor placement

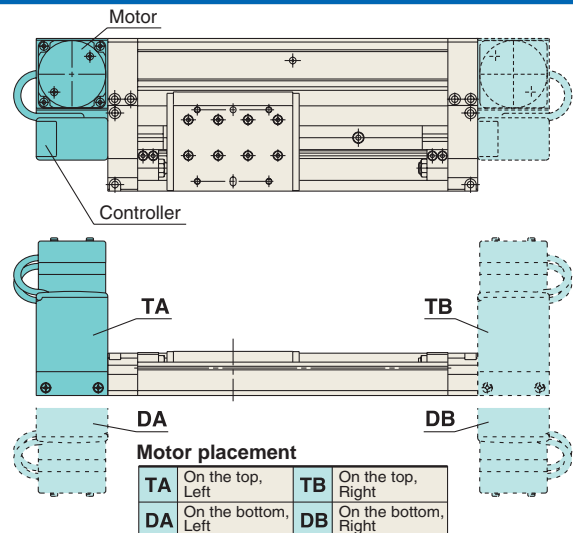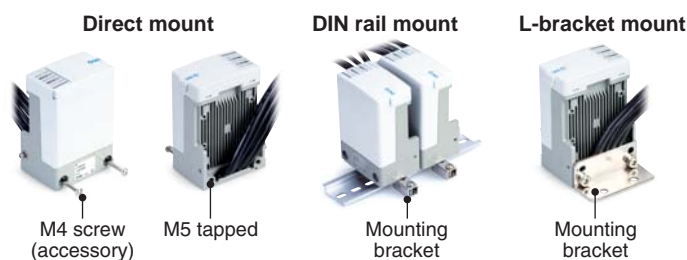|			
TA	On the top, Left	**TB**	On the top, Right
DA	On the bottom, Left	**DB**	On the bottom, Right

New Locking Functions

Settings for speed/acceleration can be locked.
If the speed/acceleration switch is changed in the middle of locking, the alarm light will blink. However, the motion will continue in accordance with the preprogrammed settings.

∗ Settings for locking a stroke and intermidiate position are not applicable.

MIDDLE
PWR
MOTOR
ALM
END

Speed/Acceleration switch

Indicator light for alarm

Manual Operation Is Possible.

Manual operation button

SMC

Remote Control Type

Easy to reset after installation as a result of the remote controller.
Suited for installing where it is difficult to reach because the controller can be operated in an easily accessible location.

● **Cable length is selectable from 1 m, 3 m and 5 m**
● **Improvement in the maximum operating temperature from 40°C to 50°C** (Actuator part only)
● **Mounting method can be selected among 3 types**

Direct mount   **DIN rail mount**   **L-bracket mount**

M4 screw   M5 tapped   Mounting   Mounting
(accessory)   bracket   bracket

Intermediate Stop Is Possible.

3-points stoppable type
(2-point for both ends and 1-point for an intermediate stop)
One intermediate stop is possible beside stops at both ends.

New **5-points stoppable type**
(2-point for both ends and 3-points for intermediate stop)
5-point positioning is possible at any preferred locations.

3-point
stoppable
type

5-point
stoppable
type
(with bar
on label)

New **Stop Function by External Input** (5-point stoppable type only)

Stop command by an external input such as a PLC or PC makes it possible to decelerate or stop a slider (as programmed).

Repeatability of stop functions by external stop

Travelling speed (mm/s)	100	500	1000
Repeatability (mm)	±0.5	±1.0	±2.0

Note) The valves shown are to be used as a selection guide and are not guaranteed.

Application example 1
Quick start-up is possible after stopping.

Stop method	Stop by external input	Emergency stop
Stopping acceleration (deceleration)	Value of switch for setting acceleration	4.9 m/s^2
Initial speed after restarting	Value of the switch for setting the speed	50 mm/s

∗ Settings for emergency acceleration and speed cannot be changed.

Application example 2

Signal from auto switches on the e-rodless cylinder can make it decelerate or stop.

Stop command by external input

PLC

Signal from an auto switch

Auto switch
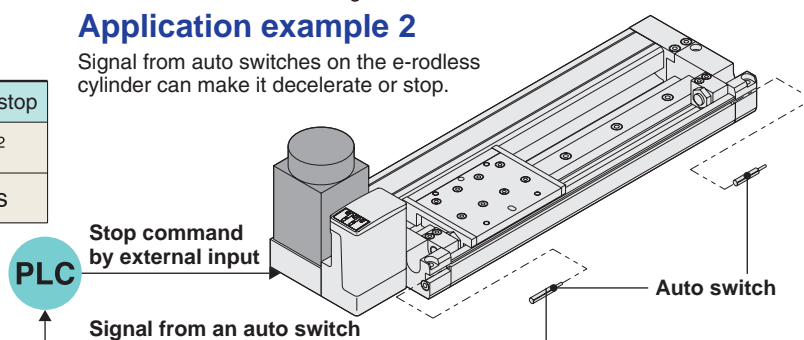
How to Reset Alarm

New ● Alarm reset by external input such as PLC, PC etc.
Alarm ocurring in the e-rodless actuator can be reset by the controller.

● Alarm reset manually by controller
∗ Perform an alarm reset after the probable cause of the alarm has been removed.

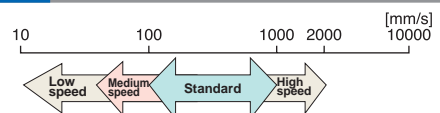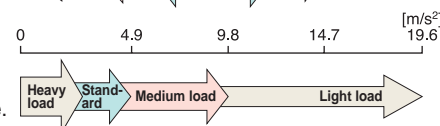## Made-to-Order   For details, consult with SMC.

● **Speed changes**
Low/High speed is possible.

● **Max. acceleration changes**
Low acceleration, heavy load is possible. High acceleration, light load is possible.

● **Improvement against moment loading**
2-axis guide specification (equivalent to MY2HT)

● **6-point stoppable type**
Stoppable at both ends (2-points) and at intermediate strokes (4-points)

Variations

| Series	E-MY2C		E-MY2H	
Guide type	Cam follower guide		High precision guide	
Controller type	Integrated controller/Remote controller			
Nominal size	16	25	16	25
Payload (kg)	5	10	5	10
Stroke (mm)	**50 to 1000** (Available in 1 mm increments.)			

Series *E-MY2*
Model Selection 1

The following are steps to select the E-MY2 series best suited for your application.

Guideline for Determining the Cylinder Model Temporarily

Cylinder model	Guide type	Slide table general accuracy	Graphs for related allowable values
E-MY2C	**Cam follower guide type**	Slide table accuracy approx. ± 0.05 mm [Note 2)]	Refer to page 3.
E-MY2H	**High precision guide type (Single axis)**	Slide table accuracy of ± 0.05 mm or less required [Note 2)]	Refer to page 4.

Note 1) Use as a guide for determining the slide table accuracy required. Consult with SMC when guaranteed accuracy is required.
Note 2) Accuracy indicates displacement of the table (at stroke end) when 50% of the allowable moment shown in the catalogue is applied. (reference value)

M_2: Rolling M_1: Pitching M_3: Yawing
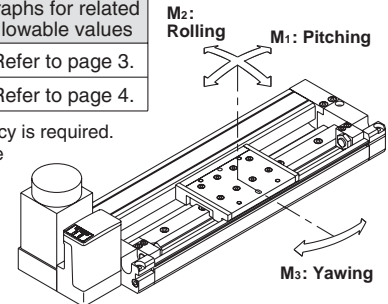
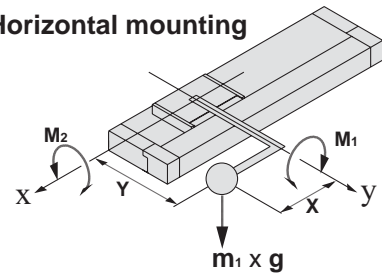## Types of Moment Applied to Rodless Cylinders

Multiple moments may be generated depending on the mounting orientation, load, and position of the centre of gravity.
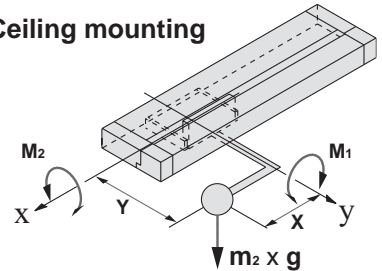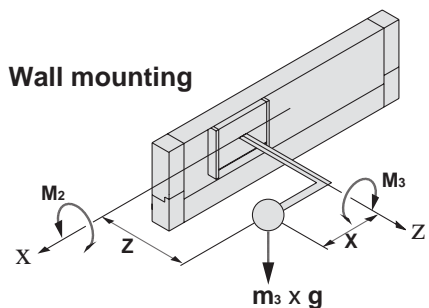
Coordinates and moments

M_3: Yawing
M_1: Pitching
M_2: Rolling
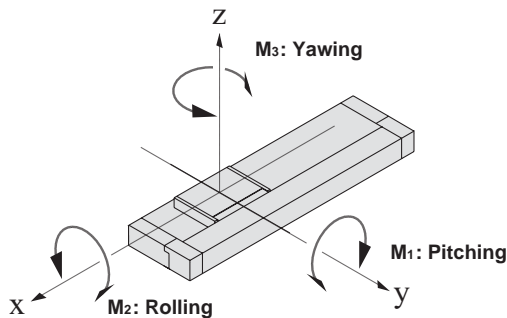
Static moment

Horizontal mounting

M_2 M_1
x Y x y
$m_1 \times g$

Ceiling mounting

M_2 M_1
x Y x y
$m_2 \times g$

Wall mounting

M_2 M_3
x Z x Z
$m_3 \times g$

Mounting orientation		Horizontal mounting	Ceiling mounting	Wall mounting
Static load (m)		m_1	m_2	m_3
Static moment	M_1	$m_1 \times g \times X$	$m_2 \times g \times X$	——
	M_2	$m_1 \times g \times Y$	$m_2 \times g \times Y$	$m_3 \times g \times Z$
	M_3	——	——	$m_3 \times g \times X$

g: Gravitational acceleration (9.8 m/s²)

Dynamic moment

M_1 Z
M_{1E} $m_n \times a$
F_E

M_{3E} $m_n \times a$ M_3
F_E
Y
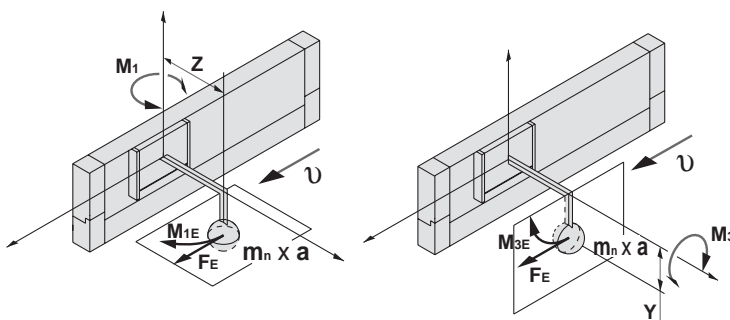
a: Set acceleration degree, υ: Set speed

Mounting orientation		Horizontal mounting	Ceiling mounting	Wall mounting
Dynamic load (F_E)		$m_n \times a$		
Dynamic moment	M_{1E}	$\frac{1}{3} \times F_E \times Z$		
	M_{2E}	Dynamic moment M_{2E} does not occur.		
	M_{3E}	$\frac{1}{3} \times F_E \times Y$		

Note) Regardless of the mounting orientation, dynamic moment is calculated with the formulas above.

SMC

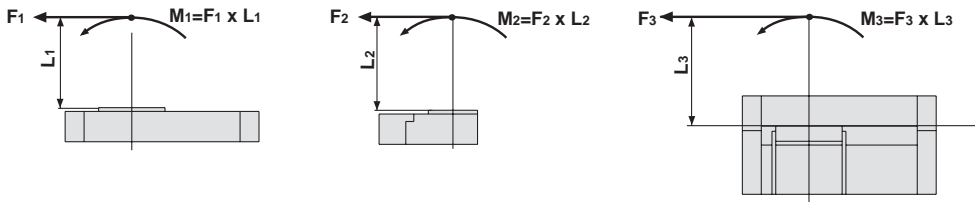# Maximum Allowable Moment/Maximum Load Weight

Maximum Allowable Moment

Select the moment from within the range of operating limits shown in the graphs. Note that the maximum allowable load value may sometimes be exceeded even within the operating limits shown in the graphs. Therefore, also check the allowable load for the selected conditions.

Model	Nominal size (mm)	Maximum allowable moment (N·m)			Maximum load weight (kg)		
		M1	M2	M3	m1	m2	m3
E-MY2C	16	5	4	3.5	18	16	14
	25	13	14	10	35	35	30
E-MY2H	16	7	6	7	15	13	13
	25	28	26	26	32	30	30

The above values are the maximum allowable values for moment and load weight. Refer to each graph regarding the maximum allowable moment and maximum load weight for a particular slide table speed.

Load weight (kg)

Moment (N·m)

$M_1 = F_1 \times L_1$ $M_2 = F_2 \times L_2$ $M_3 = F_3 \times L_3$

<Calculation of guide load factor>
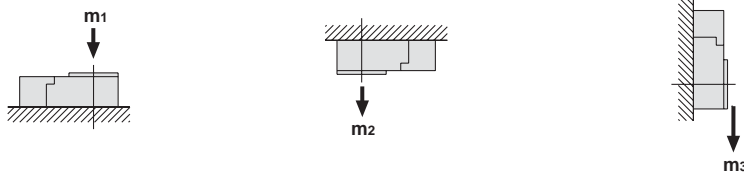
1. Maximum allowable load (1), static moment (2), and dynamic moment (at the time of acceleration/deceleration) (3) must be examined for the selection calculations.
   * Calculate m max for (1) from the maximum load weight (m_1, m_2, m_3) and Mmax for (2) and (3) from the maximum allowable moment graph (M_1, M_2, M_3).

Sum of guide load factors $\Sigma\alpha$ =	$\dfrac{\text{Load weight [m]}}{\text{Maximum load weight [m max]}}$	+	$\dfrac{\text{Static moment [M]}^{\text{Note 1)}}}{\text{Allowable static moment [Mmax]}}$	+	$\dfrac{\text{Dynamic moment [ME]}^{\text{Note 2)}}}{\text{Allowable dynamic moment [MEmax]}}$	$\leqq 1$

Note 1) Moment caused by the load, etc., with actuator in resting condition.
Note 2) Moment caused by the impact load equivalent at the stroke end (at the time of collision to stopper).
Note 3) Depending on the shape of the work piece, multiple moments may occur. When this happens, the sum of the load factors ($\Sigma\alpha$) is the total of all such moments.

2. Reference formulas [Dynamic moment at impact]
   Use the following formulas to calculate dynamic moment when taking stopper impact into consideration.
   m : Load mass (kg)
   F : Load (N)
   F_E : Load at acceleration and deceleration (N)
   a : Set acceleration (m/s²)
   υ : Set speed (mm/s)
   M : Static moment (N·m)
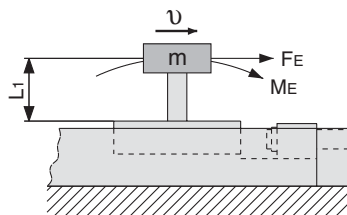 L_1 : Distance to the load's centre of gravity (m)
   M_E : Dynamic moment (N·m)

   $F_E = m \cdot a$

   $M_E = \dfrac{1}{3} \cdot F_E \cdot L_1$ (N·m) Note 4)

Note 4) Average load coefficient (= $\dfrac{1}{3}$):
   This coefficient is for averaging the dynamic moment according to service life calculations.

3. Refer to pages 5 and 6 for detailed model selection procedures.

Maximum Load Weight

Select the load weight from within the range of limits shown in the graphs. Note that the maximum allowable moment value may sometimes be exceeded even within the operating limits shown in the graphs. Therefore, also check the allowable moment for the selected conditions.

The graph value is for calculating the guide load factors. Refer to the table below for actual maximum load weight.

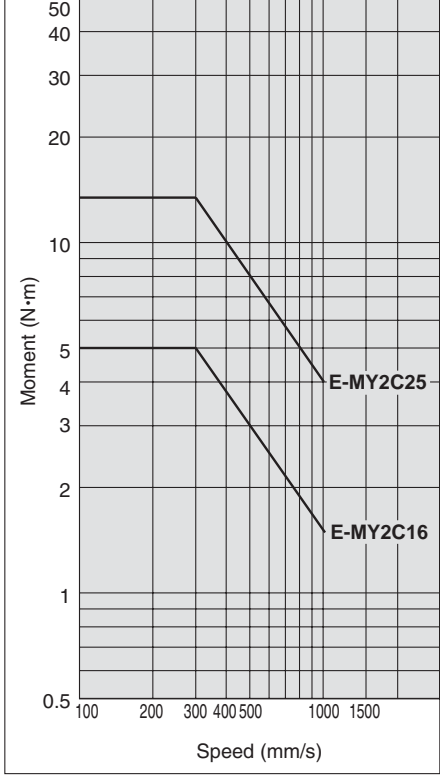| Nominal size	Maximum load weight (kg)
16	5
25	10

⚠ Caution

Select the required model by taking into consideration the operating condition specifications and any possible specification changes that may occur during operation. Contact the nearest sales representative for SMC's model selection software, which will help in selecting the correct model.
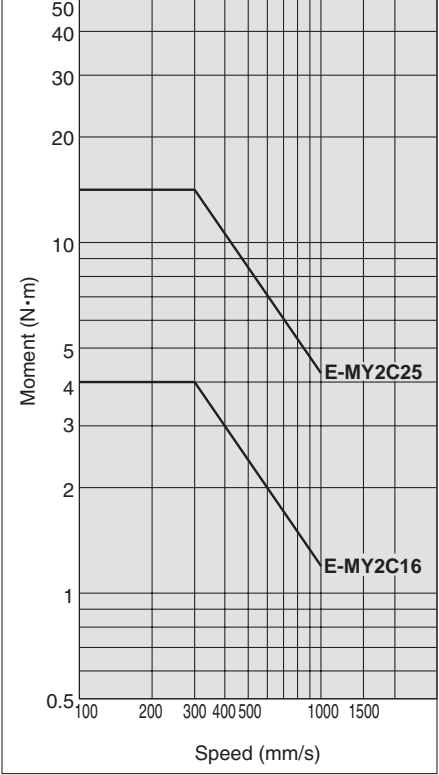
Series E-MY2

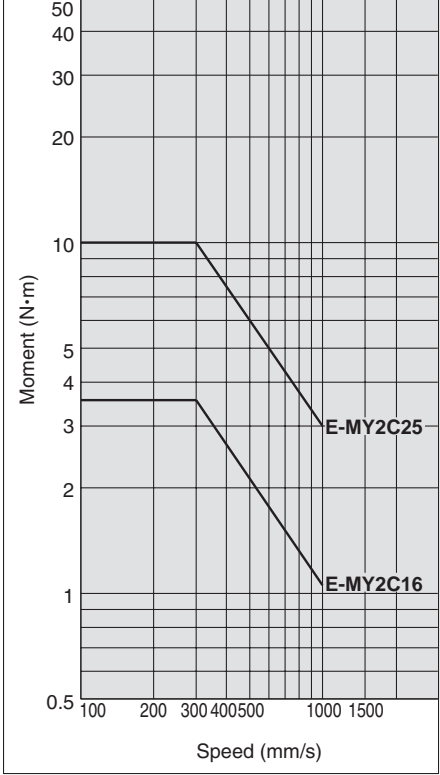## Maximum Allowable Moment/Maximum Load Weight
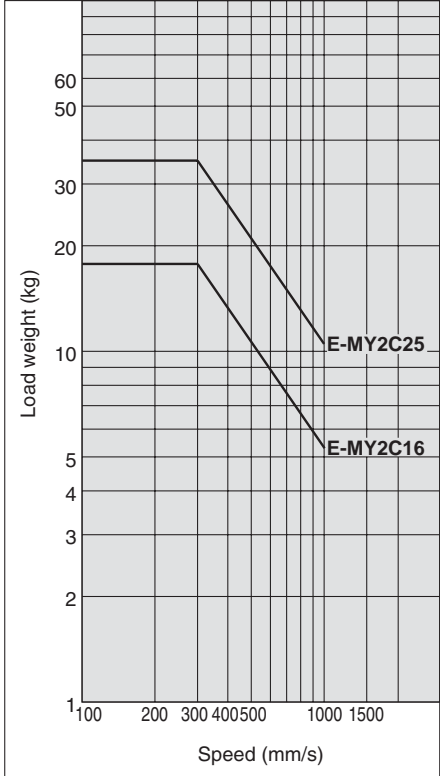
Moment / E-MY2C

E-MY2C/M₁

Moment (N·m) vs Speed (mm/s)

E-MY2C25

E-MY2C16

E-MY2C/M₂

Moment (N·m) vs Speed (mm/s)

E-MY2C25

E-MY2C16

E-MY2C/M₃

Moment (N·m) vs Speed (mm/s)

E-MY2C25

E-MY2C16

Load Weight / E-MY2C

E-MY2C/m₁

Load weight (kg) vs Speed (mm/s)

E-MY2C25

E-MY2C16

E-MY2C/m₂

Load weight (kg) vs Speed (mm/s)

E-MY2C25

E-MY2C16

E-MY2C/m₃

Load weight (kg) vs Speed (mm/s)

E-MY2C25

E-MY2C16
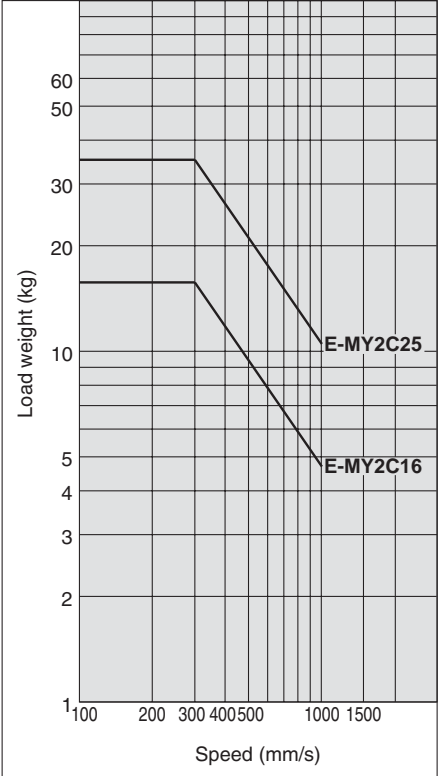
3
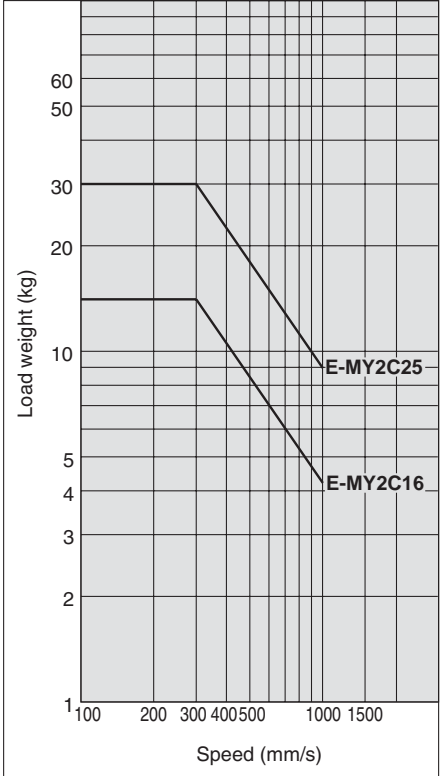
Moment / **E-MY2H**

E-MY2H/M₁
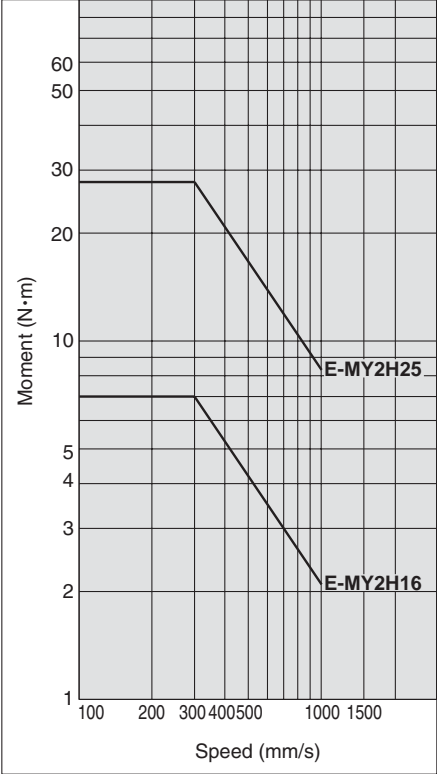
E-MY2H/M₂
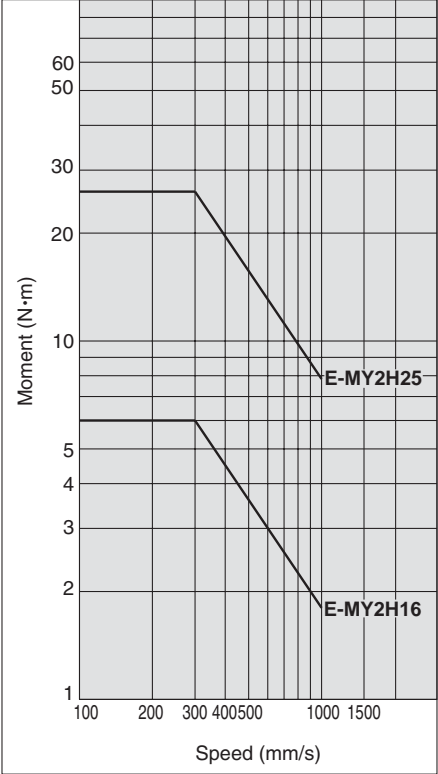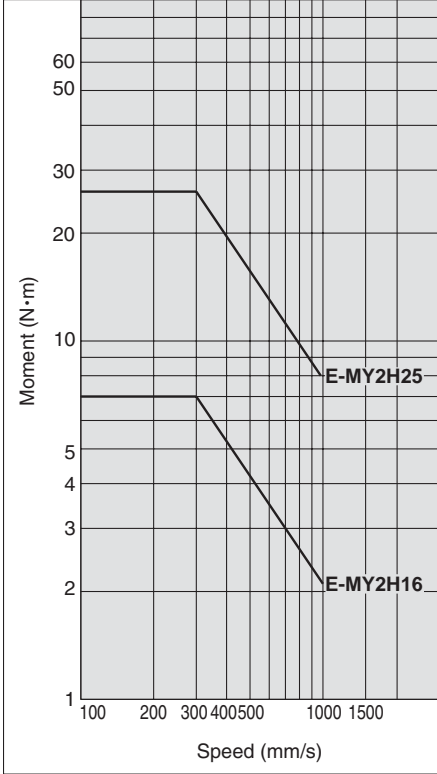
E-MY2H/M₃

Load Weight / **E-MY2H**

E-MY2H/m₁

E-MY2H/m₂

E-MY2H/m₃

Model Selection 2

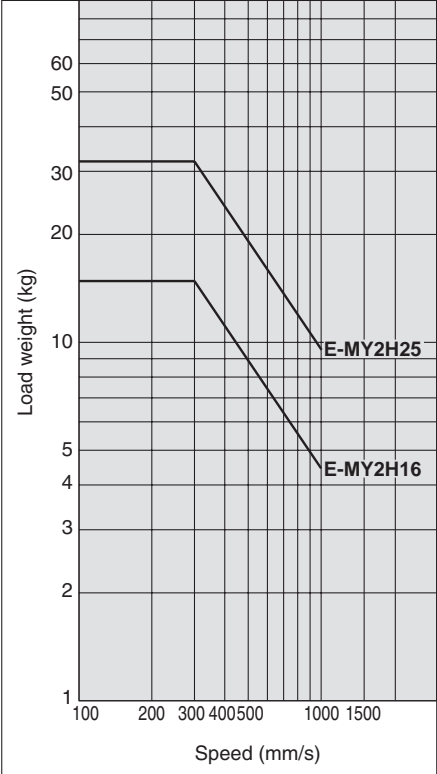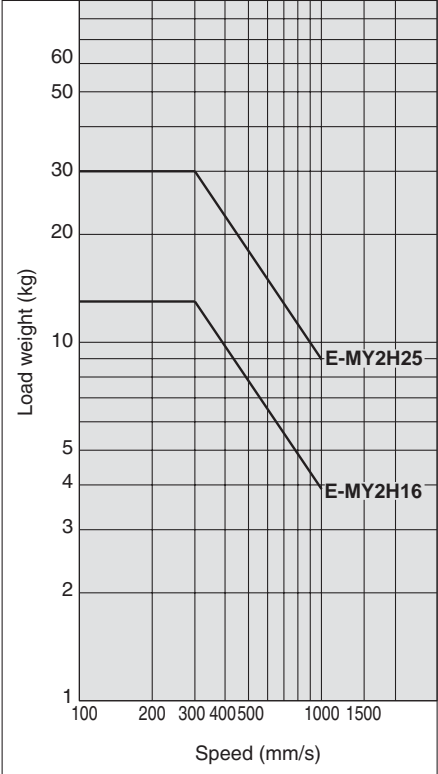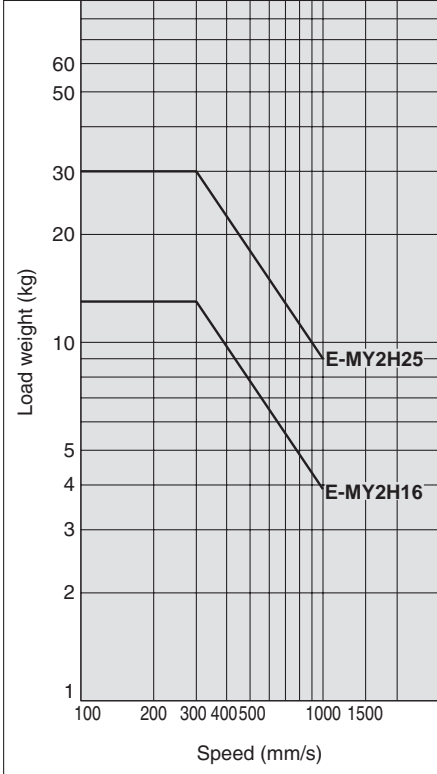The following are steps to select the E-MY2 series best suited for your application.

Calculation of Guide Load Factor

1 Operating Conditions

Operating cylinder ······ **E-MY2H25-500**
Set speed υ ·············· **400 mm/s** [Note]
Set acceleration degree a ····· **4.9 m/s² [Note]**
Mounting orientation ··· **Wall mounting**

E-MY2H25-500TAN

Wₐ: Connection plate t=10 (0.88 kg)

Note) Regarding the speed and acceleration setting, select from the speed/acceleration chart on page 8.

W_b: MGGLB25-200 (4.35 kg)

W_c: MHL2-16D1 (0.795 kg)

W_d: Workpiece (1.0 kg)

Mounting Orientation

1. Horizontal mounting
2. Wall mounting
3. Ceiling mounting

2 Load Blocking

42.5
5
111
210

150
65

Z
X
Y
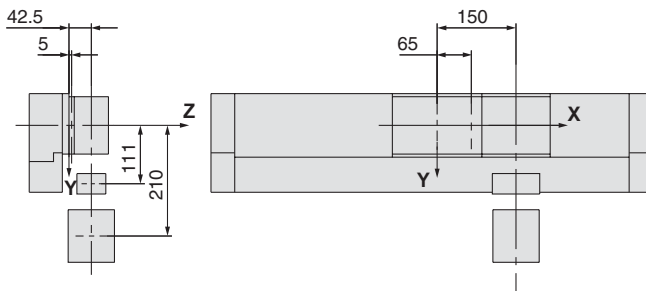
Weight and Centre of Gravity for Each Workpiece

Work piece no. (Wn)	Weight (mn)	Centre of gravity		
		X-axis Xn	Y-axis Yn	Z-axis Zn
W_a	0.88 kg	65 mm	0 mm	5 mm
W_b	4.35 kg	150 mm	0 mm	42.5 mm
W_c	0.795 kg	150 mm	111 mm	42.5 mm
W_d	1.0 kg	150 mm	210 mm	42.5 mm

n = a, b, c, d

3 Calculation of Composite Centre of Gravity

$m_3 = \Sigma m_n$
= 0.88 + 4.35 + 0.795 + 1.0 = **7.025 kg**

$X = \dfrac{1}{m_3} \times \Sigma (m_n \times x_n)$

$= \dfrac{1}{7.025} (0.88 \times 65 + 4.35 \times 150 + 0.795 \times 150 + 1.0 \times 150) = \textbf{139.4 mm}$

$Y = \dfrac{1}{m_3} \times \Sigma (m_n \times y_n)$

$= \dfrac{1}{7.025} (0.88 \times 0 + 4.35 \times 0 + 0.795 \times 111 + 1.0 \times 210) = \textbf{42.5 mm}$

$Z = \dfrac{1}{m_3} \times \Sigma (m_n \times z_n)$

$= \dfrac{1}{7.025} (0.88 \times 5 + 4.35 \times 42.5 + 0.795 \times 42.5 + 1.0 \times 42.5) = \textbf{37.8 mm}$

4 Calculation of Load Factor for Static Load

m_3: Weight

m_3 max (from 1 of graph MY2H / m_3) = 22.5 (kg) ································

Load factor $\alpha_1 = m_3 / m_3$ max = 7.025 / 22.5 = **0.31**

M_2: Moment

M_2 max (from 2 of graph MY2H / M_2) = 19.5 (N·m) ································

$M_2 = m_3 \times g \times Z = 7.025 \times 9.8 \times 37.8 \times 10^{-3} = 2.60$ (N·m)

Load factor $\alpha_2 = M_2 / M_2$ max = 2.60 / 19.5 = **0.13**

m₃

Z

m₃

M₂

SMC
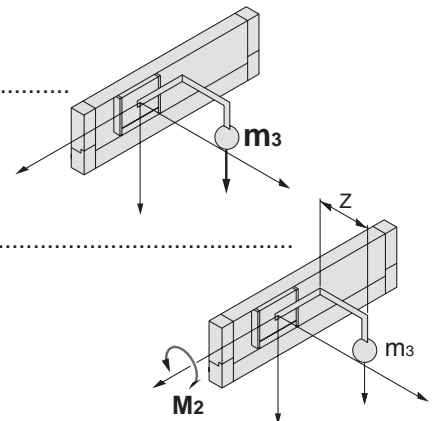
Model Selection 3

The following are steps to select the E-MY2 series best suited for your application.
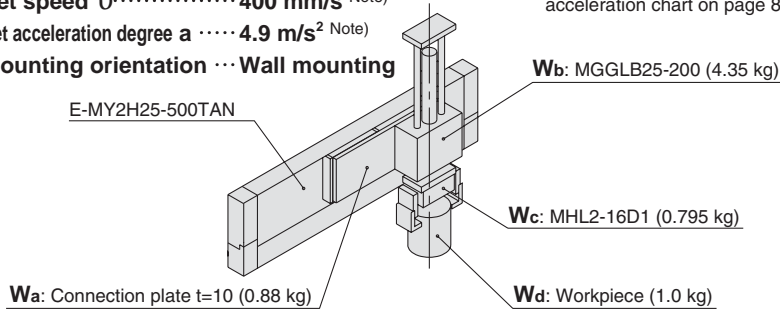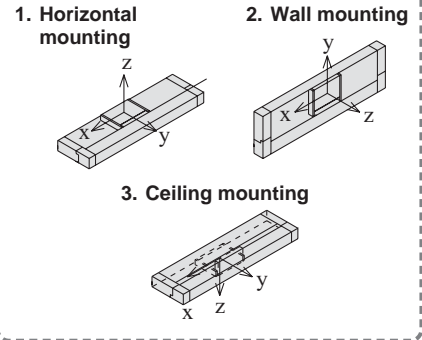
Calculation of Guide Load Factor

M3: Moment

M_3 max (from 3 of graph MY2H / M3) = 19.5 (N·m) ·······························

$M_3 = m_3 \times g \times X = 7.025 \times 9.8 \times 139.4 \times 10^{-3} = 9.59$ (N·m)

Load factor $\alpha_3 = M_3 / M_3$ max = 9.59 / 19.5 = **0.49**

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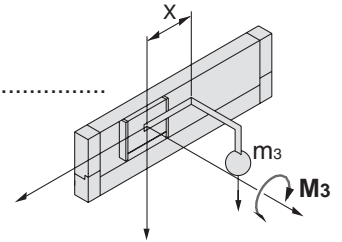
5 **Calculation of Load Factor for Dynamic Moment**

Load FE at acceleration and deceleration

$F_E = m \times a = 7.025 \times 4.9 = 34.42$ (N)

M1E: Moment

M_{1E} max (from 4 of graph MY2H / M1) = 21.0 (N·m) ······························

$M_{1E} = \dfrac{1}{3} \times F_E \times Z = \dfrac{1}{3} \times 34.42 \times 37.8 \times 10^{-3} = 0.43$ (N·m)

Load factor $\alpha_4 = M_{1E} / M_{1E}$ max = 0.43 / 21.0 = **0.02**
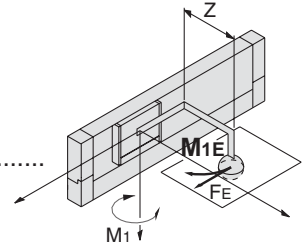
M3E: Moment

M_{3E} max (from 5 of graph MY2H / M3) = 19.5 (N·m) ······························

$M_{3E} = \dfrac{1}{3} \times F_E \times Y = \dfrac{1}{3} \times 34.42 \times 42.5 \times 10^{-3} = 0.49$ (N·m)

Load factor $\alpha_5 = M_{3E} / M_{3E}$ max = 0.49 / 19.5 = **0.03**

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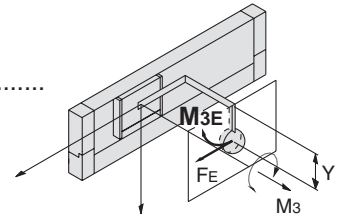
6 **Sum and Examination of Guide Load Factors**

$\Sigma\alpha = \alpha_1 + \alpha_2 + \alpha_3 + \alpha_4 + \alpha_5 = 0.98 \leqq 1$

The above calculation is within the allowable value and therefore the selected model can be used.
In an actual calculation, when sum of guide load factors $\Sigma\alpha$ in the formula above is more than 1, consider decreasing the speed, increasing the bore size, or changing the product series.

Load Weight

E-MY2H/m3
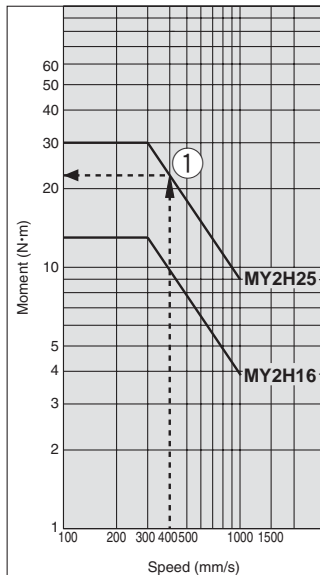
Allowable Moment

E-MY2H/M1
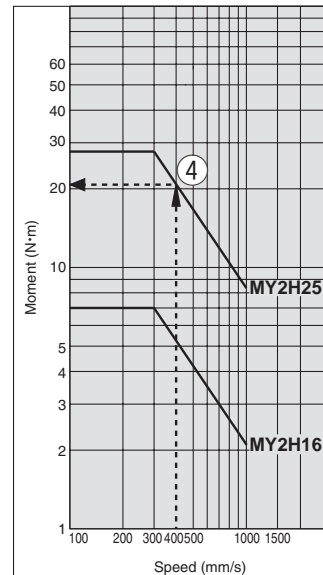
E-MY2H/M2
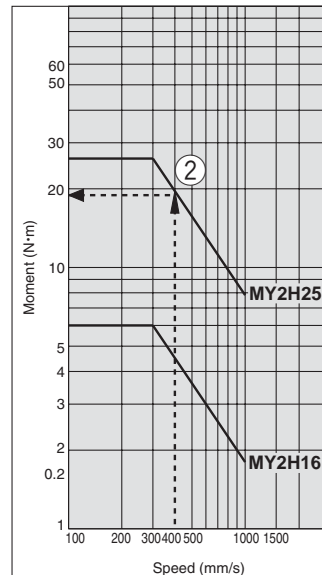
E-MY2H/M3
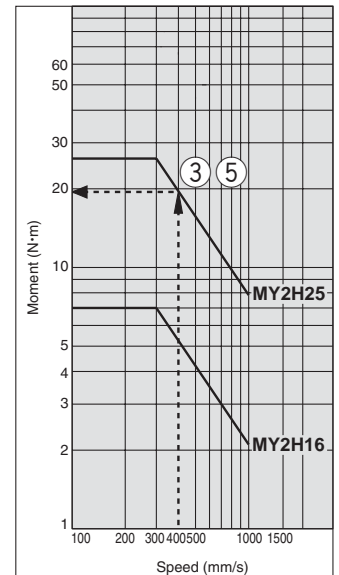
e-Rodless Actuator
Series E-MY2C
Cam Follower Guide Type/Nominal Size: 16, 25

C E

How to Order

| Integrated control type | E-MY2C | 16 | 100 | TA | N | | | M9B | |
| Remote control type | E-MY2C | 16 | 100 | TA | N | | M | M9B | | |

Nominal size

| 16 |
| 25 |

Stroke
Refer to "Standard Stroke" table.

Motor placement

TA	On the top, left
DA	On the bottom, left
TB	On the top, right
DB	On the bottom, right

TB
TA
DA
DB

Motor
Controller

* Arrow mark shows handling side on controller.

Output type

| N | NPN |
| P | PNP |

Number of stoppable positioning points

| - | 3-point stoppable type |
| A | 5-point stoppable type |

Cable length

M	1 m
L	3 m
Z	5 m

* The remote control type can be selected by adding the above symbols.

CE compliant

| - | — |
| Q | CE marked |

* No need to add a suffix for the integrated control type. It is provided with a CE compliant product.
* Noise filter is provided but not attached for the "Q" spec.

**Number of auto switches**

-	2 pcs.
S	1 pc.
n	n

Auto switch

| - | Without auto switch |

* Refer to the table below for auto switch model numbers.
* Auto switch is provided but not mounted at the time of shipment.

Standard Stroke

Nominal size	Standard stroke (mm)
16, 25	100, 200, 300, 400, 500, 600, 700, 800, 900, 1000

* Strokes are manufacturable in increments of 1 mm, up to 1000 strokes.
* When exceeding a 1000 strokes, refer to "Made to Order" on page 26.

Applicable Auto Switches/For detailed auto switch specifications, refer to page 21 through to 25.

Type	Special function	Electrical entry	Indicator light	Wiring (Output)	Load voltage DC	Load voltage AC	Auto switch model Electrical entry direction Perpendicular	In-line	Lead wire length (m) 0.5 (Nil)	3 (L)	5 (Z)	Pre-wired connector	Applicable load
Reed switch	—	Grommet	Yes	3-wire (NPN equiv.)	—	5 V	—	A96V	A96	●	●	—	—	IC circuit	—
				2-wire	24 V	12 V	100 V	A93V	A93	●	●	—	—	—	Relay PLC
	—					5 V,12 V	100 V or less	A90V	A90	●	●	—	—	IC circuit	
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 display)			3-wire (NPN)		5 V 12 V		M9NWV	M9NW	●	●	○	○	IC circuit	
				3-wire (PNP)				M9PWV	M9PW	●	●	○	○		
				2-wire		12 V		M9BWV	M9BW	●	●	○	○	—	

* Lead wire length symbols: 0.5 m ·········· Nil   (Example) M9N
　　　　　　　　　　　3 m ·········· L　　　　　　 M9NL
　　　　　　　　　　　5 m ·········· Z　　　　　　 M9NZ
* Solid state switches marked "○" are produced upon receipt of order.

SMC

Specifications

Model		E-MY2C	
Nominal size		**16**	**25**
Maximum load weight Note)		5 kg	10 kg
Transfer speed set range		100 to 1000 mm/s (By selection. Please refer to the table below.)	
Transfer speed acceleration set range		0.49 to 4.90 m/s² (By selection. Please refer to the table below.)	
Acceleration and deceleration method		Trapezoidal drive	
Moving direction		Horizontal direction	
Positioning points	3-point stoppable type	Both ends (mechanical stoppers), 1 intermediate position	
	5-point stoppable type	Both ends (mechanical stoppers), 3 intermediate positions	
Repeated positioning stopping precision	**Both ends**	± 0.01 mm	
	Intermediate stopping position	± 0.1 mm	
Intermediate stopping point positioning method		Direct teaching, JOG teaching	
Positioning setting spot		Controller body	
Display		LED for power supply, LED for alarming, LED for positioning completion	
Input signal		Actuation command signal, Emergency stop input signal	
Output signal		Positioning completion signal, Emergency detection signal, Ready signal	

Note) The maximum load weight shows the motor ability. Please consider it together with the guide load factor when selecting a model.

Made to Order
(For details, refer to page 26.)

Symbol	Specifications
-X168	Helical insert thread specifications

Electrical Specifications

Driving voltage	Power supply voltage	24 VDC ± 10%
	Current consumption	Rated current 2.5 A (Max. 5 A: 2 s or less) at 24 VDC
Current consumption	Power supply voltage	24 VDC ± 10%
	Current consumption	30 mA at 24 VDC and Output load capacity
Input signal capacity		6 mA or less at 24 VDC/1 circuit (Photo coupler input)
Output signal capacity		30 VDC or less, 20 mA or less/1 circuit (Open drain output)
Emergency detection items		Emergency stop, Output deviation, Power supply deviation, Driving deviation, Temperature deviation Stroke deviation, Motor deviation, Controller deviation

Weight

Actuator Part
Unit: kg

Nominal size	Basic weight	per 50 mm stroke additional weight
16	2.00	0.14
25	3.71	0.21

Remote Controller Part
Unit: kg

Controller body	Cable length		
	1 m	3 m	5 m
0.24	0.09	0.24	0.39

How to calculate/Example: **E-MY2C25-300TANM**

Actuator part
Basic weight ································· 3.71 kg
Additional weight ···················· 0.21/50 st
Actuator stroke ····················· 300 st
3.71 + 0.21 x 300 ÷ 50 = 4.97 kg

Remote controller part
Controller body ······················ 0.24 kg
Cable length (3 m) ················ 0.24 kg
0.24 + 0.24 = 0.48 kg

∗ For an integrated control type, add 0.24 kg (controller body) to the basic weight.

General Specifications

Operating temperature range	Integrated control type		5 to 40°C
	Remote control type	Actuator part	5 to 50°C
		Remote controller part	5 to 40°C
Operating humidity range			35 to 85%RH (with no condensation)
Storage temperature range			−10 to 60°C (with no condensation and freezing)
Storage humidity range			35 to 85%RH (no condensation)
Withstand voltage			Between all of external terminals and the case: 1000 VAC for 1 minute
Insulation resistance			Between all of external terminals and the case: 50 MΩ (500 VDC)
Noise resistance			1000 Vp-p Pulse width 1 μs, Rise time 1 ns
CE marking	Integrated control type		Standard
	Remote control type		Available with -Q suffixed products only

Replacement Parts

Drive Unit Replacement Part No.

Model Nominal size	**E-MY2C**	
16	E-MY2BH16- Stroke	∗
25	E-MY2BH25- Stroke	∗

∗ Specify the motor position and output style in ∗ parts.
For a remote control type, enter the symbol for cable length.
Example) E-MY2BH16-300TAN

Speed/Acceleration

Speed setting switch no.	Speed [mm/s]
1	100
2	200
3	300
4	400
5	500
6	600
7	700
8	800
9	900
10	1000

Note) The factory default setting for the switch is No.1 (100 mm/s).

Acceleration setting switch no.	Acceleration [m/s²]
1	0.49
2	0.74
3	0.98
4	1.23
5	1.47
6	1.96
7	2.45
8	2.94
9	3.92
10	4.90

Note) The factory default setting for the switch is No.1 (0.49 m/s²).

Option/Mounting Bracket

Description	Part no.
L-bracket	MYE-LB
DIN rail bracket	MYE-DB

Series *E-MY2C*

Dimensions:Integrated Control Type

E-MY2C | Nominal size | — | Stroke |

Nominal size: 16

(A clearance of 40 mm or greater is required.)

Motor

Controller

4-ø6 counterbore depth 3.5
ø3.5 through

27

123
129

21.3 22

28

T-slot section for mounting

60 (40) 80
70
40

72.4

4-M4 depth 7

5 16.5 6

43.5

71

40

9.8

14.4

Workpiece mounting centre line

5.6 (Max. 8.6)

4

152 + Stroke

(A clearance of 40 mm or greater (60) is required.)

(74.7) 101.7
27 74.7
72

60
102
42
5

FG terminal M3

15.5

(60.3) 87.3

I/O cable Note)

Power supply cable (2 wires)

(500)

Motor position **TA**

Slot for auto switch

60 80 160 + Stroke 20

Motor position **DA**

Motor position **TB**

Motor position **DB**

3.5 5.8
2 3.4
2 x 4-square nut M3

T-slot section for mounting details

Nominal size: 25

(A clearance of 40 mm or greater is required.)

Motor

Controller

4-ø9.5 counterbore depth 5.4
ø5.5 through

35.5

163
170

34

31.8

37

T-slot section for mounting

60 (49.6) 110.8
100
60

108.7

67

4-M5 depth 9

5 22.2 7

48.7

60

19.5

Workpiece mounting centre line

5

7.1 (Max. 10.1) 17.5

198 + Stroke 6

(A clearance of 40 mm or greater (60) is required.)

(96.7) 132.2
35.5 96.7
94

60
102
42
5

15.5

(51.8) 87.3

FG terminal M3

I/O cable Note)

Power supply cable (2 wires)

(500)

Motor position **TA**

Slot for auto switch

60 105 210 + Stroke 25

Motor position **DA**

Motor position **TB**

Motor position **DB**

5.3 8.5
3 5.5
2 x 4-square nut M5

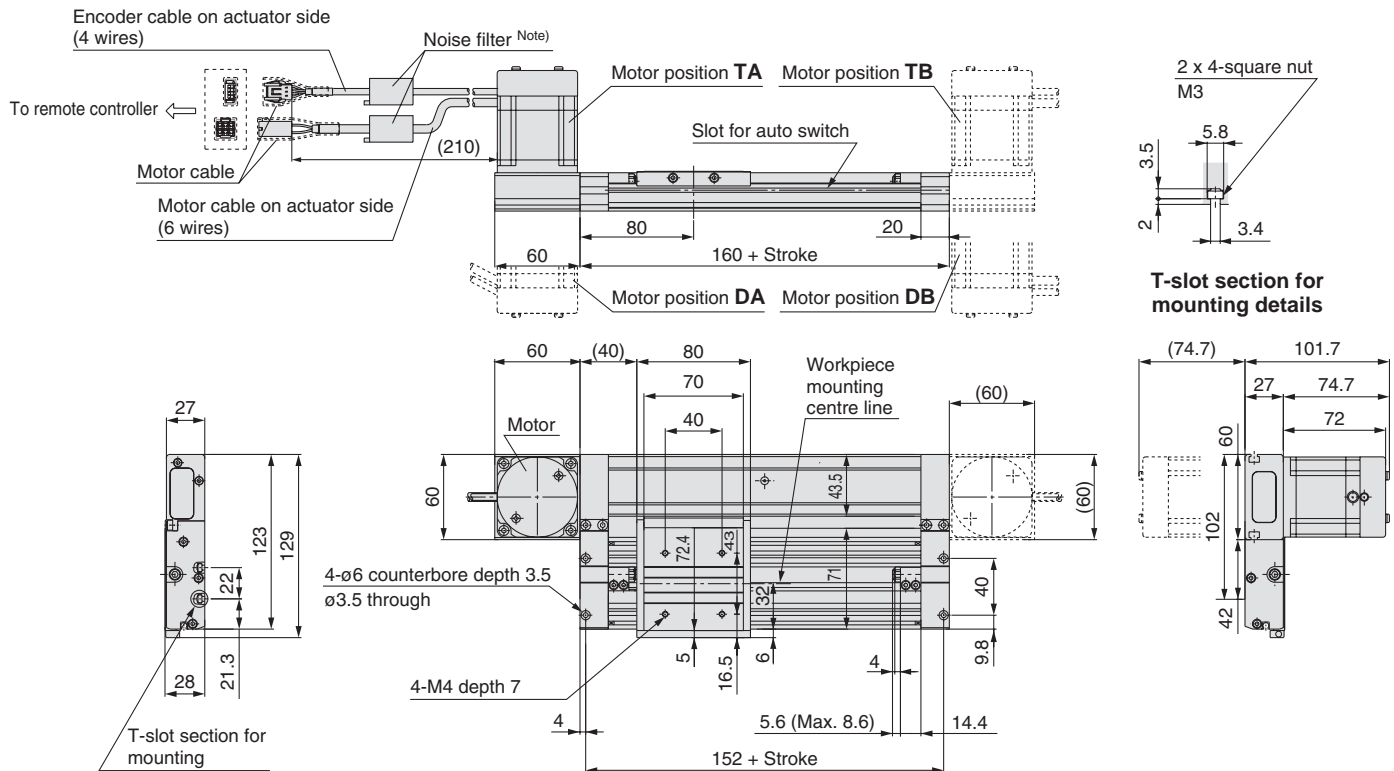**T-slot section for mounting details**

Note) For the 3-point stoppable type, the I/O cable is a 9 core type and for the 5-point stoppable type, a 11 core type is used.
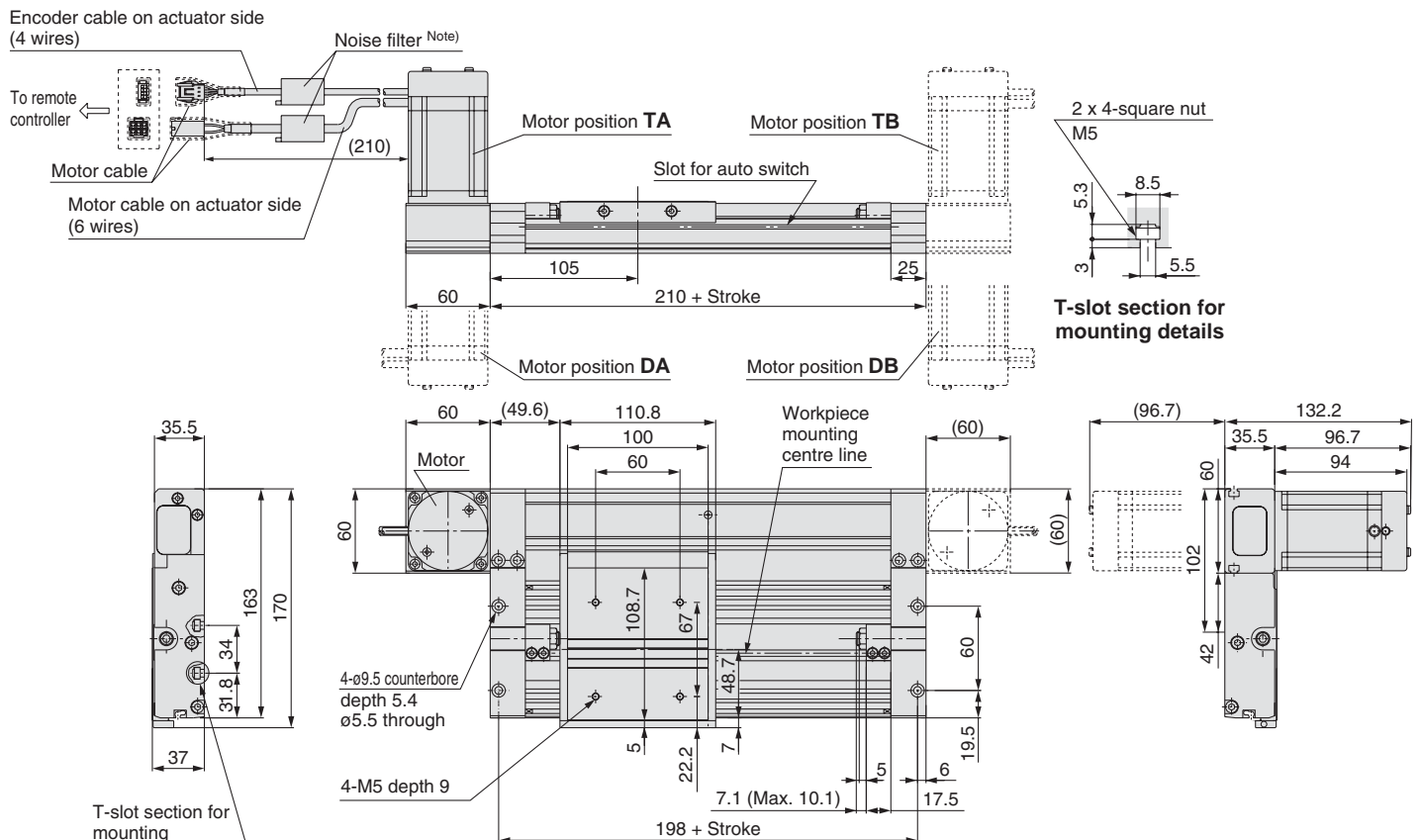
SMC

Dimensions:Remote Control Type (Actuator part)

E-MY2C | Nominal size | – | Stroke | ☐ | ☐ | **M**/**L**/**Z**

∗ Refer to page 11 for dimensions of remote controller.

Nominal size: 16

Encoder cable on actuator side
(4 wires)

Noise filter Note)

To remote controller ⇐

Motor cable

Motor cable on actuator side
(6 wires)

(210)

Motor position **TA**   Motor position **TB**

Slot for auto switch

Motor position **DA**   Motor position **DB**

60

80

160 + Stroke

20

2 x 4-square nut
M3

3.5

5.8

2

3.4

**T-slot section for
mounting details**

27

123

129

22

21.3

28

T-slot section for
mounting

60   (40)   80

Motor

70

40

Workpiece
mounting
centre line

(60)

60

43.5

(60)

4-ø6 counterbore depth 3.5
ø3.5 through

72.4

43

71

40

32

5   16.5   6   4

9.8

4-M4 depth 7

4

5.6 (Max. 8.6)   14.4

152 + Stroke

(74.7)   101.7

27   74.7

72

60

102

42

Nominal size: 25

Encoder cable on actuator side
(4 wires)

Noise filter Note)

To remote
controller ⇐

Motor cable

Motor cable on actuator side
(6 wires)

(210)

Motor position **TA**   Motor position **TB**

Slot for auto switch

Motor position **DA**   Motor position **DB**

105   25

60   210 + Stroke

2 x 4-square nut
M5

5.3

8.5

3   5.5

**T-slot section for
mounting details**

35.5

163

170

34

31.8

37

T-slot section for
mounting

60   (49.6)   110.8

Motor

100

60

Workpiece
mounting
centre line

(60)

60

(60)

4-ø9.5 counterbore
depth 5.4
ø5.5 through

108.7

67

48.7

60

5   22.2   7   5   6

19.5

4-M5 depth 9

7.1 (Max. 10.1)   17.5

198 + Stroke

(96.7)   132.2

35.5   96.7

94

60

102

42

Note) When the CE compliant model is selected, a noise filter is provided but not attached.
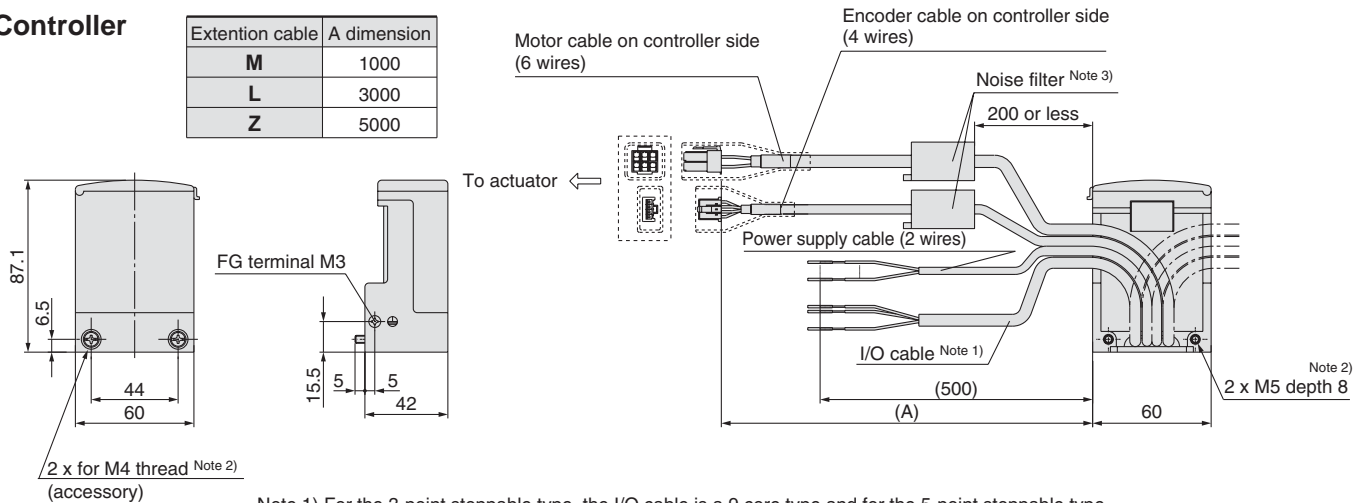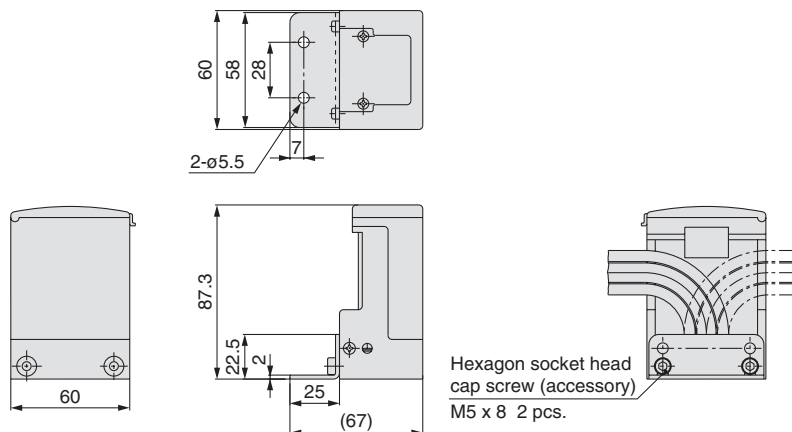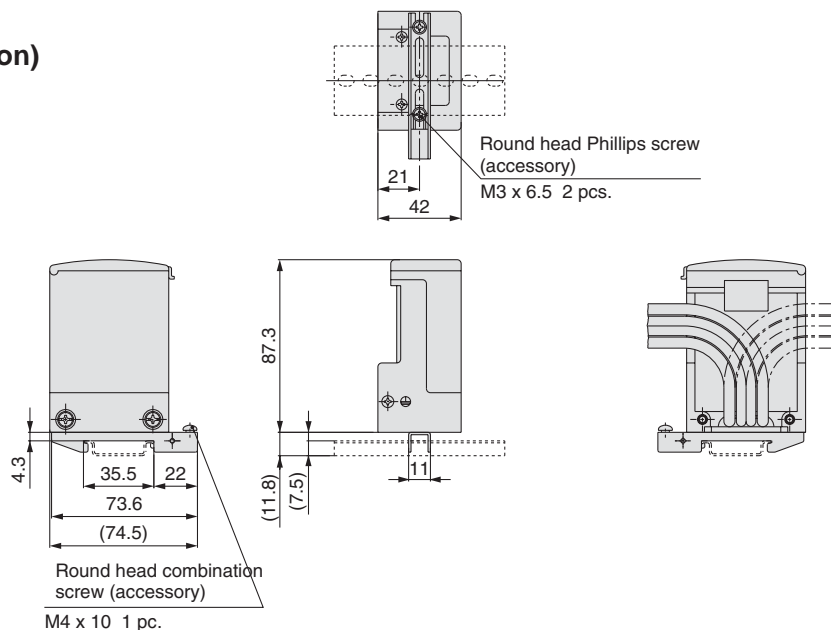The cable for the CE compliant models use dedicated shielding. Even if a noise filter is attached to a non CE marked product, the product will not be CE compliant.

Series *E-MY2C*

Dimensions:Remote Control Type (Remote controller part)

Controller

Extention cable	A dimension
M	1000
L	3000
Z	5000

Motor cable on controller side (6 wires)

Encoder cable on controller side (4 wires)

Noise filter Note 3)

200 or less

To actuator ⇦

FG terminal M3

Power supply cable (2 wires)

I/O cable Note 1)

87.1

6.5

44

60

15.5

5　5

42

(500)

(A)

60

Note 2)
2 x M5 depth 8

2 x for M4 thread Note 2)
(accessory)

Note 1) For the 3-point stoppable type, the I/O cable is a 9 core type and for the 5-point stoppable type, a 11 core type is used.
Note 2) When mounting the separated type controller, use the included M4 screw or use the M5 tap located on one side of the controller.
Note 3) When the CE compliant model is selected, a noise filter is included but not attached. The cable for the CE compliant models use dedicated shielding. Even if a noise filter is attached to a non CE marked product, the product will be not be CE compliant.

L-bracket/MYE-LB (Option)

60

58

28

2-ø5.5

7

87.3

22.5

2

60

25

(67)

Hexagon socket head cap screw (accessory)
M5 x 8 2 pcs.

DIN rail bracket/MYE-DB (Option)

Round head Phillips screw (accessory)
M3 x 6.5 2 pcs.

21

42

87.3

(11.8)

(7.5)

11

4.3

35.5　22

73.6

(74.5)

Round head combination screw (accessory)
M4 x 10 1 pc.

SMC

e-Rodless Actuator

Series **E-MY2H** $C\epsilon$

High Precision Guide Type/Nominal Size: 16, 25

How to Order

| Integrated control type | E-MY2H | 16 | 100 | TA | N | | | M9B | |
| Remote control type | E-MY2H | 16 | 100 | TA | N | | M | M9B | |

Nominal size

| 16 |
| 25 |

Stroke
Refer to "Standard Stroke" table.

Motor placement

TA	On the top, left
DA	On the bottom, left
TB	On the top, right
DB	On the bottom, right

TB

TA

DA

DB

Motor

Controller

* Arrow mark shows handling side on controller.

Output type

| N | NPN |
| P | PNP |

Number of stoppable points for positioning

| - | 3-point stoppable type |
| A | 5-point stoppable type |

Cable length

M	1 m
L	3 m
Z	5 m

* The remote control type can be selected by adding the above symbols.

CE compliant

| - | — |
| Q | CE marked |

* No need to add a suffix for the integrated control type. It is provided with a CE compliant product.
* Noise filter is provided but not attached for the "Q" spec.

Number of auto switches

-	2 pcs.
S	1 pc.
n	n

Auto switch

| - | Without auto switch |

* Refer to the table below for auto switch model numbers.
* Auto switch is provided but not mounted at the time of shipment.

Standard Stroke

| Nominal size | Standard stroke (mm) | Made to Order Long stroke (-XB11) |
		Stroke range (mm)
16, 25	50, 100, 150, 200, 250, 300, 350, 400, 450, 500, 550, 600	601 to 1000

* Strokes are manufacturable in increments of 1 mm, up to 1000 strokes.
  However, when a stroke out of the standard 51 to 599 is required, add "-XB10" at the end of the model no.
  When stroke exceeds 600 mm, add "-XB11" at the end of model no. Refer to "Made to Order" on page 26.
* When exceeding a 1000 strokes, refer to "Made to Order" on page 26.

Applicable Auto Switches/For detailed auto switch specifications, refer to page 21 through to 25.

| Type | Special function | Electrical entry | Indicator light | Wiring (Output) | Load voltage | | Auto switch model | | Lead wire length (m) * | | | Pre-wired connector | Applicable load |
| | | | | | DC | AC | Electrical entry direction | | 0.5 (Nil) | 3 (L) | 5 (Z) | | |
							Perpendicular	In-line					
Reed switch	—	Grommet	Yes	3-wire (NPN equiv.)	—	5 V	—	A96V	A96	●	●	—	—	IC circuit	—
	—			2-wire	24 V	12 V	100 V	A93V	A93	●	●	—	—	—	Relay PLC
	—					5 V,12 V	100 V or less	A90V	A90	●	●	—	—	IC circuit	
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 display)			3-wire (NPN)		5 V 12 V		M9NWV	M9NW	●	●	○	○	IC circuit	
				3-wire (PNP)				M9PWV	M9PW	●	●	○	○		
				2-wire		12 V		M9BWV	M9BW	●	●	○	○	—	

* Lead wire length symbols: 0.5 m ·········· Nil (Example) M9N
  3 m ·········· L M9NL
  5 m ·········· Z M9NZ
* Solid state switches marked "○" are produced upon receipt of order.

SMC

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Series E-MY2H

Symbol	Specifications
-XB10	Intermediate stroke
-XB11	Long stroke
-X168	Helical insert thread specifications

Weight

Actuator Part
Unit: kg

Nominal size	Basic weight	per 50 mm stroke additional weight
16	1.87	0.14
25	3.37	0.23

Remote Controller Part
Unit: kg

Controller body	Cable length		
	1 m	3 m	5 m
0.24	0.09	0.24	0.39

How to calculate/Example: **E-MY2H25-300TANM**

Actuator part
Basic weight ·································· 3.37 kg
Additional weight ··························· 0.23/50 st
Actuator stroke ····························· 300 st
3.37 + 0.23 x 300 ÷ 50 = 4.75 kg

Remote controller part
Controller body ····························· 0.24 kg
Cable length (3 m) ························· 0.24 kg
0.24 + 0.24 = 0.48 kg

∗ For an integrated control type, add 0.24 kg (controller body) to the basic weight.

Replacement Parts

Drive Unit Replacement Part No.

Nominal size \ Model	E-MY2H	
16	E-MY2BH16- Stroke	∗
25	E-MY2BH25- Stroke	∗

∗ Specify the motor position and output style in ∗ parts.
For a remote control type, enter the symbol for cable length.
Example) E-MY2BH16-300TAN

Option/Mounting Bracket

Description	Part no.
L-bracket	MYE-LB
DIN rail bracket	MYE-DB

Specifications

Model		E-MY2H	
Nominal size		**16**	**25**
Maximum load weight Note)		5 kg	10 kg
Transfer speed set range		100 to 1000 mm/s (By selection. Please refer to the table below.)	
Transfer speed acceleration set range		0.49 to 4.90 m/s² (By selection. Please refer to the table below.)	
Acceleration and deceleration method		Trapezoidal drive	
Moving direction		Horizontal direction	
Positioning points	3-point stoppable type	Both ends (mechanical stoppers), 1 intermediate position	
	5-point stoppable type	Both ends (mechanical stoppers), 3 intermediate positions	
Repeated positioning stopping precision	**Both ends**	± 0.01 mm	
	Intermediate stopping position	± 0.1 mm	
Intermediate stopping point positioning method		Direct teaching, JOG teaching	
Positioning setting spot		Controller body	
Display		LED for power supply, LED for alarming, LED for positioning completion	
Input signal		Actuation command signal, Emergency stop input signal	
Output signal		Positioning completion signal, Emergency detection signal, Ready signal	

Note) The maximum load weight shows the motor ability. Please consider it together with the guide load factor when selecting a model.

Electrical Specifications

Driving voltage	Power supply voltage	24 VDC ± 10%
	Current consumption	Rated current 2.5 A (Max. 5 A: 2 s or less) at 24 VDC
Current consumption	Power supply voltage	24 VDC ± 10%
	Current consumption	30 mA at 24 VDC and Output load capacity
Input signal capacity		6 mA or less at 24 VDC/1 circuit (Photo coupler input)
Output signal capacity		30 VDC or less, 20 mA or less/1 circuit (Open drain output)
Emergency detection items		Emergency stop, Output deviation, Power supply deviation, Driving deviation, Temperature deviation Stroke deviation, Motor deviation, Controller deviation

General Specifications

Operating temperature range	Integrated controller type		5 to 40°C
	Remote control type	Actuator part	5 to 50°C
		Remote controller part	5 to 40°C
Operating humidity range			35 to 85%RH (with no condensation)
Storage temperature range			−10 to 60°C (with no condensation and freezing)
Storage humidity range			35 to 85%RH (no condensation)
Withstand voltage			Between all of external terminals and the case: 1000 VAC for 1 minute
Insulation resistance			Between all of external terminals and the case: 50 MΩ (500 VDC)
Noise resistance			1000 Vp-p Pulse width 1 μs, Rise time 1 ns
CE marking	Integrated control type		Standard
	Remote control type		Available for suffix -Q only

Speed/Acceleration

Speed setting switch no.	Speed [mm/s]
1	100
2	200
3	300
4	400
5	500
6	600
7	700
8	800
9	900
10	1000

Note) The factory default setting for the switch is No.1 (100 mm/s).

Acceleration setting switch no.	Acceleration [m/s²]
1	0.49
2	0.74
3	0.98
4	1.23
5	1.47
6	1.96
7	2.45
8	2.94
9	3.92
10	4.90

Note) The factory default setting for the switch is No.1 (0.49 m/s²).

SMC

Dimensions:Integrated Control Type

E-MY2H | Nominal size | — | Stroke |

Nominal size: 16

I/O cable Note)

Motor position **TA**   Motor position **TB**

Slot for auto switch

Power supply cable
(2 wires)

(500)   60   80   160 + Stroke   20

Motor position **DA**   Motor position **DB**

3.5
5.8
2
3.4

2 x 4-square nut
M3

**T-slot section for
mounting details**

(A clearance of
40 mm or greater
is required.)   60   (40)   80

40

ø4H7 depth 5

43.5

(A clearance of
40 mm or greater
is required.)   (60)

(74.7)   101.7

27   74.7

72

27

102

40

5.1

28

T-slot section for mounting

Motor

50

40

102

42
5

Controller

2-ø6.5 counterbore
depth 3.3

4-M4 depth 7   6.5   4H7   6   7.2   5.6 (Max. 8.6)   14.4

Long hole
depth 5

4   3.5

4   152 + Stroke   2 x 2-ø3.3 through hole

15.5

(60.3)   87.3

FG terminal M3

Nominal size: 25

Motor position **TA**   Motor position **TB**

Slot for auto switch

I/O cable Note)

5.4

Power supply cable
(2 wires)

105

(500)   60   210 + Stroke   25

Motor position **DA**   Motor position **DB**

5.3
8.5
3
5.5

2 x 4-square nut
M5

**T-slot section for
mounting details**

(A clearance of
40 mm or greater
is required.)   60   (49.6)   110.8

100

60

2-ø5H7 depth 5

43.5

(A clearance of
40 mm or greater
is required.)   (60)

(96.7)   132.2

35.5   96.7

94

35.5

128

50

7.5

37

T-slot section for mounting

Motor

Controller

2-ø9.5 counterbore
depth 5.4

71.7   60   71.5

60

60

102   60

42   5

4-M5 depth 9   5H7   7.5   8.2   5   5.5

Long hole
depth 5   17.5

9.5   6

198 + Stroke   2 x 2-ø5.5 through hole

15.5

(51.8)   87.3

FG terminal M3

Note) For the 3-point stoppable type, the I/O cable is a 9 core type and for the 5-point stoppable type, a 11 core type is used.

Series E-MY2H

Dimensions:Remote Control Type (Actuator part)

E-MY2H | Nominal size | – | Stroke | ☐ | ☐ | **M** / **L** / **Z**

∗ Refer to page 16 for dimensions of remote controller.

Nominal size: 16

Encoder cable on actuator side (4 wires)

To remote controller ⇐

Motor cable

Motor cable on actuator side (6 wires)

Noise filter Note)

(210)

Motor position **TA**   Motor position **TB**

Slot for auto switch

Motor position **DA**   Motor position **DB**

60   80   160 + Stroke   20

2 x 4-square nut M3

3.5   5.8   3.4   2

T-slot section for mounting details

27   28   102   40   5.1

T-slot section for mounting

60   (40)   80   ø4H7 depth 5

Motor

60   40   43.5   40   (60)   (60)   40   3.5

2-ø6.5 counterbore depth 3.3

6.5   4   50.4   6   7.2   4H7   Long hole depth 5   50   5.6 (Max. 8.6)   4   14.4

2 x 2-ø3.3 through hole

4-M4 depth 7   152 + Stroke

(74.7)   101.7   27   74.7   72   60   102   42

Nominal size: 25

Encoder cable on actuator side (4 wires)

To remote controller ⇐

Motor cable

Motor cable on actuator side (6 wires)

Noise filter Note)

(210)

Motor position **TA**   Motor position **TB**

Slot for auto switch

Motor position **DA**   Motor position **DB**

5.4   105   210 + Stroke   25   60

2 x 4-square nut M5

5.3   8.5   5.5   3

T-slot section for mounting details

35.5   37   128   50   7.5

T-slot section for mounting

60   (49.6)   110.8   2-ø5H7 depth 5

Motor

60   100   60   43.5   60   (60)   (60)   60   5.5

2-ø9.5 counterbore depth 5.4

71.7   7.5   8.2   7.1 (Max. 10.1)   5   17.5   71.5   9.5   6

4-M5 depth 9   5H7   Long hole depth 5   6   198 + Stroke

2 x 2-ø5.5 through hole

(96.7)   132.2   35.5   96.7   94   60   102   42

Note) When the CE compliant model is selected, a noise filter is provided but not attached.
The cable for the CE compliant models use dedicated shielding. Even if a noise filter is attached to a non CE marked product, the product will not be CE compliant.

SMC

Dimensions:Remote Control Type (Remote controller part)

Controller

Extention cable	A dimension
M	1000
L	3000
Z	5000

FG terminal M3

87.1
6.5
44
60
2 x for M4 thread Note 2)
(accessory)

15.5
5   5
42

To actuator ⇐

Motor cable on controller side (6 wires)
Encoder cable on controller side (4 wires)
Noise filter Note 3)
200 or less

Power supply cable (2 wires)
I/O cable Note 1)
(500)
(A)
60
Note 2)
2 x M5 depth 8

Note 1) For the 3-point stoppable type, the I/O cable is a 9 core type and for the 5-point stoppable type, a 11 core type is used.
Note 2) When mounting the separated type controller, use the included M4 screw or use the M5 tap located on one side of the controller.
Note 3) When the CE compliant model is selected, a noise filter is provided but not attached. The cable for the CE compliant models use dedicated shielding. Even if a noise filter is attached to a non CE marked product, the product will not be CE compliant.

L-bracket/MYE-LB (Option)

60
58
28
2-ø5.5
7

87.3
22.5
2
25
(67)

60

Hexagon socket head cap screw (accessory)
M5 x 8 2 pcs.

DIN rail bracket/MYE-DB (Option)

21
42
Round head Phillips screw (accessory)
M3 x 6.5 2 pcs.

Round head combination screw (accessory)
M4 x 10 1 pc.

4.3
35.5   22
73.6
(74.5)

87.3
(11.8)
(7.5)
11

Auto Switches/Proper Mounting Position at Stroke End Detection

Note) The operating range is a guide including hysteresis, but is not guaranteed. There may be large variations (as much as ±30%) depending on the ambient environment.
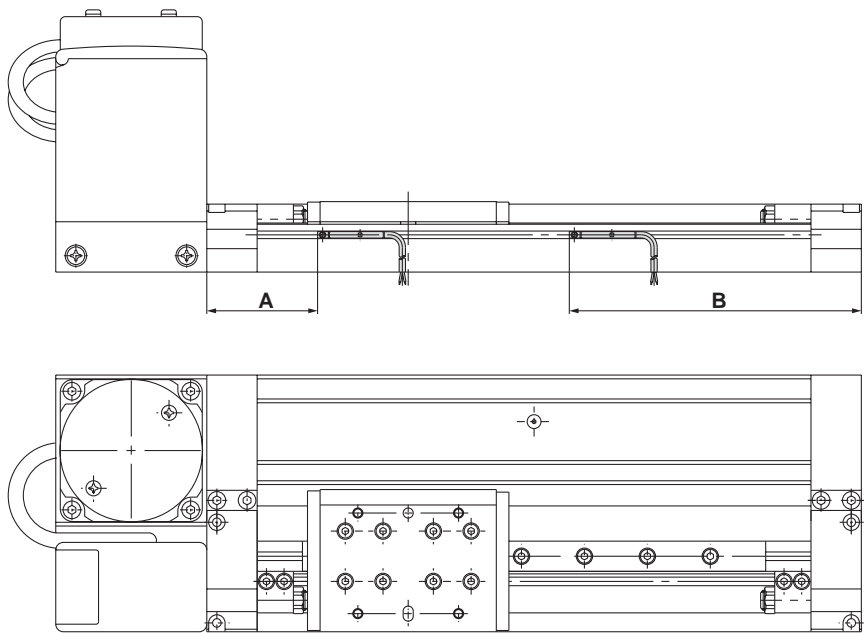
D-A9, D-A9□V (mm)

Nominal size	A	B	Operating range
16	44	116	8.5
25	54	156	

D-M9, D-M9□V (mm)

Nominal size	A	B	Operating range
16	48	112	3
25	58	152	4

D-M9□W, D-M9□WV (mm)

Nominal size	A	B	Operating range
16	48	112	8.5
25	58	152	

Auto Switch Mounting

When mounting the auto switches, they should be inserted into the actuator's switch groove from the direction shown in the drawing on the right. Once in the mounting position, use a flat head watchmakers' screwdriver to tighten the included set screw.

Note) When tightening the set screw, use a watchmakers' screwdriver with a handle diameter of about 5 to 6 mm. The tightening torque should be 0.1 to 0.2 N•m.

SMC
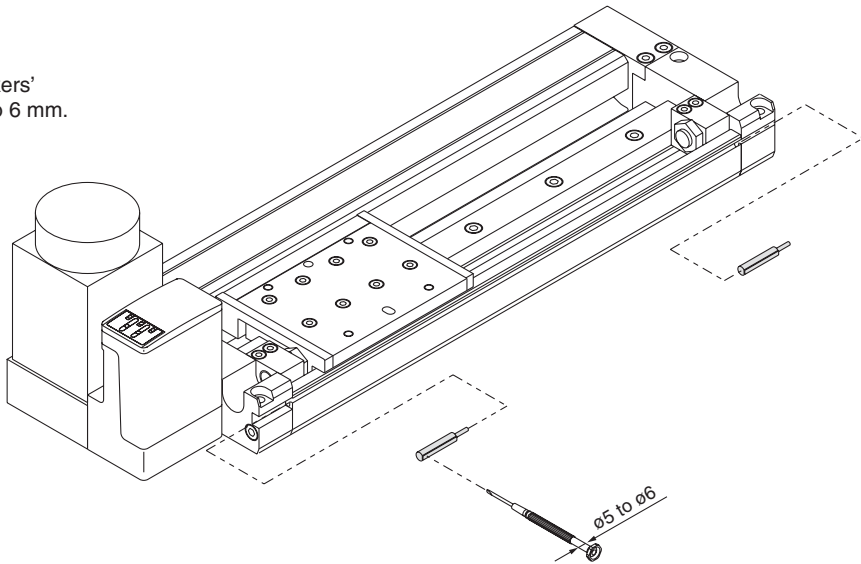
Names and Functions of Individual Parts

Integrated control type
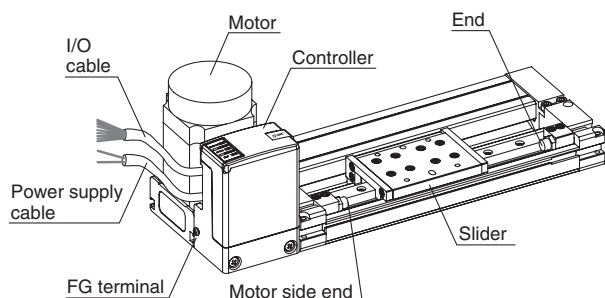
Remote control type
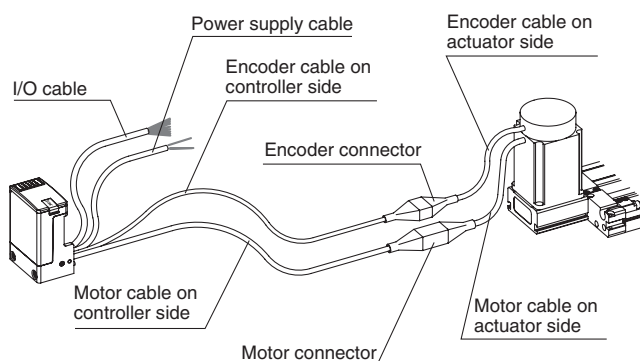
Description	Contents/Functions
Slider	Moving part within the actuator
Motor	Motor activating the actuator
Power supply cable	Power supply cable for providing power to the actuator
I/O cable	I/O cable for transmitting a positioning completion signal and driving instructions
Controller part	The unit part to control and set the actuator, and indicate its status
FG terminal	The terminal to connect the FG cable
Encoder cable on actuator side	Encoder cable for connecting the actuator with the controller
Motor cable on actuator side	Motor cable for connecting the actuator with the controller
Encoder cable on controller side	Encoder cable for separating the controller
Motor cable on controller side	Motor cable for separating the controller

Controller detail
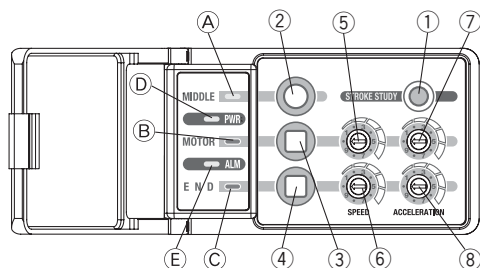
Switch

Description	Contents/Functions
①	Stroke learning switch
② to ④	Switch to move the actuator to intermediate position and set the intermediate position
⑤	Rotary switch to set moving speed to the motor side end
⑥	Rotary switch to set moving speed to the other end
⑦	Rotary switch to set moving acceleration to the motor side end
⑧	Rotary switch to set moving acceleration to the other end

Indicator Light and the Display for the Basic Functions

Symbol	Description	Power supply ON	Actuation instruction					When decelerated and completely stopped [1]	When the alarm is activated
			Motor side	End side	Intermediate 1	Intermediate 2 [1]	Intermediate 3 [1]		
Ⓐ	MIDDLE Indicator light (Green)	—	—	—	○	○	○	—	[2]
Ⓑ	MOTOR Indicator light (Green)	—	○	—	—	○	—	○	
Ⓒ	END Indicator light (Green)	—	—	○	—	—	○	○	
Ⓓ	PWR Indicator light (Green)	○	○	○	○	○	○	○	○
Ⓔ	ALM Indicator light (Red)	—	—	—	—	—	—	—	○

○ indicates on status, and — indicates off status.
∗1) Displays for the 5-point stoppable type only.
∗2) When the alarm is activated, see page 20 for the ALM display.

Examples of Internal Circuit and Wiring

3-point Stoppable Type

Power Supply Cable 2 wires AWG20 (20 lines/0.16 mm²)

Symbol	Colour	Signal name	Contents
DC1 (+)	Brown	Vcc	Power supply cables for driving the actuator
DC1 (−)	Blue	GND	

I/O Cable 9 wires AWG28 (7 wires/0.127 mm²)

Symbol	Colour	Signal name	Contents
DC2 (+)	Brown	Vcc	Power supply cables for signal
DC2 (−)	Blue	GND	
OUT1	Pink	READY output	Signal indicating the controller is operationable
OUT2	Orange	Positioning completion output 1	Signal indicating that positioning is completed
OUT3	Yellow	Positioning completion output 2	
OUT4	Green	Alarm output	Signal indicating an alarm has been generated
IN1	Purple	Actuation instruction input 1	Instruction signal to actuator
IN2	Gray	Actuation instruction input 2	
IN3	White	Emergency stop	Signal providing emergency stop instruction (The emergency stop is activated when contact is opened)

This product can be used without connecting I/O cables, however please use caution and install a power supply switch for the actuator. In case of an emergency, please turn it off.

I/O Cable Signals

Input signal

Command	Symbol	
	IN1	IN2
Motor side actuation instruction	◯	—
End side actuation instruction	—	◯
Intermediate actuation instruction	◯	◯

Output signal

Actuator status	Symbol		
	OUT1	OUT2	OUT3
Completion of motor side end positioning	◯	◯	—
Completion of end positioning	◯	—	◯
Completion of intermediate positioning	◯	◯	◯

◯ indicates on status, and — indicates off status.

NPN input/output circuit
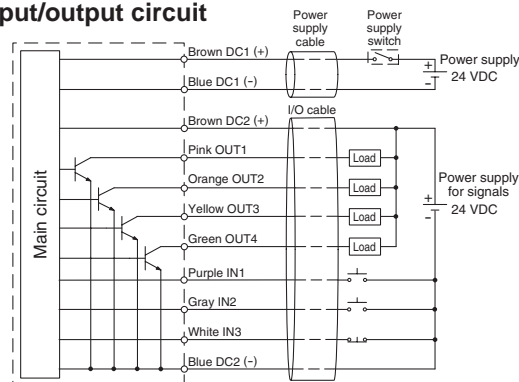
PNP input/output circuit
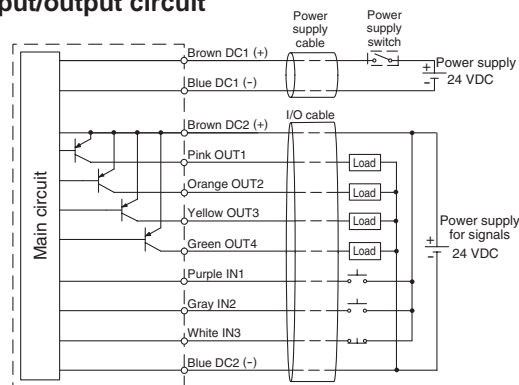
5-point Stoppable Type

Power Supply Cable 2 wires AWG20 (20 lines/0.16 mm²)

Symbol	Colour	Signal name	Contents
DC1 (+)	Brown	Vcc	Power supply cables for driving the actuator
DC1 (−)	Blue	GND	

I/O Cable 11 wires AWG28 (7 wires/0.127 mm²)

Symbol	Colour	Signal name	Contents
DC2 (+)	Brown	Vcc	Power supply cables for signal
DC2 (−)	Blue	GND	
OUT1	Pink	READY output	Signal indicating the controller is operationable
OUT2	Orange	Positioning completion output 1	Signal indicating that positioning is completed
OUT3	Yellow	Positioning completion output 2	
OUT4	Red	Positioning completion output 3	
OUT5	Green	Alarm output	Signal indicating an alarm has been generated
IN1	Purple	Actuation instruction input 1	Instruction signal to actuator
IN2	Gray	Actuation instruction input 2	
IN3	Black	Actuation instruction input 3	
IN3	White	Emergency stop	Signal providing emergency stop instruction (The emergency stop is activated when contact is opened)

This product can be used without connecting I/O cables, however please use caution and install a power supply switch for the actuator. In case of an emergency, please turn it off.

I/O Cable Signals

Input signal

Command	Symbol		
	IN1	IN2	IN3
Motor side actuation instruction	◯	—	—
End side actuation instruction	—	◯	—
Intermediate actuation instruction 1	—	—	◯
Intermediate actuation instruction 2	◯	—	◯
Intermediate actuation instruction 3	—	◯	◯
External input stop instruction	◯	◯	◯

Output signal

Actuator status	Symbol			
	OUT1	OUT2	OUT3	OUT4
Completion of motor side end positioning	◯	◯	—	—
Completion of end positioning	◯	—	◯	—
Completion of intermediate 1 positioning	◯	—	—	◯
Completion of intermediate 2 positioning	◯	◯	—	◯
Completion of intermediate 3 positioning	◯	—	◯	◯
Completion of external input stop	◯	◯	◯	◯

◯ indicates on status, and — indicates off status.

NPN input/output circuit

PNP input/output circuit

SMC
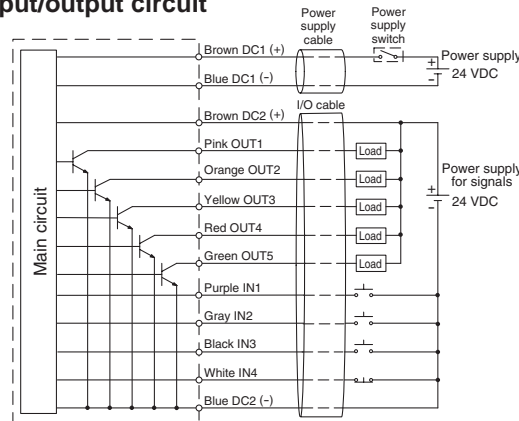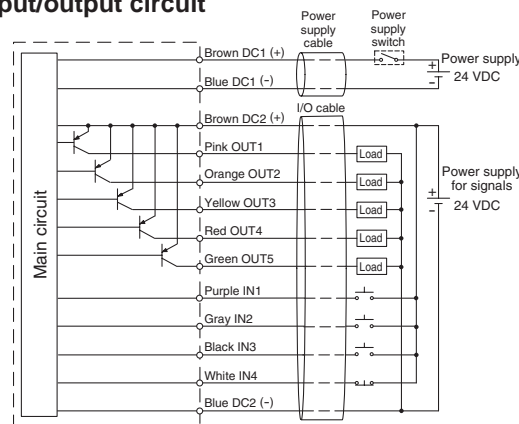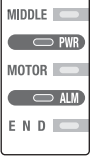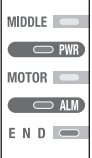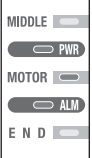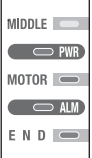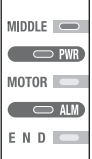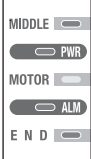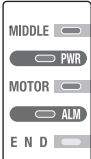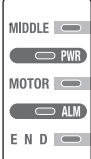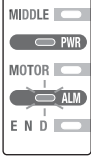
Error Display and Problem Solving

When the error indicator is displayed, refer to the following instructions.

Light ON ▭ | Blinks ▭ | Light OFF ▭

Item	Display	Contents	Solution
Emergency stop	MIDDLE / PWR / MOTOR / ALM / END	Either the emergency stop input is opened, or the power supply for the signal is cut off.	Confirm the power supply signal is energised and release the emergency stop input. (Refer to the circuit diagram on page 19.)
Abnormal external output	MIDDLE / PWR / MOTOR / ALM / END	External output is short-circuited. ∗ There is no external output signal.	In case of common power supply, turn off the power supply and check the wiring condition of load. Restart the power supply. (Refer to the circuit diagram on page 19.)
			In case of an independent power supply, turn off the power supply for the signals and check the wiring condition of load. Restart the power supply. (Refer to the circuit diagram on page 19.)
Power supply abnormality	MIDDLE / PWR / MOTOR / ALM / END	The power supply voltage is excessive or lower than the limit for operation.	Check the power supply voltage and adjust it if necessary, then press the MIDDLE button.
Drive abnormality	MIDDLE / PWR / MOTOR / ALM / END	Maximum output is continued for a prolonged period of time.	Check the work weight and confirm that no foreign materials are attached to the actuator. After confirming, press the MIDDLE button.
Temperature abnormality	MIDDLE / PWR / MOTOR / ALM / END	Internal temperature of the controller is high.	Lower the surrounding temperature of the actuator in use, and then press the MIDDLE button.

Item	Display	Contents	Solution
Abnormal stroke	MIDDLE / PWR / MOTOR / ALM / END	The motor is revolving at excessive speed or stops before target is achieved.	If any foreign materials are observed, remove them and then press the MIDDLE button.
			Check to see whether the stroke adjusting unit is loose. If required, readjust the stroke and perform the stroke learning again. Note 1)
			In case of using the remote controller type, please confirm the connection of the connector part between the motor and the controller, after turning off the power supply.
Motor abnormality	MIDDLE / PWR / MOTOR / ALM / END	The motor does not revolve properly or over current is detected.	Press the MIDDLE button.
			In case of using the remote controller type, please confirm the connector part between the motor and the controller after cutting off the power supply.
Controller abnormality	MIDDLE / PWR / MOTOR / ALM / END	The CPU is malfunctioning or the memory content is abnormal.	Turn off the power supply and restart it.
Error of the set value	MIDDLE / PWR / MOTOR / ALM / END	The switch settings for speed and acceleration have been changed while in a locked condition. ∗ There is no external output signal.	Reset the settings for speed and acceleration to the set values while in a locked condition.

Note 1) The product is in the same condition as when the stroke learning process is completed.
Return to the home position is not performed by the initial input
• If the error can not be corrected, turn off the power supply to stop operation, and contact your SMC sales representative.

Alarm reset

There are two types of alarm reset: alarm reset manually (a) and an alarm reset externally (b) by an external signal.

a: Alarm reset manually

In the event of an alarm, simply pushing (2) will revert from the alarm state.
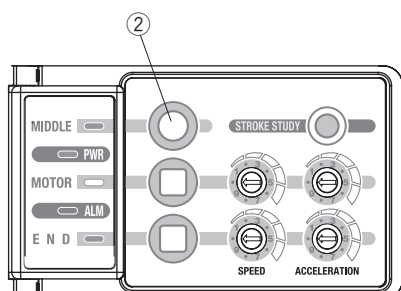
b: Alarm reset externally

In the event of an alarm, simply inputting an external emergency stop signal for 50 ms or longer will return to the state prior to the alarm. The emergency stop output will activate by releasing the input for the emergency stop.

Alarm output	
Emergency stop output	(Releasing)
READY output	50 ms or longer
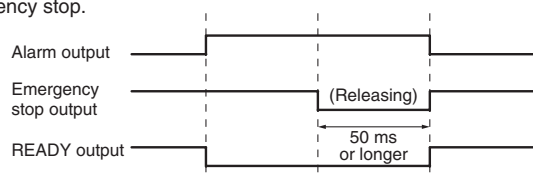
The followings are the reinstated condition.
• The slider will be free until the command for driving is applied.
• After being reverted, the next input command for driving makes it start. The initial motion after being reverted is 50 mm/s of a traveling speed.

SMC

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Auto Switch Specifications

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 M VDC (between lead wire and case)		
Withstand voltage	1000 VAC for 1 minute (between lead wire and case)		
Ambient temperature	−10 to 60°C		
Enclosure	IEC529 standard IP67, JIS C 0920 waterproof construction		

Lead Wire Length

Lead wire length indication

(Example)   **D-M9P[L]**

Lead wire length

Nil	0.5 m
L	3 m
Z	5 m

Note 1) Applicable auto switch with 5 m lead wire "Z"
Reed switch: None
Solid state switch: Manufactured upon receipt of order as standard.
Note 2) To designate solid state switches with flexible specifications, add "-61"
after the lead wire length.
∗ Oilproof flexible heavy-duty cable is used for D-M9□ as standard. There is no
need to add the suffix -61 to the end of part number.

(Example) **D-M9PWVL- [61]**

Flexible specification

Auto Switch Hysteresis

The hysteresis is the difference between the position of the auto switch as
it turns "on" and as it turns "off". A part of operating range (one side)
includes this hysteresis.

Switch operation position (ON)

Hysteresis

Note)
(Reed switch: 2 mm or less
Solid state switch: 1 mm or less)

Switch operation position (OFF)

Note) Hysteresis may fluctuate due to the operating environment.
Contact SMC if hysteresis causes an operational problem.
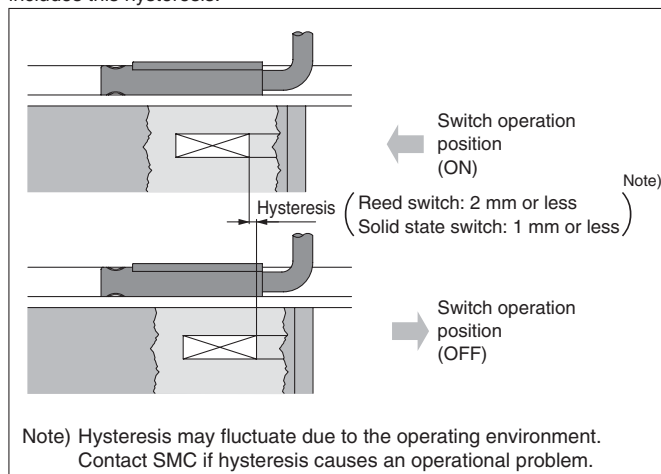
Contact Protection Boxes: CD-P11, CD-P12

<Applicable switch model>

D-A9/A9□V
The auto switches above do not have a built-in contact protection circuit.
Therefore, please use a contact protection box with the switch for any of
the following cases:
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.**
The contact life may be shortened. (Due to permanent energising conditions.)

Specifications

Part No.	CD-P11		CD-P12
Load voltage	100 VAC	200 VAC	24 VDC
Maximum 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

CD-P11	Surge absorber Choke coil OUT Brown OUT Blue
CD-P12	Zener diode Choke coil OUT (+) Brown OUT (−) Blue
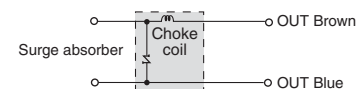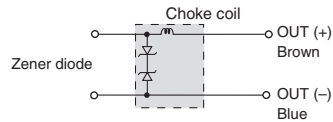
Dimensions
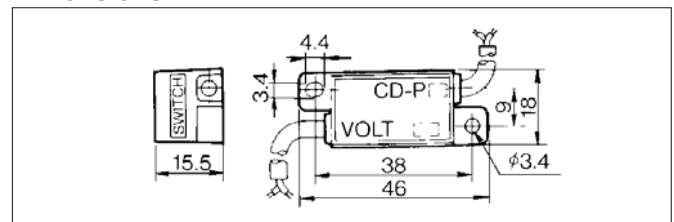
Connection

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 metre.

SMC

Auto Switch Connections and Examples

Basic Wiring

Solid state 3-wire, NPN

Switch main circuit
Brown
Load
Black
Blue
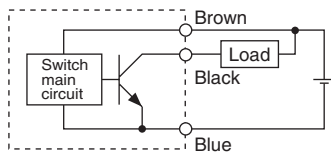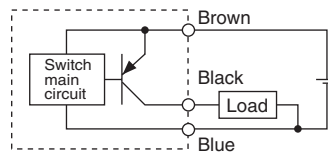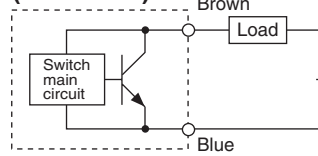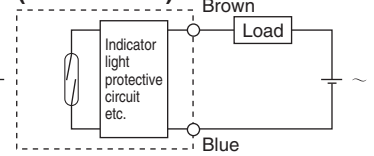
(Power supplies for switch and load are separate.)

Switch main circuit
Brown
Load
Black
Blue

Solid state 3-wire, PNP

Switch main circuit
Brown
Black
Load
Blue

2-wire (Solid state)

Switch main circuit
Brown
Load
Blue

Switch main circuit
Brown
Load
Blue

2-wire (Reed switch)

Indicator light protective circuit etc.
Brown
Load
Blue
~

Indicator light protective circuit etc.
Brown
Load
Blue
~
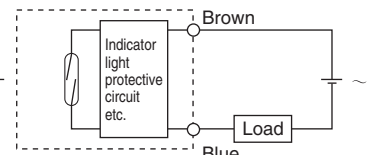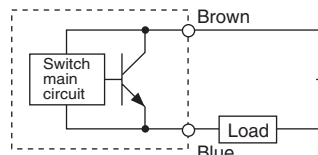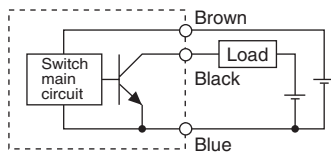
Examples of Connection to PLC (Programmable Logic Controller)

• Sink input specifications 3-wire, NPN

Switch
Black — Input
Brown
Blue
COM
PLC internal circuit

2-wire

Switch
Brown — Input
Blue
COM
PLC internal circuit
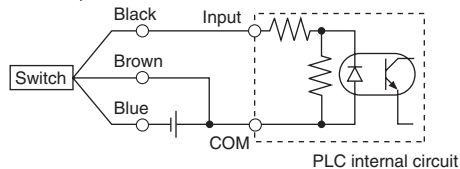
• Source input specifications 3-wire, PNP

Switch
Black — Input
Brown
Blue
COM
PLC internal circuit

2-wire

Switch
Blue — Input
Brown
COM
PLC internal circuit
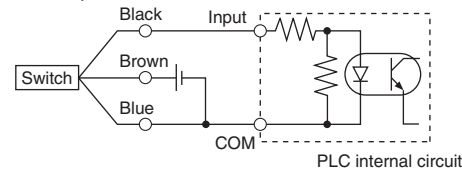
Connect according to the applicable PLC input specifications, since the connection method will vary depending on the PLC input specifications.
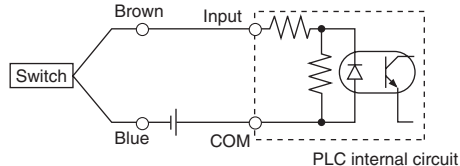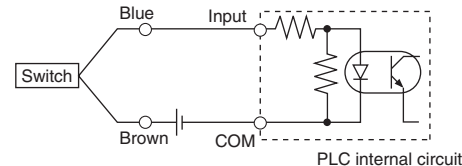
Examples of AND (Serial) and OR (Parallel) Connection

● 3-wire

AND connection for NPN output (using relays)

Switch 1
Brown
Black — Relay
Blue

Switch 2
Brown
Black — Relay
Blue
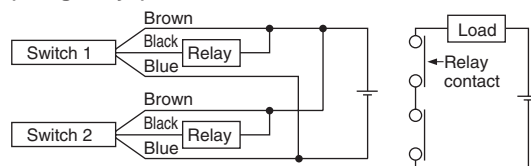
Load
Relay contact

AND connection for NPN output (performed with switches only)

Switch 1
Brown
Black
Blue — Load

Switch 2
Brown
Black
Blue
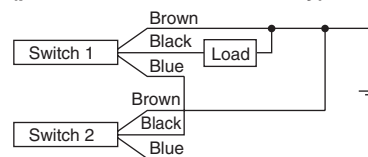
The indicator lights will light up when both switches are turned ON.

OR connection for NPN output

Switch 1
Brown
Black
Blue — Load

Switch 2
Brown
Black
Blue
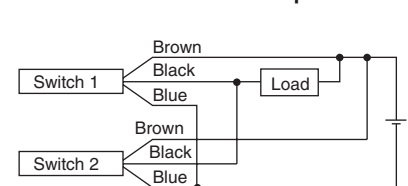
2-wire with 2-switch AND connection

Switch 1
Brown
Load
Blue
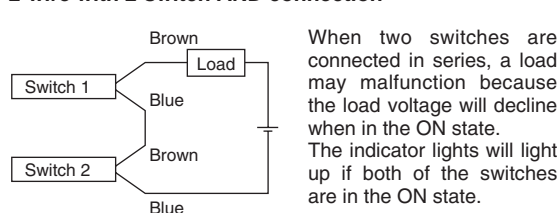
Switch 2
Brown
Blue

When two switches are connected in series, a load may malfunction because the load voltage will decline when in the ON state.
The indicator lights will light up if both of the switches are in the ON state.

Load voltage at ON = $\dfrac{\text{Power supply voltage}}{} - \dfrac{\text{Internal voltage drop}}{} \times 2 \text{ pcs.}$
= 24 V - 4 V x 2 pcs.
= 16 V

Example: Power supply is 24 VDC.
Internal voltage drop in switch is 4 V.

2-wire with 2-switch OR connection

Switch 1
Brown
Load
Blue
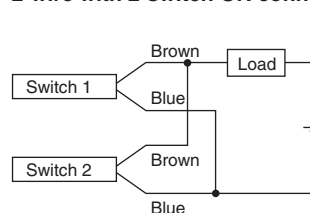
Switch 2
Brown
Blue

(Solid state)
When two switches are connected in parallel, a malfunction may occur because the load voltage will increase when 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 is 3 kΩ.
Leakage current from switch is 1 mA.

(Reed switch)
Because there is no current leakage, the load voltage will not increase when turned OFF. 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.

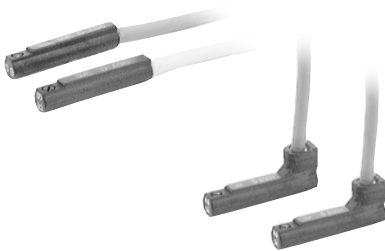# Reed Switch: Direct Mounting Style
D-A90(V)/D-A93(V)/D-A96(V) $C \in$

Grommet
Electrical entry direction: In-line

⚠Caution
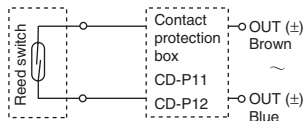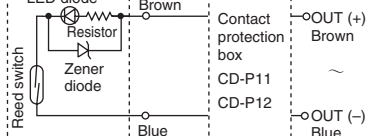#### Operating Precautions

Fix the switch with the existing screw installed on the switch body. The switch may be damaged if a screw other than the one supplied, is used.
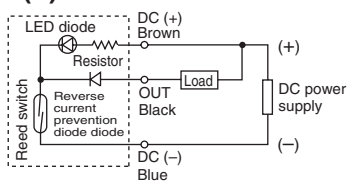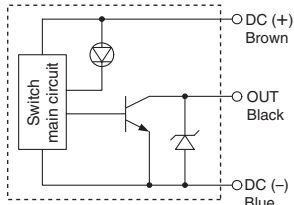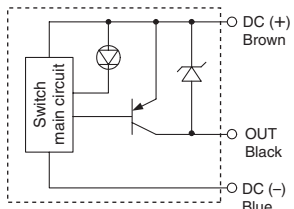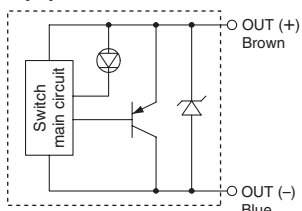
Auto Switch Internal Circuit

D-A90(V)

Reed switch — Contact protection box CD-P11 CD-P12 — OUT (±) Brown ~ OUT (±) Blue

D-A93(V)

LED diode — Brown — Resistor — Zener diode — Reed switch — Contact protection box CD-P11 CD-P12 — OUT (+) Brown ~ OUT (−) Blue

D-A96(V)

LED diode — DC (+) Brown — Resistor — Reed switch — Reverse current prevention diode diode — OUT Black — Load — DC power supply — DC (−) Blue — (+) (−)

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

Please use the auto switch with a contact protection box any of the above mentioned cases. (For details about the contact protection box, refer to page 21.)

Auto Switch Specifications

PLC: Programmable Logic Controller

D-A90/D-A90V (Without indicator light)

Auto switch part no.	D-A90/D-A90V		
Applicable load	IC circuit, Relay, PLC		
Load voltage	24 V AC/DC or less	48 V AC/DC or less	100 V AC/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)		

D-A93/D-A93V/D-A96/D-A96V (With indicator light)

Auto switch part no.	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 ON		

● 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 21 for reed switch common specifications.
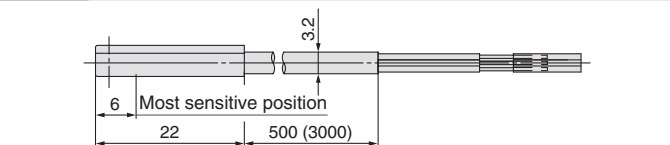Note 2) Refer to page 21 for lead wire lengths.
Note 3) In less than 5 mA condition, the indicating light visibility becomes low, and it may be unreadable in less than 2.5 mA. However, as long as the contact ouput is over a 1 mA condition, there will be no problem.

Weight
Unit: g

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

Dimensions
Unit: mm

D-A90/D-A93/D-A96

Indicator light
D-A90 type comes without indicator light
M2.5 x 4 ℓ Slotted set screw
ø2.7
Most sensitive position
10
ø4
2.8
4.5
22
(24.5)
( ): dimensions for D-A93.

D-A90V/D-A93V/D-A96V

ø2.7
4.5
9.1
5.1
Most sensitive position
10
M2.5 x 4 ℓ Slotted set screw
2
22
6
ø4
Indicator light
D-A90V type comes without indicator light

SMC

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

Auto Switch Specifications

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

PLC: Programmable Logic Controller

Grommet

● **2-wire load current is reduced (2.5 to 40 mA)**
● **Lead-free**
● **UL certified (style 2844) lead cable is used.**

D-M9□/D-M9□V (With indicator light)						
Auto switch part no.	**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				4 V or less	
Leakage current	100 μA or less at 24 VDC				0.8 mA or less	
Indicator light	Red LED illuminates when ON.					

● 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 21 for solid state switch common specifications.
Note 2) Refer to page 21 for lead wire lengths.

Weight

Unit: g

Auto switch part no.		**D-M9N(V)**	**D-M9P(V)**	**D-M9B(V)**
Lead wire length (m)	0.5	8	8	7
	3	41	41	38
	5	68	68	63

⚠Caution

Operating Precautions

Fix the switch with the existing screw installed on the switch body. The switch may be damaged if a screw other than the one supplied, is used.

Auto Switch Internal Circuit

D-M9N(V)

D-M9P(V)

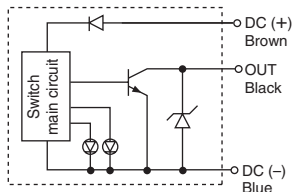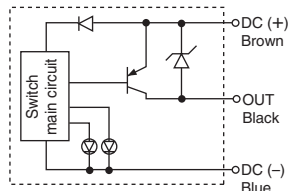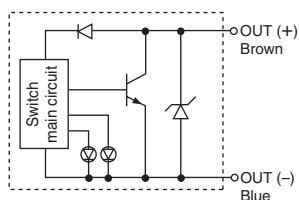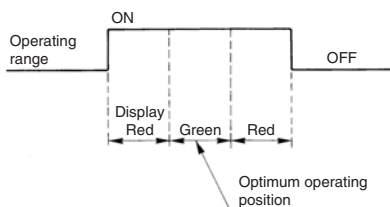### D-M9B(V)

Dimensions

Unit: mm

D-M9□

D-M9□V

2-color Indication Type, Solid State Switch: Direct Mounting Style

D-F9NW(V)/D-F9PW(V)/D-F9BW(V) $C\!\in$

Auto Switch Specifications

PLC: Programmable Logic Controller

Grommet

⚠Caution

Operating Precautions

Fix the switch with the existing screw installed on the switch body. The switch may be damaged if a screw other than the one supplied, is used.

Auto Switch Internal Circuit

D-F9NW(V)

DC (+) Brown
OUT Black
DC (−) Blue

D-F9PW(V)

DC (+) Brown
OUT Black
DC (−) Blue

D-F9BW(V)

OUT (+) Brown
OUT (−) Blue

Indicator light/Display method

D-F9□W/D-F9□WV (With indicator light)					
Auto switch part no.	D-F9NW	D-F9NWV	D-F9PW	D-F9PWV	D-F9BW	D-F9BWV
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 IC, PLC				24 VDC relay, PLC	
Power supply voltage	5, 12, 24 VDC (4.5 to 28 VDC)				—	
Current consumption	10 mA or less				—	
Load voltage	28 VDC or less		—		24 VDC (10 to 28 VDC)	
Load current	40 mA or less		80 mA or less		5 to 40 mA	
Internal voltage drop	1.5 V or less (0.8 V or less at 10 mA load current)		0.8 V or less		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.					

● Lead wires
  Oilproof heavy-duty vinyl cable: ø2.7, 0.15 mm² x 3 cores (Brown, Black, Blue), 0.18 mm² x 2 cores (Brown, Blue), 0.5 m
Note 1) Refer to page 21 for solid state switch common specifications.
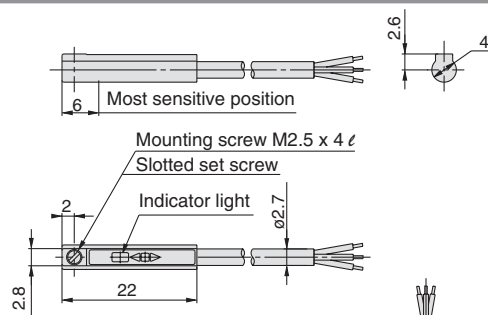Note 2) Refer to page 21 for lead wire lengths.

Weight

Unit: g

Auto switch part no.		D-F9NW(V)	D-F9PW(V)	D-F9BW(V)
Lead wire length (m)	0.5	7	7	7
	3	34	34	32
	5	56	56	52

Dimensions

Unit: mm

D-F9□W

Most sensitive position
Mounting screw M2.5 x 4ℓ
Slotted set screw
Indicator light

D-F9□WV

Most sensitive position
Mounting screw M2.5 x 4ℓ
Slotted set screw
Indicator light

SMC
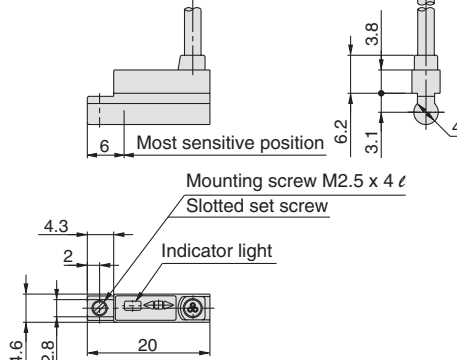
Made to Order

Please contact SMC for detailed dimensions, specifications, and lead times.

Made to Order

Made-to-Order Application List

		Intermediate stroke XB10	Long stroke XB11	Helical insert thread X168
E-MY2C	Cam follower guide type	Can be adjusted on a regular basis	Can be adjusted on a regular basis	●
E-MY2H	High precision guide type (Single axis)	●	●	●

1 Intermediate stroke -XB10

Within the standard stroke range, the stroke length in the middle range can be adjusted by 1 mm increments.

■ **Stroke range: 51 to 599 mm**

E-MY2H Refer to the standard model no. on page 12 -XB10

Example) E-MY2H25-599TAN-M9B-XB10

2 Long stroke -XB11

Available with long strokes exceeding the standard stroke range. The stroke length can be adjusted by 1 mm increments.

■ **Stroke range: 601 to 1000 mm**

E-MY2H Refer to the standard model no. on page 12 -XB11

Example) E-MY2H25-999TAN-M9B-XB11

3 Helical insert thread specifications -X168

The mounting threads of the slider are changed to helical insert threads. The thread size is standard size.

E-MY2 Refer to the standard model no. on page 7,12 -X168

Example) E-MY2H25-300TAN-M9B-X168

Others: Made-to-Order/For detail, please contact SMC.

● **Speed changes**

[mm/s]
10   100   1000 2000   10000

Low speed | Medium speed | Standard | High speed
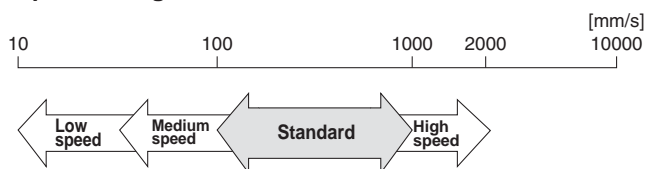
Note 1) There are slight vibrations in a low speed operation of 40 mm/s or less.
Note 2) Acceleration cannot be reached in a high speed range exceeding 1000 mm/s.

● **Acceleration changes**

[m/s²]
0   4.9   9.8   14.7   19.6

Heavy load | Standard | Medium load | Light load

[mm/s²]
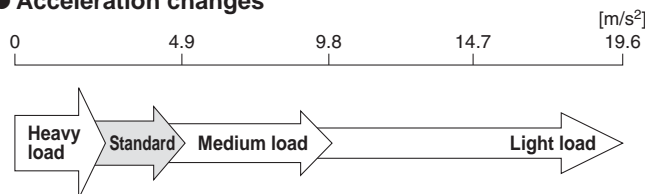
	Heavy load	Standard	Medium load	Light load
Max. acceleration	2.45	4.90	9.80	19.60

Maximum Payload [kg]

Nominal size	16	10	5	2.5	1.25
	25	20	10	5	2.5

Note) For example, the maximum acceleration for the nominal size 25 under the standard load spec. is 4.9 m/s². In the case of the heavy load spec., the max. acceleration will be 2.45 m/s², and the max. payload will be 20 kg.
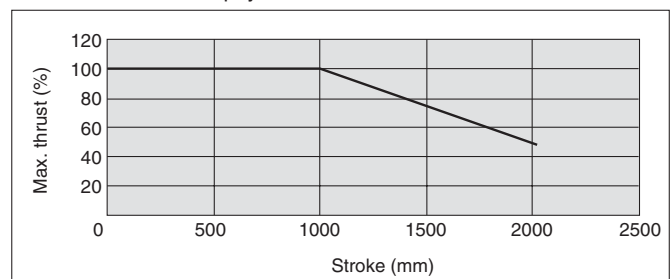
● **6-point stoppable type**
Stoppable at both ends (2-points) and at intermediate strokes (4-points)

● **Max. manufacturable stroke**
Stroke exceeding 1000 mm is available.

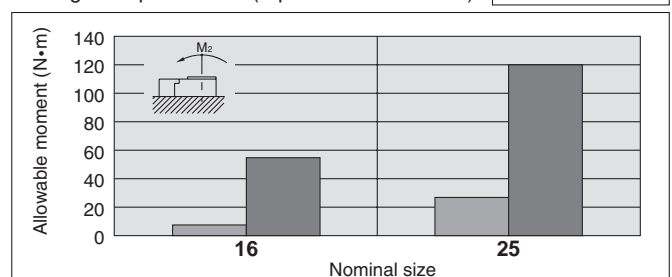| Nominal size	E-MY2C	E-MY2H
16	2000	1000
25	2000	1500

Maximum thrust is reduced depending on the stroke.
Max. thrust = Max. payload x Max. acceleration

● **Improvement against moment loading**
2-axis guide specification (equivalent to **MY2HT**)

E-MY2H
2-axis (MY2HT)

Series E-MY2
Safety Instructions

These safety instructions are intended to prevent a hazardous situation and/or equipment damage. These instructions indicate the level of potential hazard by labels of **"Caution"**, **"Warning"** or **"Danger"**. To ensure safety, be sure to observe ISO 10218 [Note 1], JIS B 8433 [Note 2] and other safety practices.

⚠ **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.

Note 1) ISO 10218: Manipulating industrial robots-Safety
Note 2) JIS B 8433: General Rules for Robot Safety

⚠ Warning

1. **The compatibility of the e-Rodless actuator is the responsibility of the person who designs the system or decides its specifications.**
   Since the products specified here are used in various operating conditions, their compatibility with a specific system must be based on either specifications, post analysis and/or tests to meet a specific requirement. The expected performance and safety assurance are the responsibility of the person who has determined the compatibility of the system. This person should continuously review the suitability of all specified items by referring to the latest information in the catalogue and by taking into consideration the possibility of equipment failure when configuring the system.

2. **Only trained personnel should operate pneumatically operated machinery and equipment.**
   Compressed air can be dangerous if handled incorrectly. Assembly, handling or repair of an electric actuator should be performed by trained and experienced operators.

3. **Do not service machinery/equipment or attempt to remove components until safety is confirmed.**
   1. Inspection and maintenance of machinery/equipment should only be performed once measures to prevent falling or runaway of the driven objects have been confirmed.
   2. When equipment will be removed, confirm that all safety precautions have been followed. Turn off the power supply for this equipment.
   3. Before machinery/equipment is restarted, confirm that safety measures are in effect.

4. **Contact SMC if the product will be used in any of the following conditions:**
   1. Conditions and environments beyond the given specifications, or if product is used outdoors.
   2. Installation on equipment in conjunction with atomic energy, medical equipment, food and beverages, or safety equipment.
   3. An application which has the possibility of having a negative effect on people, property, or animals, requiring special safety analysis.

5. **Review and confirm the product's documentation thoroughly before using the product, or contact our distributors, or SMC for confirmation for a problem free application.**

6. **Use the product after throughly reviewing and confirming the precautions in this catalogue.**

7. **Some products in this catalogue are for particular applications and sites only. Check and confirm with the distributor or SMC.**

⊘**SMC**

Design and Selection

⚠ Warning

1. Conduct operation at regulated voltage.

The product may not function correctly or the controller section may be damaged if used with any other voltage than the specified regulated voltage. If the regulated voltage is low, the load may not operate due to internal voltage drop of the controller section. Check and confirm the operating voltage before using.

2. Do not use a load that is over the maximum load volume.

The controller section may be damaged.

3. Operate within the limit of the specification range.

If operated outside of the specification range, there is a possibility of fire, malfunction, and or actuator damage. Operate after confirming the required specifications.

4. To prevent any damage by product failure or malfunction, plan and construct a backup system beforehand, such as multiplexing the components and equipment, employing failure free planning, etc.

5. Provide enough space for maintenance.

When planning, consider the space required for product checkup and maintenance.

6. Provide a protective cover when there is a risk of human injury.

If a driven object and or moving parts of a cylinder pose a danger to human injury, design the structure to avoid contact with the human body.

7. Securely tighten all mounting parts and connecting parts of the actuator to prevent them from becoming loose.

In particular, when a cylinder operates at a high frequency, or is installed where there is excessive vibration, ensure that all parts remain secure.

Mounting

⚠ Caution

1. Do not drop, strike, or apply excessive shock to the actuator.

The actuator could be damaged, resulting in its failure and or malfunction.

2. Hold the body when handling.

The actuator could be damaged, resulting in its failure and or malfunction.

3. Keep tightening torque.

If tightened beyond the specified range, damage may occur. In addition, if tightened below the specified range, the actuator installation position may shift to some extent.

4. Do not install the actuator in a location used as a scaffold for work.

By stepping on the actuator, the actuator may receive excessive load weight which may damage it.
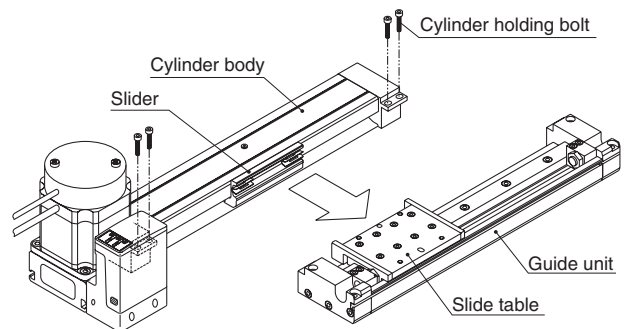
Mounting

⚠ Caution

5. Provide a flat surface for installing the actuator. The degree of surface flatness should be determined by the machine precision requirement, or its corresponding precision.

Keep surface flatness within 0.1/500 mm.

6. Attaching and detaching the cylinder body

To remove the cylinder body, remove the four cylinder holding bolts and remove the cylinder from the guide unit. To install the cylinder, insert its slider into the slide table on the guide unit and equally tighten the four holding bolts. Tighten the holding bolts securely because if they become loose, problems may occur such as damage, malfunction, etc.

Cylinder holding bolt
Cylinder body
Slider
Guide unit
Slide table

7. Workpiece mounting

When mounting a magnetic workpiece, keep a clearance of 5 mm or greater between the auto switch and the workpiece. Otherwise, the magnetic force within the cylinder may be lost, resulting in malfunction of the auto switch.

Workpiece
Auto switch
5 mm or more
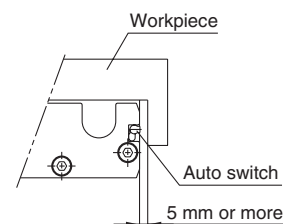
Wiring

⚠ Warning

1. Avoid repeatedly bending and/or stretching the cables.

Repeatly applying bending stress and stretching force to the cables may result in broken lead wires.

2. Avoid incorrect wiring.

Depending on the type of incorrect wiring, the controller section may be damaged.

3. Perform wiring when the power is off.

The controller section may be damaged and malfunction.

Wiring

⚠ Warning

4. Do not wire with power lines or high voltage lines.

Conduct wiring for controller separately from power lines or high voltage lines to avoid interference from the noise or surge from the signal lines of the power lines or high voltage lines. This may result in malfunction.

5. Confirm that the wiring is properly insulated.

Be certain that there is no faulty wiring insulation (contact with other circuits, improper insulation between terminals, etc.) because the e-Rodless may be damaged due to excessively applied voltage or current flow to the controller section.

6. Be sure to attach a noise filter when a remote control type, CE compliant product is used.

Using without a noise filter will make it a non-CE compliant product.

Operating Environment

⚠ Warning

1. Do not use in a place where the product may come in contact with dust, particles, water, chemicals and oil.

It may cause damage and malfunction.

2. Do not use in a place where a magnetic field is present.

It may cause malfunction to the actuator.

3. Do not use the product in the presence of flammable, explosive or corrosive gas.

It may cause fire, explosion, and corrosion.
The actuator does not have an explosion proof construction.

4. Do not use in an environment subjected to temperature cycle.

If used in an environment where temperature cycling occurs, other than the usual temperature change, the internal controller may be adversely effected.

5. Do not use in a place that has excessive electrical surge generation, even though this product is compliant with CE marking.

When there are units (solenoid type lifter, high frequency induction furnace, motor, etc.) which generate a large amount of surge in an area around the e-Rodless cylinder, deterioration or damage may occur to the internal circuit elements of the controller. Avoid sources of surge generation and crossed lines.

6. Select a product type that has built-in surge absorbing elements for a load, such as relays or solenoid valves which are employed for driving voltage generating load directly.

7. Install the actuator in a place without vibration and impact.

Vibration and impact causes damage and malfunction to the product and work, as well as prevents the work from meeting the specified parameters.

Adjustment and Operation

⚠ Warning

1. Do not short the loads.

Short on the load of the controller indicates an error, but it may cause over current and damage the controller.

2. Do not operate or conduct any settings with wet hands.

An electrical shock may result from wet hands.

3. When operating the controller, avoid making contact with the workpiece.

Contact with the workpiece may cause injury.

⚠ Caution

1. Do not push the setting buttons with sharp pointed items.

Sharp pointed items may cause setting button damage.

2. Do not touch the sides and lower parts of the motor and controller.

Conduct operation after confirming that the machine is cool since it gets hot while in operation.

3. After the stroke is adjusted, turn on the power supply and then perform stroke learning.

If stroke learning is not performed, the product may not operate according to the adjusted stroke and damage to any connected equipment may occur.

4. Do not randomly change the guide adjusting section setting.

Readjustment of the guide is not necessary for normal operation, since it is pre-adjusted. Accordingly, do not randomly change the guide adjusting section setting.

Maintenance

⚠ Warning

1. Periodically perform maintenance of the product.

Confirm that the piping and bolts are securely tightened.
Unintentional malfunction of a system's component may occur as a result of an actuator malfunction.

2. Do not disassemble, modify (including change of printed circuit board) or repair.

Disassembly or modification may result in injury or failure.

⚠ Caution

1. Confirm the range of movement of a work piece (a slider) before connecting the driving power supply or turning on the switch.

The movement of the work may cause an accident.
When the power supply is turned on, the work is returned to home position by input IN1 or IN2 signal. (Except in the case when stroke learning is not performed ever).

⊝SMC

Design and Selection

⚠ Warning

1. Confirm the specifications.

Read the specifications carefully and use this product appropriately. The product may be damaged or malfunction if it is used outside of its specification range (e.g. load current, voltage, temperature or impact, etc.).

2. Take precautions when multiple actuators are used close together.

When two or more actuators are lined up in close proximity to each other, magnetic field interference may cause the switches to malfunction. Maintain a minimum cylinder separation of 40 mm.

3. Pay attention to the length of time that a switch is on at an intermediate stroke position.

When an auto switch is placed at an intermediate position of the stroke and a load connected to the auto switch is driven at the time the slide table passes, the auto switch will operate. However if the speed is too great, the operating time will be shortened and the load may not operate properly. The maximum detectable piston speed is:

$$V \text{ (mm/s)} = \frac{\text{Auto switch operating range (mm)}}{\text{Load operating time (ms)}} \times 1000$$

4. Keep wiring as short as possible.

<Reed switch>

As the length of the wiring to a load gets longer, the rush current at the time the switch is turned ON becomes greater, which may shorten the product's life. (The switch will stay ON all the time.)

1) Use a contact protection box when the wire length is 5 m or longer.

<Solid state switch>

2) Although the wire length should not affect switch function, use a wire that is 100 m or shorter.

5. Take precautions for the internal voltage drop of the switch.

<Reed switch>

1) Switches with an indicator light   (Except D-A96, A96V)

• If auto switches are connected in series as shown below, take note that there will be a large voltage drop because of internal resistance from the light emitting diodes. (Refer to internal voltage drop in the auto switch specifications.) [The voltage drop will be "n" times larger when "n" auto switches are connected.] Even though an auto switch operates normally, the load may not operate.
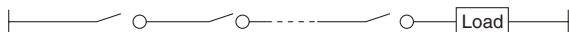
• Similarly, when operating below a specified voltage, it is possible that the load may be ineffective even though the auto switch function is normal. Therefore, the formula below should be satisfied after confirming the minimum operating voltage of the load.

$$\frac{\text{Supply}}{\text{voltage}} - \frac{\text{Internal voltage}}{\text{drop of switch}} > \frac{\text{Minimum operating}}{\text{voltage of load}}$$

2) If the internal resistance of a light emitting diode causes a problem, select a switch without an indicator light (Model A90, A90V).

<Solid state switch>

3) Generally, the internal voltage drop will be greater with a 2-wire solid state auto switch than with a reed switch. Take the same precautions as in item (1) as mentioned above. Also, note that a 12 VDC relay is not applicable.

6. Pay attention to leakage current.

<Solid state switch>

With a 2-wire solid state auto switch, current (leakage current) flows to the load to operate the internal circuit even when in the OFF state.

$$\frac{\text{Current to operate load}}{\text{(Input OFF signal of controller)}} > \frac{\text{Leakage}}{\text{current}}$$

If the condition given in the above formula is not met, internal circuit will not reset correctly (stays ON). Use a 3-wire switch if this specification cannot be satisfied.

Moreover, leakage current flow to the load will be "n" times larger when "n" auto switches are connected in parallel.

7. Do not use a load that generates surge voltage.

<Reed switch>

If driving a load such as a relay which generates a surge voltage, use a contact protection box.

<Solid state switch>

Although a zener diode for surge protection is connected at the output side of a solid state auto switch, damage may still occur if a surge is applied repeatedly. When directly driving a load which generates a surge, such as a relay or solenoid valve, use a switch with a built-in surge absorbing element.

8. Cautions for use in an interlock circuit

When an auto switch is used for an interlock signal requiring high reliability, devise a double interlock system to safeguard against malfunctions. The double interlock system should provide a mechanical protection function or use another switch (sensor) together with the auto switch. Also perform periodic inspection and confirm proper operation.

9. Provide enough space for maintenance.

When designing an application, be sure to allow sufficient clearance for maintenance and inspections.

Mounting and Adjustment

⚠Warning

1. Do not drop or bump.

Do not drop, bump or apply excessive impacts (300 m/s² or greater for reed switches and 1000 m/s² or greater for solid state switches) while handling.

Although the body of the switch may not be damaged, the inside of the switch could be damaged and cause a malfunction.

2. Do not carry an actuator by the auto switch lead wires.

Never carry a cylinder by its lead wires. This may not only cause broken lead wires, but it may cause internal elements of the switch to be damaged by the stress.

3. Mount switches using the proper tightening torque.

When a switch is tightened above the torque specification, the mounting screws, or switch may be damaged. On the other hand, tightening below the torque specification may allow the switch to slip out of position.

4. Mount a switch at the centre of the operating range.

Adjust the mounting position of an auto switch so that the piston stops at the centre of the operating range (the range in which a switch is ON). (The mounting positions shown in the catalogue indicate the optimum position at the stroke end.) If mounted at the end of the operating range (around the borderline of ON and OFF), operation will be unstable.

<D-M9□>

When the D-M9 auto switch is used to replace old series auto switch, it may not activate depending on operating condition because of its shorter operating range.

Such as
- Application where the stop position of actuator may vary and exceed the operating range of the auto switch, for example, pushing, pressing, clamping operation, etc.
- Application where the auto switch is used for detecting an intermediate stop position of the actuator. (In this case the detecting time will be reduced.)

In these applications, set the auto switch to the centre of the required detecting range.

⚠Caution

1. Fix the switch with the appropriate screw installed on the switch body. The switch may be damaged if other screws are used.

Wiring

⚠Warning

1. Avoid repeatedly bending or stretching lead wires.

Broken lead wires will result from repeatedly applying bending stress or stretching force to the lead wires.

2. Be sure to connect the load before power is applied.

<2-wire type>

If the power is turned ON when an auto switch is not connected to a load, the switch will be instantly damaged because of excess current.

Wiring

3. Confirm proper insulation of wiring.

Be certain that there is no faulty wiring insulation (such as contact with other circuits, ground fault, improper insulation between terminals, etc.). Damage may occur due to excess current flow into a switch.

4. Do not wire in conjunction with power lines or high voltage lines.

Wire separately from power lines or high voltage lines, avoiding parallel wiring or wiring in the same conduit with these lines. Control circuits containing auto switches may malfunction due to noise from these lines.

5. Do not allow short circuit of loads.

<Reed switch>

If the power is turned ON with a load in a short circuited condition, the switch will be instantly damaged because of excess current flow into the switch.

<Solid state switch>

D-M9□ and all models of PNP output type switches do not have built-in short circuit protection circuits. If loads are short circuited, the switches will be instantly damaged, as in the case of reed switches.

Take special care to avoid reverse wiring with the brown power supply line and the black output line on 3-wire type switches.

6. Avoid incorrect wiring.

<Reed switch>

A 24 VDC switch with indicator light has polarity. The brown lead wire is (+), and the blue lead wire is (–).

1) If connections are reversed, the switch will still operate, but the light emitting diode will not light up.
   Also note that a current greater than the maximum specified one will damage a light emitting diode and make it inoperable. Applicable models: D-A93, A93V

<Solid state switch>

1) Even if connections are reversed on a 2-wire type switch, the switch will not be damaged because it is protected by a protection circuit, but it will remain in a normally ON state. But reverse wiring in a short circuit load condition should be avoided to protect the switch from being damaged.
2) Even if (+) and (–) power supply line connections are reversed on a 3-wire type switch, the switch will be protected by a protection circuit. However, if the (+) power supply line is connected to the blue wire and the (–) power supply line is connected to the black wire, the switch will be damaged.

<D-M9□>

D-M9□ does not have built-in short circuit protection circuit. Be aware that if the power supply connection is reversed (e.g. (+) power supply wire and (–) power supply wire connection is reversed), the switch will be damaged.

∗ Lead wire colour changes

Lead wire colours of SMC switches have been changed in order to meet NECA Standard 0402 for production beginning September, 1996 and thereafter. Please refer to the tables provided.

Special care should be taken regarding wire polarity during the time that the old colours still coexist with the new colours.

2-wire

	Old	New
Output (+)	Red	Brown
Output (−)	Black	Blue

3-wire

	Old	New
Power supply	Red	Brown
GND	Black	Blue
Output	White	Black

SMC

Wiring

⚠Caution

1. **When the cable sheath is stripped, confirm the stripping direction. The insulator may be split or damaged depending on the direction. (D-M9☐ only)**
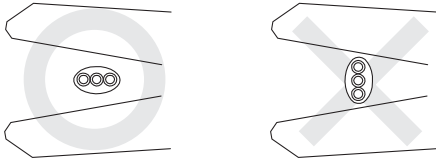
Recommended tool

Manufacturer	Model name	Model no.
VESSEL	Wire stripper	No 3000G
TOKYO IDEAL CO., LTD	Strip master	45-089

∗ Stripper for a round cable (ø2.0) can be used for a 2-wire type cable.

Operating Environment

⚠Warning

1. **Never use in an atmosphere of explosive gases.**

   The construction of the auto switch is not intended to prevent explosion. Never use in an atmosphere with an explosive gas since this may cause a serious explosion.

2. **Do not use in an area where a magnetic field is generated.**

   The auto switch will malfunction or the magnets inside of an actuator will become demagnetised if used in such an environment.

3. **Do not use in an environment where the auto switch will be continually exposed to water.**

   The switch satisfies the IEC standard IP67 construction (JIS C 0920: watertight construction). Nevertheless, it should not be used in applications where it is continually exposed to water splash or spray. This may cause deterioration of the insulation or swelling of the potting resin inside switch causing a malfunction.

4. **Do not use in an environment with oil or chemicals.**

   Consult with SMC if the auto switch will be used in an environment laden with coolant, cleaning solvent, various oils or chemicals. If the auto switch is used under these conditions for even a short time, it may be adversely effected by a deterioration of the insulation, a malfunction due to swelling of the potting resin, or hardening of the lead wires.

5. **Do not use in an environment with temperature cycles.**

   Consult with SMC if the switch is used where there are temperature cycles other than normal temperature changes, as they may adversely affected the switch internally.

Operating Environment

6. **Do not use in an environment where there is excessive impact shock.**

   <Reed switch>

   When excessive impact (300 m/s² or more) is applied to a reed switch during operation, the contact point may malfunction and generate a signal momentarily (1 ms or less) or cut off. Consult with SMC regarding the need to use a solid state switch in a specific environment.

7. **Do not use in an area where surges are generated.**

   <Solid state switch>

   When there are units (such as solenoid type lifters, high frequency induction furnaces, motors, etc.) that generate a large amount of surge in the area around an actuator with a solid state auto switch, their proximity or pressure may cause deterioration or damage to the internal circuit of the switch. Avoid sources of surge generation and crossed lines.

8. **Avoid accumulation of iron debris or close contact with magnetic substances.**

   The auto switches in an actuator may malfunction when a large accumulated amount of machining chips, welding spatter and or magnetically attracted material is located near the auto switch. This failure may be the result of loss magnetic force inside of the actuator.

Maintenance

⚠Warning

1. **Perform the following maintenance periodically in order to prevent possible danger due to unexpected auto switch malfunction.**

   1) Securely tighten switch mounting screws.
      If screws become loose or the mounting position is dislocated, retighten them after readjusting the mounting position.
   2) Confirm that there is no damage to the lead wires.
      To prevent faulty insulation, replace switches or repair lead wires, etc., if damage is discovered.
   3) Confirm that the green light on the 2-colour display type switch lights up.
      Confirm that the green LED is ON when stopped at the set position. If the red LED is ON, when stopped at the set position, the mounting position is not appropriate. Readjust the mounting position until the green LED lights up.

Other

⚠Warning

1. **Consult with SMC concerning water resistance, elasticity of lead wires, usage at welding sites, etc.**

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