

Linear and Rotary Actuators

Motorized Linear Slides/ Motorized Cylinders Common Controller

Common Controller

Introduction
Motorized Linear Slides
EZlimo EZSI
EZlimo SPV
Motorized Cylinders
EZlimo EZCI
EZlimo EZA
EZlimo PWAII
Motorized Linear Slides/Cylinders Common Controller
Accessories
Compact Linear Actuators
DRL
Hollow Rotary Actuators
DG
Accessories

Motorized Linear Slides/Motorized Cylinders Common Controller

This controller is capable of controlling a linear slide or cylinder, without tuning.

It lets you use high-performance functions through simple operations. Your controller can also be used as a driver for pulse signal controls.

Features of controller

● Up to 63 Points of Positioning Data Can be Set with Ease

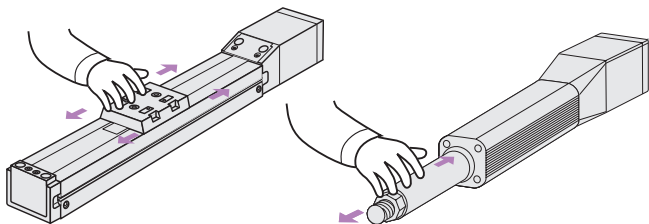
Positioning data can be set in one of three methods, as specified below (when the controller is used in the controller mode).

① Enter the desired travel amount (mm) directly.



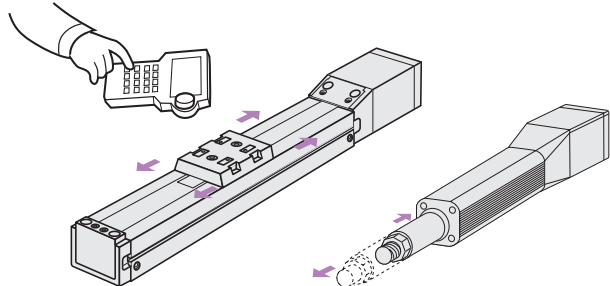
② Direct teaching

Move the table or the rod to the target position manually and store the achieved position as positioning data.



③ Remote teaching

Move the table or the rod to the target position using a teaching pendant or data editing software and store the achieved position as positioning data.

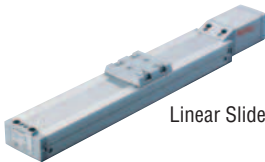

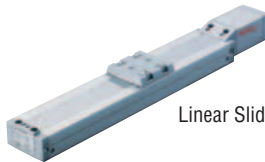




● Choice of Incremental or Absolute Option

The controller can be used as an absolute system by connecting an optional battery set (sold separately).

Choose the absolute option if you want to start operation from the current position rather than the home position, when the power is turned on, or in the event of a power failure.



Incremental Option	Absolute Option
 Linear Slide  Linear Motion Controller (Mode switch 3: OFF)	 Linear Slide  Linear Motion Controller (Mode switch 3: ON) +  Battery Set (Sold separately)

● Common Controller

Controller Key



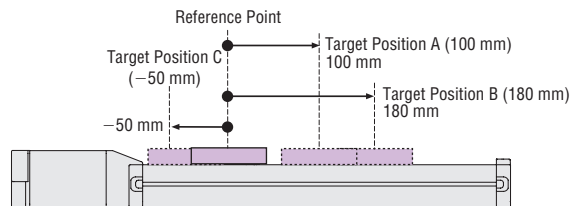
A removable controller key is used to store the parameters for the various models. This means that the same controller can be used with the **EZS II** Series, **SPV** Series, **EZC II** Series, **EZA** Series and **PWA II** Series.

● Two Positioning Data Settings

You can set positioning data in the absolute mode or incremental mode, depending on your preferred movement of the equipment.

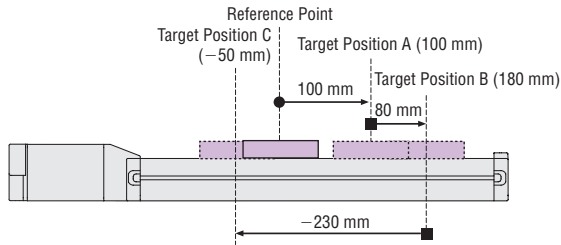
◇ Absolute Mode (Absolute-position specification):

Each position is set as the absolute position with respect to the reference point. This is suitable when you want to move the work directly from an arbitrary position to a specified position.



◇ Incremental Mode (Relative-position specification):

Each position is relative, being set as an amount of travel from the current position or another target position for the work. This is done in a regular feed or other operation where the same pattern is used repeatedly.



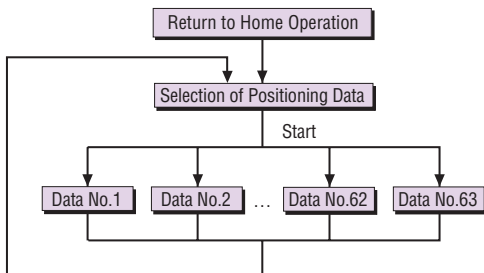
● Travel Amount Setting (Example)

Target Position	Travel Amount Setting	
	Absolute Mode	Incremental Mode
A	100	100
B	180	80
C	-50	-230

● Selective Positioning and Sequential Positioning Two Data Execution Modes

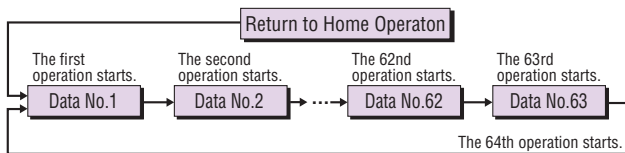
◇ Selective Positioning Mode

The set data can be selected at random.



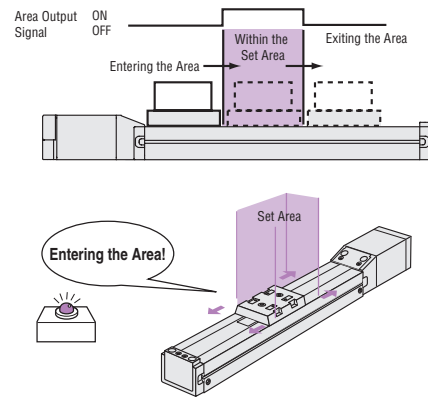
◇ Sequential Positioning Mode

Positioning operation is performed sequentially from the desired data.



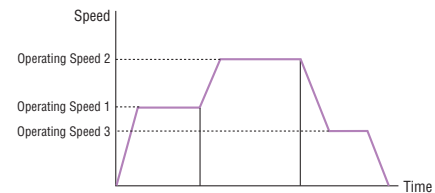
● Area Output Function

A signal is output when the linear slide table or the cylinder rod enters a set area arbitrarily set along the stroke. One set area can be set.



● Linked Operation

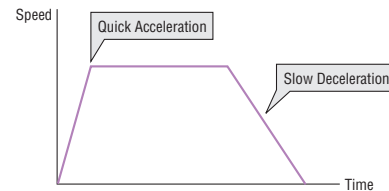
Up to four operation data can be linked, thereby allowing the actuator to change speeds without stopping.



● Data with the same operation direction can be linked.

● Acceleration/Deceleration

Four patterns of acceleration/deceleration settings are possible according to your operating conditions. Acceleration and deceleration can be set separately.



● Choice of Two Return to Home Methods

◇ Sensorless Return to Home

(Only for **EZS II /EZC II /EZA** Series)

Return to home is performed without the use of home sensors. The home position and return to home speed (maximum of 100 mm/s) can be adjusted and the direction of return to home can also be changed.

◇ Return to Home Using Sensors

Return to home is performed using home sensors. With **SPV** Series, sensors are included in the product.

● Operation Using External Pulse Input

The **EZ limo** can be combined with your existing controller to serve as a driver controlling the linear slide by pulse input.

	Controller Mode	Driver Mode
Teaching Function	●	×
Monitoring Function	●	×
Area Output Function	●	×
Absolute Specification	●	●
Sensorless Return to Home	●	●
Return to Home Using Sensor	●	●*

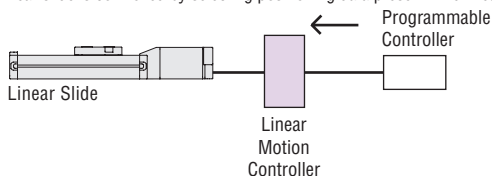
●: Available ×: Not available

*Data must be set from the teaching pendant or data editing software.

● Normal System Configuration

Controller Mode

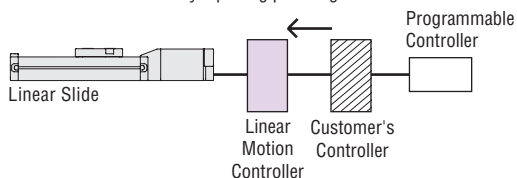
The linear slide is controlled by selecting positioning data preset in the linear motion controller.



● When Combined with the Customer's Controller

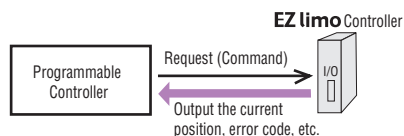
Driver Mode

The linear slide is controlled by inputting pulse signals.



● Output of Current Position and Error Code

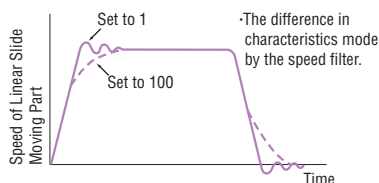
The current position, error code and other data can be output to an external device.



● Speed Filter

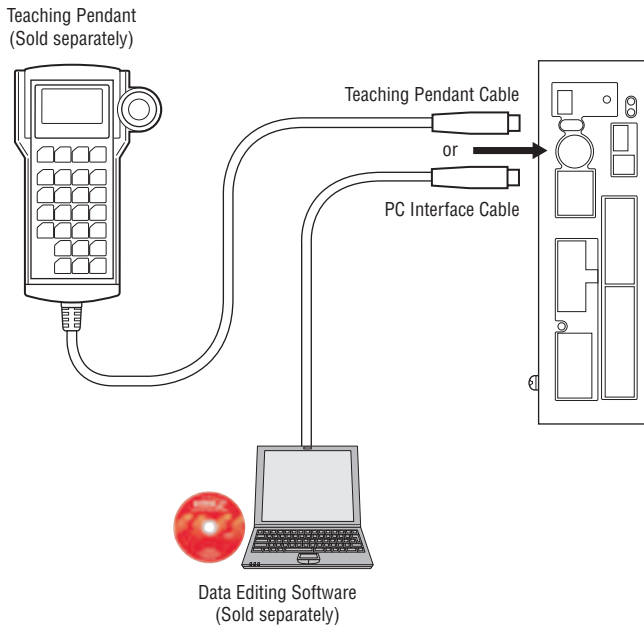
Use this filter to suppress disturbances during starting and stopping or to reduce vibration during low-speed operation. With the speed filter function you can control the motor to minimize speed fluctuations even when switching the speed rapidly between operation commands.

The set value can be adjusted digitally (over a range of 1 to 100). Increasing the set value makes the movement smoother while decreasing the synchronism with the command.



Functions of Teaching Pendant (EZT1) and Data Editing Software (EZED2)

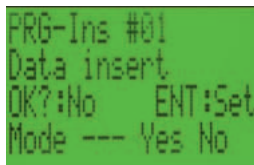
A teaching pendant and data editing software are available.
Choose the appropriate accessory based on the required functions.



Teaching Pendant (Sold separately) Model: EZT1



- All functions required for operation and adjustment, including setting of positioning data, test operation, and I/O monitoring, are provided.
- A dialogue-type user interface ensures easy operation. All you need is to enter values in the necessary fields.
- No dedicated power supply is necessary. Simply connect the cable to the controller.



Teaching Pendant (EZT1)/Data Editing Software (EZED2) Function Comparison Table

Function	Item	
	Teaching Pendant (Model: EZT1)	Data Editing Software (Model: EZED2)
Cable Length	5 m	5 m ^{*1}
Display	LCD 17 characters × 4 lines	PC screen
Emergency Stop Button	○	×
Operation Data Setting	○	○
Parameter Setting	○	○
Teaching Function (Direct/Remote)	○	○
Operation Data Monitoring	○	○
I/O & Alarm History Monitoring	○	○
Waveform Monitoring	×	○
Test Operation	○	○
Data Copy	×	○
Printing Function	×	○ ^{*2}

○: Available ×: Not available

*1 PC interface cable (included) is used.

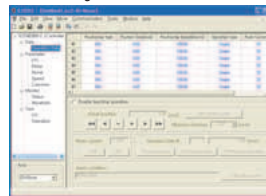
*2 The printing function is not available on computers running Windows®98, Me.

Data Editing Software (Sold separately) Model: EZED2

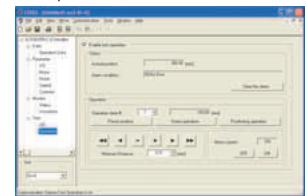


- All functions required for operation and adjustment, including setting of positioning data, test operation, and I/O monitoring, are provided.
- Running on any Windows based computer, the software is a graphic navigation tool that guides you through various operations in easy steps. This user-friendly feature makes this an ideal accessory for editing large volumes of data.
- You can also access waveform monitoring, data copy and other features not available on the teaching pendant.

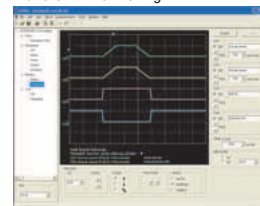
Data Editing



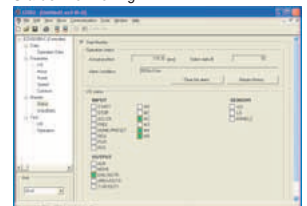
Test Operation



Waveform Monitoring



Status Monitoring



Specifications of Controller

Controller Mode

Item	Controller Model				
	ESMC-K2	ESMC-A2	ESMC-C2		
Type	Stored data type				
Power Supply Input	Control Power	24 VDC ±5% 1.0 A [Controller only: 0.5 A (Take into account safety margin of +0.2 A for the teaching pendant, and/or +0.3 A for the electromagnetic brake type.)]			
	Main Power	Voltage	24 VDC ±10%	Single-Phase 100-115 VAC -15~+10%	Single-Phase 200-230 VAC -15~+10%
		Frequency	50/60 Hz		
		Current	4.0 A*1	6.0 A*1	3.5 A*1
Positioning Data	Setting Mode	Absolute mode (absolute-position specification), Incremental mode (relative-position specification)			
	Number	63			
	Setting Method	Data is set using the accessory teaching pendant (EZT1) or data editing software (EZED2) (Stored in EEPROM).			
Positioning Control*2	Mode	Selective positioning, Sequential positioning			
	Travel Amount Setting Range	-83886.08~+83886.07 mm (value set in units of 0.01 mm)			
	Starting Speed Setting Range	0.01~200.00 mm/s (value set in units of 0.01 mm/s)			
	Operating Speed Setting Range	0.01~1500.00 mm/s (value set in units of 0.01 mm/s)			
	Acceleration/Deceleration Rate Setting Range	0.01~20.00 m/s ² (value set in units of 0.01 m/s ²)			
Control Mode	<ul style="list-style-type: none"> External input mode (EXT): In this mode, operation by external signal, command position, I/O condition and alarm condition can be monitored. Program mode (PRG): In this mode, operation data can be created, changed or cleared. Parameter mode (PAR): In this mode, operation parameters and function setting parameters can be set or changed. Test mode (TST): In this mode, manual operation and I/O check can be performed. 				
Operation Mode	Positioning operation, Return to home operation, Linked operation (a maximum of 4 data), Continuous operation				
Input Signal/Input Mode	START, STOP, HOME/PRESET, FREE, MO~M5, REQ, ACL/CK 24 VDC Photocoupler input, Input resistance 4.7 kΩ FWD, RVS 5 VDC Photocoupler input, Input resistance 180 Ω or 24 VDC Photocoupler input, Input resistance 2.7 kΩ +LS, -LS, HOMELS 24 VDC Photocoupler input, Input resistance 4.7 kΩ				
Output Signal/Output Mode	ALM, END/OUTR, MOVE, AREA/OUT0, OUT1 Photocoupler, Open-collector output (24 VDC, 10 mA or less) ASG1, BSG1 Photocoupler, Open-collector output (24 VDC, 15 mA or less) ASG2, BSG2 Line driver output				
Protective Function	Excessive position deviation, Overcurrent protection, Overvoltage protection, Overheat protection, Overload, Sensor error, Overspeed, Nonvolatile memory error, etc.				
Indicator (LED)	PWR, ALM	PWR, ALM, CHARGE			
Cooling Method	Natural ventilation				
Mass	0.44 kg	0.77 kg			

Driver Mode

Item	Controller Model				
	ESMC-K2	ESMC-A2	ESMC-C2		
Power Supply Input	Control Power	24 VDC ±5% 1.0 A [Controller only: 0.5 A (Take into account safety margin of +0.2 A for the teaching pendant, and/or +0.3 A for the electromagnetic brake type.)]			
	Main Power	Voltage	24 VDC ±10%	Single-Phase 100-115 VAC -15~+10%	Single-Phase 200-230 VAC -15~+10%
		Frequency	50/60 Hz		
		Current	4.0 A*1	6.0 A*1	3.5 A*1
Maximum Response Frequency	1-pulse input mode, 2-pulse input mode: 80 kHz, Phase difference input mode: 20 kHz				
Operation Mode	Return to home operation, Pulse input operation (1-pulse input mode, 2-pulse input mode, Phase difference input mode)				
Input Signal/Input Mode	ACL/CK, FREE, C.OFF, HOME/PRESET, REQ, HMSTOP 24 VDC Photocoupler input, Input resistance 4.7 kΩ FP, RP 5 VDC Photocoupler input, Input resistance 180 Ω or 24 VDC Photocoupler input, Input resistance 2.7 kΩ +LS, -LS, HOMELS 24 VDC Photocoupler input, Input resistance 4.7 kΩ				
Output Signal/Output Mode	MOVE, END/OUTR, ALM, TIM/OUT0, OUT1 Photocoupler, Open-collector output (24 VDC, 10 mA or less) ASG1, BSG1 Photocoupler, Open-collector output (24 VDC, 15 mA or less) ASG2, BSG2 Line driver output				
Protective Function	Excessive position deviation, Overcurrent protection, Overvoltage protection, Overheat protection, Overload, Sensor error, Overspeed, Nonvolatile memory error, etc.				
Indicator (LED)	PWR, ALM	PWR, ALM, CHARGE			
Cooling Method	Natural ventilation				
Mass	0.44 kg	0.77 kg			

*1 The maximum current varies depending on the connected linear slide or cylinder.

[ESMC-K2] EZSM3/EZSM4/EZCM4/EZAM4: 1.7 A EZSM6/SPVM6/EZCM6/EZAM6: 4.0 A

[ESMC-A2] EZSM3/EZSM4/EZCM4/EZAM4: 3.0 A EZSM6/SPVM6/EZCM6/EZAM6: 5.0 A SPVM8/PWAM8: 6.0 A PWAM6: 6.4 A

[ESMC-C2] EZSM3/EZSM4/EZCM4/EZAM4: 2.1 A EZSM6/SPVM6/EZCM6/EZAM6: 3.0 A SPVM8/PWAM8: 3.5 A PWAM6: 3.9 A

*2 Values vary depending on the connected linear slide. Check the specifications of each series.

General Specifications of Controller

This is the value after rated operation under normal ambient temperature and humidity.

● 24 VDC

Item	Specification
Insulation Resistance	100 MΩ or more when 500 VDC megger is applied between the following places: • FG – Main power supply terminal • FG – I/O connector
Dielectric Strength	Sufficient to withstand the following for 1 minute: • FG – Main power supply terminal 0.5 kVAC 50 Hz • FG – I/O connector 0.5 kVAC 50 Hz
Ambient Temperature	0 ~ +40°C (non-freezing)
Ambient Humidity	85% or less (non-condensing)

Note

● Do not measure insulation resistance or perform the dielectric strength test while the linear actuator and controller are connected.

● Single-Phase 100-115 VAC/Single-Phase 200-230 VAC

Item	Specification
Insulation Resistance	100 MΩ or more when 500 VDC megger is applied between the following places: • I/O connector – Main power supply terminal, Motor connector, Battery connector • Control power supply terminal – Main power supply terminal, Motor connector, Battery connector • PE – Main power supply terminal, Motor connector, Battery connector
Dielectric Strength	Sufficient to withstand the following terminals for 1 minute: • Signal I/O, Control power supply – Main power supply 1.8 kVAC • Signal I/O, Control power supply – Motor output 1.8 kVAC • Signal I/O, Control power supply – Battery input 1.8 kVAC • PE – Main power supply 1.5 kVAC • PE – Motor output 1.5 kVAC • PE – Battery input 1.5 kVAC
Ambient Temperature	0 ~ +40°C (non-freezing)
Ambient Humidity	85% or less (non-condensing)

Note

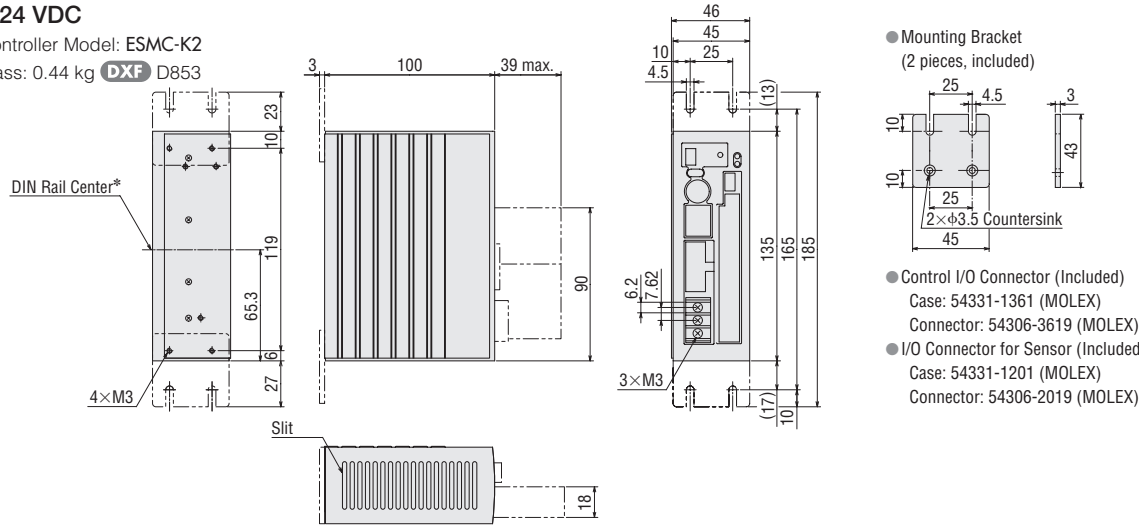
● Do not measure insulation resistance or perform the dielectric strength test while the linear actuator and controller are connected.

Controller Dimensions Unit = mm

● 24 VDC

Controller Model: ESMC-K2

Mass: 0.44 kg **DXF** D853

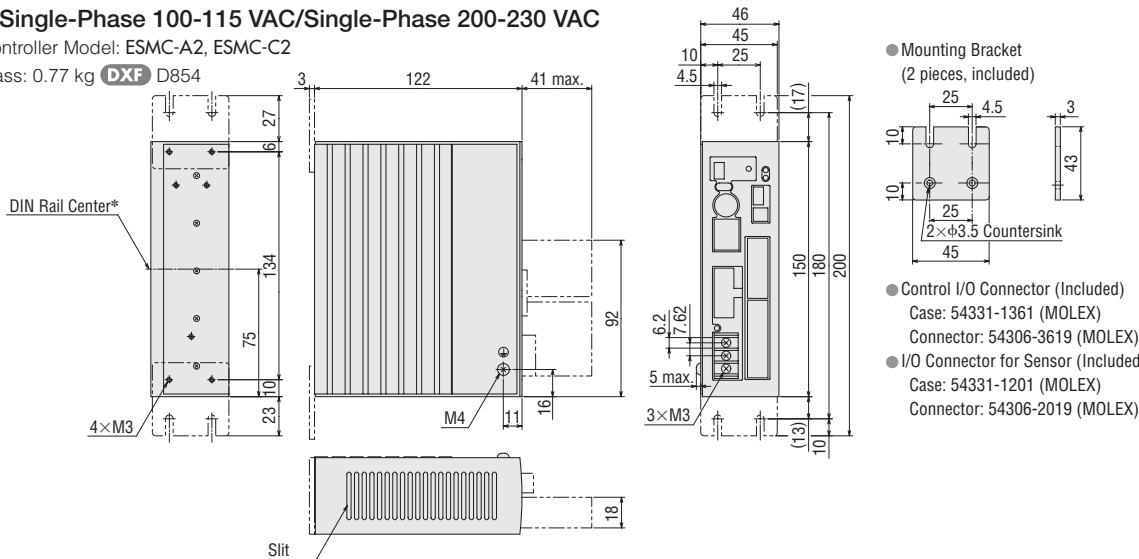


*The center of the DIN rail when a DIN rail mounting plate (**PADP01**, sold separately) is used for installation.

● Single-Phase 100-115 VAC/Single-Phase 200-230 VAC

Controller Model: ESMC-A2, ESMC-C2

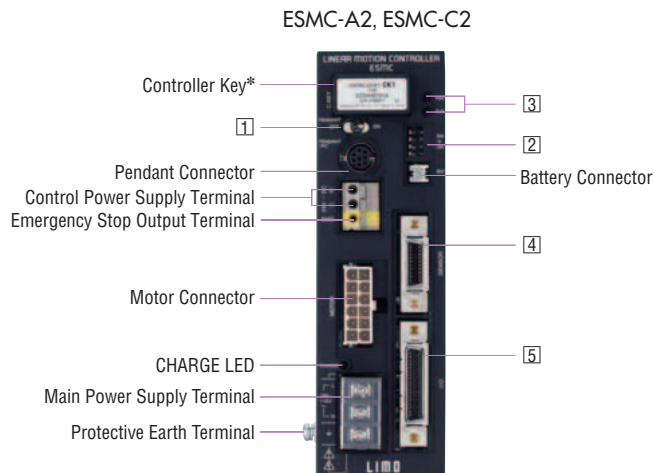
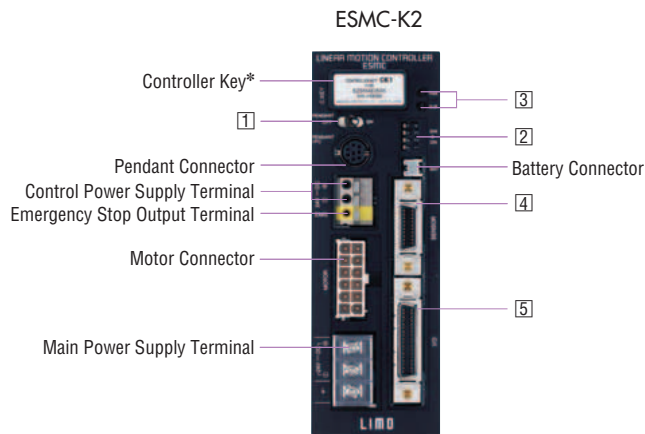
Mass: 0.77 kg **DXF** D854



*The center of the DIN rail when a DIN rail mounting plate (**PADP01**, sold separately) is used for installation.

Connection and Operation

Names and Functions of Controller Parts



① Teaching 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.)

② Mode Switch

Indication	Function
4	Invalid (not used)
3	Switch ABS/INC ON: Absolute mode OFF: Incremental mode
2	Set pulse input mode (in driver mode) ON: 1-pulse input mode OFF: 2-pulse input mode
1	Switch modes ON: Driver mode OFF: Controller mode

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

③ LED Indicator

Indication	Color	Name
PWR	Green	Control power supply indicator
ALM	Red	Alarm indicator

④ Sensor I/O Connector

Indication	Input	Pin No.	Signal Name	Function
SENSOR	Input	1	IN-COM2	Power supply for sensor
		11		
		19		
		13	+LS	+coordinate limit sensor
		14	-LS	-coordinate limit sensor
		15	HOMELS	Mechanical home sensor

* Make sure the linear actuator model name on the controller key matches the model name of the connected linear actuator. If the names do not match, the linear actuator cannot be operated as specified.

5 I/O Connector

● Controller Mode

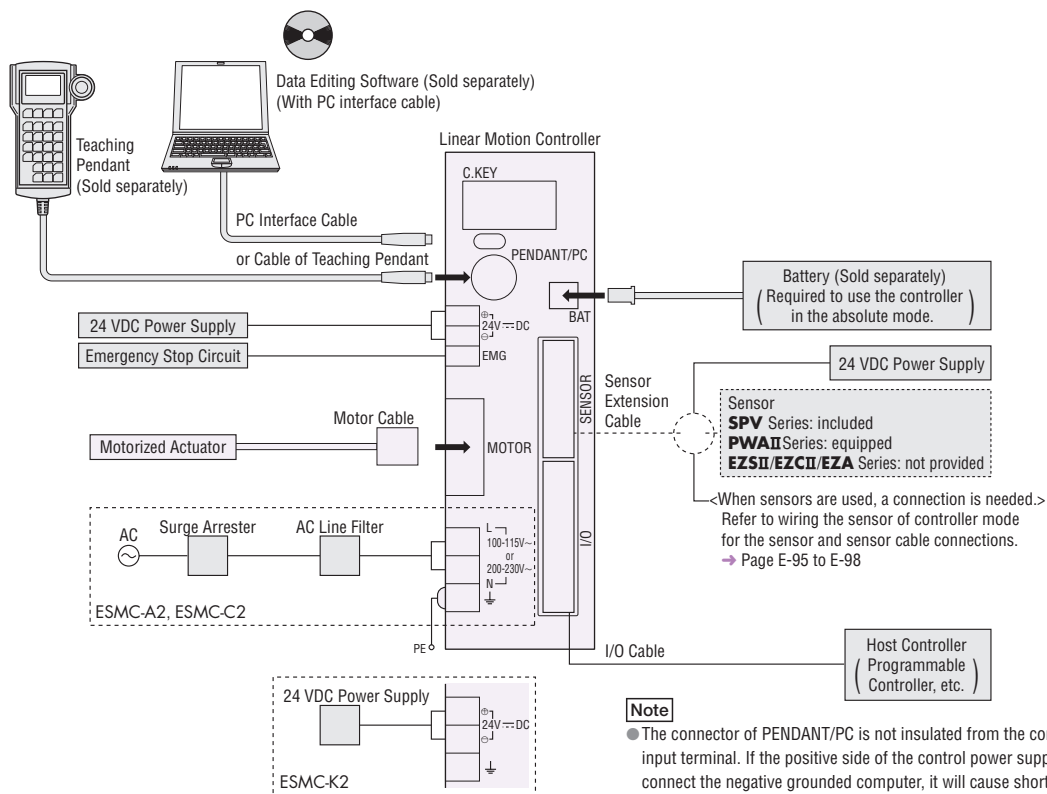
Indication	I/O	Pin No.	Signal Name	Function	
I/O	Input	18	IN-COM1	Power supply for input signals	
		19	GND	Power supply for I/O signals	
		1	OUT-COM	Power supply for output signals	
	Output	2	ALM	This signal is output when a protective function has been activated	
		3	MOVE	This signal is output while the cylinder is operating	
		4	END/OUTR	END: This signal is output when a positioning operation or return to home operation has been completed OUTR: Output the current position	
		5	AREA/OUT0	AREA: This output notifies that the table of the cylinder is staying inside a specified area OUT0: Output the current position	
		6	T-UP/OUT1	T-UP: This signal is output when a push-motion operation has been completed OUT1: Output the current position	
		20	ASG1	A-phase pulse output (Open-collector)	
		21	BSG1	B-phase pulse output (Open-collector)	
		22	ASG2	A-phase pulse output (Line driver)	
		23	ASG2		
		24	BSG2	B-phase pulse output (Line driver)	
		25	BSG2		
		Input	7	START	Start the positioning operation
			8	ACL/CK	ACL: Cancel the protective function currently active CK: Output the current position
			9	FREE	Stop motor excitation and release the electromagnetic brake
			10	STOP	Stop a positioning operation, return to home operation and continuous operation
	11		M0	Select the positioning operation No.	
	12		M1		
	13		M2		
	14		M3		
	15		M4		
	16		M5		
	17		HOME/PRESET	HOME: Start return to home operation PRESET: Preset the current position	
	30		REQ	Request the current position output	
	31		FWD+	FWD: Move the cylinder rod in the + coordinate direction	
	32		FWD-		
	33		P24-FWD		
	34		RVS+	RVS: Move the cylinder rod in the - coordinate direction	
	35		RVS-		
	36		P24-RVS		

● Driver Mode

Indication	I/O	Pin No.	Signal Name	Function	
I/O	Input	18	IN-COM1*1*2	Power supply for input signals	
		19	GND	Power supply for I/O signals	
		1	OUT-COM*3	Power supply for output signals	
	Output	2	ALM	This signal is output when a protective function has been activated	
		3	MOVE	This signal is output while the cylinder is operating	
		4	END/OUTR	END: This signal is output when a positioning operation or return to home operation has been completed OUTR: Output the current position	
		5	TIM/OUT0	TIM: This signal is output when the excitation sequence is at step "0" OUT0: Output the current position	
		6	OUT1	Output the current position	
		20	ASG1	A-phase pulse output (Open-collector)	
		21	BSG1	B-phase pulse output (Open-collector)	
		22	ASG2	A-phase pulse output (Line driver)	
		23	ASG2		
		24	BSG2	B-phase pulse output (Line driver)	
		25	BSG2		
		Input	8	ACL/CK	ACL: Cancel the protective function currently active CK: Output the current position
			9	FREE	Stop motor excitation and release the electromagnetic brake
			10	C.OFF	Stop motor excitation and hold the electromagnetic brake
			11	HMSTOP	Stop return to home operation
	17		HOME/PRESET*4	HOME: Start return to home operation PRESET: Preset the current position	
	30		REQ	Request the current position output	
	31		FP+	Operation command pulse input (The operation command pulse input in the + coordinate direction in the 2-pulse input mode)	
	32		FP-		
	33		P24-FP		
	34		RP+	Direction of movement input (The operation command pulse input in the - coordinate direction in the 2-pulse input mode)	
	35		RP-		
	36		P24-RP		

- *1 Connect this signal to 24 VDC if your controller is used in the NPN mode, or connect it to ground if the controller is used in the PNP mode.
- *2 Connect this signal even when only output signals are used.
- *3 Connect this signal to ground if your controller is used in the NPN mode, or connect it to 24 VDC if the controller is used in the PNP mode.
- *4 Teaching pendant (**EZT1**) or data editing software (**EZED2**) is required when switching the HOME/PRESET input or changing parameters in the driver mode.

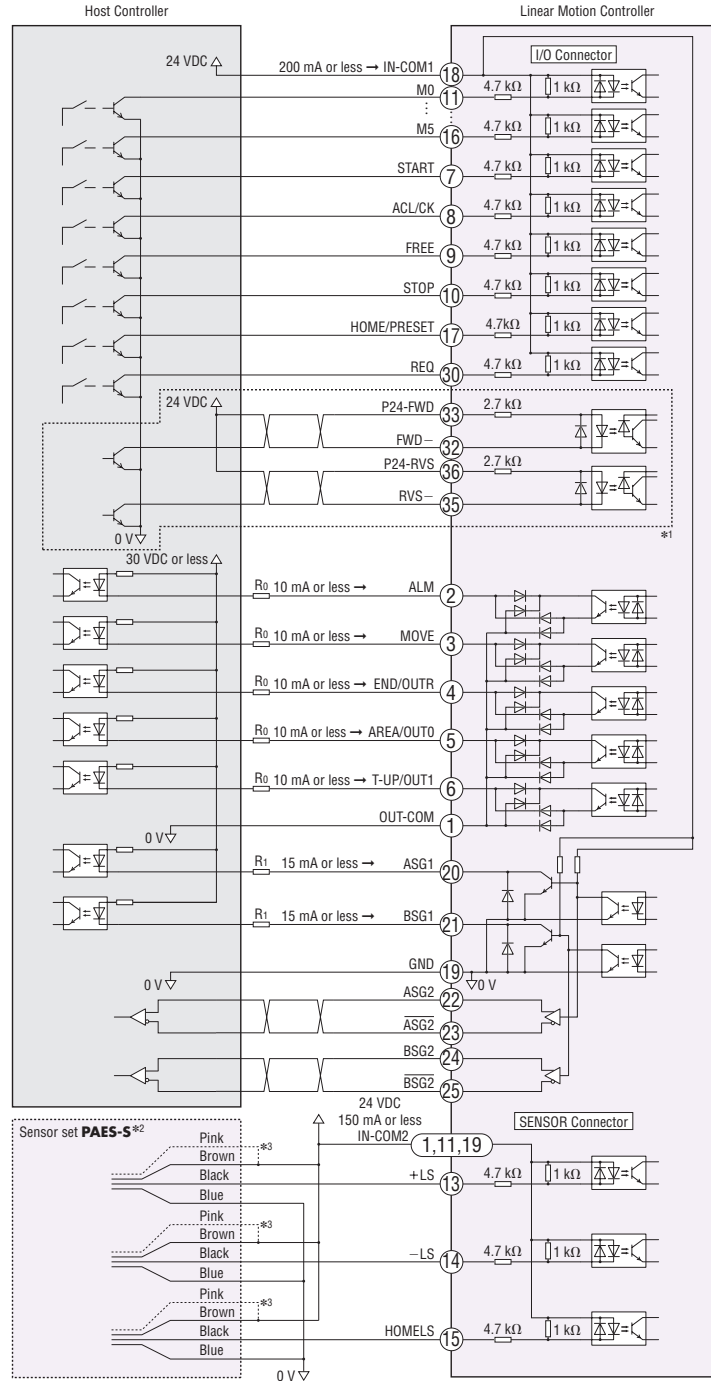
● Connection Diagram



● Connection to Host Controller

◇ Controller Mode

- Sink Logic (NPN) Specification



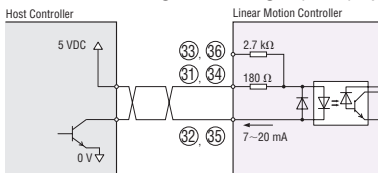
*1 For connection of 31 to 36 pins, refer to "FWD (FP) and RVS (RP) Signals" as shown below.

*2 An accessory sensor set is also available (sold separately).

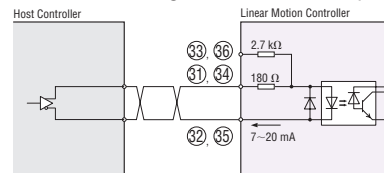
*3 Connect this line if the normally closed (NC) logic is used.

◇ FWD (FP) and RVS (RP) Signals

When connecting to sink logic (NPN) specification of 5 VDC

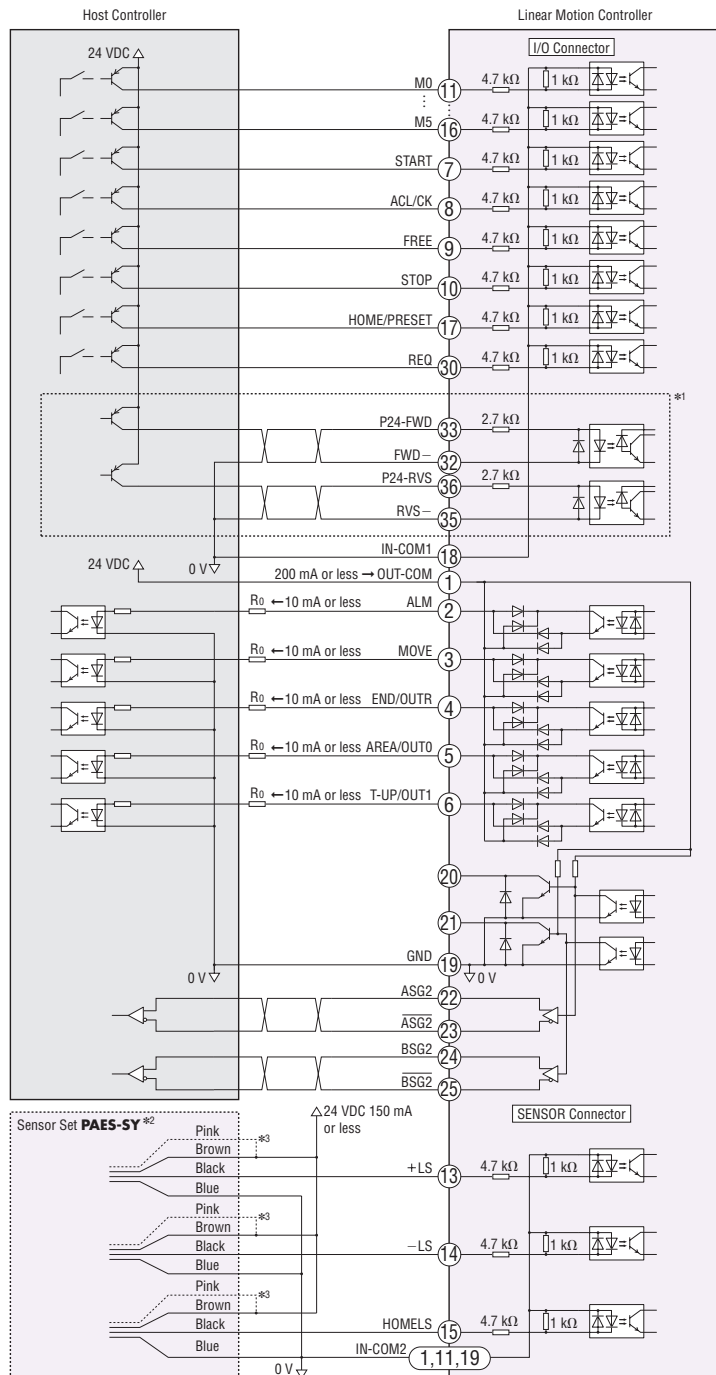


When connecting to a line driver output circuit



◇ Controller Mode

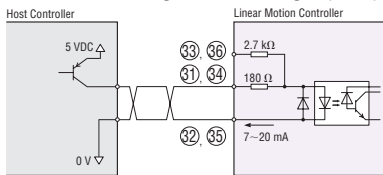
• Source Logic (PNP) Specification



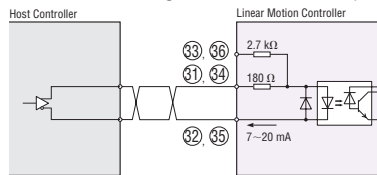
*1 For connection of 31 to 36 pins, refer to "FWD (FP) and RVS (RP) Signals" as shown below.
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◇ FWD (FP) and RVS (RP) Signals

When connecting to source logic (PNP) specification of 5 VDC

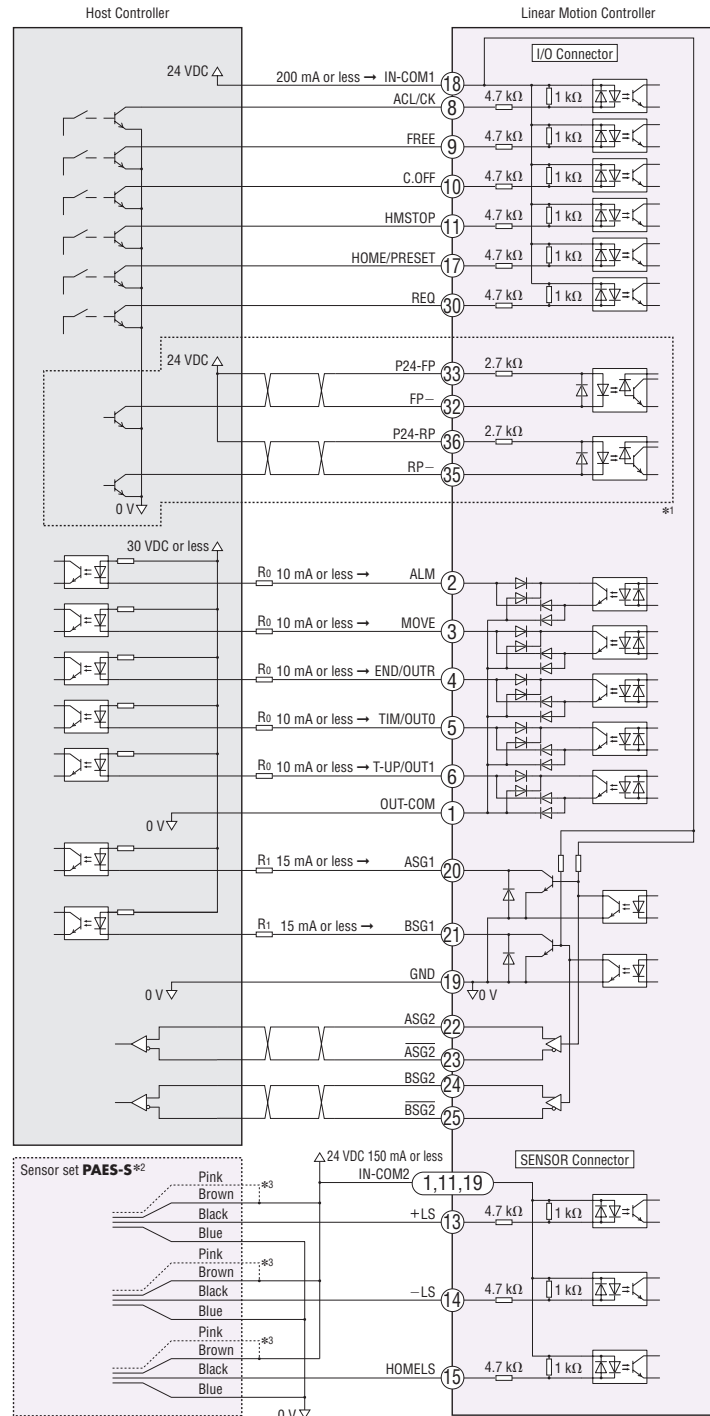


When connecting to a line driver output circuit



◇ Driver Mode

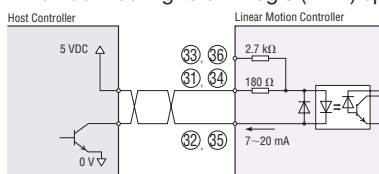
- Sink Logic (NPN) Specification



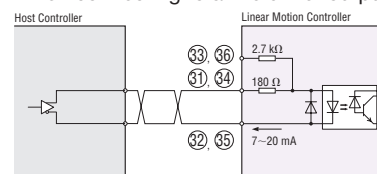
*1 For connection of 31 to 36 pins, refer to "FWD (FP) and RVS (RP) Signals" as shown below.
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◇ FWD (FP) and RVS (RP) Signals

When connecting to sink logic (NPN) specification of 5 VDC

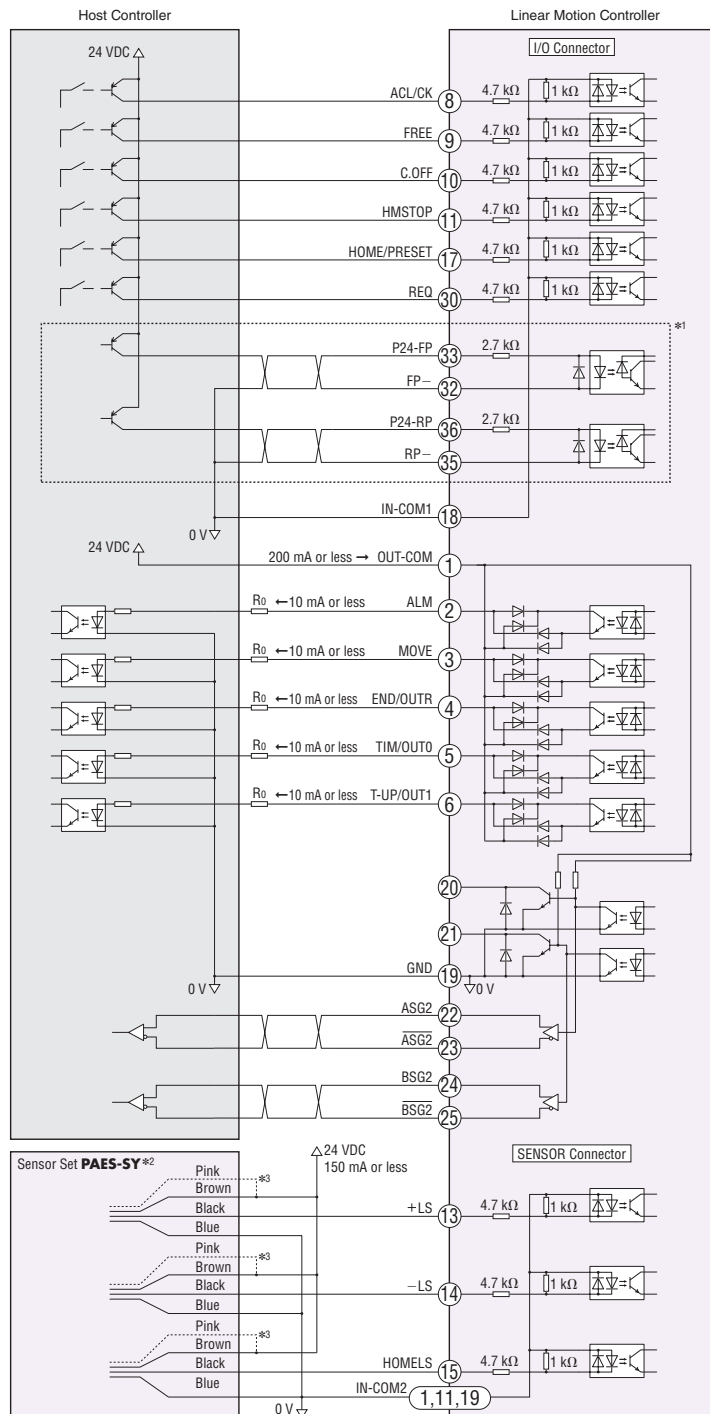


When connecting to a line driver output circuit



◇ Driver Mode

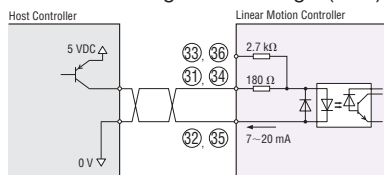
• Source Logic (PNP) Specification



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◇ FWD (FP) and RVS (RP) Signals

When connecting to source logic (PNP) specification of 5 VDC



When connecting to a line driver output circuit

