1 to 4 axis

RCX240/RCX240S

Robot controller with advanced functions

An advanced multi-axial controller newly developed based on long years of actual results! Along with a full range of functions, great engineering also makes it extremely easy to use!

RCX240 RCX240S

Main functions ▶ P.39

Features

1 RCX141 and RCX142 united into one unit

Besides Cartesian and SCARA robots, this controller also handle a mixed combination of single axis robot FLIP-X and linear single-axis robot PHASER.

2 The absolute position data hold time: 1 year

The current position information is monitored even during a long vacation, while the controller is kept unused and while it is transported so that the return to the origin process is not required when the controller is activated again.

3 Linear and circular interpolation in 2 and 3 dimensions

These functions ensure smooth and high precision operation ideal for tasks such as sealing.

4 Passing point output

The general-purpose output can be turned on or off at the specified point during interpolation tasks without having to stop robot operation along that axis.

5 Area check output

During robot operation, this function sends an I/O output when the robot enters a preset area or zone.

6 Push function

This function controls the motor torque during grip and press-fit operation.

7 Dual-synchronous drive function

The RX240 includes a dual-drive function for simultaneously driving 2 axes. The dual drive function is effective on Cartesian robots for conveying heavy-weight payloads and long strokes along the Y axis.

8 Multitasking function

This function simultaneously runs multiple (maximum of 8 tasks) in parallel on robot peripheral equipment, etc.

9 2-robot control & auxiliary axis control

Assigning 2 robot units as main and sub allows multitasking as well as operating these robots asynchronously.

10 Supports a full range of options

Select from parallel I/O boards (NPN/PNP), and network options (CC-Link, DeviceNet, Profibus, Ethernet).
Also supports the iVY board and tracking boards.

11 Capable of using additional function of "YC-Link option" for additional axis

Linking the RCX series controller with the SR1 series single-axis controller allows controlling a maximum of 8 axes (synchronous control of 6 axes).

12 Utilizes system assets from prior models RCX141 / RCX142

This RCX240 is compatible with systems using the RCX141, RCX142 and so can be shifted unchanged to function as host/upstream device on those systems.

Model Overview

Name	RCX240 / RCX240S
Power	Single phase : AC200V to 230V +/-10% maximum (50/60Hz)
Operating method	Programming / Remote command / Operation using RS-232C communication
Maximum number of controllable axes	4 axes maximum
Position detection method	Incremental / Absolute
Controllable robot	Cartesian robot XY-X / SCARA robot YK-XG / Single-axis robot FLIP-X / Linear motor single-axis robot PHASER / Pick & place robot YP-X
Programming box	RPB / RPB-E (with enable switch) P.448
Support software for PC	VIP+ P.446 / VIP

☆ Please note that:

The current sensor on the RCX240S cannot be set to 20A.
As a controller stocked for maintenance, please order an RCX240 that can be set to any of 05A, 10A and 20A.

Ordering method

RCX240
RCX240S

Controller Note1	Usable for CE	Regenerative unit Note2	Option I/O	Network Option	iVY System Option board	Gripper	Battery
RCX240: Standard model	No entry: Standard	No entry: None	N, P: Standard I/O 16/8	No entry: None	No entry: None	No entry: None	No entry: None Note6
RCX240S: Low capacity model	E: CE marking	R: RGU-2	N1, P1: 40/24 points	CC: CC-Link	VY: iVY (Vision)	GR: Gripper	B: 2pcs Note7
		R3: RGU-3 Note3	N2, P2: 64/40 points	DN: DeviceNet	TR: iVY+Light+Tracking		BB: 4pcs Note8
			N3, P3: 88/56 points	PB: Profibus	LC: iVY+Light		
			N4, P4: 112/72 points	EN: Ethernet			
				EP: EtherNet/IP			
				YC: YC-Link Note5			

Note 1. The RCX240S controller is limited to use with robots that handles 200W or lower on each axis. Check the following controller selection table to find the matching model.
Note 2. The regenerative unit (option) is required when operating a model designated by YAMAHA or a load with a large inertia. Please refer to the following regenerative unit selection table.
Note 3. YK550X / YK500XG to YK1000XG are for RGU-3.
Note 4. Use N to N4 when NPN is selected on the I/O board, and P to P4 when PNP is selected.
Note 5. Available only for the master.
Note 6. Uses no-battery specifications if connecting to all axis - linear motor.
Note 7. If any or Single-axis among the XY axes are absolute specifications then 2 batteries are required.
Note 8. If any or Single-axis among the ZR axes are absolute specifications then 2 batteries are required.

Controller model selection table

The RCX240S controller is limited to use with robots that handles 200W or lower on each axis and is partly modified such as for optimizing the IPM, but it is fully compatible with RCX240 operation and functions, and peripheral equipment can be used by both models.

	XY-X								
	PXYX	FXYX	FXYBX	SXYX	SXYBX	NXY	MXYX	HXYX	HXYLX
RCX240						●	●	●	●
RCX240S	●	●	●	●	●				

	YK-XG																	
	YK500TW	YK120XG	YK150XG	YK180X/XG	YK220X	YK250XG	YK350XG	YK400XG	YK500XGL	YK500XG	YK600XGL	YK600XG	YK700XG	YK800XG	YK900XG	YK1000XG	YK1200X	YK300XGS
RCX240	●									●		●	●	●	●	●	●	
RCX240S		●	●	●	●	●	●	●	●		●							●

	YK-XG																		
	YK400XGS	YK500XGS	YK600XGS	YK700XGS	YK800XGS	YK900XGS	YK1000XGS	YK250XGP	YK350XGP	YK400XGP	YK500XGLP	YK500XGP	YK600XGLP	YK600XGP	YK600XGHP	YK700XGP	YK800XGP	YK900XGP	YK1000XGP
RCX240		●	●	●	●	●	●					●		●	●	●	●	●	●
RCX240S	●							●	●	●	●		●						

	CLEAN											
	YK180XGC	YK220XC	YK250XGC	YK350XGC	YK400XGC	YK500XGLC	YK500XC	YK600XGLC	YK600XC	YK700XC	YK800XC	YK1000XC
RCX240							●		●	●	●	●
RCX240S	●	●	●	●	●	●		●				

Multi-robot: Driver list for each model

For “multi-robots” that are used in combination with one or more single-axis robots, the RCX240S can be used unless the divers for the combined models include a 20A model.

		FLIP-X																		PHASER					
		T4LH	T5LH	T6L	T9	T9H	F8/F8L/F8LH	F10	F14	F14H	F17/F17L	F20/F20N	N15	N18	B10	B14/B14H	R5	R10	R20	MR12	MF7	MF15	MF20	MF30	MF75
Driver	05A	●	●	●	●		●	●	●						●	●	●	●		●					
	10A					●				●									●		●	●	●		
	20A										●	●	●	●										●	●

Regenerative unit selection table

	XY-X					
	FXYx 3 axes	SXYx 3,4 axes	NXY 3,4 axes	NXY 6 axes	MXYx 3,4 axes	HXYx 3,4 axes
No entry (None)	●	○				
R (RGU-2)		○	●	●	●	●
R3						

	YK-XG																		
	YK120XG	YK150XG	YK180XG	YK180X	YK220X	YK250XG	YK350XG	YK400XG	YK500XGL	YK500XG	YK600XGL	YK600XG	YK600XGH	YK700XG	YK800XG	YK900XG	YK1000XG	YK1200X	YK300XGS
No entry (None)	●	●	●	●	●	●	●	●	●		●								●
R (RGU-2)																		●	
R3										●		●	●	●	●	●	●		

	YK-XG																		
	YK400XGS	YK500XGS	YK600XGS	YK700XGS	YK800XGS	YK900XGS	YK1000XGS	YK250XGP	YK350XGP	YK400XGP	YK500XGLP	YK500XGP	YK600XGLP	YK600XGP	YK600XGHP	YK700XGP	YK800XGP	YK900XGP	YK1000XGP
No entry (None)	●							●	●	●	●		●						
R (RGU-2)																			
R3		●	●	●	●	●	●					●		●	●	●	●	●	●

	Clean											
	SXYxC 3 axes	SXYxC 4 axes	YK180XC	YK220XC	YK250XCH	YK350XCH	YK400XCH	YK500XC	YK600XC	YK700XC	YK800XC	YK1000XC
No entry (None)	●	●	●	●	●	●	●					
R (RGU-2)								●	●	●	●	●
R3												

● : Required ○ : If Z axis is 200W specifications then regenerative unit RGU-2 is required.

Conditions where regenerative unit is needed on multi robots

- Where motor capacity exceeds a total of 450W.
- Where motor capacity for perpendicular axis exceeds a total of 240W.
- Where maximum speed exceeds 1250mm/sec. and uses belt drive.
- Where the following conditions apply when perpendicular axis capacity is 240W or less.
  - perpendicular axis is 200W.
  - perpendicular axis is 100W and stroke is 700mm or more
  - Where there are 2 perpendicular axes at 100W, and includes leads of 5mm

RCX240/RCX240S

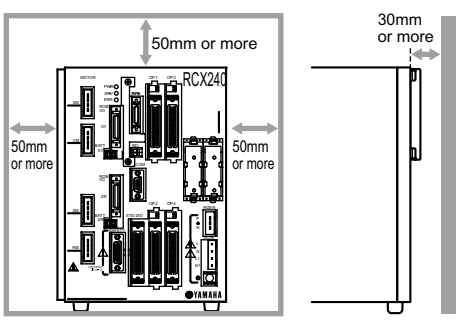
Basic specifications

	Item		Model: RCX240 / RCX240S
Basic specifications	Number of controllable axes		4 axes maximum (Control simultaneously: 4 axes)
	Controllable robots		Single-axis robot FLIP-X, Linear motor single-axis robot PHASER, Cartesian robot XY-X, SCARA robot YK-XG, Pick & place robot YP-X
	Maximum power consumption		2500VA (RCX240) / 1500VA (RCX240S)
	Capacity of the connected motor		1600W
	Dimensions		W180 × H250 × D235mm
	Weight		6.5kg
	Input power supply	Control power supply	Single phase AC200 to 230V +/-10% maximum (50/60Hz)
		Motor power supply	Single phase AC200 to 230V +/-10% maximum (50/60Hz)
Axis control	Drive method		AC full-digital software servo
	Position detection method		Multi-turn resolver with data backup function, Magnetic linear scale
	Operating method		PTP (Point to Point), Linear interpolation, Circular interpolation, ARCH
	Coordinate system		Joint coordinates, Cartesian coordinates
	Position indication units		Pulses, mm (millimeters), deg (degrees)
	Speed setting		1% to 100% (In units of 1%. However speed is in units of 0.01% during single-axis operation by DRIVE statement.)
	Acceleration setting		1. Automatic acceleration setting based on robot model type and end mass parameter 2. Setting based on acceleration and deceleration parameter (Setting by 1% unit)
	Resolution		16384 P/rev, 1μm
	Origin search method		Incremental, Absolute, Semi-absolute
Program	Program language		YAMAHA BASIC (Conforming to JIS B8439 SLIM Language)
	Multitasks		8 tasks maximum
	Sequence program		1 program
	Point-data input method		Manual data input (coordinate value input), Direct teaching, Teaching playback
Memory	Memory capacity		364KB (total capacity of program and points) (available program capacity during use of maximum number of points is 84KB)
	Programs		100 program (Max.) 9,999: maximum lines per program 98KB: maximum capacity per program
	Points		10,000 points: maximum numbers of points
	Memory Backup battery		Lithium metallic battery (service life 4 years at 0°C to 40°C)
	Internal flash memory		512KB (ALL data only)
External input/output	STD.DIO	I/O input	General input 16 points, dedicated input 10 points (NPN / PNP specifications selectable)
		I/O output	General output 8 points, dedicated output 11 points
	SAFETY		Emergency stop input (Relay contact), Service mode input (NPN/PNP specification is set according to STD. DIO setting)
	Brake output		Relay contact
	Origin sensor input		Connectable to DC 24V normally-closed contact sensor
	External communications		RS232C: 1CH D-SUB9 (female) RS422: 1CH (Dedicated RPB)
	Options	Slots	4
		Type	Optional input/output (NPN/PNP): General input 24 points / General output 16 points
			CC-Link: Dedicated input 16 points, Dedicated Output 16 points, General input 96 points, General output 96 points (4 nodes occupied)
			DeviceNet: Dedicated input 16 points, Dedicated Output 16 points, General input 96 points, General output 96 points
			Profibus: Dedicated input 16 points, Dedicated Output 16 points, General input 96 points, General output 96 points
			Ethernet: IEEE802.3 10Mbps (10BASE-T)
			iVY: Camera input (2ch), camera trigger input, PC connection input
			Tracking: AB phase input, lighting trigger input, lighting power supply input/output
			Lighting control: lighting trigger input, lighting power supply input/output
Options	Programming box		RPB, RPB-E (with enable switch)
	Support software for PC		VIP+ / VIP
General specifications	Operating temperature		0°C to 40°C
	Storage temperature		-10°C to 65°C
	Operating humidity		35% to 85%RH (non-condensing)
	Absolute backup battery		Lithium metallic battery 3.6V 5400mAH (2700mAH × 2)
	Absolute data backup period		1 year (in state with no power applied)
	Noise immunity		IEC61000-4-4 Level 3
	Protective structure		IP10

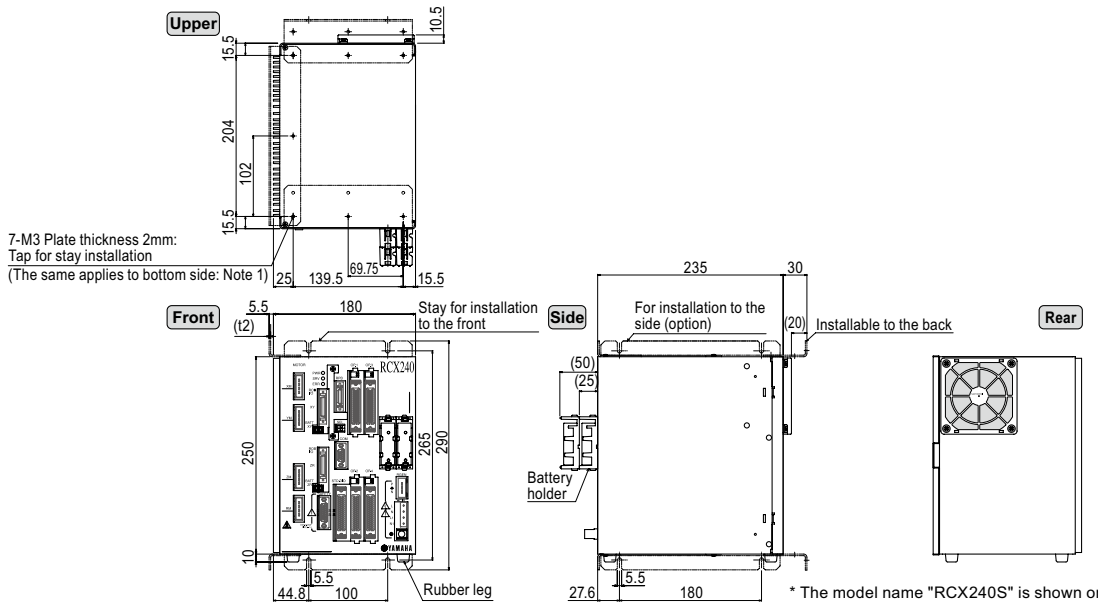
Installation conditions

- Install the RCX240/RCX240S inside the control panel.
- Install the RCX240/RCX240S on a flat, level surface.
- Install the RCX240/RCX240S in a well ventilated location, with space on all sides of the RCX240/RCX240S (See fig. at right.).
- Do not block the heat-sink on the side panel.
- Do not block the fan on the bottom of the controller.
- Ambient temperature : 0 to 40˚C
- Ambient humidity : 35 to 85% RH (no condensation)

● RCX240



Dimensions



* The model name "RCX240S" is shown on the RCX240S front panel.

Power capacity

The required power supply capacity and heat emission will vary depending on the robot type and number of axes.

Using the following table as a general guide consider the required power supply preparation and control panel size, controller installation, and cooling method.

(1) When connected to SCARA robot

Robot type				Power capacity (VA)	Generated heat amount (W)
Standard type	Clean type	Dust-proof & drip-proof type	Wall-mount / Ceiling-mount / inverse type		
YK180X, 220X	–	–	–	500	63
YK250XG, 350XG, 400XG 500XGL, 600XGL	YK250XGC, 350XGC, 400XGC 500XGLC, 600XGLC	YK250XGP, 350XGP, 400XGP 500XGLP, 600XGLP	YK300XHS, 400XHS	1000	75
–	YK500XC, 600XC	YK500XP, 600XP	YK500XS, 600XS	1500	88
YK550X, 500XG, 600XG	–	YK500XGP, 600XGP	YK500XGS, 600XGS	1700	93
–	YK700XC, 800XC, 1000XC	YK700XP, 800XP, 1000XP	YK700XS, 800XS, 1000XS	2000	100
YK600XGH, 700XG, 800XG, 900XG, 1000XG, 1200X	–	YK600XGHP, 700XGP, 800XGP, 900XGP, 1000XGP	YK700XGS, 800XGS, 900XGS, 1000XGS	2500	113

(2) When connected to 2 axis (Cartesian robot and/or multi-axis robot)

Axial current sensor value Note		Power capacity (VA)	Generated heat amount (W)
X axis	Y axis		
05	05	600	65
10	05	800	70
10	10	1000	75
20	05	1100	78
20	10	1300	83
20	20	1700	93

(3) When connected to 3 axis (Cartesian robot and/or multi-axis robot)

Axial current sensor value Note			Power capacity (VA)	Generated heat amount (W)
X axis	Y axis	Z axis		
05	05	05	700	68
10	05	05	900	73
10	10	05	1000	75
10	10	10	1200	80
20	05	05	1200	80
20	10	05	1300	83
20	10	10	1500	88
20	20	05	1600	90
20	20	10	1800	95
20	20	20	2000	95

(4) When connected to 4 axis (Cartesian robot and/or multi-axis robot)

Axial current sensor value Note				Power capacity (VA)	Generated heat amount (W)
X axis	Y axis	Z axis	R axis		
05	05	05	05	800	70
10	05	05	05	1000	75
10	10	05	05	1100	78
10	10	10	05	1300	83
10	10	10	10	1400	85
20	05	05	05	1200	80
20	10	05	05	1400	85
20	10	10	05	1500	88
20	10	10	10	1700	93
20	20	05	05	1600	90
20	20	10	05	1800	95
20	20	10	10	2000	100
20	20	20	05	2100	103
20	20	20	10	2200	105
20	20	20	20	2500	113

Note. Even if axial current sensor values for each axis are interchanged no problem will occur.

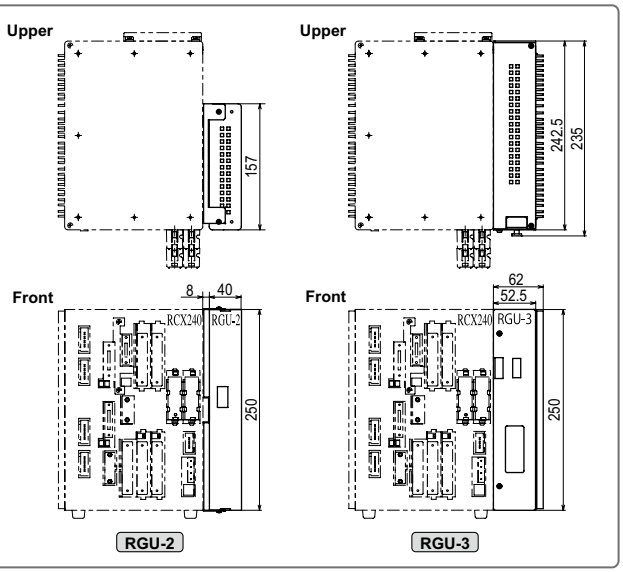
Note. Motor capacity vs. current sensor table

Connected motor capacity	Current sensor
100W or less	05
200W	10
400W or more	20

Note. Motor output of the B14H is 200W but the current sensor is 05.

RCX240/RCX240S

Regenerative unit



RGU-2 basic specifications

Item	RGU-2
Model	KX0-M4107-20 (including cable supplied with unit)
Dimensions	W40 × H250 × D157mm
Weight	0.9kg
Regenerative voltage	Approx. 380V or more
Regenerative stop voltage	Approx. 360V or less
Accessory	Cable for connection with controller (300mm)

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

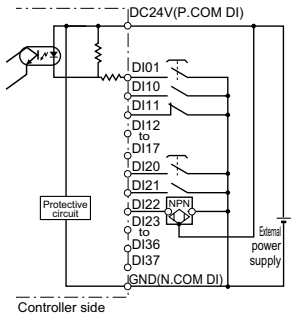
RGU-3 basic specifications

Item	RGU-3
Model	KX0-M4107-30 (including cable supplied with unit)
Dimensions	W62 × H250 × D242.5mm
Weight	3.7kg
Regenerative voltage	Approx. 380V or more
Regenerative stop voltage	Approx. 360V or less
Accessory	Cable for connection with controller (300mm)

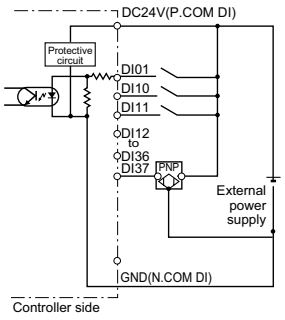
Note. Cannot be installed as a separate unit.

Example of input signal connection

NPN specification

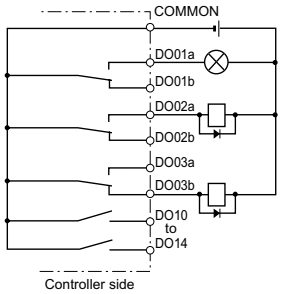


PNP specification

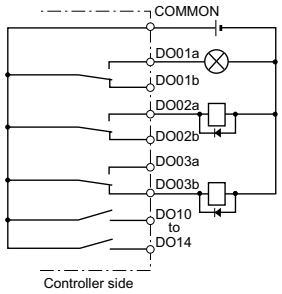


Example of output signal connection

NPN specification

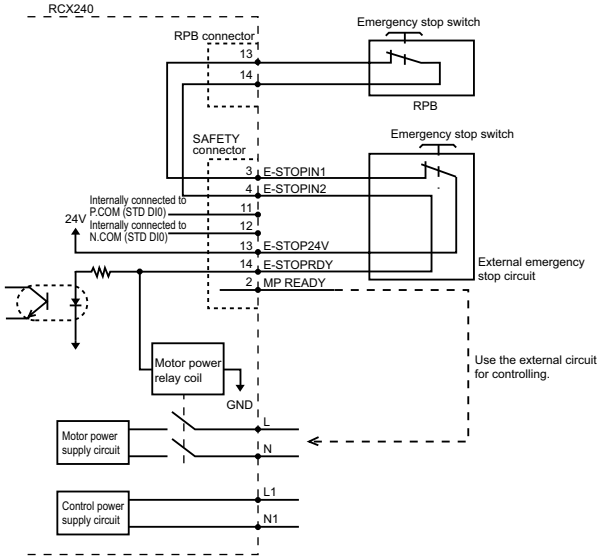


PNP specification

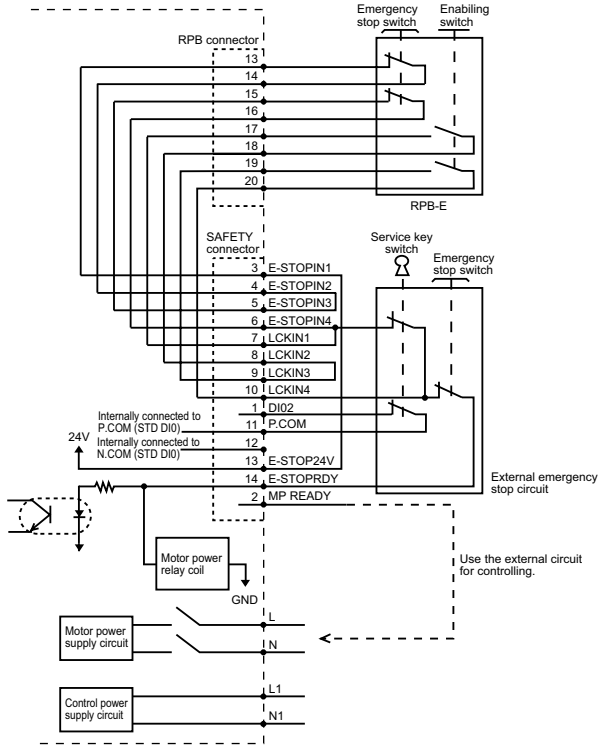


Emergency input signal connections

Connection when using the standard RPB with an external emergency stop circuit.



Connections using the RPB-E enabling switch compatible programming unit with external emergency stop circuit (PNP specification)



Installing an external safety circuit will satisfy safety category class 4 standards. See P.485 for more information.