EP-01

CE compliance

Single-axis robot positioner for single-axis robot Robonity series “ABAS”, “AGXS”, and “ABAR”. This robot positioner supports Ethernet, is equipped with an Ethernet port as standard, and achieves 37 % size reduction when compared to the conventional robot positioner. Following the TS series, usability is greatly improved.

EP-01

Handy terminal
▶ HT2 / HT2-D
P.657

Support software for PC
▶ EP-Manager
P.648
* Free download is available at the member site.

Basic specifications

Item			EP-01	
Basic specifications	Driver model		EP-01-A10	EP-01-A30
	Number of controllable axes		Single-axis	
	Controllable robots		Single-axis robot Robonity series ABAS / AGXS / ABAR	
	Power capacity		420 VA	1600 VA
	Dimensions		W 40 × H 150 × D 130 mm	W 55 × H 150 × D 130 mm
	Weight		Approx. 0.6 kg	Approx. 1 kg
	Input power supply	Control power supply	Single phase AC200 to 230V +/-10% 50/60Hz	
		Motor power supply	Single phase AC200 to 230V +/-10% 50/60Hz	
Axis control	Control method		Closed loop vector control method	
	Operating method		I/O point tracing (Positioning operation by specifying point number) / Remote command	
	Operation types		Positioning, merge-positioning, push, and jog operations	
	Position detection method		Optical encoder, battery absolute encoder, or battery-less absolute encoder is selected.	
	Resolution		8,388,608 pulses/rev.	
	Origin search method		Absolute	
Points	Number of points		255 points	
	Point type setting		(1) Standard setting: Set speed and acceleration in percent of the respective maximum settings. (2) Custom setting: Set speed and acceleration in SI units.	
	Point teaching method		Manual data input (coordinates input) , Teaching, Direct teaching	
External input/output	I/O interface		Selectable from the following: EtherNet/IP™, PROFINET, EtherCAT, NPN, CC-Link	
	Input		Servo ON (SERVO), reset (RESET), start (START), interlock (/LOCK) origin search (ORG), teaching mode (TMODE), jog motion - (JOG-), jog motion + (JOG+), point number selection (PIN0 to PIN7)	
	Output		Servo status (SRV-S), alarm (/ALM), operation end (END), operation in-progress (BUSY), control outputs (OUT0 to 3), point number output 0 to 7 (POUT0 to POUT7), feedback pulse output (A/B/Z) (option)	
	External communications		Ethernet (In conformity with IEEE802.3 100BASE-TX, Applicable to Auto Negotiation)	
	Power supply for brake		DC24V +/-10% 300mA (prepared by the customer)	
	Safety circuit		Emergency stop input, main power input ready output, emergency stop contact output (1 system: When the HT2 is used.)	
Options	Handy terminal		HT2, HT2-D (with enable switch)	
	Support software for PC		EP-Manager	
General specifications	Operating temperature / Operating humidity		0°C to 40°C, 35% to 85%RH (non-condensing)	
	Storage temperature / Storage humidity		-10°C to 65°C, 10% to 85%RH (non-condensing)	
	Atmosphere		Indoor location not exposed to direct sunlight. No corrosive , flammable gases, oil mist, or dust particles	
	Anti-vibration		All XYZ directions 10 to 57Hz unidirectional amplitude 0.075mm 57 to 150Hz 9.8m/s^2	
	Protective functions		Position detection error, power module error, temperature error, overload, overvoltage, low voltage, excessive position deviation, overcurrent, motor current error	
	Protective structure		IP20	

Controllable robot	EP-01 ▶ Robonity (ABAS P.180, AGXS P.194, ABAR P.216)
CE marking	◯
Field networks	EtherNet/IP, PROFINET, EtherCAT, CC-Link V2

Model Overview

Name		EP-01
Controllable robot		Single-axis robot Robonity (ABAS / AGXS / ABAR)
Input power	Main power supply	Single phase AC200 to 230V +/-10% 50/60Hz
	Control power supply	Single phase AC200 to 230V +/-10% 50/60Hz
Operating method		I/O point tracing (Positioning operation by specifying point number) / Remote command
Maximum number of controllable axes		Single-axis
Origin search method		Absolute

Ordering method

EP-01 - [ ] - [ ] - [ ]

Controller	Driver: Power capacity	Regenerative	I/O
	A10: 200W or less	No entry: None	EP: EtherNet/IP™
	A30: 400W/750W	R: With EP-RU	PT: PROFINET
			ES: EtherCAT
			NS: NPN
			CC: CC-Link

Note. Whether the battery is provided with the robot positioner is selected by the robot order model.

Specification selection table

Note. Conditions required for regenerative unit are only for reference and may vary depending on the actual operating conditions.

<Standard acceleration/deceleration specifications>

		Basic								Advanced						
		ABAS04	ABAS05	ABAS08	ABAS12	ABAS12H	ABAR04	ABAR05	ABAR08	AGXS05	AGXS05L	AGXS07	AGXS10	AGXS12	AGXS16	AGXS20
Driver	EP-01-A10	●	●	●	●		●	●	●	●	●	●	●			
	EP-01-A30					●								●	●	●
Regenerative unit EP-RU	Vertical		(1)	(2)	(4)	(6)	(7)	(8)	(10)		(12)	(12)	(10)	(14)	(10)	(10)
	Horizontal			(3)	(5)			(9)	(11)				(13)	(14)	(15)	(15)

Conditions required for regenerative unit

(1) Stroke of lead 5 or 10 is 650 mm or more.
(2) Stroke of lead 5 or 20 is 450 mm or more and stroke of lead 10 is 150 mm or more.
(3) Stroke of lead 20 is 250 to 750 mm.
(4) Stroke of lead 5, 10, or 20 is 150 mm or more and stroke of lead 32 is 300 to 750 mm.
(5) Stroke of lead 10 or 20 is 250 to 750 mm and stroke of lead 32 is 400 to 750 mm.
(6) Stroke of lead 5, 10, or 20 is 300 mm or more and stroke of lead 32 is 300 to 750 mm.
(7) Stroke of all leads is 250 mm or more.
(8) Stroke of all leads is 150 mm or more.
(9) Stroke of lead 20 is 300 to 400 mm.
(10) All strokes of all leads
(11) Stroke of lead 10 or 20 is 150 to 500 mm.
(12) Stroke of all leads is 500 mm or more.
(13) Stroke of lead 10, 20, or 30 is 300 to 800 mm.
(14) Stroke of all leads is 400 mm or more.
(15) Stroke of lead 20 is 400 to 850 mm and stroke of lead 40 is 600 to 950 mm.

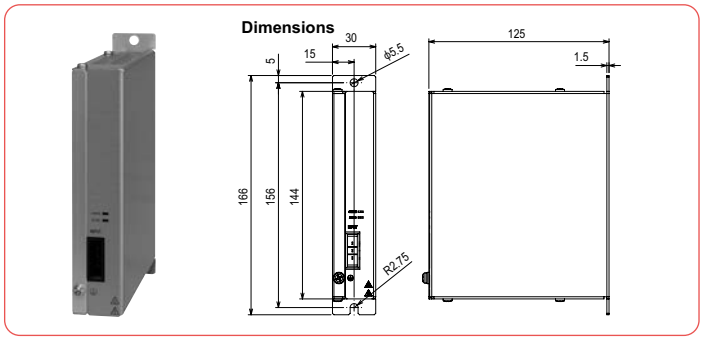
<High acceleration/deceleration specifications>

		Advanced					
		AGXS05-H	AGXS05L-H	AGXS07-H	AGXS10-H	AGXS12-H	AGXS16-H
Driver	EP-01-A10	●	●	●	●		
	EP-01-A30					●	●
Regenerative unit EP-RU	Vertical				(1)	(3)	(4)
	Horizontal				(2)		(5)

Conditions required for regenerative unit

(1) Stroke of lead 10 is 400 mm or more and stroke of lead 20 is 450 mm or more.
(2) Stroke of lead 20 is 250 mm or more and stroke of lead 30 is 450 mm or more.
(3) Stroke of lead 5 or 20 is 650 mm or more and stroke of lead 10 is 450 mm or more.
(4) All strokes of leads 10 and 20 and stroke of lead 40 is 300 mm or more.
(5) Stroke of lead 20 is 150 mm or more and stroke of lead 40 is 450 mm or more.

Regenerative unit EP-RU



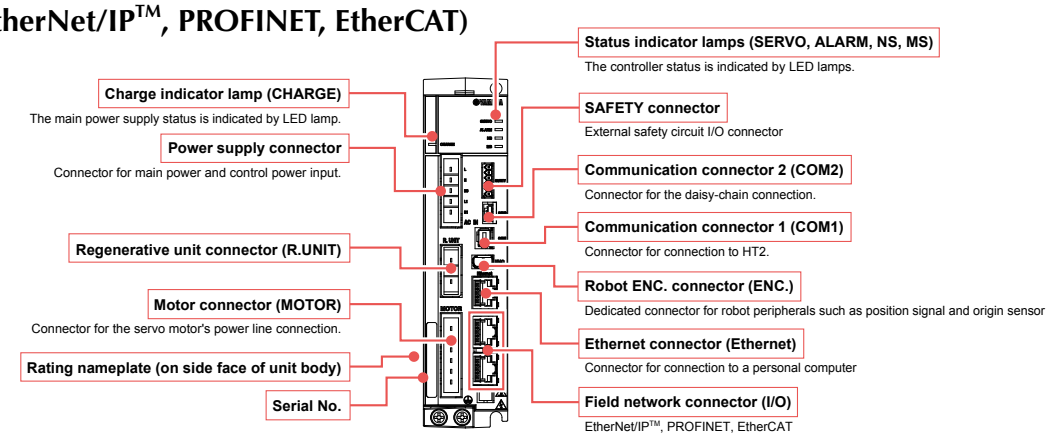
Basic specifications

Item	EP-RU
Model	KFX-M5850-00
Dimensions	W30 × H144 (Not including installation stay) × D125 mm
Weight	650 g
Regenerative voltage	Approx. 380V or more
Regenerative stop voltage	Approx. 360V or less
Absorbable electric power	40W
Accessory	Cable for connection with controller (300 mm)

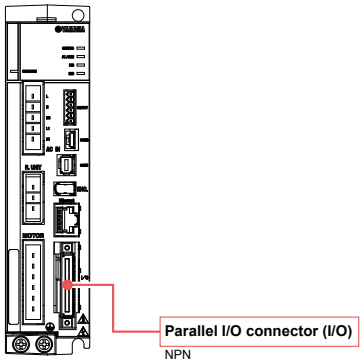
Note. Always leave an empty space (gap of about 20 mm) between this unit and the adjacent controller.
Also, always use the dedicated cable when connecting the controller.

Part names

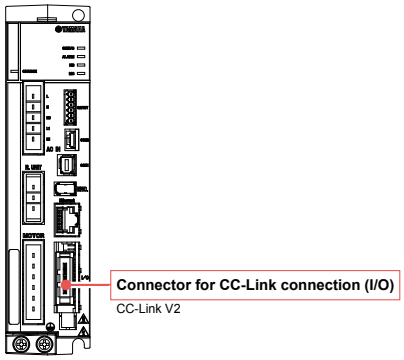
EP-01 (EtherNet/IP™, PROFINET, EtherCAT)



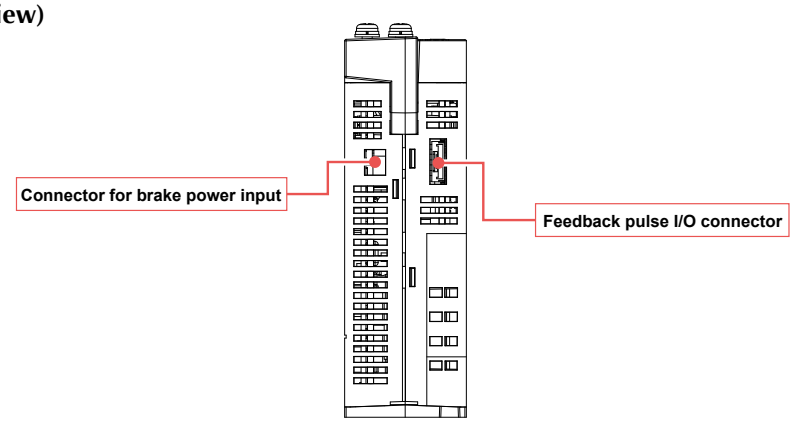
EP-01 (NPN)



EP-01 (CC-Link)

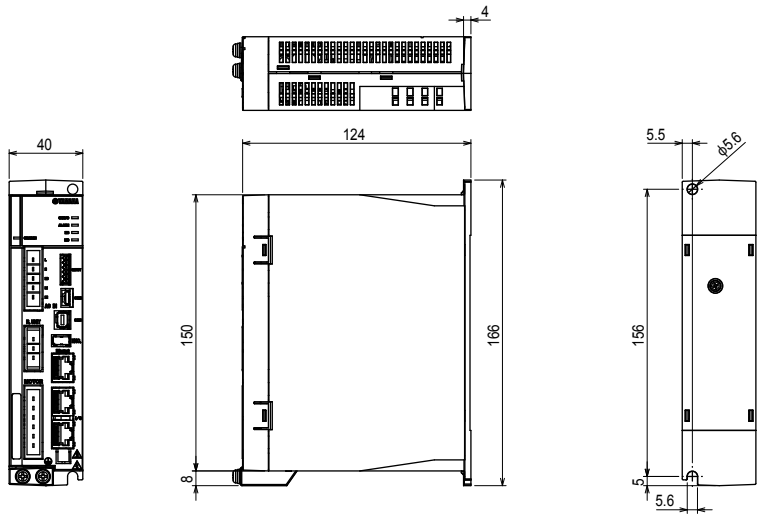


EP-01 (Bottom view)

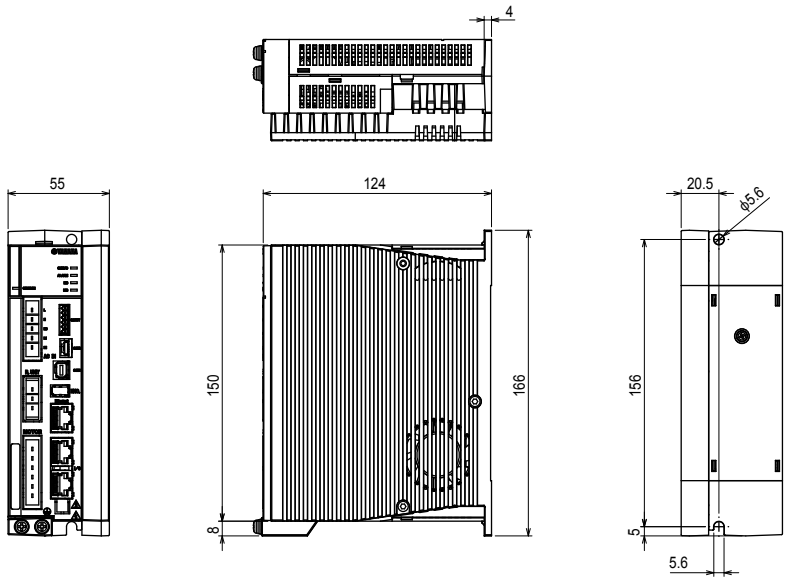


Dimensions

EP-01-A10



EP-01-A30



Installation conditions

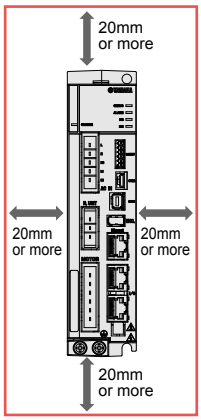
- Install the EP-01 inside the control panel.
- Install the EP-01 on a metal wall vertically.
- Install the EP-01 in a well ventilated location, with space on all sides of the EP-01 (See fig. at right.).

- Ambient temperature : 0 to 40˚C
- Ambient humidity : 35 to 85% RH (no condensation)

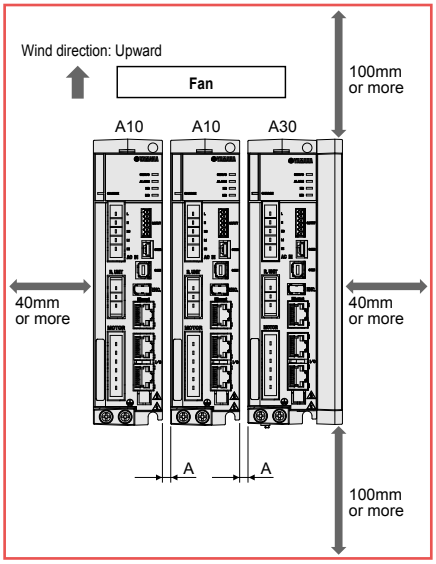
[When multiple EP-01 robot positioners are used]

- Install a fan to cool the controller main body sufficiently.
- When installing multiple controllers, keep at least 1 mm between the controllers.
- Install the controllers in a well-ventilated area with sufficient space around them. (See figure 2.)
- If the distance to the adjacent EP-01 is 20 mm or less (A in figure 2), set the effective load factor to 75% or less.

(Fig. 1)



(Fig. 2)



Data overview

Point data and parameter data settings must be specified in order to operate a robot from a EP series controller.

Point data

The point data used in positioning operations includes items such as the “RUN type”, “Position”, and “Speed”, etc.
Up to 255 points (P1 to P255) can be registered. There are two point data setting types: “Standard setting” type that automatically defines optimal positioning simply by specifying the payload and “Custom setting” type that allows setting the speed (mm/s) and acceleration (m/s^2) in SI units. Select the desired setting type according to the application.

Parameter data

The parameter data is classified into “RUN parameter”, “I/O parameter”, “Option parameter”, “Servo parameter”, and “Controller parameter”.

Data structure

Data

- **Point data** — **P1 to P255**

1	RUN type	7	Zone (-)
2	Position	8	Zone (+)
3	Speed	9	Near width
4	Accel.	10	Jump
5	Decel.	11	Flag
6	Push	12	Timer

Sets the point data to be used in positioning.
Select the desiredsetting type (“standard setting” or “custom setting”) according to the application.

(1) Standard setting
Optimum positioning is provided simply by specifying the payload.

(2) Custom setting
Speed and acceleration can be set in SI units.

- **Parameter data**
  - RUN parameter — Specifies parameter settings related to positioning and return to-origin operations.
  - I/O parameter — Specifies parameter settings related to terminal assignments and I/O function selection.
  - Option parameter — Specifies parameter settings related to options such as EtherNet/IP™, etc.
  - Servo parameter — Specifies parameter settings specified to the connected robot. These parameters are specified during initial processing.
  - Controller parameter — Specifies parameter settings related to the communication with the controller to be connected.

Point data

Point data item list

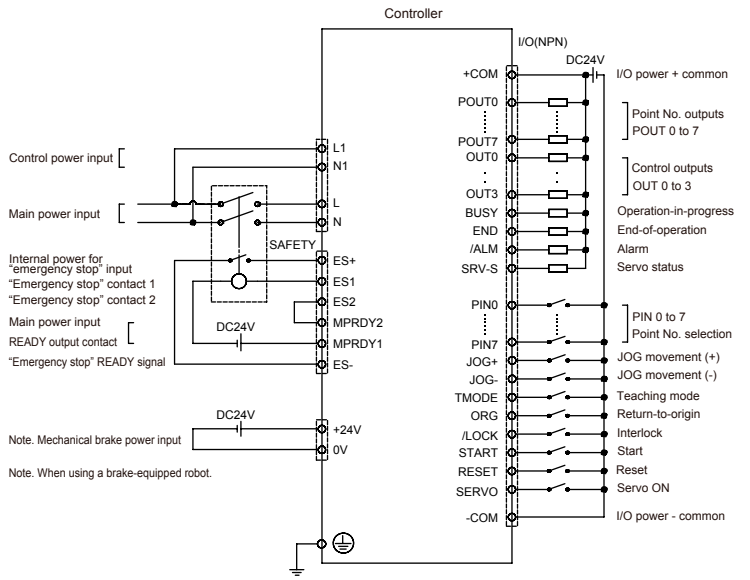
P1 to P255		
Item		Description
1	RUN type	Specifies the positioning operation pattern.
2	Position	Specifies the positioning target position or movement amount.
3	Speed	Specifies the positioning speed.
4	Accel.	Specifies the positioning acceleration.
5	Decel.	Specifies the positioning deceleration (as a percentage of the acceleration).
6	Push	Specifies the electrical current limit value for “Push” operations.
7	Zone (-)	Specifies the “personal zone” output range.
8	Zone (+)	
9	Near width	Specifies the “near width” zone (distance tolerance relative to target position).
10	Jump	Specifies the next movement destination, or the next merge operation merge destination point No. following positioning completion.
11	Flag	Specifies other information related to the positioning operation.
12	Timer	Specifies the waiting time (delay) after positioning completion.

“Standard setting” and “custom setting”

There are 2 setting types for point data (“standard setting” or “custom setting”). Select the desired setting type according to the application.
The maximum number of setting points for both setting types is 255 points (P1 to P255).

Setting Type	Description
Standard setting	Optimum positioning is provided simply by specifying the payload. This setting type is well-suited to assembly and transport applications.
Custom setting	Since the speed and acceleration can be changed arbitrarily in SI units, the positioning can be set freely. This setting type is suited for machining and inspection systems.

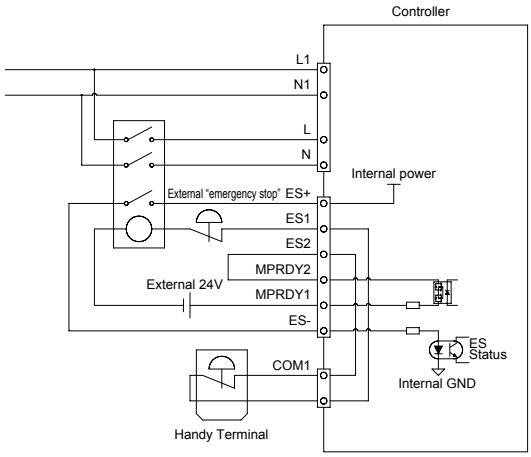
NPN type input / output wiring diagram



I/O Specifications

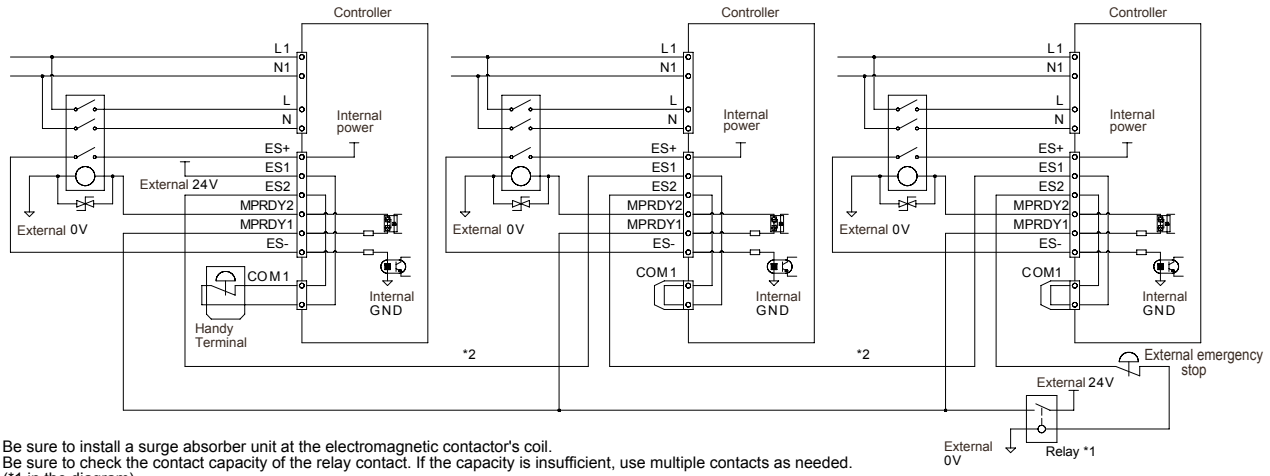
Item	Description
EtherNet/IP™	EtherNet/IP™ adapter (2 ports)
PROFINET	PROFINET Slave 1 node
EtherCAT	EtherCAT Slave 1 node
NPN	Input 16 points, 24VDC +/-10%, 5.1mA/point, positive common Output 16 points, 24VDC +/-10%, 50mA/point, sink type
CC-Link	CC-Link Ver.2.00 compatible, Remote station device (1 station double setting)

Emergency stop circuit example



Note. Always connect a surge absorber unit to the coil on the electromagnetic contactor.

Emergency stop circuit example (Daisy chain)



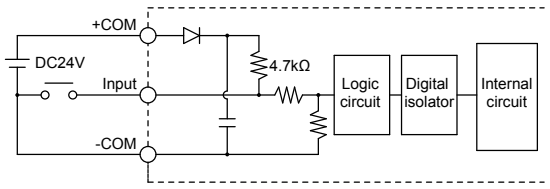
- Be sure to install a surge absorber unit at the electromagnetic contactor's coil.
- Be sure to check the contact capacity of the relay contact. If the capacity is insufficient, use multiple contacts as needed. (*1 in the diagram)
- Connect a load with a current of 300 mA or less to the emergency stop wiring using ES1 and ES2. If a load with a current of more than 300 mA is connected or if a current of more than 300 mA flows without connecting any load, the controller may malfunction. (*2 in the diagram.)

I/O signals (NPN)

No.	Signal Name		Description		No.	Signal Name	Description
A1	+COM		I/O power input, positive common		B1	POUT0	Outputs: Point No. outputs
A2					B2	POUT1	
A3	NC		No connection		B3	POUT2	
A4	NC				B4	POUT3	
A5	PIN0		Inputs: Point No. select		B5	POUT4	
A6	PIN1				B6	POUT5	
A7	PIN2				B7	POUT6	
A8	PIN3				B8	POUT7	
A9	PIN4				B9	OUT0	Outputs: OUT0 to OUT3 assignments include: • Zone output • Personal zone output • Teaching mode status • Return-to-origin end status • NEAR output • Movement-in-progress • Push status • Warning output
A10	PIN5				B10	OUT1	
A11	PIN6				B11	OUT2	
A12	PIN7				B12	OUT3	
A13	JOG+ (A15: ON)	SPD (A15: OFF)	JOG movement (+ direction)	Speed switching	B13	BUSY	Outputs: Operation-in-progress
A14	JOG-		JOG movement (- direction)		B14	END	Outputs: Operation-end
A15	TMODE		Teaching mode (ON: I/O teaching mode OFF: I/O positioning mode)		B15	/ALM	Outputs: Alarm
A16	ORG		Return-to-origin		B16	SRV-S	Outputs: Servo status
A17	/LOCK		Interlock		B17	NC	No connection
A18	TEACH (A15: ON)	START (A15: OFF)	Current position teaching	Start	B18	NC	
A19	RESET		Reset		B19	-COM	I/O power input, negative common
A20	SERVO		Servo ON		B20		

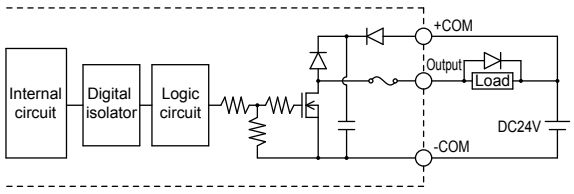
NPN type I/O circuit details

Input circuit



Type: DC input (plus common type)
Digital isolator method
Load: 24VDC +/- 10%, 5.1mA
OFF voltage 19.2 Vmin (1.0 mA)
ON voltage 7.4 Vmax (3.4 mA)

Output circuit



Type: NPN open collector output
(Minus common type)
Digital isolator method
Load: 24VDC, 50mA/point

Feedback pulse I/O signal table

Basic specifications

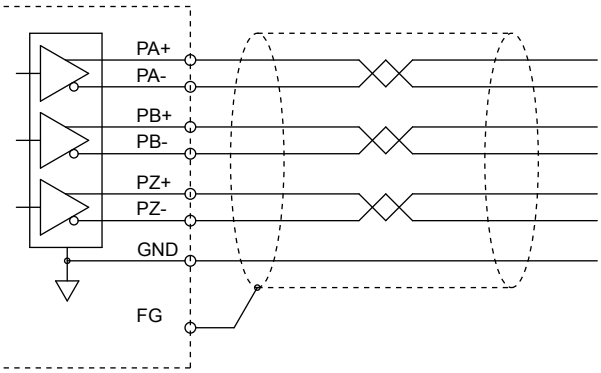
Item	Specification
Output signal	ABZ-phase pulse
Number of pulses per rotation	Variably changed in a range of 4 to 16384
Maximum rotation speed	6000 rpm
Maximum operating frequency	2 Mbps

Signal table

Signal name	Description	Wire color	Remarks
GND	Signal ground	White	
PA+	A-phase plus signal	Yellow	Twist pair (1)
PA-	A-phase minus signal	White	
PB+	B-phase plus signal	Green	Twist pair (2)
PB-	B-phase minus signal	White	
PZ+	Z-phase plus signal	Red	Twist pair (3)
PZ-	Z-phase minus signal	White	
FG	Frame ground	(Shield)	

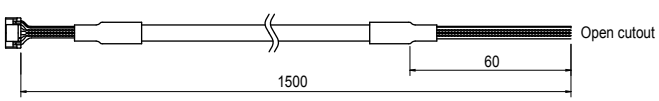
Details of feedback pulse output circuit

Output circuit



Line driver (equivalent to AM26LV31)
Maximum output current: 30 mA

Feedback pulse output cable



Model	KFX-M532M-00

Accessories and part options

EP-01

Standard accessories

The icons indicated at the right end show the controllers that each component can use.

Power connector + Operation lever

Model	Power connector	KFX-M5382-00	EP-01
	Operation lever	KEF-M657M-00	

Regeneration unit short-circuit connector

Model	KEK-M4431-00	EP-01 YHX RCX320

HT2 dummy connector

Model	KEK-M5869-00	EP-01 YHX

SAFETY connector

Model	KEK-M4432-10	EP-01 YHX

Brake power cable (1 m) Note

Note. Included in the robot with brake.

Model	KFX-M532K-10	EP-01

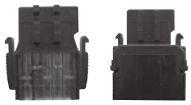
I/O cables (2 m/20-core×2) Note

Note. Included in the robot with NPN specifications.

Model	KCA-M4421-20	EP-01 TS-S2 TS-SH TS-X TS-P

CC-Link connector Note

Note. Included in the robot with CC-Link specifications.



Connector Jump socket

Model	Connector Note.	KCA-M4872-00	EP-01 TS-S2 TS-SH TS-X TS-P
	Jump socket	KCA-M4873-00	

Note. This is a single connector type. (Insert two connectors into a branching socket.)

Ferrite core Note

Note. Shipped with the ferrite core attached to the robot cable.

Model	KK1-M6563-200	EP-01

See next page for optional parts

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Options

The icons indicated at the right end show the controllers that each component can use.

Handy terminal HT2/HT2-D

P.657

		HT2	HT2-D
Model	3.5m	KFX-M5110-0E	KFX-M5110-1E
	10m	KFX-M5110-2E	KFX-M5110-3E
Enable switch		–	Available
CE marking		Not supported	Applicable

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Support software EP-Manager

P.648

Download from website (member site)

Model	KFX-M4990-00

EP-Manager environment

OS	Microsoft Windows 10 (32bit/64bit) 11 (Supported version:V1.2.4 or later)
CPU	Exceeding the environment recommended by the OS being used
Memory	Exceeding the environment recommended by the OS being used
Communication port	Ethernet port (100BASE-TX) Ethernet cable (category 5 or higher)
Display	1024×768 or higher resolution, 256 colors or higher
Applicable controllers	EP-01

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Note. Windows is the registered trademark of US Microsoft Corporation in U.S.A. and other countries.
Note. Ethernet is a registered trademark of the XEROX Corporation, USA.

Absolute battery

Absolute battery basic specifications

Item	Absolute battery
Battery type	Lithium metallic battery
Battery capacity	3.6V/2700 mAh
Data holding time	About 10 years
Dimensions	ϕ17 × L47 mm
Weight	20.3 g

Model	KFX-M53G0-00

Note. The absolute battery is subject to wear and requires replacement.

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Battery holder kit

Model	KFX-M53G7-00

Note. Set number containing the battery holder and two tie-up bands.

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CC-Link termination connector

Model	KCA-M4874-00

EP-01
TS-S2
TS-SH
TS-X
TS-P

Feedback pulse output cable

Model	KFX-M532M-00

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Daisy chain and gateway connection cable

Model	KFX-M532L-00

EP-01