■Connection and Operation

●Names and Functions of Linear Motion Controller Parts

Encoder Cable Connector
Motor Cable Connector
Battery Connector
Emergency Stop Output Terminal
Power Connector

Teaching Pendant Connector
LINK Connector

Sensor Connector
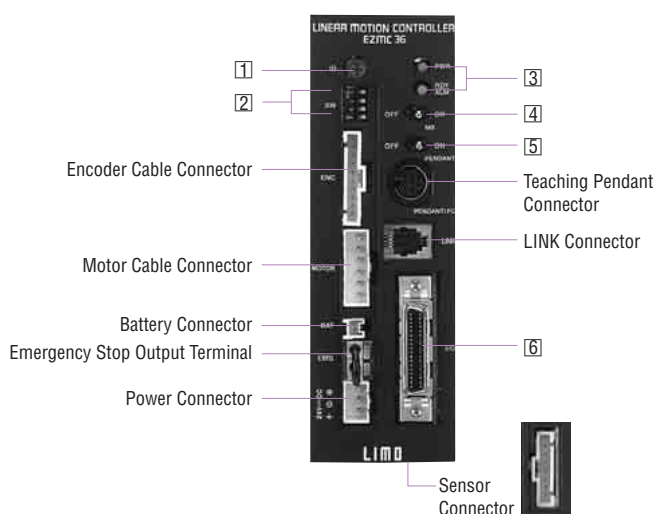
①Axis-Number Setting Switch

Indication	Function
ID	Set controller axis number

②Operation-Mode Select Switches

Indication	Function
1	Not used
2	
3	Set pulse input mode (in driver mode) ON: 1-pulse input mode OFF: 2-pulse input mode
4	Switch modes ON: Driver mode OFF: Controller mode

●The area in white indicates the switch position.

●All switches are set to OFF at the time of shipment.

③LED Indicators

Indication	Color	Function
PWR	Green	Power ON indication
RDY/ALM	Green/Red	Status indication

④Electromagnetic Brake-Release Switch

Indication	Function
MB	Forcibly switch electromagnetic brake operation modes ON: Actuation OFF: Release

●This switch becomes effective only when a protective function is activated.

⑤Teaching Pendant Switch

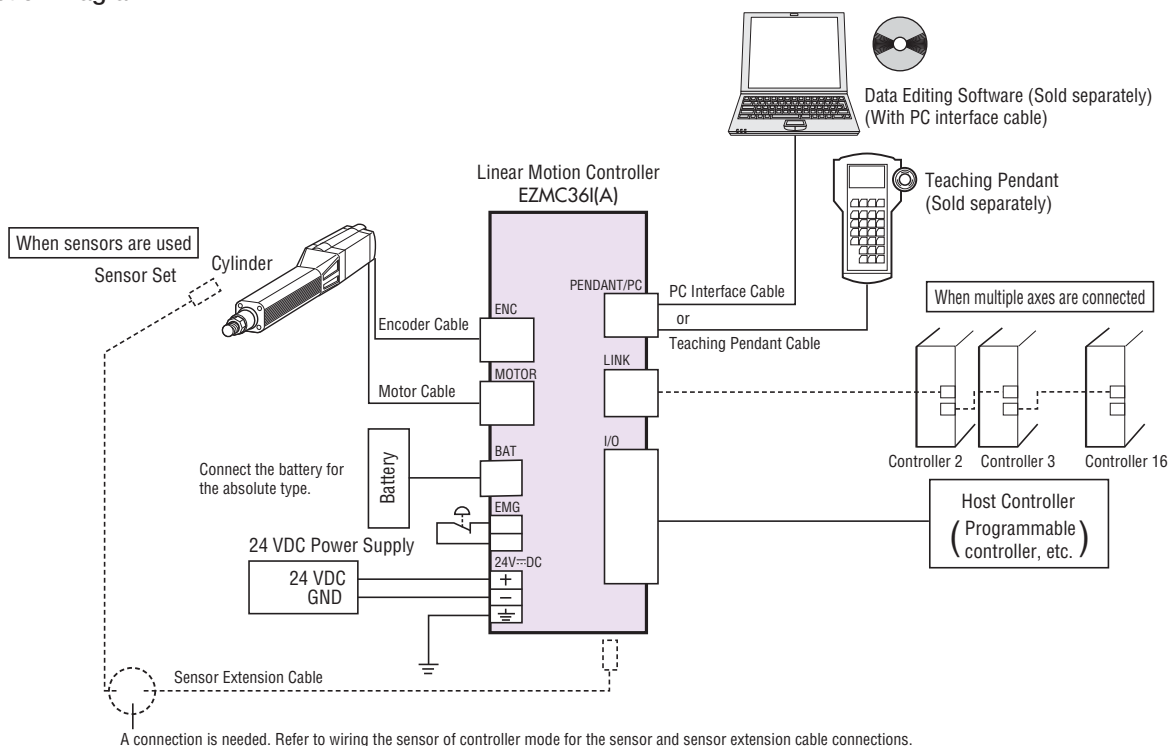| Indication	Function
PENDANT	Enable/disable the teaching pendant ON: Enable the teaching pendant OFF: Disable the teaching pendant (The emergency stop button on the teaching pendant is also disabled.)

⑥I/O Connector

◇Controller Mode

Indication	Input/Output	Pin No.	Signal Name	Function
I/O	Input	23	+COM	Power supply for output signal +24 VDC
		25		
		27	COM	Power supply for input signal +24 VDC
		28		
		24	−COM	Power supply for output signal GND
		26		
	Output	1	READY	Turn ON when the START input can be received.
		2	ALM	Turn ON while the controller is operating normally and turn OFF when the alarm generates.
		4	END	Turn ON when the operation has ended.
		5	MOVE	Turn ON during operation.
		9	AREA	Turn ON when positioning is performed inside the set area or while the set area is being passed.
		10	T-UP	Turn ON during push-motion operation.
		31	ALM0	Alarm information is output in a five-bit code.
		32	ALM1	
		33	ALM2	
		34	ALM3	
		35	ALM4	
	Input	36	ACL	Clear an alarm.
		11	M0	M0~M5 input signals are combined to select a positioning point. (If all signals are OFF, the sequential positioning mode will be selected.)
		12	M1	
		13	M2	
		14	M3	
		15	M4	
		16	M5	
		3	STOP	Stop the operation.
		6	START	Start the positioning operation.
		7	PAUSE	Stop the operation temporarily.
		8	HOME	Perform return to home operation.

◇Driver Mode

Indication	Input/Output	Pin No.	Signal Name	Function
I/O	Input	23	+COM	Power supply for output signal +24 VDC
		25		
		27	COM	Power supply for input signal +24 VDC
		28		
		24	−COM	Power supply for output signal GND
		26		
	Output	2	ALM	Turn ON while the controller is operating normally and turn OFF when the alarm generates.
		4	END	Turn ON when the operation has ended.
		31	ALM0	Alarm information is output in a five-bit code.
		32	ALM1	
		33	ALM2	
		34	ALM3	
		35	ALM4	
		21	TIM.+	Indicate that the motor is at the beginning of its excitation sequence (step "0"). This signal is output in sync with the input pulse: the signal is output once whenever the excitation sequence returns to step 0. (The excitation sequence completes one cycle when the cylinder rod has moved by 0.24 mm.)
		22	TIM.−	
	Input	36	ACL	Clear an alarm.
		11	RUN0	RUN0~RUN2 input signals are combined to set the motor operating current.
		12	RUN1	
		13	RUN2	
		14	STOP0	STOP0~STOP2 input signals are combined to set the motor standstill current.
		15	STOP1	
		16	STOP2	
		17	CW+	Move the cylinder rod to the counter-motor side.
		18	CW−	
		19	CCW+	Move the cylinder rod to the motor side.
		20	CCW−	
		7	C.OFF	When this signal is ON, the current flow to the motor is cut off and the holding force generated by motor torque is lost. Turning this signal from ON to OFF does not change the motor's excitation sequence.

Linear and Rotary Actuators
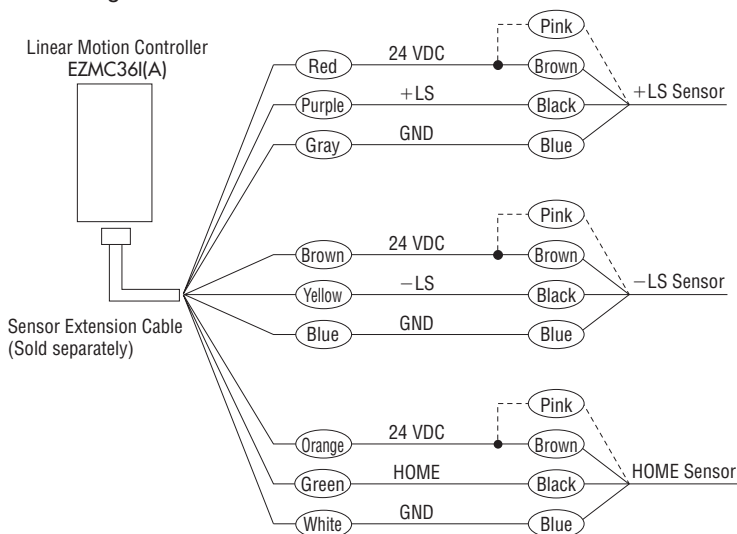
Introduction

EZ limo EZSII
Motorized Linear Slides

Accessories Installation

EZ limo EZC

EZ limo EZHC
Motorized Cylinders

EZ limo EZHP

Accessories Installation

DRL
Compact Linear Actuators

Accessories Installation

DG
Hollow Rotary Actuators

Accessories Installation

● **Connection Diagram**

Data Editing Software (Sold separately)
(With PC interface cable)

Teaching Pendant
(Sold separately)

Linear Motion Controller
EZMC36I(A)

When sensors are used

Sensor Set

Cylinder

PC Interface Cable
or
Teaching Pendant Cable

When multiple axes are connected

ENC

MOTOR

Encoder Cable

Motor Cable

PENDANT/PC

LINK

I/O

BAT

EMG

Controller 2   Controller 3   Controller 16

Connect the battery for
the absolute type.

Battery

Host Controller
(Programmable
controller, etc.)

24 VDC Power Supply

24V⎓DC

24 VDC
GND

+
−

Sensor Extension Cable

A connection is needed. Refer to wiring the sensor of controller mode for the sensor and sensor extension cable connections.

● **Connection to Host Controller**

◇ **Controller Mode**

Host Controller

Linear Motion Controller
EZMC36I(A)

24 VDC

23, 25 +COM   24 VDC Power Input
27, 28   COM

11   M0
12   M1
13   M2   Data Selection Input
14   M3
15   M4
16   M5

3   STOP
6   START
7   PAUSE   Control Input
8   HOME
36   ACL

24, 26 −COM

+5~24 VDC

R0   1   READY
R0   2   ALM
R0   4   END
R0   5   MOVE
R0   9   AREA
R0   10   T-UP   Control Output
R0   31   ALM0
R0   32   ALM1
R0   33   ALM2
R0   34   ALM3
R0   35   ALM4
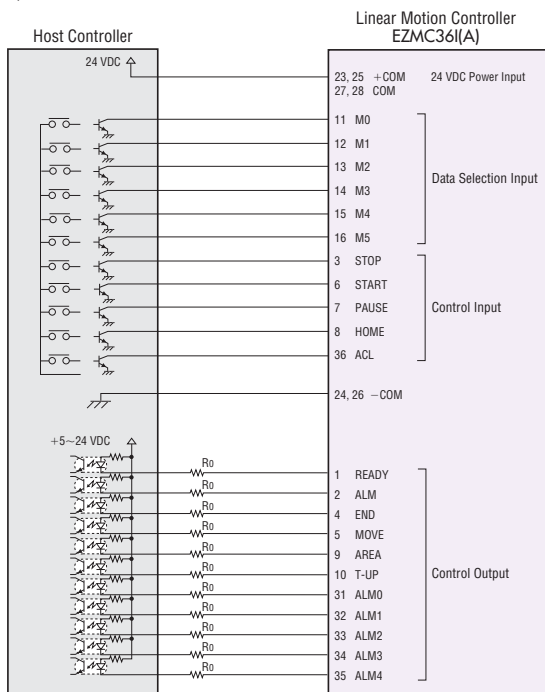
● Refer to page D-88 for the conditions of external resistor R0.

Wiring the Sensor

Linear Motion Controller
EZMC36I(A)

Sensor Extension Cable
(Sold separately)

Red   24 VDC   Pink
                         Brown
Purple   +LS   Black   +LS Sensor
Gray   GND   Blue

Brown   24 VDC   Pink
                         Brown
Yellow   −LS   Black   −LS Sensor
Blue   GND   Blue

Orange   24 VDC   Pink
                         Brown
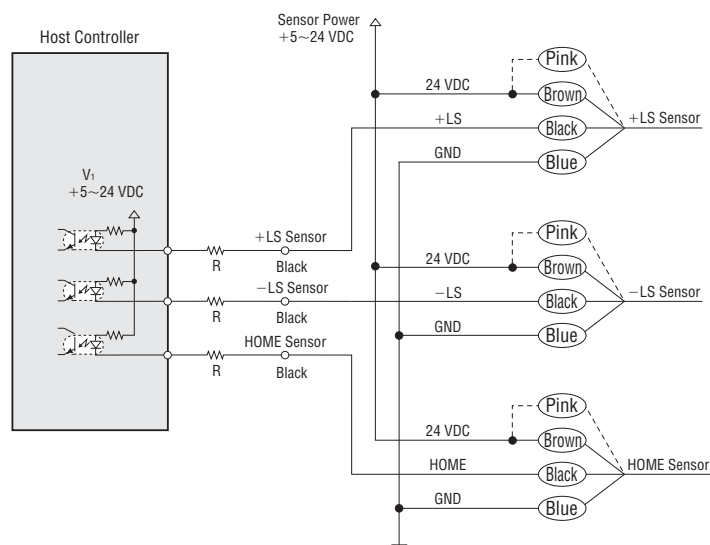Green   HOME   Black   HOME Sensor
White   GND   Blue

● The 24 VDC output from the controller is used to drive the sensors. Do not use it as a power supply for any item other than the sensors.
● Connect the pink lead to the brown lead when the sensor logic is N.C. (normally closed). The pink lead is not connected when the sensor logic is N.O. (normally open).

Specifications, Characteristics D-82 / Dimensions D-84 / Connection and Operation D-86 / Cylinder and Controller Combinations D-91

◇Driver Mode

Host Controller

Linear Motion Controller EZMC36I(A)

24 VDC

Pin	Signal	Group
23, 25	+COM	24 VDC Power Input
27, 28	COM	
11	RUN0	Motor Current Setting Input
12	RUN1	
13	RUN2	
14	STOP0	
15	STOP1	
16	STOP2	
17	CW+	Motor Pulse Input
18	CW−	
19	CCW+	
20	CCW−	
7	C.OFF	Control Input
36	ACL	
24, 26	−COM	
2	ALM	Control Output
4	END	
31	ALM0	
32	ALM1	
33	ALM2	
34	ALM3	
35	ALM4	
21	TIM.+	
22	TIM.−	

5 VDC
+5~24 VDC
R0

Wiring the Sensor

Host Controller

Sensor Power +5~24 VDC

V1 +5~24 VDC

+LS Sensor, −LS Sensor, HOME Sensor

24 VDC — Pink / Brown / Black / Blue

+LS Sensor
−LS Sensor
HOME Sensor

● V1 must be between 5 VDC and 24 VDC. The current must be 100 mA or less. If the current exceeds 100 mA, connect an external resistor R.
● Connect the pink lead to the brown lead when the sensor logic is N.C. (normally closed).
The pink lead is not connected when the sensor logic is N.O. (normally open).

◇Power Supply
● Use a 24 VDC power supply with a capacity of 4.0 A or more.
● If the power capacity is insufficient, motor output may drop, which may cause the cylinder to malfunction (due to lack of thrust force).

◇Power Supply to +COM
● Use a power supply with a capacity of 24 VDC, 100 mA or more.

◇Output Signal Connection
● Output signal voltage must be between 5 VDC and 24 VDC. The current must be 25 mA or less. If the current exceeds 25 mA, connect an external resistor R_0.

◇Notes on Wiring
● Wire the control I/O signal lines over as short a distance as possible, using a shielded cable (AWG28 or thicker).
● When it is necessary to have a connection more than 250 mm between cylinder and linear motion controller, the accessory motor cable and encoder cable must be used.
● Wire the control I/O signal lines by providing a minimum distance of 300 mm from the power lines (large-current circuits such as the power supply line and motor line). Do not wire the control I/O signal lines with the power lines in the same duct or bundle them together.

Input Circuit

COM — 680 Ω
Input — 4.7 kΩ

17, 19 — 220 Ω — 1 kΩ
18, 20 — 7~15 mA

●Controller Mode	●Driver Mode	●Driver Mode
Pin No.	Pin No.	Pin No.
36 ACL	36 ACL	17 CW+
11~16 M0~M5	11~13 RUN0~RUN2	18 CW−
3 STOP	14~16 STOP0~STOP2	19 CCW+
6 START	7 C.OFF	20 CCW−
7 PAUSE		
8 HOME		

Output Circuit

+COM — 10 kΩ — 10 kΩ
Output
−COM

21
22
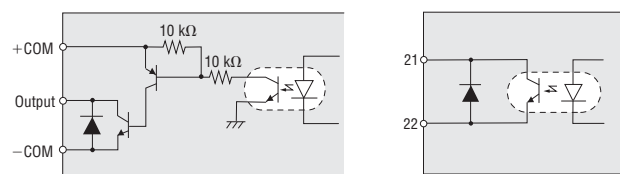
●Controller Mode	●Driver Mode	●Driver Mode
Pin No.	Pin No.	Pin No.
1 READY	2 ALM	21 TIM.+
2 ALM	4 END	22 TIM.−
4 END	31~35 ALM0~ALM4	
5 MOVE		
9 AREA		
10 T-UP		
31~35 ALM0~ALM5		

Linear and Rotary Actuators

Introduction

EZ limo EZS II Motorized Linear Slides

Accessories Installation

EZ limo EZC

EZ limo EZHC Motorized Cylinders

Accessories Installation

EZ limo EZHP

Accessories Installation

DRL Compact Linear Actuators

Accessories Installation

DG Hollow Rotary Actuators

Accessories Installation

● **Description of Input/Output Signals**

Indication of Input/Output Signal "ON""OFF"

Input (output) "ON" indicates that the current is sent into the photocoupler (transistor) inside the linear motion controller. Input (output) "OFF" indicates that the current is not sent into the photocoupler (transistor) inside the linear motion controller.

Photocoupler   OFF ⌐ ON

◇**Controller Mode**

START Input Signal
When a START signal is input following selection of positioning operation data, operation corresponding to the selected positioning operation data will start.

STOP Input Signal
This input is used to stop the moving cylinder.
The input logic for STOP signal as well as stopping pattern can be changed via the teaching pendant.

HOME Input Signal
When a HOME signal is input, the cylinder will start return to home operation.

PAUSE Input Signal
This input is used to pause the moving cylinder. (Operation data will be retained.) To resume the operation, switch the PAUSE signal to OFF and then turn the START signal ON.

M0~M5 Input Signals
Operation data to be used in positioning operation can be selected by a combination of ON/OFF settings of the six signals from M0 to M5.

M5	M4	M3	M2	M1	M0	Data to be selected
OFF	OFF	OFF	OFF	OFF	OFF	Sequential positioning operation
OFF	OFF	OFF	OFF	OFF	ON	1
OFF	OFF	OFF	OFF	ON	OFF	2
⋮	⋮	⋮	⋮	⋮	⋮	⋮
ON	ON	ON	ON	OFF	ON	61
ON	ON	ON	ON	ON	OFF	62
ON	ON	ON	ON	ON	ON	63

ACL Input Signal
This input reverts to the normal ON condition the ALM signal that has been turned OFF following an activation of the controller's protective function.

READY Output Signal
This output notifies whether or not the controller is able to accept cylinder operation commands. When the READY signal is ON, the controller accepts the inputs of the M0 to M5 signals, START signal and HOME signal.
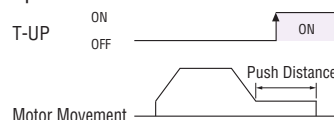
MOVE Output Signal
This output indicates that the cylinder is in operating condition and turns ON when the cylinder is moving.

AREA Output Signal
This output notifies that the moving part of the cylinder is inside a specified area (between the upper and lower limits) and turns ON when the moving part of the cylinder is inside this area. A desired area can be set via the teaching pendant. This signal is output at all time regardless of whether the cylinder is moving or stopped.

T-UP Output Signal
This output notifies that a push-motion operation has completed. The T-UP output turns ON when the load is pressed against the cylinder within the push distance.
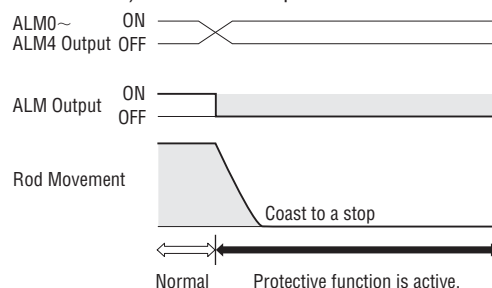

END Output Signal
This output notifies that the positioning operation or return to home operation of the cylinder has completed. This signal is output when the rod is stopped after completion of an applicable operation.

ALM Output Signal
This output notifies that the controller's protective function has been activated. The ALM output remains ON while the controller is operating normally, and turns OFF when a protective function has been activated. When an ALM signal is output, an applicable ALM code (ALM0 to ALM4) will also be output.
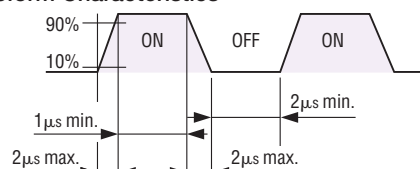

ALM0~ALM4 Output Signals
These signals are output when an ALM signal is output to notify, as an LED blink count, the protective function that has triggered the ALM output.

## ◇Driver Mode

PLS (CW), DIR (CCW) Input Signals
Pulse Waveform Characteristics

● For pulse signals, input pulse waveforms like those in the figure above.

•1-Pulse Input Mode
● The 1-pulse input mode uses "Pulse" (PLS) and "Direction of Movement" (DIR) signals.
● When DIR signals are ON, the cylinder rod moves to counter-motor side.
● When DIR signals are OFF, the cylinder rod moves to motor side.
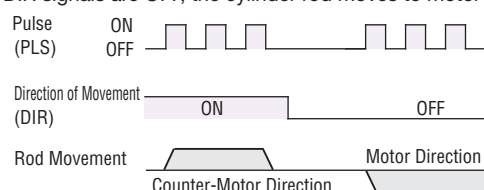
•2-Pulse Input Mode
● When CW pulses are input, the cylinder rod moves to counter-motor side.
● When CCW pulses are input, the cylinder rod moves to motor side.
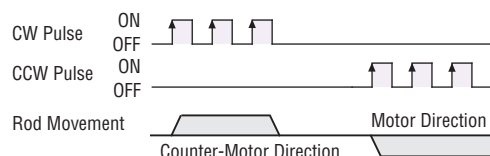
RUN0～RUN2 Input Signals
These inputs are used to set the motor's operating current. The internal setting of operating current can be changed via the teaching pendant. Input these signals externally to reduce the operating current when an ample cylinder thrust is available and you want to reduce the vibration during operation or suppress heat generation from the motor. However, since the thrust force and holding force will decrease roughly in proportion to the operating current, pay attention not to set the current excessively low.

STOP0～STOP2 Input Signals
These inputs are used to set the motor's standstill current. The internal setting of standstill current can be changed via the teaching pendant. Input these signals externally to reduce the standstill current when an ample cylinder thrust is available and you want to suppress heat generation from the motor. However, since the thrust force and holding force will decrease or starting characteristics will drop roughly in proportion to the standstill current, pay attention not to set the current excessively low.

C.OFF Input Signal
Turning the C.OFF input ON will cut off the output current to the motor. (The motor will no longer generate a holding force on the cylinder.)
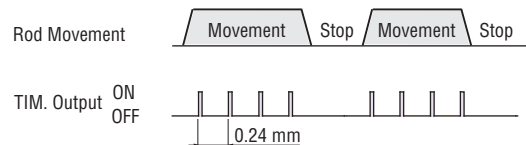To operate the cylinder, turn the C.OFF input OFF.
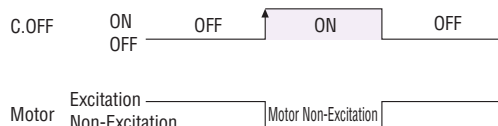
ACL Input Signal
This input reverts to the normal ON condition the ALM signal that has been turned OFF following an activation of the controller's protective function.

TIM. Output Signal
This output turns ON when a "Timing" signal is output. A TIM. signal is output each time the rod moves by 0.24 mm.
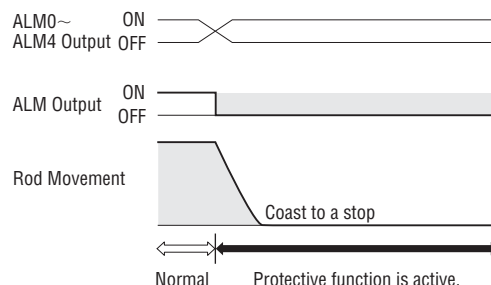

END Output Signal
This output notifies that the positioning operation or return to home operation of the cylinder has completed. This signal is output when the rod is stopped after completion of an applicable operation.

ALM Output Signal
This output notifies that the controller's protective function has been activated. The ALM output remains ON while the controller is operating normally, and turns OFF when a protective function has been activated. When an ALM signal is output, an applicable ALM code (ALM0 to ALM4) will also be output.

ALM0～ALM4 Output Signals
These signals are output when an ALM signal is output to notify, as an LED blink count, the protective function that has triggered the ALM output.