

CONTROLLER FEATURE DESCRIPTION

LCMR200 / GX series

Robot controller

YHX

Linear conveyor module LCMR200
Single-axis robot GX series

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LCM100

Robot controller

LCC140

Linear conveyor module LCM100

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Operating method	Programming/I/O point tracing/ Remote command/Operation using RS-232C communication
Points	10,000 points
Input power	Control power supply: Single phase 200 to 230V AC +/-10% maximum Main power supply: Single phase 200 to 230V AC +/-10% maximum
Origin search method	Incremental
Field networks	CC-Link, DeviceNet™, EtherNet/IP™

Single-axis

Single-axis robot positioner

EP-01

Single-axis robot Robonity
ABAS/AGXS/ABAR

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Operating method	I/O point tracing/Remote command
Points	255 points
Input power	Control power supply: Single phase 200 to 230V AC +/-10% Main power supply: Single phase 200 to 230V AC +/-10%
Origin search method	Absolute
Field networks	CC-Link V2, EtherNet/IP™ EtherNet/IP™, PROFINET

Single-axis robot positioner

TS-S2/TS-SH

Stepping motor
single-axis robots TRANSERVO ^{Note}

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Note 1. SG07 is only applicable to TS-SH.



Operating method	I/O point tracing/Remote command/ Operation using RS-232C communication
Points	255 points
Input power	Control power supply DC24V +/-10% Main power supply DC24V +/-10%
Origin search method	TS-S2 : Incremental TS-SH : Absolute Incremental
Field networks	CC-Link, DeviceNet™, EtherNet/IP™, PROFINET

Single-axis robot positioner

TS-X/TS-P

[TS-X] Single-axis robot FLIP-X
[TS-P] Linear motor single-axis PHASER

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Operating method	I/O point tracing/Remote command/Operation using RS-232C communication
Points	255 points
Input power	Control power supply AC100V specification: Single phase 100 to 115V AC +/-10% AC200V specification: Single phase 200 to 230V AC +/-10% Main power supply AC100V specification: Single phase 100 to 115V AC +/-10% AC200V specification: Single phase 200 to 230V AC +/-10%
Origin search method	TS-X : Absolute, Incremental TS-P : Incremental, Semi-absolute
Field networks	CC-Link, DeviceNet™, EtherNet/IP™, PROFINET

Single-axis robot driver

TS-SD

Stepping motor
single-axis robots TRANSERVO

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Operating method	Pulse train control
Input power	Control power supply DC24V +/-10% Main power supply DC24V +/-10%
Origin search method	Incremental
Field networks	Not supported

Single-axis

Single-axis robot driver

RDV-X/RDV-P

[RDV-X] Single-axis robot..... FLIP-X

[RDV-P] Linear motor single-axis..... PHASER

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Operating method	Pulse train control
Input power	Control power supply: Single phase 200V to 230V +10% to 15 %
	Main power supply: Single phase/3-phase 200V to 230V +10% to 15 %
Origin search method	Incremental
Field networks	Not supported

Single-axis robot controller

ERCD

Single-axis robot..... T4L/T5L

Clean single-axis C4L/C5L

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Operating method	Pulse train control/Programming/ I/O point tracing/Operation using RS-232C communication
Points	1000 points
Input power	DC24V +/-10% maximum
Origin search method	Incremental
Field networks	Not supported

Single-axis robot controller

SR1-X/SR1-P

Single-axis robot..... FLIP-X

Linear motor single-axis PHASER

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Operating method	Programming/I/O point tracing/Remote command Operation using RS-232C communication
Points	1000 points
Input power	Control power supply: Single phase 100 to 115 / 200 to 230V AC +/-10% maximum
	Main power supply: SR1-X05/SR1-X10 Single phase 100 to 115 / 200 to 230V AC +/-10% maximum
	SR1-X20 Single phase 200 to 230V AC +/-10% maximum
	SR1-P05/SR1-P10 Single phase 100 to 115 / 200 to 230V AC +/-10% maximum
	SR1-P20 Single phase 200 to 230V AC +/-10% maximum
Origin search method	SR1-X Absolute, Incremental SR1-P Incremental, Semi-absolute
Field networks	CC-Link, DeviceNet™, PROFIBUS

1 to 2 axis

Multi-axis robot controller

RCX320

Single-axis robot..... FLIP-X

Linear motor single-axis PHASER

Cartesian robot XY-X

Pick & place..... YP-X

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Operating method	Programming/Remote command/ Operation using RS-232C communication
Points	30000 points
Input power	Control power supply: Single phase 200 to 230V AC +/-10% maximum
	Main power supply: Single phase 200 to 230V AC +/-10% maximum
Origin search method	Absolute, Incremental
Field networks	CC-Link, DeviceNet™, EtherNet/IP™, Ethernet, PROFIBUS, PROFINET, EtherCAT

1 to 4 axis

Multi-axis robot controller

RCX340/RCX341

[RCX340]

Single-axis robot..... FLIP-X

Linear motor single-axis PHASER

Cartesian robot XY-X

SCARA robot..... YK-TW, YK-XG, YK-XE,
YK-XGS, YK-XGP

Pick & place..... YP-X

[RCX341]

SCARA robot..... YK1200XG

RCX340 ► **P.636** RCX341 ► **P.646**



RCX340



RCX341

Operating method	Programming/Remote command/ Operation using RS-232C communication
Points	30000 points
Input power	Control power supply: Single phase 200 to 230V AC +/-10% maximum
	Main power supply: Single phase 200 to 230V AC +/-10% maximum
Origin search method	Absolute, Incremental
Field networks	CC-Link, DeviceNet™, EtherNet/IP™, Ethernet, PROFIBUS, PROFINET, EtherCAT

Note. The RCX341 comes standard with the regenerative unit "RU1".

CONTROLLER SPECIFICATION SHEET

Category			Robot controller		Robot positioner					
Name			YHX	LCC140	EP-01	TS-S2	TS-SH	TS-X	TS-P	
External view										
Operating method			YHX Standard profile	Programming/ I/O point tracing/ Remote command/ Operation using RS-232C communication	I/O point tracing/ Remote command	I/O point tracing/Remote command/ Operation using RS-232C communication				
Applicable robot	LCMR200		●	—	—	—	—	—	—	
	LCM100		—	●	—	—	—	—	—	
	GX		●	—	—	—	—	—	—	
	Robonity		—	—	—	●	—	—	—	
	TRANSERVO		—	—	—	● Note 2	●	—	—	
	FLIP-X	T4L/T5L/C4L/C5L	—	—	—	—	—	—	—	
		FLIP-X other than above	—	—	—	—	—	●	—	
	PHASER		—	—	—	—	—	—	●	
	XY-X		—	—	—	—	—	—	—	
	YK-X		—	—	—	—	—	—	—	
	YP-X		—	—	—	—	—	—	—	
YK1200XG		—	—	—	—	—	—	—		
Input power	Control power supply		Check the details page of the YHX controller.	Single phase 200 to 230V AC +/-10% maximum (50/60Hz)	Single phase 200 to 230V AC +/-10% (50/60Hz)	DC24V +/-10% maximum		● AC100V specifications (105 / 110 driver) Single phase 100 to 115V AC +/-10% maximum (50/60Hz) ● AC200V specifications (205 / 210 / 220 driver) Single phase 200 to 230V AC +/-10% maximum (50/60Hz)		
	Main power supply									
Number of controllable axes		Single-axis								
Origin search method		Incremental		Absolute	Incremental	Absolute/ Incremental	Absolute/ Incremental	Incremental/ Semi-absolute		
Maximum number of programs		100		—	(program not required)					
Maximum number of steps per program		999 steps		—	(program not required)					
Points		10,000 points		255 points	255 points					
Multitasks		4		—	—	—	—	—		
I/O points	Dedicated I/O	8 points/4 points		16 points/16 points	16 points/16 points	16 points/16 points	16 points/16 points	16 points/16 points		
	General I/O	16 points/16 points		—	—	—	—	—		
Field network support	CC-Link		●	●	—	●	●	●	●	
	CC-Link V2		—	—	●	—	—	—	—	
	DeviceNet		—	●	—	●	●	●	●	
	EtherNet/IP		●	●	—	●	●	●	●	
	Ethernet		—	—	—	—	—	—	—	
	PROFINET		—	—	—	—	—	—	—	
	EtherCAT		●	—	●	●	●	●	●	
CE marking		●	—	●	●	●	●	●		
Programming box			YHX-PP (with enable switch)	HPB / HPB-D (with enable switch)	HT2 / HT2-D (with enable switch)	HT1 / HT1-D (with enable switch)				
Support software for PC			YHX-Studio for Standard Profile	POPCOM+	EP-Manager	TS-Manager				
Detailed info page			P.566	P.576	P.582	P.592				

Note 1. 20A specifications provide only 200V.

Note 2. Exclude SG07

Note 3. Maximum number of general-purpose I/O points when option OP.DIO boards (4 boards) are installed.

Robot driver				Robot controller					
	TS-SD	RDV-X	RDV-P	ERCD	SR1-X	SR1-P	RCX320	RCX340	RCX341
									
	Pulse train control			Pulse train control/ Programming/ I/O point tracing/ Operation using RS-232C communication	Programming/I/O point tracing/ Remote command/ Operation using RS-232C communication		Programming/Remote command/ Operation using RS-232C communication		
	—	—	—	—	—	—	—	—	—
	—	—	—	—	—	—	—	—	—
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	—	—	—	—	—	—	—	—	●
	DC24V +/-10% maximum	Single phase 200 to 230V AC +10% to -15% (50/60Hz +/-5%)		DC24V +/-10% maximum	● 05 / 10 / 20 driver Single phase 100 to 115V/200 to 230V AC +/-10% maximum (50/60Hz)		Single phase 200 to 230V AC +/-10% maximum (50/60Hz)		
		Single phase / 3-phase 200 to 230V +10% to -15% (50/60Hz +/-5%)			● 05 / 10 driver Single phase 100 to 115V/200 to 230V AC +/-10% maximum (50/60Hz) ● 20 driver Single phase 200 to 230V AC +/-10% maximum (50/60Hz)				
	Single-axis			Single-axis	Single-axis		2 axes maximum Max. number of robots 4	Max. number of robots 4 Max. number of controllable axes 16	
	Incremental			Incremental	Absolute/ Incremental	Incremental/ Semi-absolute	Absolute/Incremental/ Semi-absolute		
	—	—		100	100		100		
	—	—		1024 steps	3000 steps		9999 steps		
	—	—		1000 points	1000 points		30000 points		
	—	—		4	4		16		
	—	—		8 points/3 points	8 points/4 points		8 points/9 points		
	—	—		6 points/6 points	16 points/16 points		96 points/64 points (Max.) ^{Note 3}		
	—	—	—	—	●	●	●	●	●
	—	—	—	—	—	—	—	—	—
	—	—	—	—	●	●	●	●	●
	—	—	—	—	—	—	●	●	●
	—	—	—	—	—	—	●	●	●
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	—	—	—	—	—	—	●	●	●
	—	—	—	—	—	—	●	●	●
	●	●	●	—	●	●	●	●	●
	—	—		HPB / HPB-D (with enable switch)			PBX /PBX-E (with enable switch)		
	TS-Manager	RDV-Manager		POPCOM ⁺			RCX-Studio 2020		
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Controller operating methods

- Point trace : Host device specifies a binary point number and robot moves to the specified point when a start signal is input. Controller does not need a program and operates just by teaching point data.
- Remote command : Controller issues a wide range of commands and data to the robot via CC-Link or DeviceNet™ word functions. Host device can freely use robot controller functions as needed.
- Pulse train : Controller operates robot by pulse train from positioner unit. Controller needs no programs or point data. Pulse train operation is convenient to allow the host device to concentrate on robot control.
- Online instructions : PC can send various commands and data directly to the robot controller via RS232C or Ethernet and receive status information and data.

YHX

Dedicated for LCMR200 / GX series

Order model: **YHX-HD**

Controller	Language	Network
	J (Japanese)	N : None
	E (English)	CC : CC-Link ^{*1}
		PT : PROFINET ^{*2}
		EP : EtherNet/IP ^{*3}
		ES : EtherCAT ^{*4}

*1. CC-Link is a registered trade mark of Mitsubishi Electric Corporation.

*2. PROFINET is a registered trade mark of PROFIBUS Nutzerorganisation e.V. (PNO).

*3. EtherNet/IP is a registered trade mark of ODVA, Inc.

*4. EtherCAT is a patented technology and a registered trademark licensed by Beckhoff Automation GmbH (Germany).

The YHX-HD is a set model of the host controller unit, driver power unit, and related components shown below. Each unit should be assembled by the customer.

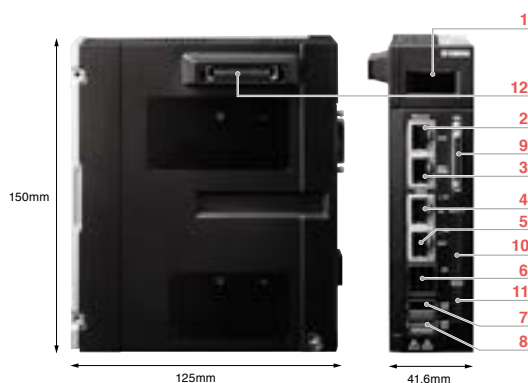


YHX-HD Configuration parts

► Control unit

Host

Host controller unit



1	LCD	Indicates the status of the controller.
2	PoE	PoE compatible giga bit Ethernet connector.
3	GbE	PoE non-compatible giga bit Ethernet connector.
4	IN	LAN connector for connecting with master devices of field network communications connector (EtherNet/IP, EtherCAT, PROFINET)
5	OUT	LAN connector for connecting with other slave devices of field network communications connector (EtherNet/IP, EtherCAT, PROFINET)
6	OP	Connector for field network communications adaptors (CC-Link)
7	USB 2.0	Connector compatible with USB 2.0
8	USB 3.0	Connector compatible with USB 3.0
9	HMI	Connector for connecting with a programming pad, display and other devices
10	SAFETY	Connect with external PLC, safety devices and the like.
11	MODE	CPU OK output Programming pad AUTO/MANUAL select switch contact output
12	Connector for connection between units (control signal/Power)	

This unit can control multiple robots by combining with the linear conveyor. Although the unit is compact, it is multifunctional and has an enhanced interface.

Japanese	Model	YHX-HCU
	Parts No.	KEK-M4200-0A
English	Model	YHX-HCU-E
	Parts No.	KEK-M4200-1A



Safety connector

Host YQLink

Used for building up an external safety circuit while connecting with the safety dedicated port of a host controller.

Model	YHX-CN-SAFE
Parts No.	KEK-M4432-00



Mode connector

Host

Used for building up an external safety circuit while using the mode switch output port of a host controller unit.

Model	YHX-CN-MODE
Parts No.	KEK-M4432-10



HMI short circuit connector

Host

Used when a programming pad is not connected with a host controller. Note that if not connected, robots do not operate because the controller enters the state of emergency stop.

Model	YHX-CN-HMIS
Parts No.	KEK-M4429-00

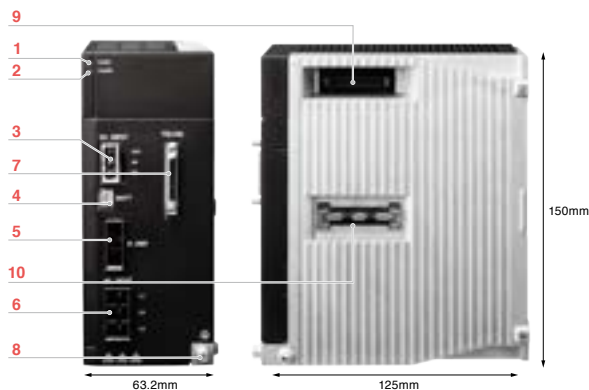


Controller

► Power unit

D. Power

Driver power unit



1	POWER	Blue: 24V DC control power supply is available.
2	CHARGE	Orange: 200V AC main power supply is available and Charge*
3	DC INPUT	Control power supply connector (24V DC)
4	BATT	ABS battery connector
5	R.UNIT	Connector for connecting regenerative unit
6	AC INPUT	Main power supply connector (Single phase / 3-phase 200 to 230V AC)
7	YQLink	YQLink communications connector Connects with IO units and linear conveyor modules.
8		Grounding terminal
9	Connector for connection between units (control signal/Power)	
10	Connector for connection between units (high voltage power source for driving motors)	

* Even when the main power is turned off, the lamp is lit while any charge remains in the internal capacitor.
 Do not touch the main circuit and motor terminal while the lamp is lit. Doing so may cause electrical shock.

This unit supplies power to each unit. Be sure to use it together with the host controller unit or a YQLink expansion unit. Use the dedicated cables to connect with linear conveyor modules.



Model	YHX-DPU
Parts No.	KEK-M5880-0A

Control power supply connector

D. Power

Used when supplying the control power supply.

Model	YHX-CN-CP
Parts No.	KEK-M4512-00



Main power supply connector

D. Power

Used when supplying the main power supply.

Model	YHX-CN-DP
Parts No.	KEK-M5382-00



Regenerative unit short circuit connector

D. Power

Used when not connecting a regenerative unit.
 An error is generated if the short circuit connector of a regenerative unit is not connected.

Model	YHX-CN-RUS
Parts No.	KEK-M4431-00



Selection options

Field network

EtherCAT slave

Model	YHX-NWS-ECAT
Parts No.	KEK-M440A-A0

EtherNet/IP adapter (slave)

Model	YHX-NWS-ENIP
Parts No.	KEK-M440A-E0

PROFINET slave

Model	YHX-NWS-PFNET
Parts No.	KEK-M440A-N0

CC-Link slave (with adapter and connector)

Model	YHX-NWS-CCL
Parts No.	KEK-M440A-C0



Connector for CC-Link

CC-Link connector

Model	YHX-CN-CCL
Parts No.	KEK-M4872-C0



CC-Link branch-out connector

Model	YHX-CN-CCSP
Parts No.	KEK-M4873-00



<Cautionary notes on field networks>

The YHX controllers are not equipped with a field network board.
 Entering the activation code, which is issued for each host controller, into the host controller unit enables field network functions.

The activation code certificate comes with a host controller unit.

* If purchasing a field network only later on, inform us of the serial number of the host controller unit because it is necessary to issue the activation code.

* When the CC-Link option is selected, the CC-Link adapter 1, CC-Link connector 2, and CC-Link branch connector 1 are supplied with the product. When the CC-Link terminating connector is needed, order it separately.

The parts with the marks below are their respective constituent parts.

Host

Host controller unit

D. Power

Driver power unit

Regenerative unit

Regenerative unit

YQLink

YQLink expansion

Drivers

Driver unit

Development environment software YHX Studio for Standard Profile

Order model: **YHX-SW-STUDIO-SP** (KEK-M4990-10)
 * No USB key is attached.

PC operating environment	OS	Windows 7 SP1/8.1/10 (64-bit version only for all)/11 (Supported version: V.2.0.6 or later)
	CPU	Equivalent to Intel Core (TM) i5-6200U 2.30 GHz or better.
	Memory	8 GB or larger
	Hard disc drive capacity	2 GB or more of empty space for destination of installing the YHX Studio.
	Communications port	Ethernet
	Display	1920 1080 or higher resolution is recommended.
Other		Ethernet cable (Category 5 or better)
Applicable controllers		YHX Host controller unit
Applicable robots		Robots connectable to YHX

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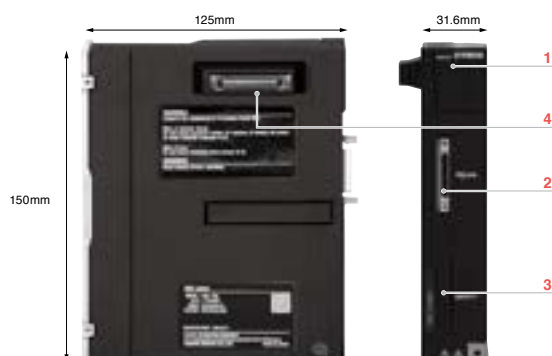
YHX Studio for Standard Profile is software that is used when the YHX host controller unit of the YAMAHA robot controller YHX series is set up.



Download from website

YQLink expansion unit set

Order model: **YHX-YQL-SET** (E -M4406-0B)



1	STATUS	Blue: 24V DC power supply available Red: Error
2	YQLink	Connect with YQLink communications connector (input) driver power unit.
3	SAFETY	Connect with external PLC, safety devices and the like.
4	Connector for connection between units (control signal/Power)	

This unit cancels the physical restrictions of the universal controller for its expansion.

YQLink

YQLink expansion unit

Model	YHX-YQL
Parts No.	KEK-M4406-0A

Safety connector

Host YQLink

Used for building up an external safety circuit while connecting with the safety dedicated port of a host controller.

Model	YHX-CN-SAFE
Parts No.	KEK-M4432-00



Other options

Battery holder box

Order model: **YHX-BATT-HLD**

D Power

Used to store the ABS batteries.
Up to eight batteries can be stored.

Model	YHX-BATT-HLD
Parts No.	KEK-M53G7-00



STOP connector

Order model: **YHX-CN-STOIN**

Drivers

Used to shut off the drive power of each driver unit.

Model	YHX-CN-STOIN
Parts No.	KEK-M5869-10



Battery holder connection cable

Order model: **YHX-BATT-15C**

D Power

Used when the battery holder box is connected.

Model	YHX-BATT-15C
Parts No.	KEK-M53G4-00



Connector for brake power

Order model: **YHX-CN-BU**

Drivers

Used when the brake power is supplied externally.
The driver is not needed when the brake power unit is used.

1 m	Model	YHX-CN-BU
	Parts No.	KEK-M4427-00



CC-Link terminating connector

Order model: **YHX-CN-CCTM**

Model	YHX-CN-CCTM
Parts No.	KEK-M4874-00



The parts with the marks below are their respective constituent parts.

Host

Host controller unit

D. Power

Driver power unit

Regenerative unit

Regenerative unit

YQLink

YQLink expansion

Drivers

Driver unit

Driver for single-axis robot

Order model:

Driver	Brake unit Note	ABS battery
A10:YHX-A10-SET	V: With brake unit	B: With ABS battery
A30:YHX-A30-SET	N: None	N: None

Note: When the external brake power is input, the brake unit cannot be used.



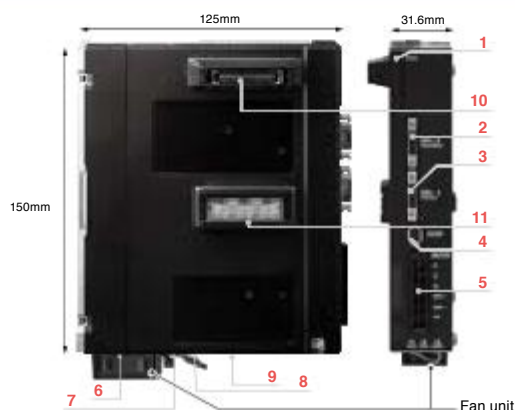
The customer assembles the necessary number of driver units between the host controller unit and driver power unit to use them.

YHX-A10-SET / YHX-A30-SET Configuration parts

Control unit

Drivers

Host controller unit 10A/30A



This unit drives robots. Use cables to connect with robots. The unit is connected to the left of the control unit.

10A Specifications	Model	YHX-A10
	Parts No.	KEK-M5800-0A
30A Specifications	Model	YHX-A30
	Parts No.	KEK-M5800-1A



Stop short circuit connector

Drivers

Used when it is not necessary to shut off the power supply to each driver unit separately.

Model	YHX-CN-STOEN
Parts No.	KEK-M5869-00



Fan unit (30A specifications only)

Drivers

Cools down a driver unit. Attached at the bottom of a driver unit to send wind to heat sinks. A driver unit made to the 30 A specification is shipped out with a fan unit.

Model	YHX-AMP-FU
Parts No.	KEK-M6195-00



1	STATUS	Blue lamp lit: Servo ON Blue lamp flashing: Servo OFF and ready for operation Blue/Red flashing in an alternate fashion: Servo OFF and not yet ready for operation Red flashing: Error
2	ENC.B	Linear scale sensor cable connection connector dedicated for circulation unit
3	ENC.A	Connector for connecting robot cable (encoder cable)
4	STOP	Use this to build up a circuit to shut off the power to a motor. When not used, connect with the STOP short circuit connector
5	MOTOR	Connector for connecting robot cable (power line) Output U/V/W current output, Brake output
6	Connector for connecting a fan	Fan unit connector *
7	BATT connector	ABS battery connector
8	Power supply output for brake	Brake unit connector
9	Power supply input for holding braking effort	External power supply connector for brake unit or brake
10	Connector for connection between units (control signal/Power)	
11	Connector for connection between units (high voltage power source for driving motors)	

* Fan unit is equipped as standard for 30 A specifications.

Selection options

ABS battery

D. Power Drivers

Model	YHX-AMP-BATT
Parts No.	KEK-M53G0-02



Brake unit

Drivers

A unit for releasing braking effort of the robot* with a brake. Enables robot brake control without an external electrical wiring. Installed at the bottom of a driver unit.

Model	YHX-AMP-BU
Parts No.	KEK-M5317-00



* Unable to release the braking effort of a robot with a brake if a brake unit is not available or if a 24V DC power supply is not connected.

The parts with the marks below are their respective constituent parts.

Host

Host controller unit

D. Power

Driver power unit

Regenerative unit

Regenerative unit

YQLink

YQLink expansion

Drivers

Driver unit

Procedure to determine the regenerative unit quantity (Circulation unit/Traversing unit/Single-axis robot GX series)

The number of regenerative units to be connected to one **D. Power** is determined by the circulation unit and traversing unit to be operated by each **D. Power** connected to that **Regenerative unit** and the configuration of the single-axis robot GX series. Check the table below for the required number of regenerative units.

Number of regenerative units required for one D. Power.				
Usage configuration of single-axis robot	Number of junction axes (circulation unit and traversing unit)			
	Junction axis is not used.	Up to 2	Up to 4	5 or more
Single-axis robot is not used.	Regenerative unit is not needed.	1	2	*1
The following usage configuration ①	1	2	*1	For details, contact a YAMAHA sales representative.
The following usage configuration ②	2	*1	*1	For details, contact a YAMAHA sales representative.

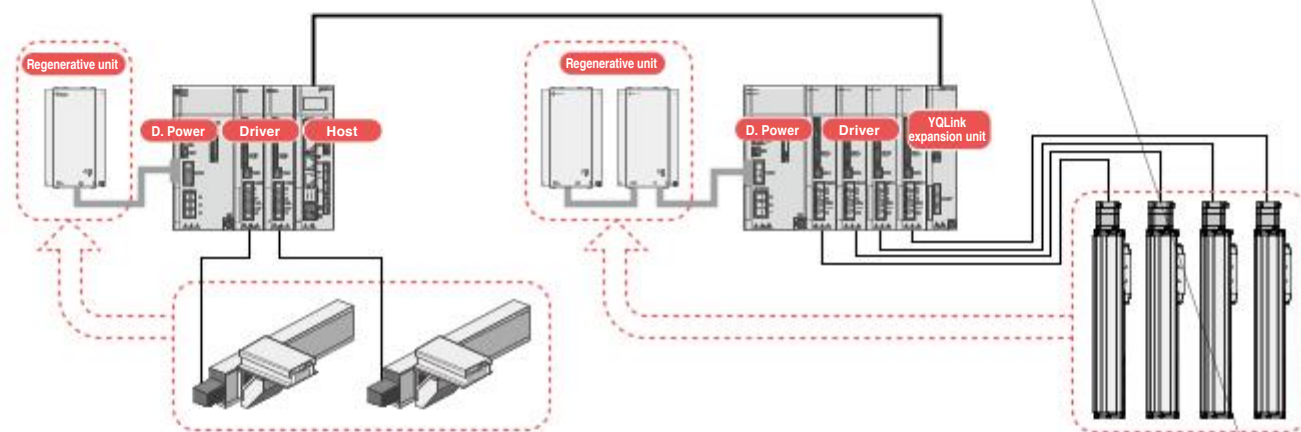
*1 Add D. Power using the YQLink extension unit.

In addition, after the D. Power has been added, separate the junction axis and single-axis robot, and check the number of regenerative units required for each D. Power.

Example of selecting the required number of regenerative units

When two horizontal circulation units and four axes of the vertically installed GX20 are connected, this corresponds to *1 and add D. Power using the YQLink extension unit.

Then, separate the D. Power to which the junction axis (horizontal circulation unit) is connected and the D. Power to which the single-axis robot (GX20) is connected, and then select the number of regenerative units required for each D. Power.



Usage configuration of single-axis robot ①

- The total motor capacity of vertically installed single-axis robots is 400 W or more.
- The vertically installed single-axis robots include the following.
 - GX07: Lead is 5 mm and stroke is 1000 mm or more.
 - GX10: Lead is 5 mm and stroke is 500 mm or more.
 - GX10: Lead is 10 mm and stroke is 500 mm or more.
 - GX10: Lead is 20 mm and stroke is 1200 mm or more.
- The horizontally installed single-axis robots include the following.
 - GX16: Lead is 20 mm and stroke is 500 to 800 mm.
 - GX20: Lead is 20 mm and stroke is 550 to 800 mm.
- The horizontally installed single-axis robots satisfy the following conditions.
 - The total number of GX12, GX16, and GX20 robots is 3 or more.
 - The total number of GX16 and GX20 robots is 2 or more.

Usage configuration of single-axis robot ②

When the single-axis robot with an operating duty (*) of 50% or more is used for 1 axis or more, two regenerative units are needed.

- The total number of vertically installed GX16 and GX20 robots is 4 axes or more.
- The total number of vertically installed GX12, GX16, and GX20 robots is 7 axes or more.
- The total number of vertically installed GX10, GX12, GX16, and GX20 robots is 8 axes or more.
- The total number of horizontally installed GX10, GX12, GX16, and GX20 robots is 6 axes or more.

* The operating duty is calculated by the following formula.

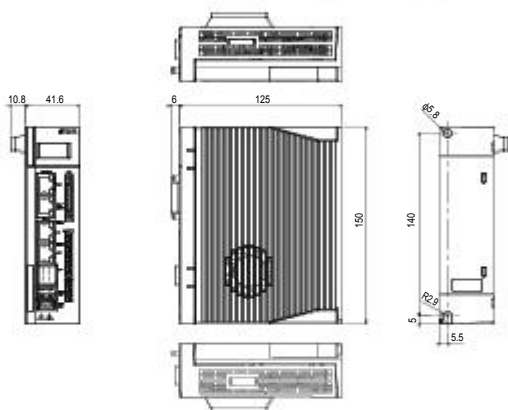
$$\text{Operating duty} = \frac{\text{Total robot movement time}}{\text{1 cycle time}} \times 100 \%$$

For the robot that reciprocates in one cycle, the total forward and backward movement time becomes the total robot movement time.

External view of each unit

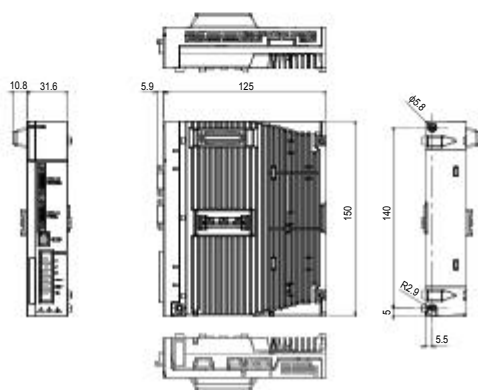
Host controller unit

YHX-HCU KEK-M4200-0A



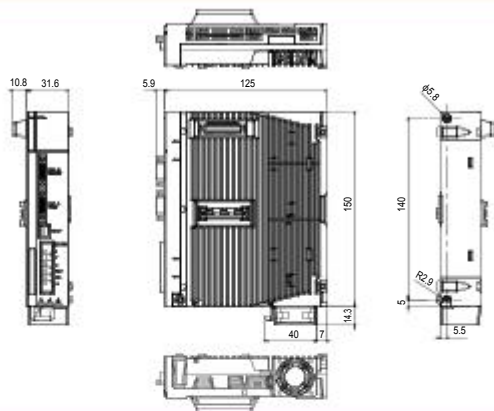
Driver unit 10A

YHX-A10 KEK-M5800-0A



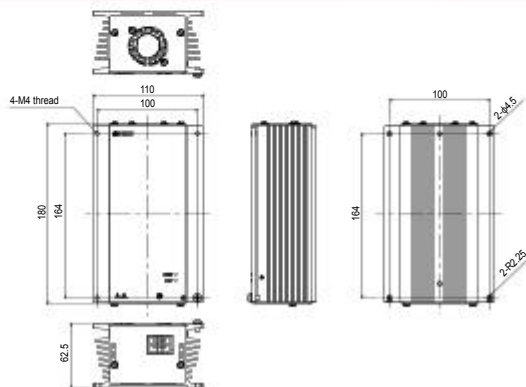
Driver unit 30A

YHX-A30 KEK-M5800-1A



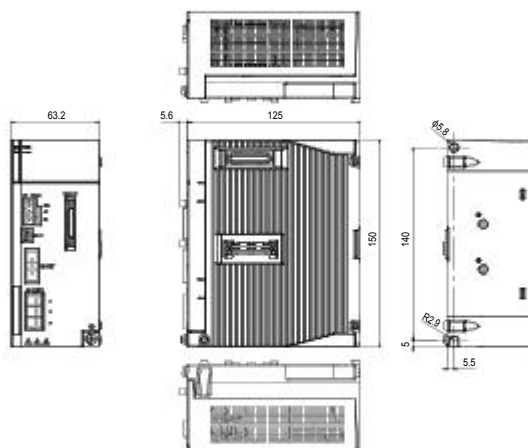
Regenerative unit

YHX-RU KEK-M5850-0A



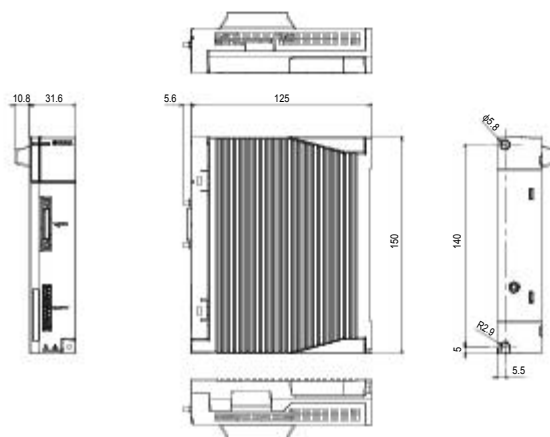
Driver power unit

YHX-DPU KEK-M5880-0A



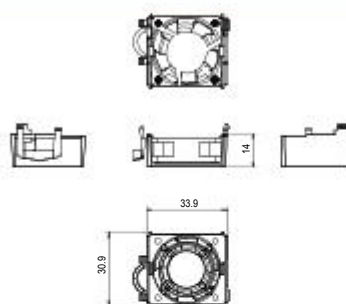
YQLink expansion unit

YHX-YQL KEK-M4406-0A



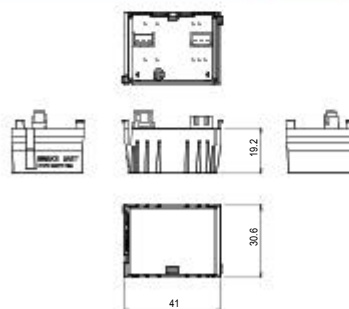
Fan unit

YHX-AMP-FU KEK-M6195-00



Brake unit

YHX-AMP-BU KEK-M5317-00



Basic specifications

Host

Host controller unit

Japanese	Model	YHX-HCU
	Parts No.	KEK-M4200-0A
English	Model	YHX-HCU-E
	Parts No.	KEK-M4200-1A

Item		Host controller unit
Power supply	Control power supply	Voltage: 21.6 to 26.4V DC (24V +/-10%)
		Current: 3.5 A (Including PoE)
Connector	External I/F	Giga bit Ethernet Compatible with PoE yet 1 port (23W) Not compatible with PoE yet 1 port Field network (Slave) Select one from the following 4 kinds. EtherCAT CC-Link* EtherNet/IP * A separate adaptor is necessary. PROFINET USB USB 2.0 1 Port (Bus power 0.5 A) USB 3.0 1 port (Bus power 1.0 A)
		HMI
	SAFETY	Emergency stop contact output Enable switch contact output Emergency stop input
		MODE
	Indicator	LCD
Dimensions		41.6 150 125 (mm)
Weight		750g
Protection structure / Protection rating		IP20 / class 1

D. power

Driver power unit

Model	YHX-DPU
Parts No.	KEK-M5880-0A

Item		Driver power unit
Power supply	Control power supply	Voltage: 21.6 to 26.4V DC (24V +/-10%) Current: 0.5A
	Main power supply	Input: Single phase / 3-phase 180 to 253V AC / (200 to 230V AC +/-10%), 50/60 Hz Power supply capacity: Single phase 3.5 kVA 3-phase 6 kVA
Connection motor capacity		Single phase within 1.6 kW, 3-phase within 3.0kW / Driver unit within 16 units (16 axes)
Connector	Regenerative	Regenerative unit connector
	External I/F	YQLink
	ABS Battery	ABS Battery connector
Dimensions		63.2 150 125 (mm)
Weight		1050g
Protection structure / Protection rating		IP20 / class 1

Regenerative unit

Regenerative unit

Model	YHX-RU
Parts No.	KEK-M5850-0A

Item		Regenerative unit
Power supply	Input	254 to 357V DC (Controller DCBUS connected)
Connector		Regenerative connector (For connecting regenerative unit/ For adding regenerative unit)
Dimensions		62.5 180 110 (mm)
Weight		1450g
Protection structure / Protection rating		IP20 / class 1

YQLink

YQLink expansion unit

Model	YHX-YQL
Parts No.	KEK-M4406-0A

Item		YQLink expansion unit
Power supply	Control power supply	Voltage: 21.6 to 26.4V DC (24V +/-10%) Current: 0.3A
		Voltage: 21.6 to 26.4V DC (24V +/-10%)
Connector	External I/F	YQLink
	SAFETY	Emergency stop input
Dimensions		31.6 150 125 (mm)
Weight		380g
Protection structure / Protection rating		IP20 / class 1

Driver

Driver unit

Servo motor specifications (10A)

Model	YHX-A10
Parts No.	KEK-M5800-0A

Driver unit

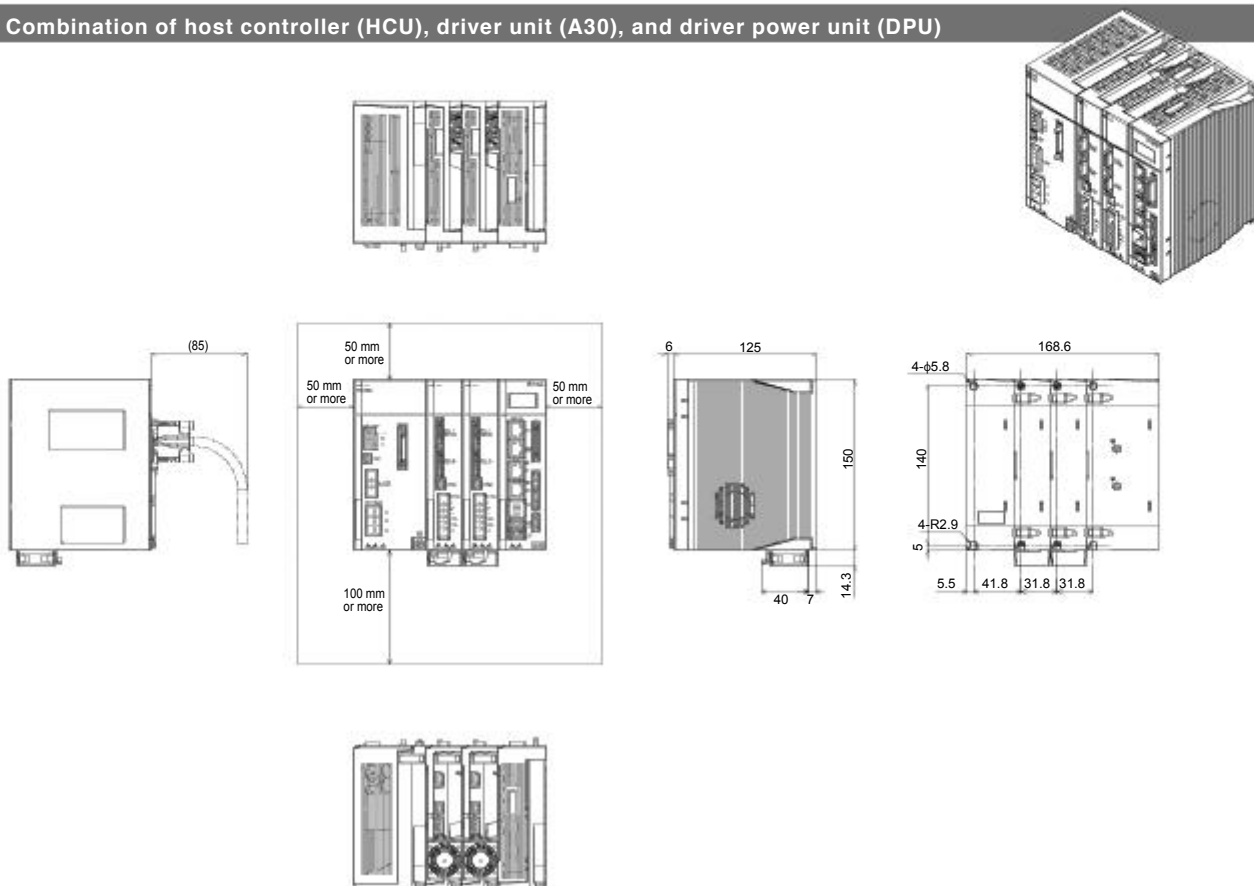
Servo motor specifications (30A)

Model	YHX-A30
Parts No.	KEK-M5800-1A

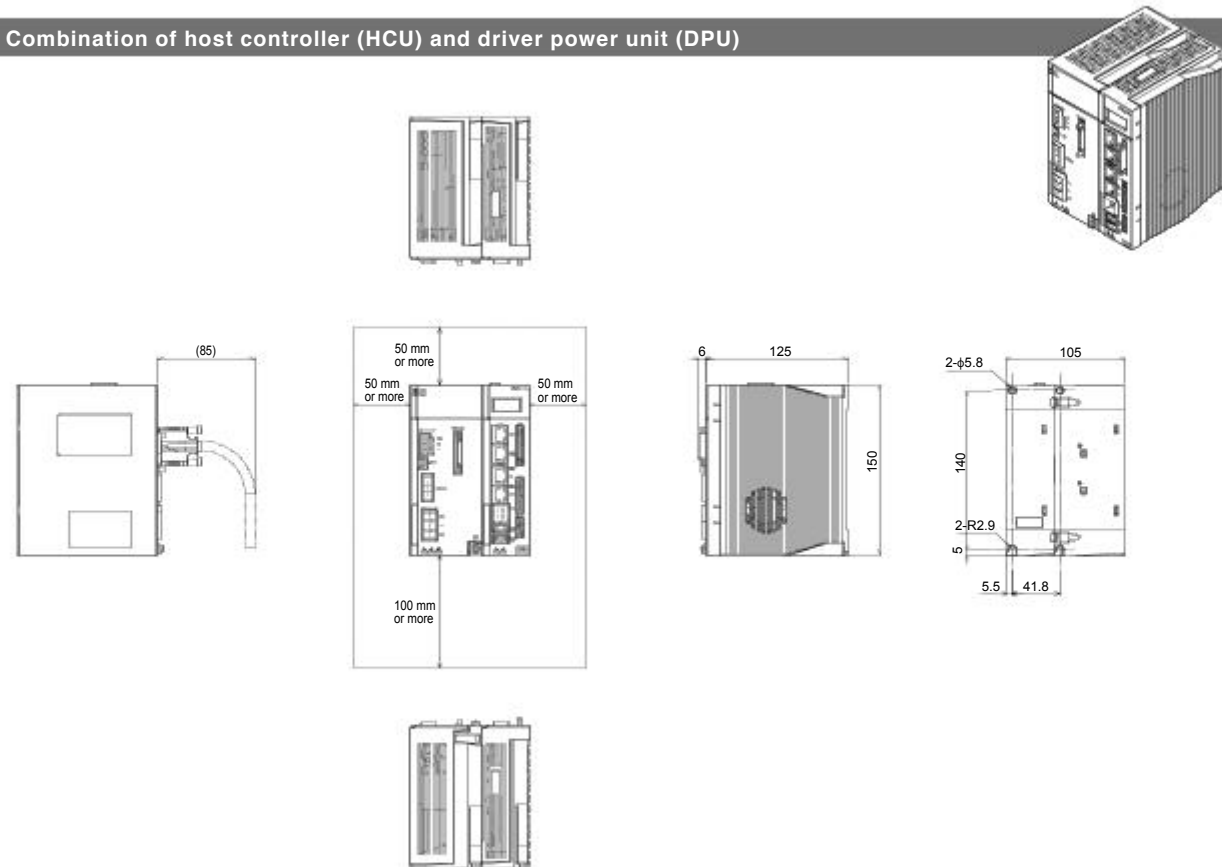
Item		Driver unit 10A/30A
Power supply	Control power supply	Voltage: 21.6 to 26.4V DC (24V +/-10%) Current: 0.8A (Including brake unit power supply)
		Encoder input
Connector	ENC.A	Encoder input (Dedicated use)
	ENC.B	Gate off input, 2 points Gate status output, 1 point
	STOP	Motor drive power supply output Brake power supply output
	MOTOR	ABS Battery connector
	ABS Battery	Accessory fan unit connection
	Fan unit connector	Brake unit is connectable.
Dimensions		31.6 150 125 (mm)
Weight		10A : 560g / 30A : 570g (Including accessory fan unit)
Protection structure / Protection rating		IP20 / class

External view of YHX unit combination

Combination of host controller (HCU), driver unit (A30), and driver power unit (DPU)



Combination of host controller (HCU) and driver power unit (DPU)



Linear conveyor modules	LCMR200
Single-axis robots	GX
Linear conveyor modules	LCM100
SCARA robots	YK-X
Single-axis robots	Robonity
Linear motor single-axis robots	PHASER
Single-axis robots	FLIP-X
Compact single-axis robots	TRANSERVO
Cartesian robots	XY-X
Pick & place robots	YP-X
	CLEAN
	CONTROLLER
	INFORMATION
Robot positioner	
Pulse string driver	
Robot controller	
RCXIVY2+ Electric gripper	
Option	

LCC140

● Dedicated controller for LCM100

This is a dedicated controller for the LCM100 linear conveyor module. In addition to controlling movement, positioning, and input/output signals, it can also perform operations related to slider insertion and ejection.



LCC140



Programming box
► HPB/HPB-D
P.658



Support software for PC
► POPCOM+
P.650

■ Basic specifications

Item	LCC140
Controllable robot	Linear conveyor module LCM100
Power supply capacity	350 VA
External dimensions	W:402.5 × H:229 × D:106.5 mm
Weight	4.8 kg
Control power supply input	Single-phase 200 to 230 V AC +/-10% (50/60 Hz)
Main power supply input	Single-phase 200 to 230 V AC +/-10% (50/60 Hz)
Control method	AC fully digital software servo
Position detection method	Magnetic linear scale
Emergency stop input	Normal close contact input
Output signal	Contact output: MPRDY
Communication	RS-232C 2ch (HPB/COM, RFID)
Program	Max. 999 steps/single program, Max. 10000 steps/all programs, Max. 100 programs
Points	10000 points
System backup	Lithium battery
Multitasking	Max. 4 tasks
Usage temperature	0 to 40 °C
Storage temperature	-10 to 65 °C
Usage humidity	35 to 85%RH (no dewing)
Noise resistance	IEC61000-4-4 level 3
CC-Link unit	CC-Link compatible version
	Ver. 1.10
	Remote station type
	Remove device station
	Number of occupied stations
	Fixed to 2 stations
	Station number
	1 to 63 (Set from HPB)
CC-Link unit	Communication speed
	10M/5M/2.5M/625K/156Kbps (Set using HPB or POPCOM+.)
	Shortest length between stations
	0.2 m or more
	Total length
	100m/10Mbps, 160m/5Mbps, 4000m/2.5Mbps, 900m/625Kbps, 1200m/156Kbps
	Monitor LED
	None
CC-Link I/O points	General-purpose input 32 points
	General-purpose output 32 points
	Dedicated input 16 points
	Dedicated output 16 points
	Input register 8 words
CC-Link I/O points	Output register 8 words

Controllable robot	LCM100 P.61
CE marking	—
Field networks	CC-Link DeviceNet EtherNet/IP

Model Overview

Name	LCC140
Controllable robot	Linear conveyor module LCM100
Input power	Control power supply Main power supply
Operating method	Single phase 200 to 230V AC +/-10% maximum (50/60Hz) Programming/I/O point tracing/Remote command/ Operation using RS-232C communication

Ordering method

Ordering notes

LCC140

10

Controller

Current sensor

Network option Note

10:10A

No entry: None

CC: CC-Link

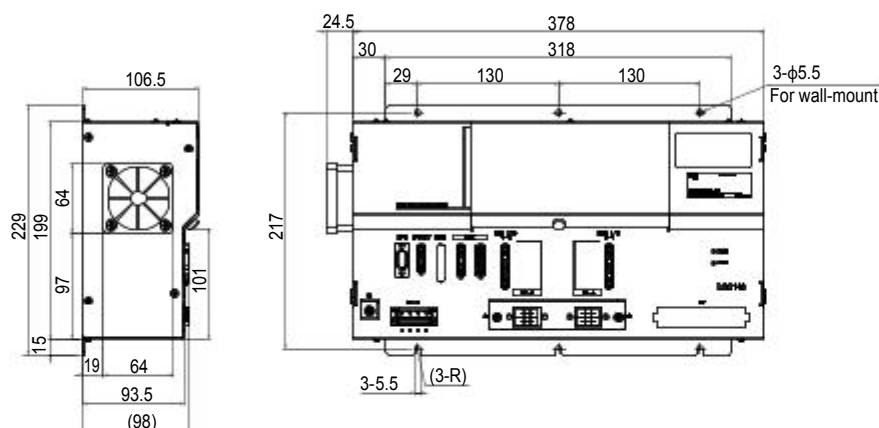
DN: DeviceNet™

EP: EtherNet/IP™

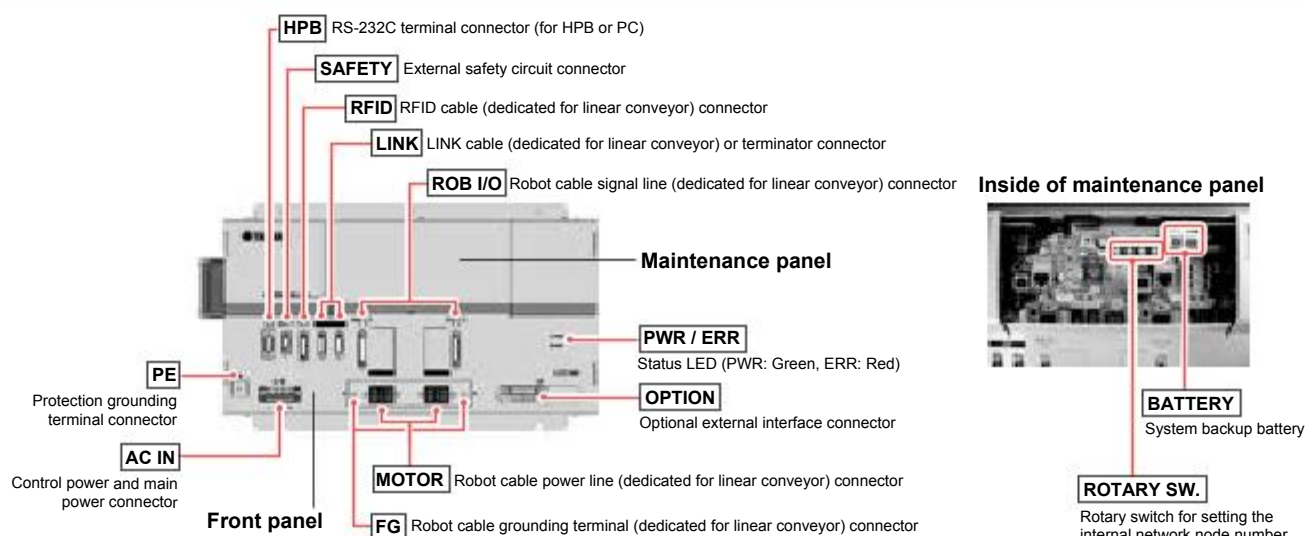
Note. For 2MT, be sure to select an appropriate network option.

	Item	LCC140
DeviceNet™ unit	Applicable DeviceNet™ specifications	Volume 1 Release2.0, Volume 2 Release2.0
	DeviceNet™ Conformance test	Compliant with CT24
	Device profile/Device type number	Generic Device (keyable) / 2B Hex
	Vendor name/Vendor ID	YAMAHA MOTOR CO.,LTD. / 636
	Product code	21
	Product revision	1.0
	EDS file name	Yamaha_LCC1(DEV).eds
	MAC ID setting	0 to 63 (Set using HPB or POPCOM+.)
	Communication speed setting	500K/250K/125Kbps (Set using HPB or POPCOM+.)
	Communication data	Predefined Master/Slave Connection Set: Group 2 only server Dynamic connection support (UCMM): None Support for divided transmission of explicit message: Yes
EtherNet/IP™ unit	Network length	Total length Branch length Total branch length
	Monitor LED	100m/500Kbps, 250m/250Kbps, 500m/125Kbps 6m or less 39m or less/500Kbps, 78m or less/250Kbps, 156m or less/125Kbps
	Number of DeviceNet™ I/O points/number of occupied channels	None General-purpose input 32 points General-purpose output 32 points Dedicated input 16 points Dedicated output 16 points Input register 8 words Output register 8 words
	Applicable software version	LCC140: Ver. 64.07 or higher HPB/HPB-D: Ver. 24.06 or higher POPCOM+: Ver. 2.1.0 or higher
	Applicable EtherNet/IP™ specifications	Volume 1: Common Industrial protocol(CIP™) Edition 3.14 Volume 2: EtherNet/IP™ Adaptation of CIP™ Edition 1.15
	EtherNet/IP™ Conformance test	Compliant with CT11
	Device profile/Device type number	Generic Device (keyable) / 2B Hex
	Vendor name/Vendor ID	YAMAHA MOTOR CO.,LTD. / 636
	Product code	23
	Product revision	1.1
EtherNet/IP™ unit	EDS file name	Yamaha_LCC1(EIP2).eds
	Communication speed	10Mbps / 100Mbps
	Connector specifications	RJ-45 connector (8-pole modular connector), 2 ports
	Applicable cable specifications	STP cable (double shield) with CAT 5e or higher
	Maximum cable length	100m
	Monitor LED	Module Status(MS), Network Status(NS), Link/Activity:Port1-2
	Number of EtherNet/IP™ I/O points/number of occupied channels	General-purpose input 32 points General-purpose output 32 points Dedicated input 16 points Dedicated output 16 points Input register 8 words Output register 8 words
		Input: 24byte Output: 24byte

■ Dimensions

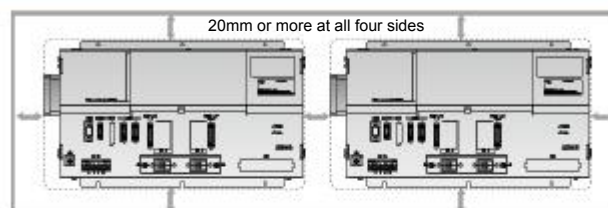


■ Part names



■ Installation conditions

- Reserve a space for the controller in the vicinity of the module.
- Install the controller perpendicularly to the wall.
- Reserve enough margins around the controller (20 mm or more on each side) and ensure sufficient ventilation.
(See fig. at right.)
- Environmental temperature: 0 to 40°C
- Environmental humidity: 35 to 85%RH (no condensation)



■ Reference for power supply capacity and heat generation quantity

The power capacity and heat generation quantity required for the linear conveyor may vary depending on the module type or operation duty. Prepare the power supply and investigate the control panel size, controller layout, and cooling method while referring to the table below.

● Reference values for actual operation (per LCC140 controller)

Module type	Number of motors	Power supply capacity			Heat generation quantity (during operation)
		Control power supply	During waiting	During slider operation	During slider operation
LCM100-4M	4	35VA	60VA	350VA	20W
LCM100-3M	3	35VA	54VA	271VA	16W
LCM100-2MT	2	35VA	48VA	193VA	11W

The power capacity and heat generation quantity values stated in the table show the maximum values of LCC140 and they do not exceed these values. Since the operation duty of each motor of the linear conveyor is low due to operating characteristics, the power capacity required for actual operation becomes about 1/4 to 1/3 of the maximum capacity value.

● Maximum capacity values (per LCC140 controller)

Model	Power supply capacity	Heat generated
LCM100	1200VA	70W

Option parts

LCC140

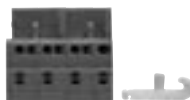


Options

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

Power connector + wiring connection lever

One set of parts per LCC140 is required.



Model KAS-M5382-00

LCC140
TS-X
TS-P
SR1-X
SR1-P
RCX320
RCX340/341

HPB dummy connector

When performing the operation with the programming box HPB removed, connect this dummy connector to the HPB connector.
One connector per LCC140 is required.



Model KDK-M5163-00

LCC140
SR1-X
SR1-P

SAFETY connector

One connector per LCC140 is required.



Model	Not wired	KDK-M5370-10
	Wired	KDK-M5370-00

Note. The wired connector is that the wiring for the emergency stop cancel was performed inside the connector. Select this model when performing the operation check or debugging with single linear conveyor.

LCC140

LINK cable

[(Number of modules) - 1] cables per line are required.



Model	1m	KDK-M5361-10
	3m	KDK-M5361-30
	5m	KDK-M5361-50

LCC140

Terminator connector

When connecting modules, two connectors per line are required.



Model KDK-M5361-00

LCC140

Dust cover (for LINK connector)

This dust cover is attached to the insertion port, into which the LINK cable terminator connector is not inserted.
When using only one module without connections, two dust covers are required.



Model KDK-M658K-00 (for MDR20 pin)

Note. The dust cover is essential for the 2MT.

LCC140

Programming box HPB/HPB-D

P.658

All operations, such as robot manual operation, program input or edit, teaching, and parameter setting can be performed with this programming box.



	HPB	HPB-D
Model	KBB-M5110-01	KBB-M5110-21
Enable switch	—	3-position
CE marking	Not supported	Applicable

LCC140
ERCD
SR1-X
SR1-P

Support software for PC POPCOM+

P.650

POPCOM is a simple to use application software that makes tasks such as robot operation, writing-editing programs, and point teaching easy to visually understand.



Model KBG-M4966-00

LCC140
ERCD
SR1-X
SR1-P

POPCOM+ environment

OS	Windows XP (32bit), Vista, 7, 8 / 8.1, 10 (Supported version: V.2.1.1 or later)
CPU	Processor that meets or exceeds the suggested requirements for the OS being used.
Memory	Suggested amount of memory or more for the OS being used.
Hard disk	50MB of available space required on installation drive.
Disk operation	RS-232C
Applicable controllers	SRCX to SR1, DRCX, TRCX, ERCX, ERCD, LCC140 ^{Note 1}

Note 1. LCC140 is applicable to Ver. 2.1.1 or later.

Note. Windows is the registered trademark of US Microsoft Corporation in U.S.A. and other countries.

Continues on next page

Options

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

● Data cables

Communication cable for POPCOM+.
Select from USB cable or D-sub cable.



Model	USB type (5m)	KBG-M538F-00
	D-Sub type 9pin-9pin (5m)	KAS-M538F-10

Note. This USB cable supports Windows 2000/XP or later.

Note. Data cable jointly used for POPCOM+, VIP+, RCX-Studio Pro.

Note. USB driver for communication cable can also be downloaded from our website.

LCC140
ERCD
SR1-X
SR1-P
RCX320
RCX340/341

RFID

● RFID^{*}
(manufactured by BALLUFF GmbH)

Reader/writer cable



* This cable is a flexible cable.

Model	3m	: KDK-M6300-00
	5m	: KDK-M6300-10
	10m	: KDK-M6300-20

Note. Whether or not the RFID system can be used may vary depending on the destination place (country).
Before selecting a RFID system, please contact YAMAHA.

● RFID
(manufactured by OMRON)

Antenna amplifier controller cable



Model	0.5m+2m : KDK-M6300-A0
-------	------------------------

Note. Whether or not the RFID system can be used may vary depending on the destination place (country).
Before selecting a RFID system, please contact YAMAHA.

● Dust cover (for RFID)

This cover is attached to the insertion port if RFID is not used. (Included as standard)



Model	KDK-M658K-10 (for MDR26 pin)
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Note. Whether or not the RFID system can be used may vary depending on the destination place (country).
Before selecting a RFID system, please contact YAMAHA.

Maintenance parts

● Robot cable for LCM100



Model	KDJ-M4751-30 (3m×1 pc.)
	KDJ-M4751-50 (5m×1 pc.)
	KDJ-M4755-30 (Flexible cable 3m×1 pc.)
	KDJ-M4755-50 (Flexible cable 5m×1 pc.)

LCC140

● Lithium battery for system backup



Model	KDK-M4252-01
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LCC140

● Replacement filter for LCC140
(5 pcs. in package)

Model	KDK-M427G-00
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LCC140

Linear conveyor modules	LCMR200
Single-axis robots	GX
Linear conveyor modules	LCM100
SCARA robots	YK-X
Single-axis robots	Robonity
Linear motor single-axis robots	PHASER
Single-axis robots	FLIP-X
Compact single-axis robots	TRANSERVO
Cartesian robots	XY-X
Pick & place robots	YP-X
	CLEAN
	CONTROLLER
	INFORMATION
Robot positioner	
Pulse string driver	
Robot controller	
RCXIVY2+ Electric gripper	
Option	

EP-01

CE compliance

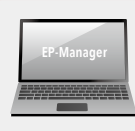
Single-axis robot positioner for single-axis robot Robonity series “ABAS”, “AGXS”, and “ABAR”.
This robot positioner supports Ethernet, is equipped with an Ethernet port as standard, and achieves 37 % size reduction when compared to the conventional robot positioner.
Following the TS series, usability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



Handy terminal

▶ HT2 / HT2-D

P.657



Support software for PC

▶ EP-Manager

P.648

* Free download is available at the member site.



EP-01

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
Axis control	Input power supply	Single phase AC200 to 230V +/-10% 50/60Hz	
	Control power supply	Single phase AC200 to 230V +/-10% 50/60Hz	
	Motor power supply	Single phase AC200 to 230V +/-10% 50/60Hz	
	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	
Points	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	
	Number of points	255 points	
External input/output	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	
	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)	
Options	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.)	
	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	
Option	Protective structure	IP20	

Controllable robot	EP-01 ▶ Robonity (ABAS P.180, AGXS P.194, ABAR P.216)		
CE marking		Field networks	   

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 A30: 400W/750W	No entry: None R: With EP-RU	EP: EtherNet/IP™ 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

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

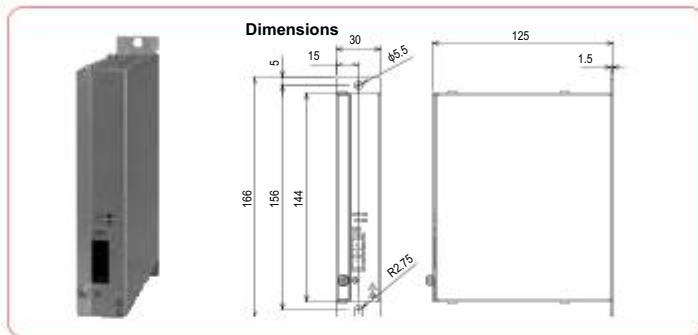
<High acceleration/deceleration specifications>

		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



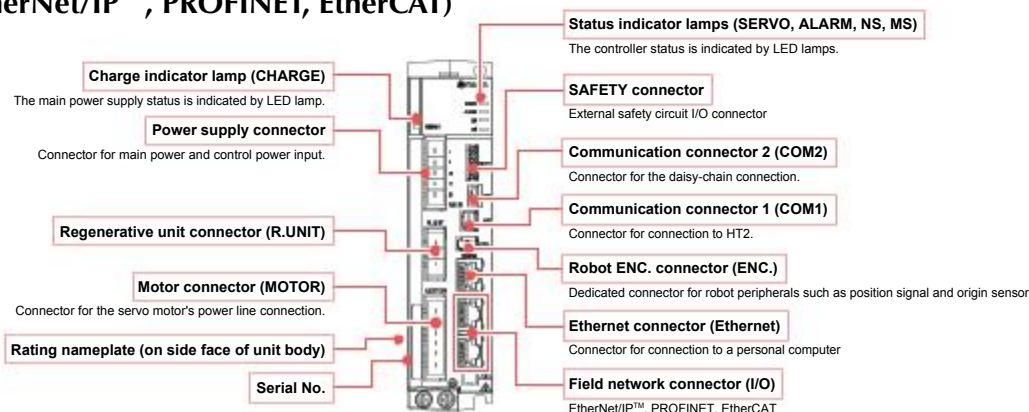
Basic specifications

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)

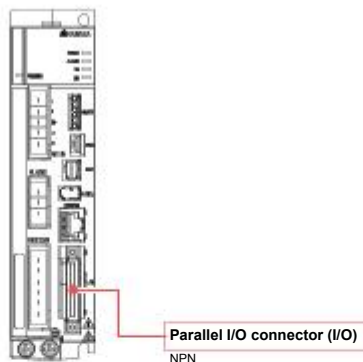
Note. Always leave an empty space (gap of about 20 mm) between this unit and the adjacent controller.
Also, always use the dedicated cable when connecting the controller.

Part names

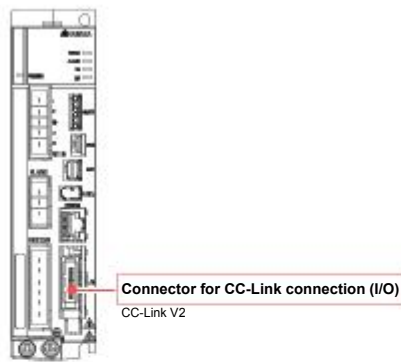
EP-01 (EtherNet/IP™, PROFINET, EtherCAT)



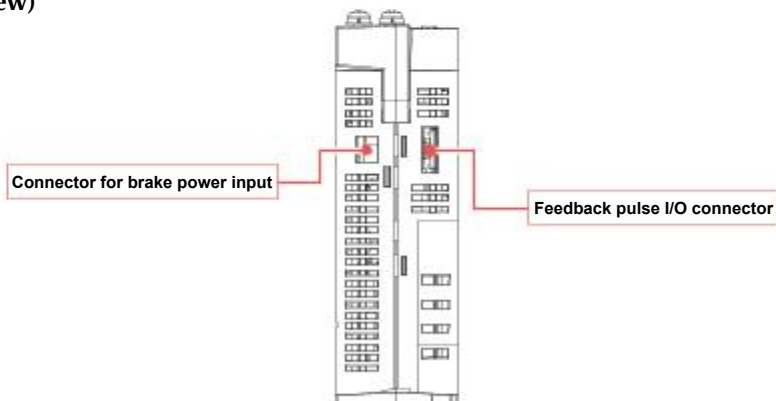
EP-01 (NPN)



EP-01 (CC-Link)

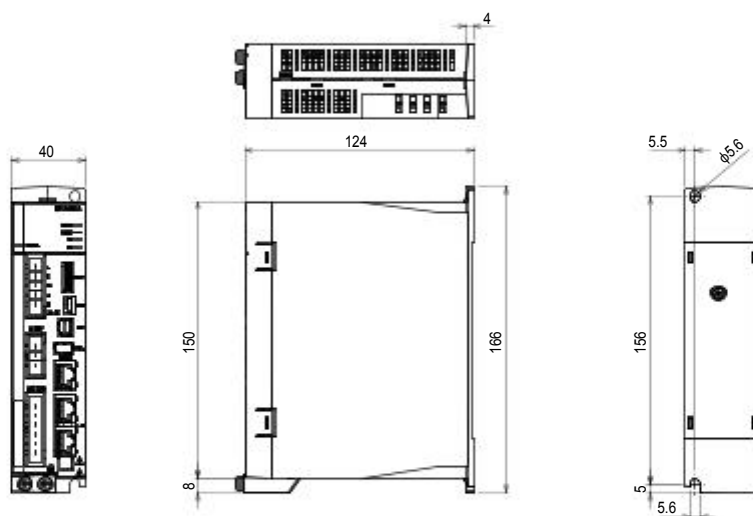


EP-01 (Bottom view)

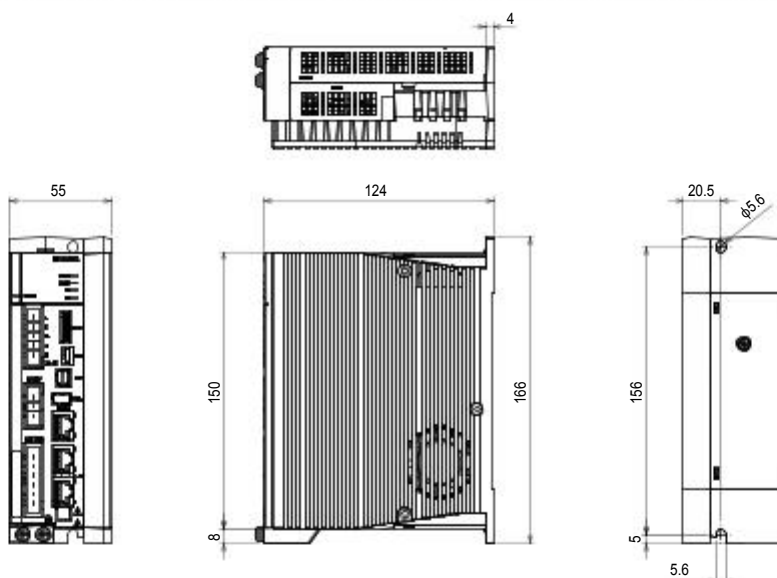


Dimensions

EP-01-A10



EP-01-A30



Installation conditions

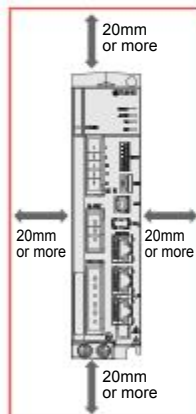
- Install the EP-01 inside the control panel.
- Install the EP-01 on a metal wall vertically.
- Install the EP-01 in a well ventilated location, with space on all sides of the EP-01 (See fig. at right.).

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

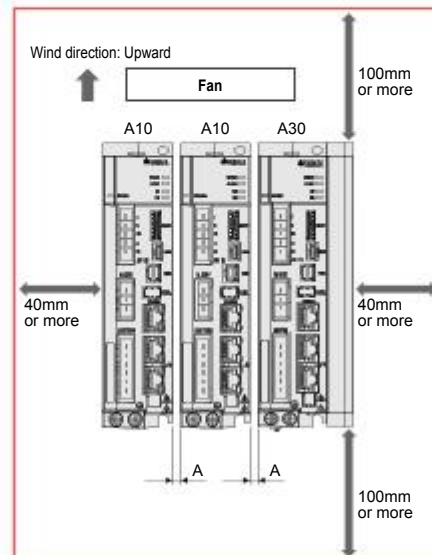
[When multiple EP-01 robot positioners are used]

- 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.

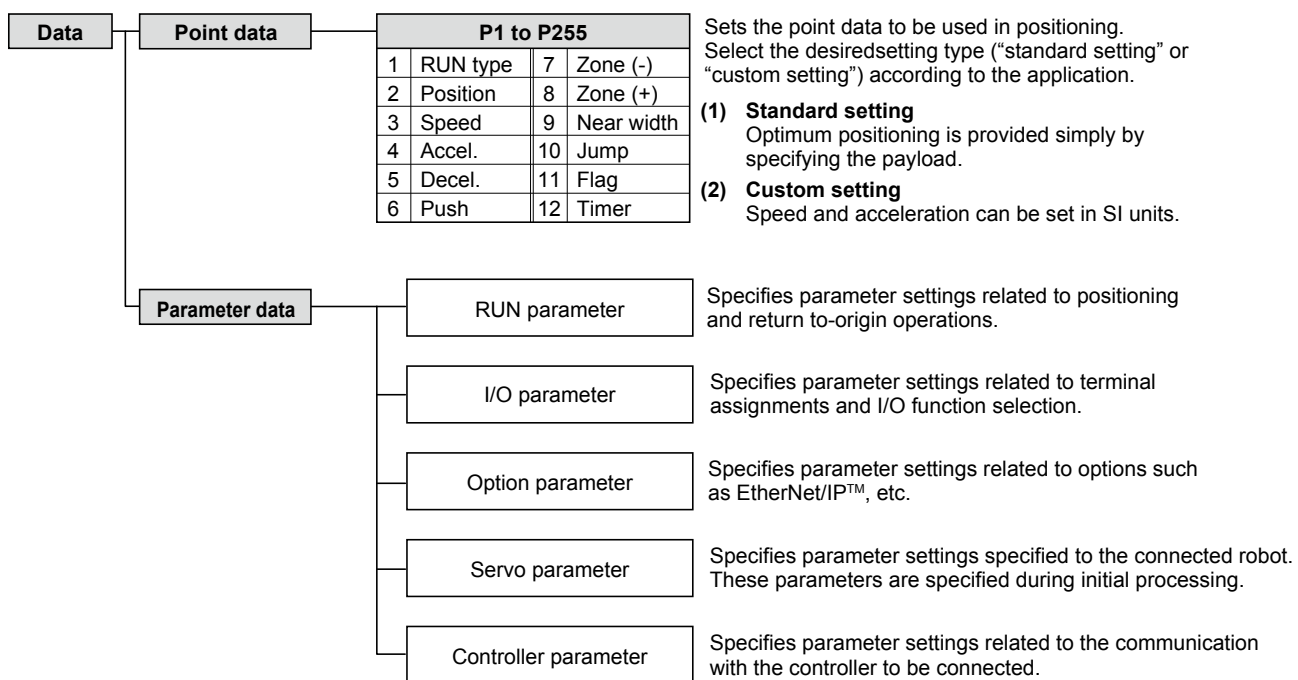
Point data

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/s²) 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



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.

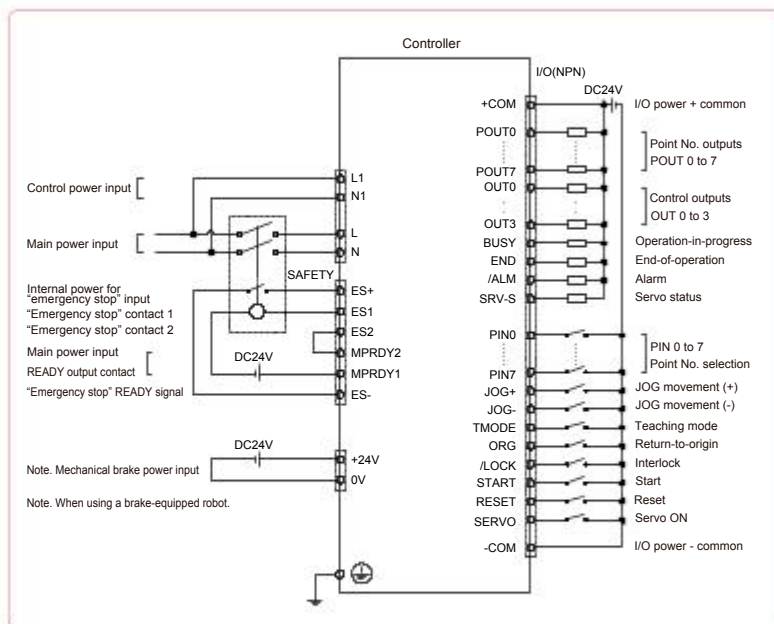
“Standard setting” and “custom setting”

There are 2 setting types for point data (“standard setting” or “custom setting”). Select the desired setting type according to the application.

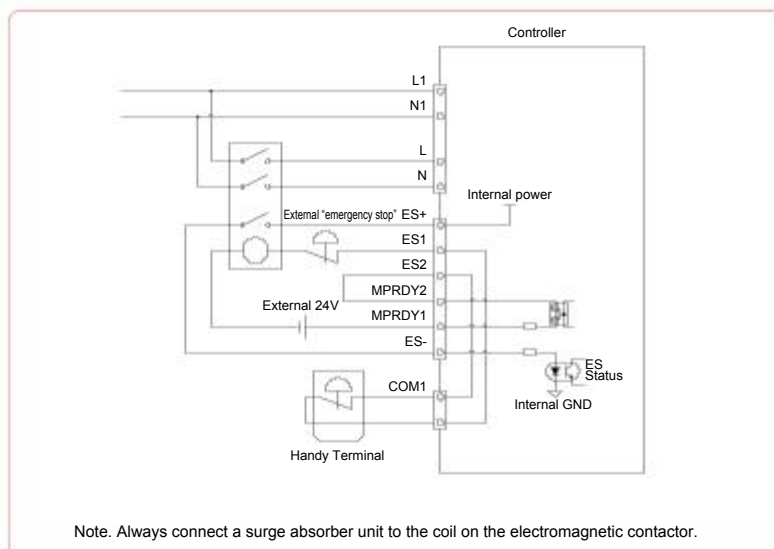
The maximum number of setting points for both setting types is 255 points (P1 to P255).

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.

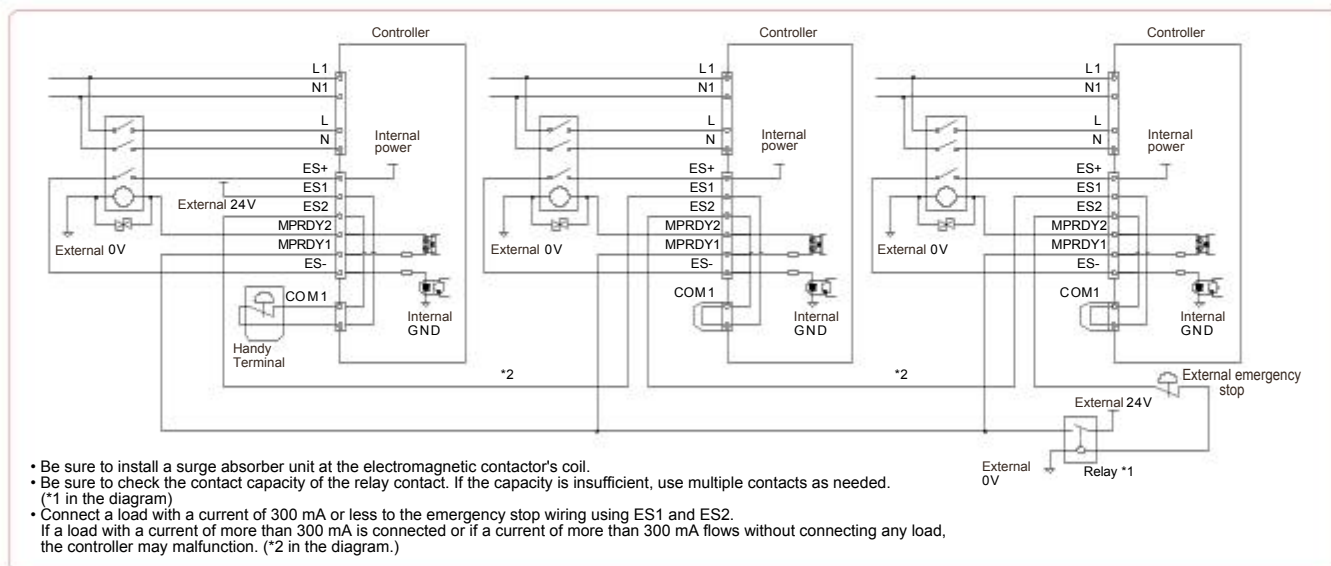
NPN type input / output wiring diagram



Emergency stop circuit example



Emergency stop circuit example (Daisy chain)



I/O Specifications

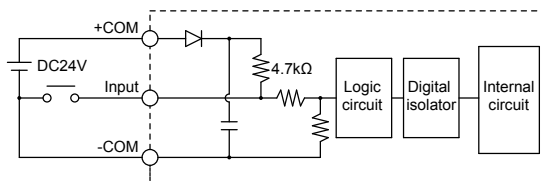
Item	Description
EtherNet/IP™	EtherNet/IP™ adapter (2 ports)
PROFINET	PROFINET Slave 1 node
EtherCAT	EtherCAT Slave 1 node
NPN	Input 16 points, 24VDC +/-10%, 5.1mA/point, positive common Output 16 points, 24VDC +/-10%, 50mA/point, sink type
CC-Link	CC-Link Ver.2.00 compatible, Remote station device (1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

I/O signals (NPN)

No.	Signal Name	Description	No.	Signal Name	Description
A1	+COM	I/O power input, positive common	B1	POUT0	Point No. outputs
A2			B2	POUT1	
A3	NC	No connection	B3	POUT2	
A4	NC		B4	POUT3	
A5	PIN0		B5	POUT4	
A6	PIN1		B6	POUT5	
A7	PIN2		B7	POUT6	
A8	PIN3		B8	POUT7	
A9	PIN4		B9	OUT0	
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	Operation-in-progress
A14	JOG-	JOG movement (- direction)	B14	END	Operation-end
A15	TMODE	Teaching mode (ON: I/O teaching mode OFF: I/O positioning mode)	B15	/ALM	Alarm
A16	ORG	Return-to-origin	B16	SRV-S	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	
A20	SERVO	Servo ON	B20		I/O power input, negative common

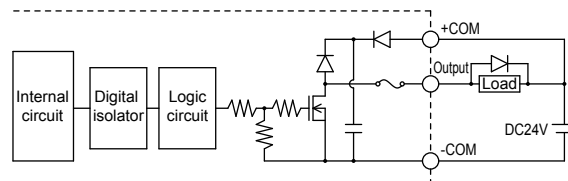
NPN type I/O circuit details

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

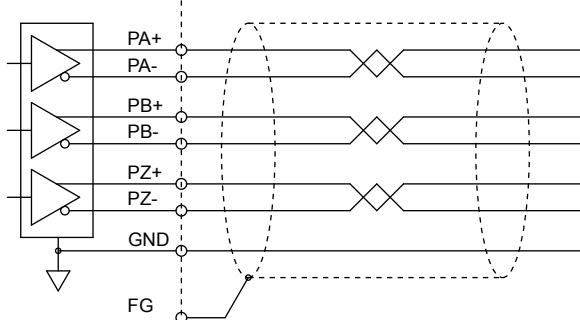
Item	Specification
Output signal	ABZ-phase pulse
Number of pulses per rotation	Variably changed in a range of 4 to 16384
Maximum rotation speed	6000 rpm
Maximum operating frequency	2 Mbps

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)	

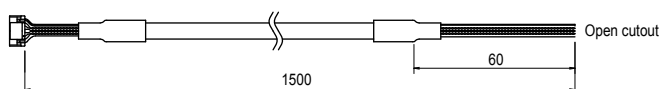
Details of feedback pulse output circuit

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
	Operation lever	KEF-M657M-00

EP-01

Regeneration unit short-circuit connector



Model	KEK-M4431-00
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EP-01

YHX

RCX320

HT2 dummy connector



Model	KEK-M5869-00
-------	--------------

EP-01

YHX

SAFETY connector



Model	KEK-M4432-10
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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
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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
	Jump socket	KCA-M4873-00

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

EP-01

TS-S2

TS-SH

TS-X

TS-P

Ferrite core Note

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



Model	KK1-M6563-200
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EP-01

See next page for optional parts

Options

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

● Handy terminal HT2/HT2-D

P.657



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

EP-01

● 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

EP-01

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

EP-01

● Battery holder kit



Model	KFX-M53G7-00
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Note. Set number containing the battery holder and two tie-up bands.

EP-01

● CC-Link termination connector



Model	KCA-M4874-00
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EP-01

TS-S2

TS-SH

TS-X

TS-P

● Feedback pulse output cable



Model	KFX-M532M-00
-------	--------------

EP-01

● Daisy chain and gateway connection cable



Model	KFX-M532L-00
-------	--------------

EP-01

Linear conveyor modules	LCMR200
Single-axis robots	GX
Linear conveyor modules	LCM100
SCARA robots	YK-X
Single-axis robots	Robonity
Linear motor single-axis robots	PHASER
Single-axis robots	FLIP-X
Compact single-axis robots	TRANSERVO
Cartesian robots	XY-X
Pick & place robots	YP-X
	CLEAN
	CONTROLLER
	INFORMATION
Robot positioner	
Pulse string driver	
Robot controller	
RCXIVY2+ Electric gripper	
Option	

TS-S2/TS-SH/TS-X/TS-P

● CE compliance

TS series are positioner type controllers that only performs point trace. No program is needed. Operation is simple. After setting point data, specify the point number and enter a START signal from host controller such as a PLC. Positioning or pushing operation then begins.



TS-S2

TS-SH

TS-X

TS-P



Handy terminal

▶ HT1/HT1-D

P.656



Support software for PC

▶ TS-Manager

P.648

■ Basic specifications

■ TS-S2/TS-SH

Item		TS-S2	TS-SH
Basic specifications	Number of controllable axes	Single-axis	
	Controllable robots	TRANSERVO series	
	Current consumption	2.5A (Rating) 4.5A (Max.)	3.5A (Rating) 6.5A (Max.)
	Dimensions	W30 × H162 × D82mm	W30 × H162 × D123mm
	Weight	Approx. 0.2kg	Approx. 0.3kg
	Input power supply	DC24V +/-10%	
	Control power supply Main power supply	DC24V +/-10%	
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	Resolver	Resolver with multi-turn absolute function
	Resolution	20480 pulses/rev. or 4096 pulses/rev. depending on the robot	
Points	Origin search method	Incremental	Absolute / Incremental
	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	
	I/O interface	Selectable from the following: NPN, PNP, CC-Link, DeviceNet™, EtherNet/IP™, PROFINET	
External input/output	Input	Servo ON (SERVO), reset (RESET), start (START), interlock (/LOCK) origin search (ORG), manual mode (MANUAL), 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)	
	External communications	RS-232C 1CH	
	Safety circuit	Emergency stop input, emergency stop contact output (1 system: When the HT1 is used.)	
Options	Handy terminal	HT1, HT1-D (with enable switch)	
	Support software for PC	TS-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, temperature error, overload, overvoltage, low voltage, excessive position deviation, overcurrent, motor current error, motor cable faulty wiring, Excitation power failure error ^{Note 1}	

Note 1. The excitation power failure error is a protection function that is available only in TS-SH.

Controllable robot	TS-S2/TS-SH ▶ TRANSERVO P.335	TS-X ▶ FLIP-X P.289	TS-P ▶ PHASER P.267
CE marking		Field networks	CC-Link DeviceNet EtherNet/IP

Model Overview

Name	TS-S2	TS-SH	TS-X/TS-P
Controllable robot	Dedicated compact single-axis TRANSERVO		TS-X: Single-axis robot FLIP-X TS-P: Linear motor single-axis PHASER
Input power	DC24V +/-10%		- AC100V specifications - Control power supply - Single phase 100 to 115V AC +/-10% - Main power supply - Single phase 100 to 115V AC +/-10%
Operating method	I/O point tracing / Remote command / Operation using RS-232C communication		
Maximum number of controllable axes	Single-axis		
Origin search method	Incremental	Absolute / Incremental	TS-X: Absolute / Incremental TS-P: Absolute / Semi-absolute

Ordering method

TS-S2/TS-SH (TRANSERVO)

Robot positioner	Type	I/O	Battery Note 1
S2: TS-S2	No entry: Standard	NP: NPN	B: With battery (Absolute model)
SH: TS-SH	S: Sensor	PN: PNP	N: None (Incremental model)
		CC: CC-Link	
		DN: DeviceNet™	
		EP: EtherNet/IP™	
		PT: PROFINET	
		GW: With no I/O board	

Note 1. Battery can only be selected for TS-SH. (Not provided for TS-S2).

TS-X/TS-P (FLIP-X/PHASER)

Controller	Driver: Power supply voltage/Power capacity	Regenerative unit	LCD monitor	Input/Output Selection	Battery Note 2
TSX: TS-X	105: 100V / 100W more less	No entry: None	No entry: None	NP: NPN	B: With battery (Absolute model)
TSP: TS-P	110: 100V / 200W	R: With RGT	L: With LCD	PN: PNP	N: None (Incremental model)
	205: 200V / 100W more less	R: With RGU-2		CC: CC-Link	
	210: 200V / 200W			DN: DeviceNet™	
	220: 200V / 400 to 600W			EP: EtherNet/IP™	
				PT: PROFINET	
				GW: With no I/O board	

Note 2. Battery can only be selected for TS-X. (Not provided for TS-P).

TS-X/TS-P

Item		TS-X / TS-P			
		100V AC input		200V AC input	
Basic specifications	Driver model	TS-X105 / TS-P105	TS-X110 / TS-P110	TS-X205 / TS-P205	TS-X210 / TS-P210
	Number of controllable axes	Single-axis			
	Controllable robots	TS-X: Single-axis robot FLIP-X series TS-P: Linear motor single-axis robot PHASER series			
	Power capacity	400VA	600VA	400VA	600VA
	Dimensions	W58 × H162 × D131mm			W70 × H162 × D131mm
Axis control	Weight	Approx. 0.9kg			
	Input power supply	Single phase 100 to 115V AC +/-10% 50/60Hz			
	Control power supply	Single phase 100 to 115V AC +/-10% 50/60Hz			
Points	Main power supply	Single phase 100 to 115V AC +/-10% 50/60Hz			
	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	TS-X: Resolver with multi-rotation absolute function TS-P: Magnetic type linear scale			
External input/output	Resolution	TS-X: 16384 pulses/rev. TS-P: 1μm			
	Origin search method	TS-X: Absolute / Incremental TS-P: Incremental / Semi-absolute			
	Number of points	255 points			
Options	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			
	I/O interface	Selectable from the following: NPN, PNP, CC-Link, DeviceNet™, EtherNet/IP™, PROFINET			
	Input	Servo ON (SERVO), reset (RESET), start (START), interlock (/LOCK) origin search (ORG), manual mode (MANUAL), 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)			
General specifications	External communications	RS-232C 1CH			
	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 HT1 is used.)			
	Handy terminal	HT1, HT1-D (with enable switch)			
	Support software for PC	TS-Manager			
Option	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			
Option	Protective structure	IP20			

TS-S2/TS-SH/TS-X/TS-P

TS-X / TS-P specification selection table

Some specifications are automatically determined by the robot model.

TS-X

		T4LH/ C4LH	T5LH/ C5LH	T6L/ C6L	T9	T9H	F8/ C8	F8L/ C8L	F8LH/ C8LH	F10/ C10	F10H	F14/ C14	F14H/ C14H	GF14XL	F17/ C17	F17L/ C17L	GF17XL	F20/ C20	F20N	N15/ N15D	N18/ N18D	B10	B14	B14H	R5	R10	R20
Power supply voltage / Current sensor	TS-X	105	●	●	●		●	●	●	●		●		●								●	●	●	●	●	
		110				●					●		●	●													●
		205	●	●	●	●	●	●	●	●		●										●	●	●	●	●	
		210				●					●		●	●							●						●
		220													●	●	●	●	●	●	●						
Regenerative unit	No entry (None)				(1)	(2)				(1)	(2)	(1)	(2)	●	(3)		(6)	(3)	(4)		●	●			(5)		
	R (RGT)				(1)	(2)				(1)	(2)	(1)	(2)		(3)	●	(6)	(3)	(4)	●	●			(5)			

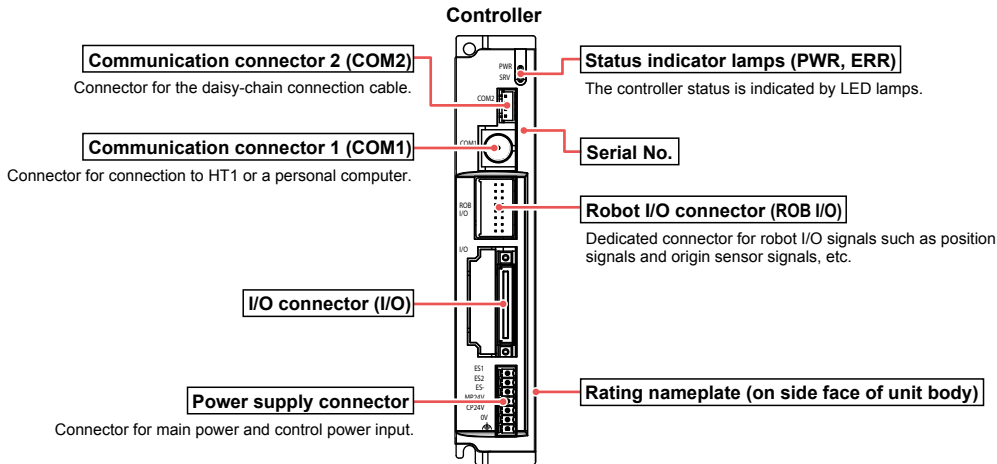
- (1) Regenerative unit is needed if using in a perpendicular position and movement stroke is 700mm or more.
- (2) Regenerative unit is needed if using in a perpendicular position.
- (3) [The following arrangements require a regeneration unit.]
 - Using in the upright position.
 - To move at a speed exceeding 1,000 mm/sec horizontally.
 - High lead (40) used horizontally.
- (4) Regenerative unit is needed if using at maximum speeds exceeding 1000mm per second.
- (5) Regenerative unit is needed if using at maximum speeds exceeding 1250mm per second.
- (6) Regenerative unit is needed if using at maximum speeds exceeding 750mm per second.

TS-P

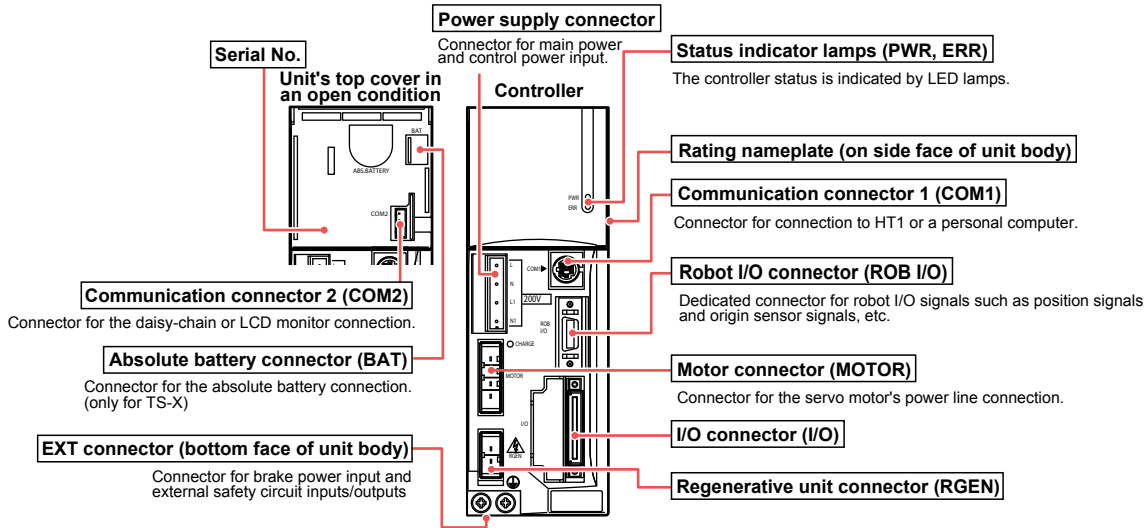
		MF7/7D	MF15/15D	MF20/20D	MF30/30D	MF75/75D
Power supply voltage / Current sensor	TS-P	105				
		110	●		●	
		205				
		210	●	●		
		220			●	●
Regenerative unit	No entry (None)	●	●			
	R (RGT)			●	●	
	R (RGU-2)					●

Part names

TS-S2/TS-SH

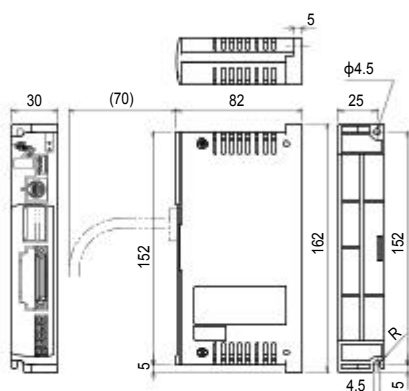


TS-X/TS-P

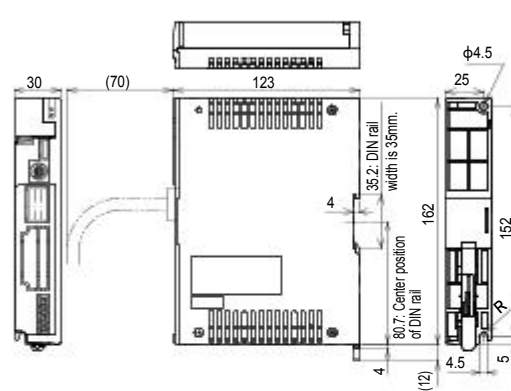


■ Dimensions

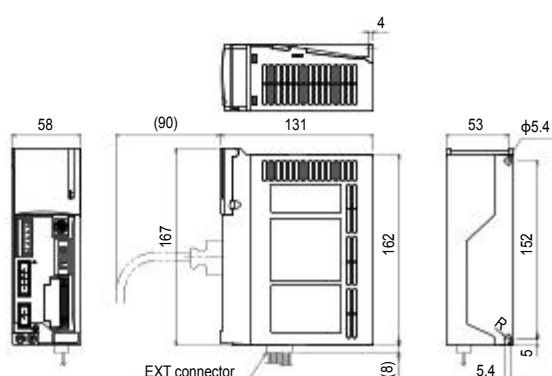
■ TS-S2



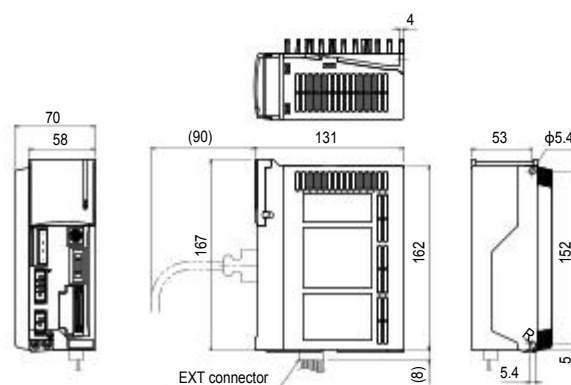
■ TS-SH



■ TS-X/TS-P (105/110/205/210)



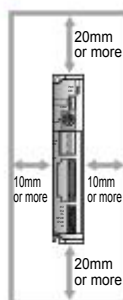
■ TS-X/TS-P (220)



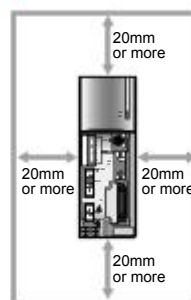
■ Installation conditions

- Install the TS-S2/TS-SH/TS-X/TS-P inside the control panel.
- Install the TS-S2/TS-SH/TS-X/TS-P on a vertical wall.
- Install the TS-S2/TS-SH/TS-X/TS-P in a well ventilated location, with space on all sides of the TS-S2/TS-SH/TS-X/TS-P (See fig. at right.).
- Ambient temperature : 0 to 40°C
- Ambient humidity : 35 to 85% RH (no condensation)

■ TS-S2/TS-SH



■ TS-X/TS-P



■ Cautions on TS-S2 / TS-SH

For the RF type sensor specifications, the controllers "TS-S2" and "TS-SH" become "TS-S2S" and "TS-SHS", respectively.

TS-S2 / TS-SH (Standard specifications)

"BK" label is affixed to the front of the controller.



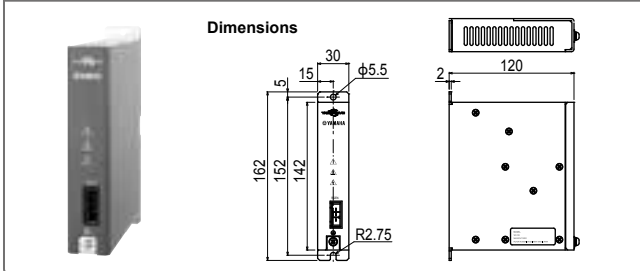
TS-S2S / TS-SHS (Sensor specifications)

"SENSOR" label is affixed to the front of the controller.
 (Be aware that "TS-S2S" is affixed to the front of the controller.)



■ Regenerative unit RGT/RGU-2

Regenerative unit RGT

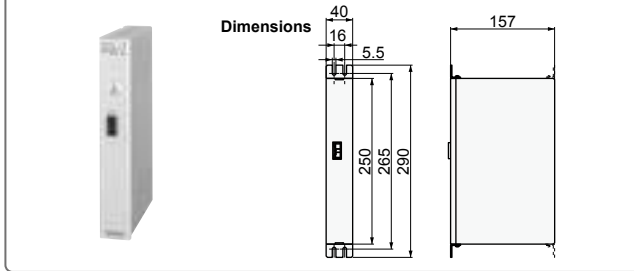


- Basic specifications

Item	RGT
Model	KCA-M4107-0A (including cable supplied with unit)
Dimensions	W30 × H142 × D118mm (Not including installation stay)
Weight	470g
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.

Regenerative unit RGU-2



- Basic specifications

Item	RGU-2 TS-P
Model	KCA-M4107-2A (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.

■ Data overview

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

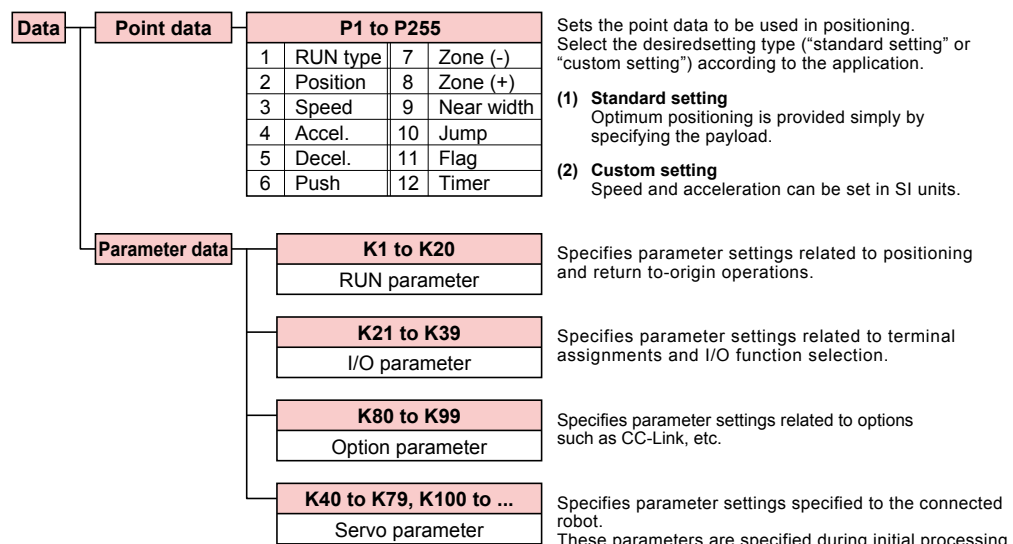
Point data

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/s²) in SI units. Select the desired setting type according to the application.

Parameter data

Parameter data is divided into the following categories: "RUN parameters", "I/O parameters", "option parameters", and "servo parameters".

- Data structure



- 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”

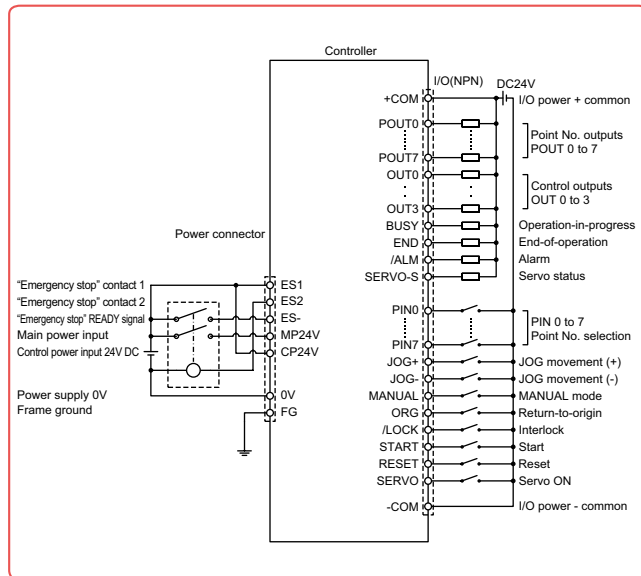
There are 2 setting types for point data ("standard setting" or "custom setting"). Select the desired setting type according to the application.

The maximum number of setting points for both setting types is 255 points (P1 to P255).

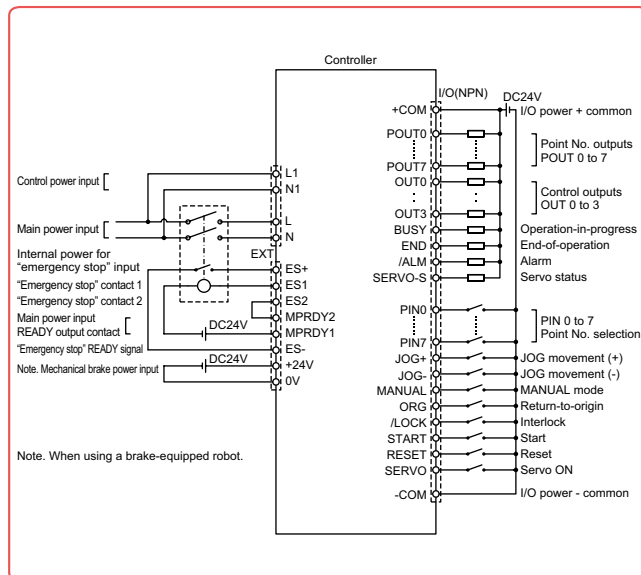
Setting Type	Description
Standard setting	Optimum positioning is provided simply by specifying the payload. This setting type is well-suited to assembly and transport applications.
Custom setting	Allows changing the speed and acceleration in SI units so the desired positioning operation can be set. This setting type is suited for machining and inspection systems.

■ NPN type input / output wiring diagram

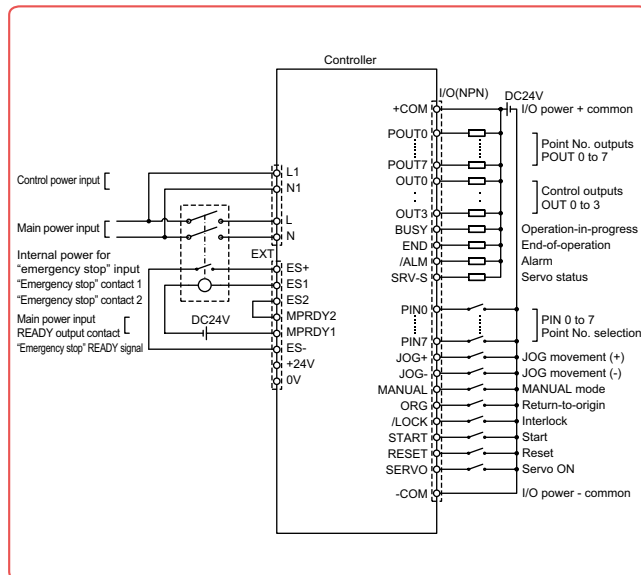
■ TS-S2/TS-SH



TS-X

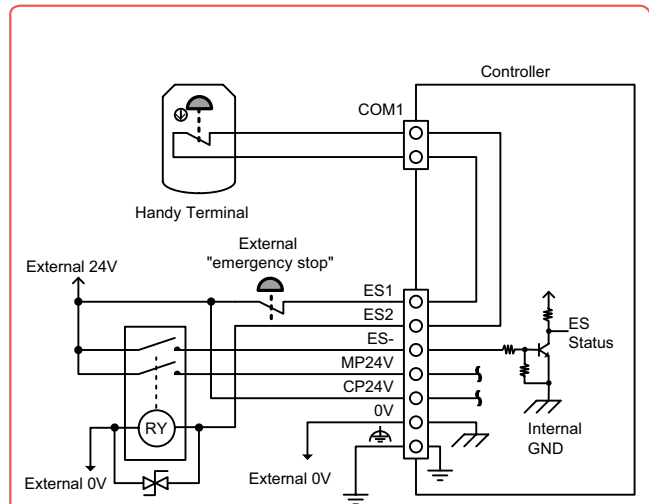


TS-P



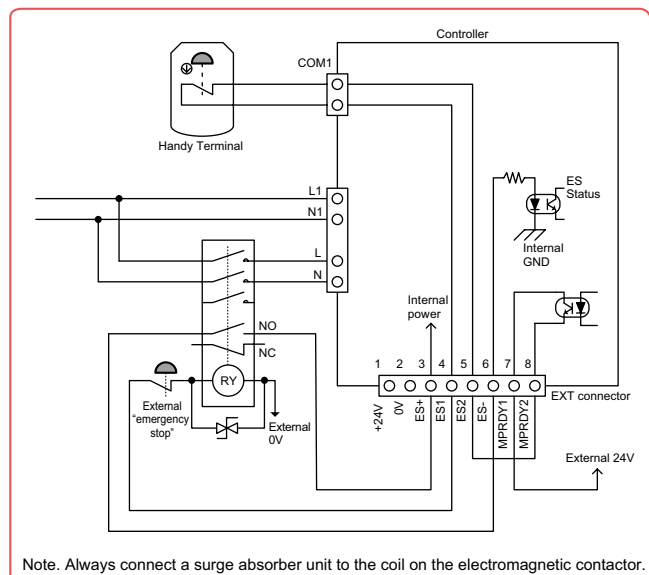
Emergency stop circuit example

■ TS-S2/TS-SH (power connector and host unit connection example)



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

■ TS-X/TS-P (EXT connector and host unit connection example)



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

Installing an external safety circuit will satisfy safety category class 4 standards. See P.715 for more information.

■ I/O Specifications

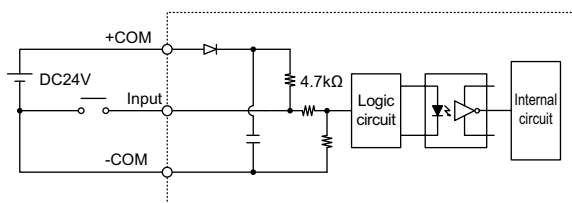
Item	Description
NPN	Input 16 points, 24VDC +/-10%, 5.1mA/point, positive common Output 16 points, 24VDC +/-10%, 50mA/point, sink type
PNP	Input 16 points, 24VDC +/-10%, 5.5mA/point, minus common Output 16 points, 24VDC +/-10%, 50mA/point, source type
CC-Link	CC-Link Ver.1.10 compatible, Remote station device (1 node)
DeviceNet™	DeviceNet™ Slave 1 node
EtherNet/IP™	EtherNet/IP™ adapter (2 ports)
PROFINET	PROFINET Slave 1 node

I/O signals (NPN / PNP)

No.	Signal Name	Description	No.	Signal Name	Description
A1	+COM	I/O power input, positive common (24VDC +/-10%)	B1	POUT0	Point No. outputs
A2			B2	POUT1	
A3	NC	No connection	B3	POUT2	
A4	NC		B4	POUT3	
A5	PIN0	Point No. select	B5	POUT4	
A6	PIN1		B6	POUT5	
A7	PIN2		B7	POUT6	
A8	PIN3		B8	POUT7	
A9	PIN4		B9	OUT0	
A10	PIN5		B10	OUT1	
A11	PIN6		B11	OUT2	
A12	PIN7		B12	OUT3	
A13	JOG+	JOG movement (+ direction)	B13	BUSY	Operation-in-progress
A14	JOG-	JOG movement (- direction)	B14	END	Operation-end
A15	MANUAL	MANUAL mode	B15	/ALM	Alarm
A16	ORG	Return-to-origin	B16	SRV-S	Servo status
A17	/LOCK	Interlock	B17	NC	No connection
A18	START	Start	B18	NC	
A19	RESET	Reset	B19	-COM	I/O power input, negative common (0V)
A20	SERVO	Servo ON	B20		

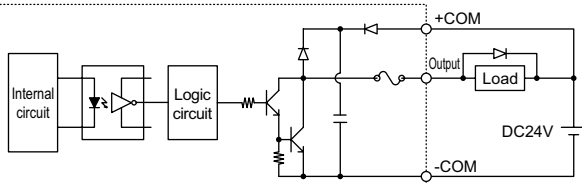
NPN type I/O circuit details

Input circuit



Type : DC input (plus common type)
 Photo-coupler isolation format
Load : 24VDC +/- 10%, 5.1mA
 OFF voltage : 19.6Vmin (1.0mA)
 ON voltage : 4.9Vmax (4.0mA)

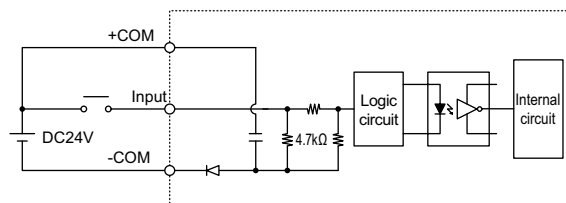
Output circuit



Type : NPN open collector output
 (Minus common type)
 Photo-coupler isolation format
Load : 24VDC, 50mA/point

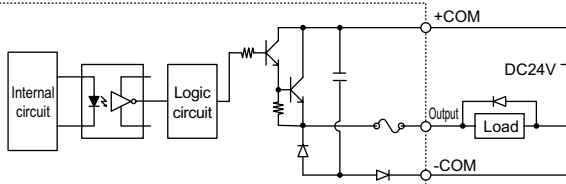
PNP type I/O circuit details

Input circuit



Type : DC input (minus common type)
 Photo-coupler isolation format
Load : 24VDC +/- 10%, 5.5mA
 ON voltage : 19.6Vmin (4.5mA)
 OFF voltage : 4.9Vmax (1.1mA)

Output circuit



Type : PNP open collector output
 (Plus common type)
 Photo-coupler isolation format
Load : 24VDC, 50mA/point

Accessories and part options

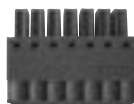
TS-S2/TS-SH/TS-X/TS-P



Standard accessories

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

Power connector

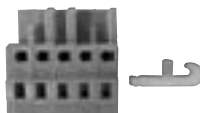


Model KCC-M4421-00

TS-S2
TS-SH
TS-SD

Power connector (AC100V specifications)

Included when 100V model is purchased

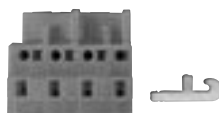


Model KCA-M5382-00

TS-X
TS-P

Power connector (AC200V specifications)

Included when 200V model is purchased



Model KAS-M5382-00

LCC140
TS-X
TS-P
SR1-X
SR1-P
RCX320
RCX340/341

EXT connector

For braking power and safety circuit connections.



Model KCA-M5370-00

TS-X
TS-P

Dummy connector



Model KCA-M5163-00

TS-S2
TS-SH
TS-X
TS-P

I/O cables (2m/20-core×2)



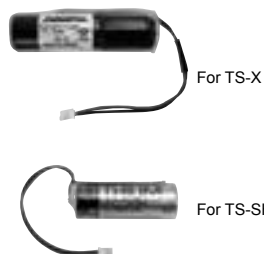
Model KCA-M4421-20

TS-S2
TS-SH
TS-X
TS-P

Absolute battery

Absolute battery basic specifications

Item	For TS-X	For TS-SH
Battery type	Lithium metallic battery	
Battery capacity	3.6V / 1,650mAh	3.6V / 2,700mAh
Data holding time	About 1 year (in state with no power applied)	
Dimensions	φ18 × L60mm	φ17 × L53mm
Weight	24g	21g



Model KCA-M53G0-10 (For TS-X)
KCA-M53G0-02 (For TS-SH)

Note. The absolute battery is subject to wear and requires replacement. If trouble occurs with the memory then remaining battery life is low so replace the absolute battery. The battery replacement period depends on usage conditions. But generally you should replace the battery after about 1 year counting the total time after connecting to the controller and left without turning on the power.

TS-X
TS-SH
RCX320
RCX340/341
RCX3-SMU

CC-Link connector (CC-Link specifications)

Included when CC-Link model is purchased



Model Connector^{Note} KCA-M4872-00
Jump socket KCA-M4873-00

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

TS-S2
TS-SH
TS-X
TS-P

See next page for optional parts

Options

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

● Handy terminal HT1/HT1-D

P.656



Model	HT1		HT1-D
	3.5m	10m	
	KCA-M5110-0J	KCA-M5110-6J	KCA-M5110-1J
Enable switch	—		3-position
CE marking	Not supported		Applicable

TS-S2
TS-SH
TS-X
TS-P

● Support software TS-Manager

P.648



Model	KCA-M4966-0J (Japanese)	KCA-M4966-0E (English)
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TS-S2
TS-SH
TS-X
TS-P
TS-SD

● TS-Manager environment

OS	Windows 2000, XP (32bit), Vista, 7, 8 / 8.1, 10 (Supported version: V.1.4.5 or later) 11 (Supported version: V.1.4.5 or later)
CPU	Exceeding the environment recommended by the OS being used
Memory	Exceeding the environment recommended by the OS being used
Hard disk	Vacant capacity of more than 20MB in the installation destination drive
Communication port	Serial (RS-232C), USB
Applicable controllers	TS series

Note. Windows is the registered trademark of US Microsoft Corporation in U.S.A. and other countries.

● Data cables

Communication cable for TS-Manager.
Select from USB cable or D-sub cable.



Model	USB type (5m)	KCA-M538F-A0
	D-Sub type (5m)	KCA-M538F-01

Note. USB driver for communication cable can also be downloaded from our website.

TS-S2
TS-SH
TS-X
TS-P
TS-SD

● Daisy chain and gateway connection cable



Model	KCA-M532L-00 (300mm)
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TS-S2
TS-SH
TS-X
TS-P
TS-SD

● CC-Link termination connector (CC-Link specifications)



Model	KCA-M4874-00
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TS-S2
TS-SH
TS-X
TS-P

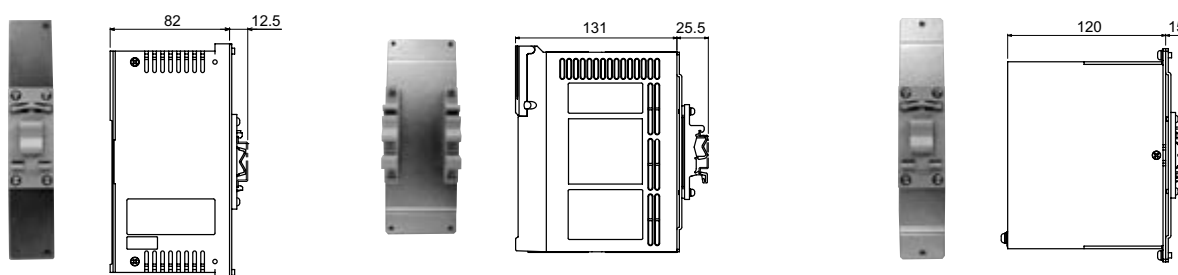
● TS-Monitor (LCD monitor) P.660



Model	For TS-X	KCA-M5119-00
	For TS-P	KCA-M5119-10

TS-X
TS-P

● DIN rail mounting bracket (This bracket is provided in TS-SH as standard equipment.)



Model	For TS-S2
	KCC-M499A-00

TS-S2

Model	For TS-X / TS-P
	KCA-M499A-00

TS-X
TS-P

Model	For TS-X / TS-P with RGT
	KCA-M499A-10

TS-X
TS-P

Linear conveyor modules	LCMR200
Single-axis robots	GX
Linear conveyor modules	LCM100
SCARA robots	YK-X
Single-axis robots	Robonity
Linear motor single-axis robots	PHASER
Single-axis robots	FLIP-X
Compact single-axis robots	TRANSERO
Cartesian robots	XY-X
Pick & place robots	YP-X
	CLEAN
	CONTROLLER
	INFORMATION
Robot positioner	
Pulse string driver	
Robot controller	
RCXIV2+ Electric gripper	
Option	

TS-SD

- CE compliance
- Only for pulse train control
- Dedicated for TRANSERVO

The TS-SD is a high-performance robot driver specifically designed for the TRANSERVO series that supports pulse train command input.



Support software for PC

► TS-Manager

P.648



TS-SD

Basic specifications

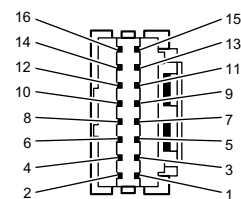
Item		TS-SD
Basic specifications	Number of controllable axes	Single-axis
	Controllable robots	TRANSERVO series ^{Note}
	Current consumption	3A (Rating) 4.5A (Max.)
	Dimensions	W30 × H162 × D82mm
	Weight	Approx. 0.2kg
Input power supply	Control power supply	DC24V +/-10%
	Main power supply	DC24V +/-10%
Axis control	Operating method	Pulse train control
	Control method	Closed loop vector control method
	Position detection method	Resolver
	Resolution	20480 P/rev, 4096 P/rev
	Origin search method	Incremental
External input/output	Pulse train command input	Line driver method : 500 kpps or less Open collector method : 100 kpps or less (DC5 to 24V +/-10%)
	Input	Servo ON (SERVO), reset (RESET) origin search (ORG)
	Output	Servo status (SRV-S), alarm (/ALM), positioning completion (IN-POS), return-to-origin end status (ORG-S)
	External communications	RS-232C 1CH
Options	Support software for PC	TS-Manager
General specifications	Operating temperature	0°C to 40°C
	Storage temperature	-10°C to 65°C
	Operating humidity	35% to 85%RH (non-condensing)
	Storage humidity	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, overheat, overload, overvoltage, low voltage, position deviation, control power voltage drop, overcurrent, motor current error, CPU error, motor line disconnection, command speed over, pulse frequency over	

Note. Except for RF type sensor specifications and STH type vertical specifications.

I/O signal table

No.	Signal Name	Description
1	+COM	I/O power supply input (DC 24V +/- 10%)
2	OPC	Open collector power supply input
3	PULS1	Command pulse input 1
4	PULS2	Command pulse input 2
5	DIR1	Command direction input 1
6	DIR2	Command direction input 2
7	ORG	Return-to-origin
8	NC	Prohibited to use this signal.
9	RESET	Reset
10	SERVO	Servo ON
11	ORG-S	Return-to-origin end status
12	IN-POS	Positioning completion
13	/ALM	Alarm
14	SRV-S	Servo status
15	-COM	I/O power supply input (0V)
16	FG	Ground

I/O connector



Controllable robot	TRANSERVO P335
CE marking	
Field networks	—

Model Overview

Name		TS-SD
Controllable robot		Dedicated compact single-axis TRANSERVO
Input power	Control power supply	DC24V +/-10% maximum
	Main power supply	
Operating method		Pulse train control
Maximum number of controllable axes		Single-axis
Origin search method		Incremental

Ordering method

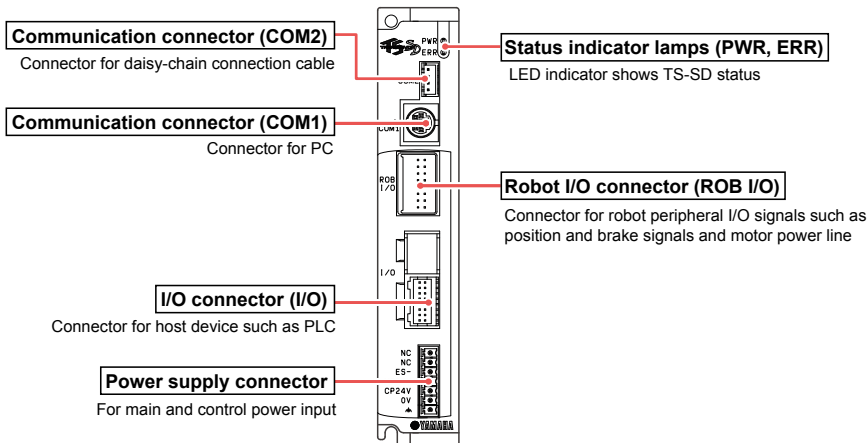
Controller only
TS-SD^{Note}
Controller

Robot + Controller

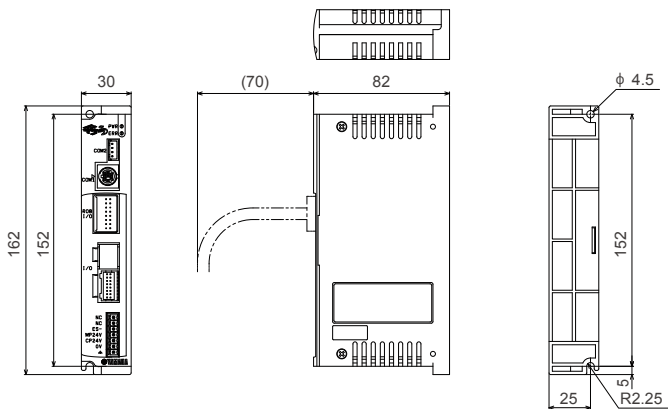
Robot model	Cable length	Controller	I/O cable
TRANSERVO Series	1L: 1 meter 3L: 3 meters 5L: 5 meters 10L: 10 meters (flexible cables)	SD	1L: 1 meter

Note. I/O cable (1 meter) comes supplied with unit.

Part names

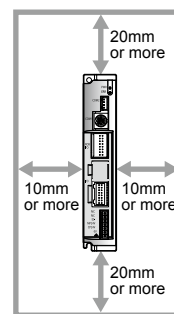


Dimensions



Installation conditions

- Install the TS-SD inside the control panel.
- Install the TS-SD on a vertical wall.
- Install the TS-SD in a well ventilated location, with space on all sides of the TS-SD (See fig. at right.).
- Ambient temperature : 0 to 40°C
- Ambient humidity : 35 to 85% RH (no condensation)

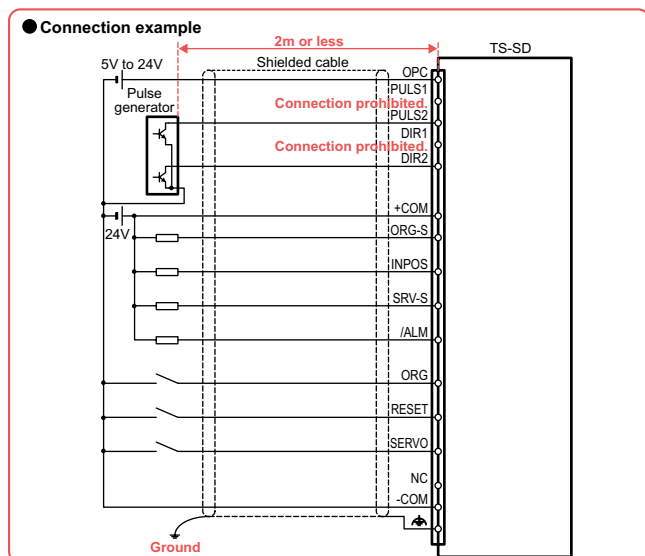


I/O signal list

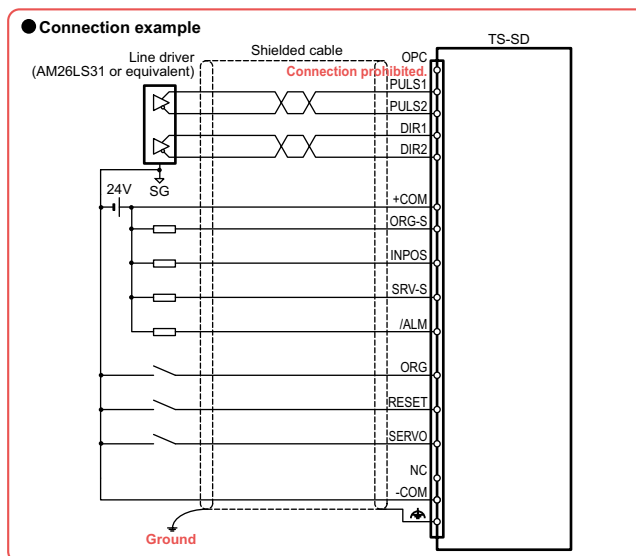
Type	Signal Name	Open collector	Line driver	Description
Inputs	OPC	Open collector power supply input	(Connection prohibited. ^{Note 2})	Input the power supply for the open collector. (DC5 to 24V +/- 10%)
	PULS1	(Connection prohibited. ^{Note 1})	Command pulse input (+)	Input terminal for pulse train input commands. Select from 3 command forms by changing parameters.
	DIR1	(Connection prohibited. ^{Note 1})	Command direction input (+)	
	PULS2	Command pulse input	Command pulse input (-)	• Phase A/Phase B input • Pulse/Sign input • CW/CCW input
	DIR2	Command direction input	Command direction input (-)	
	ORG	Return-to-origin	←	Starts return-to-origin when ON and stops it when OFF.
	RESET	Reset	←	Alarm reset
Outputs	SREVO	Servo ON	←	ON: servo on; OFF: servo off.
	ORG-S	Return-to-origin end status	←	ON at return-to-origin end.
	IN-POS	Positioning completion	←	ON when accumulated pulse in deviation counter are within specified value range.
	/ALM	Alarm	←	ON when normal. OFF when alarm occurs.
	SRV-S	Servo status	←	ON when servo is on.

Note 1. When using the open collector specifications, do not connect any signal to the PULS1 and DIR1 terminals. Doing so may cause the driver to malfunction or breakdown.
 Note 2. When using the line driver specifications, do not connect any signal to the OPC terminal. Doing so may cause the driver to malfunction or breakdown.

Input / output signal connection diagram [open collector]



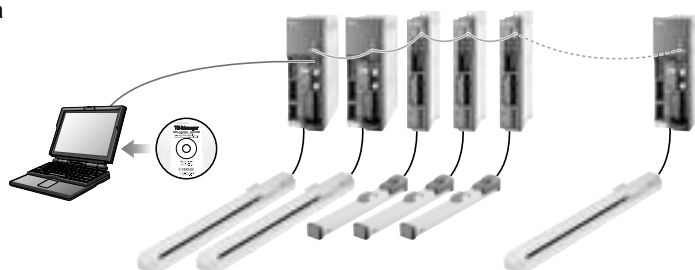
Input / output signal connection diagram [line driver]



Daisy chain function

Connecting two or more TS series controllers and drivers in a daisy chain allows editing data on any one unit from a PC.

- Up to 16 units connectable
- Requires daisy chain coupler cables.



Accessories and part options

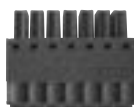
TS-SD



Standard accessories

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

Power connector



Model KCC-M4421-00

TS-S2
TS-SH
TS-SD

I/O cables (1m)



Model KCC-M5362-00

TS-SD

Options

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

Support software TS-Manager

P.648



Model KCA-M4966-0J (Japanese)
KCA-M4966-0E (English)

TS-S2
TS-SH
TS-X
TS-P
TS-SD

TS-Manager environment

OS	Windows 2000, XP (32bit), Vista, 7, 8 / 8.1, 10 (Supported version: V.1.4.5 or later) 11 (Supported version: V.1.4.5 or later)
CPU	Exceeding the environment recommended by the OS being used
Memory	Exceeding the environment recommended by the OS being used
Hard disk	Vacant capacity of more than 20MB in the installation destination drive
Communication port	Serial (RS-232C), USB
Applicable controllers	TS series

Note. Windows is the registered trademark of US Microsoft Corporation in U.S.A. and other countries.

Data cables

Communication cable for TS-Manager.
Select from USB cable or D-sub cable.



USB



D-Sub

Model USB type (5m) KCA-M538F-A0
D-Sub type (5m) KCA-M538F-01

Note. USB driver for communication cable can also be downloaded from our website.

TS-S2
TS-SH
TS-X
TS-P
TS-SD

Daisy chain and gateway connection cable



Model KCA-M532L-00 (300mm)

TS-S2
TS-SH
TS-X
TS-P
TS-SD

RDV-X/RDV-P

● Only for pulse train control

These are high-performance robot drivers for the FLIP-X series and PHASER series which support pulse train command input.



Support software for PC

► RDV-Manager

P.652



RDV-X



RDV-P

Basic specifications

Item			RDV-X			RDV-P			
Driver model			RDV-X205	RDV-X210	RDV-X220	RDV-P205	RDV-P210	RDV-P220	RDV-P225
Number of controllable axes			Single-axis						
Controllable robots			Single-axis robot FLIP-X			Linear motor single-axis robot PHASER			
Basic specifications	Capacity of the connected motor		200V 100W or less	200V 200W or less	200V 600W or less	200V 100W or less	200V 200W or less	200V 400W or less	200V 750W or less
	Maximum power consumption		0.3kVA	0.5kVA	0.9kVA	0.3kVA	0.5kVA	0.9kVA	1.3kVA
	Dimensions		W40×H160×D140mm		W40×H160×D170mm	W40×H160×D140mm		W40×H160×D170mm	W55×H160×D170mm
	Weight		0.7kg		1.1kg	0.7kg		1.1kg	1.2kg
	Input power supply	Control power supply	Single phase 200 to 230V +10% to -15%, 50/60Hz +/-5%						
		Main power supply	Single phase / 3-phase 200 to 230V +10% to -15%, 50/60Hz +/-5%						
Axis control	Position detection method		Resolver			Magnetic linear scale			
	Control system		Sine-wave PWM (pulse width modulation)						
	Control mode		Position control						
	Maximum speed ^{Note 1}		5000rpm			3.0m/s			
Input/output related function	Position command input		Line driver signal (2M pps or less) (1) Forward pulse + reverse pulse (2) Sign pulse + Command pulse (3) 90-degree phase difference 2-phase pulse command One of (1) to (3) is selectable.						
	Input signal		24V DC contact point signal input (usable for sink/source) (24V DC power supply incorporated) (1) Servo ON (2) Alarm reset (3) Torque limit (4) Forward overtravel (5) Reverse overtravel (6) Origin sensor ^{Note 3} (7) Return-to-origin (8) Pulse train input enable (9) Deviation counter clear						
	Output signal		Open collector signal output (usable for sink/source) (1) Servo ready (2) Alarm (3) Positioning completed (4) Return-to-origin complete						
	Relay output signal		Braking cancel signal (24V 375mA)			-			
	Position output		Phase A, B signal output: Line driver signal output Phase Z signal output: Line driver signal output / open collector signal output N/8192 (N=1 to 8191), 1/N (N=1 to 64) or 2/N (N=3 to 64)						
	Monitor output		Selectable items: 2ch, 0 to +/-5V voltage output, speed detection value, torque command, etc.						
Internal function	Display		5-digit number indicator, Control power LED						
	External operator		PC software “RDV-Manager” monitoring function, parameter setting function, operation tracing function, trial operation function, etc. USB2.0 is used. Windows Vista / 7 / 8 / 8.1 personal computer can be connected.						
	Regenerative braking circuit		Included (but without braking resistor)						
	Dynamic brake ^{Note 4}		Included (Operation conditions can be set.) (No DB resistor, connection: 2-phase short circuit)						
	Protective function ^{Note 2}		Semi-enclosure type (IP20)						
	Protective functions		Over-current, overload, braking resistor overload, main circuit overvoltage, memory error, etc.						
		Included (Operation conditions can be set.) (with DB resistor, connection: 2-phase short circuit)							

Controllable robot	RDV-X ▶ FLIP-X^{Note 1} P.289	RDV-P ▶ PHASER P.267
CE marking		Field networks 

Note 1. Exclude T4 / T5 / C4 / C5 / YMS

Model Overview

Name	RDV-X	RDV-P
Controllable robot	Single-axis robot FLIP-X ^{Note 1}	Linear motor single-axis robot PHASER
Input power	Control power supply	Single phase 200 to 230V +10% to -15% (50/60Hz +/-5%)
	Main power supply	Single phase / 3-phase 200 to 230V +10% to -15% (50/60Hz +/-5%)
Operating method	Pulse train control	
Maximum number of controllable axes	Single-axis	
Origin search method	Incremental	

Ordering method

RDV-X

RDV-X	2		
Controller	Power-supply voltage 2: AC200V	Driver ^{Note} 05: 100W or less 10: 200W or less 20: 600W or less	Regenerative unit ^{Note} No entry: None RBR1 RBR2

Note. Driver selection and regenerative unit selection depend on the robot type. See the selection table on the next page for selecting the driver/regenerative circuit.

RDV-P

RDV-P	2		
Controller	Power-supply voltage 2: AC200V	Driver ^{Note} 05: 100W or less 10: 200W or less 20: 400W or less 25: 750W or less	Regenerative unit ^{Note} No entry: None RBR1 RBR2

Note. Driver selection and regenerative unit selection depend on the robot type. See the selection table on the next page for selecting the driver/regenerative circuit.

Item	RDV-X	RDV-P
Driver model	RDV-X205 RDV-X210 RDV-X220	RDV-P205 RDV-P210 RDV-P220 RDV-P225
Options	Support software for PC RDV-Manager	
General specifications	Operating temperature	0°C to +55°C
	Storage temperature ^{Note 5}	-10°C to +70°C
	Operating humidity	20% to 90%RH (non-condensing)
	Vibration ^{Note 6}	5.9m/s ² (0.6G) 10 to 55Hz

Note 1. These data are parameters and calculation range in controlling the robot driver and do not indicate the capacity of the robot at the maximum speed.

Note 2. JIS C 0920 (IEC60529) is used as the base for the protection method.

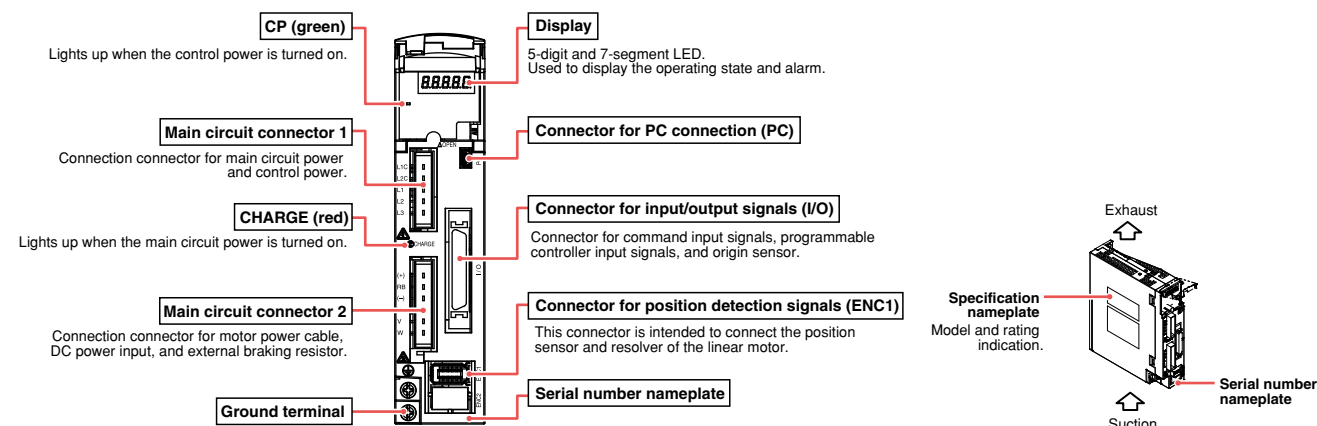
Note 3. GXL-8FB (made by SUNX) or FL7M-1P5B6-Z (made by YAMATAKE) is used for the origin sensor. The power consumption of the origin sensor is 15mA or less (at open output) and only 1 unit of the origin sensor is connected to each robot driver. (future specification)

Note 4. Use the dynamic brake for emergency stop. Note that the braking may be less effective depending on the robot model.

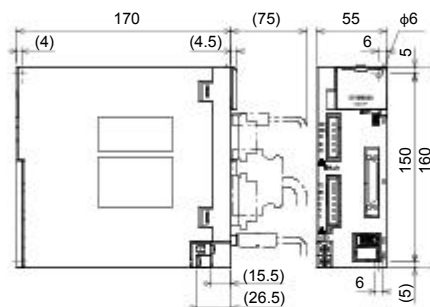
Note 5. The storage temperature is the temperature in the non-energized state including transportation.

Note 6. The JIS C 60068-2-6:2010 (IEC 60068-2-6:2007) test method is uses as the base.

Part names



RDV-P225



① If placed horizontally the RBR1 is required, if placed vertically then RBR2 is required.

			PHASER				
			MF7/ MF7D	MF15/ MF15D	MF20/ MF20D	MF30/ MF30D	MF75/ MF75D
Driver selection	RDV-P	05					
		10	●	●	●		
		20				●	
		25					●
Regenerative unit	RBR1		●	●	●		
	RBR2					●	

The regenerative unit is a device that converts the braking current generated when the motor decelerates into heat.
Regenerative unit is required for specified Yamaha models and for operation with loads having large inertia.

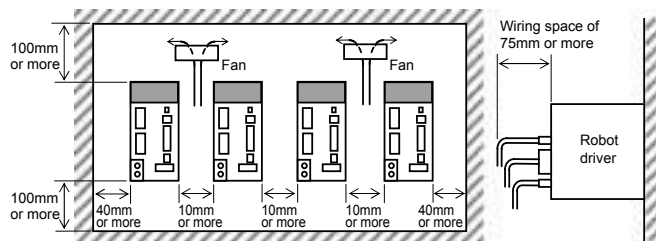
[illegible]

- Note. The internal thermal contact point capacity is AC250V, 2A max. ON (b contact point) in the normal state.
- Note. The built-in thermal fuse prevents abnormal heat generation which occurs by an erroneous use. (not resettable)
- Note. When the thermal relay has worked, reduce the regeneration energy by either stopping the servo amplifier or making the deceleration time longer.
- Note. With the regenerative unit, specifications and whether or not required may vary depending on each robot and its operation conditions.

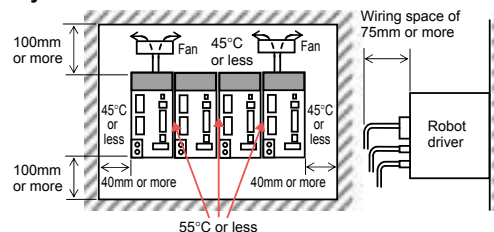
Installation conditions

- Install the RDV-X/RDV-P on a vertical metal wall.
- Install the RDV-X/RDV-P in a well ventilated location, with space on all sides of the RDV-X/RDV-P.
- Ambient temperature: 0 to 55°C
- Ambient humidity: 20 to 90% RH (no condensation)
- When placing two or more robot drivers in one operating panel, install them as shown in the figure below.

Stored inside RDV-X/RDV-P panel

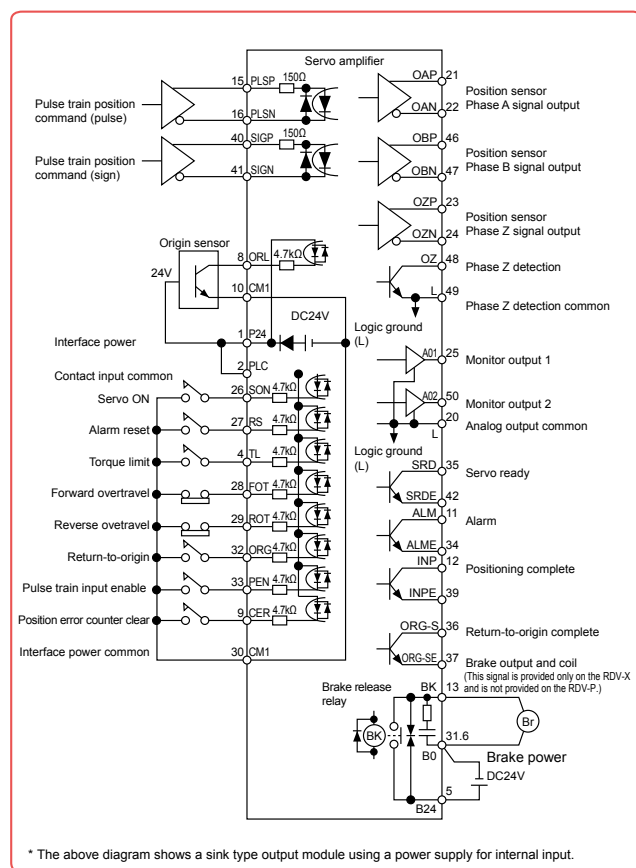


Side-by-side installation



* Note that the ambient temperature is 45°C or less or the effective load factor is 75% or less.

Input / output signal connection diagram



List of RDV-P / RDV-X terminal functions

Type	Terminal symbol	Terminal name	Description
Input signal	P24	Interface power	Supplies 24V DC for contact inputs. Connecting this signal to the PLC terminal allows using the internal power supply. Use this terminal only for contact input. Do not use for controlling external equipment connected to the driver, such as brakes.
	CM1	Interface power common	This is a ground signal for the power supply connected to P24. If using the internal power supply then input a contact signal between this signal and the contact-point signal.
	PLC	Intelligent input common	Connect this signal to the power supply common contact input. Connect an external supply or internal power supply (P24).
	SON	Servo ON	Setting this signal to ON turns the servo on (supplies power to motor to control it). Additionally, this signal is also used for estimating magnetic pole position when FA-90 is set to oFF4, oFF5.
	RS	Alarm reset	After an alarm has tripped, inputting this signal cancels the alarm. But before inputting this reset signal, first set the SON terminal to OFF and eliminate the cause of the trouble.
	TL	Torque limit	When this signal is ON, the torque limit is enabled.
	FOT	Forward overtravel	When this signal is OFF, the robot will not run in forward direction. (Forward direction limit signal)
	ROT	Reverse overtravel	When this signal is OFF, the robot will not run in reverse direction. (Reverse direction limit signal)
	ORL	Origin sensor	Input an origin limit switch signal showing the origin area.
	ORG	Return-to-origin	Inputting this signal starts return-to-origin operation.
Output signal	PEN	Pulse train input enable	When this signal is turned on, the pulse train position command input is enabled.
	CER	Position error counter clear	Inputting this signal clears the position deviation (position error) counter. (Position command value is viewed as current position.)
	SRD	Servo ready	This signal is output when the servo is ready to turn on (with main power supply turned on and no alarms tripped)
	ALM	Alarm	This signal is output when an alarm has tripped. (This signal is ON in normal state and OFF when an alarm has tripped.)
	INP	Positioning complete	This signal is output when the deviation between the command position and current position is within the preset positioning range.
Relay output	ORG-S	Return-to-origin complete	This signal is output when the return-to-origin is completed successfully.
	BK (B24)	Brake release relay output	When the servo is ON, this terminal outputs a signal to allow releasing the brake. (FLIP-X series only)
	AO1	Monitor output 1	Outputs speed detection values, torque commands, etc. as analog signal voltages for monitoring. Signals to output are selected by setting parameters. These signals are only for monitoring. Do not use for control.
Monitor output	AO2	Monitor output 2	
	L	Monitor output common	This is the ground for the monitor signal.
Position command	PLSP	Position command pulse (pulse signal)	Select one of the following signal forms as the pulse-train position command input.
	PLSN	Position command pulse (pulse signal)	1. Command pulse + direction signal
	SIGP	Position command pulse (pulse signal)	2. Forward direction pulse train + reverse direction pulse train
	SIGN	Position command pulse (pulse signal)	3. Phase difference 2-phase pulse
	OAP	Position sensor Phase A signal	Outputs monitor signal obtained by dividing "phase A" signal of position sensor.
	OAN	Position sensor Phase A signal	
Position sensor monitor	OBP	Position sensor Phase B signal	Outputs monitor signal obtained by dividing "phase B" signal of position sensor.
	OBN	Position sensor Phase B signal	
	OZP	Position sensor Phase Z signal	Outputs monitor signal for position sensor "phase Z" signal.
	OZN	Position sensor Phase Z signal	
	OZ	Phase Z detection	Outputs monitor signal for position sensor "phase Z" signal.
	L	Phase Z detection common	
Braking power input	B24	Brake power input	Input 24V DC brake power to this terminal.
	B0	Brake power common	Common terminal input for brake power.

Note 1. B24, BO and BK are available only with RDV-X, and not with RDV-P.

Accessories and part options

RDV-X/RDV-P



Standard accessories

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

I/O connector (no brake wiring)



Model KBH-M4420-00

RDV-X

RDV-P

I/O connector (with brake wiring)



Model KBH-M4421-00

RDV-X

RDV-P

Power supply connector



Model KEF-M4422-00

RDV-X

RDV-P

Options

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

Support software RDV-Manager

P.652



Model KEF-M4966-00

RDV-X

RDV-P

Environment

OS	Windows Vista SP1 (32bit) ^{Note 1} , 7, 8 / 8.1 10 (Supported version: V.2.203.12.2 or later) 11 (Supported version: V.2.203.12 or later)
CPU	Pentium4 1.8GHz or more (Recommend)
Memory	1GB or more
Hard disk	1GB of available space required on installation drive.
Disk operation	USB
Applicable controllers	RDV series

Note 1. SP1 (service pack 1) or higher.

Note. Windows is the registered trademark of US Microsoft Corporation in U.S.A. and other countries.

Communication cable

Communication cable to connect PC and a controller.



Model KEF-M538F-01

RDV-X

RDV-P

Linear conveyor modules	LCMR200
Single-axis robots	GX
Linear conveyor modules	LCM100
SCARA robots	YK-X
Single-axis robots	Robonity
Linear motor single-axis robots	PHASER
Single-axis robots	FLIP-X
Compact single-axis robots	TRANSERO
Cartesian robots	XY-X
Pick & place robots	YP-X
	CLEAN
	CONTROLLER
	INFORMATION
Robot positioner	
Pulse string driver	
Robot controller	
RCXIVY2+ Electric gripper	
Option	

ERCD

● Dedicated for T4L / T5L / C4L / C5L

Low price and compact in size.

In addition to the conventional functions, a pulse train function is added for a wider application range.

This is a dedicated controller for the FLIP-X series models T4L, T5L, C4L, and C5L.



Programming box
► HPB/HPB-D
P.658



Support software for PC
► POPCOM+
P.650



ERCD

Basic specifications

Item			ERCD
Number of controllable axes			Single-axis
Controllable robots			Single-axis robot FLIP-X series T4L / T5L / C4L / C5L
Basic specifications	Capacity of the connected motor		DC24V 30W or less
	Dimensions		W44 × H166 × D117mm
	Weight		0.45kg
	Input power supply		DC24V +/-10% maximum 3A to 4.5A (Variable depending on robots in use.)
Axis control	Drive method		AC full-digital software servo
	Position detection method		Resolver
	Operating method		Normal mode: point trace movement, program operation, operation using RS-232C communication Pulse Train mode: operation by pulse train input
	Position indication units		mm (millimeters)
	Speed setting		1% to 100% (Setting by 1% unit)
	Acceleration setting		1. Automatic speed setting per robot No. and payload 2. Setting based on acceleration and deceleration parameter 1% to 100% (Setting by 1% unit)
	Resolution		16384 P/rev
	Origin search method		Incremental
Program	Program language		YAMAHA SRC
	Multitasks		4 tasks
Memory	Point-data input method		Manual data input (coordinates input), Direct teaching, Remote teaching
	RAM		32 Kbytes with lithium battery backup (5-year life) Retains programs, point data, parameters and alarm history
	Programs		100 programs (Maximum program number) 255 steps per program 1024 steps / total or less
	Points		1000 points (256 when point tracing)
External input/output	Normal mode ^{Note 1}	Sequence input	Dedicated input 8 points, General input 6 points
		Sequence output	Dedicated input 3 points, General input 6 points, Open collector output
		Sequence input	Dedicated input 5 points, General input 6 points
		Sequence output	Dedicated input 3 points, General input 6 points, Open collector output
	Pulse train mode ^{Note 1}	Type	1.Phase A / phase B, 2.Pulse / code, 3.CW / CCW
		Mode	Line driver (+5V)
		Frequency	Maximum 2 Mpps
	Feedback pulse output	Terminal name	PA+, PA-, PB+, PB-, PZ+, PZ-
		Type	Phase A / phase B / phase Z
		Mode	Line driver (+5V)
		Number of pulse	16 to 4096 P/rev
	Power supply for sequence I/O		External DC +24V input
	Emergency stop input		Normal close contact point input
	Brake output		Relay output (for 24V/300mA brake) 1CH
	External communications		RS-232C 1CH (For communication with HPB or PC)

Controllable robot	FLIP-X Dedicated for T4L/T5L P.294	Dedicated for C4L/C5L P.520
CE marking	—	—
Field networks	—	—

Model Overview

Name	ERCD
Controllable robot	Dedicated for T4L / T5L / C4L / C5L
Input power	DC24V +/-10% maximum 3A to 4.5A (Variable depending on robots in use.)
Operating method	Pulse train control / Programming / I/O point tracing / Operation using RS-232C communication
Maximum number of controllable axes	Single-axis
Origin search method	Incremental

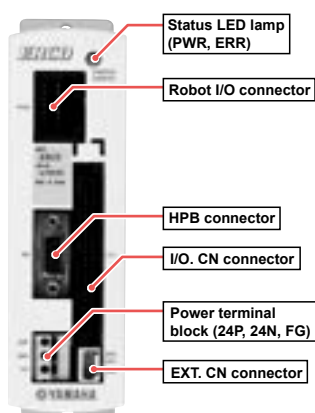
Ordering method

ERCD	
Controller	I/O connector specification
	CN1: I/O flat cable 1m (Standard)
	CN2: Twisted-pair cable 2m (pulse train function)

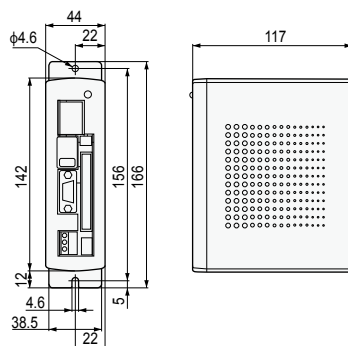
Item	ERCD
Options	HPB, HPB-D (with enable switch)
Support software for PC	POPCOM+
Operating temperature	0°C to 40°C
Storage temperature	-10°C to 65°C
Operating humidity	35% to 85%RH (non-condensing)
Noise resistance capacity	IEC61000-4-4 Level 2
Protective functions	Overload, overvoltage, voltage drop, resolver wire breakage, runaway detection, etc.

Note 1. Switching between the normal mode and pulse train mode is done by use of the parameter.

Part names

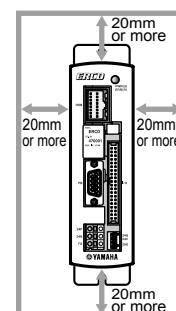


Dimensions



Installation conditions

- Install the ERCD inside the control panel.
- Install the ERCD on a vertical wall.
- Install the ERCD in a well ventilated location, with space on all sides of the ERCD (See fig. below).
- Ambient temperature : 0 to 40°C
- Ambient humidity : 35 to 85% RH (no condensation)



Connector I/O signals

Terminal number	Signal name	Function
A-1	ABS-PT	Move the point from the origin position
B-1	INC-PT	Move the point from the current position
A-2	AUTO-R	Start automatic operation
B-2	STEP-R	Start step operation
A-3	ORG-S	Return to the origin
B-3	RESET	Reset
A-4	SERVO	Return to servo on
B-4	LOCK	Interlock
A-5	DI 0	General input 0
B-5	DI 1	General input 1
A-6	DI 2	General input 2
B-6	DI 3	General input 3
A-7	DI 4	General input 4
B-7	DI 5	General input 5
A-8	(SVCE)	Service mode input
B-8	DO 5	General output 5
A-9	DO 0	General output 0
B-9	DO 1	General output 1
A-10	DO 2	General output 2
B-10	DO 3	General output 3
A-11	DO 4	General output 4
B-11	END	End normal execution
A-12	BUSY	Executing the command
B-12	READY	Ready for operation
A-13	FG	Frame ground
B-13	FG	Frame ground
A-14	GND	Signal ground
B-14	GND	Signal ground
A-15	NC	Reserved (use inhibited)
B-15	NC	Reserved (use inhibited)
A-16	NC	Reserved (use inhibited)
B-16	NC	Reserved (use inhibited)
A-17	PA+	Feedback pulse output
B-17	PA-	Feedback pulse output
A-18	PB+	Feedback pulse output
B-18	PB-	Feedback pulse output
A-19	PZ+	Feedback pulse output
B-19	PZ-	Feedback pulse output
A-20	NC	Reserved (use inhibited)
B-20	NC	Reserved (use inhibited)

Pulse train I/O connector signals

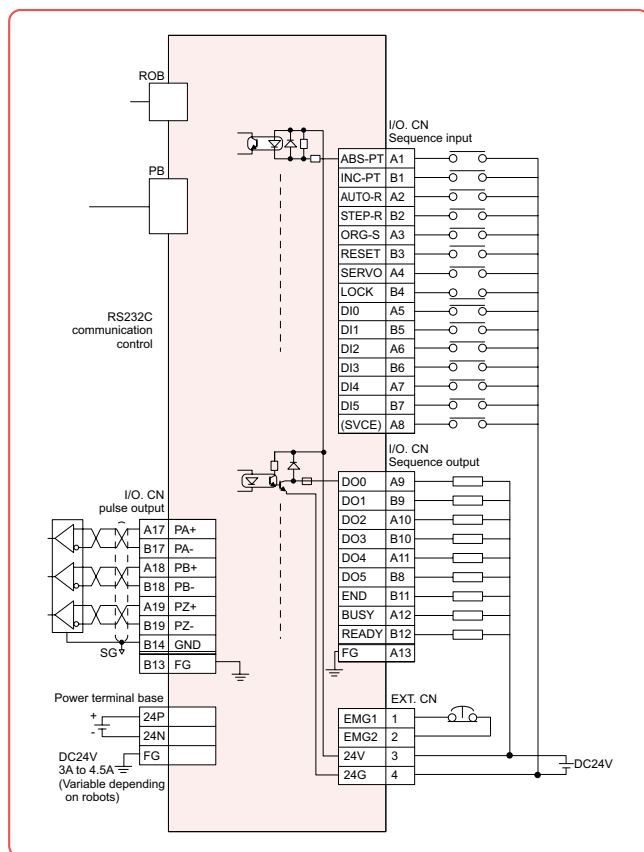
Terminal number	Signal name	Function
A-1	NC	Reserved (use inhibited)
B-1	NC	Reserved (use inhibited)
A-2	NC	Reserved (use inhibited)
B-2	PCLR	Differential clear input
A-3	ORG-S	Return to the origin input
B-3	RESET	Alarm reset input
A-4	SERVO	Servo-ON input
B-4	INH	Command pulse inhibition input
A-5	DI 0	General input 0
B-5	DI 1	General input 1
A-6	DI 2	General input 2
B-6	DI 3	General input 3
A-7	DI 4	General input 4
B-7	DI 5	General input 5
A-8	NC	Reserved (use inhibited)
B-8	DO 5	General output 5
A-9	DO 0	General output 0
B-9	DO 1	General output 1
A-10	DO 2	General output 2
B-10	DO 3	General output 3
A-11	DO 4	General output 4
B-11	IN-POS	In-position output
A-12	SRDY	Servo ready output
B-12	ALM	Alarm output
A-13	FG	Frame ground
B-13	FG	Frame ground
A-14	GND	Signal ground
B-14	GND	Signal ground
A-15	PULS+	Command pulse input
B-15	PULS-	Command pulse input
A-16	DIR+	Command direction input
B-16	DIR-	Command direction input
A-17	PA+	Feedback pulse output
B-17	PA-	Feedback pulse output
A-18	PB+	Feedback pulse output
B-18	PB-	Feedback pulse output
A-19	PZ+	Feedback pulse output
B-19	PZ-	Feedback pulse output
A-20	NC	Reserved (use inhibited)
B-20	NC	Reserved (use inhibited)

Robot Language Table

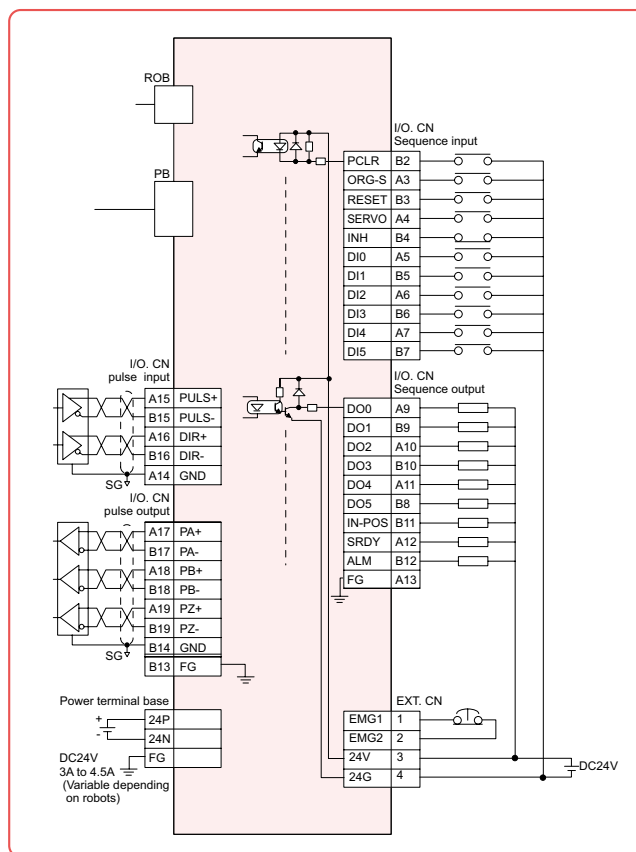
Command	Description
MOVA	Moves to a point data position.
MOVI	Moves from current position by amount of point data.
MOVF	Moves until a specified DI input is received.
JMP	Jumps to a specified label in the specified program.
JMPF	Jumps to a specified label in a specified program according to the input condition.
JMPB	Jumps to a specified label when general-purpose input or memory input is in the specified state.
L	Defines the jump destination for a JMP or JMPF statement, etc.
CALL	Runs another program.
DO	Turns general-purpose output or memory output on or off.
WAIT	Waits until general-purpose input or memory input is in the specified state.
TIMR	Waits the specified amount of time before advancing to the next step.
P	Defines point variable.
P+	Adds 1 to point variable.
P-	Subtracts 1 from point variable.
SRVO	Turns servo on or off.
STOP	Temporarily stops program execution.
ORGN	Performs return-to-origin.
TON	Runs a specified task.
TOFF	Stops a specified task.

Command	Description
JMPP	Jumps to a specified label when the axis position condition meets the specified conditions.
MAT	Defines a matrix.
MSEL	Specifies a matrix to move.
MOVm	Moves to a specified pallet work position on matrix.
JMPC	Jumps to a specified label when the counter array variable C equals the specified value.
JMPD	Jumps to a specified label when the counter variable D equals the specified value.
CSEL	Specifies an array element for counter array variable C.
C	Defines counter array variable C.
C+	Adds a specified value to counter array variable C.
C-	Subtracts a specified value from counter array variable C.
D	Defines counter variable D.
D+	Adds a specified value to counter variable D.
D-	Subtracts a specified value from counter variable D.
SHFT	Shifts the coordinate position by amount of specified point data.
IN	Stores bit information on specified general-purpose input or memory input into counter variable D.
OUT	Outputs the value of counter variable D to specified generalpurpose output or memory output.
LET	Assigns the value of a specified variable to another variable.
TORQ	Defines the maximum torque command value.

Input / output wiring diagram



Pulse train input / output wiring diagram



Pulse train input form

Logic	Command pulse form	CW direction	CCW direction
Positive logic	Phase A / phase B		
	Pulse / code		
	CW / CCW		

Logic	Command pulse form	CW direction	CCW direction
Positive logic	Phase A / phase B		
Negative logic	Pulse / code		
	CW / CCW		

Accessories and part options

ERCD



Standard accessories

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

24V power connector (for EXT. CN)



Model KAU-M4422-00

ERCD

I/O flat cable (CN1): 1m

Connects the standard parallel I/O to an external device. The end of the cable is cut and left as it is.



Model KAU-M4421-00

ERCD

I/O twisted-pair cable (CN2): 2m

Connects the parallel I/O to an external device. The end of the cable is cut and left as it is.



Model KAU-M4421-10

ERCD

Note. Select CN2 when using the pulse train input equipment.

Options

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

Support software for PC **P.650** POPCOM+

POPCOM+ is a simple to use application software that makes tasks such as robot operation, writing-editing programs, and point teaching easy to visually understand.



Model KBG-M4966-00

LCC140

ERCD

SR1-X

SR1-P

Environment

OS	Windows XP (32bit), Vista, 7, 8 / 8.1, 10 (Supported version: V.2.1.1 or later)
CPU	Processor that meets or exceeds the suggested requirements for the OS being used.
Memory	Suggested amount of memory or more for the OS being used.
Hard disk	50MB of available space required on installation drive.
Disk operation	RS-232C
Applicable controllers	SRCX to SR1, DRCX, TRCX, ERCX, ERCD, LCC140 ^{Note 1}

Note 1. LCC140 is applicable to Ver. 2.1.1 or later.

Note. Windows is the registered trademark of US Microsoft Corporation in U.S.A. and other countries.

Data cables

Communication cable for POPCOM+. Select from USB cable or D-sub cable.



USB

D-Sub

Model	USB type (5m)	KBG-M538F-00
	D-Sub type 9pin-9pin (5m)	KAS-M538F-10

Note. This USB cable supports Windows 2000/XP or later.

Note. Data cable jointly used for POPCOM+, VIP+, RCX-Studio Pro and RCX-Studio 2020.

Note. USB driver for communication cable can also be downloaded from our website.

LCC140

ERCD

SR1-X

SR1-P

RCX320

RCX340/341

Programming box HPB/HPB-D **P.658**

This device can perform all operations such as manual robot operation, program entry and edit, teaching and parameter settings.



HPB

HPB-D

	HPB	HPB-D
Model	KBB-M5110-01	KBB-M5110-21
Enable switch	—	3-position
CE marking	Not supported	Applicable

LCC140

ERCD

SR1-X

SR1-P

Linear conveyor modules	LCMR200
Single-axis robots	GX
Linear conveyor modules	LCM100
SCARA robots	YK-X
Single-axis robots	Robonity
Linear motor single-axis robots	PHASER
Single-axis robots	FLIP-X
Compact single-axis robots	TRANSERVO
Cartesian robots	XY-X
Pick & place robots	YP-X
	CLEAN
	CONTROLLER
	INFORMATION
Robot positioner	
Pulse string driver	
Robot controller	
RCXIVY2+ Electric gripper	
Option	

SR1-X/SR1-P

● Robot controller with advanced functions

Compact design with high performance.
Although with one axis, functions of upper class controllers.



SR1-X

SR1-P



Programming box
▶ HPB/HPB-D
P.658



Support software for PC
▶ POPCOM+
P.650

■ Basic specifications

Item			SR1-X			SR1-P		
Basic specifications	Driver model		SR1-X05	SR1-X10	SR1-X20	SR1-P05	SR1-P10	SR1-P20
	Applicable motor output		200V 100W or less	200V 200W or less	200V 600W or less	200V 100W or less	200V 200W or less	200V 600W or less
	Number of controllable axes		Single-axis					
	Controllable robots		Single-axis robot FLIP-X (exclude T4L, T5L)			Linear motor single-axis robot PHASER		
	Maximum power consumption		400VA	600VA	1400VA	400VA	600VA	1400VA
	Capacity of the connected motor		100W	200W	600W	100W	200W	600W
	Dimensions		W74 × H210 × D146mm		W99 × H210 × D146mm	W74 × H210 × D146mm		W99 × H210 × D146mm
	Weight		1.54kg		1.92kg	1.54kg		1.92kg
	Control power supply	Single phase AC100 to 115/200 to 230V +/-10% maximum 50/60Hz						
	Main power supply	Single phase AC100 to 115/200 to 230V +/-10% maximum 50/60Hz			Single phase AC200 to 230V +/-10% maximum 50/60Hz	Single phase AC100 to 115/200 to 230V +/-10% maximum 50/60Hz		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		Programming, I/O point tracing, Remote command, Operation using RS-232C communication					
	Position indication units		mm (millimeters), deg (degrees)					
	Speed setting		1% to 100% (Setting by 1% unit)					
	Acceleration setting		1. Automatic speed setting per robot No. and payload 2. Setting based on acceleration and deceleration parameter (Setting by 1% unit)					
	Resolution		16384 P/rev			1μm		
	Origin search method		Absolute, Incremental			Incremental, Semi-absolute		
Program	Program language		YAMAHA SRC					
	Multitasks		4 tasks maximum					
	Point-data input method		Manual data input (coordinate value input), Direct teaching, Teaching playback					
Memory	Programs		100 programs 255 steps / 1 programs 3000 steps / total					
	Points		1000 points					
External input/output	STD.DIO	I/O input	Dedicated input 8 points, General input16 points					
		I/O output	Dedicated Output4 points, General output16 points					
	SAFETY		Emergency stop input (Normal close contact point input), service mode input					
	Brake output		Relay contact			-		
	Origin sensor input		Connectable to DC 24V normally-closed contact sensor					
	External communications		RS-232C: 1CH (For communication with HPB / HPB-D or PC)					
	Analog input/output		Input 1ch (0 to +10V) Output 2ch (0 to +10V)					
	Options	Slots	1					
		Type	NPN/PNP: Dedicated input 8 points, Dedicated Output 4 points, General input 16 points, General output 16 points					
			CC-Link: Dedicated input 16 points, Dedicated Output 16 points, General input 32 points, General output 32 points DeviceNet™: Dedicated input 16 points, Dedicated Output 16 points, General input 32 points, General output 32 points PROFIBUS: Dedicated input 16 points, Dedicated Output 16 points, General input 32 points, General output 32 points					

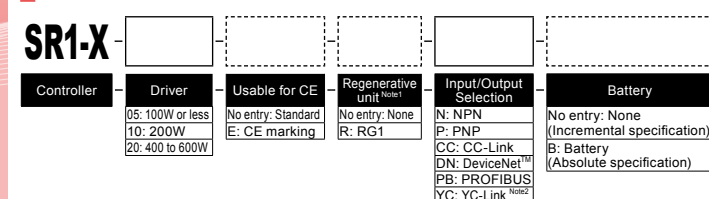
Controllable robot	SR1-X ▶ FLIP-X P.289	SR1-P ▶ PHASER P.267
CE marking		Field networks CC-Link DeviceNet 

Model Overview

Name		SR1-X	SR1-P
Controllable robot		Single-axis robot FLIP-X	Linear motor single-axis robot PHASER
Input power	Control power supply	05 / 10 / 20 driver Single phase 100 to 115V/200 to 230V AC +/-10% maximum (50/60Hz)	
	Main power supply	05 / 10 driver Single phase 100 to 115V/200 to 230V AC +/-10% maximum (50/60Hz) 20 driver Single phase 200 to 230V AC +/-10% maximum (50/60Hz)	
Operating method		Programming / I/O point tracing / Remote command / Operation using RS-232C communication	
Maximum number of controllable axes		Single-axis	
Origin search method		Absolute/Incremental	Incremental/Semi-absolute

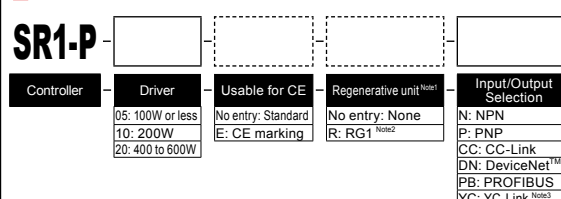
Ordering method

SR1-X



Note 1. Driver selection and regenerative unit selection depends on the robot type. See the selection table on the next page for selecting the driver/regenerative circuit.
Note 2. Available only for the slave.

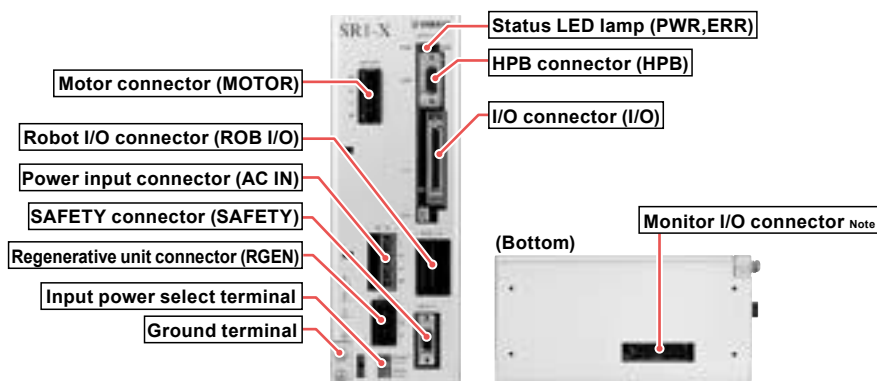
SR1-P



Note 1. Driver selection and regenerative unit selection depends on the robot type. See the selection table on the next page for selecting the driver/regenerative circuit.
Note 2. For the MF75, the regenerative unit is "RGU-2".
Note 3. Available only for the slave.

Item	SR1-X	SR1-P
Programming box	HPB, HPB-D (with enable switch)	
Support software for PC	POPCOM+	
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	-
Absolute data backup period	1 year (in state with no power applied)	-
Noise immunity	IEC61000-4-4 Level 3	

Part names



Note. Cable for monitor I/O (option) is required when using this connector.

Driver / regenerative unit selection table

SR1-X

			FLIP-X																									
			T4LH/ C4LH	T5LH/ C5LH	T6L/ C6L	T9	T9H	F8/ C8	F8L/ C8L	F8LH/ C8LH	F10 C10	F10H	F14/ C14	F14H/ C14H	GF14XL	F17/ C17	F17L/ C17L	GF17XL	F20/ C20	F20N	N15/ N15D	N18/ N18D	B10	B14	B14H	R5	R10	R20
Driver selection	SR1-X	05	●	●	●	●		●	●	●	●		●			●		●				●	●	●	●	●	●	●
		10					●						●			●						●	●	●	●	●	●	●
		20																●	●	●	●	●	●	●	●	●	●	●
Regenera- tive unit	No entry (None)	●	●	●	①	②	●	●	●	①	②	①	②	②	●	③	●	⑥	③	④	●	●	●	●	●	⑤	●	●
	R (RG1)				①	②				①	②	①	②	②	●	③	●	⑥	③	④	●	●				⑤		

- ① Regenerative unit is needed if using in a perpendicular position and movement stroke is 700mm or more.
 ② Regenerative unit is needed if using in a perpendicular position.
 ③ Regenerative unit is needed if using in a perpendicular position, using at maximum speeds exceeding 1000mm per second, or if using high leads (40).

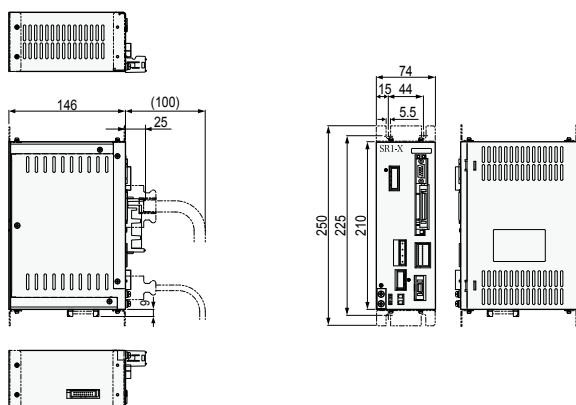
- ④ Regenerative unit is needed if using at maximum speeds exceeding 1000mm per second.
 ⑤ Regenerative unit is needed if using at maximum speeds exceeding 1250mm per second.
 ⑥ Regenerative unit is needed if using at maximum speeds exceeding 750mm per second.

SR1-P

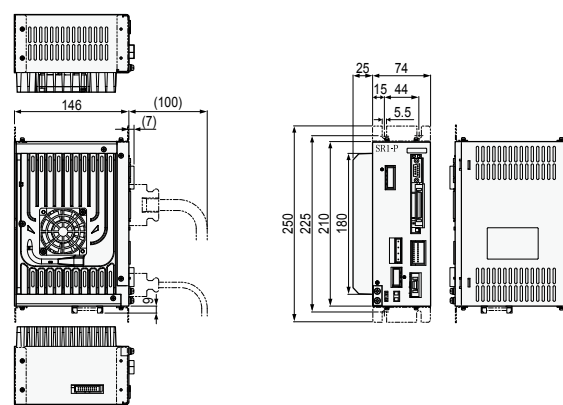
			PHASER				
			MF7/ MF7D	MF15/ MF15D	MF20/ MF20D	MF30/ MF30D	MF75/ MF75D
Driver selection	SR1-P	05					
		10	●	●	●		
		20				●	●
Regenerative unit	No entry (None)		●	●			
	R (RG1)			●	●		
	R (RGU-2)						●

Dimensions

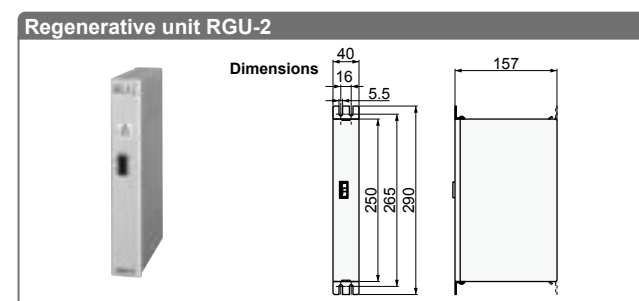
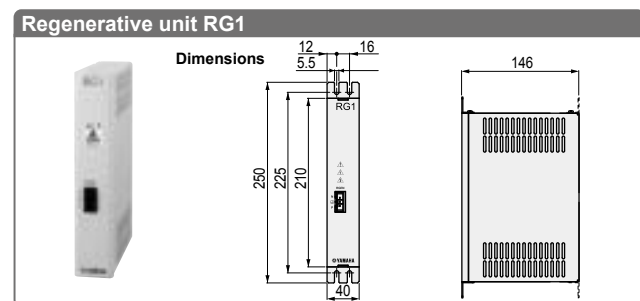
SR1-X/SR1-P 05 - 10



SR1-X/SR1-P 20



Regenerative unit RG1 / RGU-2



Basic specifications

Item	RG1
Model	KBG-M4107-0A (Including accessory)
Dimensions	W40 × H210 × D146mm
Weight	0.8kg
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.

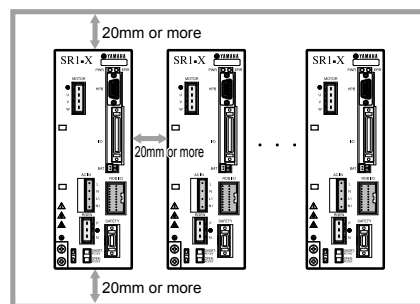
Basic specifications

Item	RGU-2
Model	KS5-M4107-0A (Including accessory)
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.

■ Installation conditions

- Install the SR1-X/SR1-P inside the control panel.
- Install the SR1-X/SR1-P on a vertical wall.
- Install the SR1-X/SR1-P in a well ventilated location, with space on all sides of the SR1-X/SR1-P (See fig. at right.).
- Ambient temperature : 0 to 40°C
- Ambient humidity : 35 to 85% RH (no condensation)



■ [NPN, PNP type] Input/Output list

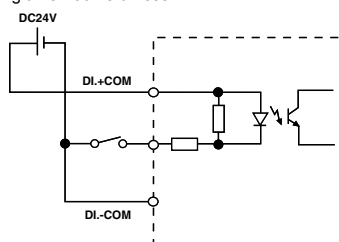
Terminal number	Signal name	Function
1	DI.+COM	Input supply+common
2	SERVO	Return to servo on
3	INC-PT	Relative point transfer
4	ABS-PT	Absolute point transfer
5	STEP-R	Step run
6	DI 0	General input 0
7	DI 1	General input 1
8	DI 2	General input 2
9	DI 3	General input 3
10	DI 4	General input 4
11	DI 5	General input 5
12	DI 6	General input 6
13	DI 7	General input 7
14	DO.+COM	Output supply+common
15	DO.+COM	Output supply+common
16	END	Execution result (Execution complete)
17	BUSY	Executing the command
18	DO 0	General output 0
19	DO 1	General output 1
20	DO 2	General output 2
21	DO 3	General output 3
22	DO 4	General output 4
23	DO 5	General output 5
24	DO 6	General output 6
25	DO 7	General output 7

Terminal number	Signal name	Function
26	DI.-COM	Input supply-common
27	AUTO-R	Auto run
28	RESET	Reset
29	ORG-S	Return to the origin
30	ALMRST	Alarm reset
31	DI 8	General input 8
32	DI 9	General input 9
33	DI 10	General input 10
34	DI 11	General input 11
35	DI 12	General input 12
36	DI 13	General input 13
37	DI 14	General input 14
38	DI 15	General input 15
39	DO.-COM	Output supply-common
40	DO.-COM	Output supply-common
41	READY	Available to operate (Ready for operation)
42	UTL	Utility output
43	DO 8	General output 8
44	DO 9	General output 9
45	DO 10	General output 10
46	DO 11	General output 11
47	DO 12	General output 12
48	DO 13	General output 13
49	DO 14	General output 14
50	DO 15	General output 15

■ NPN type input/output circuit

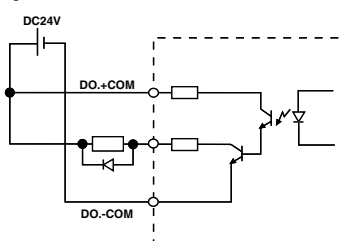
Input circuit

- Form : DC input (positive common type)
Photo coupler insulation type
- Input power supply : 5mA/point
- Answering time : 30ms or less



Output circuit

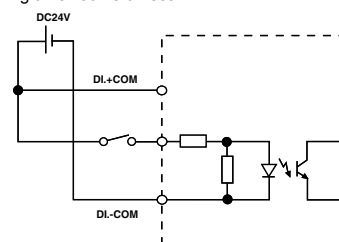
- Form : NPN open collector output (negative common type)
Photo coupler insulation type
- Load : 50mA/point
- Answering time : 1ms or less



■ PNP type input/output circuit

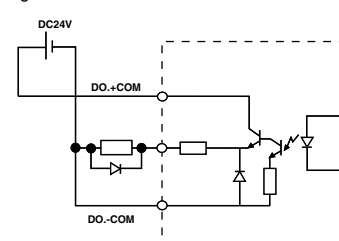
Input circuit

- Form : DC input (negative common type)
Photo coupler insulation type
- Input power supply : 5mA/point
- Answering time : 30ms or less



Output circuit

- Form : PNP open collector output (positive common type)
Photo coupler insulation type
- Load : 50mA/point
- Answering time : 1ms or less



SR1-X/SR1-P

SAFETY connector signals

Terminal number	Signal name	Meaning
1	DI.COM	Input supply common
2	LOCK	Interlock
3	SVCE	SERVICE mode
4	DO.COM	Output supply common
5	MPRDY	Main power ready
6	NC	NC
7	NC	NC
8	NC	NC
9	NC	NC
10	NC	NC
11	EMG1	Emergency stop 1
12	EMG2	Emergency stop 2
13	NC	NC
14	NC	NC

Robot Language Table

Command	Description
MOVA	Moves to a point data position.
MOVI	Moves from current position by amount of point data.
MOVF	Moves until a specified DI input is received.
JMP	Jumps to a specified label in the specified program.
JMPF	Jumps to a specified label in a specified program according to the input condition.
JMPB	Jumps to a specified label in a specified program when general-purpose input or memory input is in the specified state.
L	Defines the jump destination for a JMP or JMPF statement.
CALL	Runs another program.
DO	Turns general-purpose output or memory output on or off.
WAIT	Waits until general-purpose input or memory input is in the specified state.
TIMR	Waits the specified amount of time before advancing to the next step.
P	Defines point variable.
P+	Adds 1 to point variable.
P-	Subtracts 1 from point variable.
SRVO	Turns servo on or off.
STOP	Temporarily stops program execution.
ORGN	Performs return-to-origin.
TON	Runs a specified task.
TOFF	Stops a specified task.
JMPP	Jumps to a specified label when the axis position condition meets the specified conditions.
MAT	Defines a matrix.
MSEL	Specifies a matrix to move.
MOVM	Moves to a specified pallet work position on matrix.
JMPC	Jumps to a specified label when the counter array variable C equals the specified value.
JMPD	Jumps to a specified label when the counter variable D equals the specified value.
CSEL	Specifies an array element for counter array variable C.
C	Defines counter array variable C.
C+	Adds a specified value to counter array variable C.
C-	Subtracts a specified value from counter array variable C.
D	Defines counter variable D.
D+	Adds a specified value to counter variable D.
D-	Subtracts a specified value from counter variable D.
SHFT	Shifts the coordinate position by amount of specified point data.
IN	Stores bit information on specified general-purpose input or memory input into counter variable D.
OUT	Outputs the value of counter variable D to specified general-purpose output or memory output.
LET	Shifts the coordinate position by amount of specified point data.

Accessories and part options

SR1-X/SR1-P



Standard accessories

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

Power connector + wiring connection lever



Model KAS-M5382-00

LCC140
TS-X
TS-P
SR1-X
SR1-P
RCX320
RCX340/341

Safety connector



Connector plug model KBG-M4424-00
Connector cover model KBG-M4425-00

SR1-X
SR1-P

HPB dummy connector

Attach this to the HPB connector during operation with the programming box HPB removed.



Model KDK-M5163-00

LCC140
SR1-X
SR1-P

NPN / PNP connector



Connector plug model KBH-M4424-00
Connector cover model KBH-M4425-00

SR1-X
SR1-P
RCX320
RCX340

L type stay

Use to install the controller.



Model KBG-M410H-00

Note. Model No. is for a single bracket (L type stay).

SR1-X
SR1-P

Absolute battery

Battery for absolute data back-up.
(Not included with the SR1-P)

Basic specifications

Item	Absolute battery
Battery type	Lithium metallic battery
Battery capacity	3.6V/2,700mAh
Data holding time	About 1 year (in state with no power applied)
Dimensions	φ17 × L53mm
Weight ^{Note1}	21g



Model KAS-M53G0-12

SR1-X

Note 1. Weight of battery itself.

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

If trouble occurs with the memory then remaining battery life is low so replace the absolute battery. The battery replacement period depends on usage conditions. But generally you should replace the battery after about 1 year counting the total time after connecting to the controller and left without turning on the power.

Battery case

This is the absolute battery holder.



Model KBG-M5395-00

SR1-X

See next page for optional parts

Options

● Cable for monitor I/O

Cable to connect I/O connector of SR1 monitor. The cable is 1.5m long with its end cut and left as it is. Required when using analog input / output and feedback pulse output.



Model KBG-M4421-00

SR1-X

SR1-P

● Support software for PC **P.650** **POPCOM+**

POPCOM+ is a simple to use application software that makes tasks such as robot operation, writing-editing programs, and point teaching easy to visually understand.



Model KBG-M4966-00

LCC140

ERCD

SR1-X

SR1-P

● Environment

OS	Windows XP (32bit), Vista, 7, 8 / 8.1, 10 (Supported version: V.2.1.1 or later)
CPU	Processor that meets or exceeds the suggested requirements for the OS being used.
Memory	Suggested amount of memory or more for the OS being used.
Hard disk	50MB of available space required on installation drive.
Disk operation	RS-232C
Applicable controllers	SRCX to SR1, DRCX, TRCX, ERCX, ERCD, LCC140 ^{Note 1}

Note 1. LCC140 is applicable to Ver. 2.1.1 or later.

Note. Windows is the registered trademark of US Microsoft Corporation in U.S.A. and other countries.

● Data cables

Communication cable for POPCOM+. Select from USB cable or D-sub cable.



USB



D-Sub

Model	USB type (5m)	KBG-M538F-00
	D-Sub type 9pin-9pin (5m)	KAS-M538F-10

Note. This USB cable supports Windows 2000/XP or later. Note. Data cable jointly used for POPCOM+, VIP+, RCX-Studio Pro.

Note. USB driver for communication cable can also be downloaded from our website.

LCC140

ERCD

SR1-X

SR1-P

RCX320

RCX340/341

● Programming box **P.658** **HPB/HPB-D**

This device can perform all operations such as manual robot operation, program entry and edit, teaching and parameter settings.



HPB



HPB-D

	HPB	HPB-D
Model	KBB-M5110-01	KBB-M5110-21
Enable switch	—	3-position
CE marking	Not supported	Applicable

LCC140

ERCD

SR1-X

SR1-P

● YC-Link board (with connection cable)

Model KBG-M4400-60

SR1-X

SR1-P

Note. Use the converter cable if changing to the SR1-X, SR1-P from a system using SRCX, SRCP. (See P.708).

Linear conveyor modules	LCMR200
Single-axis robots	GX
Linear conveyor modules	LCM100
SCARA robots	YK-X
Single-axis robots	Robonity
Linear motor single-axis robots	PHASER
Single-axis robots	FLIP-X
Compact single-axis robots	TRANSERO
Cartesian robots	XY-X
Pick & place robots	YP-X
	CLEAN
	CONTROLLER
	INFORMATION
Robot positioner	
Pulse string driver	
Robot controller	
RCXIVY2+ Electric gripper	
Option	

RCX320

● Robot controller with advanced functions

A 2-axis model of the RCX340 controller has been launched finally.

The high-level equipment construction such as simultaneous control of multiple robots is achieved by the advanced functionality and flexible expandability.



RCX320



Programming box
► PBX/PBX-E

P.659



Support software for PC
► RCX-Studio 2020

P.654

■ Ordering method

RCX320

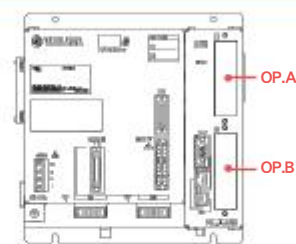
Controller	No. of controllable axes	Safety standards	Regenerative unit	Controller option A (OP.A)	Controller option B (OP.B)	Vision System	Absolute battery
	2: 2 axes 1: 1 axes	N: Normal E: CE	No entry: None R: YHX-RU1	No entry: Non-selection NS : STD.DIO(NPN) Note 1 Note 4 NE : EXP.DIO(NPN) Note 2 Note 4 PS : STD.DIO(PNP) Note 1 Note 4 PE : EXP.DIO(PNP) Note 2 Note 4 GR: Gripper TR: Tracking Note 5 YM1: YC-Link/E master Note 6 YS2 to 4: YC-Link/E slave Note 6 EP: EtherNet/IP TM Note 7 PB: PROFIBUS Note 7 CC: CC-Link Note 7 DN: DeviceNet TM Note 7 PT: PROFINET Note 7 ES: EtherCAT Note 7	No entry: Non-selection --- Note 3 NE : EXP.DIO(NPN) Note 2 Note 4 --- Note 3 PE : EXP.DIO(PNP) Note 2 Note 4 GR: Gripper TR: Tracking Note 5 YM1: YC-Link/E master Note 6 YS2 to 4: YC-Link/E slave Note 6 EP: EtherNet/IP TM Note 7 PB: PROFIBUS Note 7 CC: CC-Link Note 7 DN: DeviceNet TM Note 7 PT: PROFINET Note 7 ES: EtherCAT Note 7	No entry: Non-selection WY: with RCXIVY2+, without lighting WL: with RCXIVY2+, with lighting	2: 2 pcs. 1: 1 pc. 0: 0 pc.

Please select desired selection items from the upper portion of the controller option A in order.

- Note 1. [STD.DIO] Parallel I/O board standard specifications
Dedicated input 8 points, dedicated output 9 points,
general-purpose input 16 points, general-purpose
output 8 points
Do not mix with field bus (CC/DN/PB/EP/PT/ES).
- Note 2. [EXP.DIO] Parallel I/O board expansion specifications
General-purpose input 24 points, general-purpose
output 16 points
- Note 3. Only one DIO STD specification board can be selected.
Therefore, this board cannot be selected in OP.B to OP.D.
- Note 4. Select either NPN or PNP in DIO.

- Note 5. Only one tracking board can be selected.
- Note 6. Select only one master or slave board for YC-Link/E.
For details, refer to "YC-Link/E ordering explanation"
below.
- Note 7. Select only one fieldbus in a controller (CC/DN/PB/
EP/PT/ES).
- Note 8. The regenerative unit (option) is required when operating a model designated by YAMAHA or a load with a large inertia.

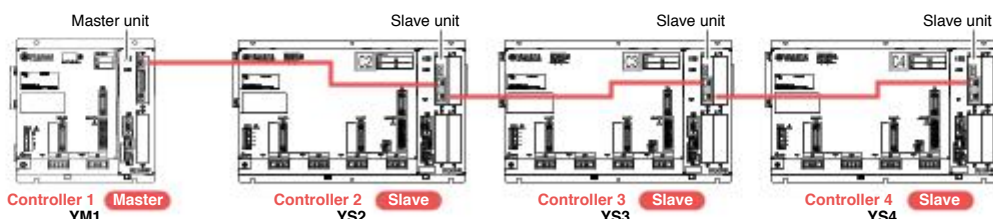
Controller option board position



■ YC-Link/E explanation

Using the inter-controller communication "YC-Link/E", the RCX320 and RCX340 are connected and up to 14 axes (4 robots) can be expanded. The YC-Link/E can be executed by the program of only the master controller. This contributes to great reduction of the system startup time.

Example of YC-Link/E connections



- The "RCX320" and "RCX340" controllers support both the master and slave specifications.
- Up to four "RCX320" and "RCX340" controllers can be connected.
- The network board is inserted into only the master controller (YM1).

* For customers who export robot controllers to Korea, connecting two or more RCX320 controllers using the YC-Link/E may not be compliant with the KCs system. Please contact us when considering such connections.

Controllable robot	XY-X P.377	FLIP-X P.289	PHASER P.267	YP-X P.505					
CE marking		Field networks	 CC-Link	 DeviceNet	 EtherNet/IP	 Ethernet	 EtherCAT	 EtherCAT	 EtherCAT

Basic specifications

Item			RCX320
Basic specifications	Applicable robots		YAMAHA single-axis robots, linear single-axis robots, P&P robots
	Connected motor capacity		1200W or less (in total for 2 axes)
	Power capacity		2400VA
	Dimensions		W213 × H195 × D130mm (main unit only)
	Weight		3.6kg (main unit only)
	Input power supply	Control power supply	Single-phase 200 to 230V AC +/-10% maximum, 50/60Hz
		Main power supply	Single-phase 200 to 230V AC +/-10% maximum, 50/60Hz
Axis control	No. of controllable axes		Max. 2 axes Up to four units of the RCX320 and RCX340 can be connected using the inter-controller communication "YC-Link/E".
	Drive method		AC full digital servo
	Position detection method		Resolver or magnetic linear scale
	Control method		PTP motion (point to point), ARCH motion, linear interpolation, circular interpolation
	Coordinate systems		Joint coordinates, Cartesian coordinates
	Position display units		Pulses, mm (1/1000 steps), degree (1/1000 steps)
	Speed setting		0.01 to 100% (below 1% can be changed by programming)
Programming	Acceleration/deceleration setting		Optimized by robot model and tip weight parameter Setting by acceleration coefficient and deceleration rate parameters (1% steps) * Can be changed by programming. Zone control (For SCARA robots only, optimized according to arm posture)
	Program language		YAMAHA BASIC II conforming to JIS B8439 (SLIM language)
	Multi-task		Max. 16 tasks
	Sequence program		1 program
	Memory capacity		2.1MB (Total of program and point data) (Available capacity for program when the maximum number of points is used: 300KB)
	Program		100 programs (maximum number of programs) 9999 lines (maximum number of lines per program)
	Point		30000 points (maximum number of points)
	Point teaching method		MDI (coordinate data input), direct teaching, teaching playback, offline teaching (data input from external unit)
	System backup (Internal memory backup)		Lithium battery (service life about 4 years at 0 to 40°C)
	Internal flash memory		512 KB
External I/O	SAFETY	Input	Emergency stop ready input, 2 systems Auto mode input, 2 systems (Enabled only when the global specifications are used.)
		Output	Emergency stop contact output, 2 systems Enable contact output, 2 systems (Enabled only when the PBX-E is used.) Motor power ready output, 2 systems
	Brake output		Transistor output (PNP open collector)
	Origin sensor input		Connectable to 24V DC B-contact (normally closed) sensor
	External communications		RS-232C: 1CH (D-SUB 9-pin (female)) Ethernet: 1CH (In conformity with IEEE802.3u/IEEE802.3) 100Mbps/10Mbps (100BASE-TX/10BASE-T) Applicable to Auto Negotiation RS-422: 1CH (Dedicated to PBX)
General specifications	Operating temperature		0 to 40°C
	Storage temperature		-10 to 65°C
	Operating humidity		35 to 85% RH (no condensation)
	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
	Noise immunity		Conforms to IEC61000-4-4 Level 3
Options	Protective structure		IP20
	Appliance classes		Class I
	Parallel I/O board	Standard specifications	Dedicated input 8 points, dedicated output 9 points General-purpose input 16 points, general-purpose output 8 points NPN/PNP specifications are selected. (maximum 1 board)
		Expansion specifications	General-purpose input 24 points, general-purpose output 16 points NPN/PNP specifications are selected. (maximum 4 boards)
	CC-Link board Ver1.1/2.0		Remote I/O
	DeviceNet™ board		Dedicated input/output: 16 points each General-purpose input/output: 96 points each
	EtherNet/IP™ board		
	PROFIBUS board		Remote register
	PROFINET board		Input/output: 16 words each
	EtherCAT board		
	YC-Link/E board (master/slave)		Communication cycle: 1 ms, control cycle: minimum 1 ms / maximum 8 ms, maximum number of robot units: four units Maximum number of control axes: total 14 axes (including two master controller axes), maximum 12 axes for slaves only Position detection method: optical rotary encoder, minimum setting distance: 0.01 mm Speed setting: 20 to 100% relative to the maximum parameter speed, number of connected gripper units: maximum two units Drive power: DC 24V +/-10%, 1.0A Max
	YRG (gripper) board		
	Tracking board		Number of connected encoders: maximum two units, supported encoders: 26LS31/26C31 equivalent line driver (RS422 compliant) Encoder power supply: DC5V (2 counter (ch) total 500 mA or less) (supplied from controller)
	RCXiVY2+ unit		Camera pixels: maximum 5 million pixels, number of registered models: 254 models, number of connected cameras: maximum two units Power supply: DC24V +/-10% 1.5A Max
	Programming box		PBX, PBX-E
	Absolute battery		3.6V 2700mAh / axis Backup retention time: About 1 year
	Support software for personal computer		RCX-Studio 2020

Linear conveyor modules
LCMR200

Single-axis robots
GX

Linear conveyor modules
LCM100

SCARA robots
YK-X

Single-axis robots
Robonity

Linear motor single-axis robots
PHASER

Single-axis robots
FLIP-X

Compact single-axis robots
TRANSERO

Cartesian robots
XY-X

Pick & place robots
YP-X

CLEAN

CONTROLLER

INFORMATION

Robot positioner

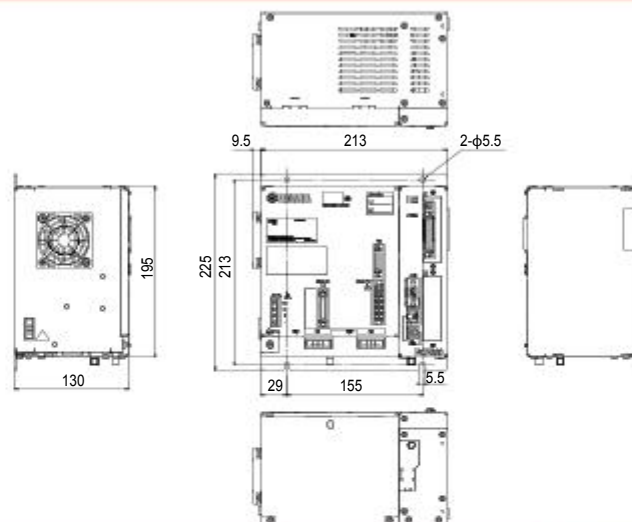
Pulse string driver

Robot controller

RCXiVY2+ Electric gripper

Option

■ Dimensions



■ Power supply capacity and heat emission

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.

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

Axial current sensor value	Power capacity (VA)	Generated heat amount (W)
X axis	Y axis	
05	05	500
10	05	700
20	05	1500
10	10	900
20	10	1700
20	20	2400

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

Motor capacity vs. current sensor table

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

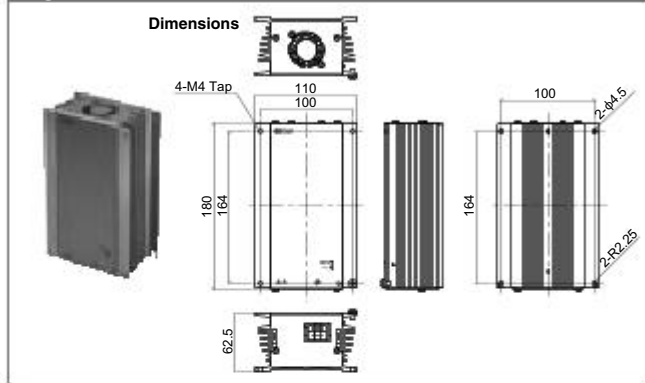
Note. Motor output of the B14H is 200W but the current sensor is 05.

Conditions where regenerative unit is needed on multi robots

- Motor capacity exceeds a total of 450W.
- Motor capacity for perpendicular axis exceeds a total of 240W.
- 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.
 - there are 2 perpendicular axes at 100W, and includes leads of 5mm.
- B14H which maximum speed exceeds 1250mm per second.

■ Regenerative unit YHX-RU1

Regenerative unit YHX-RU



● Basic specifications

Item	YHX-RU1
Model	KEK-M4107-0A (including cable supplied with unit)
Dimensions	W62.5×H180×D110mm
Weight	1.45kg
Absorbable electric power	100 W (Equivalent to RGU 3)
Power Supply	Input: 254 to 357 V DC (Controller DCBUS Connecting)
Connector	Regenerative unit connector (for unit connection and extension)
Working Temperature	0 to 40 °C
Working Humidity	35 to 85% RH (No Condensation)
Location of Use	Altitude 2,000 m or lower and indoor (free from corrosive gases and dust)
Storage Temperature	-10 to 65 °C
Vibration Withstanding	1G
Protective Construction / Rating	IP20 / Class 1
Accessory	Cable for connection with controller (500mm)

● Regenerative unit selection table

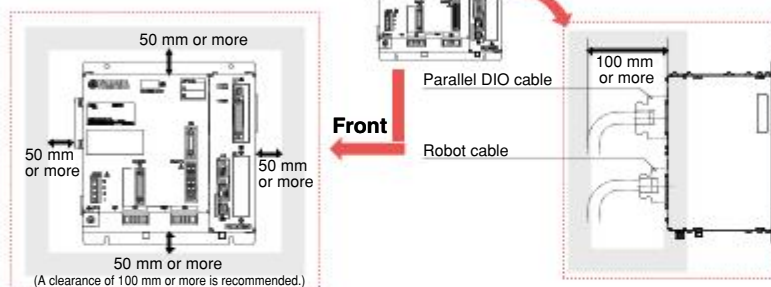
Whether the regenerative unit is needed is automatically determined by the robot model.

		PHASER								FLIP-X		XY-X												YP-X		Clean			
												Arm type, Gantry type, Moving arm type, Pole type						XZ type											
		MF7D	MF15D	MF20D	MF30D	MF50D	MF75D	N15D	N18D	PXYx	FXyX	FXyBx	SXYx	SXYBx	NXY	MXyX	HXYx	HXYLx	SXYx (ZF)	SXYx (ZFL20)	SXYBx (ZF)	SXYBx (ZFL20)	MXyX	HXYx	YP220BX	YP320X	SXYxC		
		2 axes																											
Regenerative unit	No entry (None) R (YHX-RU1)	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●			

● : Applicable ○ : Select per conditions

Installation conditions

- Use the screws to secure the controller to the installation plate inside the control panel so that it is in a horizontal position. Be sure to use the metallic installation plate.
- Install the RCX320 in a well ventilated location, with space on all sides of the RCX320 (See fig. at right.).
- Ambient temperature : 0 to 40°C
- Ambient humidity : 35 to 85% RH (no condensation)



Standard specification I/O connector signal list

Pin	I/O No.	Signal name	Remarks
1	DI 01	Dedicated input: Servo ON input	
2	DI 10	Dedicated input: Sequence control	
3	DI 03	Spare	Do not use.
4	CHK 1	Check signal 1	Short-circuit with CHK2.
5	DI 05	Spare	Do not use.
6	DI 06	Dedicated input: Stop	
7	DI 07	Spare	Do not use.
8	DI 20	General-purpose input 20	
9	DI 21	General-purpose input 21	
10	DI 22	General-purpose input 22	
11	DI 23	General-purpose input 23	
12	DI 24	General-purpose input 24	
13	DI 25	General-purpose input 25	
14	DI 26	General-purpose input 26	
15	DI 27	General-purpose input 27	
16	DO 00	Spare	Do not use.
17	DO 01	Dedicated output CPU OK	
18	DO 10	Dedicated output AUTO mode output	
19	DO 11	Dedicated output Return-to-origin complete	
20	DO 12	Dedicated output Sequence program-in-progress	
21	DO 13	Dedicated output Robot program-in-progress	
22	DO 14	Dedicated output Program reset status output	
23	DO 15	Dedicated output Warning output	
24	DO 16	Spare	Do not use.
25	DO 17	Spare	Do not use.
26	DI 12	Dedicated input: Automatic operation start	
27	DI 13	Spare	Do not use.
28	DI 14	Dedicated input: Return-to-origin (for INC axis)	
29	DI 15	Dedicated input: Program reset input	
30	DI 16	Dedicated input: Alarm reset input	
31	DI 17	Dedicated input: Return-to-origin (for ABS axis)	
32	DI 30	General-purpose input 30	
33	DI 31	General-purpose input 31	
34	DI 32	General-purpose input 32	
35	DI 33	General-purpose input 33	
36	DI 34	General-purpose input 34	
37	DI 35	General-purpose input 35	
38	DI 36	General-purpose input 36	
39	DI 37	General-purpose input 37	
40	CHK 2	Check signal 2	Short-circuit with CHK1.
41	DO 02	Dedicated output: Servo ON output	
42	DO 03	Dedicated output: Alarm output	
43	DO 20	General-purpose output 20	
44	DO 21	General-purpose output 21	
45	DO 22	General-purpose output 22	
46	DO 23	General-purpose output 23	
47	DO 24	General-purpose output 24	
48	DO 25	General-purpose output 25	
49	DO 26	General-purpose output 26	
50	DO 27	General-purpose output 27	

Expanded specification I/O connector signal list

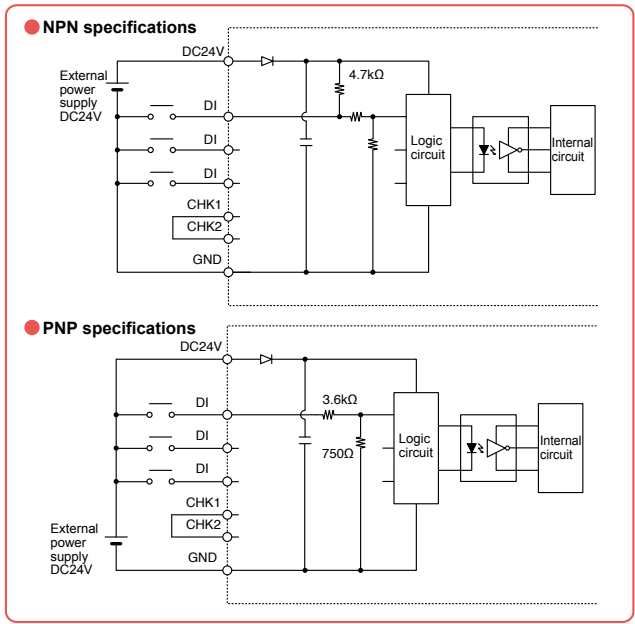
Pin	I/O No. (ID=1)	I/O No. (ID=2)	I/O No. (ID=3)	I/O No. (ID=4)	Signal name
1	---	---	---	---	Reserved
2	DI 10	DI 40	DI 70	DI 120	General-purpose input 10,40,70,120
3	---	---	---	---	Reserved
4	DI 11	DI 41	DI 71	DI 121	General-purpose input 11,41,71,121
5	---	---	---	---	Reserved
6	---	---	---	---	Reserved
7	---	---	---	---	Reserved
8	DI 20	DI 50	DI 100	DI 130	General-purpose input 20,50,100,130
9	DI 21	DI 51	DI 101	DI 131	General-purpose input 21,51,101,131
10	DI 22	DI 52	DI 102	DI 132	General-purpose input 22,52,102,132
11	DI 23	DI 53	DI 103	DI 133	General-purpose input 23,53,103,133
12	DI 24	DI 54	DI 104	DI 134	General-purpose input 24,54,104,134
13	DI 25	DI 55	DI 105	DI 135	General-purpose input 25,55,105,135
14	DI 26	DI 56	DI 106	DI 136	General-purpose input 26,56,106,136
15	DI 27	DI 57	DI 107	DI 137	General-purpose input 27,57,107,137
16	---	---	---	---	Reserved
17	---	---	---	---	Reserved
18	DO 10	DO 30	DO 50	DO 70	General-purpose output 10,30,50,70
19	DO 11	DO 31	DO 51	DO 71	General-purpose output 11,31,51,71
20	DO 12	DO 32	DO 52	DO 72	General-purpose output 12,32,52,72
21	DO 13	DO 33	DO 53	DO 73	General-purpose output 13,33,53,73
22	DO 14	DO 34	DO 54	DO 74	General-purpose output 14,34,54,74
23	DO 15	DO 35	DO 55	DO 75	General-purpose output 15,35,55,75
24	DO 16	DO 36	DO 56	DO 76	General-purpose output 16,36,56,76
25	DO 17	DO 37	DO 57	DO 77	General-purpose output 17,37,57,77
26	DI 12	DI 42	DI 72	DI 122	General-purpose input 12,42,72,122
27	DI 13	DI 43	DI 73	DI 123	General-purpose input 13,43,73,123
28	DI 14	DI 44	DI 74	DI 124	General-purpose input 14,44,74,124
29	DI 15	DI 45	DI 75	DI 125	General-purpose input 15,45,75,125
30	DI 16	DI 46	DI 76	DI 126	General-purpose input 16,46,76,126
31	DI 17	DI 47	DI 77	DI 127	General-purpose input 17,47,77,127
32	DI 30	DI 60	DI 110	DI 140	General-purpose input 30,60,110,140
33	DI 31	DI 61	DI 111	DI 141	General-purpose input 31,61,111,141
34	DI 32	DI 62	DI 112	DI 142	General-purpose input 32,62,112,142
35	DI 33	DI 63	DI 113	DI 143	General-purpose input 33,63,113,143
36	DI 34	DI 64	DI 114	DI 144	General-purpose input 34,64,114,144
37	DI 35	DI 65	DI 115	DI 145	General-purpose input 35,65,115,145
38	DI 36	DI 66	DI 116	DI 146	General-purpose input 36,66,116,146
39	DI 37	DI 67	DI 117	DI 147	General-purpose input 37,67,117,147
40	---	---	---	---	Reserved
41	---	---	---	---	Reserved
42	---	---	---	---	Reserved
43	DO 20	DO 40	DO 60	DO 100	General-purpose output 20,40,60,100
44	DO 21	DO 41	DO 61	DO 101	General-purpose output 21,41,61,101
45	DO 22	DO 42	DO 62	DO 102	General-purpose output 22,42,62,102
46	DO 23	DO 43	DO 63	DO 103	General-purpose output 23,43,63,103
47	DO 24	DO 44	DO 64	DO 104	General-purpose output 24,44,64,104
48	DO 25	DO 45	DO 65	DO 105	General-purpose output 25,45,65,105
49	DO 26	DO 46	DO 66	DO 106	General-purpose output 26,46,66,106
50	DO 27	DO 47	DO 67	DO 107	General-purpose output 27,47,67,107

Note. The IDs are set using the parameter.

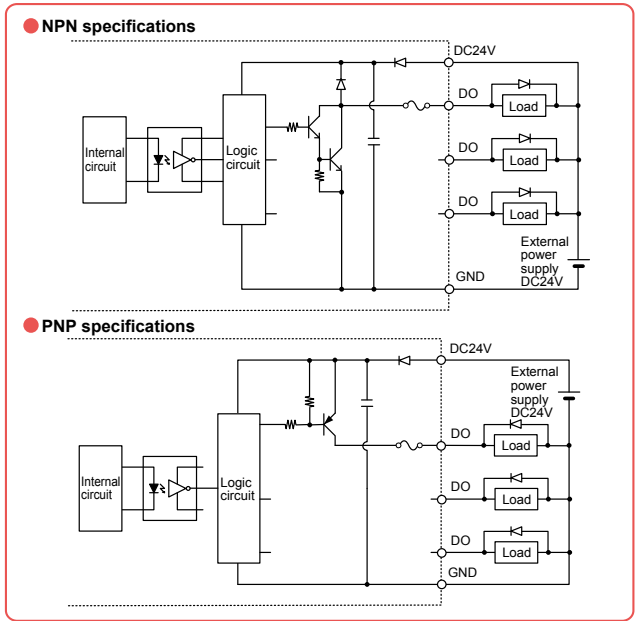
Standard specification I/O connector pin assignment lists

Pin	I/O No.	Name
1	DI01	Servo ON
2	DI10	SEQ enable
3	DI03	(Spare)
4	CHK1	Check input 1
5	DI05	(Spare)
6	DI06	STOP
7	DI07	(Spare)
8	DI20	General-purpose input
9	DI21	General-purpose input
10	DI22	General-purpose input
11	DI23	General-purpose input
12	DI24	General-purpose input
13	DI25	General-purpose input
14	DI26	General-purpose input
15	DI27	General-purpose input
16	DO00	(Spare)
17	DO01	CPUOK
18	DO10	AUTO
19	DO11	ORGOK
20	DO12	SEQRUN
21	DO13	RUN
22	DO14	RESET
23	DO15	WARNING
24	DO16	(Spare)
25	DO17	(Spare)
26	DI12	RUN
27	DI13	(Spare)
28	DI14	ORIGIN (for INC axis)
29	DI15	RESET
30	DI16	ALMRST
31	DI17	ORIGIN(for ABS axis)
32	DI30	General-purpose input
33	DI31	General-purpose input
34	DI32	General-purpose input
35	DI33	General-purpose input
36	DI34	General-purpose input
37	DI35	General-purpose input
38	DI36	General-purpose input
39	DI37	General-purpose input
40	CHK2	Check input 2
41	DO02	SERVO
42	DO03	ALARM
43	DO20	General-purpose output
44	DO21	General-purpose output
45	DO22	General-purpose output
46	DO23	General-purpose output
47	DO24	General-purpose output
48	DO25	General-purpose output
49	DO26	General-purpose output
50	DO27	General-purpose output

Typical input signal connection



Typical output signal connection

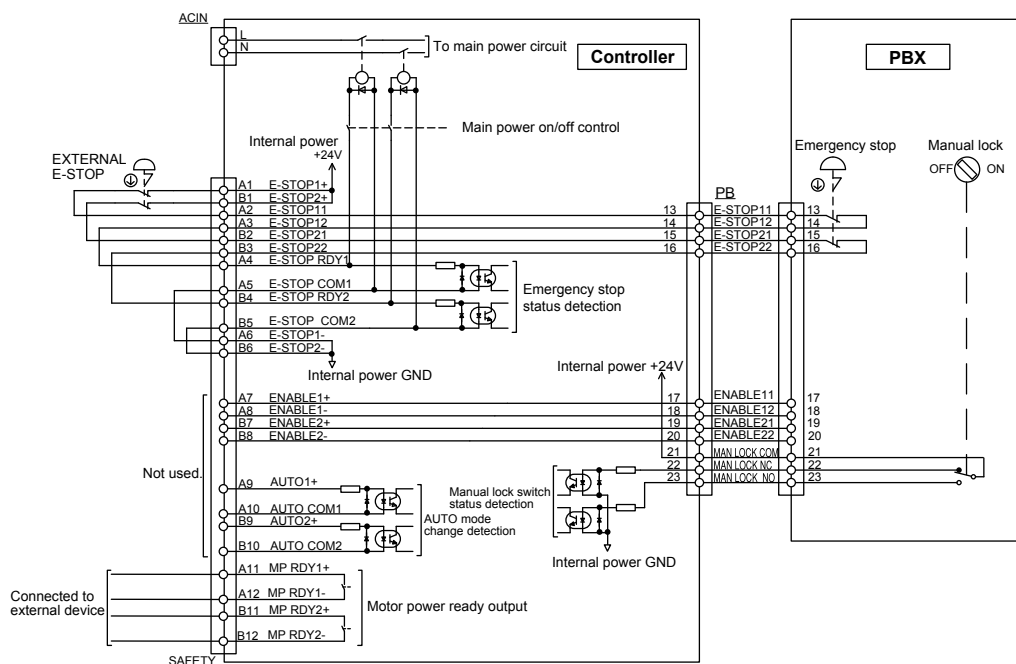


Basic functions

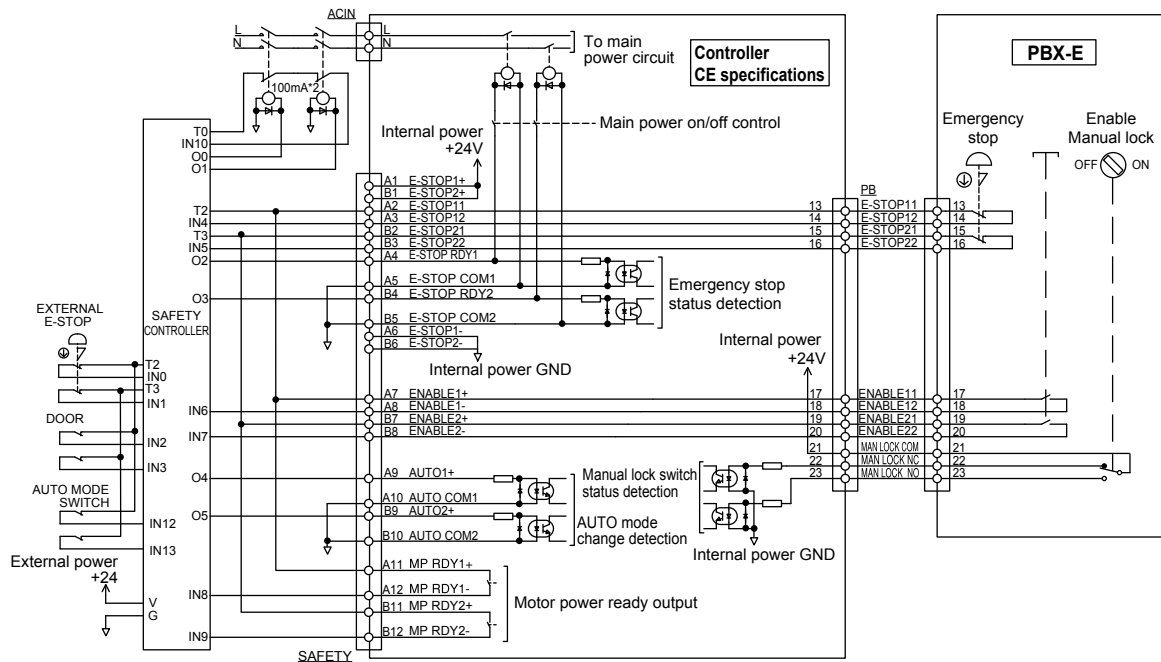
Function	Description
Operation modes	AUTO mode (Major functions: program creation, program execution, step execution, etc.) MANUAL mode (Major functions: jog movement, point data teaching, parameter editing, etc.)
Commands	Array declaration commands (DIM statement) Assignment commands (Numeric assignment, character string assignment, point definition statements, etc.) Movement commands (MOVE, DRIVE, PMOVE statements, etc.) Conditional branching commands (IF, FOR, WHILE statements, etc.) External output commands (DO, MO, LO, TO, SO statements) Parameter commands (ACCEL, OUTPOS, TOLE statements, etc.) Condition wait command (WAIT statement) Task related commands (START, SUSPEND, CUT statements, etc.) etc.
Functions	Arithmetic functions (SIN, COS, TAN functions, etc.) Character string functions (STR\$, LEFT\$, MID\$, RIGHT\$ functions, etc.) Point functions (WHERE, JTOXY, XYTOJ functions, etc.) Parameter functions (ACCEL, OUTPOS, TOLE statements, etc.) etc.
Variables	Simple variables (integer variables, real variables, character variables) Array variables (integer variables, real variables, character variables) Point variables Shift variables I/O variables etc.
Arithmetic operation	Arithmetic operators (+, -, *, /, MOD) Logic operators (AND, OR, XOR) Relational operators (=, <, >, <=, >=)
Monitor	I/O status monitor (200 ms intervals)
Online commands	Program operation commands (RUN, STOP, RESET, STEP, etc.) Utility commands (COPY, ERA, INIT, etc.) Data handling commands (READ, WRITE, etc.) Robot language commands (independent-executable commands)
Data files	Program, point, parameter, shift, hand, all, error history etc.
Internal timer	Timer count variable (TCOUNTER), 1 ms interval
Program break points	Max. 32 points

Emergency input signal connections

Connection example of controller with normal specifications and PBX



Connection example of controller with CE specifications and PBX-E



Robot Language Table

General commands

Command	Description
DIM	Declares the array variable name and the number of elements.
LET	Executes a specified assignment statement.
REM	Expresses a comment statement.

Arithmetic commands

Command	Description
ABS	Acquires the absolute value of a specified value.
ATN	Acquires the arctangent of the specified value.
ATN2	Acquires the arctangent of the specified X-Y coordinates.
COS	Acquires the cosine value of a specified value.
DEGRAD	Converts a specified value to radians (↔RADDEG).
DIST	Acquires the distance between 2 specified points.
INT	Acquires an integer for a specified value by truncating all decimal fractions.
LSHIFT	Shifts a value to the left by the specified bit count. (↔RSHIFT)
RADDEG	Converts a specified value to degrees. (↔DEGRAD)
RSHIFT	Shifts a value to the right by the specified bit count. (↔LSHIFT)
SIN	Acquires the sine value for a specified value.
SQR	Acquires the square root of a specified value.
TAN	Acquires the tangent value for a specified value.

Date / time

Command	Description
DATE \$	Acquires the date as a "yy/mm/dd" format character string.
TCOUNTER	Outputs count-up values at 1ms intervals starting from the point when the TCOUNTER variable is reset.
TIME \$	Acquires the current time as an "hh:mm:ss" format character string.
TIMER	Acquires the current time in seconds, counting from midnight.

Character string operation

Command	Description
CHR \$	Acquires a character with the specified character code.
LEFT \$	Extracts a character string comprising a specified number of digits from the left end of a specified character string.
LEN	Acquires the length (byte count) of a specified character string.
MID \$	Extracts a character string of a desired length from a specified character string.
ORD	Acquires the character code of the first character in a specified character string.
RIGHT \$	Extracts a character string comprising a specified number of digits from the right end of a specified character string.
STR \$	Converts a specified value to a character string (↔VAL).
VAL	Converts the numeric value of a specified character string to an actual numeric value. (↔STR\$)

Point, coordinates, shift coordinates

Command	Description
CHANGE	Switches the hand of a specified robot.
HAND	Defines the hand of a specified robot.
JTOXY	Converts joint coordinate data to Cartesian coordinate data of a specified robot. (↔XYTOJ)
LEFTY	Sets the hand system of a specified robot to the left-handed system.
LOCx	Specifies/acquires point data for a specified axis or shift data for a specified element.
PATH	Sets the movement path.
Pn	Defines points within a program.
PPNT	Creates point data specified by a pallet definition number and pallet position number.
RIGHTY	Sets the hand system of a specified robot to the right-handed system.
Sn	Defines the shift coordinates within the program.
SHIFT	Sets the shift coordinate for a specified robot by using the shift data specified by a shift variable.
XYTOJ	Converts the point variable Cartesian coordinate data to the joint coordinate data of a specified robot. (↔JTOXY).

Branching commands

Command	Description
EXIT FOR	Terminates the FOR to NEXT statement loop.
FOR to NEXT	Executes the FOR to NEXT statement repeatedly until a specified value is exceeded.
GOSUB to RETURN	Jumps to a subroutine with the label specified by GOSUB statement, and executes that subroutine.
GOTO	Unconditionally jumps to the line specified by a label.
IF	Allows control flow to branch according to conditions.
ON to GOSUB	Jumps to a subroutine with labels specified by a GOSUB statement in accordance with the conditions, and executes that subroutine.
ON to GOTO	Jumps to label-specified lines in accordance with the conditions.
SELECT CASE to END SELECT	Allows control flow to branch according to conditions.
WHILE to WEND	Controls repeated operations.

Error control

Command	Description
ERR / ERL	Acquires the error code number of an error which has occurred / the line number where an error occurred.
ON ERROR GOTO	This command allows the program to jump to the error processing routine specified by the label without stopping the program, or it stops the program and displays the error message.
RESUME	Resumes program execution after error recovery processing.

Program control

Command	Description
CALL	Calls a sub-procedure.
HALT	Stops the program and performs a reset.
HALTALL	Stops and resets all programs.
HOLD	Temporarily stops the program.
HOLDALL	Temporarily stops all programs.
PGMTSK	Acquires the task number in which a specified program is registered.
PGN	Acquires the program number from a specified program name.
SGI	Assigns/acquires the value to a specified integer type static variable.
SGR	Assigns/acquires the value to a specified real type static variable.
SWI	Switches the program being executed, then begins execution from the first line.
TSKPGM	Acquires the program number which is registered in a specified task.

Task control

Command	Description
CHGPRI	Changes the priority ranking of a specified task.
CUT	Terminates another task currently being executed or temporarily stopped.
EXIT TASK	Terminates its own task which is in progress.
RESTART	Restarts another task during a temporary stop.
START	Specifies the task number and priority ranking of a specified program, and starts that program.
SUSPEND	Temporarily stops another task which is being executed.

Robot operations

Command	Description
DRIVE	Moves a specified axis of a specified robot to an absolute position.
DRIVEI	Moves a specified axis of a specified robot to a relative position.
MOTOR	Controls the motor power status.
MOVE	Performs absolute movement of all axes of a specified robot.
MOVEI	Performs relative movement of all axes of a specified robot.
MOVET	Performs relative movement of all axes of a specified robot when the tool coordinate is selected.
ORIGIN	Performs return-to-origin.
PMOVE	Executes the pallet movement command of a specified robot.
PUSH	Executes a pushing operation in the axis unit.
SERVO	Controls the servo ON/OFF of a specified axis or all axes of a specified robot.

● Status acquisition

Command	Description
ABSRPOS	Acquires the machine reference value for specified robot axes. (Valid only for axes whose return-to-origin method is set as "mark".)
ARMCND	Acquires the current arm status of a specified robot.
ARMSEL	Specifies/acquires the current "hand system" setting of a specified robot.
ARMTYP	Specifies/acquires the "hand system" setting of a specified robot.
CURTQST	Acquires the current torque value ratio of a specified axis to the rated torque.
MCHREF	Acquires the return-to-origin or absolute-search machine reference value for specified robot axes. (Valid only for axes whose return-to-origin method is set as "sensor" or "stroke-end".)
MTRDUTY	Acquires the motor load factor of the specified axis.
PSHRSLT	Acquires the status at the end of the PUSH statement.
PSHSPD	Specifies/acquires the push speed parameter.
PSHTIME	Specifies/acquires the push time parameter.
WAIT ARM	Waits until the axis operation of a specified robot is completed.
WHERE	Reads out the current position of the arm of a specified robot in joint coordinates (pulse).
WHRXY	Reads out the current position of the arm of a specified robot as Cartesian coordinates (mm, degrees).

● Status change

Command	Description
ACCEL	Specifies/acquires the acceleration coefficient parameter of a specified robot.
ARCHP1	Specifies/acquires the arch position 1 parameter of a specified robot.
ARCHP2	Specifies/acquires the arch position 2 parameter of a specified robot.
ASPEED	Specifies/acquires the AUTO movement speed of a specified robot.
AXWGHT	Specifies/acquires the axis tip weight parameter of a specified robot.
CHANGE	Switches the hand of a specified robot.
DECEL	Specifies/acquires the deceleration rate parameter of a specified robot.
HAND	Defines the hand of a specified robot.
LEFTY	Sets the hand system of a specified robot to the left-handed system.
ORGORD	Specifies/acquires the axis sequence parameter for performing return-to-origin and an absolute search operation in a specified robot.
OUTPOS	Specifies/acquires the "OUT position" parameter of a specified robot.
PDEF	Defines the pallet used to execute pallet movement commands.
PSHFRC	Specifies/acquires the "Push force" parameter.
PSHJGSP	Specifies/acquires the push judge speed threshold parameter.
PSHMTD	Specifies/acquires the push method parameter.
RIGHTY	Sets the hand system of a specified robot to the right-handed system.
SETGEP	Sets the General Ethernet Port.
SPEED	Changes the program movement speed of a specified robot.
TOLE	Specifies/acquires the tolerance parameter of a specified robot.
WEIGHT	Specifies/acquires the tip weight parameter of a specified robot.

● PATH control

Command	Description
PATH	Specifies the PATH motion path.
PATH END	Ends the path setting for PATH motion.
PATH SET	Starts the path setting for PATH motion.
PATH START	Starts the PATH motion.

● Torque control

Command	Description
CURTQST	Acquires the current torque value ratio of a specified axis to the rated torque.
CURTRQ	Acquires the current torque value of the specified axis of a specified robot.
PUSH	Executes a pushing operation in the axis unit.
TORQUE	Specifies/acquires the maximum torque command value which can be set for a specified axis of a specified robot.

● Input/output control

Command	Description
DELAY	Waits for the specified period (units: ms).
DO	Outputs a specified value to the DO port or acquires the DO status.
LO	Outputs a specified value to the LO port to enable/disable axis movement or acquires the LO status.
MO	Outputs a specified value to the MO port or acquires the MO status.
OUT	Turns ON the bits of the specified output ports and terminates the command statement.
RESET	Turns the bit of a specified output port OFF.
SET	Turns the bit at the specified output port ON.
SI	Acquires a specified SI status.
SID	Acquires a specified serial input's double-word information status.
SIW	Acquires a specified serial input's word information status.
SO	Outputs a specified value to the SO port or acquires the SO status.
SOD	Outputs a specified serial output's double-word information or acquires the output status.
SOW	Outputs a specified serial output's word information or acquires the output status.
TO	Outputs a specified value to the TO port or acquires the TO status.
WAIT	Waits until the conditions of the DI/DO conditional expression are met (with time-out).

● Communication control

Command	Description
CLOSE	Close the specified General Ethernet Port.
ETHSTS	Acquires the Ethernet port status.
GEPSTS	Acquires the General Ethernet Port status.
OFFLINE	Sets a specified communication port to the "offline" mode.
ONLINE	Sets the specified communication port to the "online" mode.
OPEN	Opens the specified General Ethernet Port.
SEND	Sends a file.

Accessories and part options

RCX320



Standard accessories

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

Power connector + wiring connection lever



Model KAS-M5382-00

LCC140
TS-X
TS-P
SR1-X
SR1-P
RCX320
RCX340/341

Safety connector



Model KCX-M5370-00

RCX320
RCX340/341

Regenerative unit short circuit connector

Used when not connecting a regenerative unit. An error is generated if the short circuit connector of a regenerative unit is not connected.



Model YHX-CN-RUS
Parts No. KEK-M4431-00

RCX320
YHX

PBX terminator (dummy connector)

Attach this to the PBX connector during operation with the programming box PBX removed.



Model KFR-M5163-00

RCX320
RCX340/341

NPN / PNP connector



Connector plug model KBH-M4424-00
Connector cover model KBH-M4425-00

SR1-X
SR1-P
RCX320
RCX340/341

Absolute battery

Battery for absolute data back-up.

Basic specifications

Item	Absolute battery
Battery type	Lithium metallic battery
Battery capacity	3.6V/2,700mAh
Data holding time	About 1 year (in state with no power applied)
Dimensions	φ17 × L53mm
Weight ^{Note1}	21g



Model KCA-M53G0-02

Note 1. Weight of battery itself.

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

If trouble occurs with the memory then remaining battery life is low so replace the absolute battery. The battery replacement period depends on usage conditions. But generally you should replace the battery after about 1 year counting the total time after connecting to the controller and left without turning on the power.

RCX320
RCX340
TS-SH
RCX3-SMU

Important

Absolute battery installation conditions

1 batteries are required for each 1 axes.
● 1 battery.....Data storage time of approximately 6 months (with no power applied)
Note. No absolute battery is required for the incremental or semi-absolute axis.

Dust cover for COM connector

Model KR7-M5395-10

RCX320
RCX340/341

Dust cover for LAN connector

Model KCX-M658K-10

RCX320
RCX340/341

Dust cover for USB connector

Model KCX-M658K-00

RCX320
RCX340/341

Replacement fan filter (5 pcs.)

Model KDK-M427G-00

RCX320

Options

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

Programming box PBX/PBX-E

P.659

This device can perform all operations such as manual robot operation, program entry and edit, teaching and parameter settings.



PBX

Type	Language	Cable length	Model
PBX	Japanese	5m	KCX-M5110-1J
		12m	KCX-M5110-3J
	English	5m	KCX-M5110-1E
		12m	KCX-M5110-3E
	Chinese	5m	KCX-M5110-1C
		12m	KCX-M5110-3C
PBX-E (with enable switch)	Japanese	5m	KCX-M5110-0J
		12m	KCX-M5110-2J
	English	5m	KCX-M5110-0E
		12m	KCX-M5110-2E
	Chinese	5m	KCX-M5110-0C
		12m	KCX-M5110-2C
			Model
Display language switching USB for PBX			KCX-M6498-00
USB cable			KCX-M657E-00

RCX320
RCX340/341

Support software for PC RCX-Studio 2020

P.654

This is support software for operating the RCX320 / RCX340 controller.
 A USB key is supplied to the RCX-Studio 2020 to prevent robot operation mistakes.



USB key

Model	RCX-Studio 2020 Basic (USB key Blue)	KCX-M4990-40
Model	RCX-Studio 2020 Pro (USB key Purple)	KCX-M4990-50

RCX320
RCX340/341

Note. Even when there is no USB key, RCX-Studio 2020 can be used as function restricted version.
 For details about the functions of the function restricted, Basic, and Pro versions, see P.654.

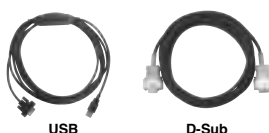
Basic specifications

Supported language	Japanese, English, Chinese
OS ^{Note1}	Microsoft Windows 7 SP1(32/64bit) / 8.1 (32 bit / 64 bit) / 10 (32 bit / 64 bit) 11 (Supported version:V3.2.5 or later)
Execution environment	.NET Framework 4.5 or more
CPU	Recommended: Intel Core i5 2 GHz or more, Minimum: Intel Celeron 2 GHz or more, 3D-SIM is invalid.: Intel Core 2 Duo 2 GHz or more
Memory	Recommended: 8 GB or more, Minimum: 4 GB or more, 3D-SIM is invalid: 1 GB or more
Hard disk capacity	1GB of available space required on installation drive
Communication Port	Communication cable: Serial communication port, Ethernet port, or USB port
Others	Dedicated communication cable (For D-Sub or USB) Ethernet cable (category 5 or better) USB port: 1 port (For USB key)
Applicable robot controllers	RCX320 / RCX340
Applicable robot	YAMAHA robot that can be connected to the RCX340, RCX320.

Note. Microsoft, Windows 7, Windows 8.1, and Windows 10 are either registered trademarks or trademarks of Microsoft Corporation in the United States and/or other countries.
 Other company names and product names listed in this manual may be the trademarks or registered trademarks of their respective companies.

Data cables

Communication cable for RCX-Studio 2020.
 Select from USB cable or D-sub cable.



[RCX320/RCX340]

Ethernet cable (category 5 or higher) is also supported.

Model	USB type (5m)	KBG-M538F-00
Model	D-Sub type 9pin-9pin (5m)	KAS-M538F-10

LCC140
ERCD
SR1-X
SR1-P
RCX320
RCX340/341

Note. This USB cable supports Windows 2000/XP or later.
 Note. Data cable jointly used for POPCOM+, VIP+, RCX-Studio Pro and RCX-Studio 2020.
 Note. USB driver for communication cable can also be downloaded from our website.

YC-Link/E master board

Model	KCX-M4400-M0
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RCX320
RCX340/341

YC-Link/E slave board

Model	KCX-M4400-S0
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RCX320
RCX340/341

YC-Link/E cable (1m)

Model	KCX-M6479-10
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RCX320
RCX340/341

RCX340

● Robot controller with advanced functions

Next generation controller, all functions of which were reviewed to further improve the functions of conventional controllers.

This controller provides the features to achieve the high functionalities that can construct the equipment at high level.



RCX340



Programming box
► PBX/PBX-E

P.659



Support software for PC
► RCX-Studio 2020

P.654

■ Basic specifications

Item		RCX340
Basic specifications	Applicable robots	YAMAHA single-axis robots, linear single-axis robots, Cartesian robots, SCARA robots (except for YK120X and YK150X), P&P robots
	Connected motor capacity	1600W or less (in total for 4 axes)
	Power capacity	2500VA
	Dimensions	W355 × H195 × D130mm (main unit only)
	Weight	6.2kg (main unit only)
Input power supply	Control power supply	Single-phase 200 to 230V AC +/-10% maximum, 50/60Hz
	Main power supply	Single-phase 200 to 230V AC +/-10% maximum, 50/60Hz
Axis control	No. of controllable axes	Max. 4 axes (simultaneous control: 6 axes) Expandable to a maximum of 16 axes (four robots) via controller link
	Drive method	AC full digital servo
	Position detection method	Resolver or magnetic linear scale
	Control method	PTP motion (point to point), ARCH motion, linear interpolation, circular interpolation
	Coordinate systems	Joint coordinates, Cartesian coordinates
	Position display units	Pulses, mm (1/1000 steps), degree (1/1000 steps)
	Speed setting	0.01 to 100% (below 1% can be changed by programming)
Programming	Acceleration/deceleration setting	Optimized by robot model and tip weight parameter Setting by acceleration coefficient and deceleration rate parameters (1% steps) * Can be changed by programming. Zone control (For SCARA robots only, optimized according to arm posture)
	Program language	YAMAHA BASIC II conforming to JIS B8439 (SLIM language)
	Multi-task	Max. 16 tasks
	Sequence program	1 program
	Memory capacity	2.1MB (Total of program and point data) (Available capacity for program when the maximum number of points is used: 300KB)
	Program	100 programs (maximum number of programs) 9999 lines (maximum number of lines per program)
	Point	30000 points (maximum number of points)
External I/O	Point teaching method	MDI (coordinate data input), direct teaching, teaching playback, offline teaching (data input from external unit)
	System backup (Internal memory backup)	Lithium battery (service life about 4 years at 0 to 40°C)
	Internal flash memory	512 KB
	SAFETY	Input Emergency stop ready input, 2 systems Auto mode input, 2 systems (Enabled only when the global specifications are used.)
		Output Emergency stop contact output, 2 systems Enable contact output, 2 systems (Enabled only when the PBX-E is used.) Motor power ready output, 2 systems
	Brake output	Transistor output (PNP open collector)
	Origin sensor input	Connectable to 24V DC B-contact (normally closed) sensor
Option	External communications	
	RS-232C: 1CH (D-SUB 9-pin (female)) Ethernet: 1CH (In conformity with IEEE802.3u/IEEE802.3) 100Mbps/10Mbps (100BASE-TX/10BASE-T) Applicable to Auto Negotiation RS-422: 1CH (Dedicated to PBX)	

Controllable robot	XY-X P.377	YK-X P.69	FLIP-X P.289	PHASER P.267	YP-X P.505
CE marking		Field networks	CC-Link DeviceNet EtherNet/IP Ethernet   EtherCAT 		

Ordering method

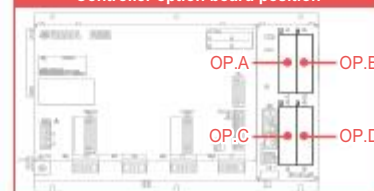
RCX340							
Controller	No. of control-able axes	Safety standards	Controller option A (OP.A)	Controller option B (OP.B)	Controller option C (OP.C)	Controller option D (OP.D)	Controller option E (OP.E)
	4: 4 axes 3: 3 axes 2: 2 axes Note 1	N: Normal E: CE K: KCs S: SMU compatible	No entry: Non-selection NS: STD.DIO(NPN) Note 2 Note 5 NE: EXP.DIO(NPN) Note 3 Note 5 PS: STD.DIO(PNP) Note 2 Note 5 PE: EXP.DIO(PNP) Note 3 Note 5 GR: Gripper Note 6 TR: Tracking Note 6 YM1: YC-Link/E master Note 7 YS2 to 4: YC-Link/E slave Note 7 EP: EtherNet/IP Note 8 PB: PROFIBUS Note 8 CC: CC-Link Note 8 DN: DeviceNet Note 8 PT: PROFINET Note 8 ES: EtherCAT Note 8	No entry: Non-selection NE: EXP.DIO(NPN) Note 3 Note 5 PE: EXP.DIO(PNP) Note 3 Note 5 GR: Gripper Note 6 TR: Tracking Note 6 YM1: YC-Link/E master Note 7 YS2 to 4: YC-Link/E slave Note 7 EP: EtherNet/IP Note 8 PB: PROFIBUS Note 8 CC: CC-Link Note 8 DN: DeviceNet Note 8 PT: PROFINET Note 8 ES: EtherCAT Note 8	No entry: Non-selection NE: EXP.DIO(NPN) Note 3 Note 5 PE: EXP.DIO(PNP) Note 3 Note 5 GR: Gripper Note 6 TR: Tracking Note 6 YM1: YC-Link/E master Note 7 YS2 to 4: YC-Link/E slave Note 7 EP: EtherNet/IP Note 8 PB: PROFIBUS Note 8 CC: CC-Link Note 8 DN: DeviceNet Note 8 PT: PROFINET Note 8 ES: EtherCAT Note 8	No entry: Non-selection NE: EXP.DIO(NPN) Note 3 Note 5 PE: EXP.DIO(PNP) Note 3 Note 5 GR: Gripper Note 6 TR: Tracking Note 6 YM1: YC-Link/E master Note 7 YS2 to 4: YC-Link/E slave Note 7 EP: EtherNet/IP Note 8 PB: PROFIBUS Note 8 CC: CC-Link Note 8 DN: DeviceNet Note 8 PT: PROFINET Note 8 ES: EtherCAT Note 8	No entry: Non-selection WY: with RCX/VY2+, without lighting WL: with RCX/VY2+, with lighting
							Absolute battery
							4: 4 pcs. 3: 3 pcs. 2: 2 pcs. 1: 1 pc. 0: 0 pc.

Please select desired selection items from the upper portion of the controller option A in order.

- Note 1. For two axes, safety standard "S" cannot be selected.
Note 2. When the field bus (CC/DN/PB/EP/PT/ES) is selected in the parallel I/O board standard (OP.B) to (OP.D) and the field bus option is enabled, the dedicated inputs from the parallel I/O board are disabled except for the STOP signal.
Note 3. Parallel I/O board expansion specifications
Note 4. Since only one parallel I/O board can be selected for an option board, the parallel I/O board standard specifications cannot be selected for (OP.B) to (OP.D).
Note 5. Be careful not to mix NPN and PNP for parallel I/O board.
Note 6. Only one tracking board can be selected from (OP.A) to (OP.D).

- Note 7. When using YC-Link/E, select only one of the four types of optional boards, master (YM1) or slave (YS2/YS3/YS4). Also, specify what robot is connected to what number controller.
Note 8. Do not mix with field bus (CC/DN/PB/EP/PT/ES).
Note 9. When using the incremental specifications, no absolute battery is required. When using a linear motor with semi-absolute specifications, the semi-absolute specifications are handled as incremental specifications, so no absolute battery is required. When using the absolute specifications, it is necessary to specify the absolute batteries for the number of axes.

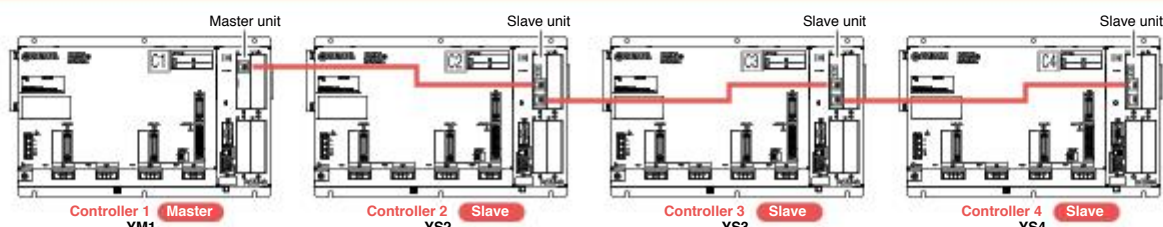
Controller option board position



Item		RCX340
General specifications	Operating temperature	0 to 40°C
	Storage temperature	-10 to 65°C
	Operating humidity	35 to 85% RH (no condensation)
	Noise immunity	Conforms to IEC61000-4-4 Level 3
	Protective structure	IP20
Options	Appliance classes	Class I
	Parallel I/O board	Standard specifications
		Dedicated input 8 points, dedicated output 9 points
	Expansion specifications	General-purpose input 16 points, general-purpose output 8 points
		NPN/PNP specifications are selected. (maximum 1 board)
	Option board	General-purpose input 24 points, general-purpose output 16 points
		NPN/PNP specifications are selected. (maximum 4 boards)
		CC-Link board Ver1.1/2.0
		Remote I/O
		Dedicated input/output: 16 points each
		General-purpose input/output: 96 points each
	YC-Link/E board (master/slave)	Remote register
		Input/output: 16 words each
		Communication cycle: 1 ms, control cycle: minimum 1 ms / maximum 8 ms, maximum number of robot units: four units
	YRG (gripper) board	Maximum number of control axes: total 16 axes (including four master controller axes), maximum 12 axes for slaves only
		Position detection method: optical rotary encoder, minimum setting distance: 0.01 mm
Robot	Tracking board	Speed setting: 20 to 100% relative to the maximum parameter speed, number of connected gripper units: maximum four units
		Drive power: DC 24V +/-10%, 1.0A Max
	RCX/VY2+ unit	Number of connected encoders: maximum two units, supported encoders: 26LS31/26C31 equivalent line driver (RS422 compliant)
		Encoder power supply: DC5V (2 counter (ch) total 500 mA or less) (supplied from controller)
	Camera pixels	Camera pixels: maximum 5 million pixels, number of registered models: 254 models, number of connected cameras: maximum two units
Support software for personal computer	Power supply	Power supply: DC24V +/-10% 1.5A Max
	Programming box	PBX, PBX-E
	Absolute battery	3.6V 2700mAh / axis Backup retention time: About 1 year
Support software for personal computer		RCX-Studio 2020

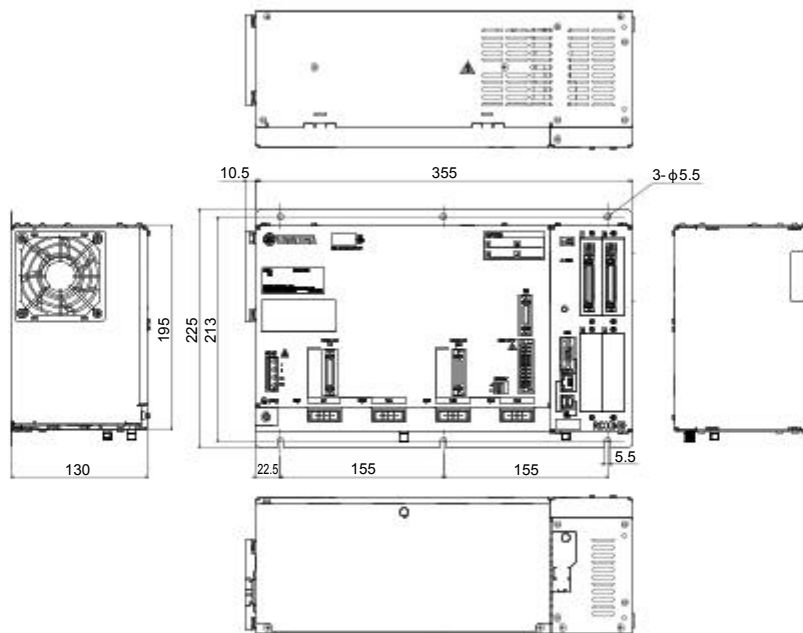
Note. There are four slots in which option boards can be installed.

YC-Link/E ordering explanation



* For customers who export robot controllers to Korea, connecting the RCX340 or RCX320 to the RCX340 using the YC-Link/E may not be compliant with the KCs system. Please contact us when considering such connections.

■ Dimensions



■ Power supply capacity and heat emission

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	Ceiling-mount	Wall-mount / Inverse type		
YK120XG, YK150XG	—	—	—	—	300	58
YK180XG, YK180X YK220X	YK180XC, YK220XC	—	—	—	500	63
YK250XG, YK350XG YK400XG, YK500XGL YK600XGL, YK400XE-4	YK250XCH, YK350XCH YK400XCH, YK250XGC YK350XGC, YK400XGC YK400XEC-4, YK500XGLC, YK600XGLC	YK250XGP, YK350XGP YK400XGP, YK500XGLP YK600XGLP	—	YK300XGS, YK400XGS	1000	75
—	YK500XC, YK600XC	—	—	—	1500	88
YK500XE-10, YK500XG YK610XE-10, YK600XG YK710XE-10, YK700XGL	YK510XEC-10, YK610XEC-10 YK710XEC-10	YK500XGP, YK600XGP	—	YK500XGS, YK600XGS	1700	93
—	YK700XC, YK800XC YK1000XC	—	—	—	2000	100
YK600XGH, YK700XG YK800XG, YK900XG YK1000XG, YK1200X	—	YK600XGHP, YK700XGP YK800XGP, YK900XGP YK1000XGP	YK350TW YK500TW	YK700XGS, YK800XGS YK900XGS, YK1000XGS	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
20	05	1100	78
10	10	1000	75
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
20	05	05	1200	80
10	10	05	1000	75
20	10	05	1300	83
20	20	05	1600	90
10	10	10	1200	80
20	10	10	1500	88
20	20	10	1800	95
20	20	20	2000	100

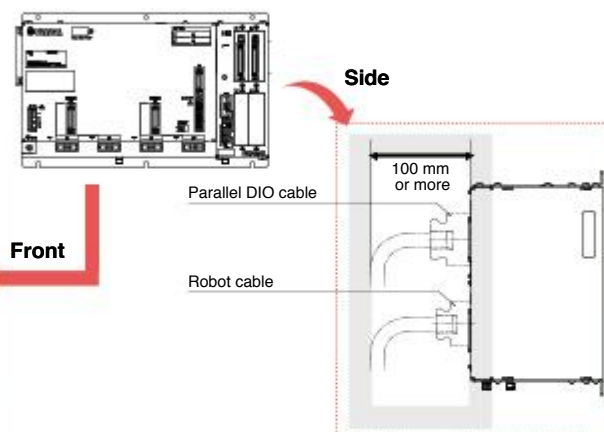
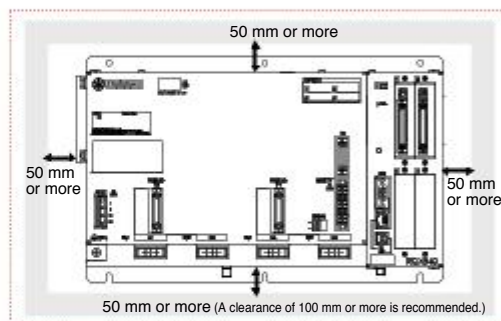
(4) When connected to 4 axis (Cartesian robot and/or multi-axis robot)

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
20	05	05	05	1200	80
10	10	05	05	1100	78
20	10	05	05	1400	85
20	20	05	05	1600	90
10	10	10	05	1300	83
20	10	10	05	1500	88
20	20	10	05	1800	95
20	20	20	05	2100	103
10	10	10	10	1400	85
20	10	10	10	1700	93
20	20	10	10	2000	100
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.

■ Installation conditions

- Use the screws to secure the controller to the installation plate inside the control panel so that it is in a horizontal position. Be sure to use the metallic installation plate.
- Install the RCX340 in a well ventilated location, with space on all sides of the RCX340 (See fig. at right.).
- Ambient temperature : 0 to 40°C
- Ambient humidity : 35 to 85% RH (no condensation)



■ Standard specification I/O connector signal list

Pin	I/O No.	Signal name	Remarks
1	DI 01	Dedicated input: Servo ON input	
2	DI 10	Dedicated input: Sequence control	
3	DI 03	Spare	Do not use.
4	CHK 1	Check signal 1	Short-circuit with CHK2.
5	DI 05	Spare	Do not use.
6	DI 06	Dedicated input: Stop	
7	DI 07	Spare	Do not use.
8	DI 20	General-purpose input 20	
9	DI 21	General-purpose input 21	
10	DI 22	General-purpose input 22	
11	DI 23	General-purpose input 23	
12	DI 24	General-purpose input 24	
13	DI 25	General-purpose input 25	
14	DI 26	General-purpose input 26	
15	DI 27	General-purpose input 27	
16	DO 00	Spare	Do not use.
17	DO 01	Dedicated output CPU OK	
18	DO 10	Dedicated output AUTO mode output	
19	DO 11	Dedicated output Return-to-origin complete	
20	DO 12	Dedicated output Sequence program-in-progress	
21	DO 13	Dedicated output Robot program-in-progress	
22	DO 14	Dedicated output Program reset status output	
23	DO 15	Dedicated output Warning output	
24	DO 16	Spare	Do not use.
25	DO 17	Spare	Do not use.
26	DI 12	Dedicated input: Automatic operation start	
27	DI 13	Spare	Do not use.
28	DI 14	Dedicated input: Return-to-origin (for INC axis)	
29	DI 15	Dedicated input: Program reset input	
30	DI 16	Dedicated input: Alarm reset input	
31	DI 17	Dedicated input: Return-to-origin (for ABS axis)	
32	DI 30	General-purpose input 30	
33	DI 31	General-purpose input 31	
34	DI 32	General-purpose input 32	
35	DI 33	General-purpose input 33	
36	DI 34	General-purpose input 34	
37	DI 35	General-purpose input 35	
38	DI 36	General-purpose input 36	
39	DI 37	General-purpose input 37	
40	CHK 2	Check signal 2	Short-circuit with CHK1.
41	DO 02	Dedicated output: Servo ON output	
42	DO 03	Dedicated output: Alarm output	
43	DO 20	General-purpose output 20	
44	DO 21	General-purpose output 21	
45	DO 22	General-purpose output 22	
46	DO 23	General-purpose output 23	
47	DO 24	General-purpose output 24	
48	DO 25	General-purpose output 25	
49	DO 26	General-purpose output 26	
50	DO 27	General-purpose output 27	

■ Expanded specification I/O connector signal list

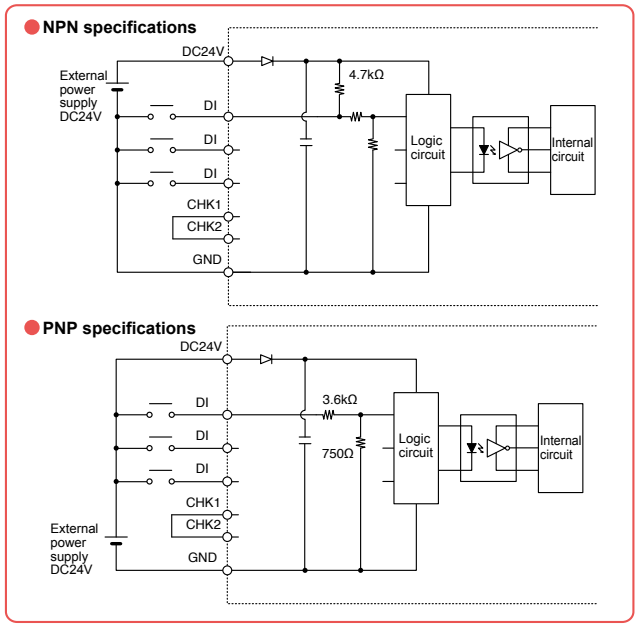
Pin	I/O No. (ID=1)	I/O No. (ID=2)	I/O No. (ID=3)	I/O No. (ID=4)	Signal name
1	---	---	---	---	Reserved
2	DI 10	DI 40	DI 70	DI 120	General-purpose input 10,40,70,120
3	---	---	---	---	Reserved
4	DI 11	DI 41	DI 71	DI 121	General-purpose input 11,41,71,121
5	---	---	---	---	Reserved
6	---	---	---	---	Reserved
7	---	---	---	---	Reserved
8	DI 20	DI 50	DI 100	DI 130	General-purpose input 20,50,100,130
9	DI 21	DI 51	DI 101	DI 131	General-purpose input 21,51,101,131
10	DI 22	DI 52	DI 102	DI 132	General-purpose input 22,52,102,132
11	DI 23	DI 53	DI 103	DI 133	General-purpose input 23,53,103,133
12	DI 24	DI 54	DI 104	DI 134	General-purpose input 24,54,104,134
13	DI 25	DI 55	DI 105	DI 135	General-purpose input 25,55,105,135
14	DI 26	DI 56	DI 106	DI 136	General-purpose input 26,56,106,136
15	DI 27	DI 57	DI 107	DI 137	General-purpose input 27,57,107,137
16	---	---	---	---	Reserved
17	---	---	---	---	Reserved
18	DO 10	DO 30	DO 50	DO 70	General-purpose output 10,30,50,70
19	DO 11	DO 31	DO 51	DO 71	General-purpose output 11,31,51,71
20	DO 12	DO 32	DO 52	DO 72	General-purpose output 12,32,52,72
21	DO 13	DO 33	DO 53	DO 73	General-purpose output 13,33,53,73
22	DO 14	DO 34	DO 54	DO 74	General-purpose output 14,34,54,74
23	DO 15	DO 35	DO 55	DO 75	General-purpose output 15,35,55,75
24	DO 16	DO 36	DO 56	DO 76	General-purpose output 16,36,56,76
25	DO 17	DO 37	DO 57	DO 77	General-purpose output 17,37,57,77
26	DI 12	DI 42	DI 72	DI 122	General-purpose input 12,42,72,122
27	DI 13	DI 43	DI 73	DI 123	General-purpose input 13,43,73,123
28	DI 14	DI 44	DI 74	DI 124	General-purpose input 14,44,74,124
29	DI 15	DI 45	DI 75	DI 125	General-purpose input 15,45,75,125
30	DI 16	DI 46	DI 76	DI 126	General-purpose input 16,46,76,126
31	DI 17	DI 47	DI 77	DI 127	General-purpose input 17,47,77,127
32	DI 30	DI 60	DI 110	DI 140	General-purpose input 30,60,110,140
33	DI 31	DI 61	DI 111	DI 141	General-purpose input 31,61,111,141
34	DI 32	DI 62	DI 112	DI 142	General-purpose input 32,62,112,142
35	DI 33	DI 63	DI 113	DI 143	General-purpose input 33,63,113,143
36	DI 34	DI 64	DI 114	DI 144	General-purpose input 34,64,114,144
37	DI 35	DI 65	DI 115	DI 145	General-purpose input 35,65,115,145
38	DI 36	DI 66	DI 116	DI 146	General-purpose input 36,66,116,146
39	DI 37	DI 67	DI 117	DI 147	General-purpose input 37,67,117,147
40	---	---	---	---	Reserved
41	---	---	---	---	Reserved
42	---	---	---	---	Reserved
43	DO 20	DO 40	DO 60	DO 100	General-purpose output 20,40,60,100
44	DO 21	DO 41	DO 61	DO 101	General-purpose output 21,41,61,101
45	DO 22	DO 42	DO 62	DO 102	General-purpose output 22,42,62,102
46	DO 23	DO 43	DO 63	DO 103	General-purpose output 23,43,63,103
47	DO 24	DO 44	DO 64	DO 104	General-purpose output 24,44,64,104
48	DO 25	DO 45	DO 65	DO 105	General-purpose output 25,45,65,105
49	DO 26	DO 46	DO 66	DO 106	General-purpose output 26,46,66,106
50	DO 27	DO 47	DO 67	DO 107	General-purpose output 27,47,67,107

Note. The IDs are set using the parameter.

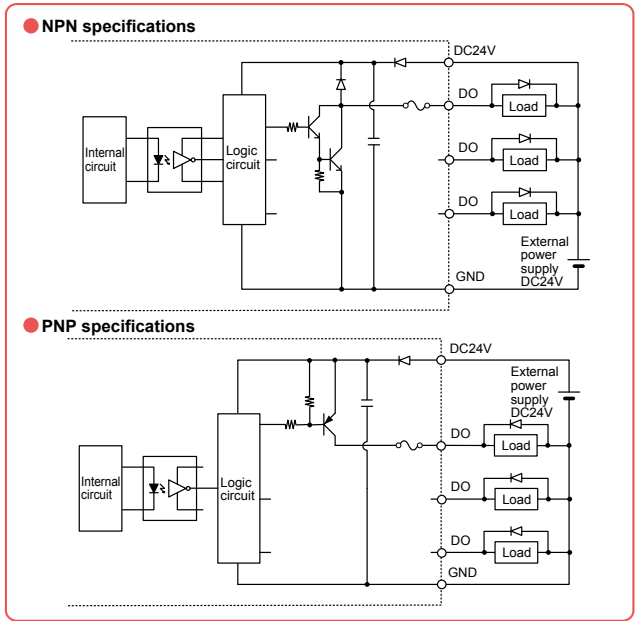
Standard specification I/O connector pin assignment lists

Pin	I/O No.	Name
1	DI01	Servo ON
2	DI10	SEQ enable
3	DI03	(Spare)
4	CHK1	Check input 1
5	DI05	(Spare)
6	DI06	STOP
7	DI07	(Spare)
8	DI20	General-purpose input
9	DI21	General-purpose input
10	DI22	General-purpose input
11	DI23	General-purpose input
12	DI24	General-purpose input
13	DI25	General-purpose input
14	DI26	General-purpose input
15	DI27	General-purpose input
16	DO00	(Spare)
17	DO01	CPUOK
18	DO10	AUTO
19	DO11	ORGOK
20	DO12	SEQRUN
21	DO13	RUN
22	DO14	RESET
23	DO15	WARNING
24	DO16	(Spare)
25	DO17	(Spare)
26	DI12	RUN
27	DI13	(Spare)
28	DI14	ORIGIN (for INC axis)
29	DI15	RESET
30	DI16	ALMRST
31	DI17	ORIGIN(for ABS axis)
32	DI30	General-purpose input
33	DI31	General-purpose input
34	DI32	General-purpose input
35	DI33	General-purpose input
36	DI34	General-purpose input
37	DI35	General-purpose input
38	DI36	General-purpose input
39	DI37	General-purpose input
40	CHK2	Check input 2
41	DO02	SERVO
42	DO03	ALARM
43	DO20	General-purpose output
44	DO21	General-purpose output
45	DO22	General-purpose output
46	DO23	General-purpose output
47	DO24	General-purpose output
48	DO25	General-purpose output
49	DO26	General-purpose output
50	DO27	General-purpose output

Typical input signal connection



Typical output signal connection

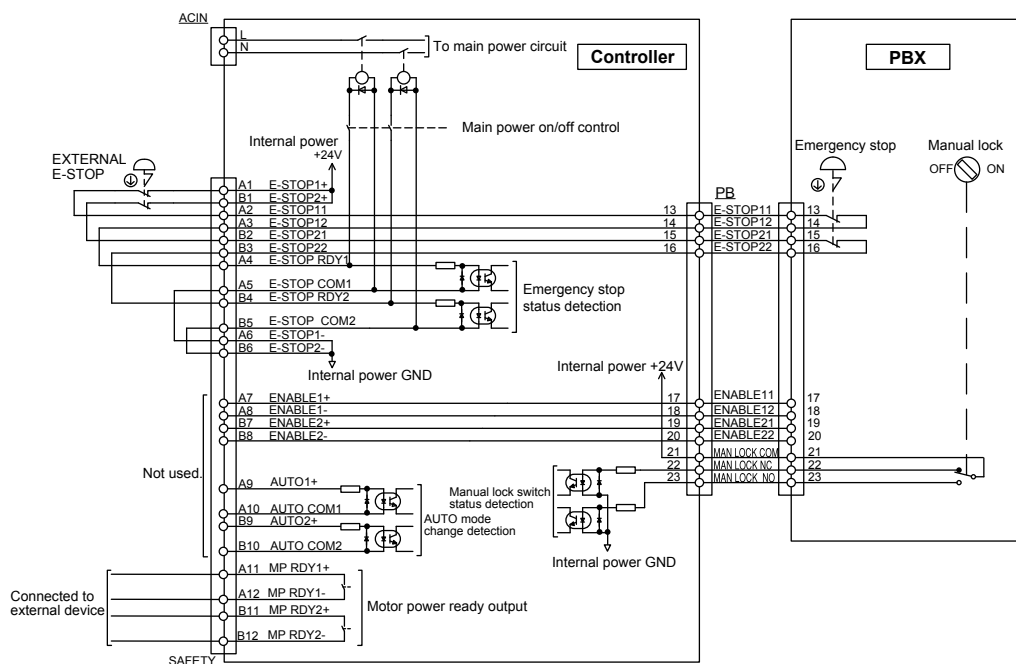


Basic functions

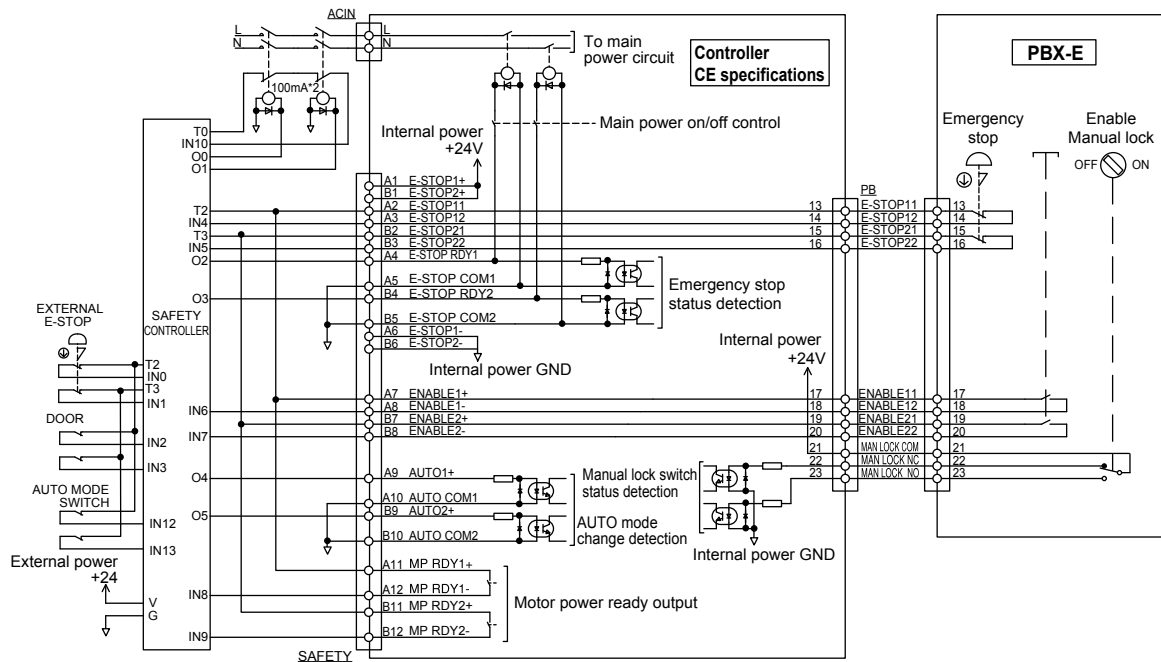
Function	Description
Operation modes	AUTO mode (Major functions: program creation, program execution, step execution, etc.) MANUAL mode (Major functions: jog movement, point data teaching, parameter editing, etc.)
Commands	Array declaration commands (DIM statement) Assignment commands (Numeric assignment, character string assignment, point definition statements, etc.) Movement commands (MOVE, DRIVE, PMOVE statements, etc.) Conditional branching commands (IF, FOR, WHILE statements, etc.) External output commands (DO, MO, LO, TO, SO statements) Parameter commands (ACCEL, OUTPOS, TOLE statements, etc.) Condition wait command (WAIT statement) Task related commands (START, SUSPEND, CUT statements, etc.) etc.
Functions	Arithmetic functions (SIN, COS, TAN functions, etc.) Character string functions (STR\$, LEFT\$, MID\$, RIGHT\$ functions, etc.) Point functions (WHERE, JTOXY, XYTOJ functions, etc.) Parameter functions (ACCEL, OUTPOS, TOLE statements, etc.) etc.
Variables	Simple variables (integer variables, real variables, character variables) Array variables (integer variables, real variables, character variables) Point variables Shift variables I/O variables etc.
Arithmetic operation	Arithmetic operators (+, -, *, /, MOD) Logic operators (AND, OR, XOR) Relational operators (=, <, >, <=, >=)
Monitor	I/O status monitor (200 ms intervals)
Online commands	Program operation commands (RUN, STOP, RESET, STEP, etc.) Utility commands (COPY, ERA, INIT, etc.) Data handling commands (READ, WRITE, etc.) Robot language commands (independent-executable commands)
Data files	Program, point, parameter, shift, hand, all, error history etc.
Internal timer	Timer count variable (TCOUNTER), 1 ms interval
Program break points	Max. 32 points

Emergency input signal connections

Connection example of controller with normal specifications and PBX



Connection example of controller with CE specifications and PBX-E



Robot Language Table

General commands

Command	Description
DIM	Declares the array variable name and the number of elements.
LET	Executes a specified assignment statement.
REM	Expresses a comment statement.

Arithmetic commands

Command	Description
ABS	Acquires the absolute value of a specified value.
ATN	Acquires the arctangent of the specified value.
ATN2	Acquires the arctangent of the specified X-Y coordinates.
COS	Acquires the cosine value of a specified value.
DEGRAD	Converts a specified value to radians (↔RADDEG).
DIST	Acquires the distance between 2 specified points.
INT	Acquires an integer for a specified value by truncating all decimal fractions.
LSHIFT	Shifts a value to the left by the specified bit count. (↔RSHIFT)
RADDEG	Converts a specified value to degrees. (↔DEGRAD)
RSHIFT	Shifts a value to the right by the specified bit count. (↔LSHIFT)
SIN	Acquires the sine value for a specified value.
SQR	Acquires the square root of a specified value.
TAN	Acquires the tangent value for a specified value.

Date / time

Command	Description
DATE \$	Acquires the date as a "yy/mm/dd" format character string.
TCOUNTER	Outputs count-up values at 1ms intervals starting from the point when the TCOUNTER variable is reset.
TIME \$	Acquires the current time as an "hh:mm:ss" format character string.
TIMER	Acquires the current time in seconds, counting from midnight.

Character string operation

Command	Description
CHR \$	Acquires a character with the specified character code.
LEFT \$	Extracts a character string comprising a specified number of digits from the left end of a specified character string.
LEN	Acquires the length (byte count) of a specified character string.
MID \$	Extracts a character string of a desired length from a specified character string.
ORD	Acquires the character code of the first character in a specified character string.
RIGHT \$	Extracts a character string comprising a specified number of digits from the right end of a specified character string.
STR \$	Converts a specified value to a character string (↔VAL).
VAL	Converts the numeric value of a specified character string to an actual numeric value. (↔STR\$)

Point, coordinates, shift coordinates

Command	Description
CHANGE	Switches the hand of a specified robot.
HAND	Defines the hand of a specified robot.
JTOXY	Converts joint coordinate data to Cartesian coordinate data of a specified robot. (↔XYTOJ)
LEFTY	Sets the hand system of a specified robot to the left-handed system.
LOCx	Specifies/acquires point data for a specified axis or shift data for a specified element.
PATH	Sets the movement path.
Pn	Defines points within a program.
PPNT	Creates point data specified by a pallet definition number and pallet position number.
RIGHTY	Sets the hand system of a specified robot to the right-handed system.
Sn	Defines the shift coordinates within the program.
SHIFT	Sets the shift coordinate for a specified robot by using the shift data specified by a shift variable.
XYTOJ	Converts the point variable Cartesian coordinate data to the joint coordinate data of a specified robot. (↔JTOXY).

Branching commands

Command	Description
EXIT FOR	Terminates the FOR to NEXT statement loop.
FOR to NEXT	Executes the FOR to NEXT statement repeatedly until a specified value is exceeded.
GOSUB to RETURN	Jumps to a subroutine with the label specified by GOSUB statement, and executes that subroutine.
GOTO	Unconditionally jumps to the line specified by a label.
IF	Allows control flow to branch according to conditions.
ON to GOSUB	Jumps to a subroutine with labels specified by a GOSUB statement in accordance with the conditions, and executes that subroutine.
ON to GOTO	Jumps to label-specified lines in accordance with the conditions.
SELECT CASE to END SELECT	Allows control flow to branch according to conditions.
WHILE to WEND	Controls repeated operations.

Error control

Command	Description
ERR / ERL	Acquires the error code number of an error which has occurred / the line number where an error occurred.
ON ERROR GOTO	This command allows the program to jump to the error processing routine specified by the label without stopping the program, or it stops the program and displays the error message.
RESUME	Resumes program execution after error recovery processing.

Program control

Command	Description
CALL	Calls a sub-procedure.
HALT	Stops the program and performs a reset.
HALTALL	Stops and resets all programs.
HOLD	Temporarily stops the program.
HOLDALL	Temporarily stops all programs.
PGMTSK	Acquires the task number in which a specified program is registered.
PGN	Acquires the program number from a specified program name.
SGI	Assigns/acquires the value to a specified integer type static variable.
SGR	Assigns/acquires the value to a specified real type static variable.
SWI	Switches the program being executed, then begins execution from the first line.
TSKPGM	Acquires the program number which is registered in a specified task.

Task control

Command	Description
CHGPRI	Changes the priority ranking of a specified task.
CUT	Terminates another task currently being executed or temporarily stopped.
EXIT TASK	Terminates its own task which is in progress.
RESTART	Restarts another task during a temporary stop.
START	Specifies the task number and priority ranking of a specified program, and starts that program.
SUSPEND	Temporarily stops another task which is being executed.

Robot operations

Command	Description
DRIVE	Moves a specified axis of a specified robot to an absolute position.
DRIVEI	Moves a specified axis of a specified robot to a relative position.
MOTOR	Controls the motor power status.
MOVE	Performs absolute movement of all axes of a specified robot.
MOVEI	Performs relative movement of all axes of a specified robot.
MOVET	Performs relative movement of all axes of a specified robot when the tool coordinate is selected.
ORIGIN	Performs return-to-origin.
PMOVE	Executes the pallet movement command of a specified robot.
PUSH	Executes a pushing operation in the axis unit.
SERVO	Controls the servo ON/OFF of a specified axis or all axes of a specified robot.

● Status acquisition

Command	Description
ABSRPOS	Acquires the machine reference value for specified robot axes. (Valid only for axes whose return-to-origin method is set as "mark".)
ARMCND	Acquires the current arm status of a specified robot.
ARMSEL	Specifies/acquires the current "hand system" setting of a specified robot.
ARMTYP	Specifies/acquires the "hand system" setting of a specified robot.
CURTQST	Acquires the current torque value ratio of a specified axis to the rated torque.
MCHREF	Acquires the return-to-origin or absolute-search machine reference value for specified robot axes. (Valid only for axes whose return-to-origin method is set as "sensor" or "stroke-end".)
MTRDUTY	Acquires the motor load factor of the specified axis.
PSHRSLT	Acquires the status at the end of the PUSH statement.
PSHSPD	Specifies/acquires the push speed parameter.
PSHTIME	Specifies/acquires the push time parameter.
WAIT ARM	Waits until the axis operation of a specified robot is completed.
WHERE	Reads out the current position of the arm of a specified robot in joint coordinates (pulse).
WHRXY	Reads out the current position of the arm of a specified robot as Cartesian coordinates (mm, degrees).

● Status change

Command	Description
ACCEL	Specifies/acquires the acceleration coefficient parameter of a specified robot.
ARCHP1	Specifies/acquires the arch position 1 parameter of a specified robot.
ARCHP2	Specifies/acquires the arch position 2 parameter of a specified robot.
ASPEED	Specifies/acquires the AUTO movement speed of a specified robot.
AXWGHT	Specifies/acquires the axis tip weight parameter of a specified robot.
CHANGE	Switches the hand of a specified robot.
DECEL	Specifies/acquires the deceleration rate parameter of a specified robot.
HAND	Defines the hand of a specified robot.
LEFTY	Sets the hand system of a specified robot to the left-handed system.
ORGORD	Specifies/acquires the axis sequence parameter for performing return-to-origin and an absolute search operation in a specified robot.
OUTPOS	Specifies/acquires the "OUT position" parameter of a specified robot.
PDEF	Defines the pallet used to execute pallet movement commands.
PSHFRC	Specifies/acquires the "Push force" parameter.
PSHJGSP	Specifies/acquires the push judge speed threshold parameter.
PSHMTD	Specifies/acquires the push method parameter.
RIGHTY	Sets the hand system of a specified robot to the right-handed system.
SETGEP	Sets the General Ethernet Port.
SPEED	Changes the program movement speed of a specified robot.
TOLE	Specifies/acquires the tolerance parameter of a specified robot.
WEIGHT	Specifies/acquires the tip weight parameter of a specified robot.

● PATH control

Command	Description
PATH	Specifies the PATH motion path.
PATH END	Ends the path setting for PATH motion.
PATH SET	Starts the path setting for PATH motion.
PATH START	Starts the PATH motion.

● Torque control

Command	Description
CURTQST	Acquires the current torque value ratio of a specified axis to the rated torque.
CURTRQ	Acquires the current torque value of the specified axis of a specified robot.
PUSH	Executes a pushing operation in the axis unit.
TORQUE	Specifies/acquires the maximum torque command value which can be set for a specified axis of a specified robot.

● Input/output control

Command	Description
DELAY	Waits for the specified period (units: ms).
DO	Outputs a specified value to the DO port or acquires the DO status.
LO	Outputs a specified value to the LO port to enable/disable axis movement or acquires the LO status.
MO	Outputs a specified value to the MO port or acquires the MO status.
OUT	Turns ON the bits of the specified output ports and terminates the command statement.
RESET	Turns the bit of a specified output port OFF.
SET	Turns the bit at the specified output port ON.
SI	Acquires a specified SI status.
SID	Acquires a specified serial input's double-word information status.
SIW	Acquires a specified serial input's word information status.
SO	Outputs a specified value to the SO port or acquires the SO status.
SOD	Outputs a specified serial output's double-word information or acquires the output status.
SOW	Outputs a specified serial output's word information or acquires the output status.
TO	Outputs a specified value to the TO port or acquires the TO status.
WAIT	Waits until the conditions of the DI/DO conditional expression are met (with time-out).

● Communication control

Command	Description
CLOSE	Close the specified General Ethernet Port.
ETHSTS	Acquires the Ethernet port status.
GEPSTS	Acquires the General Ethernet Port status.
OFFLINE	Sets a specified communication port to the "offline" mode.
ONLINE	Sets the specified communication port to the "online" mode.
OPEN	Opens the specified General Ethernet Port.
SEND	Sends a file.

Accessories and part options

RCX340



Standard accessories

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

Power connector + wiring connection lever



Model KAS-M5382-00

LCC140
TS-X
TS-P
SR1-X
SR1-P
RCX320
RCX340/341

Safety connector



Model KCX-M5370-00

RCX320
RCX340/341

PBX terminator (dummy connector)

Attach this to the PBX connector during operation with the programming box PBX removed.



Model KFR-M5163-00

RCX320
RCX340/341

NPN / PNP connector



Connector plug model KBH-M4424-00
Connector shell model KBH-M4425-00

SR1-X
SR1-P
RCX320
RCX340/341

Absolute battery

Battery for absolute data back-up.

Basic specifications

Item	Absolute battery
Battery type	Lithium metallic battery
Battery capacity	3.6V/2,700mAh
Data holding time	About 1 year (in state with no power applied)
Dimensions	φ17 × L53mm
Weight ^{Note1}	21g



Model KCA-M53G0-03

Note 1. Weight of battery itself.

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

If trouble occurs with the memory then remaining battery life is low so replace the absolute battery. The battery replacement period depends on usage conditions. But generally you should replace the battery after about 1 year counting the total time after connecting to the controller and left without turning on the power.

RCX320
RCX340/341
TS-SH
RCX3-SMU

Important Absolute battery installation conditions

1 batteries are required for each 1 axes.
● 1 battery.....Data storage time of approximately 6 months (with no power applied)
Note. No absolute battery is required for the incremental or semi-absolute axis.

Dust cover for COM connector

Model KR7-M5395-10

RCX320
RCX340/341

Dust cover for LAN connector

Model KCX-M658K-10

RCX320
RCX340/341

Dust cover for USB connector

Model KCX-M658K-00

RCX320
RCX340/341

Replacement fan filter (5 pcs.)

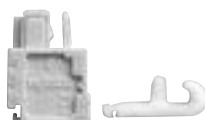
Model KDK-M427G-00

RCX320

Options

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

- **External 24V power supply connector for brake + wiring lever**



Model	KCX-M6500-10	RCX340/341
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- **Programming box PBX/PBX-E**

P.659

This device can perform all operations such as manual robot operation, program entry and edit, teaching and parameter settings.



Type	Language	Cable length	Model	RCX320 RCX340/341	
PBX	Japanese	5m	KCX-M5110-1J		
		12m	KCX-M5110-3J		
	English	5m	KCX-M5110-1E		
		12m	KCX-M5110-3E		
	Chinese	5m	KCX-M5110-1C		
		12m	KCX-M5110-3C		
PBX-E (with enable switch)	Japanese	5m	KCX-M5110-0J		
		12m	KCX-M5110-2J		
	English	5m	KCX-M5110-0E		
		12m	KCX-M5110-2E		
	Chinese	5m	KCX-M5110-0C		
		12m	KCX-M5110-2C		
				Model	
	Display language switching USB for PBX			KCX-M6498-00	
USB cable			KCX-M657E-00		

- **Support software for PC RCX-Studio 2020**

P.654

This is support software for operating the RCX320 / RCX340 controller. A USB key is supplied to the RCX-Studio 2020 to prevent robot operation mistakes.



Model	RCX-Studio 2020 Basic (USB key blue)	KCX-M4990-40	RCX320 RCX340/341
	RCX-Studio 2020 Pro (USB key purple)	KCX-M4990-50	

Note. Even when there is no USB key, RCX-Studio 2020 can be used as function restricted version. For details about the functions of the function restricted, Basic, and Pro versions, see P.654.

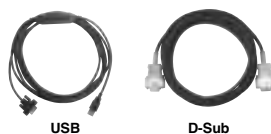
Basic specifications

Supported language	Japanese, English, Chinese
OS ^{Note1}	Microsoft Windows 7 SP1(32/64bit) / 8.1 (32 bit / 64 bit) / 10 (32 bit / 64 bit) 11 (Supported version:V3.2.5 or later)
Execution environment	.NET Framework 4.5 or more
CPU	Recommended: Intel Core i5 2 GHz or more, Minimum: Intel Celeron 2 GHz or more, 3D-SIM is invalid.: Intel Core 2 Duo 2 GHz or more
Memory	Recommended: 8 GB or more, Minimum: 4 GB or more, 3D-SIM is invalid: 1 GB or more
Hard disk capacity	1GB of available space required on installation drive
Communication Port	Communication cable: Serial communication port, Ethernet port, or USB port
Others	Dedicated commutation cable (For D-Sub or USB) Ethernet cable (category 5 or better) USB port: 1 port (For USB key)
Applicable robot controllers	RCX320 / RCX340
Applicable robot	YAMAHA robot that can be connected to the RCX340, RCX320.

Note. Microsoft, Windows 7, Windows 8.1, and Windows 10 are either registered trademarks or trademarks of Microsoft Corporation in the United States and/or other countries.
 Other company names and product names listed in this manual may be the trademarks or registered trademarks of their respective companies.

- **Data cables**

Communication cable for RCX-Studio 2020. Select from USB cable or D-sub cable.



[RCX320/RCX340]
Ethernet cable (category 5 or higher) is also supported.

Model	USB type (5m)	KBG-M538F-00	LCC140
	D-Sub type 9pin-9pin (5m)	KAS-M538F-10	ERCD SR1-X SR1-P RCX320 RCX340/341

Note. This USB cable supports Windows 2000/XP or later.
 Note. Data cable jointly used for POPCOM+, VIP+, RCX-Studio Pro and RCX-Studio 2020.
 Note. USB driver for communication cable can also be downloaded from our website.

- **YC-Link/E master board**

Model	KCX-M4400-M0	RCX320 RCX340/341
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- **YC-Link/E slave board**

Model	KCX-M4400-S0	RCX320 RCX340/341
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- **YC-Link/E cable (1m)**

Model	KCX-M6479-10	RCX320 RCX340/341
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RCX341

● Robot controller with advanced functions

Based on the multi-axis controller “RCX340”, which features advanced functionality that enables high-level equipment construction, the external regenerative unit “RU1” is installed to dissipate heat inside the controller.

The maximum output current has been increased while maintaining the same compact design as RCX340.



RU1



RCX341



Programming box
► PBX/PBX-E

P.659



Support software for PC
► RCX-Studio 2020

P.654

■ Basic specifications

Item		RCX341
Basic specifications	Applicable robots	SCARA robots (YK1200XG)
	Connected motor capacity	1600W or less (in total for 4 axes)
	Power capacity	2500VA
	Dimensions	W355 × H195 × D130mm (main unit only)
	Weight	5.8kg (main unit only)
Input power supply	Control power supply	Single-phase 200 to 230V AC +/-10% maximum, 50/60Hz
	Main power supply	Single-phase 200 to 230V AC +/-10% maximum, 50/60Hz
Axis control	No. of controllable axes	See RCX340 (p.636)
	Drive method	
	Position detection method	
	Control method	
	Coordinate systems	
	Position display units	
	Speed setting	
	Acceleration/deceleration setting	
Programming	Program language	See RCX340 (p.636)
	Multi-task	
	Sequence program	
	Memory capacity	
	Program	
	Point	
	Point teaching method	
	System backup (Internal memory backup)	
External I/O	SAFETY	Input
		Output
	Brake output	
	Origin sensor input	
	External communications	

Item		RCX341
General specifications	Operating temperature	See RCX340 (p.636)
	Storage temperature	
	Operating humidity	
	Noise immunity	
	Protective structure	
	Appliance classes	
Options	Parallel I/O board	Standard specifications
		Expansion specifications
	Option board	CC-Link board Ver1.1/2.0
		DeviceNet™ board
		EtherNet/IP™ board
		PROFIBUS board
		PROFINET board
		EtherCAT board
		YC-Link/E board (master/slave)
		YRG (gripper) board
		Tracking board
	RCXiVY2+ unit	
	Programming box	
	Absolute battery	
	Support software for personal computer	

Note. There are four slots in which option boards can be installed.

Controllable robot	YK1200XG P.106
CE marking	
Field networks	

Ordering method

RCX341-4	R						
Controller	Safety standards	Regenerative unit	Controller option A (OP.A)	Controller option B (OP.B)	Controller option C (OP.C)	Controller option D (OP.D)	Controller option E (OP.E)
	N: Normal E: CE K: KCs		No entry: Non-selection NS: STD.DIO(NPN) Note 1 Note 4 NE: EXP.DIO(NPN) Note 2 Note 4 PS: STD.DIO(PNP) Note 1 Note 4 PE: EXP.DIO(PNP) Note 2 Note 4 GR: Gripper Note 5 TR: Tracking Note 5 YM1: YC-Link/E master Note 6 YS2 to 4: YC-Link/E slave Note 6 EP: EtherNet/IP™ Note 7 PB: PROFIBUS Note 7 CC: CC-Link Note 7 DN: DeviceNet™ Note 7 PT: PROFINET Note 7 ES: EtherCAT Note 7	No entry: Non-selection NE: EXP.DIO(NPN) Note 2 Note 4 PE: EXP.DIO(PNP) Note 2 Note 4 GR: Gripper Note 5 TR: Tracking Note 5 YM1: YC-Link/E master Note 6 YS2 to 4: YC-Link/E slave Note 6 EP: EtherNet/IP™ Note 7 PB: PROFIBUS Note 7 CC: CC-Link Note 7 DN: DeviceNet™ Note 7 PT: PROFINET Note 7 ES: EtherCAT Note 7	No entry: Non-selection NE: EXP.DIO(NPN) Note 2 Note 4 PE: EXP.DIO(PNP) Note 2 Note 4 GR: Gripper Note 5 TR: Tracking Note 5 YM1: YC-Link/E master Note 6 YS2 to 4: YC-Link/E slave Note 6 EP: EtherNet/IP™ Note 7 PB: PROFIBUS Note 7 CC: CC-Link Note 7 DN: DeviceNet™ Note 7 PT: PROFINET Note 7 ES: EtherCAT Note 7	No entry: Non-selection NE: EXP.DIO(NPN) Note 2 Note 4 PE: EXP.DIO(PNP) Note 2 Note 4 GR: Gripper Note 5 TR: Tracking Note 5 YM1: YC-Link/E master Note 6 YS2 to 4: YC-Link/E slave Note 6 EP: EtherNet/IP™ Note 7 PB: PROFIBUS Note 7 CC: CC-Link Note 7 DN: DeviceNet™ Note 7 PT: PROFINET Note 7 ES: EtherCAT Note 7	No entry: Non-selection WY: with RCX iVY2+, without lighting WL: with RCX iVY2+, with lighting
	Note. Please check with our distributor for the latest standard compliance status.						Absolute battery 4: 4 pcs.

Please select desired selection items from the upper portion of the controller option A in order.

Note 1. When the field bus (CC/DN/PB/EP/PT/ES) is selected in the parallel I/O board standard (OP.B) to (OP.D) and the field bus option is enabled, the dedicated inputs from the parallel I/O board are disabled except for the STOP signal.

Note 2. Parallel I/O board expansion specifications

Note 3. Since only one parallel I/O board can be selected for an option board, the parallel I/O board standard specifications cannot be selected for (OP.B) to (OP.D).

Note 4. Be careful not to mix NPN and PNP for parallel I/O board.

Note 5. Only one tracking board can be selected from (OP.A) to (OP.D).

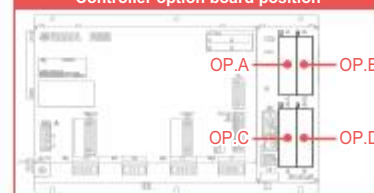
Note 6. When using YC-Link/E, select only one of the four types of optional boards, master (YM1) or slave (YS2/YS3/YS4).

Also, specify what robot is connected to what number controller.

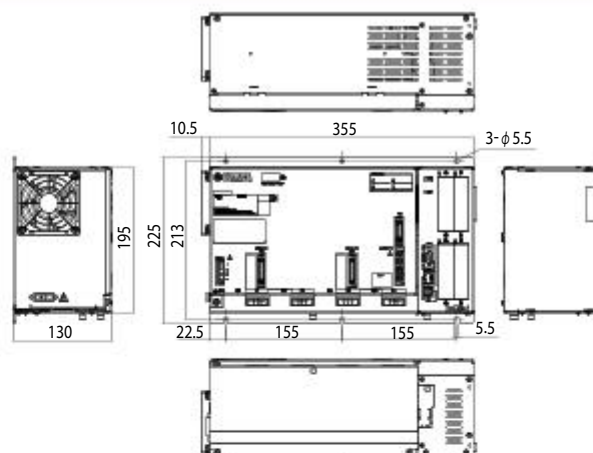
Note 7. Do not mix with field bus (CC/DN/PB/EP/PT/ES).

Note 8. When using the incremental specifications, no absolute battery is required. When using the absolute specifications, it is necessary to specify the absolute batteries for the number of axes.

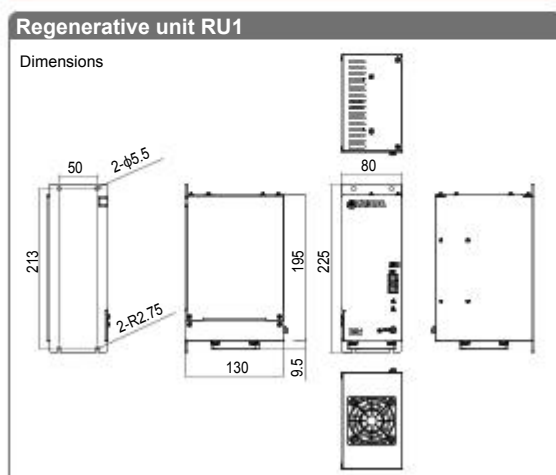
Controller option board position



Dimensions



Regenerative unit RU1



Basic specifications

Item	RU1
Model	KCX-M4107-00
Dimensions	W80×H195×D130mm (main unit only)
Weight	2500g (main unit only)
Power Supply	Input 254 to 357 V DC (Controller DCBUS Connecting)
Connector	Regenerative unit connector (for unit connection)
Installation Environment	Working Temperature 0 to 40 °C Working Humidity 35 to 85% RH (No Condensation) Location of Use Altitude 2,000 m or lower and indoor (free from corrosive gases and dust) Storage Temperature -10 °C to 65 °C Vibration Withstanding 1G
Protective Construction / Rating	IP20 / Class 1

Support software for PC

TS-Manager/EP-Manager

Besides basic functions, such as point data edit and backup, this support software TS-Manager/EP-Manager incorporates various convenient functions to efficiently process the system debugging and analysis. The TS-Manager/EP-Manager helps you in every scene from the system setup to the maintenance.



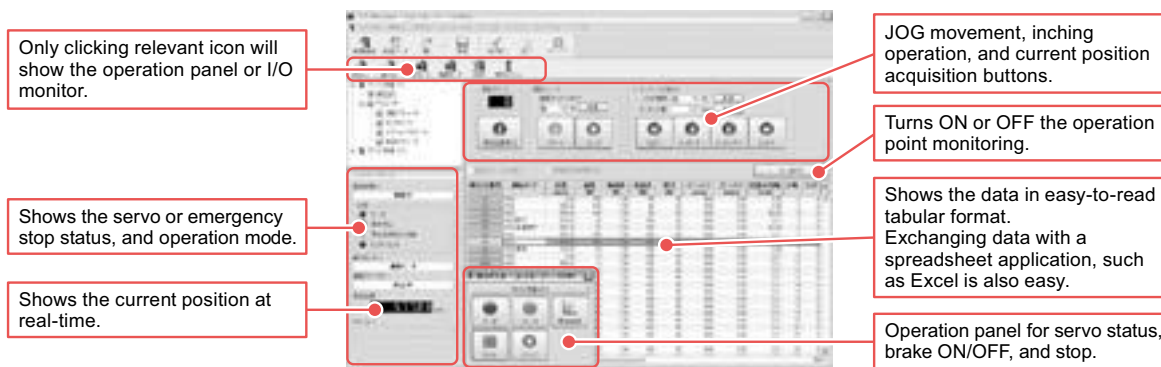
▼Applicable controllers

TS TS-Manager	TS-S2	P.592
	TS-SH	
	TS-X	
	TS-P	
EP EP-Manager	TS-SD	P.602
	EP-01	P.582

■ Features

1 Basic functions TS EP

Detailed settings by point, such as the position information, operation pattern, speed, acceleration, and deceleration settings, and robot parameter settings can be set, edited, and backed up. Additionally, the basic operation of the robot, such as JOG movement or inching operation can also be controlled through the TS-Manager.



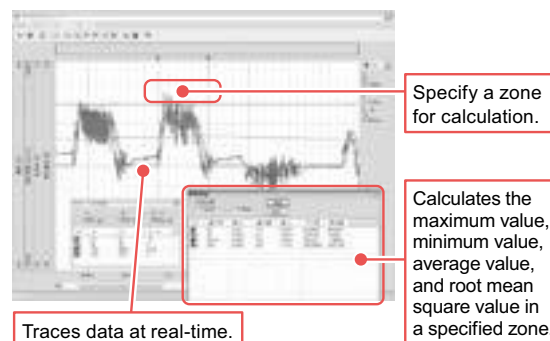
Note. Excel is a registered trademark of Microsoft Corporation in the United States and/or other countries.

2 Real-time trace TS EP

This function traces the current position, speed, load factor, current value, and voltage value at real-time. Additionally, as trigger conditions are set, data can be automatically obtained when these conditions are satisfied. Furthermore, as a zone is specified from the monitor results, the maximum value, minimum value, and average value can be calculated. These values are useful for the analysis if a trouble occurs.

Real-time traceable items (up to four items)		
• Voltage value	• Commanded position	• Current position
• Command speed	• Current speed	• Internal temperature
• Command current value	• Present current value	• Motor load factor
• Input/output I/O status	• Input pulse count ^{*1}	• Movement pulse count ^{*1}
• Word input/output status ^{*2}		

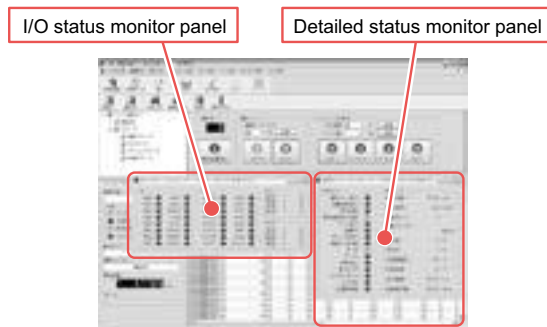
^{*1}: Only on TS-SD
^{*2}: Only on TS controllers and EP-01



3 Various monitor functions and detailed error logs TS EP

The robot operation status (operation mode or servo status) and I/O status can be monitored.

Additionally, the Alarm Log screen also displays the input/output I/O status in addition to the carrier position, speed, operation status, current value, and voltage value in case of an alarm. This greatly contributes to the status analysis.



4 Operation simulation TS EP

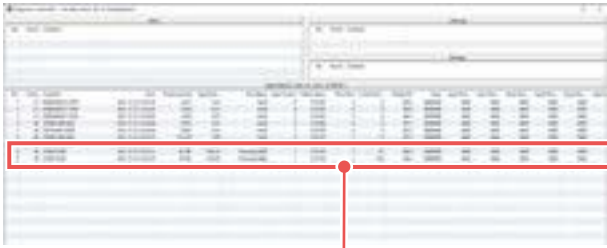
As the operation condition data or point data is input, a period of time necessary for operation is simulated. Use of this function makes it possible to select an optimal model before purchase and simulate the speed and acceleration/deceleration settings without use of actual machine. The TS-Manager/EP-Manager can also be linked with a controller, so edited point data can be easily reflected on actual machines.



5 Alarm history TS EP

In addition to the position, speed, operation status, current value, and voltage value in case of an alarm, the I/O status of the input/output is displayed.

This contributes to analysis of the status.



Even if the alarm is the same, the cause may be different if the occurrence location, operating conditions, and operating status are different.

6 Free download EP

Support software "EP-Manager" that allows you to perform "Setting" → "Pre-check" → "Debug" → "Maintenance" in a single step is provided free of charge.

Easy edit for robot operation, positioning, timing, or monitoring motor load.



Download from website
(member site)

Free
of
charge

TS-Manager TS



Model	KCA-M4966-0J (Japanese)
	KCA-M4966-0E (English)

TS-Manager environment

OS	Windows 2000, XP (32bit), Vista, 7, 8 / 8.1, 10 (Supported version: V.1.4.5 or later) 11 (Supported version: V.1.4.5 or later)
CPU	Exceeding the environment recommended by the OS being used
Memory	Exceeding the environment recommended by the OS being used
Hard disk	Vacant capacity of more than 20MB in the installation destination drive
Communication port	Serial (RS-232C), USB
Applicable controllers	TS series

Note. Windows is the registered trademark of US Microsoft Corporation in U.S.A. and other countries.

Data cables (5m)

Communication cable for TS-Manager.
Select from USB cable or D-sub cable.



Model	USB type (5m)	KCA-M538F-A0
	D-Sub type (5m)	KCA-M538F-01

Note. USB driver for communication cable can also be downloaded from our website.

EP-Manager EP



Download from website
(member site)

Free
of
charge

EP-Manager environment

OS	Microsoft Windows 10 (32bit/64bit), 11 (Supported version: V.1.2.4 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

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.

Model	KFX-M4990-00
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Linear conveyor modules
LCMR200
Single-axis robots
GX
Linear conveyor modules
LCM100
SCARA robots
YK-X
Single-axis robots
Robonity
Linear motor single-axis robots
PHASER
Single-axis robots
FLIP-X
Compact single-axis robots
TRANSERO
Cartesian robots
XY-X
Pick & place robots
YP-X
CLEAN
CONTROLLER
INFORMATION
Robot positioner
Pulse string driver
Robot controller
RCX+VYZ Electric gripper
Option

Support software for PC

POPCOM+

POPCOM+ is an easy to operate application software that makes tasks such as robot operation, writing-editing programs, and point teaching easy to visually understand.



▼Applicable controllers

LCC140 **P.576**ERCD **P.612**SR1-X **P.618**
SR1-P

■ Features

1 Easy to use

All items necessary for robot operation are displayed on single screen. There is no need to remember the menu structure so that it can be easily operated with mouse control by anybody.

**2 Program editing**

Edit amendment, cut, copy, paste, syntax check and program entry can be performed efficiently with function keys.

**3 Point editing**

Edit amendment, cut, copy, paste, syntax check, teach and trace functions are provided.

**4 Help function**

If you need some detailed information, robot language etc. during operation, operate [F1] key or [HELP] key to recall useful information on the screen.

**5 Robot operation**

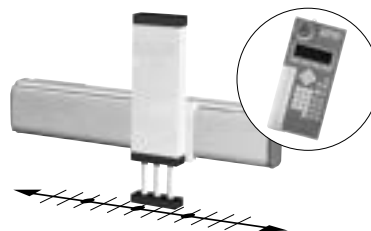
By connecting between a computer and the controller with a communication cable, the controller can control the robot in the same way as a HPB / HPB-D (programming box).

**6 Creating point data**

There are three methods available for creating the point data.

● MDI (Manual Data Input) teaching

The numeric keyboard is used to enter position coordinate data directly.



● Remote teaching

The robot arm is actually moved to the target position using the keys for point data registration.



● Direct teaching

The robot arm is manually moved to the target position with the servo motors off for point data registration.



■ PC supporting software POPCOM+



POPCOM+ software model	KBG-M4966-00
------------------------	--------------

■ POPCOM+ environment

OS	Windows XP (32bit), Vista, 7, 8 / 8.1, 10 (Supported version: V.2.1.1 or later)
CPU	Processor that meets or exceeds the suggested requirements for the OS being used.
Memory	Suggested amount of memory or more for the OS being used.
Hard disk	50MB of available space required on installation drive.
Disk operation	RS-232C
Applicable controllers	SRCX to SR1, DRCX, TRCX, ERCX, ERCD, LCC140 ^{Note 1}

Note 1. LCC140 is applicable to Ver. 2.1.1 or later.

Note. Windows is the registered trademark of US Microsoft Corporation in U.S.A. and other countries.

■ Data cables (5m)

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

Communication cable for POPCOM+.
Select from USB cable or D-sub cable.



	USB	D-Sub
Model	USB type (5m) D-Sub type 9pin-9pin (5m)	KBG-M538F-00 KAS-M538F-10

LCC140	ERCD
SR1-X	SR1-P
RCX320	RCX340/341

Note. This USB cable supports Windows 2000/XP or later.

Note. Data cable jointly used for POPCOM+, VIP+, RCX-Studio Pro.

Note. USB driver for communication cable can also be downloaded from our website.

Option details

Support software for PC

RDV-Manager

RDV-Manager is software for RDV-X/RDV-P. Using the Windows operating computer, it is possible to set parameters, to monitor the position, speed and torque and to have graphics displayed, assuring pleasant and easy operation in the Windows Vista, Windows 7 or Windows 8 / Windows 8.1 environment.



▼Applicable controllers

RDV-X
RDV-P

P.606

■ Features

1 Monitoring function

It is possible to monitor the operation condition and output state in real time. Additionally, the terminal can be operated forcibly to check the operation.



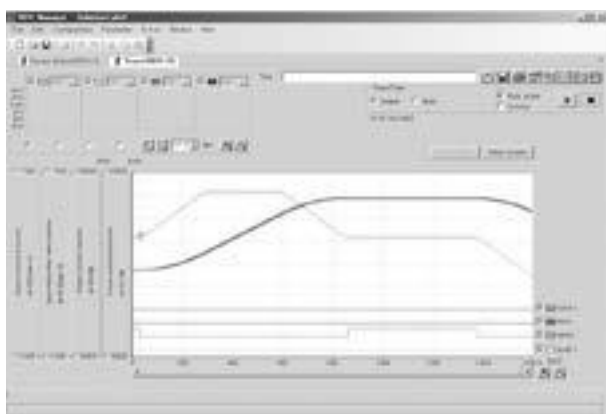
2 Setting parameters

It is possible to set, change, print and store the parameters.



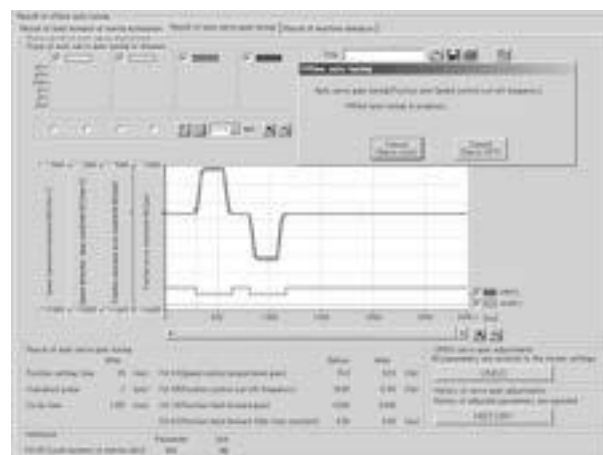
3 Operation tracing function

It is possible to have the servo motor speed and electric current displayed in the form of graphics.



4 Offline auto tuning function

The load moment of inertia can be estimated and the automatic servo gain can be adjusted.



■ Support software RDV-Manager

RDV-Manager is RDV-X / RDV-P dedicated software.



Model	KEF-M4966-00
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■ Environment

OS	Windows Vista SP1 (32bit) ^{Note 1} , 7, 8 / 8.1, 10 (Supported version: V2.203.12.2 or later) 11 (Supported version: V2.203.12 or later)
CPU	Pentium4 1.8GHz or more (Recommend)
Memory	1GB or more
Hard disk	1GB of available space required on installation drive.
Disk operation	USB
Applicable controllers	RDV series

Note 1. SP1 (service pack 1) or higher.

Note. Windows is the registered trademark of US Microsoft Corporation in U.S.A. and other countries.

■ Communication cable for PC supporting software RDV-Manager (3m)

Communication cable to connect PC and a controller.



Model	KEF-M538F-01
-------	--------------

Linear conveyor modules	LCMR200
Single-axis robots	GX
Linear conveyor modules	LCM100
SCARA robots	YK-X
Single-axis robots	Robonity
Linear motor single-axis robots	PHASER
Single-axis robots	FLIP-X
Compact single-axis robots	TRANSERVO
Cartesian robots	XY-X
Pick & place robots	YP-X
	CLEAN
	CONTROLLER
	INFORMATION
Robot positioner	
Pulse string driver	
Robot controller	
RCXIVY2+ Electric gripper	
Option	

RCX-Studio 2020

New functions such as 3D simulator function and program template (program template automatic creation function) are added for ease of user operation.



▼Applicable controllers

RCX320 **P626**

RCX340 **P636**

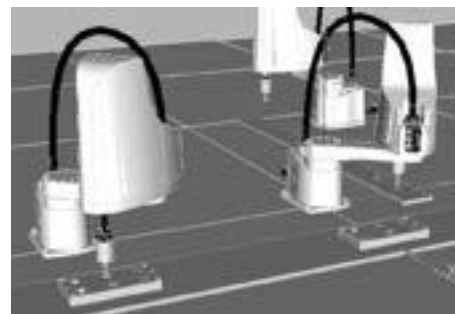
■ Features

1 3D simulator

● Layout can be verified beforehand without connecting robot

Robots and peripheral devices are displayed in 3D, and the robot operation is simulated on PC.

- ▶ Robot layout, teaching, and debugging can be performed.
- ▶ Physical interference between the robot and peripheral device can be checked before operation is started.



2 Program template (Program template automatic creation function)

● Program creation time can be shortened greatly.

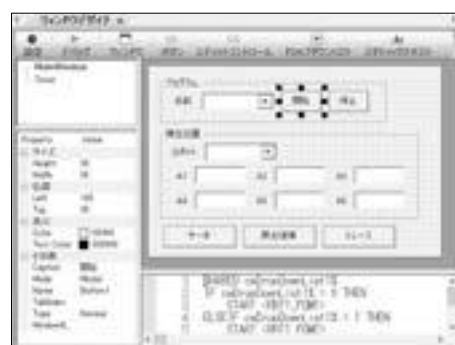
Program templates for 10 types of applications are incorporated. Just following the steps to perform the operation creates a program template automatically.



3 Custom window creation

● Operation screens suitable for the customer's equipment can be created.

GUIs for operators that are displayed on the panel computer can be created.



4 Other existing functions

All useful features from RCX-Studio Pro are succeeded to help supporting from startup to maintenance.

Cycle time
calculator

Real time
trace

Data comparison



RCX-Studio 2020 software

Software can be downloaded from YAMAHA's WEB site (member site) together with RCX-Studio 2020 Basic or RCX-Studio 2020 Pro.



Basic specifications

Product name	RCX-Studio 2020 Basic	RCX-Studio 2020 Pro
Type ^{Note1}	KCX-M4990-40	KCX-M4990-50
License management	USB key (blue) ^{Note2}	USB key (purple)
Supported language	Japanese, English, Chinese	
OS ^{Note3}	Microsoft Windows 7 SP1(32/64bit) / 8.1 (32 bit / 64 bit) / 10 (32 bit / 64 bit) / 11 (Supported version:V3.2.5 or later)	
Execution environment	.NET Framework 4.5 or more	
CPU	Recommended: Intel Core i5 2 GHz or more, Minimum: Intel Celeron 2 GHz or more, 3D-SIM is invalid.: Intel Core 2 Duo 2 GHz or more	
Memory	Recommended: 8 GB or more, Minimum: 4 GB or more, 3D-SIM is invalid: 1 GB or more	
Hard disk capacity	1GB of available space required on installation drive	
Communication Port	Communication cable: Serial communication port, Ethernet port, or USB port	
Others	Dedicated commutation cable (For D-Sub or USB) Ethernet cable (category 5 or better) USB port: 1 port (For USB key)	
Applicable controller	RCX340/RCX320	
Applicable robot	YAMAHA robot that can be connected to the RCX340, RCX320.	

Note 1. This shows the software package type. The software is common to two products and can be downloaded from YAMAHA's WEB site.

Note 2. Common to the conventional model RCX-Studio Pro.

Note 3. Microsoft, Windows 7, Windows 8.1, and Windows 10 are either registered trademarks or trademarks of Microsoft Corporation in the United States and/or other countries. Other company names and product names listed in this manual may be the trademarks or registered trademarks of their respective companies.

USB key

A USB key is supplied to the RCX-Studio 2020 to prevent irregular movement of robots. There will be limitations of software functions (see below chart):

Functions	When the USB key is not connected	RCX-Studio 2020 Basic (blue) ^{Note.}	RCX-Studio 2020 Pro (purple) ^{Note.}
Backup/restore via data transfer	Valid	Valid	Valid
Controller operation in online mode	Invalid	Valid	Valid
File save	Invalid	Valid	Valid
Real Time Trace	Only data save is invalid.	Valid	Valid
Cycle Time Calculator	Starting only (No calculating)	Valid	Valid
iVY2 editor	Starting only (No connecting)	Valid	Valid
Data Difference	Except data saving	Valid	Valid
3D simulator function	Only capturing is invalid.	Valid	Valid
Custom window	Valid	Valid	Valid
Program template	Only file output is invalid.	Valid	Valid
CAD data read	STL, OBJ, VRML	Valid	Valid
	STEP	Invalid	Valid
CAD to point conversion	Invalid	Invalid	Valid

Note. USB key color

Data cables (5m)

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

Communication cable for RCX-Studio 2020. Select from USB cable or D-sub cable



[RCX320/RCX340]
Ethernet cable (category 5 or higher)
is also supported.

Model	USB type (5m)	KBG-M538F-00
	D-Sub type 9pin-9pin (5m)	KAS-M538F-10

Note. This USB cable supports Windows 2000/XP or later.

Note. The communication cable is common to POPCOM+, VIP+, RCX-Studio Pro, and RCX-Studio 2020.

Note. USB driver for communication cable can also be downloaded from our website.

LCC140	ERCD
SR1-X	SR1-P
RCX320	RCX340/341

Linear conveyor modules
LCMR200

Single-axis robots
GX

Linear conveyor modules
LCM100

SCARA robots
YK-X

Single-axis robots
Robonity

Linear motor single-axis robots
PHASER

Single-axis robots
FLIP-X

Compact single-axis robots
TRANSERO

Cartesian robots
XY-X

Pick & place robots
YP-X

CLEAN

CONTROLLER

INFORMATION

Robot positioner

Pulse string driver

Robot controller

RCX+VYZ Electric gripper

Option

Option details

Handy terminal

HT1/HT1-D

This Handy Terminal is a device that can perform any operation such as robot manual operation, point data edit, teaching, and parameter setting, etc.
Has graphic LCD display with backlight for easy viewing.

Note. When purchasing the HT1/HT1-D, be careful not to confuse it with the handy terminal “HT2/HT2-D” for EP-01.

▼Applicable controllers

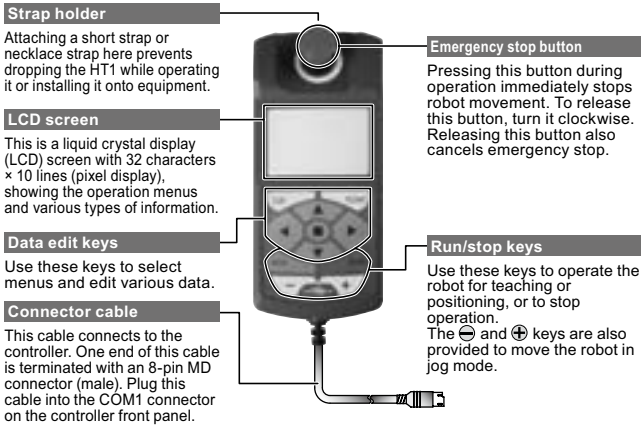
TS-S2
TS-SH
TS-X
TS-P

P.592

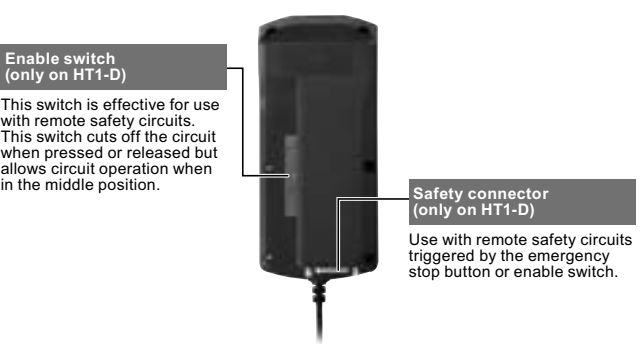
■ HT1 / HT1-D basic specifications

Name		HT1	HT1-D
External view			
Applicable controllers		TS-S2 / TS-SH / TS-X / TS-P	
Model	Japanese specifications	KCA-M5110-0J(3.5m) KCA-M5110-6J(10m)	KCA-M5110-1J(3.5m) KCA-M5110-7J(10m)
	English specifications	KCA-M5110-0E(3.5m) KCA-M5110-6E(10m)	KCA-M5110-1E(3.5m) KCA-M5110-7E(10m)
Display		Dot matrix monochrome display (with backlighting) 32 characters × 10 lines	
Operation keys		Mechanical switch	
Emergency stop button		Normally closed contact point (with lock function)	
Enable switch		-	3-position
Safety connector		-	15 pin D-sub connector (male)
CE marking		Not supported	Applicable
Operating temperature		0°C to 40°C	
Operating humidity		35% to 85%RH (non-condensing)	
Dimensions		W88 × H191 × D45mm (Emergency stop button not included.)	
Weight		260g (not including cable)	300g (not including cable)
Cable length		3.5m / 10m	

■ Part names and function



■ HT1-D rear side



Handy terminal

HT2/HT2-D

▼Applicable controllers

EP-01

P.592

This Handy Terminal is a device that can perform any operation such as robot manual operation, point data edit, teaching, and parameter setting, etc.

Has graphic LCD display with backlight for easy viewing.

Note. When purchasing the HT2/HT2-D, be careful not to confuse it with the handy terminal "HT1/HT1-D" for TS series.

■ HT2 / HT2-D basic specifications

Name		HT2	HT2-D
External view			
Applicable controllers		EP-01	
Model	Japanese specifications	KFX-M5110-0J(3.5m) KFX-M5110-2J(10m)	KFX-M5110-1J(3.5m) KFX-M5110-3J(10m)
	English specifications	KFX-M5110-0E(3.5m) KFX-M5110-2E(10m)	KFX-M5110-0J(3.5m) KFX-M5110-2J(10m)
Display		Dot matrix monochrome display (with backlighting) 32 characters × 10 lines	
Operation keys		Mechanical switch	
Emergency stop button		Normally closed contact point (with lock function)	
Enable switch		-	3-position
Safety connector		-	15 pin D-sub connector (male)
CE marking		Not supported	Applicable
Operating temperature		0°C to 40°C	
Operating humidity		35% to 85%RH (non-condensing)	
Dimensions		W88 × H191 × D45mm (Emergency stop button not included.)	
Weight		260g (not including cable)	300g (not including cable)
Cable length		3.5m / 10m	

■ Part names and function

Strap holder

Attaching a short strap or necklace strap here prevents dropping the HT1 while operating it or installing it onto equipment.

LCD screen

This is a liquid crystal display (LCD) screen with 32 characters × 10 lines (pixel display), showing the operation menus and various types of information.

Data edit keys

Use these keys to select menus and edit various data.

Connector cable

This cable connects to the controller. One end of this cable is terminated with an 8-pin MD connector (male). Plug this cable into the COM1 connector on the controller front panel.

Emergency stop button

Pressing this button during operation immediately stops robot movement. To release this button, turn it clockwise. Releasing this button also cancels emergency stop.

Run/stop keys

Use these keys to operate the robot for teaching or positioning, or to stop operation. The $\ominus$ and $\oplus$ keys are also provided to move the robot in jog mode.

■ HT2-D rear side

Enable switch (only on HT2-D)

This switch is effective for use with remote safety circuits. This switch cuts off the circuit when pressed or released but allows circuit operation when in the middle position.

Safety connector (only on HT2-D)

Use with remote safety circuits triggered by the emergency stop button or enable switch.

Option details

Programming box

HPB/HPB-D

All operations can be performed from this device including manual robot operation, programming entry and editing, teaching and setting parameters. The display works interactively with the operator so even an absolute beginner can easily learn how to use programming box.

▼Applicable controllers

LCC140	P.576
ERCD	P.612
SR1-X	P.618
SR1-P	

■ HPB / HPB-D basic specifications

Name		HPB	HPB-D
External view			
Model	Using with ERCD, SR1-X, SR1-P	KBB-M5110-01 (without a conversion adaptor)	KBB-M5110-21 (without a conversion adaptor)
Display		LCD (20characters × 4 lines)	
Emergency stop button		Normally closed contact point (with lock function)	
Enable switch		—	3-position
CE marking		Not supported	Applicable
Memory back-up device		SD Memory card	
Operating temperature		0°C to 40°C	
Operating humidity		35% to 85%RH (non-condensing)	
Dimensions		W107 × H230 × D53mm (Strap holder, emergency stop button not included.)	
Weight		650g	
Cable length		3.5m	

■ Part names and function

Emergency stop button

Performs a robot emergency stop when pressed during robot operation. Release the button lock (locks when pressed) by turning the button in the CW direction. After releasing the button, a servo recovery must be performed from the HPB (or by I/O operation) in order to recover from the emergency stop status.

Strap hole

Attaching a short strap or necklace strap here prevents dropping the HPB while operating it or installing it onto equipment.

Liquid crystal display

This is a 20-character, 4-line LCD screen. The operation menu and other information are displayed here.

SD memory card connector

An SD memory card can be inserted here. SD memory cards are provided by the customer.

Connector cable

Connects the HPB to the controller. A D-Sub 9-pin connector (male) is provided at one end of the cable.

Operation keys

These keys are used to operate the robot and to enter programs and data, etc. The keys are divided into 2 main groups: function keys and data entry/operation keys. (For operation key details, see Chapter 3, "Basic operations".)

■ HPB-D rear side

Safety connector (HPB-D only)

Use this connector with the emergency stop or enable switch to configure an external safety circuit. Attaching the supplied 15-pin D-sub connector (KS9-M532E-00 female) directly to this safety connector enables the emergency stop button only.

3-position enable switch (HPB-D only)

This switch is effective for use with an external safety circuit. This switch opens (cuts off) the circuit when pressed or released. Pressing it to mid-position connects the circuit. Use this switch as the enable switch in Service mode, so that the external safety circuit triggers emergency stop on the robot when this switch is pressed or released.

Programming box

PBX/PBX-E

This programming box is applicable to three languages, “Japanese”, “English”, and “Chinese”. Use of a color display makes it possible to improve the visibility. Work to add or edit functions becomes easy, allowing even personnel without programming skill to operate this programming box. A function to save the controller data into the USB memory is incorporated.

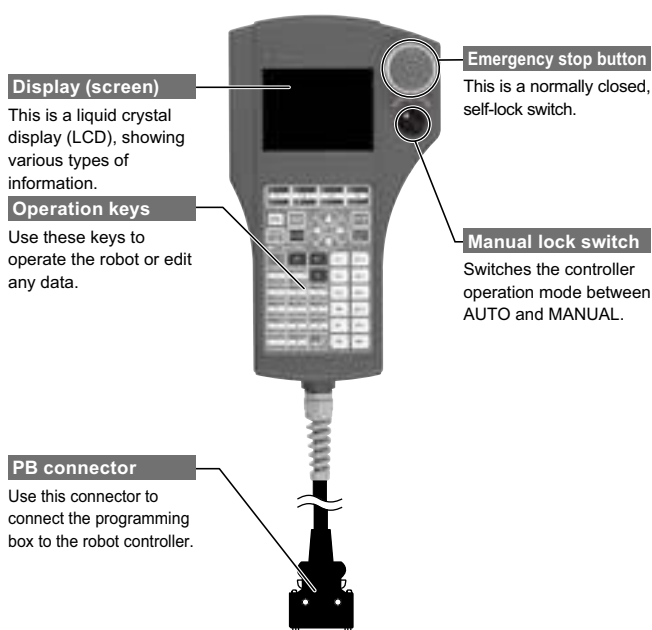
▼Applicable controllers

RCX320 **P.626**RCX340 **P.636**RCX341 **P.646**

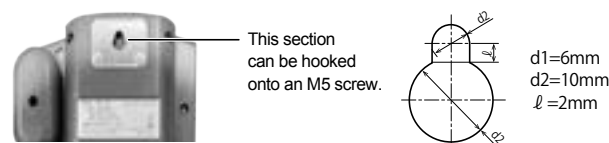
■ PBX/PBX-E basic specifications

Name		PBX	PBX-E
External view			
Applicable controllers		RCX320 / RCX340 / RCX341	
Model	Japanese language model	KCX-M5110-1J (5m) KCX-M5110-3J (12m)	KCX-M5110-0J (5m) KCX-M5110-2J (12m)
	English language model	KCX-M5110-1E (5m) KCX-M5110-3E (12m)	KCX-M5110-0E (5m) KCX-M5110-2E (12m)
	Chinese language model	KCX-M5110-1C (5m) KCX-M5110-3C (12m)	KCX-M5110-0C (5m) KCX-M5110-2C (12m)
Display screen		Color LCD (320 × 240 dot)	
Emergency stop button		Normally-closed contract (with lock function)	
Enable switch		Not provided	3-position type
Manual lock selector switch		90°, 2-notch	
Power		+12 V DC	
Operating environment		Ambient temperature for use: 0 to 40 °C, Ambient temperature for storage: -10 to 60 °C Humidity: 35 to 80% (no condensation)	
Dimensions (mm)		W141 × H245 × D45 (excluding projecting parts)	
Cable length		5 m or 12 m (Select either)	
Weight		440 g (excluding the cable)	460 g (excluding the cable)

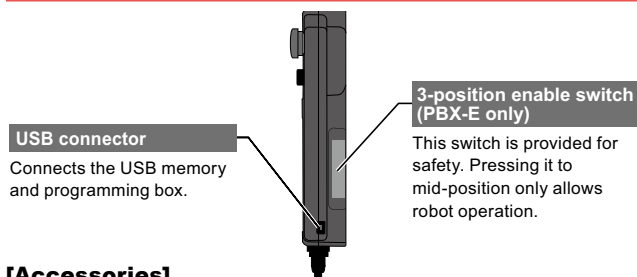
■ Part names and function



■ PBX back side



■ PBX-E rear side



[Accessories]

■ Display language switching USB for PBX

	Model
Display language switching USB for PBX*	KCX-M6498-00
USB cable	KCX-M657E-00

* The data for updating the PBX (language switch data) can be downloaded from the website shown below.
<https://global.yamaha-motor.com/business/robot/download/>

LCD Monitor option

TS-Monitor

▼Applicable controllers

TS-X
TS-P

P592



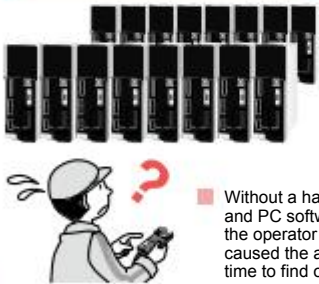
Integrated into the controller unit, the TS-monitor needs no connections to the handy terminal or PC and checks operation status, current position, error information, etc. The TS-monitor even allows the operator on the scene or service personnel to easily check the controller status.

Total operating time is also displayed which is convenient to schedule maintenance periods.

Note. The TS-Monitor cannot be installed on the controller when using a daisy-chain connection or when using a gateway connection.

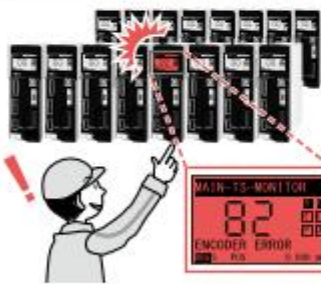
The TS Monitor Advantage

Before installing TS Monitor



Without a handy terminal "HT1" and PC software "TS-Manager", the operator does not know what caused the alarm and it takes a time to find out the cause.

After installing TS-Monitor



- Operator instantly knows various information without hooking to a handy terminal or PC.
- During errors the backlit display turns red and operator can see what error occurred on what controller at a glance.
- Display shows total operating time, so scheduling maintenance periods is easy.
- Backlit display is bright and easy to read even on dark panels.

Features

MAIN screen
Shows basic info
Displays optional name or character string.

Error

MAIN-TS-MONITOR

Desired character string specified by the user.

Simple status display
ON / OFF

Run mode

DBG S POS: 0.000 mm

Current position

MAIN screen
Easy to see error messages
Red backlit display appears during alarms.

Alarm occurs.

MAIN-TS-MONITOR

ENCODER ERROR

DBG S POS: 0.000 mm

Alarm name

Simple status display

Display	Meaning
S	Servo status
E	Emergency stop
P	Main power failure
O	Return-to-origin completion status
L	Interlock status
A	Alarm

Run mode

Display	Meaning
NM	Normal mode
MON	Monitor mode
DBG	Debug mode

I/O screen
Shows I/O status
Displays input/output bit states.

I/O

IN

OUT

Bit signal correspondence table

	F	E	D	C	B	A	9	8
IN	SERVO	RESET	START	LOCK	ORG	MANUAL	JOG	JOG+
	7	6	5	4	3	2	1	0
OUT	PIN7	PIN6	PIN5	PIN4	PIN3	PIN2	PIN1	PIN0
	F	E	D	C	B	A	9	8
	SRV-S	/ALM	END	BUSY	OUT3	OUT2	OUT1	OUT0
	7	6	5	4	3	2	1	0
	POUT17	POUT6	POUT5	POUT4	POUT3	POUT2	POUT1	POUT0

Input signal status
* Displays the status of input bit 0 to 15.

Output signal status
* Displays the status of output bit 0 to 15.

INFORMATION screen
Shows machine info
Displays the connected robot and version.

INFORMATION

CONT: TS-X-10A

VER: 1.03.105

ROBOT: F14-20

P.TYP: CUSTOM

Controller name

Controller software version

Robot name

Point type

STATUS screen
Shows status info
Info such as error status or movement status is all at a glance.

STATUS

SRV-S

ORGSEN

TLM-S

MOVE

E-STOP

P-BLK

ORG-S

WARN

Status display
ON / OFF

Status display

Display	Meaning
SRV-S	Servo status
ORGSEN	Origin sensor
TLM-S	Push status
MOVE	Move status
E-STOP	Emergency stop
P-BLK	Main power failure
ORG-S	Return-to-origin completion status
WARN	Warning output

CHECK screen
Shows operating status
Displays total drive distance (helpful for preventive maintenance).

CHECK

VOLT: 270.0 V

TEMP: 36 °C

TIME: 4:01:23

DIST: 15.827 km

Internal voltage of controller

Temperature inside controller

Total startup time of controller (Day : Hour : Minute)

Total movement distance of robot

RUN screen
Shows operation status and data
Info includes position, speed, load factors and run type.

RUN

POS: 500.000 mm

SPD: 600.00 mm/s

LOAD: 69 %

Run type

Robot current position

Robot point

Robot operation speed

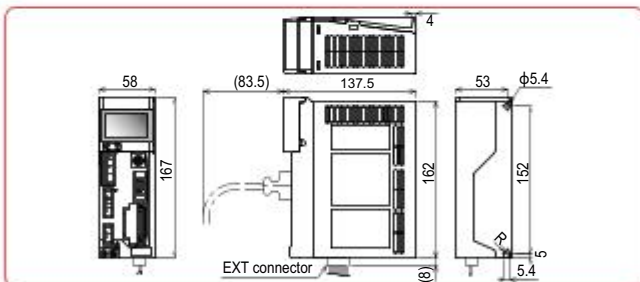
Load rate

Run type

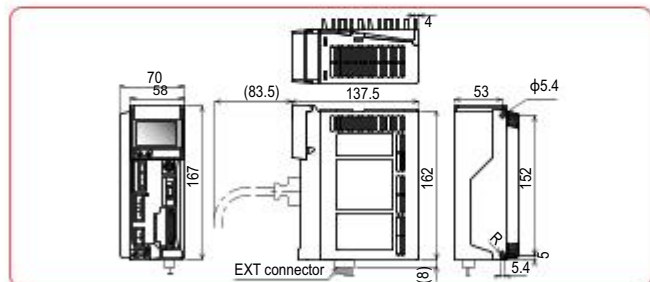
Display	Meaning
HOLD	Servo is off or robot is stopping.
ABS	ABS
INC	INC
ABS MERGE	ABS merge operation
INC MERGE	INC merge operation
ABS PUSH	ABS push operation
INC PUSH	INC push operation
ABS->PUSH	ABS deceleration push operation
INC->PUSH	INC deceleration push operation
ORG	Return-to-origin

TS-X/TS-P dimensions (with TS-Monitor)

TS-X/TS-P (105/110/205/210) with TS-Monitor



TS-X/TS-P (220) with TS-Monitor



TS-Monitor basic specifications

Model	TS-X	KCA-M5119-00
	TS-P	KCA-M5119-10
Effective display size	W40.546 × H25.63mm	
Screen display	Graphic monochrome LCD	

Backlight	Blue and red, 2-color LCD
Contrast adjustment	5 steps
Number of display dots	128 × 64 dots

Touch operator interface

Pro-face

GP4000 series

Connecting GP4000 Series made by Pro-face to Robot Positioner, TS-S2, TS-SH, TS-X, TS-P enables you to use a lot of functions as well as basic operations on Touch Operator Interface.

Free download of the program file from the Pro-face home page
<https://www.proface.com>

▼Applicable controllers

TS-S2
 TS-SH
 TS-X
 TS-P

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■ Features

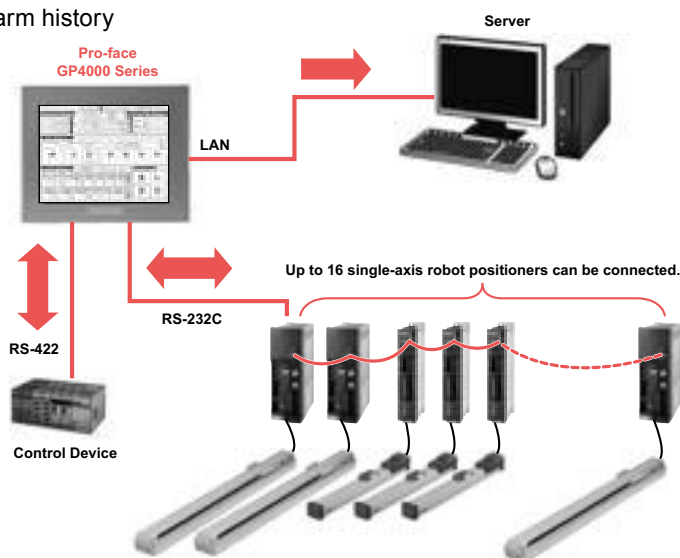
1 Can easily check a state and change settings.

- Check the status (the current position, speed etc)
- Basic operations such as Jog operation, inching operation, return to origin, error reset etc.
- Set, edit, or back up point data and parameters
- Check triggered alarms and detailed descriptions of alarm history

2 Supports 3 languages

- Supports Japanese, English, and Chinese (simplified, traditional)

Without opening the control panel, you can check the status and change the settings on Touch Operator Interface alone.



■ Screen details

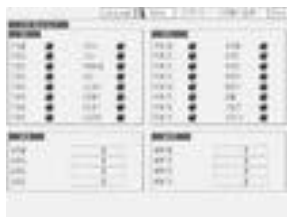
Diagnostic Screen

When a problem occurs, you can check the detailed descriptions of the alarm history, so you can understand easily what the cause is.



I/O Monitor Screen

Displays both general I/O and dedicated I/O together. You can quickly check the I/O status.



Information Monitor Screen

The screen can display the robot status and the operation status. You can check immediately the robot condition.



Position Data Editing Screen

You can edit and back up point data (255 points).^{Note}

Note. Settings for it and a USB storage required.



Parameter Editing Screen

While checking parameters of robot positioners in the list, you can set them with the pull-down menu.



Connecting Selection Screen

You can connect up to 16 robot positioners simultaneously with GP-Pro EX Ver.3.0 multi-axis feature.



Contact; Pro-face web site (Schneider Electric Japan Holdings Ltd)
<https://www.proface.com>

Software tool kit

RCX3-SDK

▼Applicable controllers

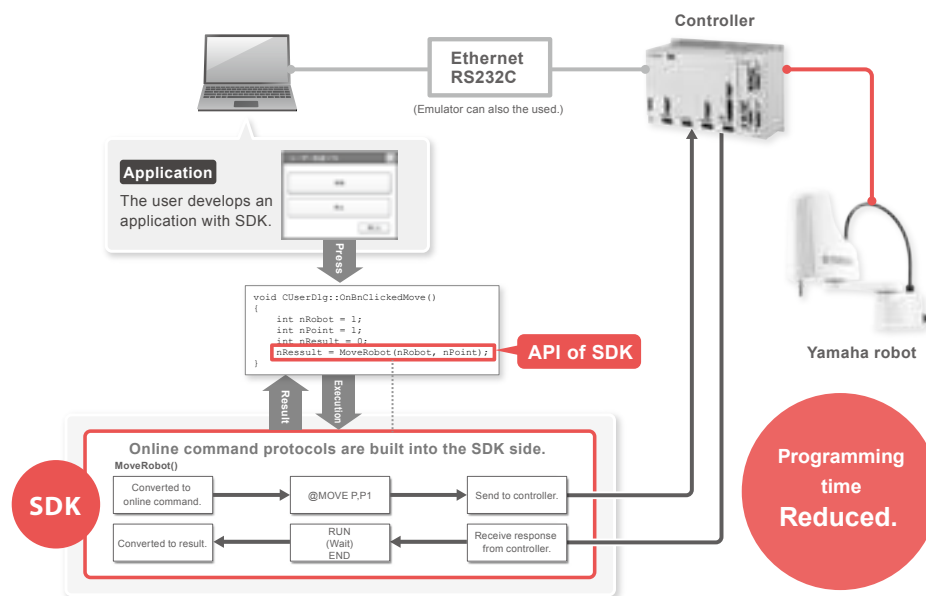
RCX320 **P.626**RCX340 **P.636**

RCX3-SDK enables customers to create applications that can perform robot operations using their own development environment such as Microsoft Visual Basic.

There is no need to learn command protocols specific to robot controllers and the application development time can be shortened.

RCX3-SDK can be used free of charge for three months. Download RCX3-SDK from the member site and try it out.

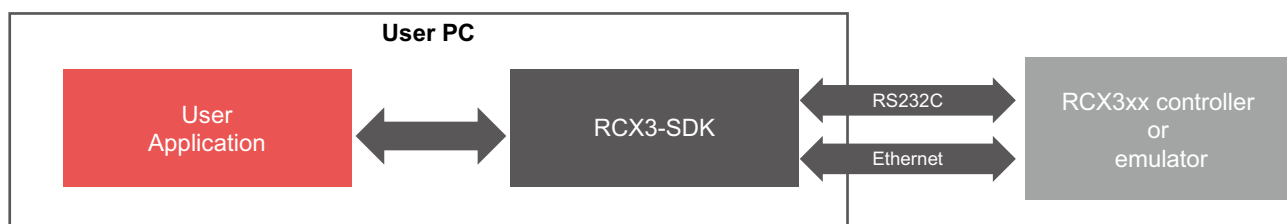
■ Configuration diagram



■ Function

- Multiple controllers and robots can be controlled from a single application.
- Application development without an actual machine is also possible when used in combination with RCX-Studio software.

The configuration using RCX3-SDK is described below.



■ Operating environment

Applicable OS	Windows 7 SP1, Windows 8.1, Windows 10 version 1803 or higher
Development environment	Microsoft Visual Studio 2017 (C#, Visual Basic .NET, C++/CLI, C++)
Execution environment	.NET Framework 4.5 or higher
Communication interface	RS232C, Ethernet
Applicable controller	RCX3 series

Note. Microsoft Windows is a registered trademark or trademark of Microsoft Corporation in the United States and other countries.
Other company and product names mentioned herein are registered trademarks or trademarks of their respective companies.

■ Precautions for use

This product can be download from the member site.

The software is no longer usable after three months from the installation date, so if you want to use the software for three months or more, purchase a license key.

Model	KCX-M4987-00
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Field network system with minimal wiring

NETWORK

YHX

Each field path setting file can be downloaded from the website.
<https://global.yamaha-motor.com/business/robot/download/fieldbus/>

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EtherNet/IP™ Basic specifications for network

Item	EtherNet/IP™
Applicable controllers	YHX
Network specifications	As specified for Ethernet (IEEE802.3)
Applicable EtherNet/IP™ specifications	Volume 1: Common Industrial protocol(CIP™) Edition 3.21 Volume 2: EtherNet/IP™ Adaptation Edition 1.22
Device type	Generic Device (device number 43)
Communication speed	10Mbps / 100 Mbps
Connector specifications	RJ-45 connector (8-pole modular connector), 2 ports
Cable specifications	EtherNet/IP™ Refer to "2.1 LAN cable" in Chapter 2 of this user's manual.
Maximum cable length	100 m
Input/output data size	Input: 1408byte (704 words) Output: 1408byte (704 words)
Setting of IP address, etc.	Set from YHX-Studio
Monitor LED	Module Status(MS), Network Status(NS), Link/Activity: Port1-2



Basic specifications for network

Item	PROFINET
Applicable controllers	YHX
Network specification conformance	PROFINET IO V2.33
Conformance class	Conformance Class C
Vendor Name/Vendor_ID	YAMAHA Motor co., Ltd. / 0x02D5
Station Type/Device_ID	YAMAHA-YHX-HCU / 0x002B
Product revision	1.00
Communication speed	100Mbps
Connector specifications	RJ-45 connector (8-pole modular connector), 2 ports
Cable specifications	STP cable (double shield) with CAT 5e or higher
Maximum cable length	100 m
Input/output data size	Input: 1408byte (704 words) Output: 1408byte (704 words)
Monitor LED	Module Status(MS), Network Status(NS), Link/Activity: Port1-2



Basic specifications for network

Item	EtherCAT
Applicable controllers	YHX
ESI file name	YAMAHA YHX EtherCAT 1_01.xml
Communication speed	100Mbps
Connector specifications	RJ-45 connector (8-pole modular connector) 2 ports
Cable specifications	STP cable (double shield) with CAT 5e or higher
Maximum cable length	100 m
Input/output data size	Input: 1408byte (704 words) Output: 1408byte (704 words)
Monitor LEDs	RUN, ERROR, Link/Activity:Port1-2



Basic specifications for network

Item	CC-Link
Applicable controllers	YHX
CC-Link compatible version	Ver. 2.00
Remote station type	Remove device station
Number of occupied stations	Fixed to 4 stations
Station number	1 to 61
Communication speed	10Mbps, 5Mbps, 2.5Mbps, 625kbps, 156kbps
Shortest length between stations	0.2 m or more
Total length	100m/10Mbps, 150m/5Mbps, 200m/2.5Mbps, 600m/625kbps, 1200m/156kbps
Input/output data size	Input: 368byte (184 words) Output: 368byte (184 words)
Monitor LED	L RUN, L ERROR

Option details

Field network system with minimal wiring

NETWORK

LCC140

Each field path setting file can be downloaded from the website.
<https://global.yamaha-motor.com/business/robot/download/fieldbus/>

P.576

■ CC-Link Basic specifications for network

Item	CC-Link
Applicable controllers	LCC140
CC-Link compatible version	Ver. 1.10
Remote station type	Remove device station
Number of occupied stations	Fixed to 2 stations
Station number	1 to 63 (Set from HPB)
Communication speed	10M/5M/2.5M/625K/156Kbps (Set using HPB or POPCOM+.)
Shortest length between stations	0.2 m or more
Total length	100m/10Mbps, 160m/5Mbps, 4000m/2.5Mbps, 900m/625Kbps, 1200m/156Kbps
Monitor LED	None
CC-Link I/O points	General-purpose input 32 points, General-purpose output 32 points Dedicated input 16 points, Dedicated output 16 points Input register 8 words Output register 8 words

■ DeviceNet Basic specifications for network

Item	DeviceNet™
Applicable controllers	LCC140
Applicable DeviceNet™ specifications	Volume 1 Release2.0 Volume 2 Release2.0
DeviceNet™ Conformance test	Compliant with CT24
Device profile / Device type number	Generic Device (keyable) / 2B Hex
Vendor name/Vendor ID	YAMAHA MOTOR CO.,LTD. / 636
Product code	21
Product revision	1.0
EDS file name	Yamaha_LCC1(DEV).eds
MAC ID setting	0 to 63 (Set using HPB or POPCOM+.)
Communication speed setting	500K/250K/125Kbps (Set using HPB or POPCOM+.)
Communication data	Predefined Master/Slave Connection Set: Group 2 only server Dynamic connection support (UCMM): None Support for divided transmission of explicit message: Yes
Network length	Total length 100m/500Kbps, 250m/250Kbps, 500m/125Kbps Branch length/Total branch length 6m or less/39m or less, 6m or less/78m or less, 6m or less/156m or less
Monitor LED	None
Number of DeviceNet™ I/O points/ number of occupied channels	General-purpose input 32 points, General-purpose output 32 points Dedicated input 16 points, Dedicated output 16 points Input register 8 words Output register 8 words

■ EtherNet/IP Basic specifications for network

Item	EtherNet/IP™
Applicable controllers	LCC140
Applicable software version	LCC140: Ver. 64.07 or higher HPB/HPB-D: Ver. 24.06 or higher POPCOM+: Ver. 2.1.0 or higher
Applicable EtherNet/IP™ specifications	Volume 1: Common Industrial protocol(CIP™) Edition 3.14 Volume 2: EtherNet/IP™ Adaptation of CIP™ Edition 1.15
EtherNet/IP™ Conformance test	Compliant with CT11
Device profile/Device type number	Generic Device (keyable) / 2B Hex
Vendor name/Vendor ID	YAMAHA MOTOR CO.,LTD. / 636
Product code	23
Product revision	1.1
EDS file name	Yamaha_LCC1(EIP2).eds
Communication speed	10Mbps / 100Mbps
Connector specifications	RJ-45 connector (8-pole modular connector), 2 ports
Applicable cable specifications	STP cable (double shield) with CAT 5e or higher
Maximum cable length	100m
Monitor LED	Module Status(MS), Network Status(NS), Link/Activity: Port1-2
Number of EtherNet/IP™ I/O points/ number of occupied channels	General-purpose input 32 points, General-purpose output 32 points Dedicated input 16 points, Dedicated output 16 points Input register 8 words Output register 8 words

Field network system with minimal wiring

NETWORK

Each field path setting file can be downloaded from the website.
<https://global.yamaha-motor.com/business/robot/download/fieldbus/>

TS-S2/TS-SH/TS-X/TS-P

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 Basic specifications for network

Item	CC-Link
Applicable controllers	TS-S2 / TS-SH / TS-X / TS-P
Version supporting CC-Link	Ver. 1.10
Remote node type	Remote device node
Number of occupied nodes	1 node
Node number setting	1 to 64
Communication speed setting	10Mbps, 5Mbps, 2.5Mbps, 625Kbps, 156Kbps
No. of CC-Link inputs/outputs	Input 16 points, Output 16 points
Shortest distance between nodes ^{Note1}	0.2m or more
Overall extension distance ^{Note1}	100m/10Mbps, 160m/5Mbps, 400m/2.5Mbps, 900m/625Kbps, 1200m/156Kbps
Monitor LED	L RUN, L ERR, SD, RD

Note 1. These values apply when a cable that supports CC-Link Ver.1.10 is used.

 Basic specifications for network

Item		DeviceNet™
Applicable controllers		TS-S2 / TS-SH / TS-X / TS-P
Applicable DeviceNet™ specifications		Volume 1 Release2.0/Volume 2 Release2.0
Device type		Generic Device (device number 0)
Number of occupied CH		Input 6ch, Output 6ch
MAC ID setting		0 to 63
Communication speed setting		500Kbps, 250Kbps, 125Kbps
DeviceNet™ inputs/outputs		Input 16 points, Output 16 points
Network length	Overall extension distance	100m/500Kbps, 250m/250Kbps, 500m/125Kbps
	Branch length	6m or less
	Overall branch length	39m or less/500Kbps, 78m or less/250Kbps, 156m or less/125Kbps
Monitor LED		Module, Network

 Basic specifications for network

Item	EtherNet/IP™
Applicable controllers	TS-S2 / TS-SH / TS-SH / TS-X / TS-P ^{Note}
Applicable EtherNet/IP™ specifications	Volume1: Common Industrial Protocol (CIP™) Edition 3.8 Volume2: EtherNet/IP™ Adaptation Edition 1.9
Device type	Generic Device (device number 43)
Number of occupied CH	Input 6ch, Output 6ch
Ethernet interface	10BASE-T/100BASE-TX
Network length	100m
Monitor LED	MS, NS, Activity, Link

Note. Supported by controller software version V1.10.121 or later. Necessary parameters can be set with the support tool, HT-1 (V1.13 or later) and TS-Manager (V1.3.3 or later).

 Basic specifications for network

Item	PROFINET
Applicable controllers	TS-S2 / TS-SH / TS-X / TS-P ^{Note}
Network specification conformance	PROFINET IO V2.2
Conformance class	Conformance Class B / IO Device
Input/output data size	Input 6 words, output 6 words
Transmission speed	100Mbps(Auto-negotiation)
Network length	100m
Monitor LED	MS, NS, Activity, Link

Note. Supported by controller software version V1.14.136 or later. Necessary parameters can be set with the support tool, HT-1 (V1.16 or later) and TS-Manager (V1.4.4 or later).

Option details

Field network system with minimal wiring

NETWORK

SR1-X/SR1-P

Each field path setting file can be downloaded from the website.
<https://global.yamaha-motor.com/business/robot/download/fieldbus/>

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CC-Link Basic specifications for network

Item	CC-Link
Applicable controllers	SR1-X / SR1-P
Version supporting CC-Link	Ver. 1.10
Remote node type	Remote device node
Number of occupied nodes	Two nodes fixed
Node number setting	1 to 63
Communication speed setting	10Mbps, 5Mbps, 2.5Mbps, 625Kbps, 156Kbps
No. of CC-Link I/O ^{Note1}	General input 32 points, General output 32 points, Dedicated input 16 points, Dedicated Output 16 points
Parallel external I/O (ERCX, SRCP30, DRCX only)	All points usable as parallel external I/O for controller. Each point controllable from master station sequencer (PLC) by emulated serialization, regardless of robot program.
Shortest distance between nodes ^{Note2}	0.2m or more
Overall length ^{Note2}	100m/10Mbps, 160m/5Mbps, 400m/2.5Mbps, 900m/625Kbps, 1200m/156Kbps
Monitor LED	RUN, ERR, SD, RD

Note 1. Controller I/Os are updated every 10ms.
Note 2. These values apply when a cable that supports CC-Link Ver 1.10 is used.

DeviceNet Basic specifications for network

Item	DeviceNet™
Applicable controllers	SR1-X / SR1-P
Applicable DeviceNet™ specifications	Volume 1 Release2.0/Volume 2 Release2.0
Device type	Generic Device (device number 0)
Number of occupied CH	Input 2ch ^{Note1} , Output 2ch ^{Note1}
MAC ID setting	0 to 63
Communication speed setting	500Kbps, 250Kbps, 125Kbps
DeviceNet™ I/O ^{Note2}	General input 16 points ^{Note3} , General output 16 points ^{Note3} , Dedicated input 16 points, Dedicated Output 16 points
Parallel external I/O (ERCX, SRCP30, DRCX only)	All points usable as parallel external I/O for controller. Each point controllable from master station sequencer (PLC) by emulated serialization, regardless of robot program.
Network length ^{Note4}	Overall length 100m/500Kbps, 250m/250Kbps, 500m/125Kbps Branch length/Overall branch length 6m or less/39m or less, 6m or less/78m or less, 6m or less/156m or less
Monitor LED	Module, Network

Note 1. Inputs / Outputs are 12ch each when using SR1-P / SR1-X with extension model.
Note 2. Controller I/Os are updated every 10ms.
Note 3. General Inputs / Outputs are 32 each when using SR1-P / SR1-X with extension model.
Note 4. These values apply when a thick cable is used. The distance is less when a fine cable is used or when thick and fine cables are mixed in use.

PROFIBUS Basic specifications for network

Item	PROFIBUS
Applicable controllers	SR1-X / SR1-P
Communication profile	PROFIBUS-DP slave
Number of occupied nodes	1 node
Setting of station address	0 to 126
Communication speed setting	9.6Kbps, 19.2Kbps, 93.75Kbps, 187.5Kbps, 500Kbps, 1.5Mbps, 3Mbps, 6Mbps, 12Mbps (automatic recognition)
PROFIBUS I/O ^{Note}	General input 32 points, General output 32 points, Dedicated input 16 points, Dedicated Output 16 points
Parallel external I/O (ERCX / DRCX only)	All points usable as parallel external I/O for controller. Each point controllable from master station sequencer (PLC) by emulated serialization, regardless of robot program.
Overall length	100m/12Mbps, 200m/1.5Mbps, 400m/500Kbps, 1000m/187.5Kbps, 1200m/9.6K · 19.2K · 93.75Kbps

Note. The shortest I/O update interval of the controller is 10ms but the actual I/O update time varies depending on the update time with the master station.

Field network system with minimal wiring

NETWORK

Each field path setting file can be downloaded from the website.
<https://global.yamaha-motor.com/business/robot/download/fieldbus/>

RCX320

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RCX340/RCX341

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 Basic specifications for network

Item	CC-Link
Applicable controllers	RCX320 / RCX340 / RCX341
Version supporting CC-Link	Ver. 1.10
Remote station type	Remote device node
Number of occupied stations	Fixed to 4 stations
Station number setting	1 to 61 RCX320 (Set from the rotary switch on the board) RCX340/RCX341 (Set from the programming box or support software)
Communication speed setting	10Mbps, 5Mbps, 2.5Mbps, 625Kbps, 156Kbps (set from the Rotary switch on board)
No. of CC-Link I/O ^{Note1}	General input 96 points, General output 96 points, Dedicated input 16 points, Dedicated output 16 points
Parallel external I/O ^{Note2}	A function that simulates serial communication enables individual control of the various points from a master sequencer, regardless of the robot program.
Shortest distance between nodes ^{Note3}	0.2 m or more
Overall length ^{Note3}	100m/10Mbps, 150m/5Mbps, 200m/2.5Mbps, 600m/625Kbps, 1200m/156Kbps
Monitor LED	RUN, ERR, SD, RD

Note 1. In case of RCX320, the controller I/Os are updated every 10ms.

For RCX 340/341, the controller I/Os are updated every 5ms for the shortest. The actual update time changes depending on the communication cycle of the master unit.

Note 2. With RCX 141/142, the exclusive input of the parallel I/O cannot be used other than the interlock input. With RCX320, the exclusive input of the parallel I/O cannot be used. (The interlock input terminal is located on the SAFETY connector side.)

Note 3. These values apply when a cable that supports CC-Link Ver.1.10 is used.

 Basic specifications for network

Item	DeviceNet™
Applicable controllers	RCX320 / RCX340 / RCX341
Applicable DeviceNet™ specifications	Volume 1 Release2.0 / Volume 2 Release2.0
Device Profile Name	Generic Device (device number 0)
Number of occupied CH ^{Note1}	Normal: Input/output 24ch each, Compact: Input/output 2ch each
MAC ID setting	0 to 63
Transmission speed setting	500Kbps, 250Kbps, 125Kbps (set using DIP switch on board)
DeviceNet™ I/O ^{Note2}	Normal: General input 96 points, General output 96 points, Dedicated input 16 points, Dedicated output 16 points Compact: General input 16 points, General output 16 points, Dedicated input 16 points, Dedicated output 16 points
Parallel external I/O ^{Note3}	The master module and up to four ports can be controlled regardless of the robot program by using the pseudoserialization function.
Network length ^{Note4}	Overall length: 100m/500Kbps, 250m/250Kbps, 500m/125Kbps Branch length / Overall branch length: 6m max./39m max., 6m max./78m max., 6m max./156m max.
Monitor LED	MS (Module Status), NS (Network Status)

Note 1. Use the robot parameter to select Normal or Compact. However, with the controllers earlier than Ver.9.08 of RCX320, this selection is not available and the setting remains the same as Normal.

Note 2. In case of RCX320, the controller I/Os are updated every 10ms.

For RCX 340/341, the controller I/Os are updated every 5ms for the shortest. The actual update time changes depending on the communication cycle of the master unit.

Note 3. With RCX320, the exclusive input of the parallel I/O cannot be used. (The interlock input terminal is located on the SAFETY connector side.)

Note 4. These values apply when a thick cable is used. The distance is less when a fine cable is used or when thick and fine cables are mixed in use.


Basic specifications for network

Item	PROFIBUS
Applicable controllers	RCX320 / RCX340 / RCX341
Communication profile	PROFIBUS-DP slave
Number of occupied nodes	1 node
Setting of station address	1 to 99 (set using Rotary switch on board)
Setting of communication speed	9.6Kbps, 19.2Kbps, 93.75Kbps, 187.5Kbps, 500Kbps, 1.5Mbps, 3Mbps, 6Mbps, 12Mbps (automatic recognition)
PROFIBUS I/O ^{Note1}	General input 96 points, General output 96 points, Dedicated input 16 points, Dedicated output 16 points
Parallel external I/O ^{Note2}	The master module and up to four ports can be controlled regardless of the robot program by using the pseudoserialization function.
Overall length	100m/3M-6M-12Mbps, 200m/1.5Mbps, 400m/500Kbps, 1000m/187.5Kbps, 1200m/9.6K-19.2K-93.75Kbps
Monitor LED	RUN, ERR, SD, RD, DATA-EX

Note 1. In case of RCX320, the shortest I/O update interval of the controller is 10ms but the actual I/O update time varies depending on the update time with the master station.

For RCX 340/341, the controller I/Os are updated every 5ms for the shortest. The actual update time changes depending on the communication cycle of the master unit.

Note 2. With RCX320, the exclusive input of the parallel I/O cannot be used. (The interlock input terminal is located on the SAFETY connector side.)

Option details

Field network system with minimal wiring

NETWORK

Each field path setting file can be downloaded from the website.
<https://global.yamaha-motor.com/business/robot/download/fieldbus/>

RCX320

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RCX340/RCX341

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EtherNet/IP™ Basic specifications for network

Item	EtherNet/IP™		
Applicable controllers	RCX320 / RCX340 / RCX341		
Network specifications	Conforms to Ethernet (IEEE 802.3).		
Applicable EtherNet/IP™ specifications	Volume 1 : Common Industrial protocol (CIP™) Edition 3.14 Volume 2 : EtherNet/IP™ Adaptation Edition 1.15		
Device type	Generic Device (Device No. 43)		
Data size	48 bytes each for input/output		
Transmission speed	10 Mbps/100 Mbps		
Connector specifications	R -45 connector (8-pole modular connector) 2 port		
Cable specifications	Refer to 2.1 LAN cable in Chapter 2 of this user's manual.		
Max. cable length	100 m		
EtherNet/IP™ input/output points Note	Input (48 bytes in total)	byte 0-3	Dedicated word input : 2 words
		byte 4-31	General purpose word input : 14 words
	Output (48 bytes in total)	byte 32-33	Dedicated bit input : 16 points
		byte 34-47	General-purpose bit input : 96 points
		byte 0-3	Dedicated word output : 2 words
		byte 4-31	General-purpose word output : 14 words
		byte 32-33	Dedicated bit output : 16 points
		byte 34-47	General-purpose bit output : 96 points
Parallel external input	Regardless of the robot program, the master module and up to four ports can be controlled using the emulated serialization function.		
Settings, such as IP address	The settings are made with the programming box (PBX) or RCX-Studio 2020.		
Monitor LEDs	Network Status, Module Status		

Note. The controller I/Os are updated every 5ms for the shortest. The actual update time changes depending on the communication cycle of the master unit.

PROFINET Basic specifications for network

Item	PROFINET		
Applicable controllers	RCX320 / RCX340 / RCX341		
Network specification conformance	PROFINET IO V2.2		
Conformance class	Conformance Class B / IO Device		
Vendor Name / Vendor_ID	YAMAHA MOTOR CO.,LTD. / 0x02D5		
Station Type / Device_ID	YAMAHA RCX3 PROFINET / 0x0001		
Product revision	1.00		
Transmission speed	100 Mbps (Auto-negotiation)		
Connector specifications	RJ-45 connector (8-pole modular connector) 2 ports		
Conforming cable specifications	CAT 5e or higher STP cable (double shield)		
Max. cable length	100 m		
Monitor LEDs	Module Status(MS), Network Status(NS), Link/Activity:Port1-2		
Input/output data size Note	Input : 48bytes	Dedicated word input 2 words (4 bytes)	
		General-purpose word input 14 words (28 bytes)	
		Dedicated bit input 16 bits (2 bytes)	
		General-purpose bit input 96 bits (12 bytes)	
	Output : 48bytes	Reserved area 2 bytes	
		Dedicated word output 2 words (4 bytes)	
		General-purpose word output 14 words (28 bytes)	
		Dedicated bit output 16 bits (2 bytes)	
		General-purpose bit output 96 bits (12 bytes)	
		Reserved area 2 bytes	

Note. The controller I/Os are updated every 5ms for the shortest. The actual update time changes depending on the communication cycle of the master unit.

Field network system with minimal wiring

NETWORK

Each field path setting file can be downloaded from the website.
<https://global.yamaha-motor.com/business/robot/download/fieldbus/>

RCX320

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RCX340/RCX341

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Basic specifications for network

Item	EtherCAT	
Applicable controllers	RCX320 / RCX340 / RCX341	
Transmission speed	100 Mbps (Auto-negotiation)	
Connector specifications	RJ-45 connector (8-pole modular connector) 2 ports	
Conforming cable specifications	CAT 5e or higher STP cable (double shield)	
Max. cable length	100 m	
Monitor LEDs	RUN, ERROR, Link/Activity: Port1-2	
Input/output data size ^{Note}	Input : 48bytes	Dedicated word input 2 words (4 bytes)
		General-purpose word input 14 words (28 bytes)
		Dedicated bit input 16 bits (2 bytes)
		General-purpose bit input 96 bits (12 bytes)
		Reserved area 2 bytes
	Output : 48bytes	Dedicated word output 2 words (4 bytes)
		General-purpose word output 14 words (28 bytes)
		Dedicated bit output 16 bits (2 bytes)
		General-purpose bit output 96 bits (12 bytes)
		Reserved area 2 bytes

Note. The controller I/Os are updated every 5ms for the shortest. The actual update time changes depending on the communication cycle of the master unit.



Ethernet Basic specifications for network

Item	Ethernet
Applicable controllers	RCX320 / RCX340 / RCX341
Network specification	As specified for Ethernet (IEEE802.3)
Connector specification	RJ-45 connector (8-pole modular connector) 1 port
Baud rate	10Mbps (10BASE-T)
Communication mode	Half Duplex (Half-duplex)
Network protocol	Application layer: TELNET / Transport layer: TCP / Network layer: IP, ICMP, ARP / Data link layer: CSMA/CD / Physical layer: 10BASE-T
Number of simultaneous log inputs	1
Setting of IP address, etc.	Set from RPB
Monitor LED	Run, Collision, Link, Transmit, Receive

RCX3-SMU

For RCX340/RCX341
controller

Speed Monitoring Unit

The RCX3-SMU is the first Yamaha robot-related product that has acquired the functional safety certification.

Yamaha robot controller RCX340/RCX341 enables functional safety support by connecting it to the dedicated optional unit "RCX3-SMU".



RCX3-SMU



RCX340/RCX341



Third-party certification
by TÜV SÜD.

Compatible standards

- Safety Standards for Industrial Robots
ISO10218-1:2011
- Standards for Functional Safety of Machinery
IEC 62061:2021
- Functional Safety Standards
EN ISO 13849-1:2015

Basic specifications

Basic specifications

Item		RCX3-SMU
Basic specifications	Name	RCX3-SMU
	Type	Speed Monitoring Unit
	Supported Controller	RCX340-S *YC-Link/E not supported
	Target robots	Standard robot with 3 or more axes that can be connected to RCX340 (Some multi-robots are not compatible. Please contact YAMAHA sales for details.)
	Max. number of monitored axes	4 axes
	Max. number of monitored robots	1 robot
	Dimensions (W x H x D mm)	155 × 195 × 130
	Main unit weight	2.6kg
	Cooling method	Forced air cooling
Input/Output Interface	Power supply	INPUT Single-phase 200-230 V±10%, 50/60 Hz, Min0.3A Max12.7A OUTPUT Single-phase 200-230 V±10%, 50/60 Hz, Max12.5A
	Indicators	STATUS/ALARM/BEAT
	Power supply for safety I/O	Input COMMON × 1 Output COMMON × 1
	Safety Input	Emergency stop/automatic mode/manual mode/general purpose x 4
	Safety Output	General purpose x 2
Built-in	Safety circuit	Main power switch circuit
	Noise filter	Built-in noise filter
	Surge absorber	Built-in surge absorber

Applicable standards

Applicable standards	RCX3-SMU
IEC 61508-1:2010	Functional safety of electrical/electronic/programmable electronic safety-related systems - Part 1: General requirements
IEC 61508-2:2010	Functional safety of electrical/electronic/programmable electronic safety-related systems - Part 2: Requirements for electrical/electronic/programmable electronic safety-related systems
IEC 61508-3:2010	Functional safety of electrical/electronic/programmable electronic safety-related systems - Part 3: Software requirements
IEC 62061:2021	Safety of machinery - Functional safety of safety-related control systems
EN ISO 13849-1:2015	Safety of machinery - Safety-related parts of control systems - Part 1: General principles for design
EN ISO 10218-1:2011	Robotics - Safety requirements - Part 1: Industrial robots
EN 61800-5-1:2007/A11:2021	Adjustable speed electrical power drive systems - Part 5-1: Safety requirements -Electrical, thermal and energy
EN 61800-5-2:2017	Adjustable speed electrical power drive systems - Part 5-2: Safety requirements - Functional

Ordering method

Select safety standard "S" to use RCX3-SMU.

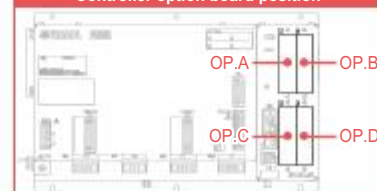
RCX340							
Controller	No. of control-able axes	Safety standards	Controller option A (OP.A)	Controller option B (OP.B)	Controller option C (OP.C)	Controller option D (OP.D)	Controller option E (OP.E)
	4: 4 axes 3: 3 axes 2: 2 axes	N: Normal E: CE K: KCs S: SMU compatible	No entry: Non-selection NS : STD.DIO(NPN) Note 2 Note 5 NE : EXP.DIO(NPN) Note 3 Note 5 PS : STD.DIO(PNP) Note 2 Note 5 PE : EXP.DIO(PNP) Note 3 Note 5 GR: Gripper TR: Tracking YM1: YC-Link/E master Note 7 YS2 to 4: YC-Link/E slave Note 7 EP: EtherNet/IP™ Note 8 PB: PROFIBUS Note 8 CC: CC-Link Note 8 DN: DeviceNet™ Note 8 PT: PROFINET Note 8 ES: EtherCAT Note 8	No entry: Non-selection NE : EXP.DIO(NPN) Note 3 Note 5 PE : EXP.DIO(PNP) Note 3 Note 5 GR: Gripper TR: Tracking YM1: YC-Link/E master Note 7 YS2 to 4: YC-Link/E slave Note 7 EP: EtherNet/IP™ Note 8 PB: PROFIBUS Note 8 CC: CC-Link Note 8 DN: DeviceNet™ Note 8 PT: PROFINET Note 8 ES: EtherCAT Note 8	No entry: Non-selection NE : EXP.DIO(NPN) Note 3 Note 5 PE : EXP.DIO(PNP) Note 3 Note 5 GR: Gripper TR: Tracking YM1: YC-Link/E master Note 7 YS2 to 4: YC-Link/E slave Note 7 EP: EtherNet/IP™ Note 8 PB: PROFIBUS Note 8 CC: CC-Link Note 8 DN: DeviceNet™ Note 8 PT: PROFINET Note 8 ES: EtherCAT Note 8	No entry: Non-selection NE : EXP.DIO(NPN) Note 3 Note 5 PE : EXP.DIO(PNP) Note 3 Note 5 GR: Gripper TR: Tracking YM1: YC-Link/E master Note 7 YS2 to 4: YC-Link/E slave Note 7 EP: EtherNet/IP™ Note 8 PB: PROFIBUS Note 8 CC: CC-Link Note 8 DN: DeviceNet™ Note 8 PT: PROFINET Note 8 ES: EtherCAT Note 8	No entry: Non-selection WY: with RCXIVY2+, without lighting WL: with RCXIVY2+, with lighting
							Absolute battery Note 8 4: 4 pcs. 3: 3 pcs. 2: 2 pcs. 1: 1 pc. 0: 0 pc.

Please select desired selection items from the upper portion of the controller option A in order.

- Note 1. For two axes, safety standard "S" cannot be selected.
Note 2. When the field bus (CC/DN/PB/EP/PT/ES) is selected in the parallel I/O board standard (OP.B) to (OP.D) and the field bus option is enabled, the dedicated inputs from the parallel I/O board are disabled except for the STOP signal.
Note 3. Parallel I/O board expansion specifications
Note 4. Since only one parallel I/O board can be selected for an option board, the parallel I/O board standard specifications cannot be selected for (OP.B) to (OP.D).
Note 5. Be careful not to mix NPN and PNP for parallel I/O board.
Note 6. Only one tracking board can be selected from (OP.A) to (OP.D).

- Note 7. When using YC-Link/E, select only one of the four types of optional boards, master (YM1) or slave (YS2/YS3/YS4). Also, specify what robot is connected to what number controller.
Note 8. Do not mix with field bus (CC/DN/PB/EP/PT/ES).
Note 9. When using the incremental specifications, no absolute battery is required. When using a linear motor with semi-absolute specifications, the semi-absolute specifications are handled as incremental specifications, so no absolute battery is required. When using the absolute specifications, it is necessary to specify the absolute batteries for the number of axes.

Controller option board position



Safety functions PLd, Cat. 3 (ISO13849-1) Compliant with SIL2 (EN62061)

Safety functions	RCX3-SMU	
STO	PFHd [×10-9]: 88 DCavg [%]: 94.7	MTTFd [Year]: 1304 SFF [%]: 97.4
SS1	PFHd [×10-9]: 175 DCavg [%]: 93.7	MTTFd [Year]: 652 SFF [%]: 96.9
Speed monitoring	PFHd [×10-9]: 175 DCavg [%]: 93.7	MTTFd [Year]: 652 SFF [%]: 96.9
Area monitoring	PFHd [×10-9]: 175 DCavg [%]: 93.7	MTTFd [Year]: 652 SFF [%]: 96.9
PBX-E emergency stop switch	PFHd [×10-9]: 174 DCavg [%]: 93.7	MTTFd [Year]: 656 SFF [%]: 97.0
PBX-E enable switch	PFHd [×10-9]: 174 DCavg [%]: 93.7	MTTFd [Year]: 656 SFF [%]: 97.0
Safety input (emergency stop)	PFHd [×10-9]: 175 DCavg [%]: 93.7	MTTFd [Year]: 653 SFF [%]: 96.9
Safety input mode selection (manual mode)	PFHd [×10-9]: 175 DCavg [%]: 93.7	MTTFd [Year]: 653 SFF [%]: 96.9
Safety input mode selection (auto mode)	PFHd [×10-9]: 174 DCavg [%]: 93.7	MTTFd [Year]: 656 SFF [%]: 96.9

Safety functions	RCX3-SMU	
Safety input	PFHd [×10-9]: 174 DCavg [%]: 93.7	MTTFd [Year]: 654 SFF [%]: 96.9
manual mode protective stop	PFHd [×10-9]: 174 DCavg [%]: 93.7	MTTFd [Year]: 654 SFF [%]: 96.9
Safety input	PFHd [×10-9]: 174 DCavg [%]: 93.7	MTTFd [Year]: 654 SFF [%]: 96.9
auto mode protective stop	PFHd [×10-9]: 174 DCavg [%]: 93.7	MTTFd [Year]: 654 SFF [%]: 96.9
Safety input	PFHd [×10-9]: 174 DCavg [%]: 93.7	MTTFd [Year]: 654 SFF [%]: 96.9
auto mode speed monitoring	PFHd [×10-9]: 174 DCavg [%]: 93.7	MTTFd [Year]: 654 SFF [%]: 96.9
Safety input	PFHd [×10-9]: 174 DCavg [%]: 93.7	MTTFd [Year]: 654 SFF [%]: 96.9
area monitoring	PFHd [×10-9]: 174 DCavg [%]: 93.7	MTTFd [Year]: 654 SFF [%]: 96.9
Safety output	PFHd [×10-9]: 65 DCavg [%]: 97.0	MTTFd [Year]: 1752 SFF [%]: 98.4
emergency stop status	PFHd [×10-9]: 65 DCavg [%]: 97.0	MTTFd [Year]: 1752 SFF [%]: 98.4
Safety output	PFHd [×10-9]: 65 DCavg [%]: 97.0	MTTFd [Year]: 1752 SFF [%]: 98.4
safety status	PFHd [×10-9]: 65 DCavg [%]: 97.0	MTTFd [Year]: 1752 SFF [%]: 98.4
Safety output	PFHd [×10-9]: 65 DCavg [%]: 97.0	MTTFd [Year]: 1752 SFF [%]: 98.4
operable status	PFHd [×10-9]: 65 DCavg [%]: 97.0	MTTFd [Year]: 1752 SFF [%]: 98.4
Safety output	PFHd [×10-9]: 65 DCavg [%]: 97.0	MTTFd [Year]: 1752 SFF [%]: 98.4
auto mode status	PFHd [×10-9]: 65 DCavg [%]: 97.0	MTTFd [Year]: 1752 SFF [%]: 98.4

Operating environment

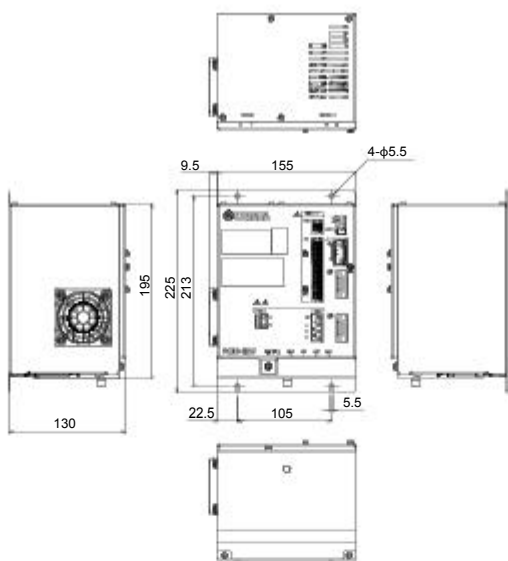
Operating environment	RCX3-SMU
Ambient temperature/humidity	Operation: 0 to 40°C, 35 to 85% RH (no condensation) Storage: -10 to 65°C, 95% RH (no condensation)
Atmosphere	Indoors without direct sunlight. No corrosive or flammable gas, oil mist, dust, zinc acid gas, or radioactive exposure.
Vibration resistance	10-57 Hz in XYZ each direction, half amplitude 0.075 mm, 57-150 Hz, 9.8 m/s ²
Degrees of protection	IP20
Altitude	0 to 2000 m above sea level

List of safety functions

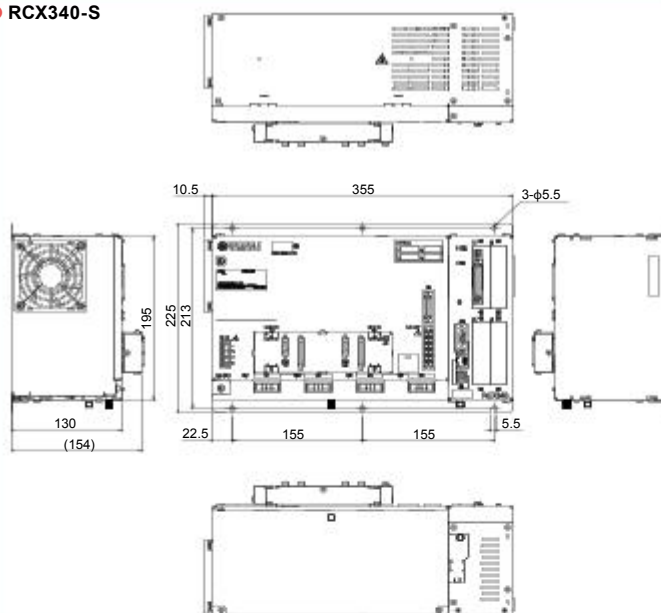
Functions	Descriptions
STO	Shuts off the main power supply of the controller and shifts to a safety status
SS1-r/t	Monitors the deceleration stop of the robot, and executes <SF001>STO if it deviates from the deceleration conditions specified by the parameter.
Speed monitoring (SLS)	Monitors whether the robot speed deviates from the value specified by the parameter, and executes <SF002>SS1-r/t if it deviates.
Area monitoring (SLP)	Monitors whether the robot position deviates from the range specified by the parameter, and executes <SF002>SS1-r/t if it deviates.
PBX-E Emergency stop Switch	Monitors whether the emergency stop switch on the programming box is pressed, and executes <SF002>SS1-r/t if it is pressed.
PBX-E Enable Switch	Monitors whether the enable switch on the programming box is at the center position during the manual mode, and executes <SF002>SS1-r/t if it is not.
Safety input Emergency stop	Monitors the input of emergency stop contact from an external device, and executes <SF002>SS1-r/t when the contact is open.
Safety input Mode selection	Monitors the status of the Auto mode signal and Manual mode signal from an external device. If the status is changed, <SF002>SS1-r/t will be executed to change the operation mode.
Safety input Manual mode Protective stop	Monitors whether the contact of an external device is closed during manual mode, and executes <SF002>SS1-r/t if it turns open.
Safety input Auto mode Protective stop	Monitors whether the contact of an external device is closed during automatic mode, and executes <SF002>SS1-r/t if it turns open.
Safety input Auto mode Speed monitoring	Monitors whether the contact of an external device is closed during automatic mode, and if it turns open, enables <SF003> Speed Monitoring even in automatic mode.
Safety input Area monitoring	Monitors whether the contact of an external device is closed, and if it turns open, enables <SF004> Area Monitoring.
Safety output	Selects and outputs the status of RCX3-SMU among emergency stop status/safety status/operable status/automatic mode status.

Dimensions

RCX3-SMU



RCX340-S



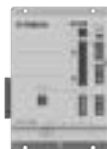
Accessories and part options

RCX3-SMU



RCX3-SMU + standard accessory set

RCX3-SMU



Model	KNH-M4230-00
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Standard accessories

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

The above includes the following accessories.

Power connector

Model	KNH-M4421-00
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Wiring lever

Model	KNH-M657M-00
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SAFETY PWR connector

Model	KNH-M4422-00
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SAFETY I/O connector

Model	KNH-M4423-00
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Absolute battery

Battery for absolute data back-up.

Basic specifications

Item	Absolute battery
Battery type	Lithium metallic battery
Battery capacity	3.6V/2,700mAh
Data holding time	About 1 year (in state with no power applied)
Dimensions	φ17 × L53mm
Weight ^{Note1}	21g



Model	KCA-M53G0-03
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Note 1. Weight of battery itself.

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

If trouble occurs with the memory then remaining battery life is low so replace the absolute battery. The battery replacement period depends on usage conditions. But generally you should replace the battery after about 1 year counting the total time after connecting to the controller and left without turning on the power.

RCX320

RCX340/341

TS-SH

RCX3-SMU

Important

Absolute battery installation conditions

1 battery is required for each 1 axes.

● 1 battery.....Data storage time of approximately 6 months (with no power applied)
 Note. No absolute battery is required for the incremental or semi-absolute axis.

Optional parts

The following four types of cables are required to use RCX3-SMU. Select the cable you need below.

AC POWER cable

Power cable that connects RCX3-SMU to RCX340

Cable length	Model
0.5m	KNH-M53E0-00
1m	KNH-M53E0-10
2m	KNH-M53E0-20

CNT I/F cable

Safety input/output cable between RCX3-SMU and RCX340.

Cable length	Model
0.5m	KNH-M5370-00
1m	KNH-M5370-10
2m	KNH-M5370-20

COM cable

Communication cable between RCX3-SMU and RCX340.

Cable length	Model
0.5m	KNH-M538F-00
1m	KNH-M538F-10
2m	KNH-M538F-20

ROBO I/O cable

Cable for each resolver for 1st-2nd axis/3rd-4th axis between RCX3-SMU and RCX340.

Cable length	Model	Label
0.5m	KNH-M5361-00	Yellow
1m	KNH-M5361-10	For 1st-
2m	KNH-M5361-20	2nd axis
0.5m	KNH-M5361-40	Silver
1m	KNH-M5361-50	For 3rd-
2m	KNH-M5361-60	4th axis