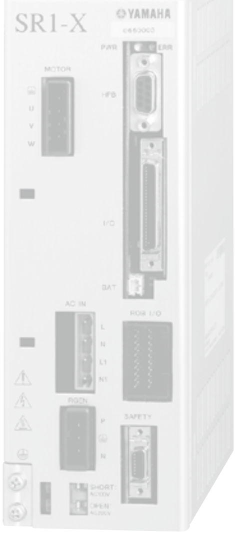
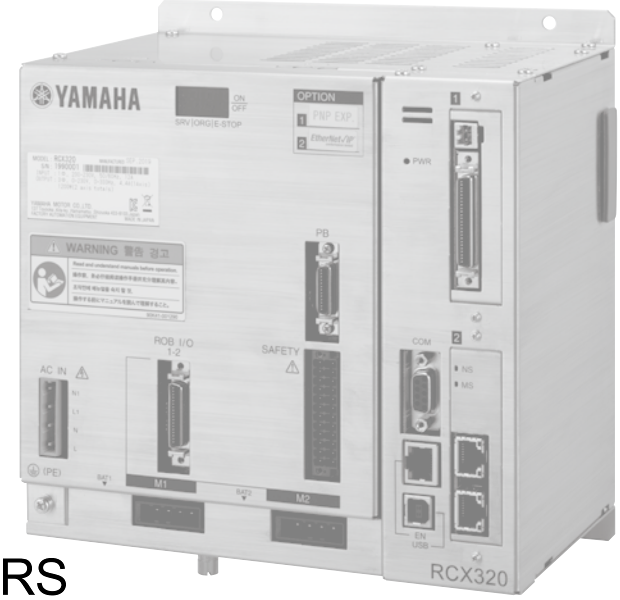




YAMAHA ROBOT CONTROLLERS
CONTROLLER

CONTENTS

CONTROLLER for LCMR200/GX series

CONTROLLER for LCM100

POSITIONER

DRIVER

CONTROLLER

OPTION DETAILS

● Support software for PC

● Handy terminal

● Programming box

● LCD Monitor option

● Touch operator interface

● Software tool kit

● Field network system with minimal wiring (network)

CONTROLLER OPTION

ROBOT VISION

ELECTRIC GRIPPER

● Compact single cam type

● Single cam type

● Double cam type

● Screw type strait style

● Screw type “T” style

● Three fingers type

CONTROLLER FEATURE DESCRIPTION

LCMR200 / GX series

Robot controller

YHX

Linear conveyor module LCMR200
Single-axis robot ....GX series

P.566

LCM100

Robot controller

LCC140

Linear conveyor module LCM100

P.576

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^{TM}, EtherNet/IP^{TM}

Single-axis

Single-axis robot positioner

EP-01

Single-axis robot ....Robonity ABAS/AGXS/ABAR

P.582

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^{TM} EtherNet/IP^{TM}, PROFINET

Single-axis robot positioner

TS-S2/TS-SH

Stepping motor single-axis robots..................TRANSERVO Note

P.592

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^{TM}, EtherNet/IP^{TM}, PROFINET

Single-axis robot positioner

TS-X/TS-P

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

P.592

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^{TM}, EtherNet/IP^{TM}, PROFINET

Single-axis robot driver

TS-SD

Stepping motor single-axis robots..................TRANSERVO

P.602

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

P.606

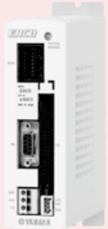
Operating method	Pulse train control
Input power	Control power supply: Single phase 200V to 230V +10% to 15 % Main power supply: Single phase/3-phase 200V to 230V +10% to 15 %
Origin search method	Incremental
Field networks	Not supported

Single-axis robot controller

ERCD

Single-axis robot.................. T4L/T5L
Clean single-axis C4L/C5L

P.612



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

P.618

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$^{\mathrm{TM}}$, 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

P.626

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$^{\mathrm{TM}}$, EtherNet/IP$^{\mathrm{TM}}$, Ethernet, PROFIBUS, PROFINET, EtherCAT

1 to 4 axis

Multi-axis robot controller

RCX340/RCX341

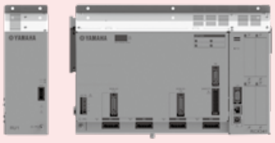
[RCX340]
Single-axis robot................. FLIP-X
Linear motor single-axis .... PHASER
Cartesian robot .... XY-X
SCARA robot....................... YK-TW, YK-XG, YK-XE, YK-XGS, YK-XGP
Pick & place........................ YP-X

[RCX341]
SCARA robot....................... YK1200XG

RCX340 ▶ P.636 **RCX341 ▶ P.646**

Note. The RCX341 comes standard with the regenerative unit “RU1”.

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$^{\mathrm{TM}}$, EtherNet/IP$^{\mathrm{TM}}$, Ethernet, PROFIBUS, PROFINET, EtherCAT

CONTROLLER SPECIFICATION SHEET

Category			YHX	LCC140	EP-01	TS-S2	TS-SH	TS-X	TS-P
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** Note 1 (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		—	—	—	—	—	—	—
	PROFIBUS		—	—	—	—	—	—	—
	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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—	—	●	—	—	●	●	●	●
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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		
—	—	—	—	●	●	●	●	●
—	—	—	—	—	—	—	—	—
—	—	—	—	●	●	●	●	●
—	—	—	—	—	—	●	●	●
—	—	—	—	—	—	●	●	●
—	—	—	—	●	●	●	●	●
—	—	—	—	—	—	●	●	●
—	—	—	—	—	—	●	●	●
●	●	●	—	●	●	●	●	●
—	—		HPB / HPB-D (with enable switch)			PBX /PBX-E (with enable switch)		
TS-Manager	RDV-Manager		POPCOM$^+$			RCX-Studio 2020		
P.602	P.606		P.612	P.618		P.626	P.636	P.646

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^{TM} 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
YHX-HD	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).

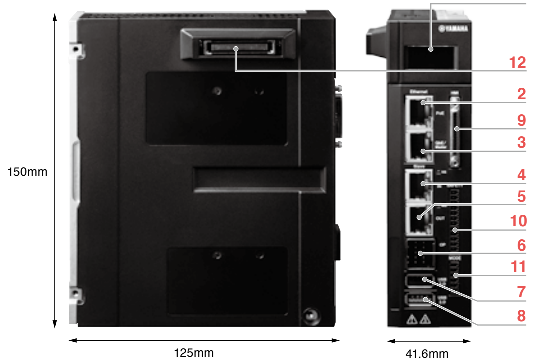
The YHX-HD is a set model of the host controller unit, driver power unit, and related components shown below. Each unit should be assembled by the customer.

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)**	

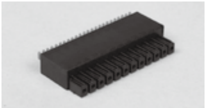
This unit can control multiple robots by combining with the linear conveyor. Although the unit is compact, it is multifunctional and has an enhanced interface.

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.

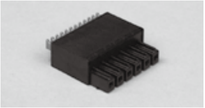


Model	YHX-CN-SAFE
Parts No.	KEK-M4432-00

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.

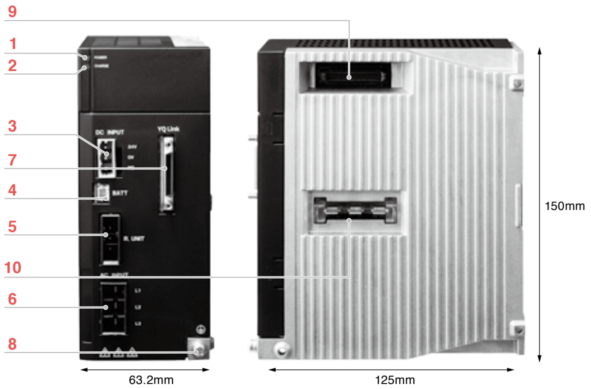
Model	YHX-CN-HMIS
Parts No.	KEK-M4429-00

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

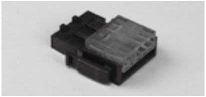
Model	YHX-NWS-PFNET
Parts No.	KEK-M440A-N0

CC-Link slave (with adapter and connector)

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

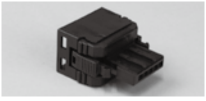
Connector for CC-Link

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.

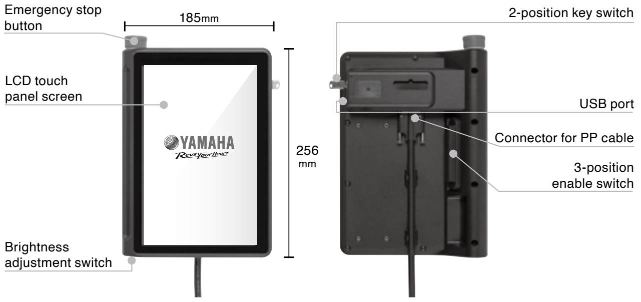
* If purchasing a field network only later on, inform us of the serial number of the host controller unit because it is necessary to issue the activation code.

* 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

Programming pad (cable set)

Order model: YHX-PP6L (KEK-M5110-0B) 6 m cable
YHX-PP12L (KEK-M5110-1B) 12 m cable



Use the touch panel screen for various operation. Equipped with safety functions (emergency stop button and enable switch) and a USB connector.

Programming pad

Model	YHX-PP
Parts No.	KEK-M5110-0A

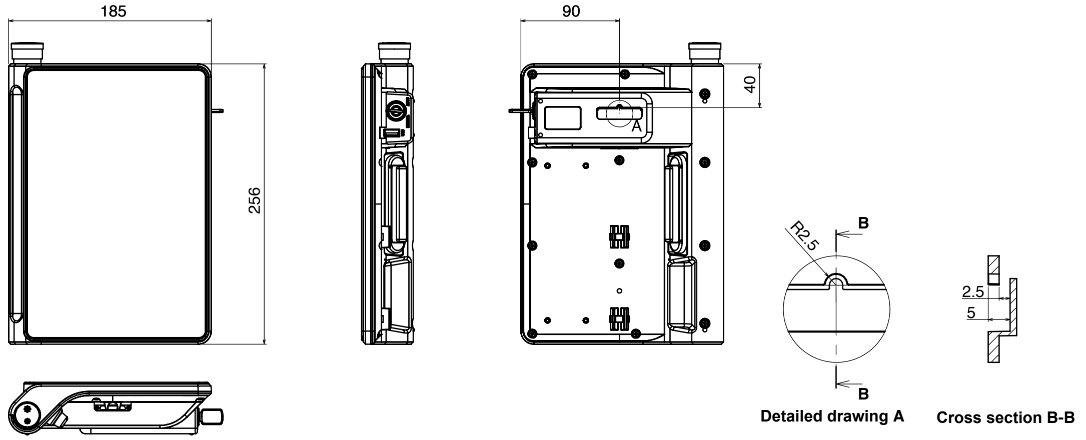
Programming pad cable

Host

Used when connecting a programming pad.

6 m	**Model**	YHX-PP-6M
	Parts No.	KEK-M5362-61
12 m	**Model**	YHX-PP-12M
	Parts No.	KEK-M5362-C0

Dimensions

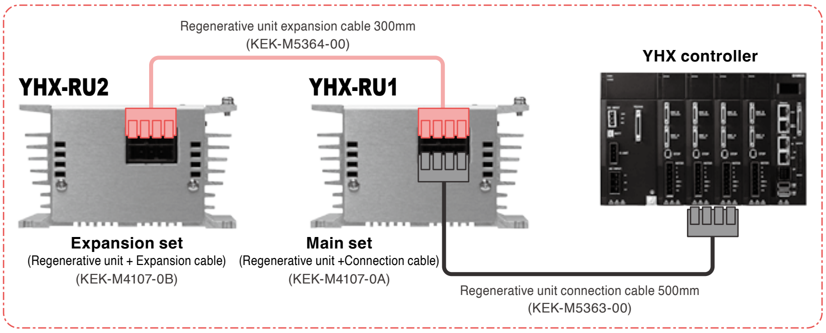


Detailed drawing A

Cross section B-B

Regenerative unit set

* For the required number of regenerative units, see page 571.


Regenerative unit expansion cable 300mm
(KEK-M5364-00)
YHX-RU2
YHX-RU1
YHX controller
Expansion set
(Regenerative unit + Expansion cable)
(KEK-M4107-0B)
Main set
(Regenerative unit +Connection cable)
(KEK-M4107-0A)
Regenerative unit connection cable 500mm
(KEK-M5363-00)

Absorbs regenerative energy generated during decelerating a robot with a large motor.
Connecting two increases the capacity to absorb regenerative energy to two times.

Absorbable electric power	100W (Equivalent to RGU 3)
Momentary maximum power	1600W
Number of connected units	Maximum 2 units
Other	Forced cooling and exhaust by fan Overheat detection for protection

Regenerative unit

Regenerative unit (Main set)

Set model of regenerative unit and regenerative unit connection cable

Order model: YHX-RU1 (KEK-M4107-0A)

Regenerative unit

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

Regenerative unit connection cable

D. Power Regenerative unit

Used when connecting a regenerative unit.

0.5 m	**Model**	YHX-RU-50C
	Parts No.	KEK-M5363-00

Regenerative unit

Regenerative unit (Expansion set)

Set model of regenerative unit and regenerative unit expansion cable

Order model: YHX-RU2 (KEK-M4107-0B)

Regenerative unit

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

Regenerative unit expansion cable

Regenerative unit

Used when adding a regenerative unit.

0.3 m	**Model**	YHX-RU-EX30C
	Parts No.	KEK-M5364-00

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 SP1/8/8.1/10 (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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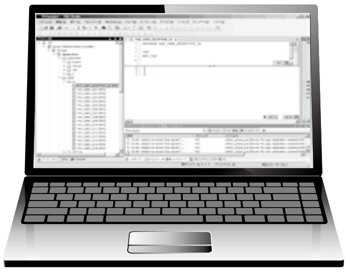
YHX Studio for Standard Profile is software that is used when the YHX host controller unit of the YAMAHA robot controller YHX series is set up.



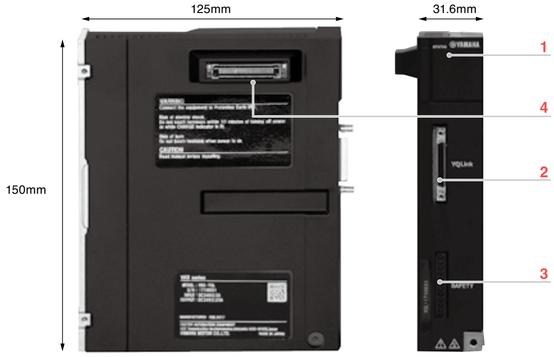
Download from website

YQLink expansion unit set

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

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

YQLink



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)**	

YQLink expansion unit

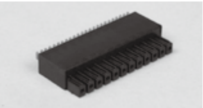
Model	YHX-YQL
Parts No.	KEK-M4406-0A

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

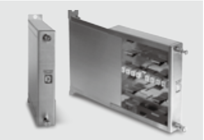
Battery holder box

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

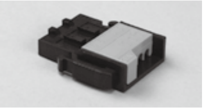
Used when the brake power is supplied externally.
The driver is not needed when the brake power unit is used.

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.

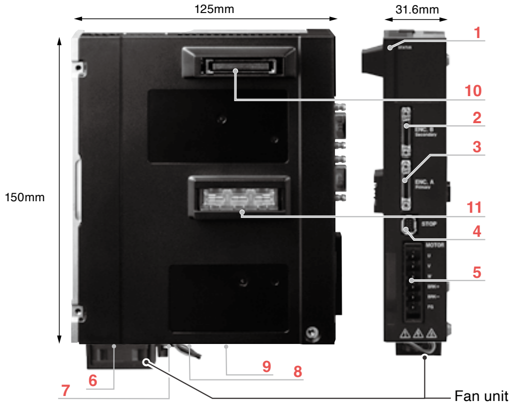
The customer assembles the necessary number of driver units between the host controller unit and driver power unit to use them.

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

▶Control unit

Drivers

Host controller unit 10A/30A



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.

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

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.

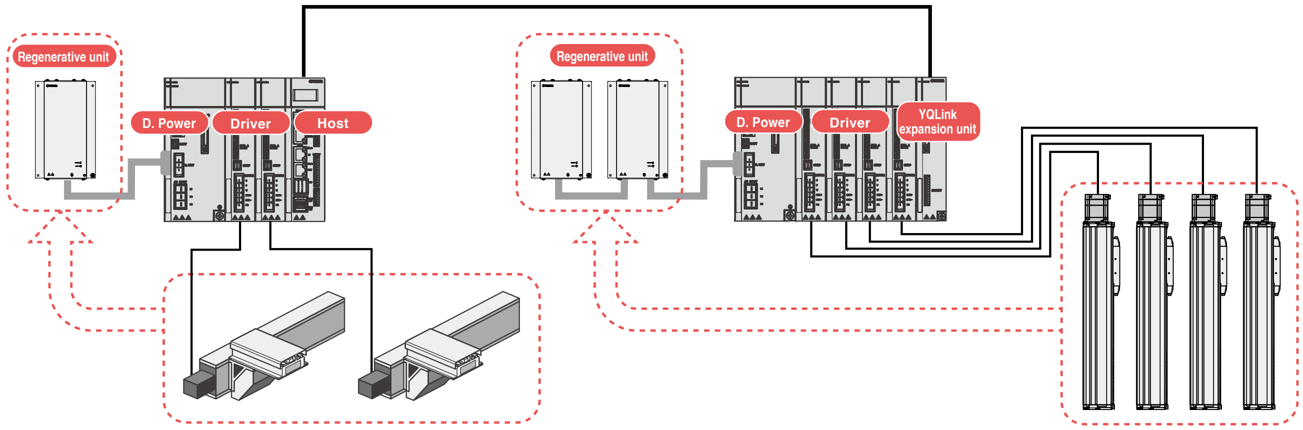
Number of regenerative units required for one D. Power.

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

1. **The total motor capacity of vertically installed single-axis robots is 400 W or more.**
2. **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.
3. **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.
4. **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.

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

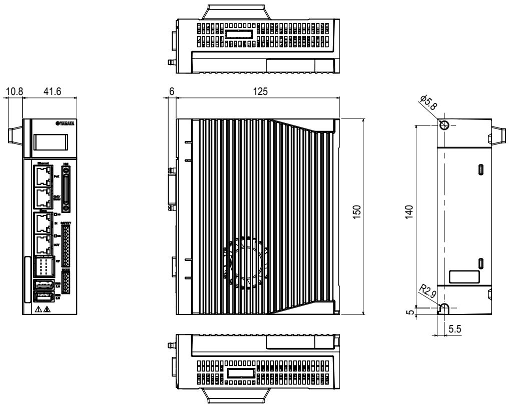
* The operating duty is calculated by the following formula.

Operating duty = Total robot movement time ÷ 1 cycle time × 100[%]

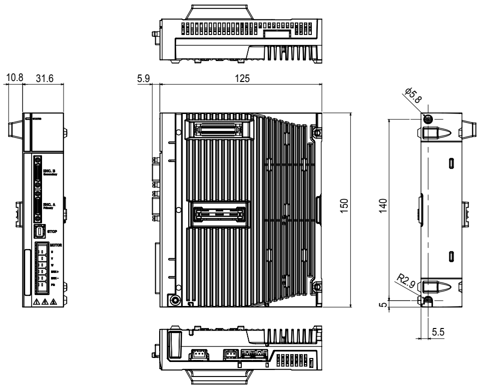
For the robot that reciprocates in one cycle, the total forward and backward movement time becomes the “total robot movement time”.

External view of each unit

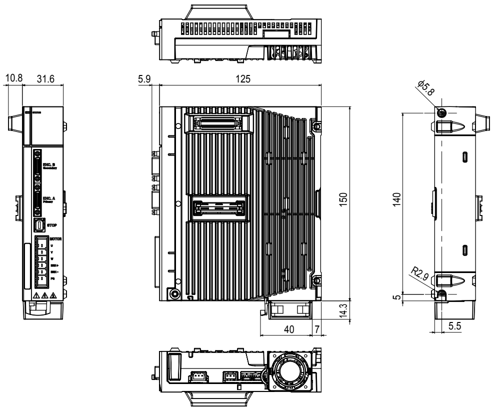
Host controller unit YHX-HCU KEK-M4200-0A



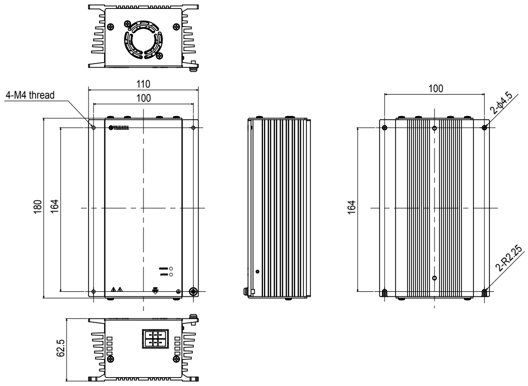
Driver unit 10A YHX-A10 KEK-M5800-0A



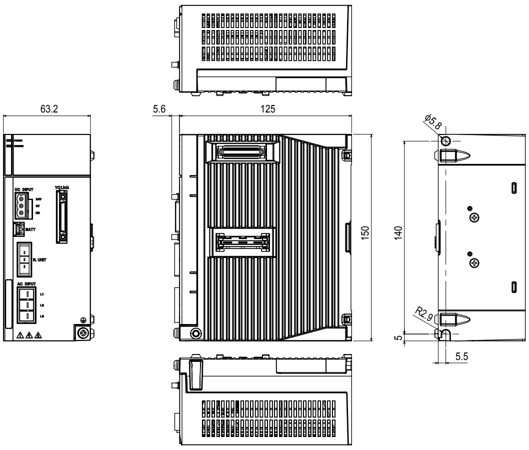
Driver unit 30A YHX-A30 KEK-M5800-1A



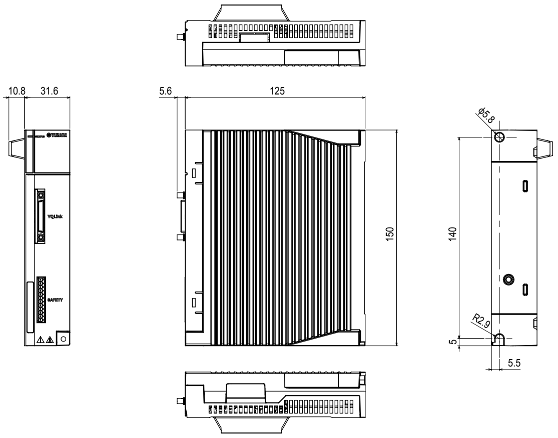
Regenerative unit YHX-RU KEK-M5850-0A



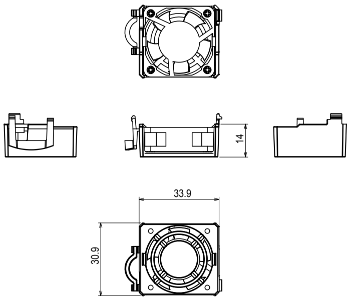
Driver power unit YHX-DPU KEK-M5880-0A



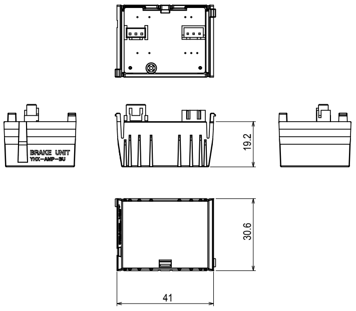
YQLink expansion unit YHX-YQL KEK-M4406-0A



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	Connector for connecting programming pad
	SAFETY	Emergency stop contact output Enable switch contact output Emergency stop input
	MODE	CPU OK output Programming pad AUTO/MANUAL select key switch output
Indicator	**LCD**	128 x 64 dots, Yellow
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%)Voltage: 21.6 to 26.4V DC (24V +/-10%)
		Current: 0.3A
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

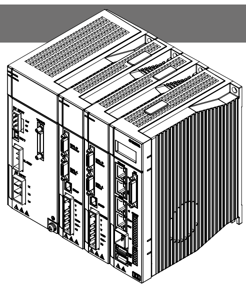
Servo motor specifications (30A)

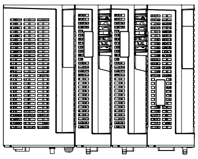
Model	YHX-A30
Parts No.	KEK-M5800-1A

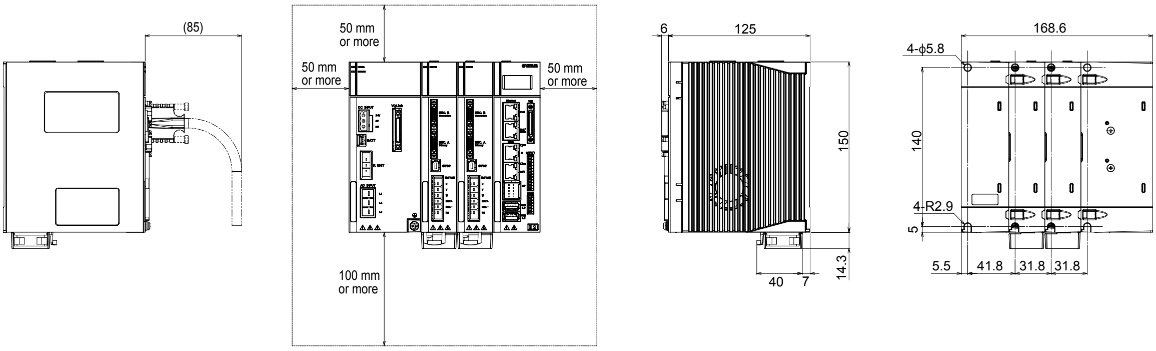
Item		Driver unit 10A/30A
Power supply	**Control power supply**	Voltage: 21.6 to 26.4V DC (24V +/-10%)
		Current: 0.8A (Including brake unit power supply)
Connector	**ENC.A**	Encoder input
	ENC.B	Encoder input (Dedicated use)
	STOP	Gate off input, 2 points Gate status output, 1 point
	MOTOR	Motor drive power supply output Brake power supply output
	ABS Battery	ABS Battery connector
	Fan unit connector	Accessory fan unit connection
	Brake 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

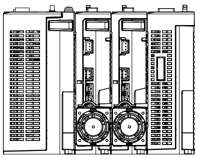
External view of YHX unit combination

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

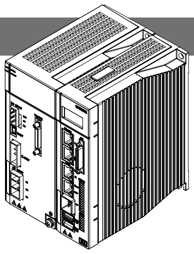


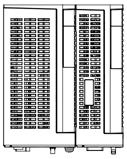


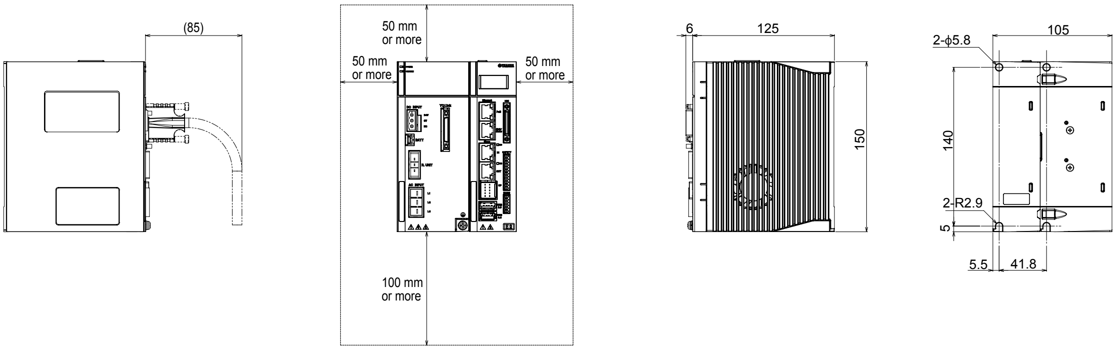


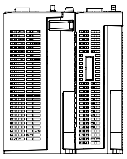


Combination of host controller (HCU) and driver power unit (DPU)









MEMO

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)
	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

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	Single phase 200 to 230V AC +/-10% maximum (50/60Hz)
	Main power supply	
Operating method		Programming/I/O point tracing/Remote command/ Operation using RS-232C communication

Ordering method

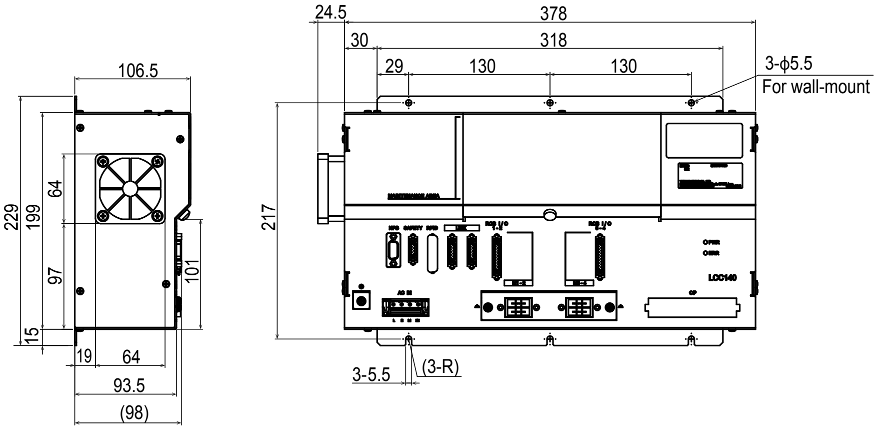
LCC140	10	
Controller	Current sensor	Network option Note
	10:10A	No entry: None
		CC: CC-Link
		DN: DeviceNet™
		EP: EtherNet/IP™

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

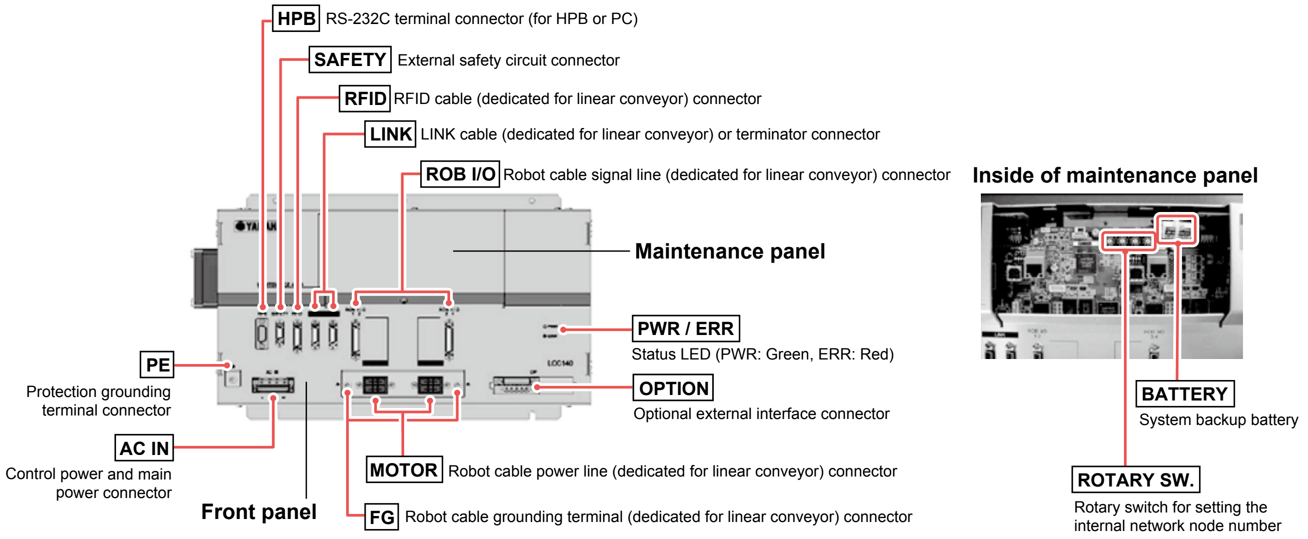
Item			LCC140	
DeviceNet™ unit	Applicable DeviceNet™ specifications		Volume 1 Release2.0, Volume 2 Release2.0	
	DeviceNet™ Conformance test		Compliant with CT24	
	Device profile/Device type number		Generic Device (keyable) / 2B Hex	
	Vendor name/Vendor ID		YAMAHA MOTOR CO.,LTD. / 636	
	Product code		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	
	Network length	Total length	100m/500Kbps, 250m/250Kbps, 500m/125Kbps	
		Branch length	6m or less	
		Total branch length	39m or less/500Kbps, 78m or less/250Kbps, 156m or less/125Kbps	
	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	Input: 24byte Output: 24byte
EtherNet/IP™ unit	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	Input: 24byte Output: 24byte

LCC140

Dimensions

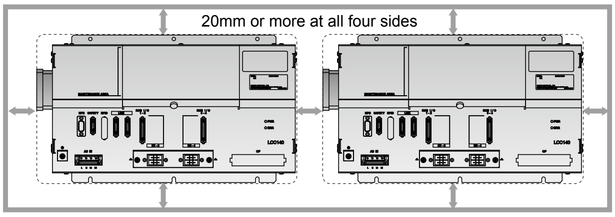


Part names


HPB RS-232C terminal connector (for HPB or PC)
SAFETY External safety circuit connector
RFID RFID cable (dedicated for linear conveyor) connector
LINK LINK cable (dedicated for linear conveyor) or terminator connector
ROB I/O Robot cable signal line (dedicated for linear conveyor) connector
Inside of maintenance panel
Maintenance panel
PWR / ERR
Status LED (PWR: Green, ERR: Red)
OPTION
Optional external interface connector
BATTERY
System backup battery
PE
Protection grounding terminal connector
AC IN
Control power and main power connector
Front panel
MOTOR Robot cable power line (dedicated for linear conveyor) connector
FG Robot cable grounding terminal (dedicated for linear conveyor) connector
ROTARY SW.
Rotary switch for setting the internal network node number

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

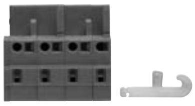
LCC140

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

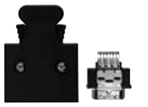
When performing the operation with the programming box HPB removed, connect this dummy connector to the HPB connector.
One connector per LCC140 is required.

Model	KDK-M5163-00

LCC140 SR1-X SR1-P

SAFETY connector

One connector per LCC140 is required.



Not wired (plug + shell kit)

Wired Note

Model		
Model	Not wired	KDK-M5370-10
	Wired Note	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		
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 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

LCC140

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.

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**

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)

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.

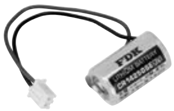
Maintenance parts

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

LCC140

Replacement filter for LCC140 (5 pcs. in package)

Model	KDK-M427G-00

LCC140

MEMO

EP-01

● CE compliance

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

EP-01

Handy terminal
▶ HT2 / HT2-D
P.657

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

Basic specifications

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

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

Model Overview

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

Ordering method

EP-01 - ☐ - ☐ - ☐

Controller	Driver: Power capacity	Regenerative	I/O
EP-01	A10: 200W or less	No entry: None	EP: EtherNet/IP™
	A30: 400W/750W	R: With EP-RU	PT: PROFINET
			ES: EtherCAT
			NS: NPN
			CC: CC-Link

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

Specification selection table

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

<Standard acceleration/deceleration specifications>

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

Conditions required for regenerative unit

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

<High acceleration/deceleration specifications>

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

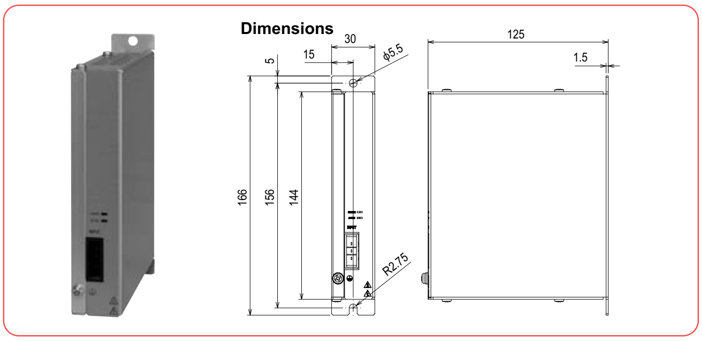
Conditions required for regenerative unit

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

LCMR200 Linear conveyor modules
GX Single-axis robots
LCM100 Linear conveyor modules
YK-X SCARA robots
Robonity Single-axis robots
PHASER Linear motor single-axis robots
FLIP-X Single-axis robots
TRANSERVO Compact single-axis robots
XY-X Cartesian robots
YP-X Pick & place robots
CLEAN
CONTROLLER
INFORMATION
Robot positioner
Pulse string driver
Robot controller
RCXiVY2+ Electric gripper
Option

EP-01

Regenerative unit EP-RU



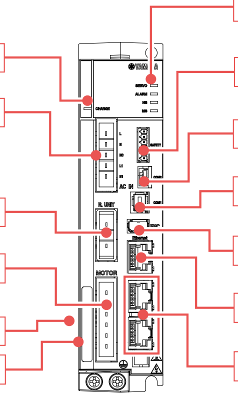
Basic specifications

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)



Charge indicator lamp (CHARGE)
The main power supply status is indicated by LED lamp.

Power supply connector
Connector for main power and control power input.

Regenerative unit connector (R.UNIT)

Motor connector (MOTOR)
Connector for the servo motor's power line connection.

Rating nameplate (on side face of unit body)

Serial No.

Status indicator lamps (SERVO, ALARM, NS, MS)
The controller status is indicated by LED lamps.

SAFETY connector
External safety circuit I/O connector

Communication connector 2 (COM2)
Connector for the daisy-chain connection.

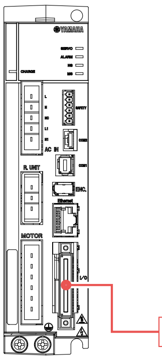
Communication connector 1 (COM1)
Connector for connection to HT2.

Robot ENC. connector (ENC.)
Dedicated connector for robot peripherals such as position signal and origin sensor

Ethernet connector (Ethernet)
Connector for connection to a personal computer

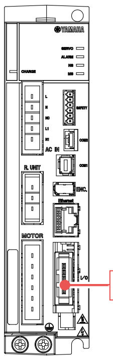
Field network connector (I/O)
EtherNet/IP™, PROFINET, EtherCAT

EP-01 (NPN)



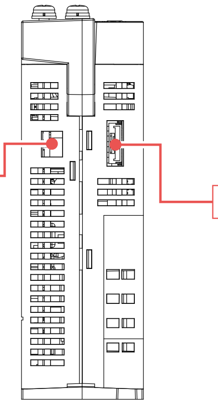
Parallel I/O connector (I/O)
NPN

EP-01 (CC-Link)



Connector for CC-Link connection (I/O)
CC-Link V2

EP-01 (Bottom view)

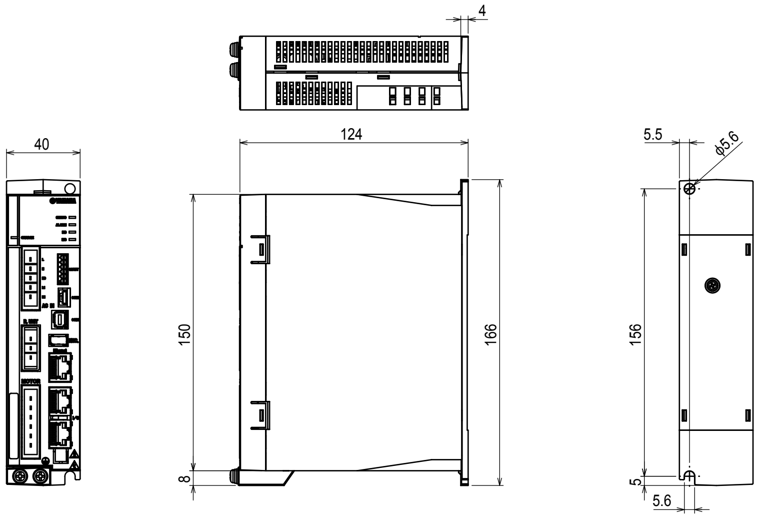


Connector for brake power input

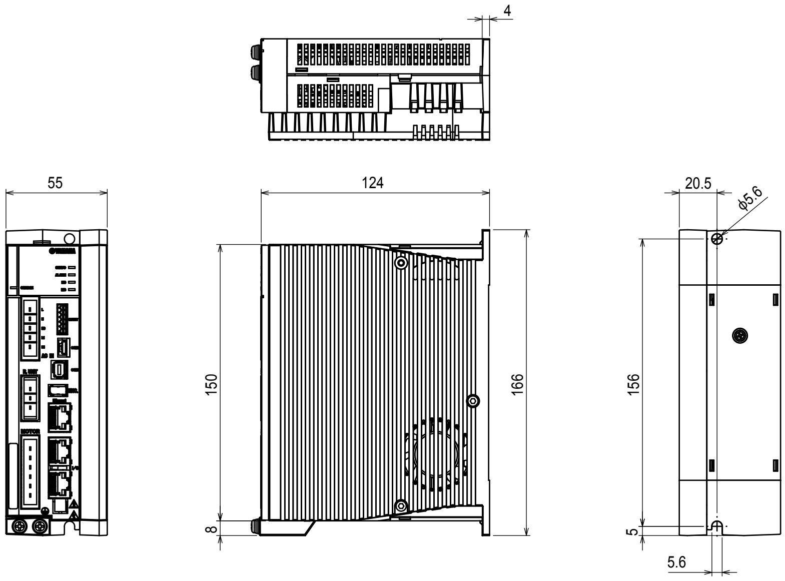
Feedback pulse I/O connector

Dimensions

EP-01-A10



EP-01-A30



Installation conditions

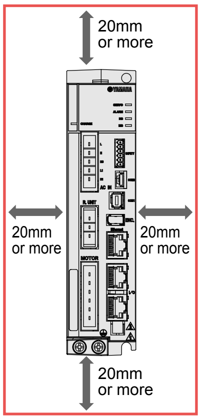
- Install the EP-01 inside the control panel.
- Install the EP-01 on a metal wall vertically.
- Install the EP-01 in a well ventilated location, with space on all sides of the EP-01 (See fig. at right.).

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

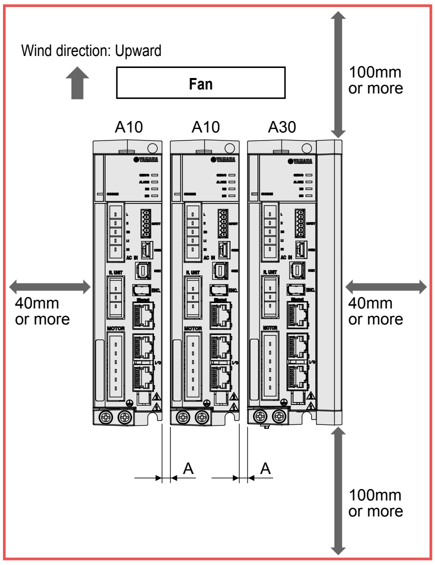
[When multiple EP-01 robot positioners are used]

- 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)



EP-01

Data overview

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

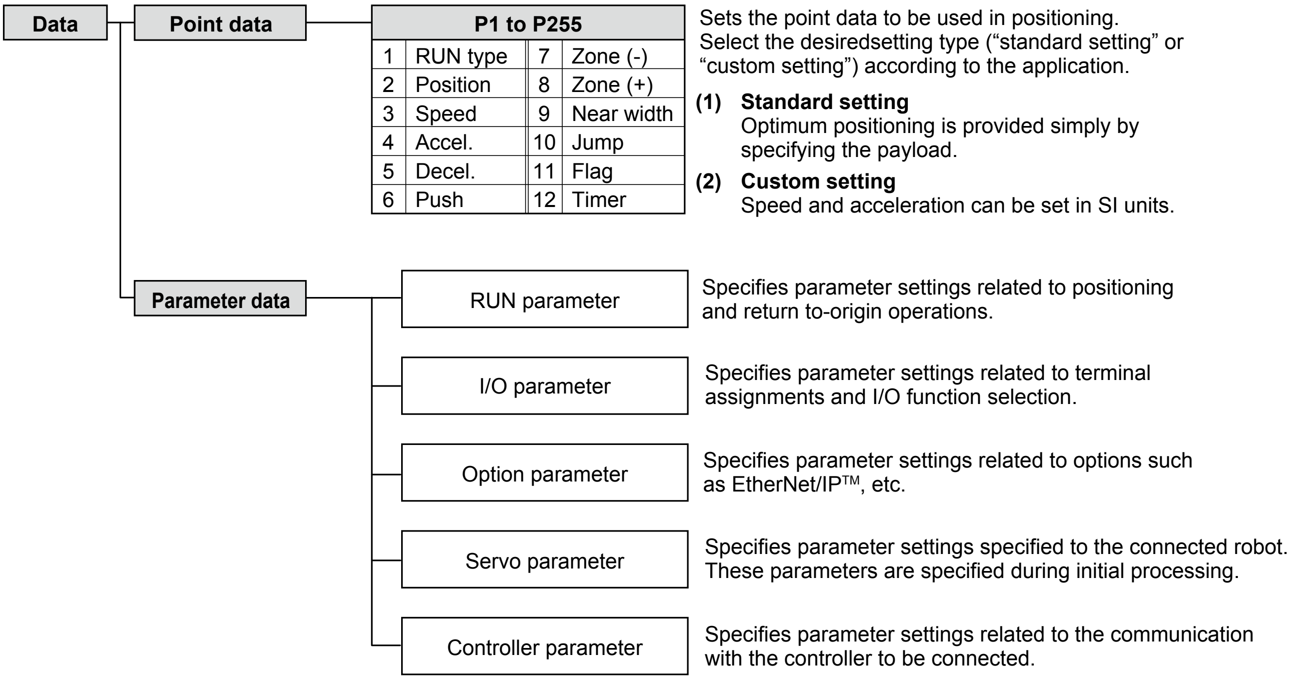
Point data

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

Parameter data

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

Data structure



P1 to P255			
1	RUN type	7	Zone (-)
2	Position	8	Zone (+)
3	Speed	9	Near width
4	Accel.	10	Jump
5	Decel.	11	Flag
6	Push	12	Timer

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

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

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

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

Point data

Point data item list

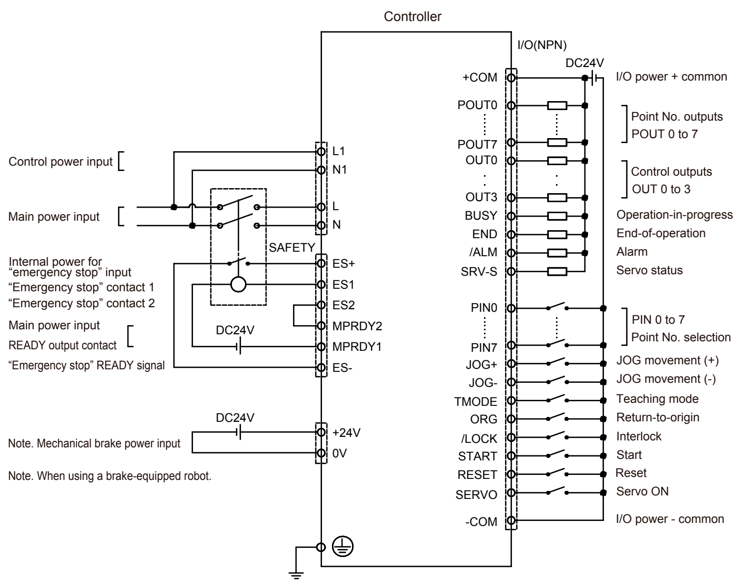
P1 to P255		
	Item	Description
1	RUN type	Specifies the positioning operation pattern.
2	Position	Specifies the positioning target position or movement amount.
3	Speed	Specifies the positioning speed.
4	Accel.	Specifies the positioning acceleration.
5	Decel.	Specifies the positioning deceleration (as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

“Standard setting” and “custom setting”

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

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

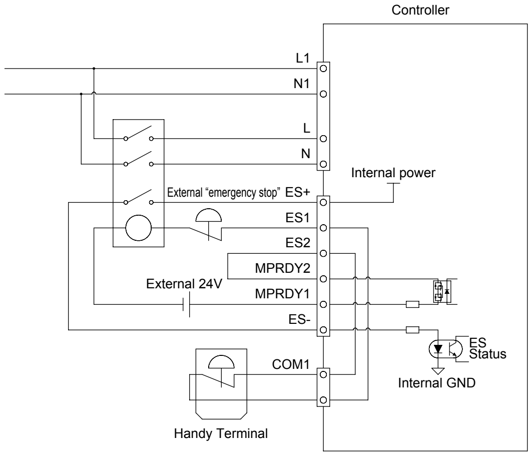
NPN type input / output wiring diagram



I/O Specifications

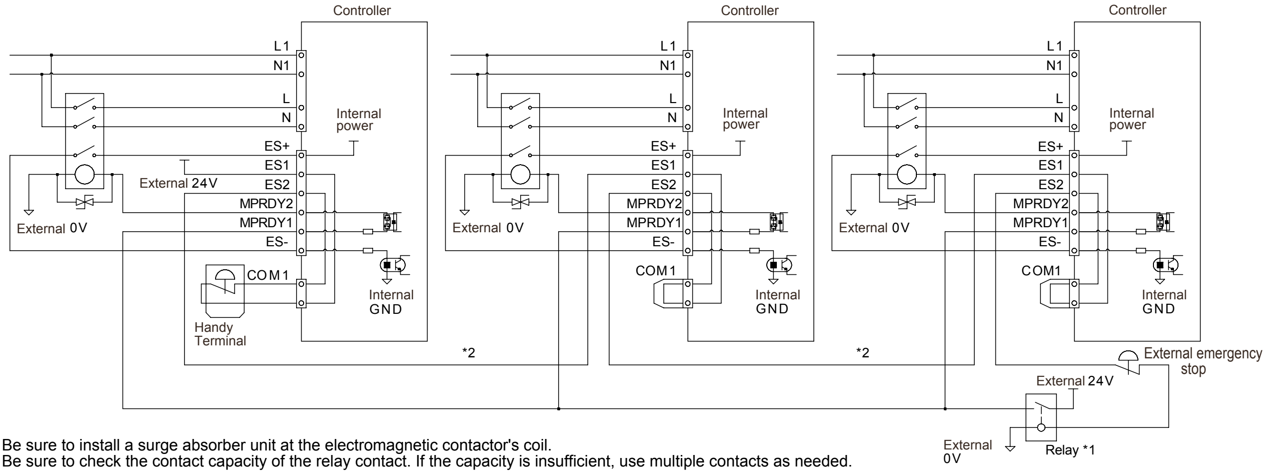
Item	Description
EtherNet/IP™	EtherNet/IP™ adapter (2 ports)
PROFINET	PROFINET Slave 1 node
EtherCAT	EtherCAT Slave 1 node
NPN	Input 16 points, 24VDC +/-10%, 5.1mA/point, positive common Output 16 points, 24VDC +/-10%, 50mA/point, sink type
CC-Link	CC-Link Ver.2.00 compatible, Remote station device (1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

Emergency stop circuit example



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

Emergency stop circuit example (Daisy chain)



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

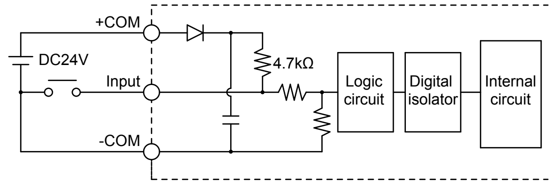
EP-01

I/O signals (NPN)

No.	Signal Name			Description		No.	Signal Name		Description
A1	+COM			I/O power input, positive common		B1	POUT0	Outputs	Point No. outputs
A2						B2	POUT1		
A3	NC			No connection		B3	POUT2		
A4	NC					B4	POUT3		
A5	PIN0		Inputs	Point No. select		B5	POUT4		
A6	PIN1					B6	POUT5		
A7	PIN2					B7	POUT6		
A8	PIN3					B8	POUT7		
A9	PIN4					B9	OUT0		OUT0 to OUT3 assignments include: • Zone output • Personal zone output • Teaching mode status • Return-to-origin end status • NEAR output • Movement-in-progress • Push status • Warning output
A10	PIN5					B10	OUT1		
A11	PIN6					B11	OUT2		
A12	PIN7					B12	OUT3		
A13	JOG+ (A15: ON)	SPD (A15: OFF)		JOG movement (+ direction)	Speed switching	B13	BUSY		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		I/O power input, negative common
A20	SERVO			Servo ON		B20			

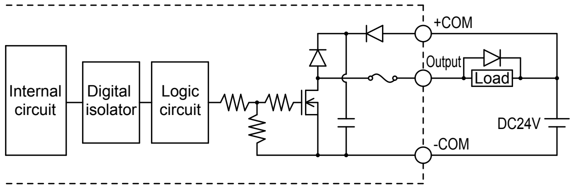
NPN type I/O circuit details

Input circuit



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

Output circuit



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

Feedback pulse I/O signal table

Basic specifications

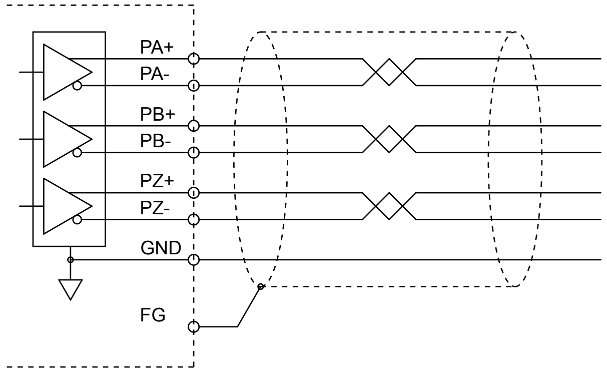
Item	Specification
Output signal	ABZ-phase pulse
Number of pulses per rotation	Variably changed in a range of 4 to 16384
Maximum rotation speed	6000 rpm
Maximum operating frequency	2 Mbps

Signal table

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

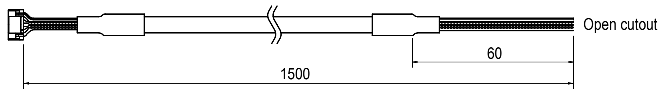
Details of feedback pulse output circuit

Output circuit



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

Feedback pulse output cable



Model	KFX-M532M-00

Accessories and part options

EP-01

Standard accessories

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

Power connector + Operation lever

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

Regeneration unit short-circuit connector

Model		Controllers
Model	KEK-M4431-00	EP-01 YHX RCX320

HT2 dummy connector

Model		Controllers
Model	KEK-M5869-00	EP-01 YHX

SAFETY connector

Model		Controllers
Model	KEK-M4432-10	EP-01 YHX

Brake power cable (1 m) Note

Note. Included in the robot with brake.

Model		Controllers
Model	KFX-M532K-10	EP-01

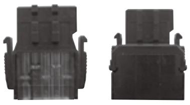
I/O cables (2 m/20-core×2) Note

Note. Included in the robot with NPN specifications.

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

CC-Link connector Note

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



Connector Jump socket

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

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

Ferrite core Note

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

Model		Controllers
Model	KK1-M6563-200	EP-01

See next page for optional parts

EP-01

Options

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

Handy terminal HT2/HT2-D

P.657

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

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

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.

EP-01

Absolute battery

Absolute battery basic specifications

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

Model	KFX-M53G0-00

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

EP-01

Battery holder kit

Model	KFX-M53G7-00

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

EP-01

CC-Link termination connector

Model	KCA-M4874-00

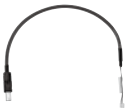
EP-01
TS-S2
TS-SH
TS-X
TS-P

Feedback pulse output cable

Model	KFX-M532M-00

EP-01

Daisy chain and gateway connection cable



Model	KFX-M532L-00

EP-01

MEMO

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	Control power supply	DC24V +/-10%	
		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	
	Origin search method		Incremental	Absolute / Incremental
Points	Points		255 points	
	Point type setting		(1) Standard setting: Set speed and acceleration in percent of the respective maximum settings. (2) Custom setting: Set speed and acceleration in SI units.	
	Point teaching method		Manual data input (coordinates input), Teaching, Direct teaching	
External input/output	I/O interface		Selectable from the following: NPN, PNP, CC-Link, DeviceNet^{TM}, EtherNet/IP^{TM}, 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)	
	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.

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

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 PROFINET

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	Control power supply	DC24V +/-10%		● AC100V specifications Control power supply Single phase 100 to 115V AC +/-10% Main power supply Single phase 100 to 115V AC +/-10%	● AC200V specifications Control power supply Single phase 200 to 230V AC +/-10% Main power supply Single phase 200 to 230V AC +/-10%
	Main power supply				
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	TS-X220 / TS-P220
	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	1400VA
	Dimensions		W58 × H162 × D131mm				W70 × H162 × D131mm
	Weight		Approx. 0.9kg				Approx. 1.1kg
	Input power supply	Control power supply	Single phase 100 to 115V AC +/-10% 50/60Hz		Single phase 200 to 230V AC +/-10% 50/60Hz		
		Main power supply	Single phase 100 to 115V AC +/-10% 50/60Hz		Single phase 200 to 230V AC +/-10% 50/60Hz		
Axis control	Control method		Closed loop vector control method				
	Operating method		I/O point tracing (Positioning operation by specifying point number) / Remote command				
	Operation types		Positioning, merge-positioning, push, and jog operations				
	Position detection method		TS-X: Resolver with multi-rotation absolute function TS-P: Magnetic type linear scale				
	Resolution		TS-X: 16384 pulses/rev. TS-P: 1μm				
	Origin search method		TS-X: Absolute / Incremental TS-P: Incremental / Semi-absolute				
Points	Number of points		255 points				
	Point type setting		(1) Standard setting: Set speed and acceleration in percent of the respective maximum settings. (2) Custom setting: Set speed and acceleration in SI units.				
	Point teaching method		Manual data input (coordinates input) , Teaching, Direct teaching				
External input/output	I/O interface		Selectable from the following: 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)				
	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.)				
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, power module error, temperature error, overload, overvoltage, low voltage, excessive position deviation, overcurrent, motor current error				
	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														●	●	●	●	●	●	●						
Regenera-tive 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.

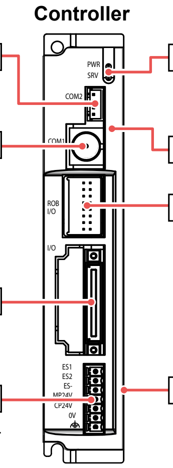
(4) Regenerative unit is needed if using at maximum speeds exceeding 1000mm per second.
(5) Regenerative unit is needed if using at maximum speeds exceeding 1250mm per second.
(6) Regenerative unit is needed if using at maximum speeds exceeding 750mm per second.

TS-P

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

Part names

TS-S2/TS-SH



Communication connector 2 (COM2)
Connector for the daisy-chain connection cable.

Communication connector 1 (COM1)
Connector for connection to HT1 or a personal computer.

I/O connector (I/O)

Power supply connector
Connector for main power and control power input.

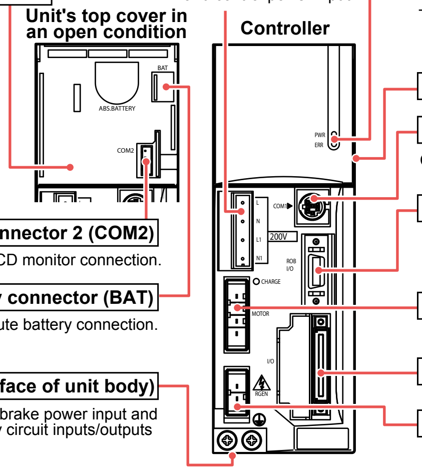
Status indicator lamps (PWR, ERR)
The controller status is indicated by LED lamps.

Serial No.

Robot I/O connector (ROB I/O)
Dedicated connector for robot I/O signals such as position signals and origin sensor signals, etc.

Rating nameplate (on side face of unit body)

TS-X/TS-P



Serial No.

Power supply connector
Connector for main power and control power input.

Communication connector 2 (COM2)
Connector for the daisy-chain or LCD monitor connection.

Absolute battery connector (BAT)
Connector for the absolute battery connection.
(only for TS-X)

EXT connector (bottom face of unit body)
Connector for brake power input and external safety circuit inputs/outputs

Status indicator lamps (PWR, ERR)
The controller status is indicated by LED lamps.

Rating nameplate (on side face of unit body)

Communication connector 1 (COM1)
Connector for connection to HT1 or a personal computer.

Robot I/O connector (ROB I/O)
Dedicated connector for robot I/O signals such as position signals and origin sensor signals, etc.

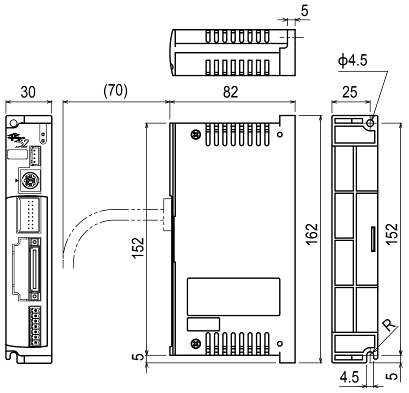
Motor connector (MOTOR)
Connector for the servo motor's power line connection.

I/O connector (I/O)

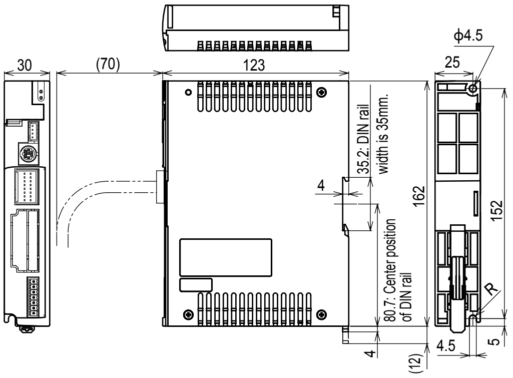
Regenerative unit connector (RGEN)

Dimensions

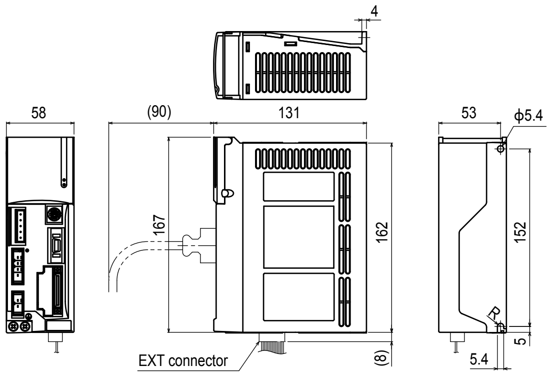
TS-S2



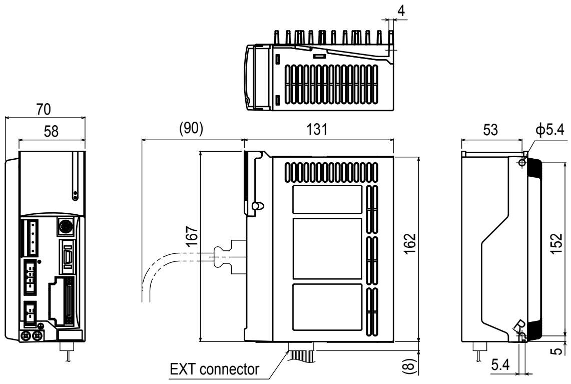
TS-SH


ϕ4.5
30
(70)
123
25
35.2: DIN rail width is 35mm.
4
162
152
80.7: Center position of DIN rail
R
4
(12)
4.5
5

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



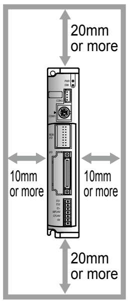
TS-X/TS-P (220)



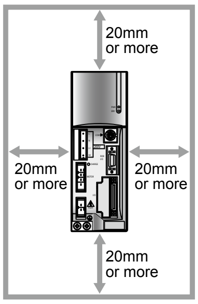
Installation conditions

- 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

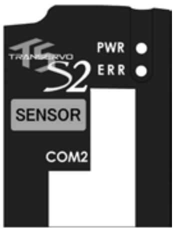
For the RF type sensor specifications, the controllers “TS-S2” and “TS-SH” become “TS-S2S” and “TS-SHS”, respectively.

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.)

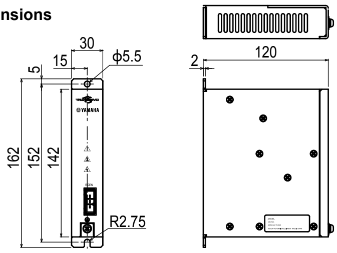


TS-S2/TS-SH/TS-X/TS-P

Regenerative unit RGT/RGU-2

Regenerative unit RGT

Dimensions



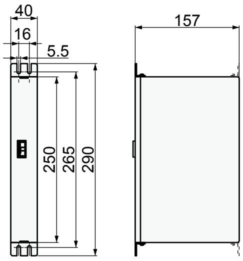
Basic specifications

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

Dimensions



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.

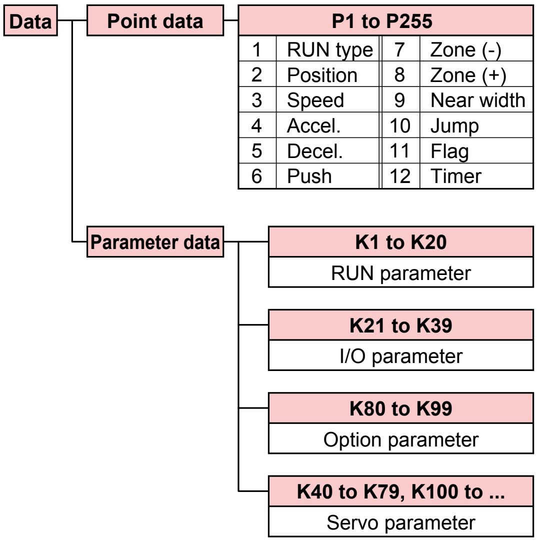
Point data

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/s^2) 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



Data — **Point data** — **P1 to P255**

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

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

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

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

Parameter data

K1 to K20
RUN parameter

Specifies parameter settings related to positioning and return to-origin operations.

K21 to K39
I/O parameter

Specifies parameter settings related to terminal assignments and I/O function selection.

K80 to K99
Option parameter

Specifies parameter settings related to options such as CC-Link, etc.

K40 to K79, K100 to ...
Servo parameter

Specifies parameter settings specified to the connected robot.
These parameters are specified during initial processing.

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.

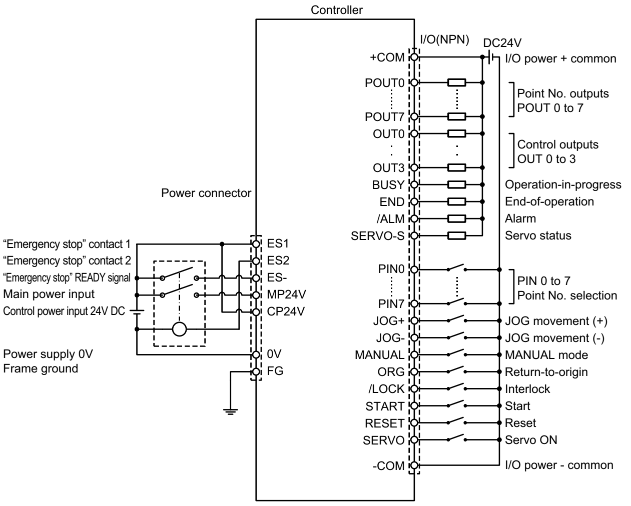
"Standard setting" and "custom setting"

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).

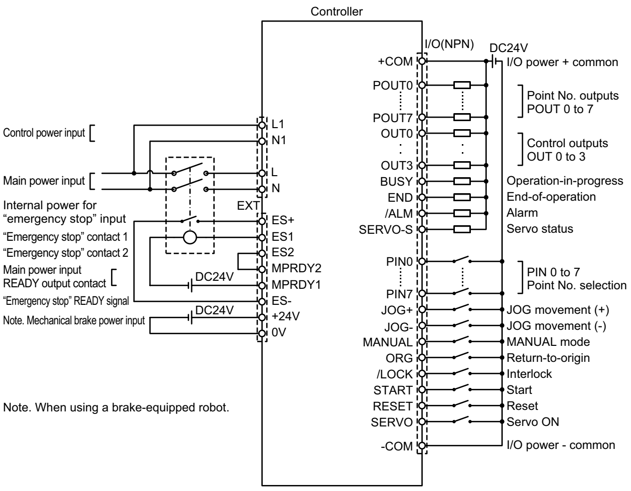
Setting Type	Description
Standard setting	Optimum positioning is provided simply by specifying the payload. This setting type is well-suited to assembly and transport applications.
Custom setting	Allows changing the speed and acceleration in SI units so the desired positioning operation can be set. This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

NPN type input / output wiring diagram

TS-S2/TS-SH

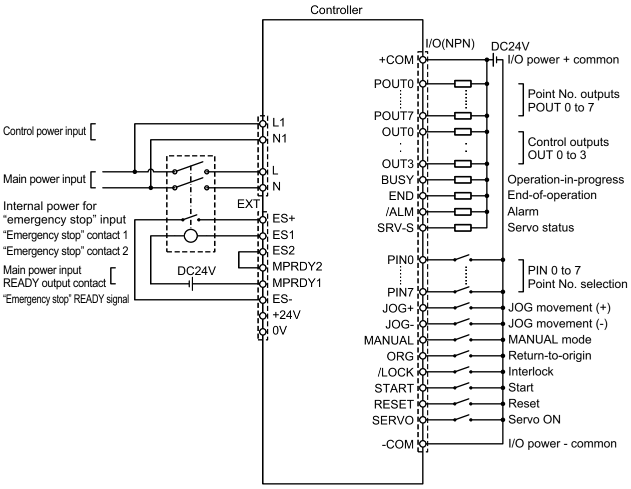


TS-X



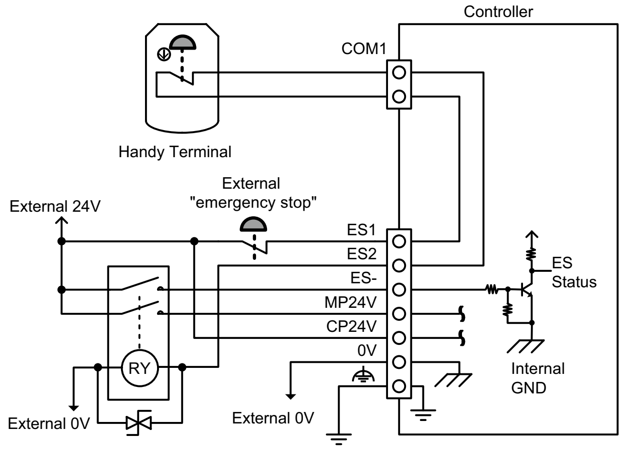
Note. When using a brake-equipped robot.

TS-P



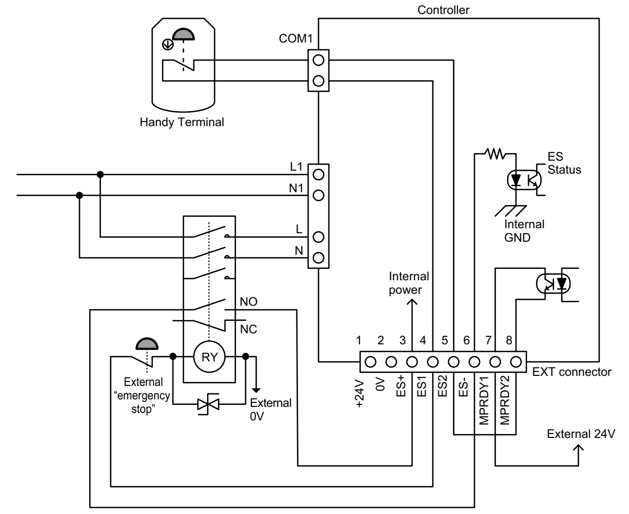
Emergency stop circuit example

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

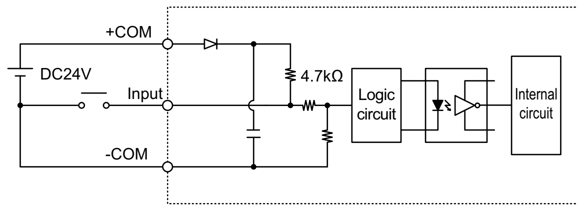
TS-S2/TS-SH/TS-X/TS-P

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	Outputs	Point No. outputs
A2				B2	POUT1		
A3	NC	No connection		B3	POUT2		
A4	NC			B4	POUT3		
A5	PIN0	Inputs	Point No. select	B5	POUT4		
A6	PIN1			B6	POUT5		
A7	PIN2			B7	POUT6		
A8	PIN3			B8	POUT7		
A9	PIN4			B9	OUT0		OUT0 to OUT3 assignments include: • Zone output • Personal zone output • MANUAL mode status • Return-to-origin end status • NEAR output • Movement-in-progress • Push status • Warning output
A10	PIN5			B10	OUT1		
A11	PIN6			B11	OUT2		
A12	PIN7			B12	OUT3		
A13	JOG+		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			

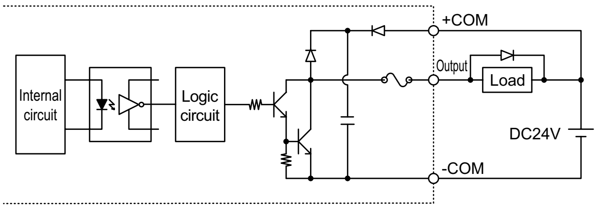
NPN type I/O circuit details

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)

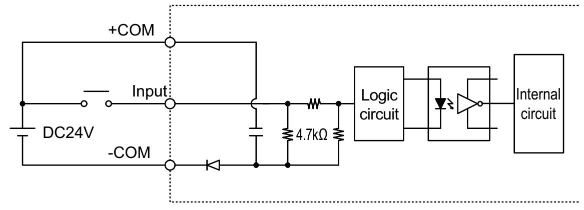
Output circuit



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

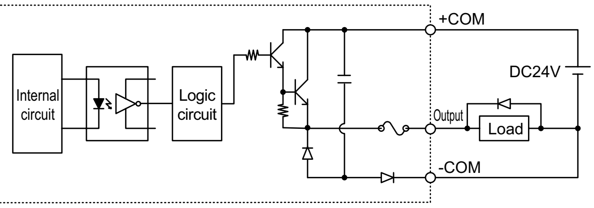
PNP type I/O circuit details

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.

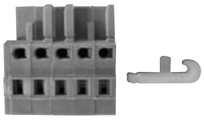
Power connector

Model	KCC-M4421-00

TS-S2 **TS-SH** **TS-SD**

Power connector (AC100V specifications)

Included when 100V model is purchased

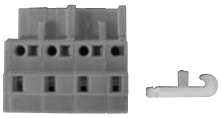


Model	KCA-M5382-00

TS-X **TS-P**

Power connector (AC200V specifications)

Included when 200V model is purchased

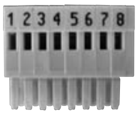


Model	KAS-M5382-00

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

For TS-X

For TS-SH

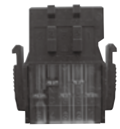
Model	KCA-M53G0-10 (For TS-X) KCA-M53G0-02 (For TS-SH)

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



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.)

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

See next page for optional parts

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

Options

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

Handy terminal HT1/HT1-D

P.656

		HT1	HT1-D
Model	3.5m	KCA-M5110-0J	KCA-M5110-1J
	10m	KCA-M5110-6J	KCA-M5110-7J
Enable switch		–	3-position
CE marking		Not supported	Applicable

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

Support software TS-Manager

P.648

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

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

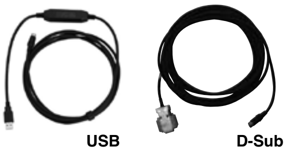
TS-Manager environment

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.



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

CC-Link termination connector (CC-Link specifications)

Model	KCA-M4874-00

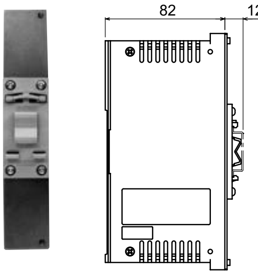
TS-S2
TS-SH
TS-X
TS-P

TS-Monitor (LCD monitor) P.660

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

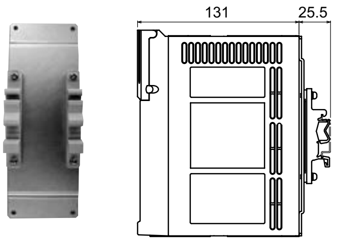
TS-X
TS-P

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



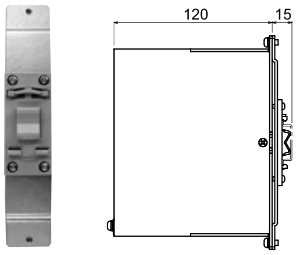
Model	For TS-S2 KCC-M499A-00

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

MEMO

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

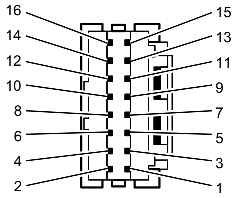
	Item		TS-SD
Basic specifications	Number of controllable axes		Single-axis
	Controllable robots		TRANSERVO series [Note]
	Current consumption		3A (Rating) 4.5A (Max.)
	Dimensions		W30 × H162 × D82mm
	Weight		Approx. 0.2kg
	Input power supply	Control power supply	DC24V +/-10%
		Main power supply	DC24V +/-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 P.335		
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

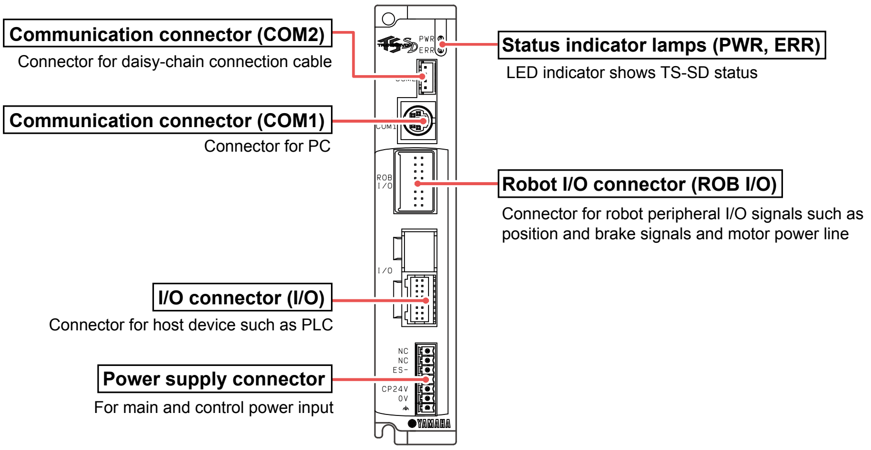
Robot + Controller

☐ – ☐ – **SD** **1**

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

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

Part names



Communication connector (COM2)
Connector for daisy-chain connection cable

Communication connector (COM1)
Connector for PC

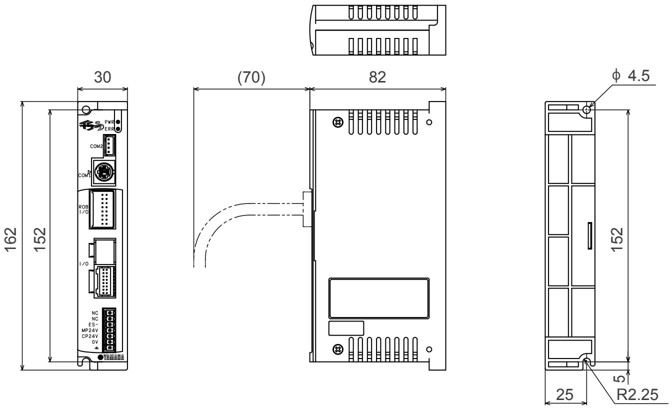
I/O connector (I/O)
Connector for host device such as PLC

Power supply connector
For main and control power input

Status indicator lamps (PWR, ERR)
LED indicator shows TS-SD status

Robot I/O connector (ROB I/O)
Connector for robot peripheral I/O signals such as position and brake signals and motor power line

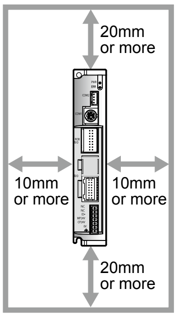
Dimensions



TS-SD

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)



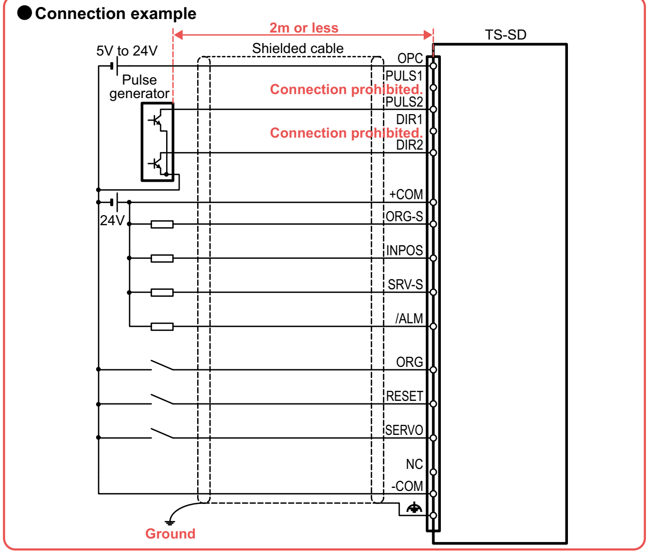
I/O signal list

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. • Phase A/Phase B input • Pulse/Sign input • CW/CCW input
	DIR1	(Connection prohibited. [Note 1])	Command direction input (+)	
	PULS2	Command pulse input	Command pulse 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
	SREVO	Servo ON	←	ON: servo on; OFF: servo off.
Outputs	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.

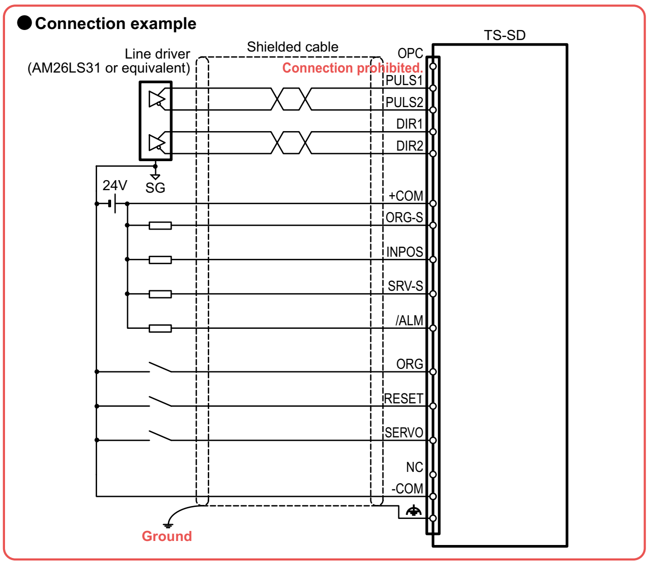
Input / output signal connection diagram [open collector]

● Connection example



Input / output signal connection diagram [line driver]

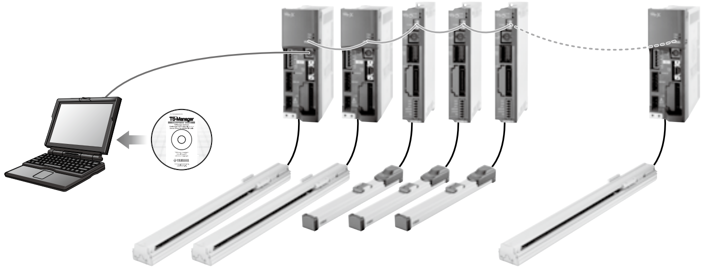
● Connection example



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

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

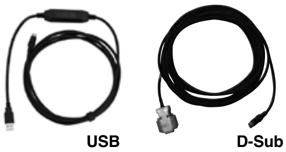
TS-Manager environment

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.



Model		
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.

RDV-X

RDV-P

Support software for PC
▶ **RDV-Manager**
P.652

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)						Included (Operation conditions can be set.) (with 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.						

RDV-X/RDV-P

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	Driver [Note]	–	Regenerative unit [Note]
	2: AC200V	05: 100W or less		No entry: None
		10: 200W or less		RBR1
		20: 600W or less		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

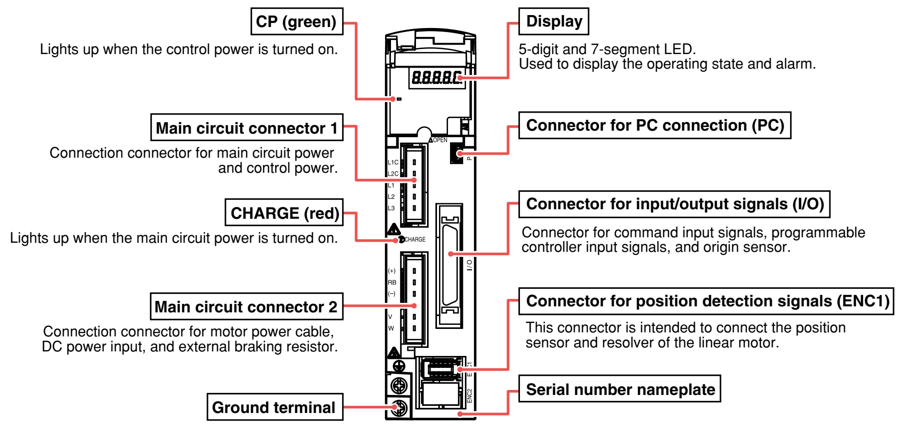
RDV-P	2		–	
Controller	Power-supply voltage	Driver [Note]	–	Regenerative unit [Note]
	2: AC200V	05: 100W or less		No entry: None
		10: 200W or less		RBR1
		20: 400W or less		RBR2
		25: 750W or less		

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



CP (green)
Lights up when the control power is turned on.

Main circuit connector 1
Connection connector for main circuit power and control power.

CHARGE (red)
Lights up when the main circuit power is turned on.

Main circuit connector 2
Connection connector for motor power cable, DC power input, and external braking resistor.

Ground terminal

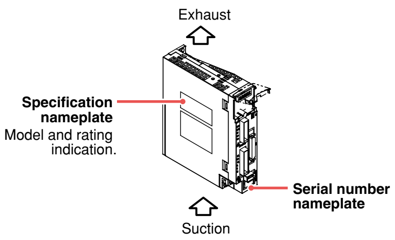
Display
5-digit and 7-segment LED.
Used to display the operating state and alarm.

Connector for PC connection (PC)

Connector for input/output signals (I/O)
Connector for command input signals, programmable controller input signals, and origin sensor.

Connector for position detection signals (ENC1)
This connector is intended to connect the position sensor and resolver of the linear motor.

Serial number nameplate



Exhaust

Specification nameplate
Model and rating indication.

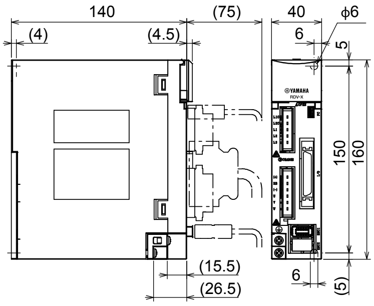
Serial number nameplate

Suction

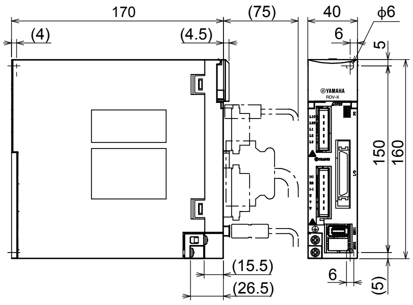
RDV-X/RDV-P

Dimensions

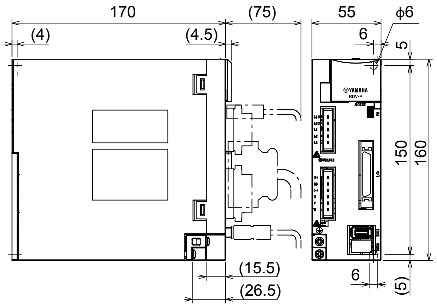
RDV-X205/210
RDV-P205/210



RDV-X220
RDV-P220



RDV-P225



Driver / regenerative unit selection table

RDV-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	N18	N15D	N18D	B10	B14	B14H	R5	R10	R20
Driver selection	RDV-X	05	●	●	●	●		●	●	●	●		●												●	●		●	●	
		10					●					●		●													●			●
		20													●	●	●	●	●	●	●	●	●	●						
Regenera-tive unit	No entry (None)		●	●																										
	RBR1				●	●	●	●	●	●	●	●	●	●	●	❶	❶	●	❶	●	●	●	●	●	●	●	●	●	●	●
	RBR2															❶	❶		❶											

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

RDV-P

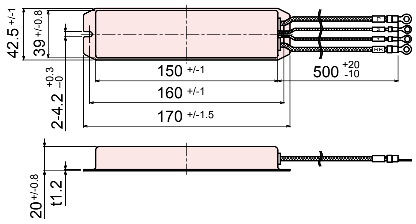
			PHASER				
			MF7/ MF7D	MF15/ MF15D	MF20/ MF20D	MF30/ MF30D	MF75/ MF75D
Driver selection	RDV-P	05					
		10	●	●	●		
		20				●	
		25					●
Regenera-tive unit	RBR1		●	●	●	●	
	RBR2						●

Regenerative unit RBR1 / RBR2 dimensions

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.

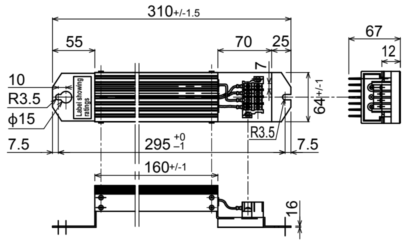
Regenerative unit RBR1

Dimensions



Regenerative unit RBR2

Dimensions



Regenerative unit RBR1 / RBR2 basic specifications

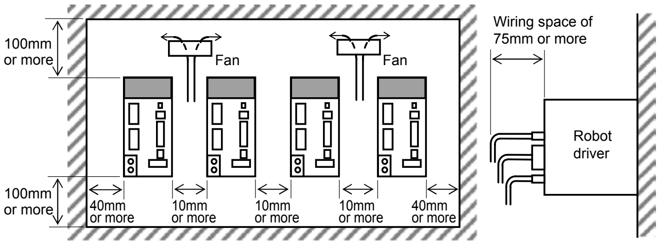
Item	RBR1	RBR2
Model	KBH-M5850-00	KBH-M5850-10
Capacity type	120W	200W
Resistance value	100Ω	100Ω
Permissible braking frequency	2.5%	7.5%
Permissible continuous braking time	12 sec.	30 sec.
Weight	0.27kg	0.97kg

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.

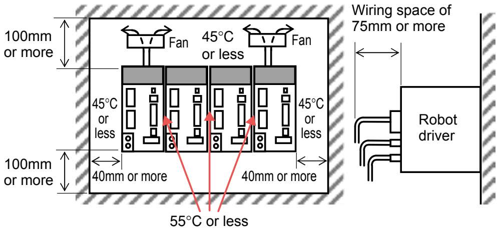
Installation conditions

- 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

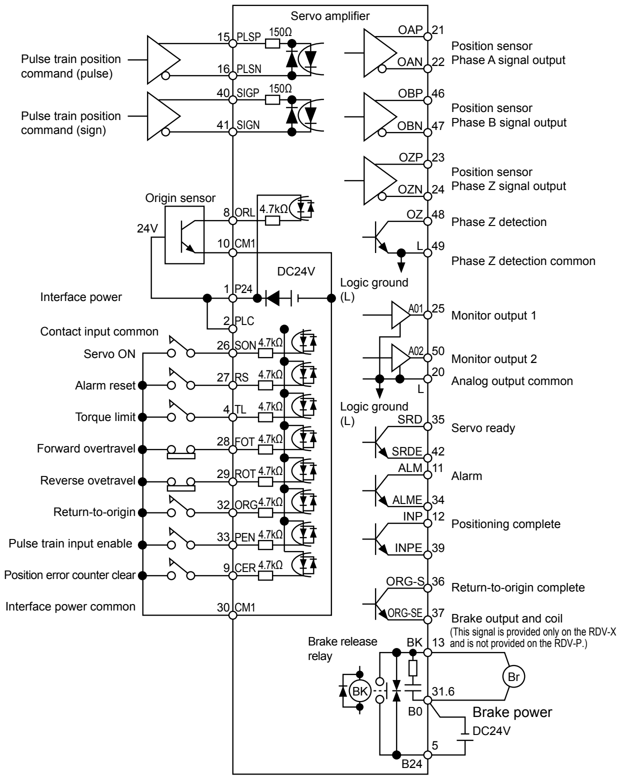


Side-by-side installation



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

Input / output signal connection diagram



* The above diagram shows a sink type output module using a power supply for internal input.

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.
	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.)
Output signal	SRD SRDE	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 ALME	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 INPE	Positioning complete	This signal is output when the deviation between the command position and current position is within the preset positioning range.
	ORG-S ORG-SE	Return-to-origin complete	This signal is output when the return-to-origin is completed successfully.
Relay output	BK (B24) Note 1	Brake release relay output	When the servo is ON, this terminal outputs a signal to allow releasing the brake. (FLIP-X series only)
Monitor output	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.
	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. 1. Command pulse + direction signal 2. Forward direction pulse train + reverse direction pulse train 3. Phase difference 2-phase pulse
	PLSN		
	SIGP	Position command pulse (sign signal)	
	SIGN		
Position sensor monitor	OAP	Position sensor Phase A signal	Outputs monitor signal obtained by dividing "phase A" signal of position sensor.
	OAN		
	OBP	Position sensor Phase B signal	Outputs monitor signal obtained by dividing "phase B" signal of position sensor.
	OBN		
	OZP	Position sensor Phase Z signal	Outputs monitor signal for position sensor "phase Z" signal.
	OZN		
	OZ	Phase Z detection	Outputs monitor signal for position sensor "phase Z" signal.
	L	Phase Z detection common	
Braking power input	B24 Note 1	Brake power input	Input 24V DC brake power to this terminal.
	B0 Note 1	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

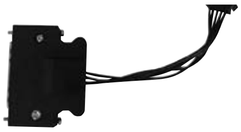
The icons indicated at the right end show the controllers that each component can use.

● 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

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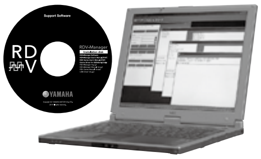


Model	KEF-M4966-00

RDV-X
RDV-P

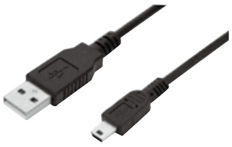
● Environment

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

MEMO

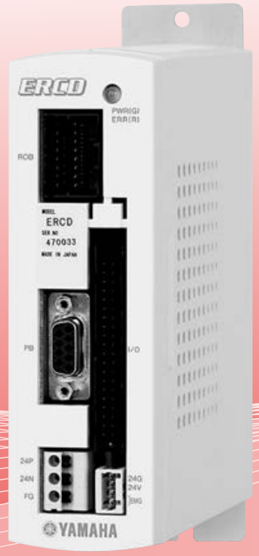
ERCD

● 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
	Point-data input method				Manual data input (coordinates input), Direct teaching, Remote teaching
Memory	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	I/O interface	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
		Pulse train mode Note 1	Sequence input		Dedicated input 5 points, General input 6 points
			Sequence output		Dedicated input 3 points, General input 6 points, Open collector output
			Command pulse input	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	Deicated 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

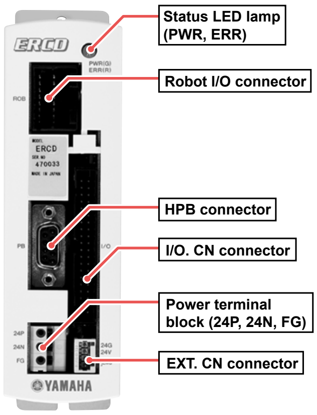
ERCD – ☐

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

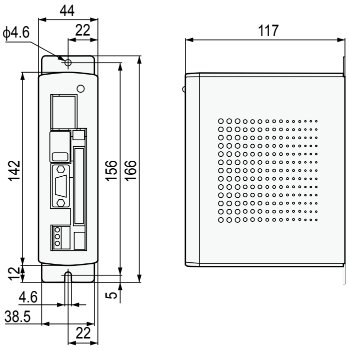
	Item	ERCD
Options	Programming box	HPB, HPB-D (with enable switch)
	Support software for PC	POPCOM+
General specifications	Operating temperature	0°C to 40°C
	Storage temperature	-10°C to 65°C
	Operating humidity	35% to 85%RH (non-condensing)
	Noise resistance capacity	IEC61000-4-4 Level 2
	Protective 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

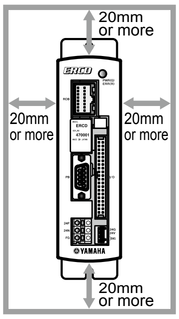


Dimensions



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)



ERCD

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

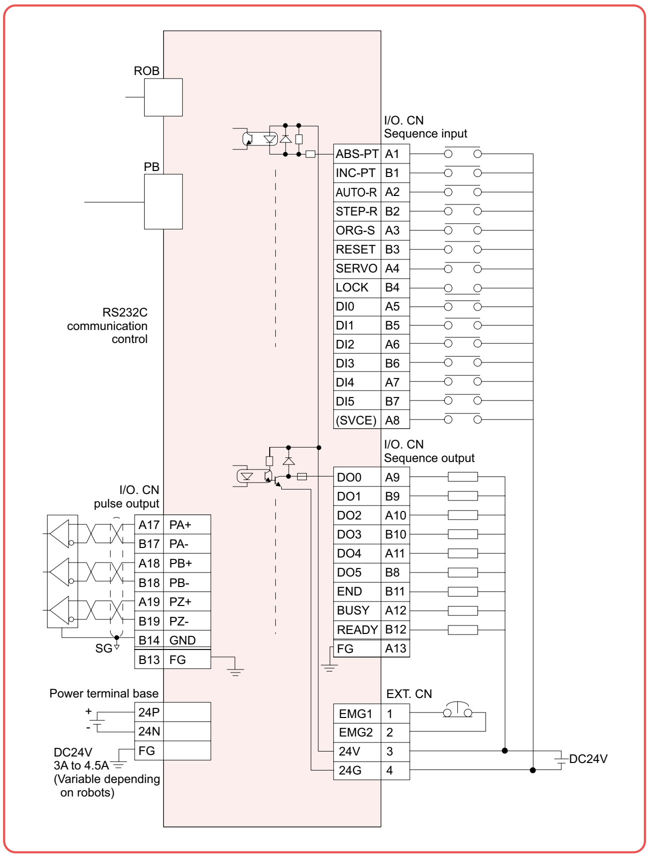
Terminal number	Signal name	Function
A-1	NC	Reserved (use inhibited)
B-1	NC	Reserved (use inhibited)
A-2	NC	Reserved (use inhibited)
B-2	PCLR	Differential clear input
A-3	ORG-S	Return to the origin input
B-3	RESET	Alarm reset input
A-4	SERVO	Servo-ON input
B-4	INH	Command pulse inhibition input
A-5	DI 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

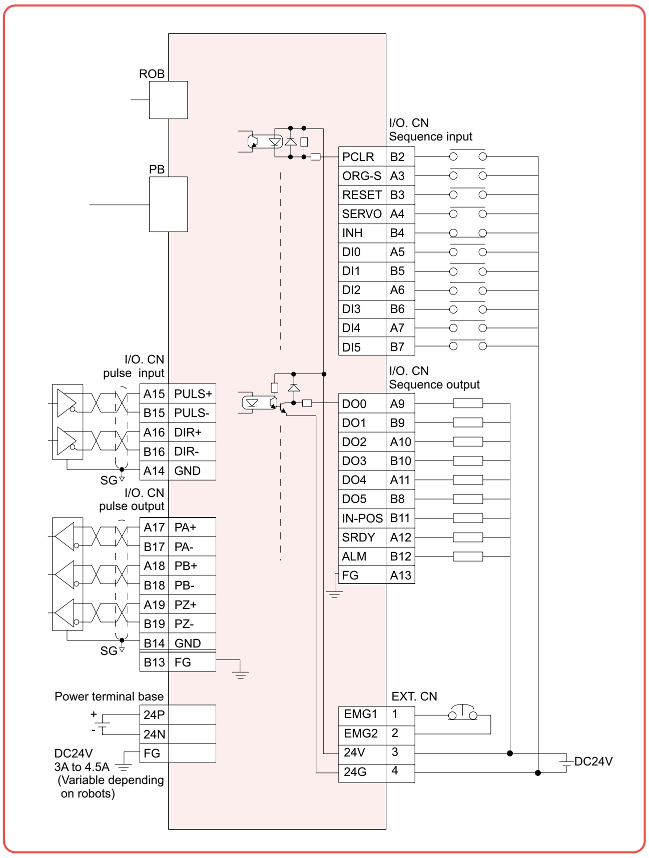
Command	Description
MOVA	Moves to a point data position.
MOVI	Moves from current position by amount of point data.
MOVF	Moves until a specified DI input is received.
JMP	Jumps to a specified label in the specified program.
JMPF	Jumps to a specified label in a specified program according to the input 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.

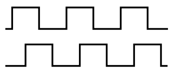
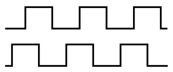
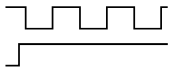
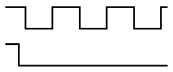
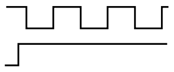
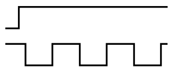
Input / output wiring diagram

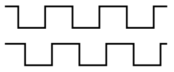
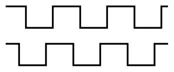
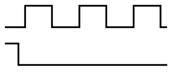
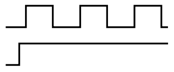
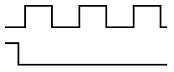
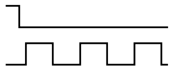


Pulse train input / output wiring diagram



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.

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

Model	KAU-M4421-10

ERCD

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**

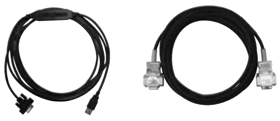
Environment

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.



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 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
Model	KBB-M5110-01	KBB-M5110-21
Enable switch	–	3-position
CE marking	Not supported	Applicable

LCC140 **ERCD** **SR1-X** **SR1-P**

MEMO

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
	Input power supply	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$^{\text{TM}}$: 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					

SR1-X/SR1-P

Controllable robot	SR1-X ▶ FLIP-X P.289	SR1-P ▶ PHASER P.267

CE marking	○	Field networks	CC-Link DeviceNet PROFIBUS

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

SR1-X – ☐ – ☐ – ☐ – ☐ – ☐

Controller	Driver	Usable for CE	Regenerative unit [Note1]	Input/Output Selection	Battery
	05: 100W or less	No entry: Standard	No entry: None	N: NPN	No entry: None (Incremental specification)
	10: 200W	E: CE marking	R: RG1	P: PNP	B: Battery (Absolute specification)
	20: 400 to 600W			CC: CC-Link	
				DN: DeviceNet™	
				PB: PROFIBUS	
				YC: YC-Link [Note2]	

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

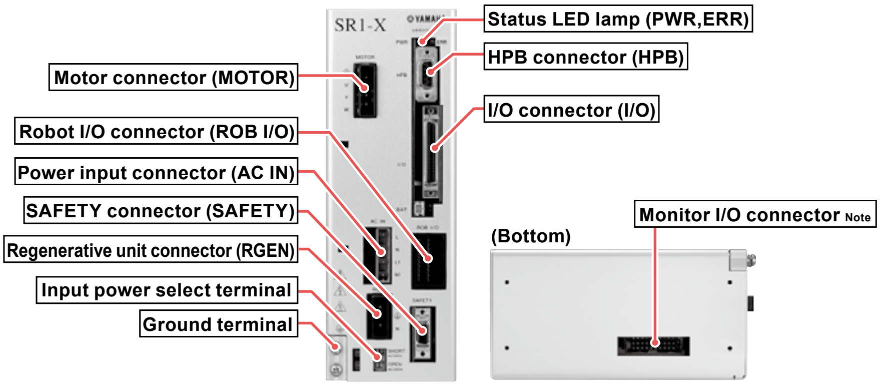
SR1-P – ☐ – ☐ – ☐ – ☐

Controller	Driver	Usable for CE	Regenerative unit [Note1]	Input/Output Selection
	05: 100W or less	No entry: Standard	No entry: None	N: NPN
	10: 200W	E: CE marking	R: RG1 [Note2]	P: PNP
	20: 400 to 600W			CC: CC-Link
				DN: DeviceNet™
				PB: PROFIBUS
				YC: YC-Link [Note3]

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
Options	Programming box	HPB, HPB-D (with enable switch)	
	Support software for PC	POPCOM+	
General specifications	Operating temperature	0°C to 40°C	
	Storage temperature	-10°C to 65°C	
	Operating humidity	35% to 85%RH (non-condensing)	
	Absolute backup battery	Lithium metallic battery	–
	Absolute data backup period	1 year (in state with no power applied)	–
	Noise immunity	IEC61000-4-4 Level 3	

Part names


SR1-X
Status LED lamp (PWR,ERR)
HPB connector (HPB)
Motor connector (MOTOR)
I/O connector (I/O)
Robot I/O connector (ROB I/O)
Power input connector (AC IN)
SAFETY connector (SAFETY)
Regenerative unit connector (RGEN)
Input power select terminal
Ground terminal
(Bottom)
Monitor I/O connector Note

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

SR1-X/SR1-P

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	●	③		⑥	③	④			●	●	⑤	●	●	●
	R (RG1)					①	②				①	②	①	②		③	●	⑥	③	④	●	●			⑤			

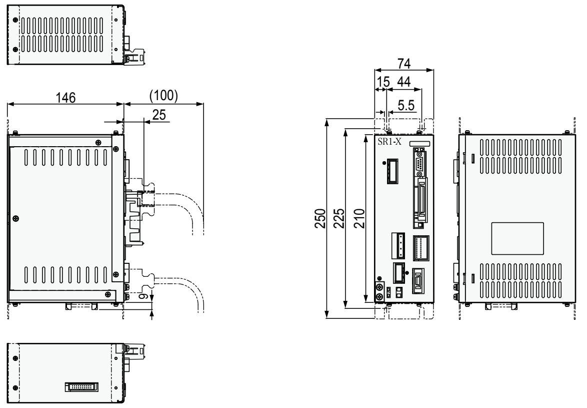
① Regenerative unit is needed if using in a perpendicular position and movement stroke is 700mm or more.
② Regenerative unit is needed if using in a perpendicular position.
③ Regenerative unit is needed if using in a perpendicular position, using at maximum speeds exceeding 1000mm per second, or if using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

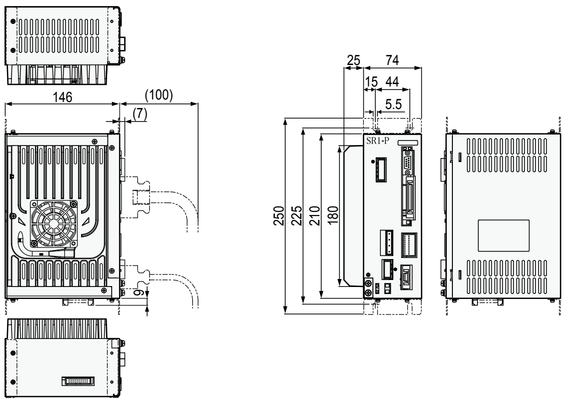
			PHASER				
			MF7/ MF7D	MF15/ MF15D	MF20/ MF20D	MF30/ MF30D	MF75/ MF75D
Driver selection	SR1-P	05					
		10	●	●	●		
		20				●	●
Regenera-tive unit	No entry (None)		●	●			
	R (RG1)				●	●	
	R (RGU-2)						●

Dimensions

SR1-X/SR1-P 05 - 10



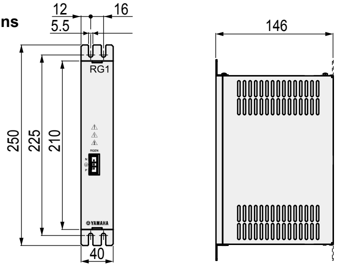
SR1-X/SR1-P 20



Regenerative unit RG1 / RGU-2

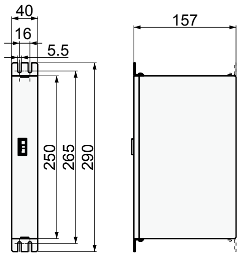
Regenerative unit RG1

Dimensions



Regenerative unit RGU-2

Dimensions



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.

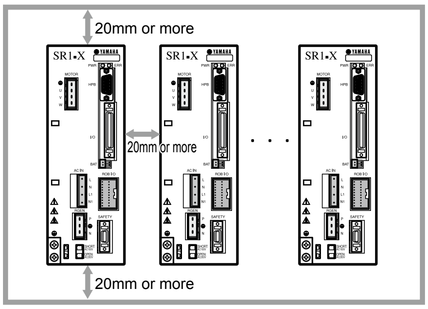
Basic specifications

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

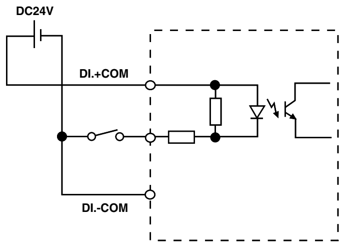
Terminal number	Signal name	Function
1	DI.+COM	Input supply+common
2	SERVO	Return to servo on
3	INC-PT	Relative point transfer
4	ABS-PT	Absolute point transfer
5	STEP-R	Step run
6	DI 0	General input 0
7	DI 1	General input 1
8	DI 2	General input 2
9	DI 3	General input 3
10	DI 4	General input 4
11	DI 5	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

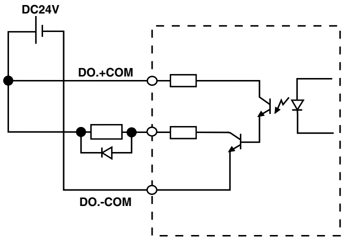
Input circuit

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



Output circuit

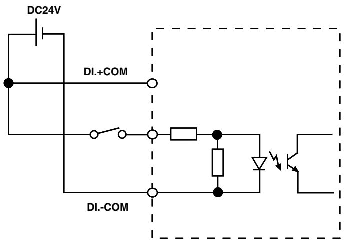
- Form : NPN open collector output (negative common type)
  Photo coupler insulation type
- Load : 50mA/point
- Answering time : 1ms or less



PNP type input/output circuit

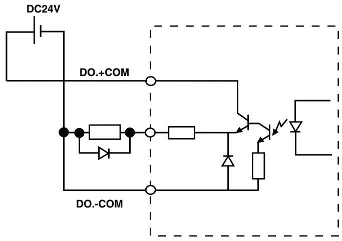
Input circuit

- 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.

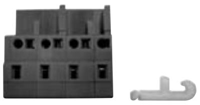
Accessories and part options

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

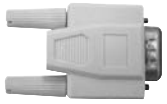
Safety connector

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

SR1-X
SR1-P

HPB dummy connector

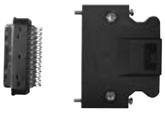
Attach this to the HPB connector during operation with the programming box HPB removed.



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).

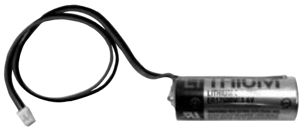
SR1-X
SR1-P

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

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.

SR1-X

Battery case

This is the absolute battery holder.

Model	KBG-M5395-00

SR1-X

See next page for optional parts

SR1-X/SR1-P

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).

MEMO

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

Controller	No. of controllable axes	Safety standards	Regenerative unit Note 8	Controller option A (OP.A)	Controller option B (OP.B)	Vision System	Absolute battery
RCX320	2: 2 axes	N: Normal	No entry: None	No entry: Non-selection	No entry: Non-selection	No entry: Non-selection	2: 2 pcs.
	1: 1 axes	E: CE	R: YHX-RU1	NS : STD.DIO(NPN) Note 1 Note 4	--- Note 3	WY: with RCXiVY2+, without lighting	1: 1 pc.
				NE : EXP.DIO(NPN) Note 2 Note 4	NE : EXP.DIO(NPN) Note 2 Note 4	WL: with RCXiVY2+, with lighting	0: 0 pc.
				PS : STD.DIO(PNP) Note 1 Note 4	--- Note 3		
				PE : EXP.DIO(PNP) Note 2 Note 4	PE : EXP.DIO(PNP) Note 2 Note 4		
				GR: Gripper	GR: Gripper		
				TR : Tracking Note 5	TR : Tracking Note 5		
				YM1 : YC-Link/E master Note 6	YM1 : YC-Link/E master Note 6		
				YS2 to 4: YC-Link/E slave Note 6	YS2 to 4: YC-Link/E slave Note 6		
				EP : EtherNet/IP™ Note 7	EP : EtherNet/IP™ Note 7		
				PB : PROFIBUS Note 7	PB : PROFIBUS Note 7		
				CC: CC-Link Note 7	CC: CC-Link Note 7		
				DN : DeviceNet™ Note 7	DN : DeviceNet™ Note 7		
				PT : PROFINET Note 7	PT : PROFINET Note 7		
				ES : EtherCAT Note 7	ES : EtherCAT Note 7		

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.

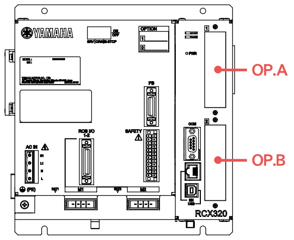
Note 5. Only one tracking board can be selected.

Note 6. Select only one master or slave board for YC-Link/E. For details, refer to “YC-Link/E ordering explanation” below.
Additionally, when ordering YC-Link/E, please specify what robot is connected to what number controller.

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.

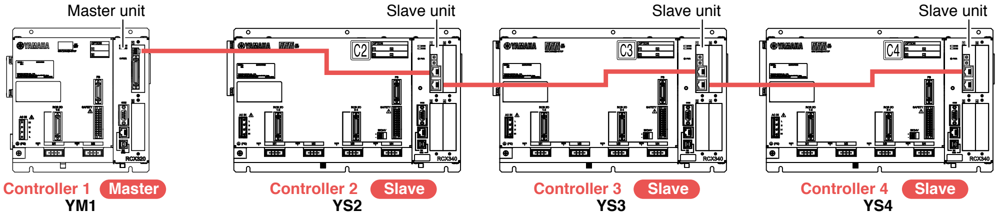
Controller option board position



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

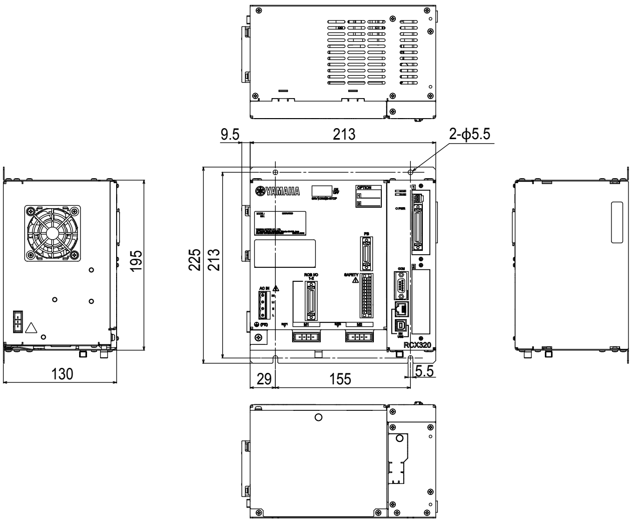
CE marking	○	Field networks	CC-Link DeviceNet EtherNet/IP Ethernet PROFIBUS PROFINET EtherCAT

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)
	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)
Programming	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
	Protective structure			IP20
	Appliance classes			Class I
Options	Option board	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 Dedicated input/output: 16 points each General-purpose input/output: 96 points each Remote register Input/output: 16 words each
		DeviceNet™ board		
		EtherNet/IP™ board		
		PROFIBUS board		
		PROFINET board		
		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
		YRG (gripper) board		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
		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

RCX320

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	53
10	05	700	58
20	05	1500	78
10	10	900	63
20	10	1700	83
20	20	2400	100

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.

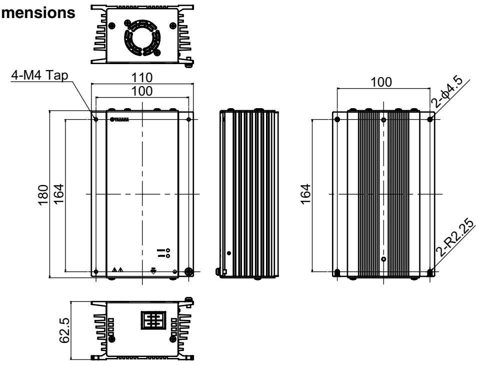
Conditions where regenerative unit is needed on multi robots

- 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

Dimensions



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)
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 to 65 °C
	Vibration Withstanding	1G
Protective Construction / Rating		IP20 / Class 1
Accessory		Cable for connection with controller (500mm)

Regenerative unit selection table

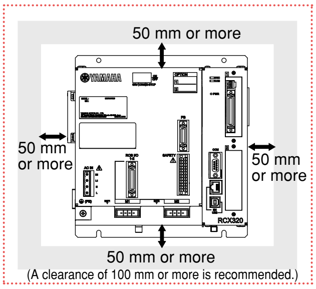
Whether the regenerative unit is needed is automatically determined by the robot model.

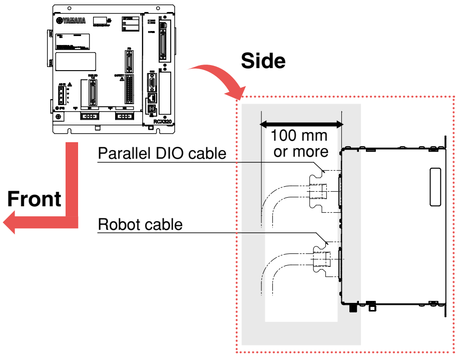
		PHASER						FLIP-X		XY-X															YP-X		Clean
										Arm type, Gantry type, Moving arm type, Pole type									XZ type								
		MF7D	MF15D	MF20D	MF30D	MF50D	MF75D	N15D	N18D	PXYx	FXYx	FXYBx	SXYx	SXYBx	NXY	MXYx	HXYx	HXYLx	SXYx (ZF)	SXYx (ZFL20)	SXYBx (ZF)	SXYBx (ZFL20)	MXYx	HXYx	YP220BX	YP320X	SXYxC
										2 axes																	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.

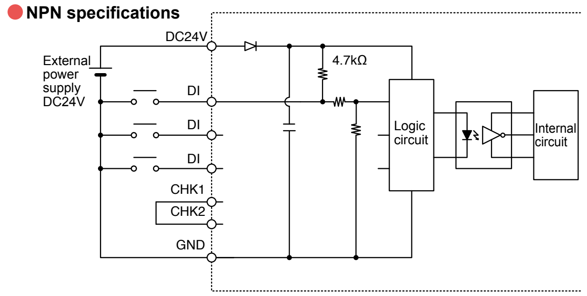
RCX320

Standard specification I/O connector pin assignment lists

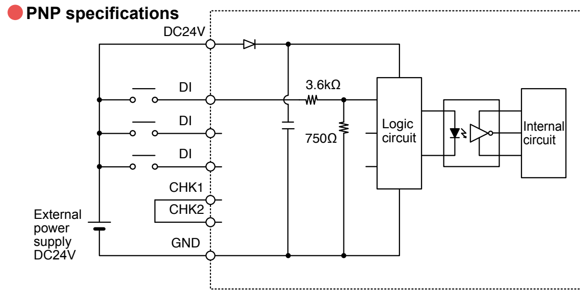
Pin	I/O No.	Name
1	DI01	Servo ON
2	DI10	SEQ enable
3	DI03	(Spare)
4	CHK1	Check input 1
5	DI05	(Spare)
6	DI06	STOP
7	DI07	(Spare)
8	DI20	General-purpose input
9	DI21	General-purpose input
10	DI22	General-purpose input
11	DI23	General-purpose input
12	DI24	General-purpose input
13	DI25	General-purpose 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

● NPN specifications

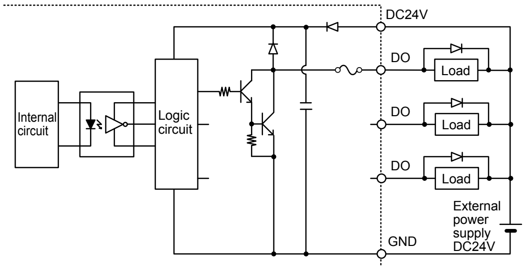


● PNP specifications

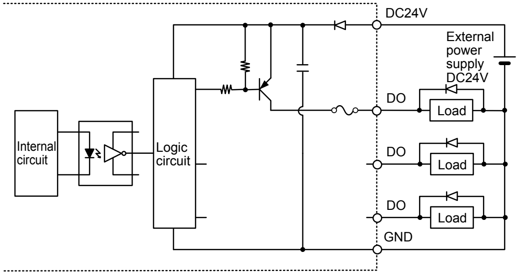


Typical output signal connection

● NPN specifications



● PNP specifications

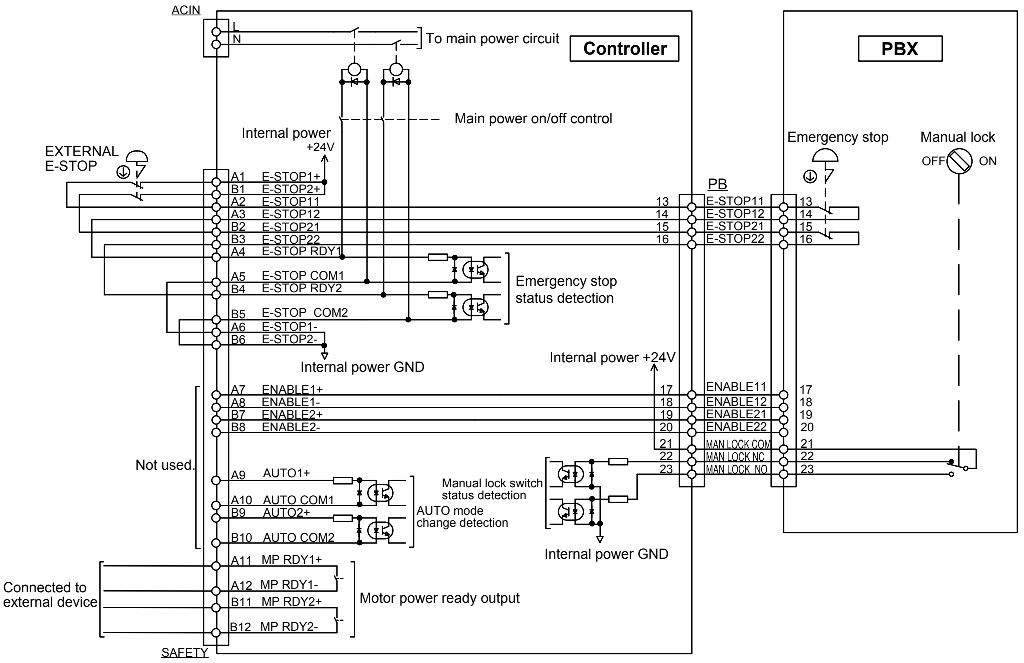


Basic functions

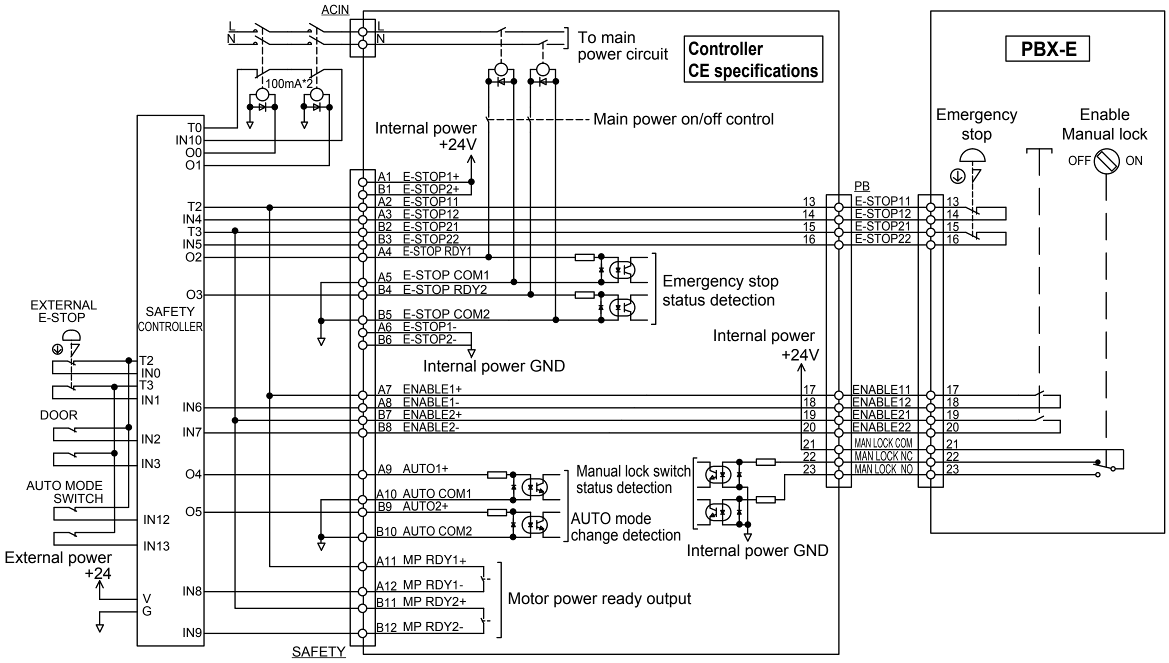
Function	Description
Operation modes	AUTO mode (Major functions: program creation, program execution, step execution, etc.) MANUAL mode (Major functions: jog movement, point data teaching, parameter editing, etc.)
Commands	Array declaration commands (DIM statement) Assignment commands (Numeric assignment, 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.

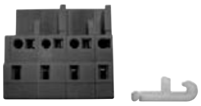
Accessories and part options

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

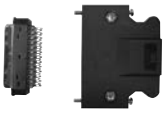
● PBX terminator (dummy connector)

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
	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.

RCX320
RCX340/341

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.

USB

D-Sub

[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. 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

YC-Link/E master board

Model	KCX-M4400-M0

RCX320
RCX340/341

YC-Link/E slave board

Model	KCX-M4400-S0

RCX320
RCX340/341

YC-Link/E cable (1m)

Model	KCX-M6479-10

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)
	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)
Programming	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)

RCX340

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 PROFIBUS PROFINET EtherCAT

Ordering method

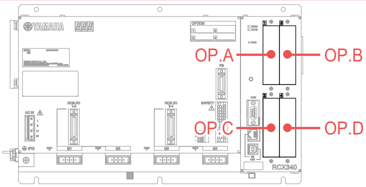
RCX340 - ☐ - ☐ - ☐ - ☐ - ☐ - ☐ - ☐ - ☐

Controller	No. of controllable 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)	Absolute battery
	4: 4 axes	N: Normal	No entry: Non-selection	No entry: Non-selection	No entry: Non-selection	No entry: Non-selection	No entry: Non-selection	4: 4 pcs.
	3: 3 axes	E: CE	NS : STD.DIO(NPN) Note 2 Note 5	--- Note 4	--- Note 4	--- Note 4	WY: with RCXiVY2+, without lighting	3: 3 pcs.
	2: 2 axes Note 1	K: KCs	NE : EXP.DIO(NPN) Note 3 Note 5	NE : EXP.DIO(NPN) Note 3 Note 5	NE : EXP.DIO(NPN) Note 3 Note 5	NE : EXP.DIO(NPN) Note 3 Note 5	WL: with RCXiVY2+, with lighting	2: 2 pcs.
		S: SMU compatible	PS : STD.DIO(PNP) Note 2 Note 5	--- Note 4	--- Note 4	--- Note 4		1: 1 pc.
			PE : EXP.DIO(PNP) Note 3 Note 5	PE : EXP.DIO(PNP) Note 3 Note 5	PE : EXP.DIO(PNP) Note 3 Note 5	PE : EXP.DIO(PNP) Note 3 Note 5		0: 0 pc.
			GR: Gripper	GR: Gripper	GR: Gripper	GR: Gripper		
			TR : Tracking Note 6	TR : Tracking Note 6	TR : Tracking Note 6	TR : Tracking Note 6		
			YM1 : YC-Link/E master Note 7	YM1 : YC-Link/E master Note 7	YM1 : YC-Link/E master Note 7	YM1 : YC-Link/E master Note 7		
			YS2 to 4: YC-Link/E slave Note 7	YS2 to 4: YC-Link/E slave Note 7	YS2 to 4: YC-Link/E slave Note 7	YS2 to 4: YC-Link/E slave Note 7		
			EP : EtherNet/IP™ Note 8	EP : EtherNet/IP™ Note 8	EP : EtherNet/IP™ Note 8	EP : EtherNet/IP™ Note 8		
			PB : PROFIBUS Note 8	PB : PROFIBUS Note 8	PB : PROFIBUS Note 8	PB : PROFIBUS Note 8		
			CC : CC-Link Note 8	CC : CC-Link Note 8	CC : CC-Link Note 8	CC : CC-Link Note 8		
			DN : DeviceNet™ Note 8	DN : DeviceNet™ Note 8	DN : DeviceNet™ Note 8	DN : DeviceNet™ Note 8		
			PT : PROFINET Note 8	PT : PROFINET Note 8	PT : PROFINET Note 8	PT : PROFINET Note 8		
			ES : EtherCAT Note 8	ES : EtherCAT Note 8	ES : EtherCAT Note 8	ES : EtherCAT Note 8		

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.

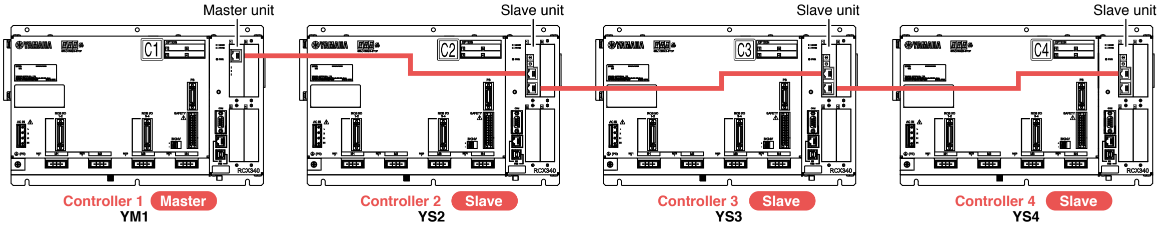
Controller option board position



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
	Appliance classes			Class I
Options	Option board Note	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 Dedicated input/output: 16 points each General-purpose input/output: 96 points each Remote register Input/output: 16 words each
		DeviceNet™ board		
		EtherNet/IP™ board		
		PROFIBUS board		
		PROFINET board		
		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 16 axes (including four master controller axes), maximum 12 axes for slaves only
		YRG (gripper) board		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 four units Drive power: DC 24V +/-10%, 1.0A Max
		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

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

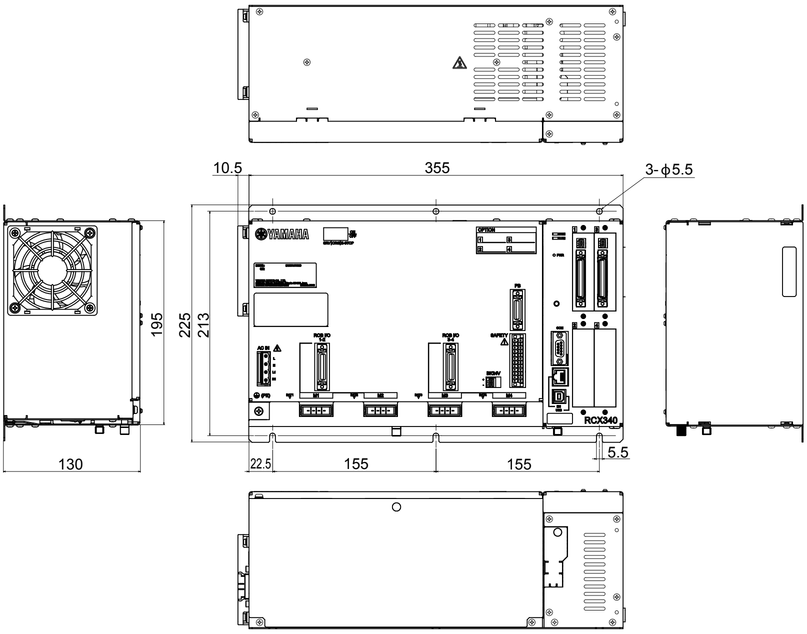
YC-Link/E ordering explanation



* 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.

RCX340

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

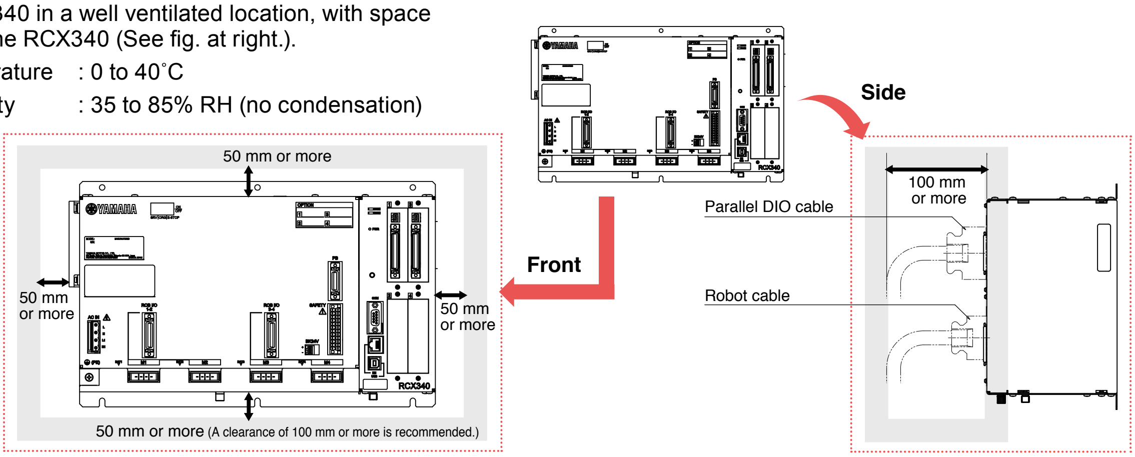
(4) When connected to 4 axis (Cartesian robot and/or multi-axis robot)

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.

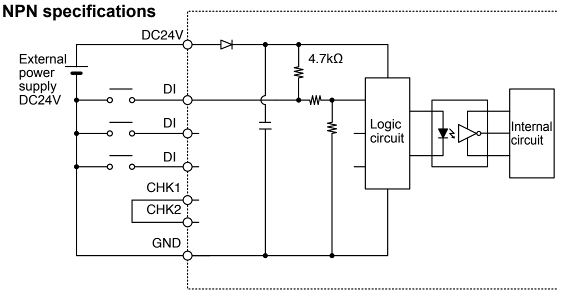
RCX340

Standard specification I/O connector pin assignment lists

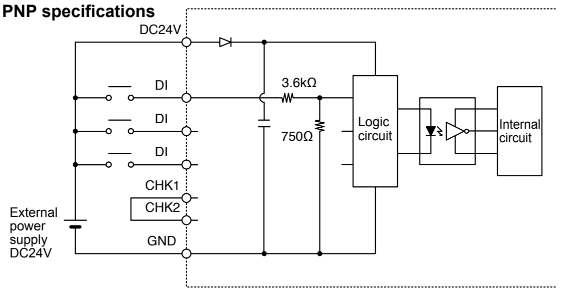
Pin	I/O No.	Name
1	DI01	Servo ON
2	DI10	SEQ enable
3	DI03	(Spare)
4	CHK1	Check input 1
5	DI05	(Spare)
6	DI06	STOP
7	DI07	(Spare)
8	DI20	General-purpose input
9	DI21	General-purpose input
10	DI22	General-purpose input
11	DI23	General-purpose input
12	DI24	General-purpose input
13	DI25	General-purpose 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

● **NPN specifications**

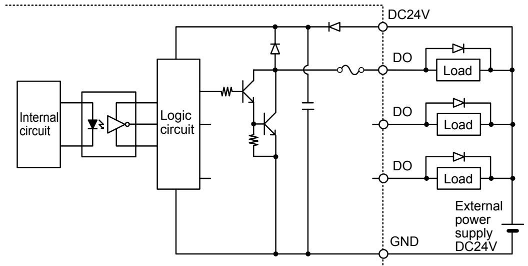


● **PNP specifications**

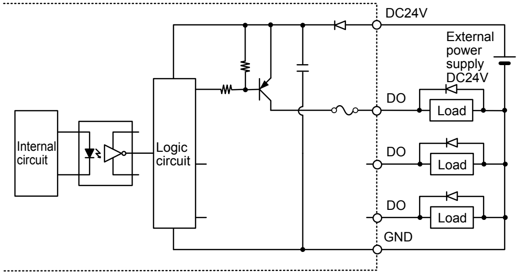


Typical output signal connection

● **NPN specifications**



● **PNP specifications**

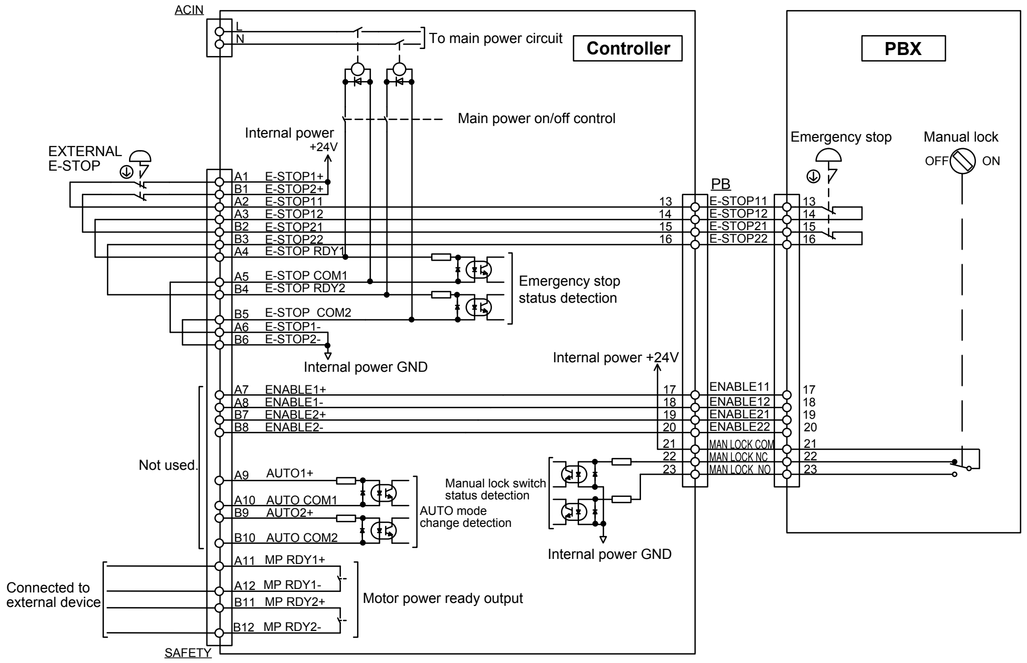


Basic functions

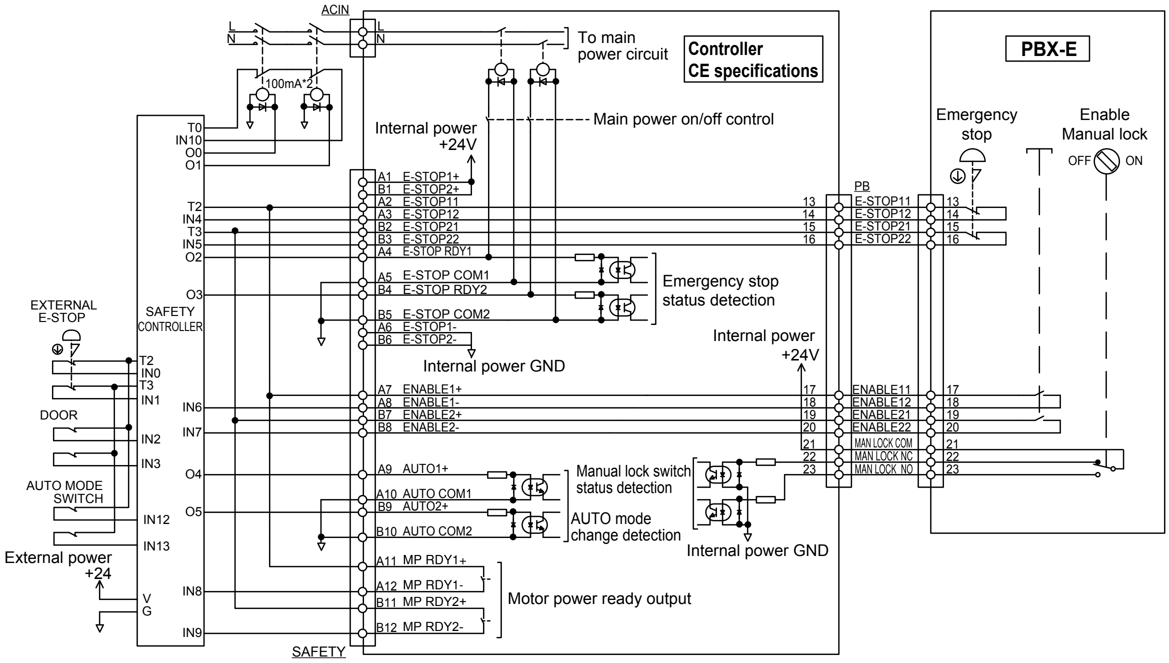
Function	Description
Operation modes	AUTO mode (Major functions: program creation, program execution, step execution, etc.) MANUAL mode (Major functions: jog movement, point data teaching, parameter editing, etc.)
Commands	Array declaration commands (DIM statement) Assignment commands (Numeric assignment, 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.

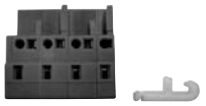
Accessories and part options

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

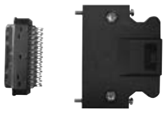
PBX terminator (dummy connector)

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.)

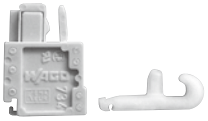
Model	KDK-M427G-00

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

● 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
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.

Model	RCX-Studio 2020 Basic (USB key blue)	KCX-M4990-40
	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 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.

USB

D-Sub

[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. 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

● YC-Link/E master board

Model	KCX-M4400-M0

RCX320
RCX340/341

● YC-Link/E slave board

Model	KCX-M4400-S0

RCX320
RCX340/341

● YC-Link/E cable (1m)

Model	KCX-M6479-10

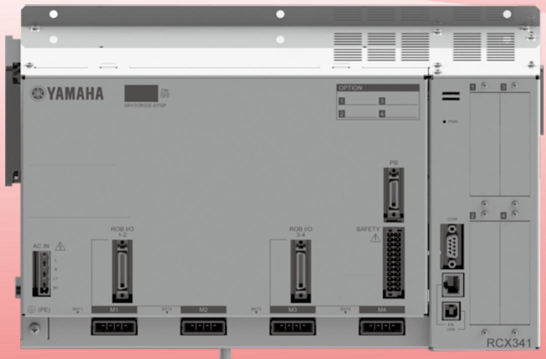
RCX320
RCX340/341

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		
	Multi-task		
	Sequence program		
	Memory capacity		
	Program		
	Point		
	Point teaching method		
	System backup (Internal memory backup)		
	Internal flash memory		
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	Option board Note	Parallel I/O board	Standard specifications	
			Expansion specifications	
		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	CC-Link DeviceNet™ EtherNet/IP™ Ethernet PROFIBUS® PROFINET® EtherCAT®

Ordering method

RCX341-4 – ☐ – **R** – ☐ – ☐ – ☐ – ☐ – ☐ – ☐

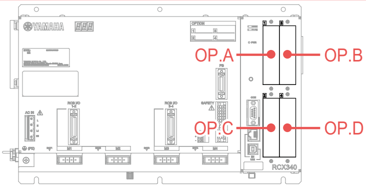
Controller	Safety standards	Regenerative unit	Controller option A (OP.A)	Controller option B (OP.B)	Controller option C (OP.C)	Controller option D (OP.D)	Controller option E (OP.E)	Absolute battery
RCX341-4	N: Normal	R	No entry: Non-selection	No entry: Non-selection	No entry: Non-selection	No entry: Non-selection	No entry: Non-selection	4: 4 pcs.
	E: CE		NS : STD.DIO(NPN) Note 1 Note 4	--- Note 3	--- Note 3	--- Note 3	WY: with RCXiVY2+, without lighting	
	K: KCs		NE : EXP.DIO(NPN) Note 2 Note 4	NE : EXP.DIO(NPN) Note 2 Note 4	NE : EXP.DIO(NPN) Note 2 Note 4	NE : EXP.DIO(NPN) Note 2 Note 4	WL: with RCXiVY2+, with lighting	
			PS : STD.DIO(PNP) Note 1 Note 4	--- Note 3	--- Note 3	--- Note 3		
			PE : EXP.DIO(PNP) Note 2 Note 4	PE : EXP.DIO(PNP) Note 2 Note 4	PE : EXP.DIO(PNP) Note 2 Note 4	PE : EXP.DIO(PNP) Note 2 Note 4		
			GR: Gripper	GR: Gripper	GR: Gripper	GR: Gripper		
			TR : Tracking Note 5	TR : Tracking Note 5	TR : Tracking Note 5	TR : Tracking Note 5		
			YM1 : YC-Link/E master Note 6	YM1 : YC-Link/E master Note 6	YM1 : YC-Link/E master Note 6	YM1 : YC-Link/E master Note 6		
			YS2 to 4: YC-Link/E slave Note 6	YS2 to 4: YC-Link/E slave Note 6	YS2 to 4: YC-Link/E slave Note 6	YS2 to 4: YC-Link/E slave Note 6		
			EP : EtherNet/IP™ Note 7	EP : EtherNet/IP™ Note 7	EP : EtherNet/IP™ Note 7	EP : EtherNet/IP™ Note 7		
			PB : PROFIBUS Note 7	PB : PROFIBUS Note 7	PB : PROFIBUS Note 7	PB : PROFIBUS Note 7		
			CC : CC-Link Note 7	CC : CC-Link Note 7	CC : CC-Link Note 7	CC : CC-Link Note 7		
			DN : DeviceNet™ Note 7	DN : DeviceNet™ Note 7	DN : DeviceNet™ Note 7	DN : DeviceNet™ Note 7		
			PT : PROFINET Note 7	PT : PROFINET Note 7	PT : PROFINET Note 7	PT : PROFINET Note 7		
			ES : EtherCAT Note 7	ES : EtherCAT Note 7	ES : EtherCAT Note 7	ES : EtherCAT Note 7		

Note. Please check with our distributor for the latest standard compliance status.

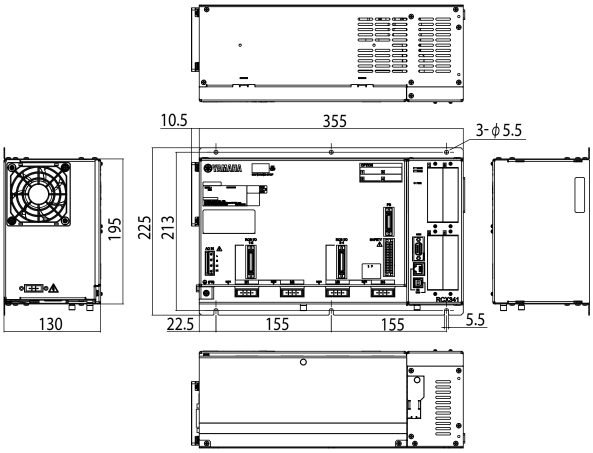
Please select desired selection items from the upper portion of the controller option A in order.

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



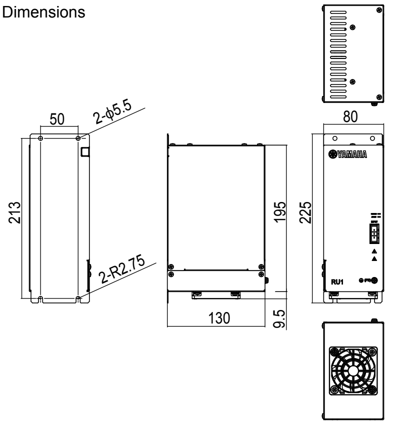
Dimensions



Regenerative unit RU1

Regenerative unit RU1

Dimensions



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

Option details

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.

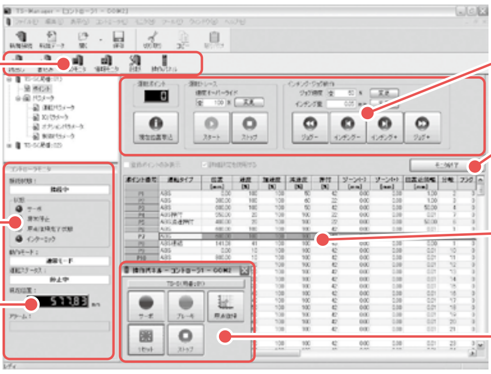
▼Applicable controllers

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



Only clicking relevant icon will show the operation panel or I/O monitor.

Shows the servo or emergency stop status, and operation mode.

Shows the current position at real-time.

JOG movement, inching operation, and current position acquisition buttons.

Turns ON or OFF the operation point monitoring.

Shows the data in easy-to-read tabular format. Exchanging data with a spreadsheet application, such as Excel is also easy.

Operation panel for servo status, brake ON/OFF, and stop.

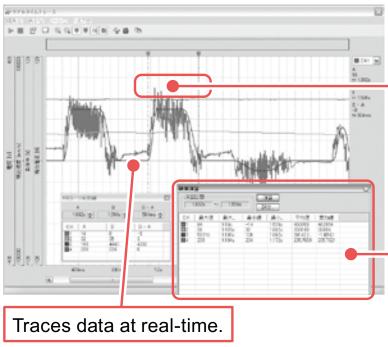
Note. Excel is a registered trademark of Microsoft Corporation in the United States and/or other countries.

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



Specify a zone for calculation.

Calculates the maximum value, minimum value, average value, and root mean square value in a specified zone.

Traces data at real-time.

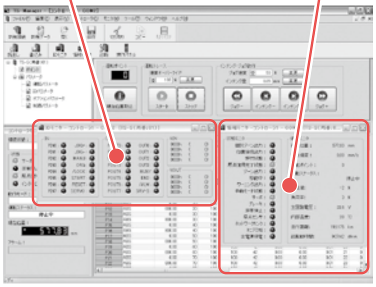
3 Various monitor functions and detailed error logs TS EP

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.

I/O status monitor panel

Detailed status monitor panel



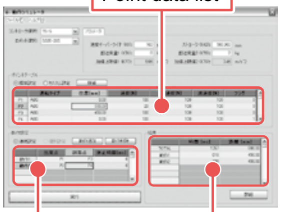
4 Operation simulation TS EP

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.

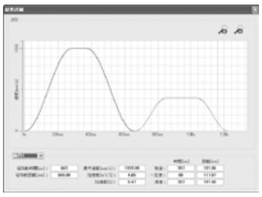
The TS-Manager/EP-Manager can also be linked with a controller, so edited point data can be easily reflected on actual machines.

Point data list



Operation setting list

Result display list

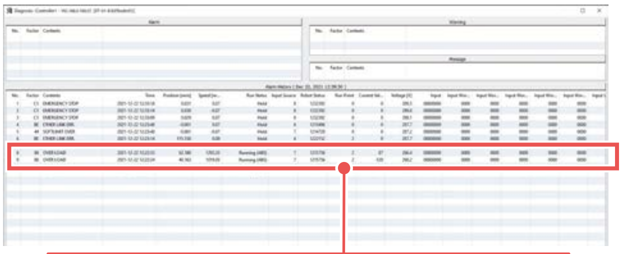


Displays the detailed simulation results graphically.

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)

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.

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.

EP-Manager EP

Download from website (member site)

Model	KFX-M4990-00

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.

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
RCX1/Y2+ Electric gripper
Option

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 SR1-P	P.618

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

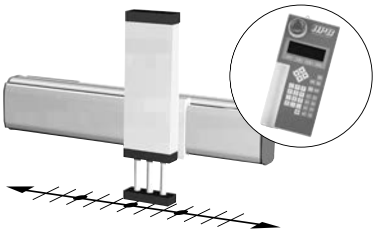
By connecting between a computer and the controller with a communication cable, the controller can control the robot in the same way as a HPB / HPB-D (programming box).

6 Creating point data

There are three methods available for creating the point data.

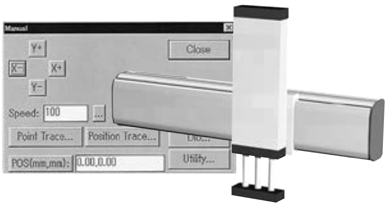
● MDI (Manual Data Input) teaching

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



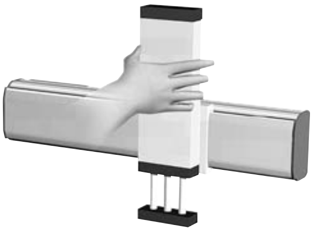
● Remote teaching

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)	KBG-M538F-00
	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.

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

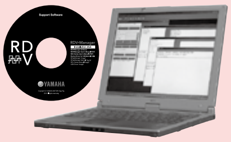
Support software for PC

RDV-Manager

▼Applicable controllers

RDV-X RDV-P	P.606

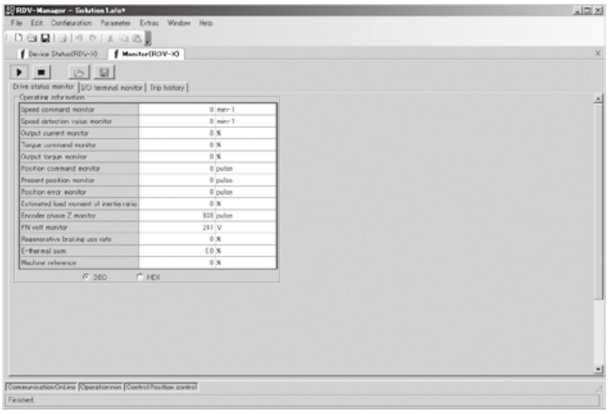
RDV-Manager is software for RDV-X/RDV-P. Using the Windows operating computer, it is possible to set parameters, to monitor the position, speed and torque and to have graphics displayed, assuring pleasant and easy operation in the Windows Vista, Windows 7 or Windows 8 / Windows 8.1 environment.



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.

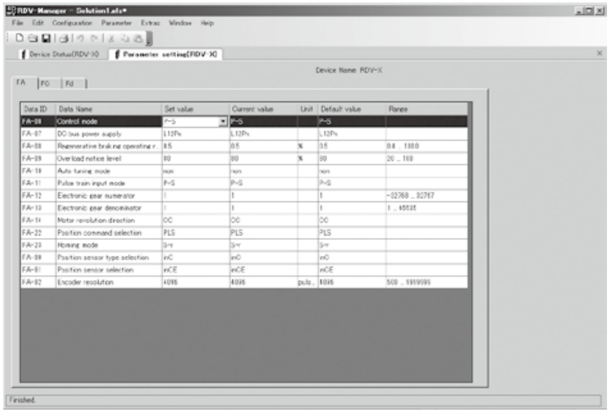


Speed command monitor	0	min-1
Speed detection value monitor	0	min-1
Output current monitor	0	%
Torque command monitor	0	%
Output torque monitor	0	%
Position command monitor	0	pulse
Present position monitor	0	pulse
Position error monitor	0	pulse
Estimated load moment of inertia ratio	0	%
Encoder phase Z monitor	938	pulse
P-N volt monitor	281	V
Regenerative braking use rate	0	%
E-thermal sum	0.0	%
Machine reference	0	%

Finished.

2 Setting parameters

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


RDV-Manager – Solution1.afs*
File Edit Configuration Parameter Extras Window Help
Device Status(RDV-X)
Parameter setting(RDV-X)
FA
FO
Fd

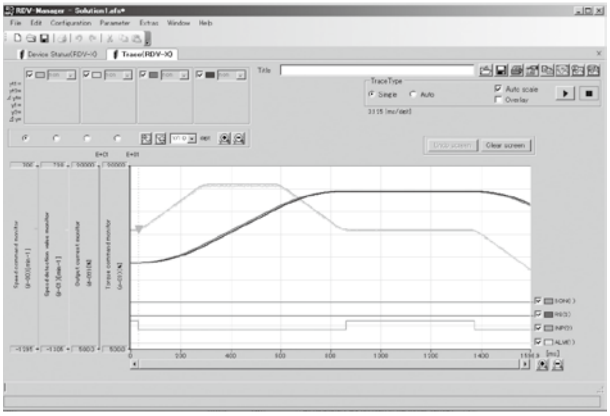
Device Name: RDV-X

Data ID	Data Name	Set value	Current value	Unit	Default value	Range
FA-00	Control mode	P-S	P-S		P-S	
FA-07	DC bus power supply	L12Ps	L12Ps		L12Ps	
FA-08	Regenerative braking operating r...	0.5	0.5	%	0.5	0.0 ... 100.0
FA-09	Overload notice level	80	80	%	80	20 ... 100
FA-10	Auto tuning mode	non	non		non	
FA-11	Pulse train input mode	P-S	P-S		P-S	
FA-12	Electronic gear numerator	1	1		1	-32768 ... 32767
FA-13	Electronic gear denominator	1	1		1	1 ... 65535
FA-14	Motor revolution direction	CC	CC		CC	
FA-22	Position command selection	PLS	PLS		PLS	
FA-23	Homing mode	S-r	S-r		S-r	
FA-80	Position sensor type selection	inC	inC		inC	
FA-81	Position sensor selection	inCE	inCE		inCE	
FA-82	Encoder resolution	4096	4096	puls...	4096	500 ... 9999999

Finished.

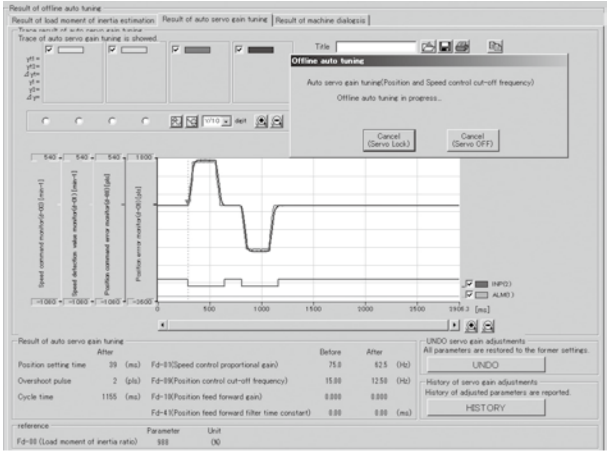
3 Operation tracing function

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.


Result of offline auto tuning
Result of load moment of inertia estimation
Result of auto servo gain tuning
Result of machine dialogsis
Trace of auto servo gain tuning is showed
Title
Offline auto tuning
Auto servo gain tuning(Position and Speed control cut-off frequency)
Offline auto tuning in progress.
Cancel (Servo Lock)
Cancel (Servo OFF)
Speed command monitor
Speed detection value monitor
Position command error monitor
Position error monitor
-1060
-1060
-1060
-3600
0
500
1000
1500
2000
2500
2906.3
[ms]
INP(2)
ALM(0)
UNDO
HISTORY

Result of auto servo gain tuning

	After			Before	After	
Position setting time	39	(ms)	Fd-01(Speed control proportional gain)	75.0	62.5	(Hz)
Overshoot pulse	2	(pls)	Fd-09(Position control cut-off frequency)	15.00	12.50	(Hz)
Cycle time	1155	(ms)	Fd-10(Position feed forward gain)	0.000	0.000	
			Fd-41(Position feed forward filter time constant)	0.00	0.00	(ms)

UNDO servo gain adjustments
All parameters are restored to the former settings.

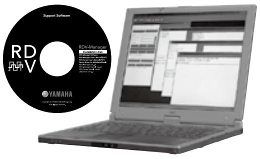
History of servo gain adjustments
History of adjusted parameters are reported.

reference

	Parameter	Unit
Fd-00 (Load moment of inertia ratio)	988	(%)

Support software RDV-Manager

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



Model	KEF-M4966-00

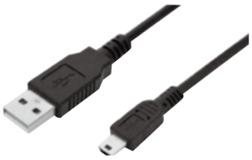
Environment

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

MEMO

Option details

Support software for PC

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	P.626
RCX340	P.636

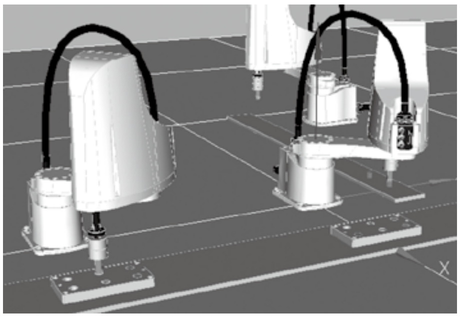
Features

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.

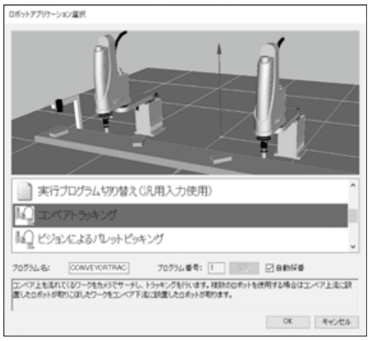
- ▶ Robot layout, teaching, and debugging can be performed.
- ▶ Physical interference between the robot and peripheral device can be checked before operation is started.



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.


ロボットアプリケーション選択
実行プログラム切り替え(汎用入力使用)
コンベアトラッキング
ビジョンによるパレットピッキング
OK
キャンセル

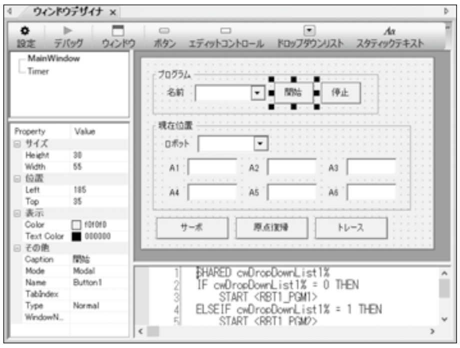
プログラム名: CONVEYORTRAC　プログラム番号: 1　☑ 自動採番

コンベア上を流れてくるワークをカメラでサーチし、トラッキングを行います。複数のロボットを使用する場合はコンベア上流に設置したロボットが取りこぼしたワークをコンベア下流に設置したロボットが取ります。

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.



Property	Value
⊟ サイズ	
Height	30
Width	55
⊟ 位置	
Left	185
Top	35
⊟ 表示	
Color	☐ f0f0f0
Text Color	■ 000000
⊟ その他	
Caption	開始
Mode	Modal
Name	Button1
TabIndex	
Type	Normal
WindowN...	

```
SHARED cwDropDownList1%
IF cwDropDownList1% = 0 THEN
    START <RBT1_PGM1>
ELSEIF cwDropDownList1% = 1 THEN
    START <RBT1_PGM2>
```

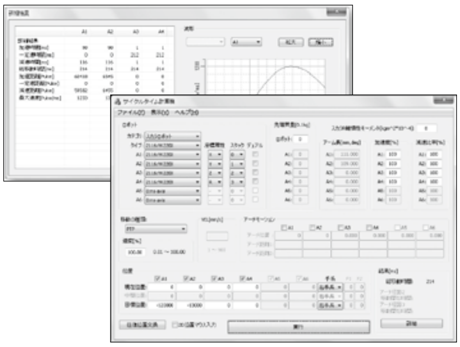
4 Other existing functions

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):

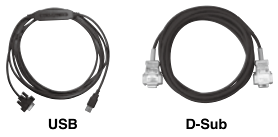
Functions		When the USB key is not connected	RCX-Studio 2020 Basic (blue) [Note.]	RCX-Studio 2020 Pro (purple) [Note.]
Backup/restore via data transfer		Valid	Valid	Valid
Controller operation in online mode		Invalid	Valid	Valid
File save		Invalid	Valid	Valid
Real Time Trace		Only data save is invalid.	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	Valid
	STEP	Invalid	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**

LCMR200 Linear conveyor modules
GX Single-axis robots
LCM100 Linear conveyor modules
YK-X SCARA robots
Robonity Single-axis robots
PHASER Linear motor single-axis robots
FLIP-X Single-axis robots
TRANSERVO Compact single-axis robots
XY-X Cartesian robots
YP-X Pick & place robots
CLEAN
CONTROLLER
INFORMATION
Robot positioner
Pulse string driver
Robot controller
RCX/VY2+ Electric gripper
Option

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

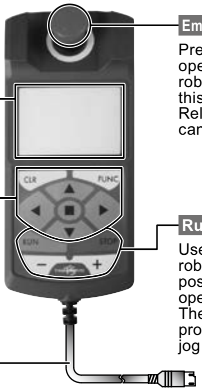
Name		HT1	HT1-D
External view			
Applicable controllers		TS-S2 / TS-SH / TS-X / TS-P	

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



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.

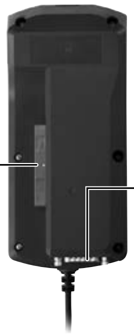
Emergency stop button

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 ⊖ and ⊕ keys are also provided to move the robot in jog mode.

HT1-D rear side



Enable switch (only on HT1-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 HT1-D)

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

Option details

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

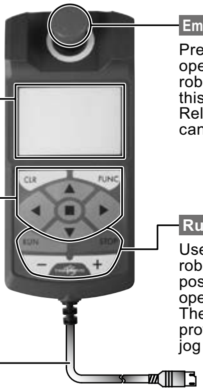
Name		HT2	HT2-D
External view			
Applicable controllers		EP-01	

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-M5110-2J10m)

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.

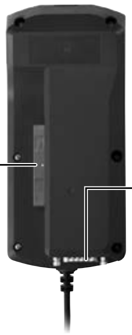
Data edit keys
Use these keys to select menus and edit various data.

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 ⊖ and ⊕ 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.

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.

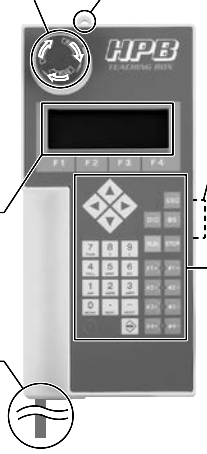
▼Applicable controllers

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

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.

Liquid crystal display

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

Connector cable

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

Strap hole

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

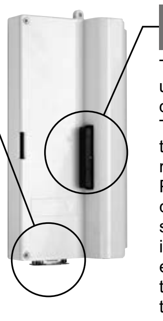
SD memory card connector

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

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

▼Applicable controllers

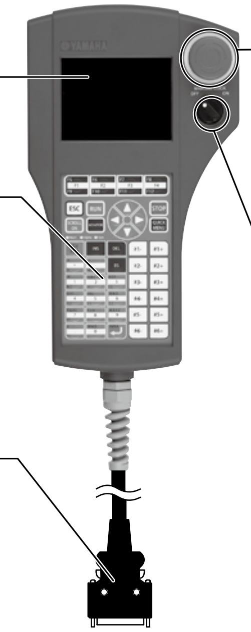
RCX320	P.626
RCX340	P.636
RCX341	P.646

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.

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



Display (screen)
This is a liquid crystal display (LCD), showing various types of information.

Operation keys
Use these keys to operate the robot or edit any data.

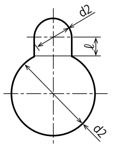
PB connector
Use this connector to connect the programming box to the robot controller.

Emergency stop button
This is a normally closed, self-lock switch.

Manual lock switch
Switches the controller operation mode between AUTO and MANUAL.

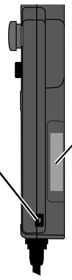
PBX back side

This section can be hooked onto an M5 screw.



d1=6mm
d2=10mm
ℓ =2mm

PBX-E rear side



USB connector
Connects the USB memory and programming box.

3-position enable switch (PBX-E only)
This switch is provided for safety. Pressing it to mid-position only allows robot operation.

[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

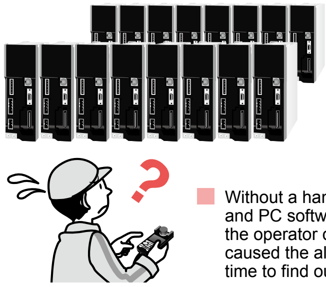
TS-X
TS-P
P.592

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.

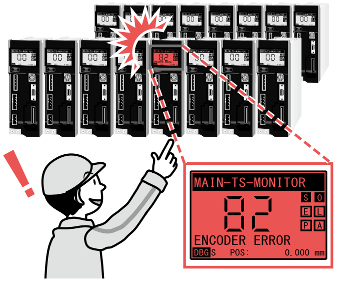
The TS Monitor Advantage

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

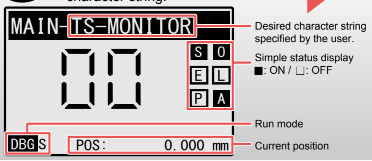


- Operator instantly knows various information without hooking to a handy terminal or PC.
- During errors the backlit display turns red and operator can see what error occurred on what controller at a glance.
- Display shows total operating time, so scheduling maintenance periods is easy.
- Backlit display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

Features

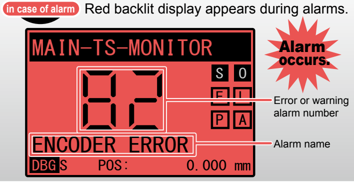
MAIN screen (in normal operation) Shows basic info

Displays optional name or character string.


MAIN-TS-MONITOR
00
S O
E L
P A
DBG S POS: 0.000 mm

MAIN screen (in case of alarm) Easy to see error messages

Red backlit display appears during alarms.


MAIN-TS-MONITOR
82
S O
E L
P A
ENCODER ERROR
DBG S POS: 0.000 mm

Simple status display

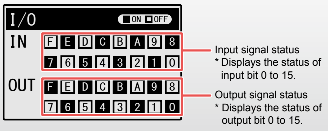
Display	Meaning
S	Servo status
E	Emergency stop
P	Main power failure
O	Return-to-origin completion status
L	Interlock status
A	Alarm

Run mode

Display	Meaning
NRM	Normal mode
MON	Monitor mode
DBG	Debug mode

I/O screen Shows I/O status

Displays input/output bit states.

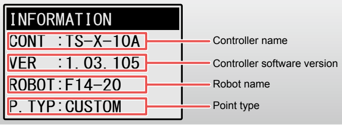

I/O ■ON □OFF
IN F E D C B A 9 8
7 6 5 4 3 2 1 0
OUT F E D C B A 9 8
7 6 5 4 3 2 1 0
Input signal status
* Displays the status of input bit 0 to 15.
Output signal status
* Displays the status of output bit 0 to 15.

Bit signal correspondence table

IN	F	E	D	C	B	A	9	8
	SERVO	RESET	START	/LOCK	ORG	MANUAL	JOG-	JOG+
	7	6	5	4	3	2	1	0
	PIN7	PIN6	PIN5	PIN4	PIN3	PIN2	PIN1	PIN0
OUT	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
	POUT7	POUT6	POUT5	POUT4	POUT3	POUT2	POUT1	POUT0

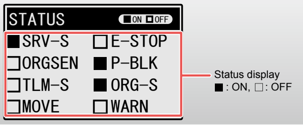
INFORMATION screen Shows machine info

Displays the connected robot and version.


INFORMATION
CONT :TS-X-10A
VER :1.03.105
ROBOT:F14-20
P.TYP:CUSTOM

STATUS screen Shows status info

Info such as error status or movement status is all at a glance.

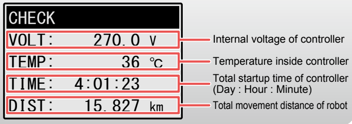

STATUS ■ON □OFF
■SRV-S □E-STOP
□ORGSEN ■P-BLK
□TLM-S ■ORG-S
□MOVE □WARN

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

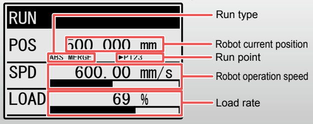
CHECK screen Shows operating status

Displays total drive distance (helpful for preventive maintenance).


CHECK
VOLT: 270.0 V
TEMP: 36 ℃
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.

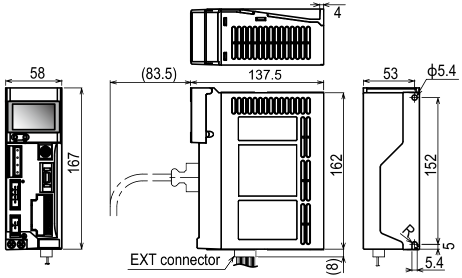

RUN
POS 500.000 mm
ABS MERGE ▶P123
SPD 600.00 mm/s
LOAD 69 %

Run type

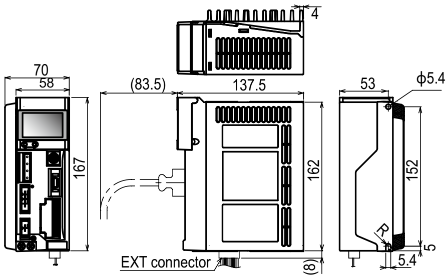
Display	Meaning
HOLD	Servo is off or robot is stopping.
ABS	ABS
INC	INC
ABS MERGE	ABS merge operation
INC MERGE	INC merge operation
ABS PUSH	ABS push operation
INC PUSH	INC push operation
ABS->PUSH	ABS deceleration push operation
INC->PUSH	INC deceleration push operation
ORG	Return-to-origin

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

▼Applicable controllers

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

P.592

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

Features

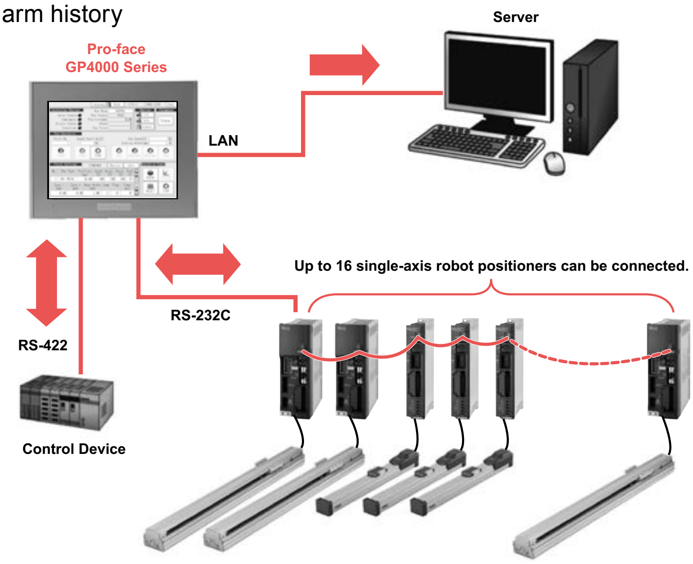
1 Can easily check a state and change settings.

- 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)

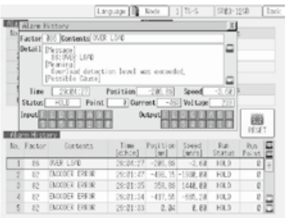
Without opening the control panel, you can check the status and change the settings on Touch Operator Interface alone.



Screen details

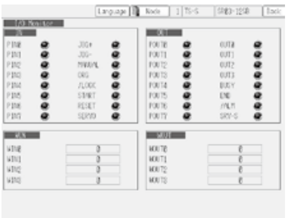
Diagnostic Screen

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



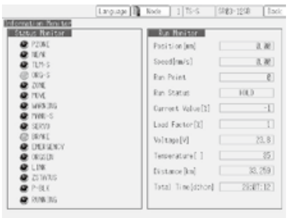
I/O Monitor Screen

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



Information Monitor Screen

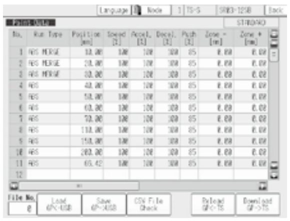
The screen can display the robot status and the operation status. You can check immediately the robot condition.



Position Data Editing Screen

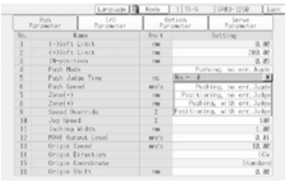
You can edit and back up point data (255 points).Note

Note. Settings for it and a USB storage required.



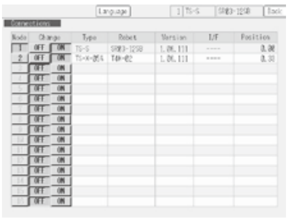
Parameter Editing Screen

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

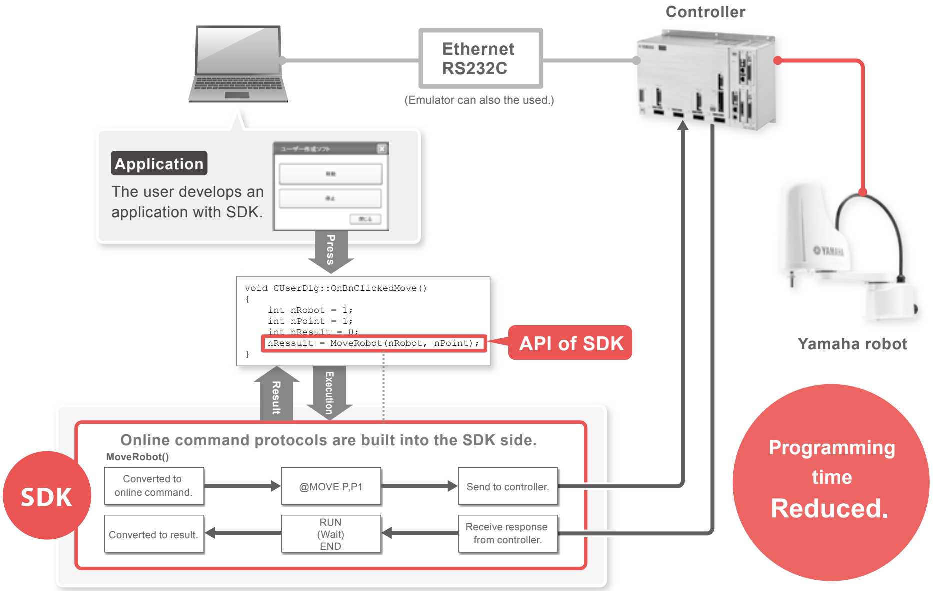
▼Applicable controllers

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

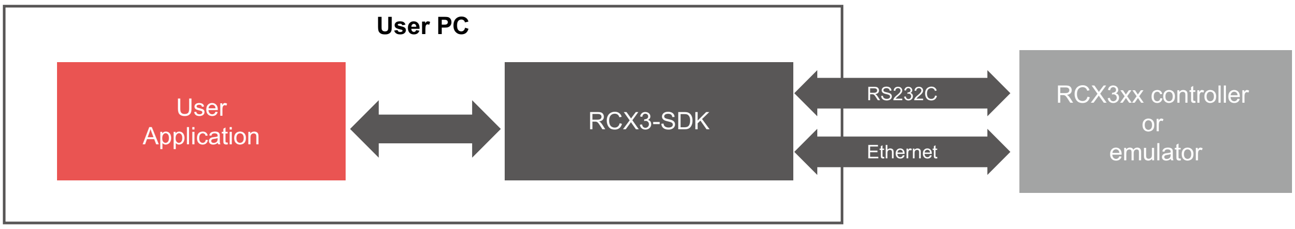

Controller
Ethernet
RS232C
(Emulator can also the used.)
Application
The user develops an application with SDK.
Press
API of SDK
Yamaha robot
Result
Execution
SDK
Online command protocols are built into the SDK side.
MoveRobot()
Converted to online command.
@MOVE P,P1
Send to controller.
Converted to result.
RUN
(Wait)
END
Receive response from controller.
Programming time
Reduced.

```
void CUserDlg::OnBnClickedMove()
{
    int nRobot = 1;
    int nPoint = 1;
    int nResult = 0;
    nRessult = MoveRobot(nRobot, nPoint);
}
```

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

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/

P.566

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 t o “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

PROFI NET® 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

EtherCAT® 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

CC-Link 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

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	Input: 24byte Output: 24byte

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	Input: 24byte Output: 24byte

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

P.592

CC-Link 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.

DeviceNet 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

EtherNet/IP™ 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 Voluime2: 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).

PROFINET 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).

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/

SR1-X/SR1-P

P.618

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	Overall length [Note4]	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 P.626 RCX340/RCX341 P.646

CC-Link 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 swich on board)
No. of CC-Link I/O [Note1]	General input 96 points, General output 96 points, Dedicated input 16 points, Dedicated output16 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.

DeviceNet™ 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	Overall length [Note4]	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.

PROFIBUS® 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 intput 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.)

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 P.626 RCX340/RCX341 P.636

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	RJ-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 byte 4-31	Dedicated word input : 2 words General purpose word input : 14 words
		byte 32-33 byte 34-47	Dedicated bit input : 16 points General-purpose bit input : 96 points
	Output (48 bytes in total)	byte 0-3 byte 4-31	Dedicated word output : 2 words General-purpose word output : 14 words
		byte 32-33 byte 34-47	Dedicated bit output : 16 points 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.

PROFI NET® 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)
		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.

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 P.626 RCX340/RCX341 P.636

EtherCAT 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

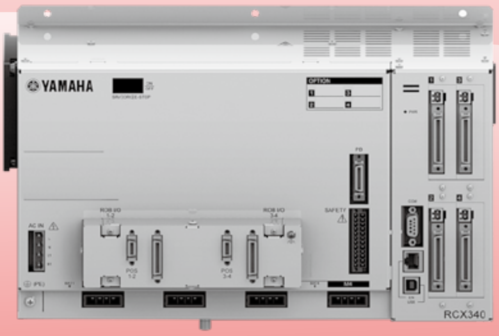
RCX3-SMU

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
	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
Input/Output Interface	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

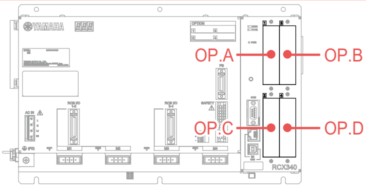
Select safety standard “S” to use RCX3-SMU.

Controller	No. of controllable 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)	Absolute battery Note 8
RCX340	4: 4 axes	N: Normal	No entry: Non-selection	No entry: Non-selection	No entry: Non-selection	No entry: Non-selection	No entry: Non-selection	4: 4 pcs.
	3: 3 axes	E: CE	NS : STD.DIO(NPN) Note 2 Note 5	--- Note 4	--- Note 4	--- Note 4	WY: with RCXiVY2+, without lighting	3: 3 pcs.
	2: 2 axes Note 1	K: KCs	NE : EXP.DIO(NPN) Note 3 Note 5	NE : EXP.DIO(NPN) Note 3 Note 5	NE : EXP.DIO(NPN) Note 3 Note 5	NE : EXP.DIO(NPN) Note 3 Note 5	WL: with RCXiVY2+, with lighting	2: 2 pcs.
		S: SMU compatible	PS : STD.DIO(PNP) Note 2 Note 5	--- Note 4	--- Note 4	--- Note 4		1: 1 pc.
			PE : EXP.DIO(PNP) Note 3 Note 5	PE : EXP.DIO(PNP) Note 3 Note 5	PE : EXP.DIO(PNP) Note 3 Note 5	PE : EXP.DIO(PNP) Note 3 Note 5		0: 0 pc.
			GR: Gripper	GR: Gripper	GR: Gripper	GR: Gripper		
			TR : Tracking Note 6	TR : Tracking Note 6	TR : Tracking Note 6	TR : Tracking Note 6		
			YM1 : YC-Link/E master Note 7	YM1 : YC-Link/E master Note 7	YM1 : YC-Link/E master Note 7	YM1 : YC-Link/E master Note 7		
			YS2 to 4: YC-Link/E slave Note 7	YS2 to 4: YC-Link/E slave Note 7	YS2 to 4: YC-Link/E slave Note 7	YS2 to 4: YC-Link/E slave Note 7		
			EP : EtherNet/IP™ Note 8	EP : EtherNet/IP™ Note 8	EP : EtherNet/IP™ Note 8	EP : EtherNet/IP™ Note 8		
			PB : PROFIBUS Note 8	PB : PROFIBUS Note 8	PB : PROFIBUS Note 8	PB : PROFIBUS Note 8		
			CC: CC-Link Note 8	CC: CC-Link Note 8	CC: CC-Link Note 8	CC: CC-Link Note 8		
			DN: DeviceNet™ Note 8	DN: DeviceNet™ Note 8	DN: DeviceNet™ Note 8	DN: DeviceNet™ Note 8		
			PT : PROFINET Note 8	PT : PROFINET Note 8	PT : PROFINET Note 8	PT : PROFINET Note 8		
			ES : EtherCAT Note 8	ES : EtherCAT Note 8	ES : EtherCAT Note 8	ES : EtherCAT Note 8		

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

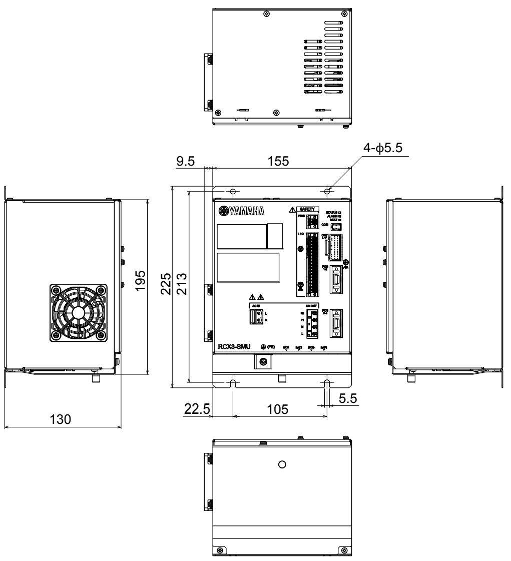
RCX3-SMU

List of safety functions

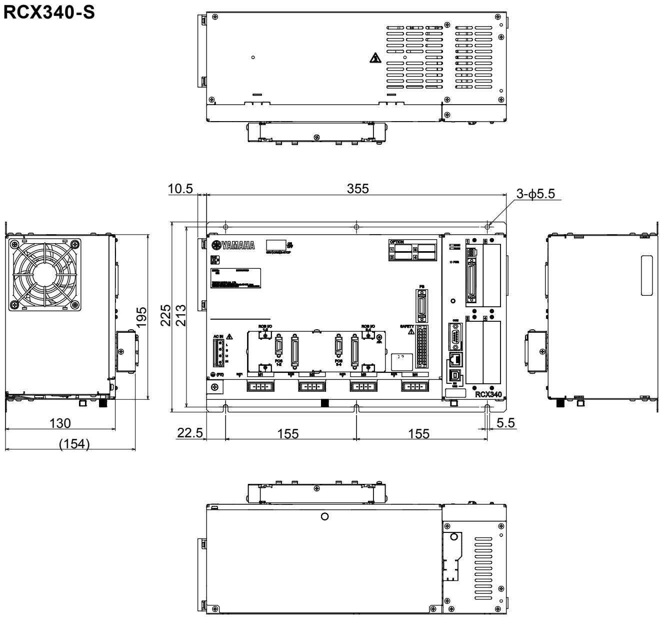
Functions	Descriptions
STO	Shuts off the main power supply of the controller and shifts to a safety status
SS1-r/t	Monitors the deceleration stop of the robot, and executes <SF001>STO if it deviates from the deceleration conditions specified by the parameter.
Speed monitoring (SLS)	Monitors whether the 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

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

- **Wiring lever**

Model	KNH-M657M-00

- **SAFETY PWR connector**

Model	KNH-M4422-00

- **SAFETY I/O connector**

Model	KNH-M4423-00

- **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.

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 For 1st-2nd axis
1m	KNH-M5361-10	
2m	KNH-M5361-20	
0.5m	KNH-M5361-40	Silver For 3rd-4th axis
1m	KNH-M5361-50	
2m	KNH-M5361-60	

RCXiVY2+ System

Applicable controllers RCX3 series

● Robot with image processing functions

Integrated Robot Vision System with "plug-and-play" simplicity.
New functions have been added to the conventional iVY2 to make the vision system even easier to use.

Ordering method

RCX340	–		–		–		–		–	
Controller	–	**No. of controllable axes**	–	**Safety standards**	–	**Controller option A to D (OP.A to D)**	–	**Controller option E (OP.E)**	–	**Absolute battery**
						TR: Tracking Note1		No entry: without RCXiVY2+ WY: with RCXiVY2+, without lighting WL: with RCXiVY2+, with lighting		

RCX320	–		–		–		–		–		–	
Controller	–	**No. of controllable axes**	–	**Safety standards**	–	**Regenerative unit**	–	**Controller option A / B (OP.A / OP.B)**	–	**Vision System**	–	**Absolute battery**
								TR: Tracking Note1		No entry: Non-selection WY: with RCXiVY2+, without lighting WL: with RCXiVY2+, with lighting		

For details on the various selection items
RCX320 ▶ P.626
RCX340 ▶ P.637

Note1. Only one tracking board can be selected.

Basic specifications

● Robot vision basic specifications

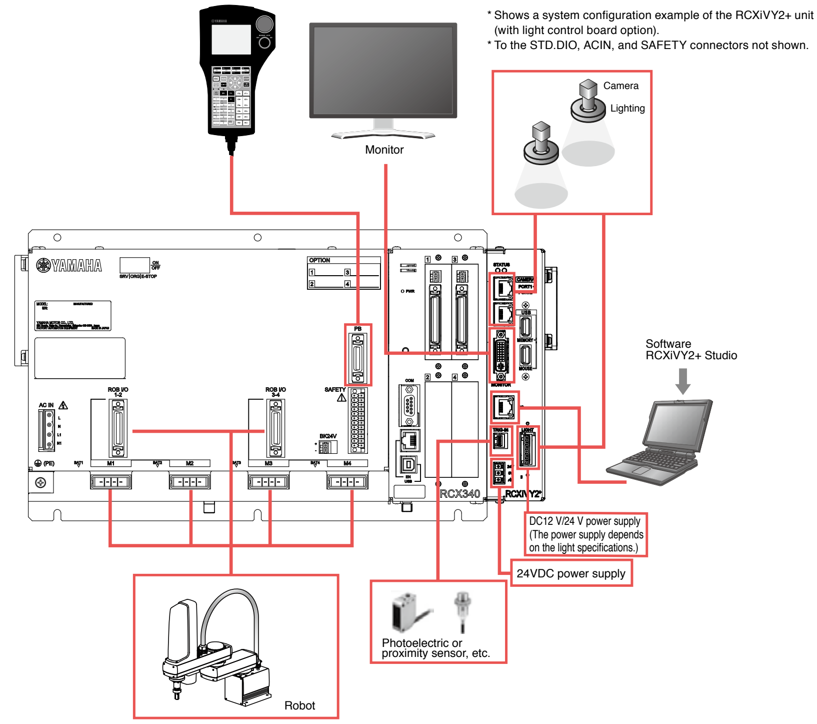
Item			RCXiVY2+ unit
Basic specifications	Applicable controllers		RCX340 / RCX320

	Number of screen pixels		720(H) × 540(V) (400,000 pixels)
			1440(H) × 1080(V) (1,600,000 pixels)
			2048(H) × 1536(V) (3,200,000 pixels)
			2592(H) × 1944(V) (5,000,000 pixels) Note1

	Model setting capacity		254 models
	Number of connectable cameras		2 cameras (8 units when the HUB is used.)
	Connectable camera		GigE camera PoE: IEEE802.3af 1 ch up to 7W
	External interface		Ethernet (1000BASE-T) Note2 USB 2.0 2Ch (Up to 5V 2.5W / ch)
	External monitor output		DVI-I Note3 Monitor resolution: 1024 × 768 Vertical periodic frequency: 60 Hz Horizontal periodic frequency: 48.4 kHz
	Power supply		24 VDC +/- 10%, Maximum 1.5 A
	Dimensions		W45 × H195 × D130 (RCXiVY2+ unit only)
	Weight		0.8kg (RCXiVY2+ unit only, when the lighting control board option is selected)
	Operating environment		Compliant with the RCX340/RCX320 controller.
	Storage environment		Compliant with the RCX340/RCX320 controller.
Search method			Edge search, Measuring search, Blob search, Code search
Image capturing	Trigger mode		S/W trigger, H/W trigger
	External trigger input		2 points
Function			Position detection, coordinate conversion, automatic point data generation, distortion and inclination correction
Camera installation position			Fixed to the fixed camera (up, down) or robot (Y-axis, Z-axis). Vertical direction to the image capturing target workpiece is recommended.
Setting support function			Calibration, image save function, model registration Note4, fiducial mark registration Note4, measuring registration Note4, blob registration Note4, code registration Note4, monitor function Note4
Lighting control options		Number of connectable lighting units	Maximum 2
		Modulated light format	PWM modulated light control (0 to 100%), PWM frequency switchable 62.5 kHz/ 125 kHz Continuous light, strobe light (follows camera exposure)
		Lighting power input	12V DC or 24V DC (external supply shared by both channels)
		Lighting output	For 12V DC supply: Total of less than 40W for both channels. For 24V DC supply: Total of less than 80W for both channels.

Note1. Since the rolling shutter is used, the tracking is not supported.
Note2. For setting and monitor operations
Note3. Also usable with an analog monitor by using a conversion adaptor.
Note4. RCXiVY2+ Studio function (requires a Windows PC)

System configuration illustration



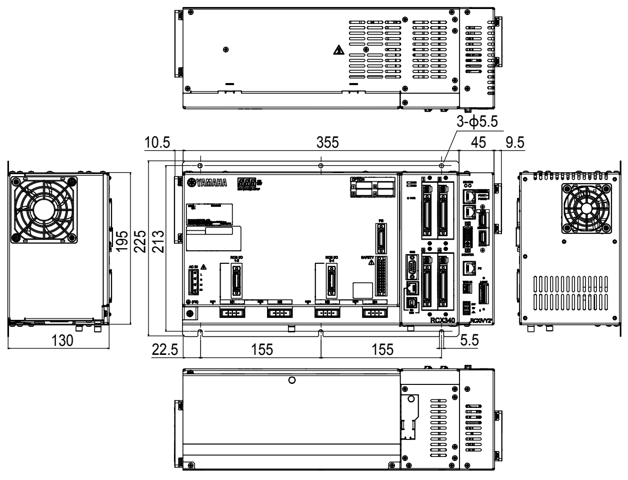
* Shows a system configuration example of the RCXiVY2+ unit (with light control board option).
* To the STD.DIO, ACIN, and SAFETY connectors not shown.

Tracking board basic Specifications

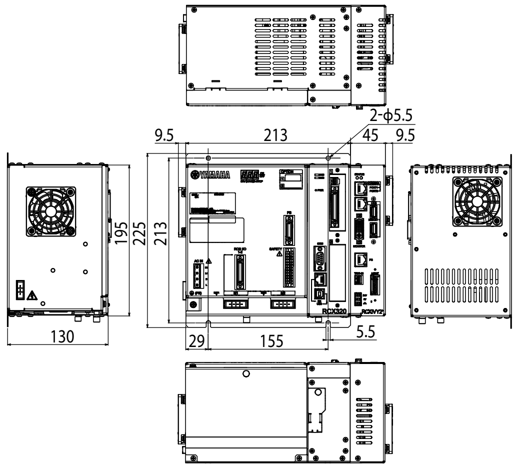
Item		Tracking board
Basic specifications	Applicable controllers	RCX340 / RCX320
	Number of connected encoders	Up to 2 units.
	Encoder power supply	5VDC (2 counters total 500 mA or less) (Supplied from controller)
	Applicable encoder	26LS31/26C31 or equivalent line driver (RS-422 compliance).
	Input phase	A, $\overline{A}$, B, $\overline{B}$, Z, $\overline{Z}$
	Max. response frequency	2MHz or less
	Counter	0 to 65535
	Multiplier	4x
	Other	With disconnection detection function

Dimensional outlines

RCX340+RCXiVY2+



RCX320+RCXiVY2+



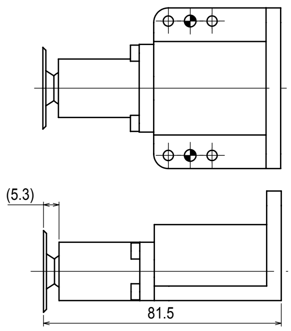
RCXiVY2+ System

Dimensional outlines

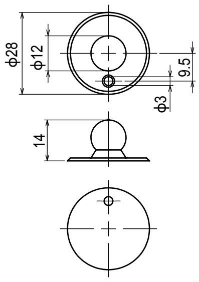
Calibration jig

Calibration jig
(Model: KCX-M7200-00)

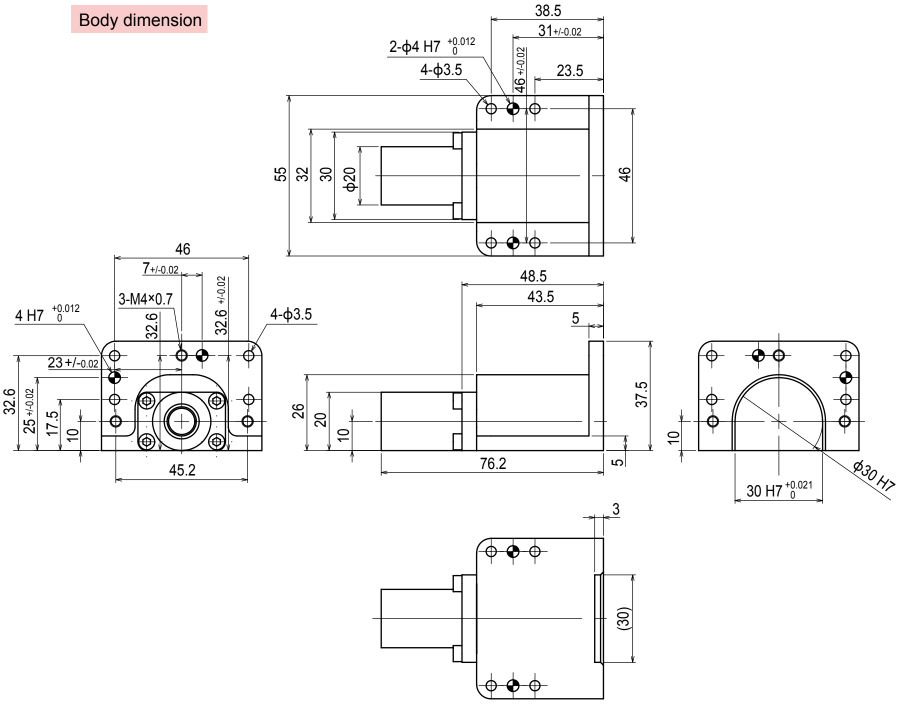
Mark gripper dimension



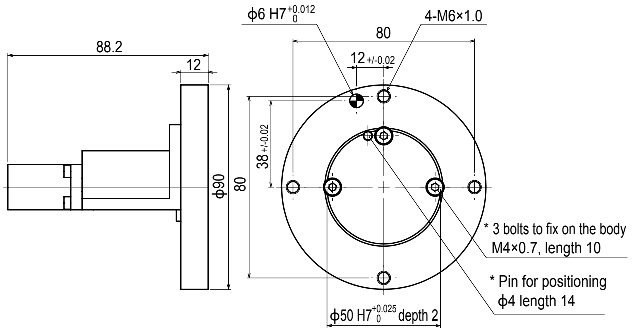
Mark dimension



Body dimension



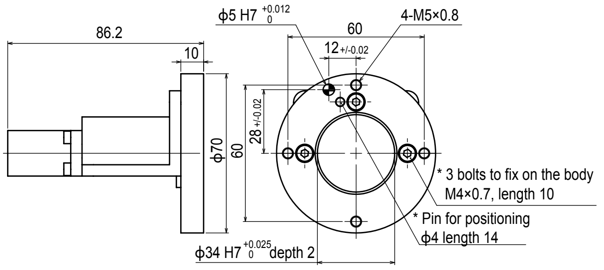
When using attachment (large)



* 3 bolts to fix on the body
M4×0.7, length 10

* Pin for positioning
ϕ4 length 14

When using attachment (small)



* 3 bolts to fix on the body
M4×0.7, length 10

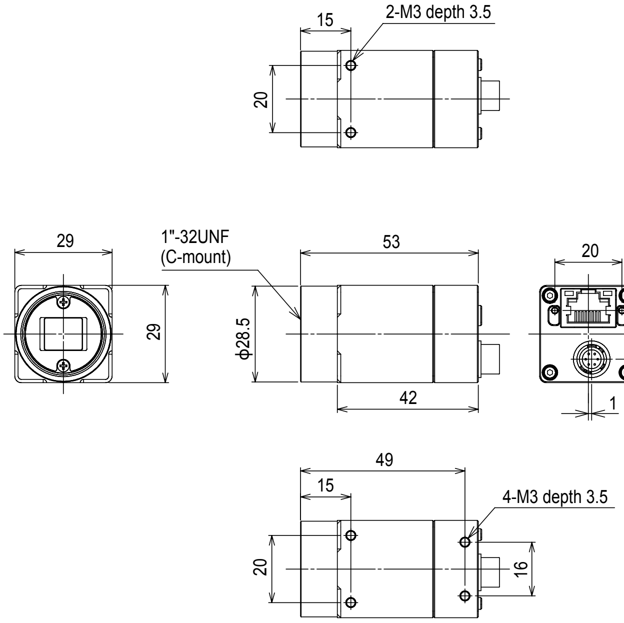
* Pin for positioning
ϕ4 length 14

Dimensional outlines

Camera

CMOS camera

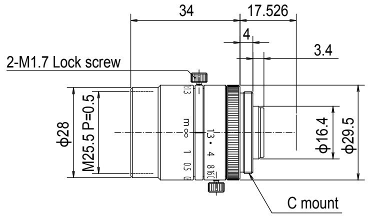
(400,000 pixel • 1,600,000 pixel • 3,200,000 pixel)



Lenses

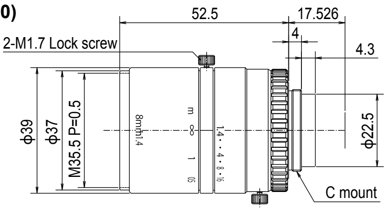
8mm lens

(Model: KCX-M7214-00)



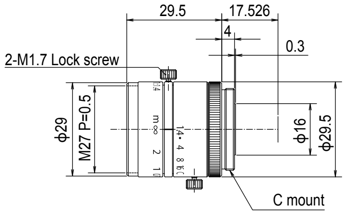
8mm lens (megapixel support)

(Model: KCX-M7214-40)



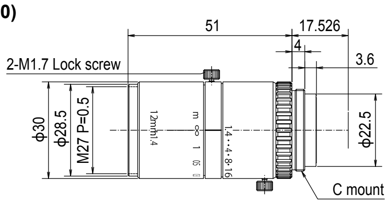
12mm lens

(Model: KCX-M7214-10)



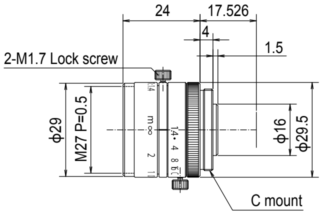
12mm lens (megapixel support)

(Model: KCX-M7214-50)



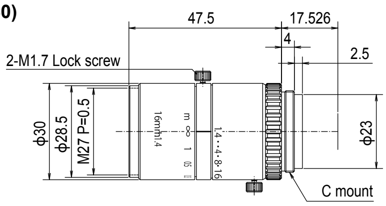
16mm lens

(Model: KCX-M7214-20)



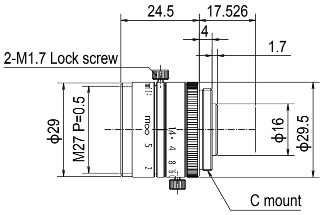
16mm lens (megapixel support)

(Model: KCX-M7214-60)



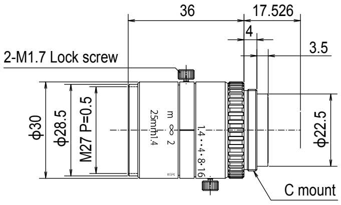
25mm lens

(Model: KCX-M7214-30)



25mm lens (megapixel support)

(Model: KCX-M7214-70)



RCXiVY2+ System

Lens characteristics

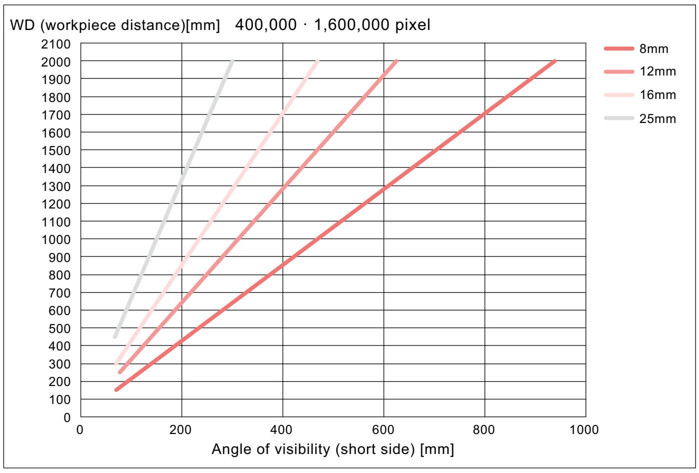
Lens	Model	Focal length [mm]	Aperture value [F No.]	Angle-of-view (degrees)								Closest approach distance [m]
				KFR-M6541-01 (400,000 pixel camera)		KFR-M6541-11 (1,600,000 pixel camera)		KFR-M6541-21 (3,200,000 pixel camera)		KFR-M6541-32 (5,000,000 pixel camera)		
				Vertical	Horizontal	Vertical	Horizontal	Vertical	Horizontal	Vertical	Horizontal	
8mm	KCX-M7214-00	8	F1.3–CLOSE	27.13	36.09	26.85	35.69	37.57	49.23	30.72	40.60	0.2
12mm	KCX-M7214-10	12	F1.4–CLOSE	17.23	23.01	17.05	22.74	24.11	31.95	19.57	26.03	0.3
16mm	KCX-M7214-20	16	F1.4–CLOSE	13.17	17.50	13.03	17.30	18.48	24.44	14.97	19.83	0.4
25mm	KCX-M7214-30	25	F1.4–CLOSE	8.57	11.42	8.47	11.29	12.05	16.01	9.74	12.95	0.5
8mm (megapixel support)	KCX-M7214-40	8	F1.4–F16	26.47	34.83	26.20	34.44	36.68	47.61	29.97	39.21	0.1
12mm (megapixel support)	KCX-M7214-50	12	F1.4–F16	17.49	23.19	17.31	22.92	24.47	32.19	19.86	26.23	0.1
16mm (megapixel support)	KCX-M7214-60	16	F1.4–F16	13.28	17.69	13.14	17.48	18.64	24.69	15.09	20.04	0.1
25mm (megapixel support)	KCX-M7214-70	25	F1.4–F16	8.62	11.48	8.52	11.34	12.12	16.09	9.80	13.02	0.15

Note. This table shows the angle-of-view for Yamaha's standard lenses. If the angle-of-view is greater, there might be more distortion at the edge of the image.

Contact angle ⇔ WD (workpiece distance) table

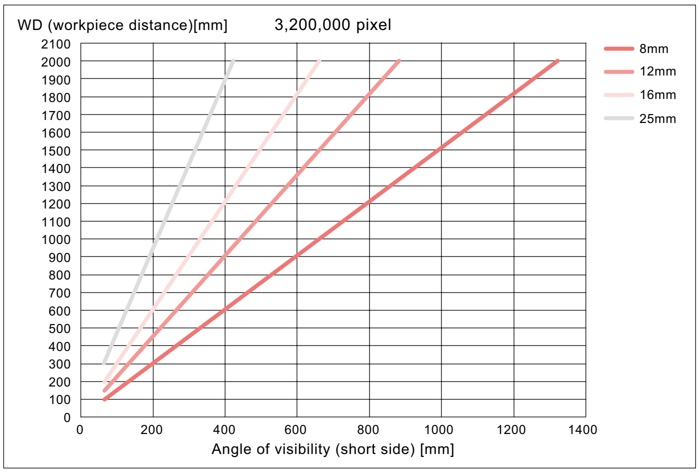
400,000 pixel (KFR-M6541-01) • 1,600,000 pixel (KFR-M6541-11)

	Lens							
	8mm KCX-M721-40		12mm KCX-M721-50		16mm KCX-M721-60		25mm KCX-M721-70	
WD[mm]	Horizontal	Vertical	Horizontal	Vertical	Horizontal	Vertical	Horizontal	Vertical
100	63	47	42	31	31	23		
150	94	70	63	47	47	35	30	23
200	126	94	84	63	63	47	40	30
250	157	117	105	78	78	59	50	38
300	188	141	126	94	94	70	60	45
350	220	164	146	109	110	82	70	53
400	251	188	167	125	126	94	80	60
450	282	211	188	141	141	105	90	68
500	314	234	209	156	157	117	100	75
550	345	258	230	172	173	129	110	83
600	377	281	251	188	188	141	120	90
650	408	305	272	203	204	152	131	98
700	439	328	293	219	220	164	141	105
750	471	352	314	234	235	176	151	113
800	502	375	335	250	251	188	161	120
850	533	398	356	266	267	199	171	128
900	565	422	377	281	282	211	181	135
950	596	445	397	297	298	223	191	143
1000	628	469	418	313	314	234	201	150
1500	941	703	628	469	471	352	301	225
2000	1255	938	837	625	628	469	402	300



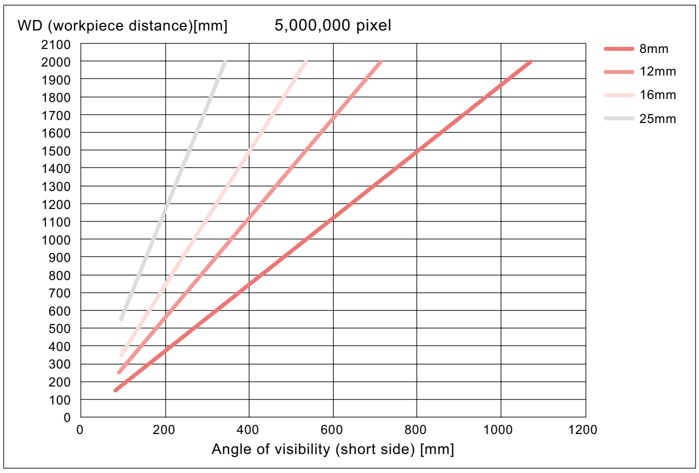
3,200,000 pixel (KFR-M6541-21)

	Lens							
	8mm KCX-M721-40		12mm KCX-M721-50		16mm KCX-M721-60		25mm KCX-M721-70	
WD[mm]	Horizontal	Vertical	Horizontal	Vertical	Horizontal	Vertical	Horizontal	Vertical
100	88	66	59	44	44	33		
150	132	99	88	66	66	50	42	32
200	177	132	118	88	88	66	56	42
250	221	165	147	110	110	83	71	53
300	265	198	177	132	132	99	85	63
350	309	231	206	154	154	116	99	74
400	353	265	235	176	177	132	113	85
450	397	298	265	198	199	149	127	95
500	441	331	294	220	221	165	141	106
550	485	364	324	242	243	182	155	116
600	530	397	353	265	265	198	169	127
650	574	430	382	287	287	215	184	138
700	618	463	412	309	309	231	198	148
750	662	496	441	331	331	248	212	159
800	706	529	471	353	353	265	226	169
850	750	562	500	375	375	281	240	180
900	794	595	530	397	397	298	254	190
950	838	628	559	419	419	314	268	201
1000	883	661	588	441	441	331	282	212
1500	1324	992	883	661	662	496	424	317
2000	1765	1323	1177	882	883	661	565	423



5,000,000 pixel (KFR-M6541-32)

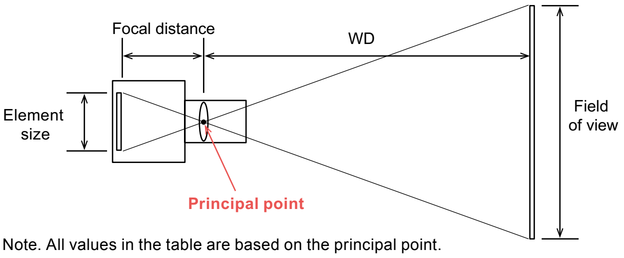
	Lens							
	8mm KCX-M721-40		12mm KCX-M721-50		16mm KCX-M721-60		25mm KCX-M721-70	
WD[mm]	Horizontal	Vertical	Horizontal	Vertical	Horizontal	Vertical	Horizontal	Vertical
100	71	54	48	36	36	27		
150	107	80	71	54	53	40	34	26
200	143	107	95	71	71	54	46	34
250	178	134	119	89	89	67	57	43
300	214	161	143	107	107	80	68	51
350	249	187	166	125	125	94	80	60
400	285	214	190	143	143	107	91	68
450	321	241	214	161	160	120	103	77
500	356	268	238	178	178	134	114	86
550	392	294	261	196	196	147	125	94
600	428	321	285	214	214	161	137	103
650	463	348	309	232	232	174	148	111
700	499	375	333	250	249	187	160	120
750	534	401	356	268	267	201	171	128
800	570	428	380	285	285	214	182	137
850	606	455	404	303	303	227	194	146
900	641	482	428	321	321	241	205	154
950	677	508	451	339	338	254	217	163
1000	713	535	475	357	356	268	228	171
1500	1069	803	713	535	534	401	342	257
2000	1425	1070	950	713	713	535	456	342



Minimum WD (workpiece distance) when close-up ring is used.

	Lens							
	8mm KCX-M721-40		12mm KCX-M721-50		16mm KCX-M721-60		25mm KCX-M721-70	
Close-up ring [mm]	Minimum	Maximum	Minimum	Maximum	Minimum	Maximum	Minimum	Maximum
None	100	∞	100	∞	100	∞	150	∞
0.5	46	114	67	284	78	506	131	1233
1.0			48	132	63	243	115	608
1.5			36	82	52	116	102	399
2.0					43	112	92	295
5.0							54	108

Note. The values in this table are for reference only and are not absolute indexes.



Note. All values in the table are based on the principal point.

Accessories and part options

RCXiVY2+ System

Standard accessories

RCXiVY2+ unit

The RCXiVY2+ unit adds robot vision to the RCX340/RCX341/RCX320 robot controller.

RCXiVY2+ unit

Model	No lighting	KFR-M4400-V0
	With lighting	KFR-M4400-L0

RCXiVY2+ unit accessories

Name	Model
Trigger input cable connector set	KX0-M657K-00
24V power supply connector	KCF-M5382-00

Support software for PC RCXiVY2+ Studio

RCXiVY2+ Studio is programming software for the RCXiVY2+ system that allows registering part types and reference marks as well as monitoring the work search status during automatic robot operation by connecting to the robot controller.

Download from website (member site)

Environment

OS	Microsoft Windows XP / Vista (32 bit / 64 bit) / 7 (32 bit / 64 bit) / 8, 8.1 (32 bit / 64 bit) /10 (32 bit / 64 bit) / 11 (Supported version: V.3.06.03.00 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 capacity	30MB of available space required on installation drive. * Additional vacant space is required for saving images and data.
Display	800 x 600 dot, or higher, 32768 colors (16bit High Color) or higher (recommended)
Communication Port	Ethernet Port of TCP/IP

Note. Microsoft, Windows XP, Windows Vista, Windows 7, Windows 8, 8.1, and Windows 10 are registered trademarks of the Microsoft Corporation, USA.
Note. Ethernet is a registered trademark of the XEROX Corporation, USA.

Options

● CMOS camera

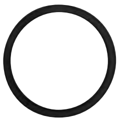
Model	400,000 pixel	720(H) × 540(V)	KFR-M6541-01
	1,600,000 pixel	1440(H) × 1080(V)	KFR-M6541-11
	3,200,000 pixel	2048(H) × 1536(V)	KFR-M6541-21
	5,000,000 pixel	2592(H) × 1944(V)	KFR-M6541-32

● Lens

Model	8mm	KCX-M7214-00
	12mm	KCX-M7214-10
	16mm	KCX-M7214-20
	25mm	KCX-M7214-30
	8mm (megapixel support)	KCX-M7214-40
	12mm (megapixel support)	KCX-M7214-50
	16mm (megapixel support)	KCX-M7214-60
	25mm (megapixel support)	KCX-M7214-70

* Common to iVY2.

● Close-up ring



Model	0.5mm	KX0-M7215-00
	1.0mm	KX0-M7215-10
	2.0mm	KX0-M7215-20
	5.0mm	KX0-M7215-40

● Lighting control board

This board adds lighting control functionality to the RCXiVY2+ system. (Installed in the RCXiVY2+ unit when shipped)

● Lighting control board

Name	Model
Lighting control board	KCX-M4403-L0

● Lighting control board accessories

Name	Model
Lighting power cable connector set	KX0-M657K-10

● Tracking board

This board adds conveyor tracking functionality to the RCX340/RCX320 controller.

● Tracking board

Name	Model
Tracking board	KCX-M4400-T0

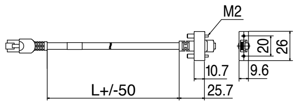
● Tracking board accessories

Name	Model
Tracking encoder connector	KX0-M657K-20

● Camera cable

Cable for connecting the camera to the RCXiVY2+ board.

External diagram of camera cable



Cable length (L)	Model
5m	KCX-M66F0-00
10m	KCX-M66F0-10
15m	KCX-M66F0-20

* Common to iVY2.

● LAN cable with shield cloth (5 m)

Model	KX0-M55G0-00

● Tracking encoder cable (10 m)

Model	KX0-M66AF-00

● Calibration jig (Large and small attachments are provided.)

Model	KCX-M7200-00