e-Rodless Actuator

Operation Manual

E-MY2B Series

e-Actuator

SMC Corporation

URL http://www.smcworld.com

Thank you for purchasing the SMC E-MY2B Series e-Rodless Actuator.
Please read this manual carefully before operating the e-Rodless Actuator and make sure you understand the e-Rodless Actuator,
its capabilities and limitations.
Please keep this manual handy for future reference.

OPERATOR

- This operation manual has been written for those who have knowledge of machinery and apparatuses that use actuator and have full knowledge of assembly, operation and maintenance of such equipment.
- Please read this operation manual carefully and understand it before assembling, operating or providing maintenance service to the actuator.

Phone

AUSTRIA / (43) 2262-62 280
BELGIUM / (32) 3-355 1464
CZECH REP. / (420) 5-414 24611
DENMARK / (45) 70 25 29 00
FINLAND / (358) 9-859 580
FRANCE / (33) 1-64 76 1000
GERMANY / (49) 6103 4020
GREECE / (30) 1- 342 6076
HUNGARY / (36) 1-371 1343
IRELAND / (353) 1-403 9000
ITALY / (39) 02-92711
NETHERLANDS / (31) 20-531 8888
NORWAY / (47) 67 12 90 20
POLAND / (48) 22-548 50 85
PORTUGAL / (351) 2 610 89 22
SPAIN / (34) 945-18 4100
SWEDEN / (46) 8-603 0700
SWITZERLAND / (41) 52-396 3131
TURKEY / (90) 212 221 1512
UNITED KINGDOM / (44) 1908-56 3888

CONTENTS

SAFETY

The e-Rodless Actuator and this manual contain essential information for the protection of users and others from possible injury and property damage and to ensure correct handling.
Please check that you fully understand the definition of the following messages (signs) before going on to read the text, and always follow the instructions.
Please read the operation manuals of related apparatus and understand it before operating the actuator.

IMPORTANT MESSAGES	
Read this manual and follow its instructions. Signal words such as WARNING, CAUTION and NOTE, will be followed by important safety information that must be carefully reviewed.	
⚠WARNING	Indicates a potentially hazardous situation which could result in death or serious injury if you do not follow instructions.
⚠CAUTION	Indicates a potentially hazardous situation which if not avoided, may result in minor injury or moderate injury.
NOTE	Gives you helpful information.

⚠WARNING

Do not disassemble, remodel (including change of printed circuit board) or repair.
An injury or failure can result.

Do not perform operation and setting with wet hands.
Electric shock may occur.

Do not operate beyond specification range.
Fire, malfunction or switch damage can result.
Please use it after confirming the specification.

⚠WARNING

Do not use the product in the environment with possible presence of flammable, explosive or corrosive gas with the product to prevent fire, explosion or corrosion.

Note the actuator doesn't have explosion proof construction.

During operation, do not touch the moving parts of the actuator or place hands within the movement area.

It may cause injury.

⚠CAUTION

Do not touch the side and lower part of motor and controller.

These parts become hot and should not be touched until it is confirmed they become cool enough.

The grounding should be performed separately at short length near controller if possible.

Be sure to ground the product to keep the capability of resistance for the noise in the actuator.

Ground with FG terminal.

Perform functional inspection after maintenance.

Stop operation when equipment or component doesn't work properly. Safety may not be guaranteed by unintended malfunction.

Ensure the safety in wiring for ALM signal by inputting emergency stop signal and causing successive error.

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

If the stroke leaning is not performed, the product may not operate along with the adjusted stroke and damage the connected equipment.

Do not connect driving power supply and turn on it before the area where the work (slider) is moved confirms safety.

The movement of the work may cause accident. And when power supply is turned on, the work is returned to home position by input IN1 or IN2 signal. (Except that stroke learning is not performed at all.)

Precaution on Handling

Use UL approved product for direct current power supply.

1. Clamping voltage current circuit complies with UL508
   Circuit which power supply if insulation transducer satisfying following conditions.
   Max. voltage (No load) : 30Vrms (42.4V peak) or less
   Max. current : (1) 8A or less (Including short circuit)
   (2) When limited by the circuit protector (fuse etc.) with the ratings in the table below.

Voltage without load (V peak)	Max. current rating (A)
0 to 20[V]	5.0
Over 20[V] up to 30[V]	100/peak voltage

2. Circuit (of class 2) which is of 30Vrms (42.4V peak) or less with the power supply unit of class 2 complying with UL1310 or transducer of class 2 complying with UL1585.

NOTE

Follow the instructions given below when handling your actuator. Otherwise, the actuator may be damaged or may fail, thereby resulting in malfunction.

- •Do not use at voltage over specified voltage.
- •Do not apply the load over max.
- •Keep the space for maintenance.
- •Do not drop and collide the product or give excessive impact to it.
- •Hold the body for handling.
- •Keep screws tightened to the specified torque.
- •Do not install the actuator in a place where it could be trod on.
- •Keep flatness of mounting face for actuator within 0.1/500mm.
- •Do not give repeated bending and tensile force to the connected cable to prevent the breakage of the cable.
- •Connect wiring properly.
- •Do not energize the product during wiring.
- •Do not use in the place with dust, particle and splash of water, chemicals and oil to prevent breakage and malfunction of the product.
- •Do not use in the place creating magnetic field to prevent the malfunction of the actuator.
- •Do not use in the environment subject to temperature cycle.
- •Do not use where close to surge generating source.
- •Do not short the load. Short of the load of the controller is indicated as error, but it may cause over current and break the actuator.
- •Do not push setting buttons with the pointed tool to avoid the damage of the buttons.
- •Perform maintenance for the product periodically.

Model Indication Method

E-MY2B **16** [ ] [ ] **100** [ ] **T** **N** [ ] **M** **M9B** [ ]

Nominal size
16
25

Speed type	
L	Low speed
M	Middle speed
Nil	Standard speed

Load type	
Q	Heavy load
Nil	Standard load
E	Midium load
D	Light load

Stroke

Stroke adjusting unit	
Nil	—
M	Motor side
E	End side
W	Double-side

Motor placement	
T	On the top
D	On the bottom

Output type	
N	NPN
P	PNP

Positioning stop number	
Nil	3 positions
A	5 positions

Cable length	
M	1m
L	3m
Z	5m

Auto switch

Number of auto switches

Note) Refer to the catalog for Stroke, Auto switch and Number of auto switches.

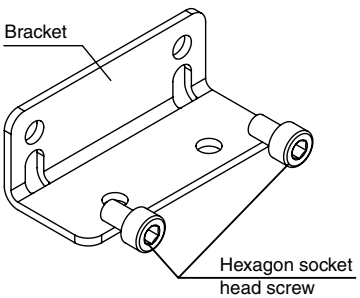
Options

•Controller mount bracket

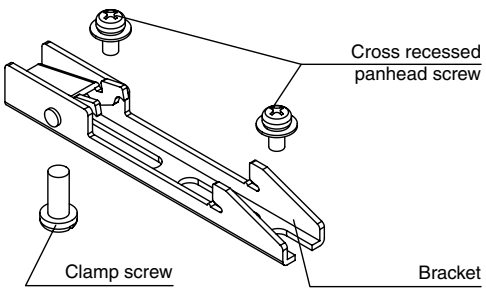
•L type bracket ····· MYE-LB Hexagon socket head screw M5 x 8 (2)

•DIN rail bracket···· MYE-DB Cross recessed panhead screw M3 x 6.5 (2)

Clamp screw M4 x 10 (1)



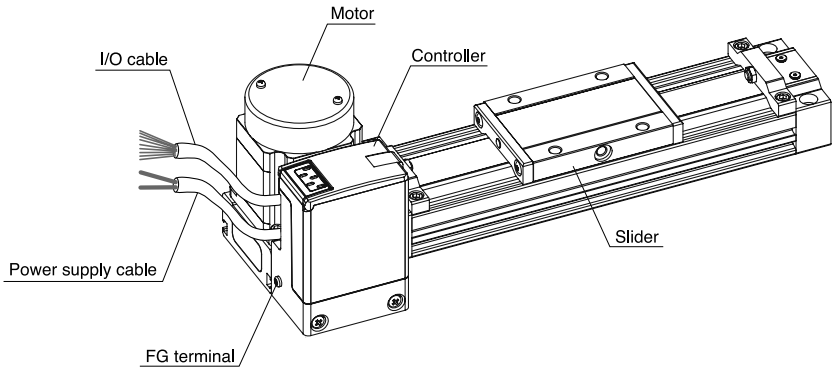
L type bracket
(MYE-LB)



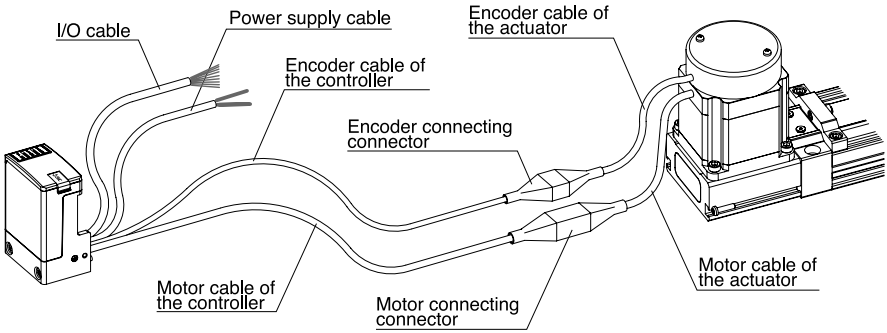
DIN rail bracket
(MYE-DB)

Names and Functions of Individual Parts

Controller integrated type



Controller separated type



Description	Content/Function
Slider	The parts which can move in the actuator
Motor	The motor to move the actuator
Power supply cable	The power supply line to drive the actuator
I/O cable	The signal line to transmit signal of positioning completion and command for drive
Controller	The unit to control, set and indicate the actuator
FG terminal	The terminal to connect FG cable
Encoder cable of the actuator	Encoder cable connecting the actuator and the controller
Motor cable of the actuator	Motor cable connecting the actuator and the controller
Encoder cable of the controller	Encoder cable to separate the controller
Motor cable of the controller	Motor cable to separate the controller

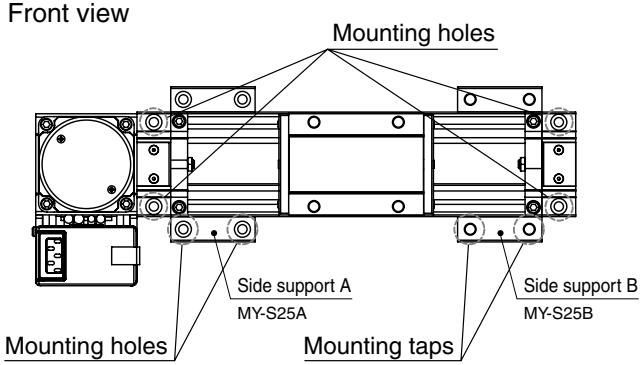
Installation

Read "Precautions for Handling" of safety Instruction and "How to install" of this chapter with care to provide safe and exact measurement for installation of the actuator.

Installation of body

Use 4 mounting holes on the top of the body.

Front view

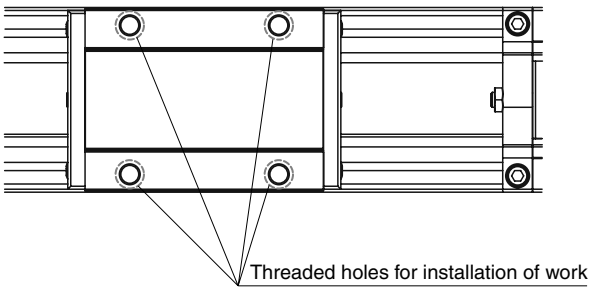


Mounting holes on the top

Name	Type	Thread size
Main body	Mounting hole	M5
Side Support A	Mounting hole	M5
Side Support B	Mounting Tap	M6 x1

Installation of work

Use 4 threaded holes on the top of slider for installation of work.



Installation of work tap

Threaded hole dimension	Effective length
M5 depth 8mm	5 to 8mm

•Select screw which enables effective length of thread to enter.

Precautions for installation

•Do not operate the actuator outside operating temperature range.
•Do not install the actuator in a place where it could be trod on.
•Keep flatness following mechanical accuracy or equivalent reference for the face where the actuator is installed.
Also, confirm the flatness is within 0.1/500mm

Connection with external guide

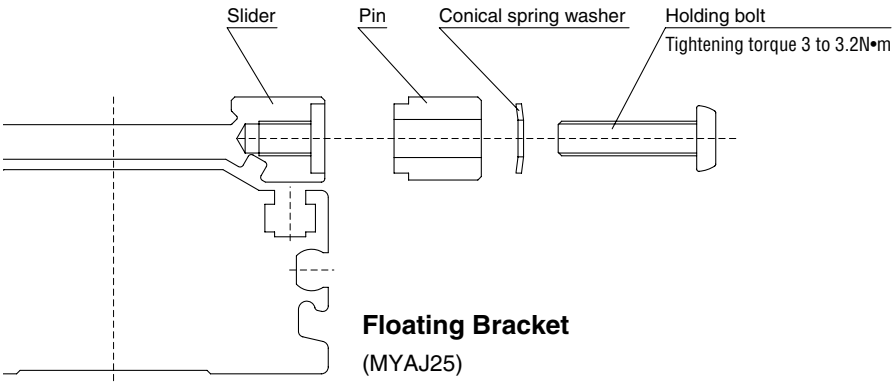
Connect an external guide by using the floating structure.
Keep the resistance of the external guide not more than the allowable resistance.

Allowable external resistance

Nominal size	Allowable external resistance
16	10N
25	20N

When the floating bracket is used

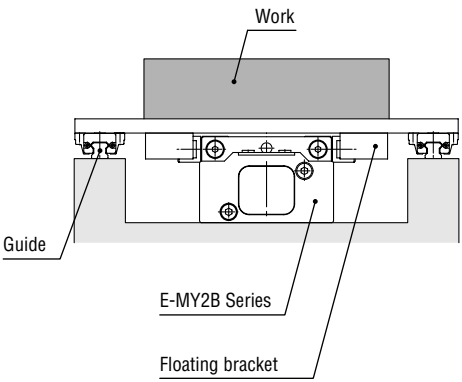
Installation of a holding bolt.
Install the pin and the conical spring washer in the slider with a holding bolt.



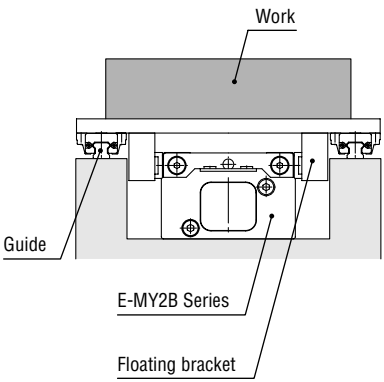
Floating Bracket
(MYAJ25)

Application

Mounting direction 1
(to minimize the installation width)



Mounting direction 2
(to minimize the installation hight)



Note) Refer to tha catalog for adjustable range.

Mounting controller (When controller separated type is used)

How to remove controller
Loosen M4 mounting screw shown in fig. 1 and remove the controller.

Direct mounting
Use M4 mounting screw shown in fig. 1 or M5 tap hole to mount the controller.

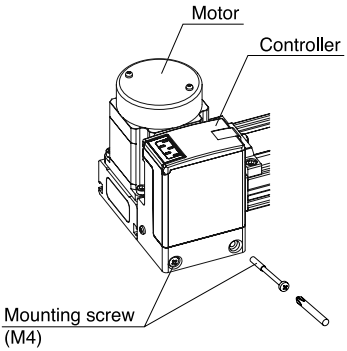


fig. 1

Mounting by L type bracket
Mount the optional L type bracket on the main unit using the two mounting screws M5X8L and install on the facility using hexagon socket head cap screws as shown in fig. 2.

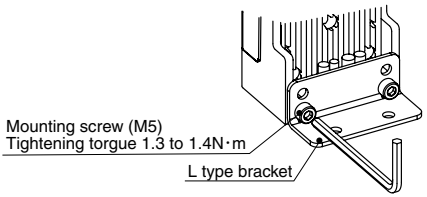


fig. 2

Mounting by DIN rail bracket
Use set screw to mount optional DIN rail mount bracket to the body.
When mounting, lower the clamp bracket as in fig. 3.
Please be noted that some tools may interfere with clamp bracket.

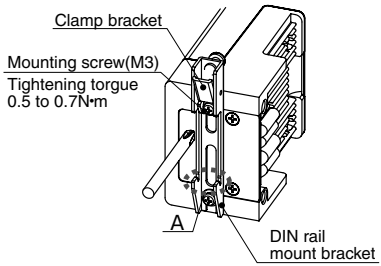


fig. 3

When setting to DIN rail, place A of fig. 3 into DIN rail.
While pushing it, fix it by the clamp of screw in fig. 4.
Inadequate pushing may cause falling of parts.

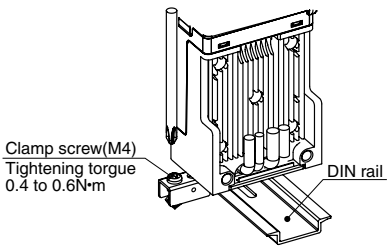
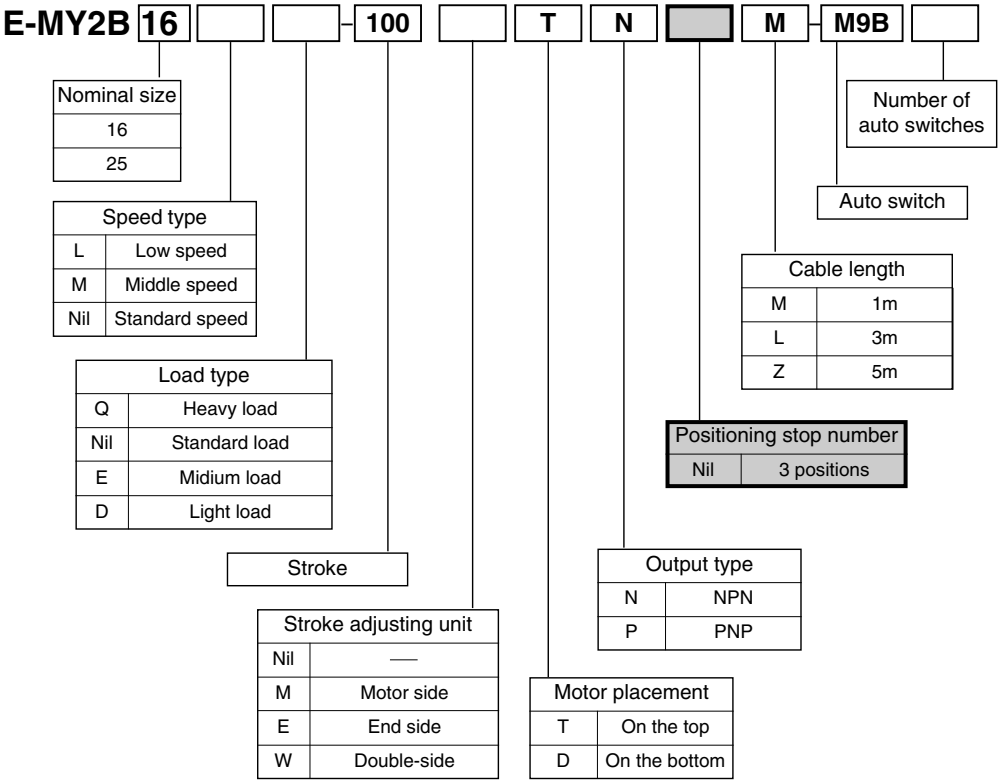


fig. 4

3 positions

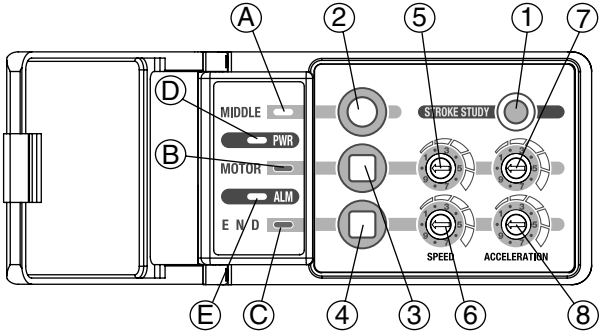


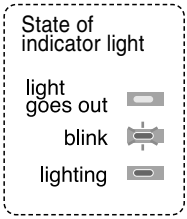
Note) Refer to the catalog for Stroke, Auto switch and Number of auto switches.

3 positions

Names and Functions of Controller (3 positions)

Controller detail





Switch

No.	Content/Function
①	Stroke learning switch
②	The switch to move the actuator to intermediate position and set the intermediate position
③	The switch to move the work to motor end
④	The switch to move the work to the other end
⑤	The rotary switch to set moving speed to motor end
⑥	The rotary switch to set moving speed to the other end
⑦	The rotary switch to set moving acceleration to motor end
⑧	The rotary switch to set moving acceleration to the other end

Display of the indicator lamp and basic operation

Symbol	Description	Power is turn on	When positioning completed			In case of error
			Motor side	End side	Intermediate	
Ⓐ	MIDDLE indicator lamp(Green)	—	—	—	○	※1
Ⓑ	MOTOR indicator lamp(Green)	—	○	—	—	
Ⓒ	END indicator lamp(Green)	—	—	○	—	
Ⓓ	PWR indicator lamp(Green)	○	○	○	○	○
Ⓔ	ALM indicator lamp(Red)	—	—	—	—	○

"○" indicates light is on, "—" indicates light is off.

※1 See page 36, 37 and after for ALM display in case of error.

Example of Internal Circuit and Wiring

● Electric Specification

Item		Specification
Power supply for drive	Power supply voltage	DC24V ±10%
	Current consumption	Max.5A(within 2s) normally 2.5A at DC24V
Power supply for signal	Power supply voltage	DC24V ±10%
	Current consumption	30mA + output load capacity at DC24V
Input signal capacity		6mA or less / 1 circuit at DC24V(Photo-coupler input)
Output load capacity		DC30V or less, 20mA or less / 1 circuit(opendrain output)
Abnormal detection items		Emergency stop, Abnormal external output,Abnormal power supply, Abnormal drive,Abnormal temperature, Abnormal stroke, Abnormality of motor, Abnormality of controller

Power supply cable 2 wire AWG20(conductor area 0.52mm²)

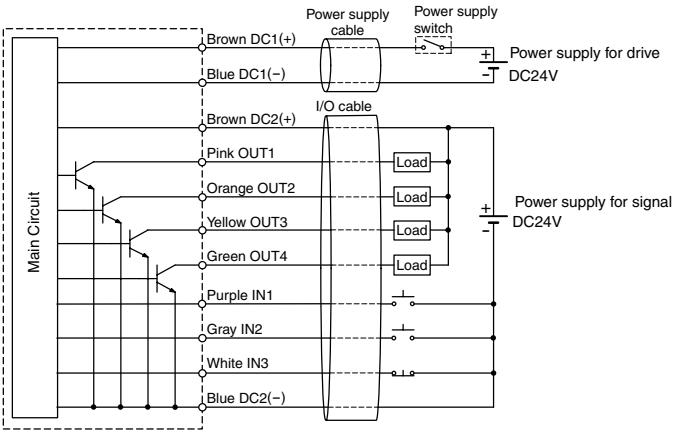
Symbol	Cable color	Signal name	Content
DC1(+)	Brown	Vcc	Power supply cable for actuator operation
DC1(–)	Blue	GND	

I/O cable 9 wire AWG28(conductor area 0.088mm²)

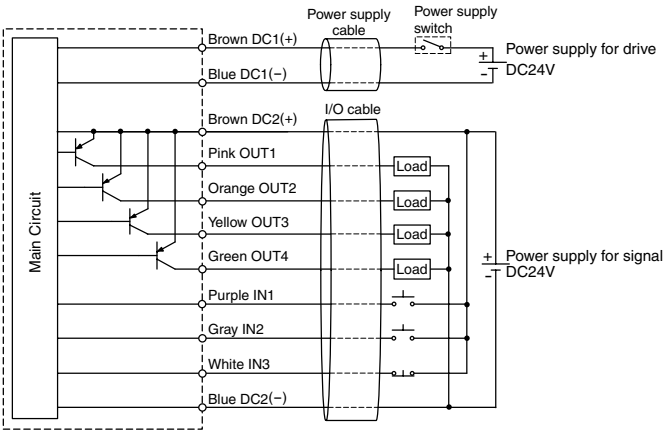
Symbol	Cable color	Signal name	Content
DC2(+)	Brown	Vcc	Power supply line for signal
DC2(–)	Blue	GND	
OUT1	Pink	READY output	The signal to show the controller can be operated
OUT2	Orange	The output for completion of positioning 1	The signal to show the positioning is completed
OUT3	Yellow	The output for completion of positioning 2	
OUT4	Green	Alarm output	The signal to show the alarm occurs
IN1	Purple	The input transmit drive command 1	The signal to transmit drive command
IN2	Gray	The input transmit drive command 2	
IN3	White	Emergency stop input	The signal to transmit emergency stop command(When contact is opened)

•The product can be used without connection of I/O cable, but in that case, consider the safety and install power supply switch for drive. And for emergency case, turn off the switch.

•Corresponding to NPN I/O



•Corresponding to PNP I/O



Signal through I/O cable

Input signal

Command	Symbol	
	IN1	IN2
Command to operate motor side	◯	—
Command to operate end side	—	◯
Command to operate intermediate stop	◯	◯

◯ means ON, — means OFF

Output signal

Actuator condition	Symbol		
	OUT1	OUT2	OUT3
When motor side positioning completed	◯	◯	—
When end side positioning completed	◯	—	◯
When Intermediate stop positioning completed	◯	◯	◯
During actuating	—	—	—

◯ means ON, — means OFF

Connection of the motor and the controller (When controller separated type is used)

⚠CAUTION

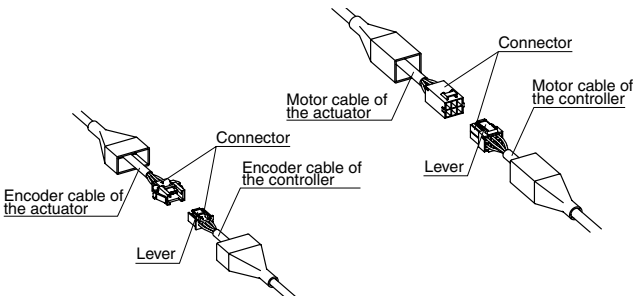
Do not pull the cable forcefully when removing attaching / detaching the connector.

Cable might be disconnected.

Turn off the power during connecting.

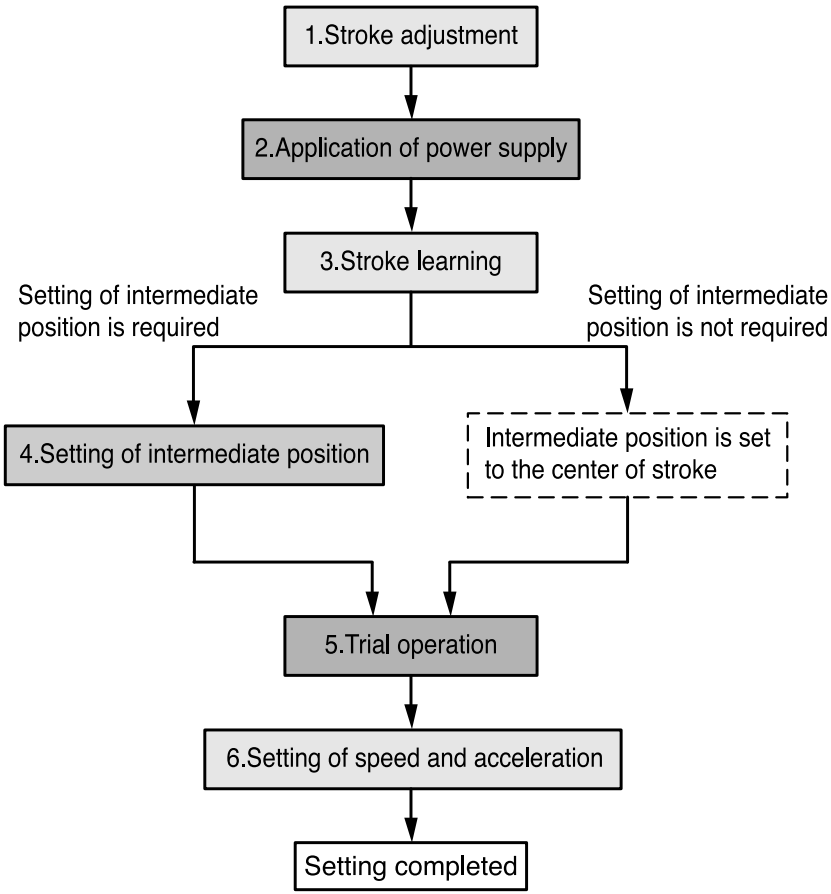
The slider may run suddenly.

•Mind the direction of the connector and insert them until they click when connecting the cable.
•When pulling out the cable, pull them out while pressing connector lever.



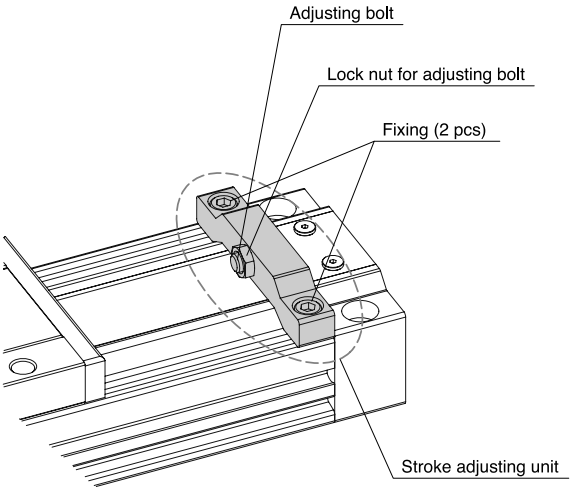
Setting Procedures

Confirm the product is installed and connected properly and perform setting in the following procedure.



1.Stroke adjustment

Adjust the stroke of actuating part.



1-1 Loosen fixing bolt, move the unit to the position where required stroke is obtained and fix the unit by the bolt.

1-2 Loosen lock nut for adjusting bolt for fine setting of stroke by the bolt. After the fine adjustment, tighten the lock nut again to fix the stroke.

2.Application of power supply

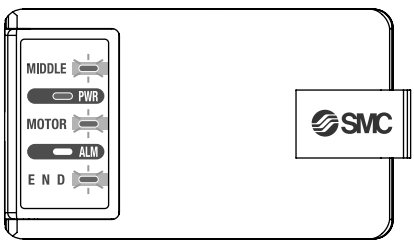
Apply DC24V to power supply for signal and drive.

⚠CAUTION

After the stroke is adjusted, turn on power supply and then perform stroke learning.
If the stroke learning is not performed, the product may not operate along with the adjusted stroke and damage the connected equipment.

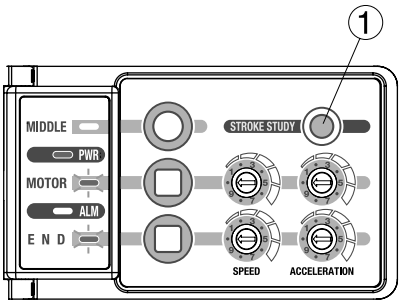
If stroke learning is not completed, 3 indicator lamps, MOTOR, END and MIDDLE will blink. If the stroke learning is completed, with receipt of drive command, the product starts return to original position (movement to motor side or end side).

- Intermediate stop command does not perform return to origin.
- If necessary, re-application of power supply should be done when 5s or more passes after PWR indicator lamp goes off.



3.Stroke learning

3-1 By push of ① over 3s at least, the product comes into learning mode and starts stroke learning.
3-2 Confirm 2 indicator lamps MOTOR and END are blinking.
The actuator starts moving automatically to learn the adjusted stroke.
3-3 After stroke learning is completed, the actuator stops at motor side and MOTOR indicator lamp lights up.



•Do not put tools into or around the actuator.

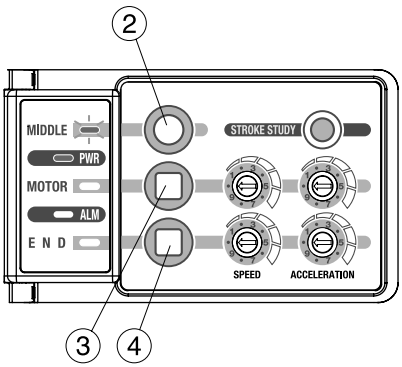
4.Setting of intermediate position

⚠WARNING

During operation, do not touch the moving parts of the actuator or place hands within the movement area.
It may cause injury.

4-1 After pressing ② , the slide table will move to intermediate position, and the indicator lamp of MIDDLE will light up.

4-2 By push of ② over 1s at least again during lighting of MIDDLE indicator lamp, setting mode for intermediate position is achieved.
4-3 Confirm the MIDDLE indicator lamp is blinking.
4-4 Set the intermediate position by direct teaching or JOG teaching. (Initially, intermediate position is set to the point on half of adjusted stroke.)
4-4-1 Direct teaching setting Move slider manually during setting.
4-4-2 JOG teaching setting Move slider by push of ③ or ④ of controller during setting.
4-5 After the intermediate position is fixed, push ② over 1s to return the actuator to normal operation.

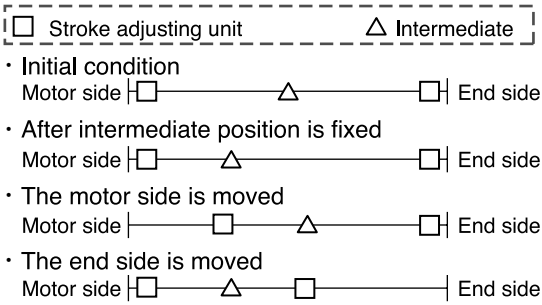


5.Trial operation

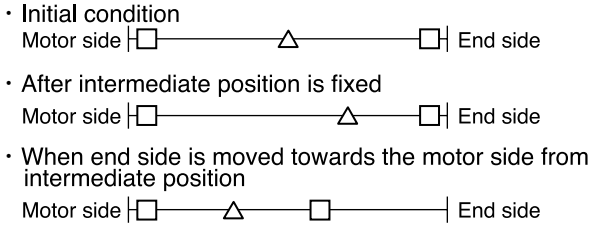
Push ② , ③ and ④ to check the operation adjusted in the above processes.

Precautions on intermediate position

Intermediate position is set relative to the motor side.
Therefore, if the stroke adjusting unit at the motor side is moved, the intermediate position is changed.
On the other hand, change of the position of the stroke adjusting unit at the end side does not make sense.



If the stroke is set shorter than the distance between the motor side and intermediate position, the intermediate position is fixed to the center of the stroke automatically.



6.Setting of speed and acceleration

6-1 Setting of speed

By adjustment of switch ⑤ and ⑥ , the speed of actuator is set.

⑤ :Rotary switch to set speed of movement to the direction of the motor side.

⑥ :Rotary switch to set speed of movement to the direction of the end side.

6-2 Setting of acceleration

By adjustment of switch ⑦ and ⑧ , the acceleration of actuator is set.

For the acceleration and the deceleration, the set value is the same.

⑦ :Rotary switch to set acceleration of movement to the direction of the motor side.

⑧ :Rotary switch to set acceleration of movement to the direction of the end side.

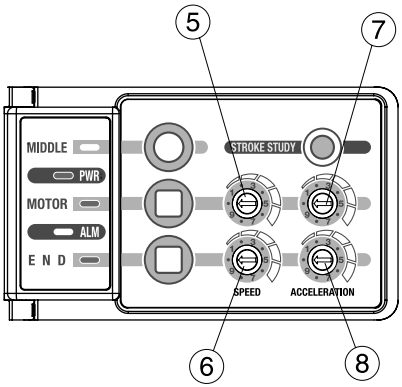


Figure.

Switch and speed [mm/s]

Switch No.	Low speed	Middle speed	Standard speed
1	10	50	100
2	20	75	200
3	30	100	300
4	40	125	400
5	50	150	500
6	75	200	600
7	100	250	700
8	300	300	800
9	500	500	900
10	1000	1000	1000

Figure.

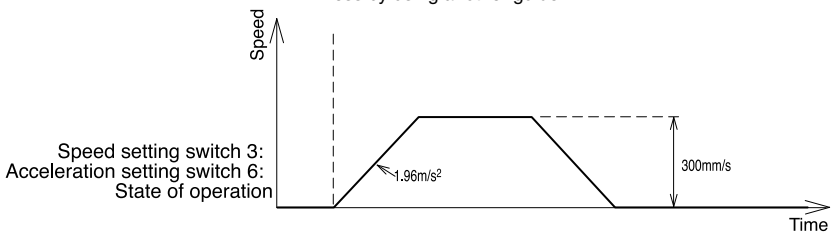
Switch and acceleration [m/s²]

Switch No.	Heavy load	Standard load	Midium load	Light load
1	0.25	0.49	0.98	1.96
2	0.49	0.74	1.47	2.94
3	0.74	0.98	1.96	3.92
4	0.98	1.23	2.45	4.90
5	1.23	1.47	2.94	5.88
6	1.47	1.96	3.92	7.84
7	1.72	2.45	4.90	9.80
8	1.96	2.94	5.88	11.76
9	2.21	3.92	7.84	15.68
10	2.45	4.90	9.80	19.60

Maximum weight of transferred object [kg]

Nominal size	16	6(10)	4(5)	2.5(2.5)	1.25(1.25)
	25	11(20)	8(10)	4(5)	2.5(2.5)

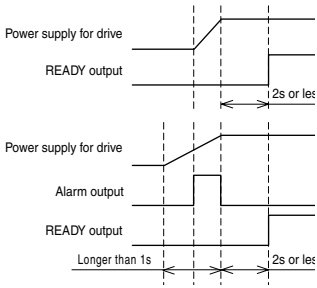
• In parentheses, the coefficient of friction indicate the case of 0.1 or less by using another guide



Operation Characteristics

Application of power supply

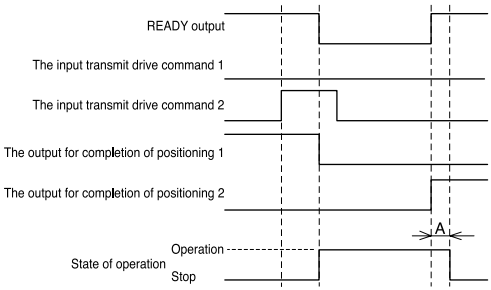
When power supply is applied, the controller is initialized and then READY output is performed.
If first transit of used power supply is 1s or more, the alarm output is performed in prior to initialization and READY output.
If emergency stop input is released, READY output is not sent and alarm output is generated instead.



Movement to end

Ex.)Movement from motor side to end side

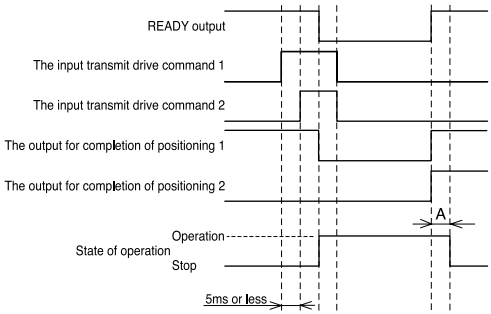
Do not turn off input of drive command until READY output is confirmed.
The signal for completion of positioning is output when the actuator reaches the position 0.5mm before target position (indicated as A).



Intermediate operation

Ex.)Movement from motor side to intermediate position

Only if drive command 1 and 2 are input within 5 msec, the intermediate operation is performed. Input over 5 msec moves the actuator to motor end or the other end.
The signal for completion of positioning is output when the actuator reaches the position 0.5mm before target position (indicated as A).



Specifications

Standard specifications

Item		Specification			
Transfer speed set range	Low speed	10 to 1000 mm/s			
	Middle speed	50 to 1000 mm/s			
	Standard speed	100 to 1000 mm/s			
Transfer acceleration set range	Load type	Heavy load	Standard load	Midium load	Light load
	Acceleration	0.25 to 2.45 m/s^2	0.49 to 4.90 m/s^2	0.98 to 9.80 m/s^2	1.96 to 19.6 m/s^2
Maximum load weight NOTE 1)	Nominal size:16	6(10)kg	4(5)kg	2.5(2.5)kg	1.25(1.25)kg
	Nominal size:25	11(20)kg	8(10)kg	4(5)kg	2.5(2.5)kg
Acceleration and deceleration method		Trapezoidal drive			
Moving direction		Horizontal direction			
Positioning points		Both ends (mechanical stoppers), 1 intermediate position			
Repeated Positioning stopping precision	Both ends	±0.01mm			
	Intermediate stopping position	±0.1mm			
Allowable external resistance NOTE 2)	Nominal size:16	10N			
	Nominal size:25	20N			
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 1) The maximum load weight shows the motor abilitiy. Please consider it together with the guide load factor when selecting a model. In parentheses, the coefficient of friction indicate the case of 0.1 or less by using another guide.
NOTE 2) Keep the resistance of the external guide not more than the allowable resistance.

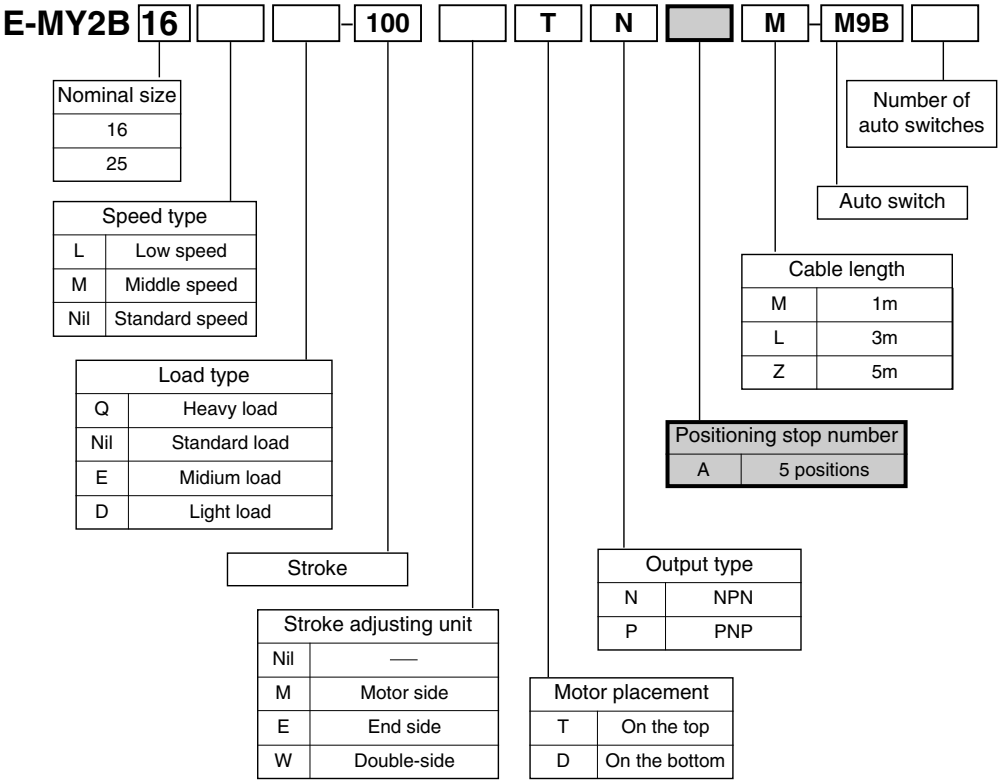
Electric Specification

Item		Specification
Power supply for drive	Power supply voltage	DC24V ±10%
	Current consumption	Max.5A(within 2s) normally 2.5A at DC24V
Power supply for signal	Power supply voltage	DC24V ±10%
	Current consumption	30mA + output load capacity at DC24V
Input signal capacity		6mA or less / 1 circuit at DC24V(Photo-coupler input)
Output load capacity		DC30V or less, 20mA or less / 1 circuit(opendrain output)
Abnormal detection items		Emergency stop, Abnormal external output,Abnormal power supply, Abnormal drive,Abnormal temperature, Abnormal stroke, Abnormality of motor, Abnormality of controller

Environment specifications

Item		Specification
Operating temperature range	Acutuator	5 to 50 ºC
	Controller (separated type)	5 to 40 ºC
Operating humidity range		35 to 85%RH (with no condensation)
Storage temperature range		-10 to 60 ºC (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 external terminal and case: 50 MΩ (500 VDC)
Noise resistance		1000 Vp-p Pulse width 1 μs, Rise time 1 ns

5 positions

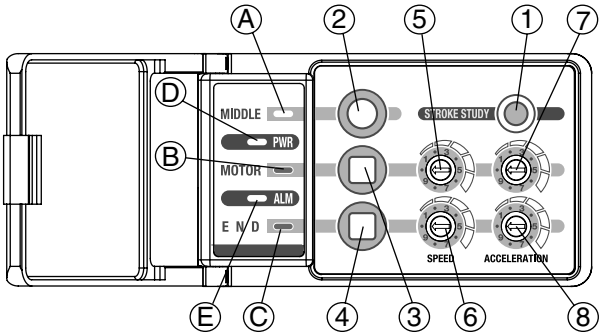


Note) Refer to the catalog for Stroke, Auto switch and Number of auto switches.

5 positions

Names and Functions of Controller (5 positions)

Controller detail



State of indicator light

light goes out

blink

lighting

Switch

No.	Content/Function
①	Stroke learning switch
②～④ ※1	Switch to move slider part and intermediate position set switch
⑤	Rotary switch to set speed of movement to the direction of the motor side
⑥	Rotary switch to set speed of movement to the direction of the end side
⑦	Rotary switch to set acceleration of movement to the direction of the motor side
⑧	Rotary switch to set acceleration of movement to the direction of the end side

※1 See Page 30 Operation method for moving method.

Display of the indicator lamp and basic operation

Symbol	Description	Power is turn on	When positioning completed					External input stop completed	In case of alarm
			Motor side	End side	Intermediate 1	Intermediate 2	Intermediate 3		
Ⓐ	MIDDLE indicator lamp(Green)	—	—	—	○	○	○	—	※2
Ⓑ	MOTOR indicator lamp(Green)	—	○	—	—	○	—	○	
Ⓒ	END indicator lamp(Green)	—	—	○	—	—	○	○	
Ⓓ	PWR indicator lamp(Green)	○	○	○	○	○	○	○	○
Ⓔ	ALM indicator lamp(Red)	—	—	—	—	—	—	—	○

"○" indicates light is on, "—" indicates light is off.

※2 See page 36, 37 and after for ALM display in case of error.

Electric Specification

Item		Specification
Power supply for drive	Power supply voltage	DC24V ±10%
	Current consumption	Max.5A(within 2s) normally 2.5A at DC24V
Power supply for signal	Power supply voltage	DC24V ±10%
	Current consumption	30mA + output load capacity at DC24V
Input signal capacity		6mA or less / 1 circuit at DC24V(Photo-coupler input)
Output load capacity		DC30V or less, 20mA or less / 1 circuit(opendrain output)
Abnormal detection items		Emergency stop, Abnormal external output,Abnormal power supply, Abnormal drive,Abnormal temperature, Abnormal stroke, Abnormality of motor, Abnormality of controller

Power supply cable 2 wire AWG20(conductor area 0.52mm²)

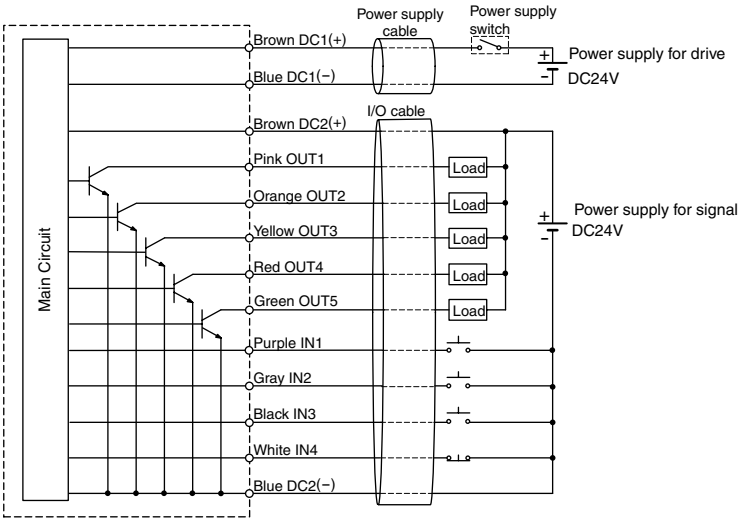
Symbol	Cable color	Signal name	Content
DC1(+)	Brown	Vcc	Power supply cable for actuator operation
DC1(–)	Blue	GND	

I/O cable 11 wire AWG28(conductor area 0.088mm²)

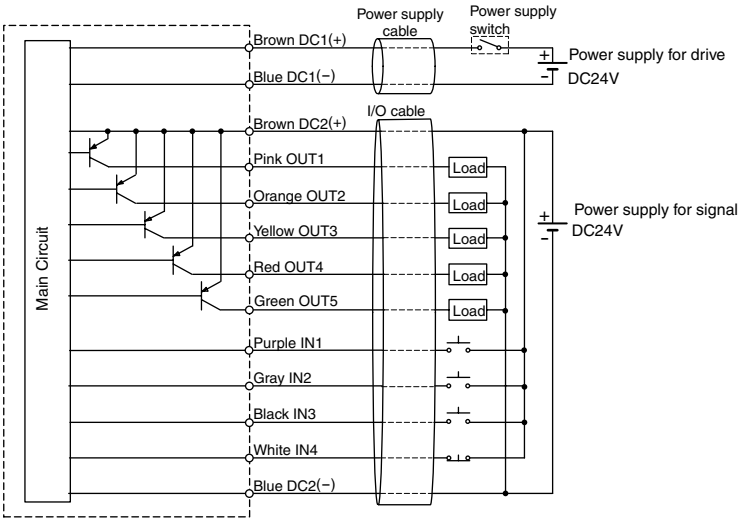
Symbol	Cable color	Signal name	Content
DC2(+)	Brown	Vcc	Power supply line for signal
DC2(–)	Blue	GND	
OUT1	Pink	READY output	The signal to show the controller can be operated
OUT2	Orange	The output for completion of positioning 1	The signal to show the positioning is completed
OUT3	Yellow	The output for completion of positioning 2	
OUT4	Red	The output for completion of positioning 3	
OUT5	Green	Alarm output	The signal to show the alarm occurs
IN1	Purple	The input transmit drive command 1	The signal to transmit drive command
IN2	Gray	The input transmit drive command 2	
IN3	Black	The input transmit drive command 3	
IN4	White	Emergency stop input	The signal to transmit emergency stop command(When contact is opened)

•The product can be used without connection of I/O cable, but in that case, consider the safety and install power supply switch for drive. And for emergency case, turn off the switch.

•Corresponding to NPN I/O



•Corresponding to PNP I/O



Signal through I/O cable

Input signal

Command	Symbol		
	IN1	IN2	IN3
Command to operate motor side	◯	—	—
Command to operate end side	—	◯	—
Command to operate intermediate stop 1	—	—	◯
Command to operate intermediate stop 2	◯	—	◯
Command to operate intermediate stop 3	—	◯	◯
External input stop command	◯	◯	—

◯ means ON, — means OFF

Output signal

Actuator condition	Symbol			
	OUT1	OUT2	OUT3	OUT4
External controll allowed	◯	—	—	—
When motor side positioning completed	◯	◯	—	—
When end side positioning completed	◯	—	◯	—
When Intermediate stop 1 positioning completed	◯	—	—	◯
When Intermediate stop 2 positioning completed	◯	◯	—	◯
When Intermediate stop 3 positioning completed	◯	—	◯	◯
External input stop operation is completed	◯	◯	◯	—

◯ means ON, — means OFF

Connection of the motor and the controller (When controller separated type is used)

⚠CAUTION

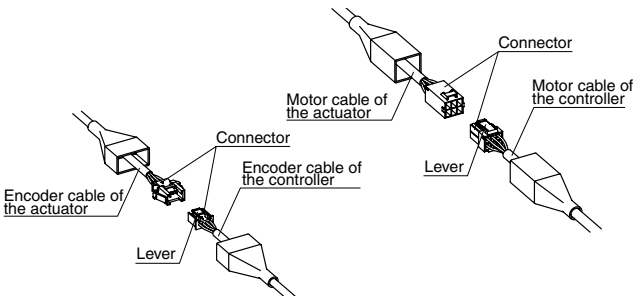
Do not pull the cable forcefully when removing attaching / detaching the connector.

Cable might be disconnected.

Turn off the power during connecting.

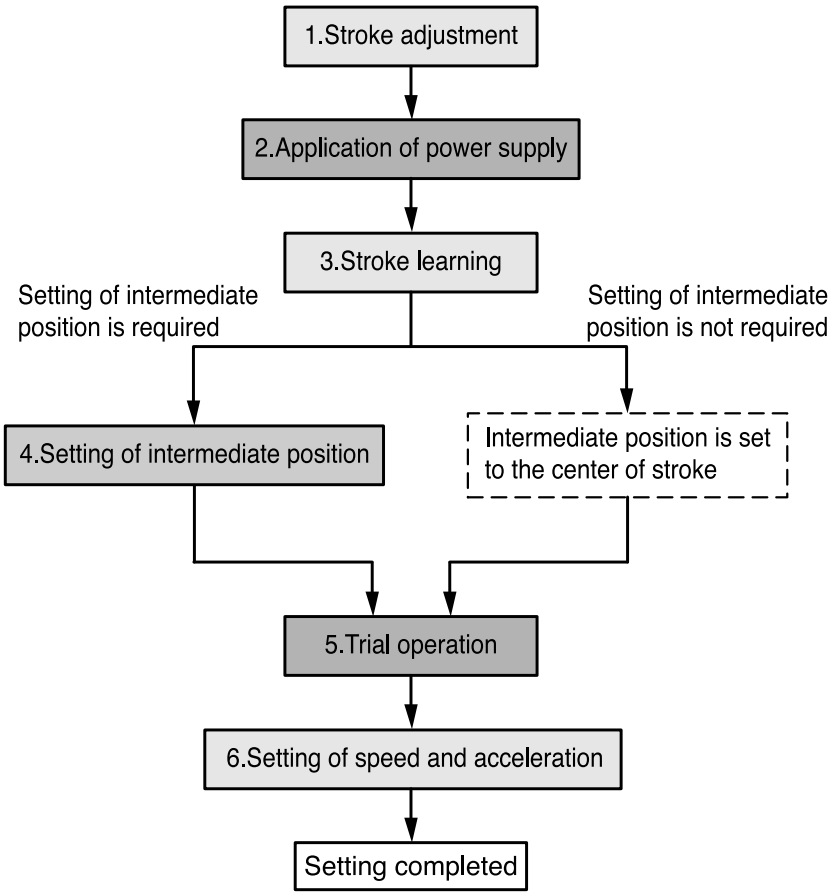
The slider may run suddenly.

•Mind the direction of the connector and insert them until they click when connecting the cable.
•When pulling out the cable, pull them out while pressing connector lever.



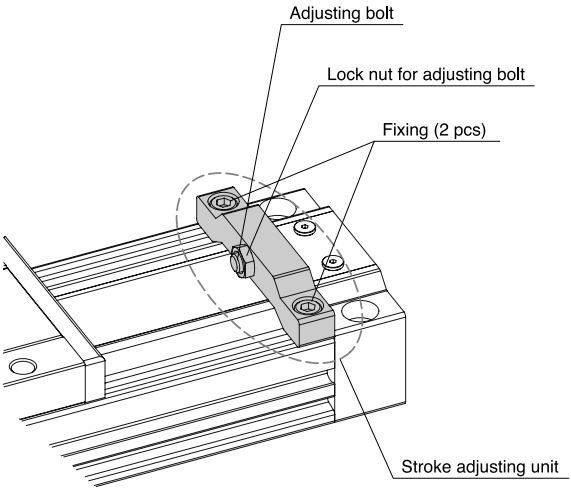
Setting Procedures

Confirm the product is installed and connected properly and perform setting in the following procedure.



1.Stroke adjustment

Adjust the stroke of actuating part.



1-1 Loosen fixing bolt, move the unit to the position where required stroke is obtained and fix the unit by the bolt.

1-2 Loosen lock nut for adjusting bolt for fine setting of stroke by the bolt. After the fine adjustment, tighten the lock nut again to fix the stroke.

2.Application of power supply

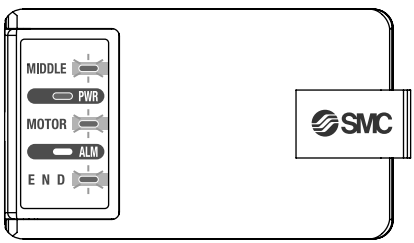
Apply DC24V to power supply for signal and drive.

⚠CAUTION

After the stroke is adjusted, turn on power supply and then perform stroke learning.
If the stroke learning is not performed, the product may not operate along with the adjusted stroke and damage the connected equipment.

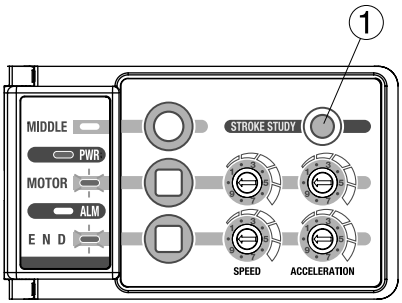
If stroke learning is not completed, 3 indicator lamps, MOTOR, END and MIDDLE will blink. If the stroke learning is completed, with receipt of drive command, the product starts return to original position (movement to motor side or end side).

- Intermediate stop command does not perform return to origin.
- If necessary, re-application of power supply should be done when 5s or more passes after PWR indicator lamp goes off.



3.Stroke learning

3-1 By push of ① over 3s at least, the product comes into learning mode and starts stroke learning.
3-2 Confirm 2 indicator lamps MOTOR and END are blinking.
The actuator starts moving automatically to learn the adjusted stroke.
3-3 After stroke learning is completed, the actuator stops at motor side and MOTOR indicator lamp lights up.



•Do not put tools into or around the actuator.

4.Setting of intermediate position

⚠WARNING

During operation, do not touch the moving parts of the actuator or place hands within the movement area.
It may cause injury.

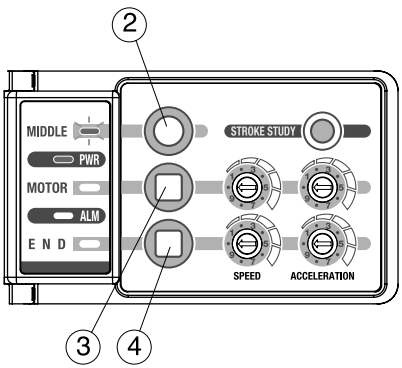
4-1 Slider is moved to the specified intermediate position with following method.

● Operation method

Travel to intermediate position 1	Press ② again within 3s after pressing ②.
Travel to intermediate position 2	Press ③ within 3s. after pressing ②.
Travel to intermediate position 3	Press ④ within 3s. after pressing ②.

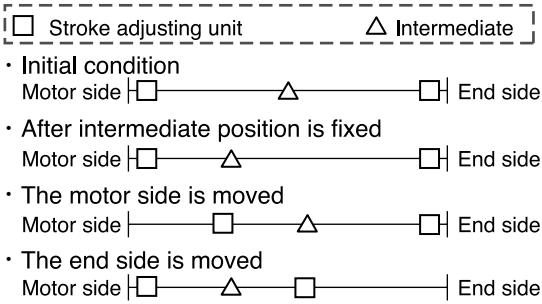
Note) After pressing ② , the indicator lamp of MIDDLE, MOTOR, and END blink for max. 3s.
When intermediate position is not set, position 1 to 3 are all set at the center of the stroke.

4-2 By push of ② over 1s at least again during lighting of MIDDLE indicator lamp (See page 22 for indicator lamp of intermediate 1 to 3), setting mode for intermediate position is achieved.
4-3 Confirm the MIDDLE indicator lamp is blinking.
4-4 Set the intermediate position by direct teaching or JOG teaching. (Initially, intermediate position is set to the point on half of adjusted stroke.)
4-4-1 Direct teaching setting
Move slider manually during setting.
4-4-2 JOG teaching setting
Move slider by push of ③ or ④ of controller during setting.
4-5 After the intermediate position is fixed, push ② over 1s to return the actuator to normal operation.

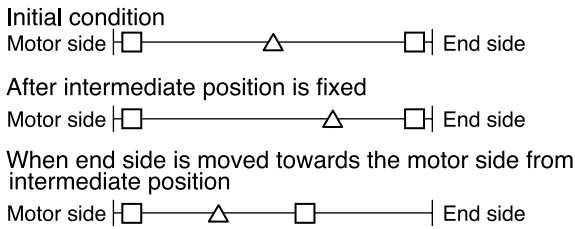


Precautions on intermediate position

Intermediate position is set relative to the motor side.
Therefore, if the stroke adjusting unit at the motor side is moved, the intermediate position is changed.
On the other hand, change of the position of the stroke adjusting unit at the end side does not make sense.



If the stroke is set shorter than the distance between the motor side and intermediate position, the intermediate position is fixed to the center of the stroke automatically.

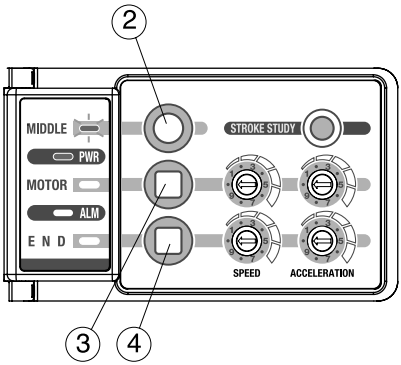


5.Trial operation

Push ②, ③and ④ to check the operation adjusted in the above processes.

● Operation method

Travel to Motor side	Press ③ .
Travel to End side	Press ④ .
Travel to intermediate position 1	Press ② again within 3s after pressing ②.
Travel to intermediate position 2	Press ③ within 3s after pressing ②.
Travel to intermediate position 3	Press ④ within 3s after pressing ②.



6.Setting of speed and acceleration

6-1 Setting of speed
By adjustment of switch ⑤ and ⑥ , the speed of actuator is set.
⑤ :Rotary switch to set speed of movement to the direction of the motor side.
⑥ :Rotary switch to set speed of movement to the direction of the end side.

6-2 Setting of acceleration
By adjustment of switch ⑦ and ⑧ , the acceleration of actuator is set.
For the acceleration and the deceleration, the set value is the same.
⑦ :Rotary switch to set acceleration of movement to the direction of the motor side.
⑧ :Rotary switch to set acceleration of movement to the direction of the end side.

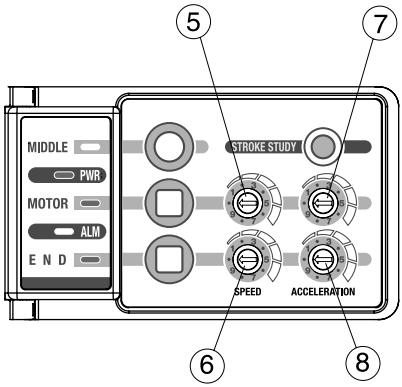


Figure.
Switch and speed [mm/s]

Switch No.	Low speed	Middle speed	Standard speed
1	10	50	100
2	20	75	200
3	30	100	300
4	40	125	400
5	50	150	500
6	75	200	600
7	100	250	700
8	300	300	800
9	500	500	900
10	1000	1000	1000

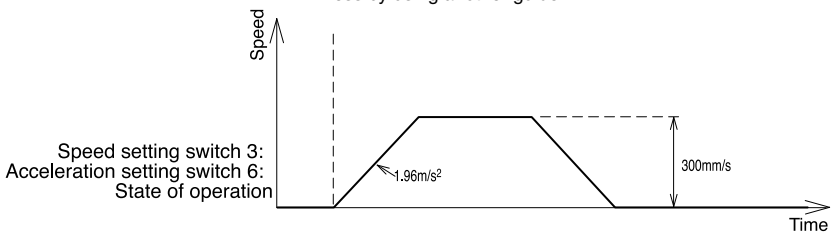
Figure.
Switch and acceleration [m/s²]

Switch No.	Heavy load	Standard load	Midium load	Light load
1	0.25	0.49	0.98	1.96
2	0.49	0.74	1.47	2.94
3	0.74	0.98	1.96	3.92
4	0.98	1.23	2.45	4.90
5	1.23	1.47	2.94	5.88
6	1.47	1.96	3.92	7.84
7	1.72	2.45	4.90	9.80
8	1.96	2.94	5.88	11.76
9	2.21	3.92	7.84	15.68
10	2.45	4.90	9.80	19.60

Maximum weight of transferred object [kg]

Nominal size	16	6(10)	4(5)	2.5(2.5)	1.25(1.25)
	25	11(20)	8(10)	4(5)	2.5(2.5)

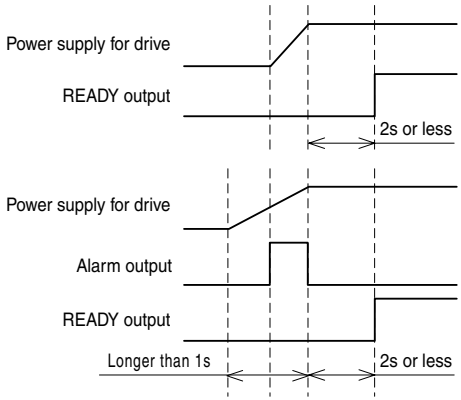
• In parentheses, the coefficient of friction indicate the case of 0.1 or less by using another guide



Operation Characteristics

Application of power supply

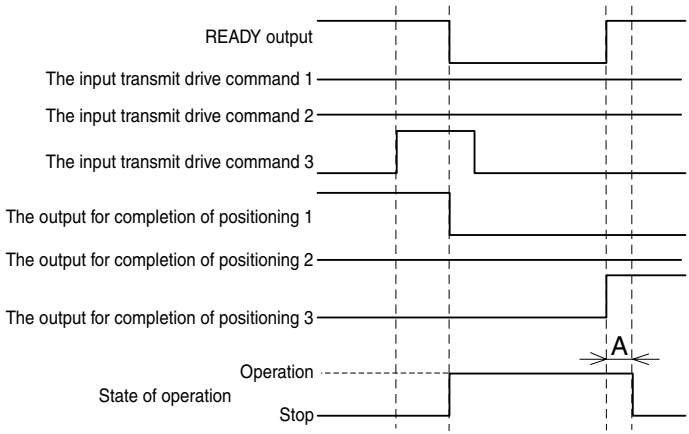
When power supply is applied, the controller is initialized and then READY output is performed.
If first transit of used power supply is 1s or more, the alarm output is performed in prior to initialization and READY output.
If emergency stop input is released, READY output is not sent and alarm output is generated instead.



Movement to end

Ex.)Movement from motor side to end side

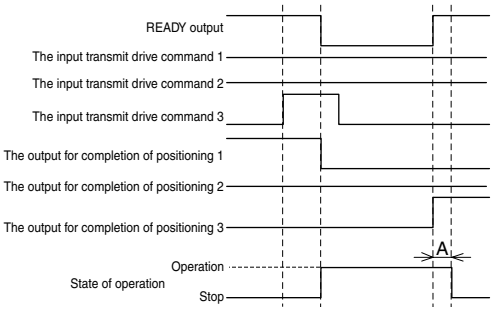
Do not turn off input of drive command until READY output is confirmed.
The signal for completion of positioning is output when the actuator reaches the position 0.5mm before target position (indicated as A).



Intermediate operation

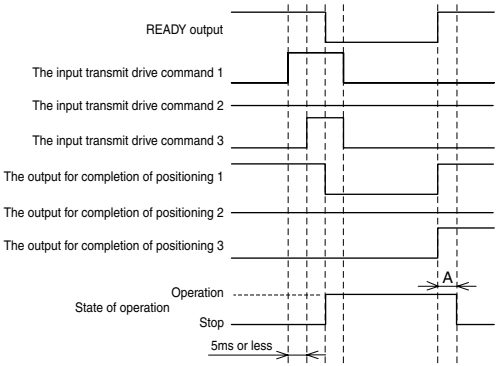
Ex.)Movement from motor side to intermediate 1

Do not turn off input of drive command until READY output is confirmed.
The signal for completion of positioning is output when the actuator reaches the position 0.5mm before target position (indicated as A).



Ex.)Movement from motor side to intermediate 2

When operation command input 1 and 3 are input within 5ms, the operation of intermediate stop 2 starts.
When it is longer than 5ms, the slider moves the motor side or intermediate stop 1.
When the actuator reaches the position 0.5mm before target position (indicated as A), the signal for completion of positioning is output.

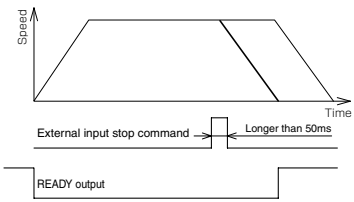


Other Functions

External input stop function

External input stop is the function to stop the slider by decelerating with the acceleration speed set by the acceleration speed set SW by means of stop command input from external device.

External input stop command more than 50ms.
Signal does not necessary have to be pulse.
Continuous input is acceptable.



Specifications

Standard specifications

Item		Specification			
Transfer speed set range	Low speed	10 to 1000 mm/s			
	Middle speed	50 to 1000 mm/s			
	Standard speed	100 to 1000 mm/s			
Transfer acceleration set range	Load type	Heavy load	Standard load	Midium load	Light load
	Acceleration	0.25 to 2.45 m/s²	0.49 to 4.90 m/s²	0.98 to 9.80 m/s²	1.96 to 19.6 m/s²
Maximum load weight NOTE 1)	Nominal size:16	6(10)kg	4(5)kg	2.5(2.5)kg	1.25(1.25)kg
	Nominal size:25	11(20)kg	8(10)kg	4(5)kg	2.5(2.5)kg
Acceleration and deceleration method		Trapezoidal drive			
Moving direction		Horizontal direction			
Positioning points		Both ends (mechanical stoppers), 3 intermediate position			
Repeated Positioning stopping precision	Both ends	±0.01mm			
	Intermediate stopping position	±0.1mm			
Allowable external resistance NOTE 2)	Nominal size:16	10N			
	Nominal size:25	20N			
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 1) The maximum load weight shows the motor ability. Please consider it together with the guide load factor when selecting a model. In parentheses, the coefficient of friction indicate the case of 0.1 or less by using another guide.
NOTE 2) Keep the resistance of the external guide not more than the allowable resistance.

Electric Specification

Item		Specification
Power supply for drive	Power supply voltage	DC24V ±10%
	Current consumption	Max.5A(within 2s) normally 2.5A at DC24V
Power supply for signal	Power supply voltage	DC24V ±10%
	Current consumption	30mA + output load capacity at DC24V
Input signal capacity		6mA or less / 1 circuit at DC24V(Photo-coupler input)
Output load capacity		DC30V or less, 20mA or less / 1 circuit(opendrain output)
Abnormal detection items		Emergency stop, Abnormal external output,Abnormal power supply, Abnormal drive,Abnormal temperature, Abnormal stroke, Abnormality of motor, Abnormality of controller

Environment specifications

Item		Specification
Operating temperature range	Acutuator	5 to 50 ºC
	Controller (separated type)	5 to 40 ºC
Operating humidity range		35 to 85%RH (with no condensation)
Storage temperature range		-10 to 60 ºC (with no condensation and freezing)
Storage humidity range		35 to 85%RH (no condensation)
Withstand voltage		Between all of external terminals and the case: 500 VAC for 1 minute
Insulation resistance		Between external terminal and case: 50 MΩ (500 VDC)
Noise resistance		1000 Vp-p Pulse width 1 μs, Rise time 1 ns

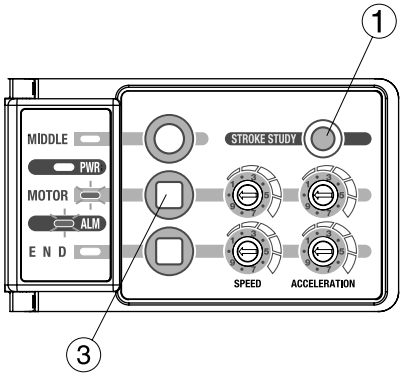
Lock function

If the set value of speed and acceleration need to be fixed, they can be locked. Set value of intermediate position is not locked.

•Lock

Press ① . then ③ within 3s. while pressing ① .
The lock function is set when this condition lasts over 1s and ALM and MOTOR start to blink.
If the switch is released, the operation returns to normal condition.

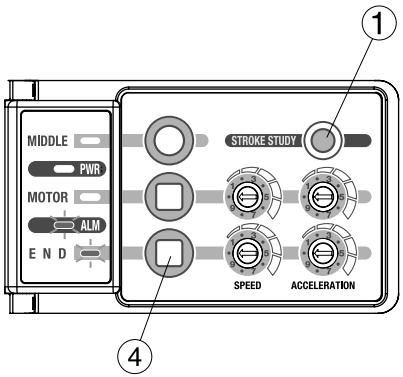
Note) Stroke learning starts when pressing ① only for 3s or longer.



•Unlock

Press ① . then ④ within 3s. while pressing ① .
The lock function is released when this condition lasts over 1s and ALM and END start to blink.
If the switch is released, the operation returns to normal condition.

Note) Stroke learning starts when pressing ① only for 3s or longer.

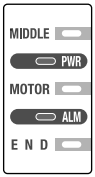
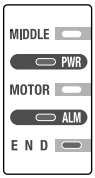
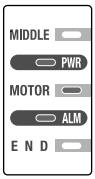
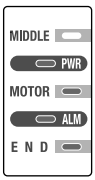
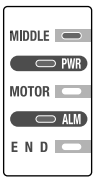


When changing the setting switch of speed and acceleration under locked condition, ALM indicator will blink.
Controller shows the following phenomena.

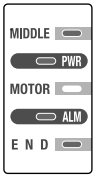
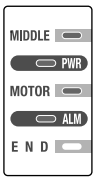
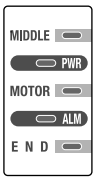
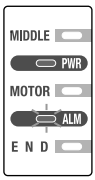
- Start operation with the set value at the lock condition.
- It is possible to unlock it. The setting value will change after unlocking.
- Alarm signal is not output to external.

Alarm indication and remedy

Perform the following remedy when an alarm comes out.

Point	Display	Content	Disposition
Emergency stop		Emergency stop input is opened or power supply for signal is cut off.	Confirm the power supply for signal is energized and release emergency stop input. (3 positions : See the circuit on page 13. 5 positions : See the circuit on page 25.)
Abnormal external output		Abnormal external output. ※ Alarm signal is not output.	[Common power supply] Turn off power supply once to check the wiring condition of load and modify it if necessary. Then reapply the power supply. (3 positions : See the circuit on page 13. 5 positions : See the circuit on page 25.) [Independent power supply] Turn off power supply for signal once to check the wiring condition of load and modify it if necessary. Then reapply the power supply and push MIDDLE button. (3 positions : See the circuit on page 13. 5 positions : See the circuit on page 25.)
Abnormal power supply		Power supply voltage is excessive or lower than limit for operation.	Check the voltage and adjust it if necessary and then perform alarm reset.
Abnormal drive		Max. output is continued for prolonged period.	Check the weight of work and foreign material attached to actuating part and then perform alarm reset.
Abnormal temperature		Internal temperature of controller becomes excessive.	Decrease ambient temperature of the actuator and then perform alarm reset.

Tuming off blink Ligting

Point	Display	Content	Disposition
Abnormal stroke		The required stroke has been exceeded or not reached.	If foreign material is found, remove it and then perform alarm reset. Readjust stroke adjusting unit to the given stroke and perform stroke learning again after turning off the power supply. When controller separate type is used, check connected part between motor and controller after turning off the power supply.
Abnormality of motor		The motor does not revolute properly or over current is detected.	Perform alarm reset. When controller separate type is used, check connected part between motor and controller after turning off the power supply.
Abnormality of controller		CPU is running way out of control or the content of memory is abnormal.	Turn off power supply once and then turn it on again.
Abnormality of setting value		Setting switch of speed and acceleration is changed under locked condition.	Return setting value of speed and acceleration to the one at the lock condition (See page 35 Lock function). ※ Alarm signal is not output.

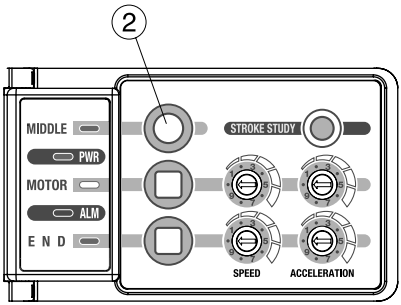
•If the error can not be released, turn off power supply, stop use of the product and contact SMC sales responsibility.

Alarm reset

Alarm reset is available by manual alarm reset using ② and external alarm reset by external signal.
(See page 36, 37 and after for ALM display in case of alarm.)

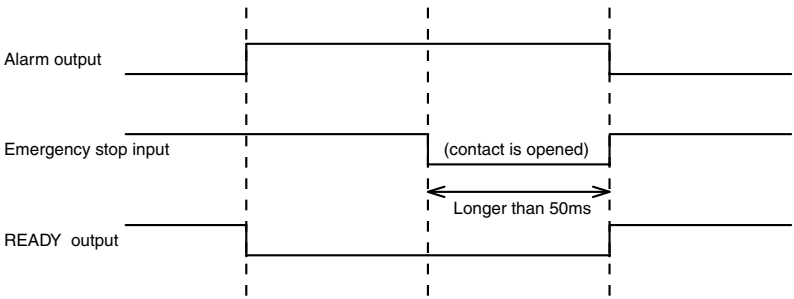
Manual alarm reset

When alarm occur, press ② for recovery from alarm condition.



External alarm reset

Even if alarm occurs, it recovers from alarm condition by inputting emergency stop command externally for 50ms or more. Then operation is available.



Recovery status is as below

- Slider is free from command until operation command is given.
- After recovery, operation command inputted next starts the operation. The moving speed of the first operation after the recovery is 50mm/s.