





YAMAHA ROBOT CONTROLLERS

# **CONTENTS**

CONTROLLER for LCMR200/GX series	
YHX·····610	
CONTROLLER for LCM100	
LCC140 ·····620	
POSITIONER	
TS-S2/TS-SH/TS-X/TS-P626	
DRIVER	
TS-SD636	
RDV-X/RDV-P 640	
CONTROLLER	
ERCD 646	
SR1-X/SR1-P652	
RCX320····· 660	
RCX221/RCX222 ·····670	١.
RCX340678	
OPTION DETAILS	
Support software for PC	1
TS-Manager ······ 688	
POPCOM+ 690	
VIP+ ·····692	
RDV-Manager····· 694	
RCX-Studio 2020 ····· 696	
Handy terminal	
HT1/HT1-D	

Programming box
HPB/HPB-D 699
RPB/RPB-E700
PBX/PBX-E · · · · · 701
● LCD Monitor option TS-Monitor702
Touch operator interface     Pro-face703
<ul> <li>Field network system with minimal wiring (network)</li> </ul>
YHX704
LCC140 ······705
TS-S2/TS-SH/TS-X/TS-P·····706
SR1-X/SR1-P707
RCX320/RCX221/RCX222/RCX340 ··· 708
RCX320/RCX340 ·····709
ROBOT VISION
RCXiVY2+ System ·····712
ELECTRIC GRIPPER
YRG Series ·····720
● Compact single cam type YRG-2005SS ·····721
• Single cam type

YRG-2005W/2810W/4220W ·····723

Double cam type

Screw type strait style     YRG-2020FS/2840FS · · · · · 72	4
• Screw type "T" style YRG-2020FT/2840FT72	5
● Three fingers type YRG-2004T	Ĭ

Screw type strait style     YRG-2020FS/2840FS724
● Screw type "T" style YRG-2020FT/2840FT ·····725
● Three fingers type YRG-2004T726
YRG-2013T/2820T/4230T ·····727

# Option

# **CONTROLLER FEATURE DESCRIPTION**

# LCMR200 / GX series

**Robot controller** 

# YHX

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

P.610



## Single-axis

**Robot controller** 

**LCC140** 

Linear conveyor module ...... LCM100

P.620



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 <sup>™</sup> , EtherNet/IP <sup>™</sup>

**Single-axis robot positioner** 

TS-S2/TS-SH

Stepping motor single-axis robots ... TRANSERVO Note 1

P.626

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 <sup>™</sup> , EtherNet/IP <sup>™</sup> , PROFINET

**Single-axis robot positioner** 

TS-X/TS-P

Single-axis robot .....FLIP-X Linear motor single-axis .....PHASER

P.626



Operating method	I/O point tracing/Remote command/Operation
Operating method	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 <sup>™</sup> , EtherNet/IP <sup>™</sup> , PROFINET

Single-axis robot driver

TS-SD

Stepping motor single-axis robots ... TRANSERVO

P.636



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 robot driver

RDV-X/RDV-P

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

P.640



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.646



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

Single-axis robot controller

# SR1-X/SR1-P

Single-axis robot.....FLIP-X Linear motor single-axis.....PHASER

P.652



Programming/I/O point tracing/Remote command Operation using/RS-232C communication
1000 points
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 SR1-P20 Single phase 200 to 230V AC +/-10% maximum
SR1-X Absolute, Incremental SR1-P Incremental, Semi-absolute
CC-Link, DeviceNet <sup>™</sup> , PROFIBUS

## 1 to 2 axis

**Multi-axis robot controller** 

# RCX320

P.660



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 <sup>™</sup> , EtherNet/IP <sup>™</sup> , Ethernet, PROFIBUS, PROFINET, EtherCAT

**Multi-axis robot controller** 

# RCX221/ RCX221HP

P.670



Programming/Remote command/ Operation using RS-232C communication
10000 points
Control power supply: Single phase 200 to 230V AC +/-10% maximum Main power supply: Single phase 200 to 230V AC +/-10% maximum
Incremental, Semi-absolute
CC-Link, DeviceNet <sup>™</sup> , PROFIBUS

Multi-axis robot controller

# RCX222/ RCX222HP

Single-axis robot FLIP-X
Cartesian robot XY-X
Pick & place YP-X

P.670



Operating method	Programming/Remote command/ Operation using RS-232C communication
Points	10000 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 <sup>™</sup> , PROFIBUS

### 1 to 4 axis

**Multi-axis robot controller** 

# **RCX340**

P.678



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 <sup>™</sup> , EtherNet/IP <sup>™</sup> , Ethernet, PROFIBUS, PROFINET, EtherCAT

# **CONTROLLER SPECIFICATION SHEET**

Cat	Category Robot controller Robot positioner					Robot driver	,					
Nan	ne		YHX	LCC140	TS-S2	TS-SH	TS-X	TS-P	TS-SD	RDV-X	RDV-P	
External view		DOCO 10 Activity Activi Activi Activity Activi Activi Activi Activi Activi Activi Activi Activi Activi	(- <u> </u>									
Operating method		YHX Standard profile	Programming/ I/O point tracing/ Remote command/ Operation using RS-232C communication	I/O Opera	) point tracing/F ation using RS-	Remote comma 232C commun	ind/ ication	F	Pulse train contr	ol		
	LCMR20	00	•	_	_	_	_	_	_	_	_	
	LCM100		_	•	_	_	_	_	_	_	_	
	GX		•	_		_	_	_	_	_		
opo	TRANS	ERVO	_	_	Note 2	•	_	_	•	_	_	
Applicable robot	FLIP-X	T4L/T5L/C4L/C5L	_	_		_	_	_	_	_		
icak		FLIP-X other than above	_	_	_	_	•	_	_	•	_	
App	PHASE	2		_	_	_	_	•	_	_	•	
	XY-X		_	_	_	_	_	_	_	_	-	
	YK-X		_	_	_	_	_	_	_	_	_	$\perp$
	YP-X		_	_	_	_	_	_	_	_	_	
ower	Control	power supply		Single phase	AC100V specifications Note     (105 / 110 driver)     Single phase 100 to 115V A:     +/-10% maximum (50/60Hz)			driver) 100 to 115V AC	+10% to -15%		30V AC o -15%	
Input p	Main power supply			200 to 230V AC +/-10% maximum (50/60Hz) DC24V +/-10% maximum		• AC200V specifications (205 / 210 / 220 driver) Single phase 200 to 230V AC +/-10% maximum (50/60Hz)		maximum	Single phas 200 to +10% t	se / 3-phase 230V o -15% z +/-5%)		
Nun	nber of co	ontrollable axes	Check the details	Single-axis		Singl	e-axis			Single-axis		
Orig	gin searcl	n method	page of the YHX controller.	Incremental	Incremental	Absolute/ Incremental	Absolute/ Incremental	Incremental/ Semi-absolute		Incremental		
Max	kimum nu	mber of programs		100		(program r	ot required)		_	_	_	
Maxi	imum numb	er of steps per program		999 steps		(program r	ot required)		_	_		
Poi	nts			10,000 points		255	points		_	_	_	
Mul	titasks			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	_	-	_	
		General I/O		16 points/16 points	_	_	_	_	_	_	_	
		CC-Link	•	•	•	•	•	•	_	_	_	
		Device: lef	_	•	•	•	•	•	_	_	1	
		Ether Vet/P	•	•	•	•	•	•	_	_	_	
Fiel	d work	Ethernet	_	_	_	_	_	_	_	_	1	
	port	99995°	_	_	_	_	_	_	_	_	_	
			•	_	•	•	•	•	_	_	_	
		Ethor@ATT	•	_	_	_	_	_	_	_		
Ether@Au. T		•	_	•	•	•	•	•	•	•		
	gramming	g box	YHX-PP	HPB / HPB-D			ith enable switch		_	_	_	
		ware for PC	(with enable switch)  YHX-Studio for Standard Profile	(with enable switch) POPCOM+	TS-Manager			,	TS-Manager	RDV-M	anager	
			P.610	P.620			<b>626</b>		P.636		40	
Detailed info page  Note 1. 20A specifications provide only 20					•							

Note 1. 20A specifications provide only 200V.

Note 2. Exclude SG07

Note 3. Maximum number of general-purpose I/O points when a total of two option boards OP.1 and OP.2 (one each) are installed.

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

			Robot controller			
ERCD	SR1-X	SR1-P	RCX320	RCX221 RCX221HP	RCX222 RCX222HP	RCX340
				- 5 - 5 - 5 - 5 - 5 - 5 - 5 - 5 - 5 - 5		11-11
Pulse train control/ Programming/ I/O point tracing/ Operation using RS- 232C communication	Remote of	(O point tracing/ command/ 232C communication		Programming/Re Operation using RS-2	emote command/ 232C communication	
_	_	_	_	_	_	_
_	_	_	_	_	_	_
_	_	_	_	_	_	_
_	_	_	_	_	_	_
•	_	_	_	_	_	_
_	•	_	•	•	•	•
_	_	•	•	•	_	•
_	_	_	•	•	•	•
		_	•	_	•	•
Single-axis	+/-10% maximum (5  20 driver Single phase 200 to +/-10% maximum (5	230V AC	2 axes maximum Max. number of robots 4	2 axes maximum	2 axes maximum	Max. number of robots Max. number of controllable axes
Incremental	Absolute/	Incremental/ Semi-absolute	Absolute/Incremental/ Semi-absolute	Incremental/ Semi-absolute	Absolute/	Absolute/Incremental Semi-absolute
100	1	00	100	100	100	100
1024 steps	3000	steps	9999 steps	9999 steps	9999 steps	9999 steps
1000 points	1000	points	30000 points	10000 points	10000 points	30000 points
4		4	16	8	8	16
8 points/3 points	8 points	/4 points	8 points/9 points	10 points/12 points	10 points/12 points	8 points/9 points
6 points/6 points	16 points	/16 points	96 points/64 points (Max.) Note 4	40 points/24 points(Max.) Note 3	40 points/24 points(Max.) Note 3	96 points/64 points (Max.) N
_	•	•	•	•	•	•
_	•	•	•	•	•	•
_	_	_	•	_	_	•
_	-	_	•	•	-	•
_	•	•	•	•	•	•
_	_	<del>-</del>	•	_	_	•
_	_	_	•	_	_	•
_			PBX /PBX-E			PBX /PBX-E
HPB / HPB-D (with enable switch)		(with enable switch)	RPB / RPB-E (with enable switch)		(with enable switch)	
DCAC	POPCOM <sup>+</sup>	250	RCX-Studio 2020	VIP*		RCX-Studio 2020
P.646	C.	<b>352</b>	P.660	R	<del>570)</del>	P.678
Point trace  Remote commit- Pulse train	teaching point data. and : Controller issues a wic : Controller operates ro concentrate on robot	a binary point number and ro e range of commands and da bot by pulse train from positio control.	bot moves to the specified poin ta to the robot via CC-Link or De oner unit. Controller needs no p		device can freely use robot co ain operation is convenient to	

# YHX

## Dedicated for LCMR200 / GX series



- \*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).

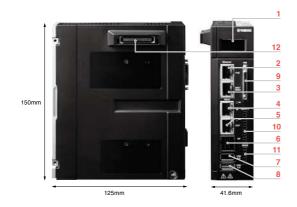
The YHX-HD is a set model of the host controller unit, driver power unit, and related components shown below. Each unit should be assembled by the customer.

Main functions ▶ P.32

#### YHX-HD Configuration parts

#### Control unit

#### 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	оит	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	нмі	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 connec	tion 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.

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

is de critical calpat port of a ricot controller arms			
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.

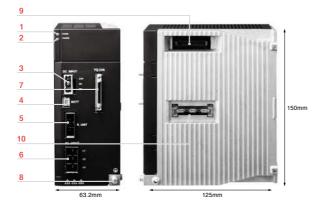
Model	YHX-CN-HMIS
Parts No.	KEK-M4429-00



# 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

Used when supplying the control power supply.

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



#### Main power supply connector

Used when supplying the main power supply.

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



#### 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	



#### 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		
Parte No	KEK-M440A-NO		

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.

- $^{\star}$  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  $\times$  1 are supplied with the product. When the CC-Link terminating connector is needed, order it separately.













## Programming pad (cable set)

#### Order model: YHX-PP6L (KEK-M5110-0B)



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

Used when connecting a programming pad

		0 1	0 01
_	6 m	Model	YHX-PP-6M
	O m	Parts No.	KEK-M5362-61



## 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)	
		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 Other Applicable controllers	Display	1920 x 1080 or higher resolution is recommended.
		Other	Ethernet cable (Category 5 or better)
		YHX Host controller unit	
Applicable robots		ts	Robots connectable to YHX

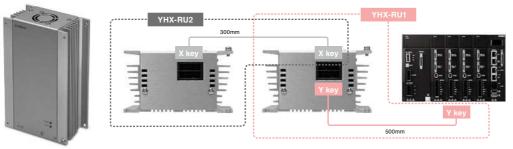
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YHX Studio for Standard Profile is software that is used when the YHX host controller unit of the YAMAHA robot controller YHX series





#### Regenerative unit set



Absorbs regenerative energy generated during decelerating a robot with a large

Connecting two increases the capacity to absorb regenerative energy to two times

Absorbable electric power	100 W (Equivalent to RGU 3) * 200 W when 2 are connected
Momentary maximum power	1600W
Number of connected units	Maximum 2 units
Other	Forced cooling and exhaust by fan Overheat detection for protection

#### Regenerative unit

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

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



#### Regenerative unit connection cable

Used when connecting a regenerative unit.			
٥.	Model	YHX-RU-50C	
0.5 m	Parts No.	KEK-M5363-00	



#### Regenerative unit (For expansion)

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

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



#### Regenerative unit expansion cable

Used when adding a regenerative unit.

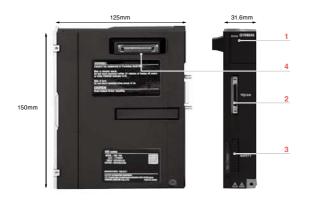
	Model	YHX-RU-EX30C
0.3 m	Parts No.	KEK-M5364-00



<sup>\*</sup> For details about how to determine the regenerative unit quantity of the single-axis robot GX series, see P. 615.

## YQLink expansion unit set

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



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

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

#### YQLink expansion unit

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

#### Safety connector

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

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

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



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



#### Battery holder connection cable

## Order model: YHX-BATT-15C

Used when the battery holder box is connected.

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



#### CC-Link terminating connector

# Order model: YHX-CN-CCTM

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



#### STOP connector

## Order model: YHX-CN-STOIN

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

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



#### Connector for brake power

### Order model: YHX-CN-BU

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











### **Driver for single-axis robot**

Order model:

A10:YHX-A10-SET A30:YHX-A30-SET V: With bit N: None

V: With brake unit

B: With ABS battery N: None

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

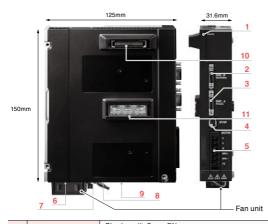
The customer assembles the necessary number of driver units between the host controller unit and driver power unit to use them.



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

**▶**Control unit

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



#### Stop short circuit connector

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)

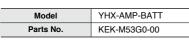
Cools down a driver unit. Attached at the bottom of a driver unit to send wind to heat sinks. A driver unit made

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





#### Brake unit

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



<sup>\*</sup> 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.







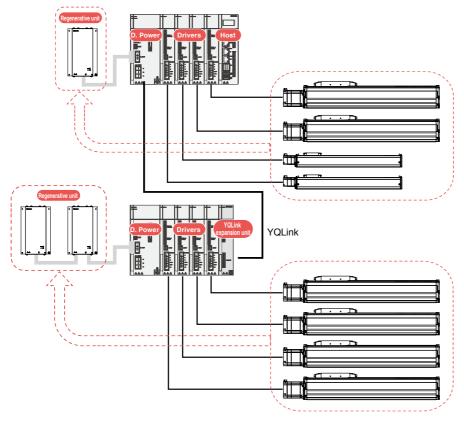






## Procedure to determine the regenerative unit quantity (Single-axis robot GX series)

The number of regenerative units to be connected to the D. Power is determined depending on the configuration of the single-axis robot GX series operated by each Drivers connected to this D. Power.



When the following conditions are satisfied, one regenerative unit needed.

- 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.
  - $\cdot$  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.

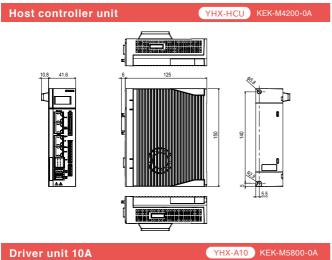
When the single-axis robot with an operating duty (\*) of 50% or more is used for 1 axis or more, two regenerative units are needed.

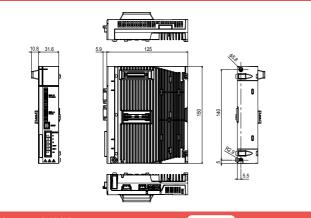
- 1. The total number of vertically installed GX10, GX12, GX16, and GX20 robots is 8 axes or more.
- 2. The total number of vertically installed GX12, GX16, and GX20 robots is 7 axes or more.
- 3. The total number of vertically installed GX16 and GX20 robots is 4 axes or more.
- 4. The vertically installed GX20 robots are connected to 4 axes or more.
- 5. 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.

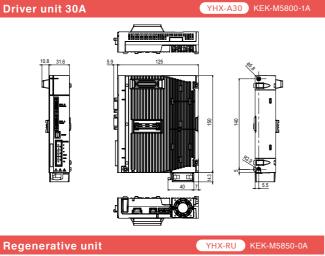
Operating duty = Total robot movement time ÷ 1 cycle time × 100[%]

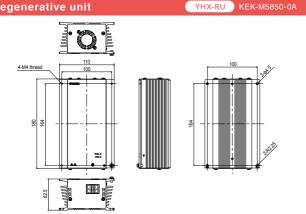
For the robot that reciprocates in one cycle, the total forward and backward movement time becomes the "total robot movement time".

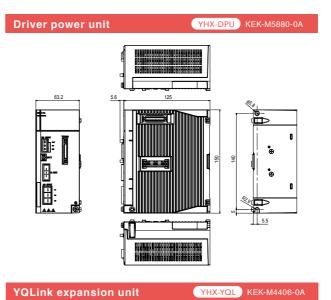
### External view of each unit

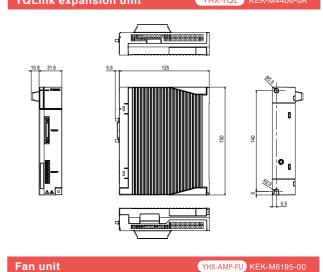


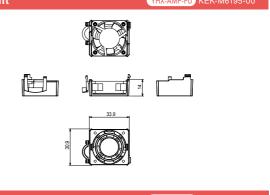


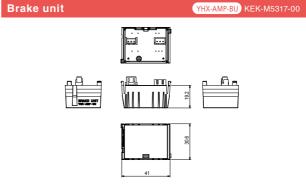












# **Basic specifications**

#### Host

#### Host controller unit

lananasa	Model	YHX-HCU
Japanese	Parts No.	KEK-M4200-0A
Fuelish	Model	YHX-HCU-E
English	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)
		Giga bit Ethernet  · Compatible with PoE yet 1 port (23W)  · Not compatible with PoE yet 1 port
	External I/F	Field network (Slave) Select one from the following 4 kinds.  EtherCAT  CC-Link*  EtherNet/IP  A separate adaptor is necessary.  PROFINET
Connector		USB
	нмі	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
	Control power supply	Voltage: 21.6 to 26.4V DC (24V +/-10%)
Dawer armahi		Current: 0.5A
Power supply	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	n motor capacity	Single phase within 1.6 kW, 3-phase within 3.0kW / Driver unit within 16 units (16 axes)
	Regenerative	Regenerative unit connector
Connector	External I/F	YQLink
	ABS Battery	ABS Battery connector
Di	mensions	63.2×150×125 (mm)
	Weight	1050g
Protection struc	cture / Protection rating	IP20 / class 1

#### Regenerative unit

#### Regenerative unit

Model	YH X-RU
Parts No.	KEK-M5850-0A

Itelli		negenerative 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
Dower cumply	0	Voltage: 21.6 to 26.4V DC (24V +/-10%)Voltage: 21.6 to 26.4V DC (24V +/-10%)
Power supply Control power supply		Current: 0.3A
Connector	External I/F	YQLink
Connector	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	
		Voltage: 21.6 to 26.4V DC (24V +/-10%)	
Powar supply	Control power supply	Current: 0.8A (Including brake unit power supply)	
ENC.A		Encoder input	
	ENC.B	Encoder input (Dedicated use)	
	STOP	Gate off input, 2 points	
		Gate status output, 1 point	
Connector	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.	
Di	mensions	31.6×150×125 (mm)	
	Weight	10A: 560g / 30A: 570g (Including accessory fan unit)	
Protection structure / Protection rating		IP20 / class	

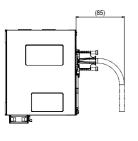
## **External view of YHX unit combination**

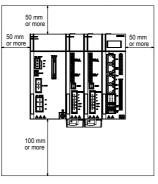
#### Combination of host controller (HCU), driver unit (A30), and driver power unit (DPU)

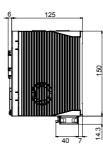


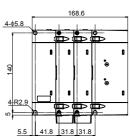


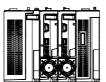






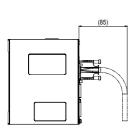


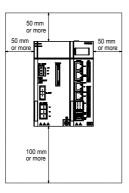




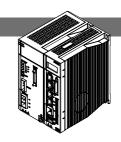
### Combination of host controller (HCU) and driver power unit (DPU)

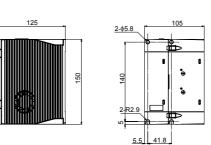












619



# **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

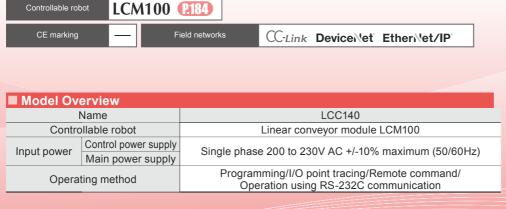
## Main functions ▶ P.27

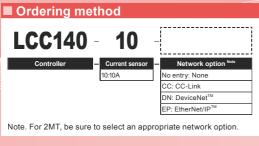




#### Basic specifications

Item		LCC140		
Controllable robot		Linear conveyor module LCM100		
Power supply capacity		350 VA		
External dimen	sions	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 su	oply input	Single-phase 200 to 230 V AC +/-10% (50/60 Hz)		
Control method		AC fully digital software servo		
Position detect	ion method	Magnetic linear scale		
Emergency sto	p input	Normal close contact input		
Output signal		Contact output: MPRDY		
Communication	ı	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 tempera	ture	0 to 40 °C		
Storage tempe	rature	-10 to 65 °C		
Usage humidity	1	35 to 85%RH (no dewing)		
Noise resistant	ce	IEC61000-4-4 level 3		
	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+.)		
CC-Link unit	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		

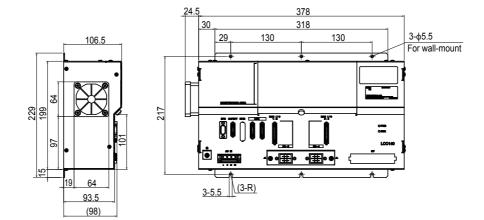




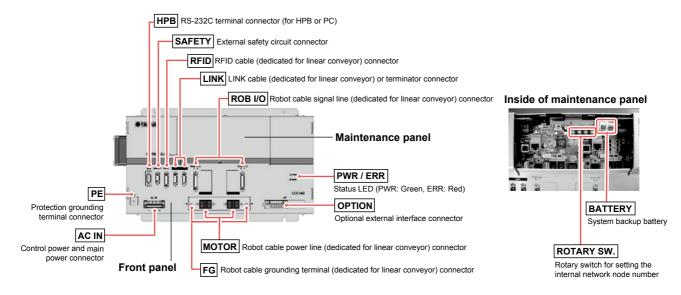
	Item		LCC14	10	
	Applicable DeviceNet™ specifications		Volume 1 Release2.0, Volume 2 Release2.0	<del>I</del> U	
	DeviceNet™ Conformance test		·		
			Compliant with CT24		
			Generic Device (keyable) / 2B Hex YAMAHA MOTOR CO.,LTD. / 636		
	Product code		21		
	Product revision		1.0		
			Yamaha LCC1(DEV).eds		
	MAC ID setting		0 to 63 (Set using HPB or POPCOM+.)		
	Communication speed setting	ng	500K/250K/125Kbps (Set using HPB or POPCOM		
DeviceNet™	Communication data		Predefined Master/Slave Connection Set: Group 2 Dynamic connection support (UCMM): None	only server	
unit	Communication data		Support for divided transmission of explicit messa	ne. Yes	
unit		Total length	100m/500Kbps, 250m/250Kbps, 500m/125Kbps	90. 100	
	Network length		6m or less		
		Total branch length	39m or less/500Kbps, 78m or less/250Kbps, 156r	n or less/125Kbps	
	Monitor LED		None		
			General-purpose input 32 points	Input: 24byte	
	Number of DavisoNetTM I/O	into/	General-purpose output 32 points	Output: 24byte	
	of occupied channels		Dedicated input 16 points Dedicated output 16 points		
			Input register 8 words		
			Output register 8 words		
			LCC140: Ver. 64.07 or higher		
			HPB/HPB-D: Ver. 24.06 or higher		
			POPCOM+: Ver. 2.1.0 or higher Volume 1: Common Industrial protocol(CIP™) Edit	tion 3.14	
	Applicable EtherNet/IP™ specifications		Volume 2: EtherNet/IP™ Adaptation of CIP™ Editi	on 1.15	
	EtherNet/IP™ Conformance test		Compliant with CT11		
	Device profile/Device type number		Generic Device (keyable) / 2B Hex		
	Vendor name/Vendor ID		YAMAHA MOTOR CO.,LTD. / 636		
	Product code		23		
	Product revision		1.1		
EtherNet/IP™	EDS file name		Yamaha_LCC1(EIP2).eds		
unit	Communication speed		10Mbps / 100Mbps		
	Connector specifications		RJ-45 connector (8-pole modular connector), 2 ports		
	Applicable cable specification	ons	STP cable (double shield) with CAT 5e or higher		
	Maximum cable length		100m		
	Monitor LED		Module Status(MS), Network Status(NS), Link/Act		
	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	

Opti

#### ■ Dimensions

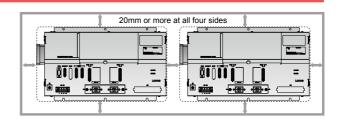


#### ■ Part names



#### ■ Installation conditions

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



#### Reference for power supply capacity and heat generation quantity

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

#### Reference values for actual operation (per LCC140 controller)

Modulo tuno	Number of	I	Power supply capaci	Heat generation quantity (during operation)	
Module type	motors	Control power supply	During waiting	<b>During slider operation</b>	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

LCC140 TS-X TS-P

RCX340

# **Option parts**

LCC140

#### ■ Options

Power connector + wiring connection lever

One set of parts per LCC140 is required.



Model KAS-M5382-00

SR1-X SR1-P RCX320 RCX221 RCX222

#### 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.



		LCC140
Model	KDK-M5163-00	SR1-X
		SR1-P

#### SAFETY connector

One connector per LCC140 is required.



Wired Not wired (plug + shell kit)

Not wired KDK-M5370-10 Model 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.



	1m	KDK-M5361-10	
Model	3m	KDK-M5361-30	LCC140
	5m	KDK-M5361-50	

#### Terminator connector

When connecting modules, two connectors per line are required.



KDK-M5361-00	LCC140
	KDK-M5361-00

#### 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

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

LCC140

**ERCD** 

SR1-X

SR1-P

#### Support software for PC (2690) 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

DO	DC	OM+	anviro	nmont

	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.

#### ■ Options

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





	USB type (5m)	KBG-M538F-00			
Model	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	)
RCX221	)
RCX222	)

RCX340

#### RFID

RFID \*
 (manufactured by BALLUFF GmbH)
 Reader/writer 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



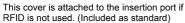
Model 0.5m+2m : KDK-M6300-A0

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

Dust cover (for RFID)

\* This cable is a flexible cable





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-M4252-00

(LCC140)

 Replacement filter for LCC140 (5 pcs. in package)



Model KDK-M427G-00

(LCC140)

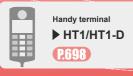
625

# 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.

# Main functions ▶ P.94







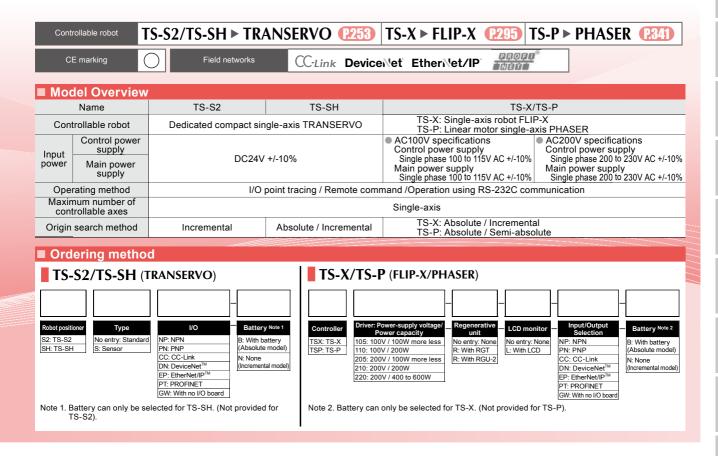
#### ■ Basic specifications

#### TS-S2/TS-SH

		Item	TS-S2	TS-SH						
SI	Number of cor	ntrollable axes	Single-axis							
specification	Controllable ro	bots	TRANSERVO series							
fica	Current consu	mption	2.5A (Rating) 4.5A (Max.) 3.5A (Rating) 6.5A (Max.)							
eci	Dimensions		W30 × H162 × D82mm	W30 × H162 × D123mm						
	Weight		Approx. 0.2kg	Approx. 0.3kg						
Basic	Input power	Control power supply	DC24V +/-10%							
ä	supply	Main power supply	DC24V +/-10%							
	Control metho	d	Closed loop vector control method							
2	Operating met	hod	I/O point tracing (Positioning operation by specifying po	int number) / Remote command						
control	Operation type	es	Positioning, merge-positioning, push, and jog operation	S						
is	Position detec	tion method	Resolver	Resolver with multi-turn absolute function						
Axis	Resolution		20480 pulses/rev. or 4096 pulses/rev. depending on the	robot						
	Origin search	method	Incremental	Absolute / Incremental						
"	Points		255 points							
Points	Point type sett	ing	(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							
Ħ	I/O interface		Selectable from the following: NPN, PNP, CC-Link, DeviceNet <sup>™</sup> , EtherNet/IP <sup>™</sup> , PROFINET							
External input/output	Input		Servo ON (SERVO), reset (RESET), start (START), interlock (/LOCK) origin search (ORG), manual mode (MANUAL), jog motion - (JOG-), jog motion + (JOG+), Point number selection (PIN0 to PIN7)							
nal in	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)							
xe	External comm	nunications	RS-232C 1CH							
	Safety circuit		Emergency stop input, emergency stop contact output (1 system: When the HT1 is used.)							
Options	Handy termina	ıl	HT1, HT1-D (with enable switch)							
g	Support softw	are for PC	TS-Manager							
ons	Operating temp	erature / Operating humidity	0°C to 40°C, 35% to 85%RH (non-condensing)							
icati	Storage tempe	erature/ Storage humidity	-10°C to 65°C, 10% to 85%RH (non-condensing)							
ecif	Atmosphere		Indoor location not exposed to direct sunlight. No corros	sive , flammable gases, oil mist, or dust particles						
alst	Anti-vibration		All XYZ directions 10 to 57Hz unidirectional amplitude (							
General specifications	Protective fund	ctions	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.

ň



### TS-X/TS-P

	Item		TS-X / TS-P								
	item	100V	200V AC input								
Driver model		TS-X105 / TS-P105	TS-X110 / TS-P110	TS-X205 / TS-P205	TS-X220 / TS-P220						
Number of co	ontrollable axes	Single-axis									
Controllable r	robots	TS-X: Single-axis robot FLIP-X series TS-P: Linear motor single-axis robot PHASER series									
Number of co Controllable r Power capaci Dimensions	ity	400VA	00VA 600VA 400VA 600VA 1400VA								
Dimensions		W58 × H162 × D131r	W58 × H162 × D131mm W70 × H162 × D131n								
		Approx. 0.9kg				Approx. 1.1kg					
୍ଦ୍ର Weight Input power	Control power supply	Single phase 100 to 1	15V AC +/-10% 50/60Hz	Single phase 200 to	230V AC +/-10% 50/60	)Hz					
supply	Main power supply	Single phase 100 to 1	15V AC +/-10% 50/60Hz	Single phase 200 to	230V AC +/-10% 50/60	)Hz					
Control metho	od	Closed loop vector of	ontrol method	-							
Operating me	ethod	I/O point tracing (Pos	sitioning operation by sp	ecifying point numbe	r) / Remote command						
Operating me	oes	Positioning, merge-p	ositioning, push, and jo	g operations							
ρ Position determined to the control of the co	ction method	TS-X: Resolver with	multi-rotation absolute	function TS-P: Magn	etic type linear scale						
Resolution		TS-X: 16384 pulses/rev. TS-P: 1µm									
Origin search	method	TS-X: Absolute / Incremental TS-P: Incremental / Semi-absolute									
<sub>ω</sub> Number of po	pints	255 points									
Point type set	tting	(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	g method	Manual data input (coordinates input) , Teaching, Direct teaching									
I/O interface		Selectable from the following: NPN, PNP, CC-Link, DeviceNet <sup>™</sup> , EtherNet/IP <sup>™</sup> , PROFINET									
Input Output Output		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)									
_ :		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 com	munications	RS-232C 1CH									
External com Power supply	for brake	DC24V +/-10% 300mA (prepared by the customer)									
Safety circuit		Emergency stop input, main power input ready output, emergency stop contact output (1 system: When the HT1 is used.)									
Handy termin Support softw	al	HT1, HT1-D (with enable switch)									
Support softw	vare for PC	TS-Manager									
C Operating tem	perature / Operating humidity	0°C to 40°C, 35% to 85%RH (non-condensing)									
Operating temposition  Storage temposition  Atmosphere  Anti-vibration	erature / 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			to 57Hz unidirectional								
Protective fun	nctions	Position detection error, power module error, temperature error, overload, overvoltage, low voltage, excessive position deviation, overcurrent, motor current error									
Protective str	ucture	IP20									

#### ■ TS-X / TS-P specification selection table

Some specifications are automatically determined by the robot model.

#### TS-X

			T4LH/ C4LH	T5LH/ C5LH	T6L/ C6L	Т9	Т9Н	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
D		105	•	•	•	•		•	•	•	•		•										•	•	•	•	•	
Power supply		110					•					•		•	•													•
voltage /	TS-X	205	•	•	•	•		•	•	•	•		•										•	•	•	•	•	
Current		210					•					•		•	•													•
sensor		220														•	•	•	•	•	•	•						
Regenera-	No entry	(None)				(1)	(2)				(1)	(2)	(1)	(2)	•	(3)		(6)	(3)	(4)					(5)			
	R (RG					(1)	(2)				(1)	(2)	(1)	(2)		(3)	•	(6)	(3)	(4)	•	•			(5)			

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

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

- (1) Regenerative unit is needed if using in a perpendicular position and movement stroke
- is 700mm or more.

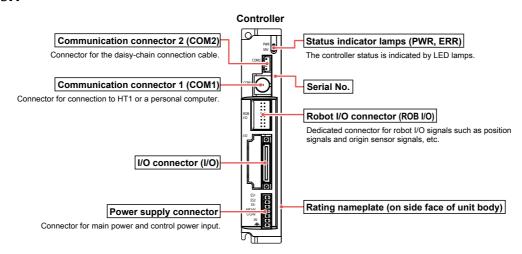
  (2) Regenerative unit is needed if using in a perpendicular position.
- (3) [The following arrangements require a regeneration unit.]
  - Using in the upright position. To move at a speed exceeding 1,000 mm/sec horizontally
    High lead (40) used horizontally.

#### TS-P

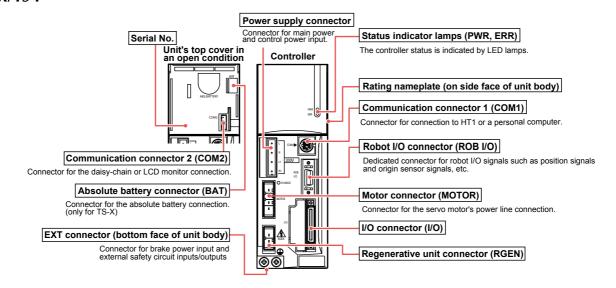
			MF7/7D	MF15/15D	MF20/20D	MF30/30D	MF75/75D
_		105					
Power supply		110	•	•	•		
voltage /	TS-P	205					
Current		210	•	•	•		
sensor		220				•	•
Regenera- tive unit	No entry	(None)	•	•			
	R (RGT)				•	•	
	R (RGU-2)						•

#### ■ Part names

#### TS-S2/TS-SH



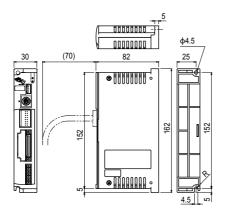
## TS-X/TS-P



Option

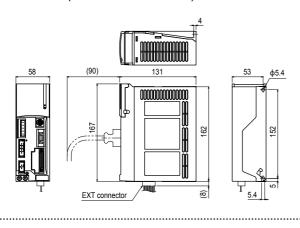
#### ■ Dimensions

TS-S2



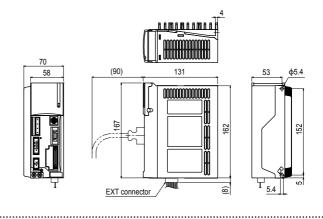
30. (70) 123 25. DIVI all 162 4.5 25. ON all 163 55. DIVI all 162 4.5 25. ON all 163 55. DIVI all 163 55. DI

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



TS-X/TS-P (220)

TS-SH



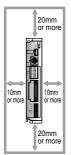
#### ■ Installation conditions

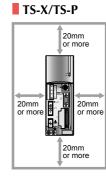
- Install the TS-S2/TS-SH/TS-X/TS-P inside the control panel.
- Install the TS-S2/TS-SH/TS-X/TS-P on a vertical wall.
- Install the TS-S2/TS-SH/TS-X/TS-P in a well ventilated location, with space on all sides of the TS-S2/TS-SH/TS-X/TS-P (See fig. at right.).

• Ambient temperature : 0 to 40°C

• Ambient humidity : 35 to 85% RH (no condensation)







#### ■ Cautions on TS-S2 / TS-SH

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

#### TS-S2 / TS-SH (Standard specifications)

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

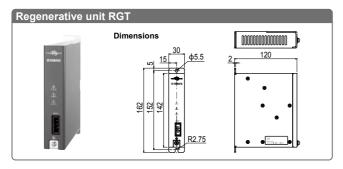


#### TS-S2S / TS-SHS (Sensor specifications)

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



#### ■ Regenerative unit RGT/RGU-2



#### 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 adiacent controller

Also, always use the dedicated cable when connecting the controller

Data structure

Parameter data

# Regenerative unit RGU-2 157 Dimensions 16 5.5 1 250 265 290

#### Basic specifications

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

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

#### ■ Data overview

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

#### Point data

The point data used in positioning operations includes items such as the "RUN type", "Position", and "Speed", etc. Up to 255 points (P1 to P255) can be registered. There are two point data setting types: "Standard setting" type that automatically defines optimal positioning simply by specifying the payload and "Custom setting" type that allows setting the speed (mm/s) and acceleration (m/s²) in SI units. Select the desired setting type according to the application.

#### Parameter data

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

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

K1 to K20

**RUN** parameter

K21 to K39

I/O parameter

K80 to K99

Option parameter

K40 to K79, K100 to ..

Servo parameter

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

- **Standard setting**Optimum positioning is provided simply by specifying the payload.
- (2) Custom setting Speed and acceleration can be set in SI units.

Specifies parameter settings related to positioning

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

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

Specifies parameter settings specified to the connected

and return to-origin operations.

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 (-)	Charifica the "personal zone" output ronge
8	Zone (+)	Specifies the "personal zone" output range.
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.

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.

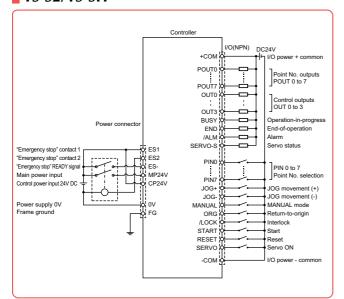
The maximum number of setting points for both setting types is 255 points (P1 to P255).

Setting Type	Description	
Standard setting	Optimum positioning is provided simply by speci- fying 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

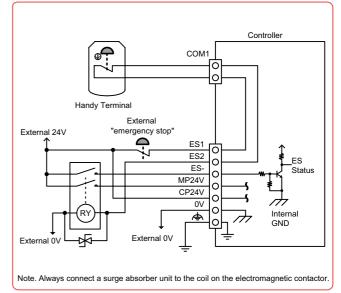
#### TS-S2/TS-SH

https://global.yamaha-motor.com/business/robot/

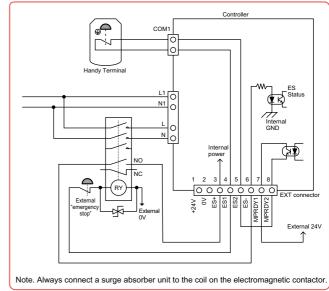


## ■ Emergency stop circuit example

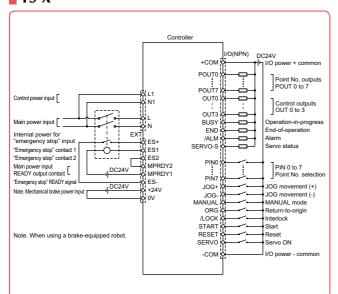
#### TS-S2/TS-SH (power connector and host unit connection example)



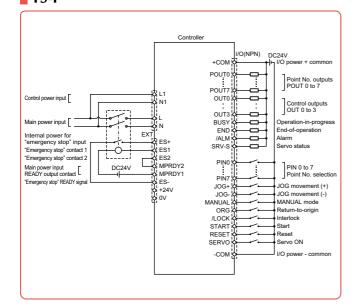




#### TS-X



### TS-P



Installing an external safety circuit will satisfy safety category class 4 standards. See P.748 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 <sup>™</sup> Slave 1 node
EtherNet/IP™	EtherNet/IP <sup>™</sup> adapter (2 ports)
PROFINET	PROFINET Slave 1 node

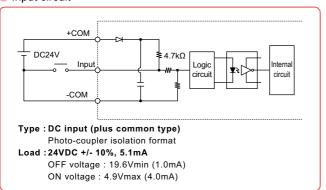
Option

### ■ I/O signals (NPN / PNP)

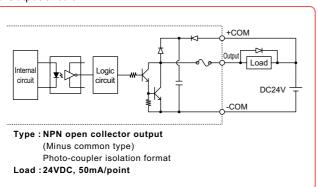
No.	Signal Name		Description	No.	Signal Name		Description
A1	+COM	I/O p	power input, positive common	B1	POUT0		
A2	+COM	(24V	/DC +/-10%)	B2	POUT1		
A3	NC	No.		В3	POUT2		
A4	NC	INO C	No connection		POUT3		Deliat No. code de
A5	PIN0			B5	POUT4		Point No. outputs
A6	PIN1			В6	POUT5		
A7	PIN2			В7	POUT6		
A8	PIN3			B8	POUT7	uts	
A9	PIN4		Point No. select	В9	OUT0	Outputs	OUT0 to OUT3 assignments include: • Zone output • Personal zone output • MANUAL mode status
A10	PIN5			B10	OUT1		
A11	PIN6			B11	OUT2		Return-to-origin end status     NEAR output     Mayomant in progress
A12	PIN7	Inputs		B12	OUT3		Movement-in-progress     Push status     Warning output
A13	JOG+	<u>u</u>	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	NO C	OHIGGRIOH
A19	RESET		Reset	B19	-COM	1/0 *	power input, negative common (0V)
A20	SERVO		Servo ON	B20	-COIVI	1/0	ower input, negative common (0v)

#### ■ NPN type I/O circuit details

#### Input circuit

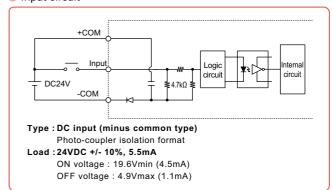


#### Output circuit

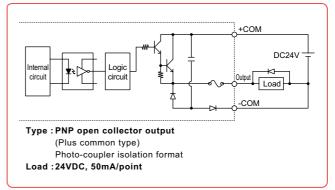


#### ■ PNP type I/O circuit details

#### Input circuit



#### Output circuit



# **Accessories and part options**

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

#### Standard accessories

Power connector



		TS-S2
Model	KCC-M4421-00	TS-SH
		TS-SD

Power connector (AC100V specifications)

Included when 100V model is purchased





Model	KCA-M5382-00

TS-X TS-P

LCC140 TS-X TS-P

SR1-X

Power connector (AC200V specifications)

Included when 200V model is purchased

For braking power and safety circuit connections.





Model KAS-M5382-00

SR1-P RCX320 RCX221 RCX222 RCX340

Model KCA-M5370-00

TS-X TS-P

TS-S2 TS-SH

Dummy connector

EXT connector



Model	KCA-M5163-00

TS-X TS-P

TS-X

TS-SH

RCX320

RCX340

I/O cables (2m/20-core×2)



		TS-S2
Model	KCV W4434 30	TS-SH
iviodei	KCA-M4421-20	TS-X
		TS-P

#### Absolute battery

#### Absolute battery basic specifications

• / tboolate batte	Tiboorato battory baoro opoornoationo			
Item	For TS-X	For TS-SH		
Battery type	Lithium metall			
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		





	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.

Model	Connector Note.	KCA-M4872-00
	lumn socket	KCA-M4873-00

•	TS-S2
-	TS-SH
•	TS-X
	TS-P

CC-Link connector
(CC-Link specifications)

Included when CC-Link model is purchased





Note. This is a single connector type. (Insert tw nectors into a branching socket.)	o con-

#### ■ Options

Handy terminal HT1/HT1-D



		HT1	HT1-D
Madal	3.5m	KCA-M5110-0J KCA-M5110-6J	KCA-M5110-1J
wodei	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



		TS-S
Madal	KCA-M4966-0J (Japanese)	TC.
Model	KCA-M4966-0E (English)	15-
	TOT WHOOD OF (Eligibil)	TS-
		TS-S

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

#### TS-Manager environment

os	Windows 2000, XP (32bit), Vista, 7, 8 / 8.1, 10 (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		LISB type (5m)	KCA-M538F-A0
	Model	D-Sub type (5m)	KCA-M538F-01

TS-SH TS-X Note. USB driver for communication cable can also be TS-P TS-SD

TS-S2

Daisy chain and gateway connection cable



Model	KCA-M532L-00 (300mm)

downloaded from our website.

TS-P TS-SD

TS-S2 TS-SH

TS-X

CC-Link termination connector (CC-Link specifications)



TS-S2		
— TS-SH	KCA M4074 00	Madal
— TS-X	KCA-M4874-00	Model
TS-P		

● TS-Monitor (LCD monitor) (2702)

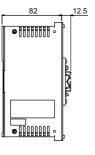


	Model	For TS-X	KCA-M5119-00	T:
		For TS-P	KCA-M5119-10	T:

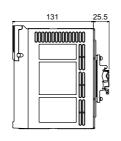
S-X S-P

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

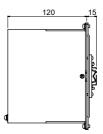












For TS-S2 KCC-M499A-00

TS-S2

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

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

TS-X TS-P

635

# TS-SD

CE complianceOnly for pulse train controlDedicated for TRANSERVO

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

Main functions ▶ P.93



# **Basic specifications**

Item		TS-SD
us	Number of controllable axes	Single-axis
ţ	Controllable robots	TRANSERVO series Note
specifications	Current consumption	3A (Rating) 4.5A (Max.)
eci	Dimensions	W30 × H162 × D82mm
sb	Weight	Approx. 0.2kg
Basic	Input power Control power supply	DC24V +/-10%
B	supply Main power supply	DC24V +/-10%
_	Operating method	Pulse train control
control	Control method	Closed loop vector control method
8	Position detection method	Resolver
Axis	Resolution	20480 P/rev, 4096 P/rev
⋖	Origin search method	Incremental
Ħ		Line driver method : 500 kpps or less
External input/output	Pulse train command input	Open collector method: 100 kpps or less (DC5 to 24V +/-10%)
in	Input	Servo ON (SERVO), reset (RESET) origin search (ORG)
ternal	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
	Operating temperature	0°C to 40°C
General specifications	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 <sup>2</sup>
Gen	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

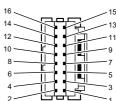
Note. Except for RF type sensor specifications and STH type vertical specifications.

## 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

TS-SD

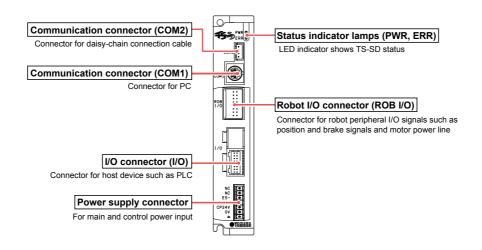
#### I/O connector



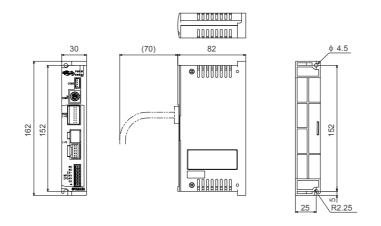
on



#### ■ Part names

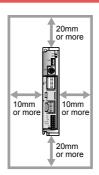


#### ■ Dimensions



### ■ Installation conditions

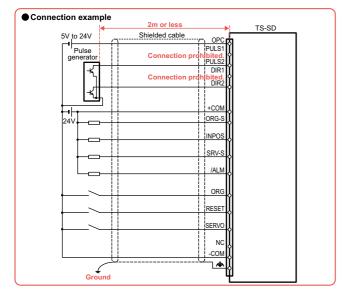
- Install the TS-SD inside the control panel.
- · Install the TS-SD on a vertical wall.
- Install the TS-SD in a well ventilated location, with space on all sides of the TS-SD (See fig. at right.).
- Ambient temperature: 0 to 40°C
- · Ambient humidity : 35 to 85% RH (no condensation)



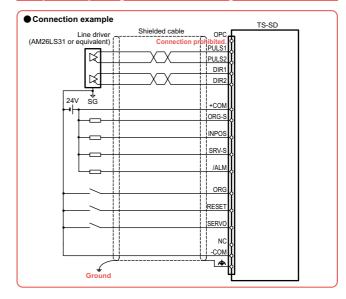
Туре	Signal Name	Open collector	Line driver	Description		
Inputs		Open collector power supply input	(Connection prohibited. Note 2)	Input the power supply for the open collector. (DC5 to 24V +/- 10%)		
	PULS1	(Connection prohibited. Note 1)	Command pulse input (+)	Input terminal for pulse train input commands. Select from 3		
	DIR1	(Connection prohibited. Note 1)	Command direction input (+)	Phase A/Phase B input     Pulse/Sign 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.		
	ORG-S	Return-to-origin end status	←	ON at return-to-origin end.		
Outputs	IN-POS	Positioning completion	<b>←</b>	ON when accumulated pulse in deviation counter are within specified value range.		
	/ALM	Alarm	←	ON when normal. OFF when alarm occurs.		
	SRV-S	Servo status	←	ON when servo is on.		

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

#### ■ Input / output signal connection diagram [open collector]



#### ■ Input / output signal connection diagram [line driver]



#### ■ Daisy chain function

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

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



# **Accessories and part options**



#### Standard accessories

Power connector



TS-S2 Model KCC-M4421-00 TS-SH TS-SD

I/O cables (1m)



KCC-M5362-00 Model TS-SD

#### ■ Options

Support software TS-Manager





KCA-M4966-0J (Japanese) Model 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)
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
	USB type (5m) D-Sub type (5m)	KCA-M538F-01

downloaded from our website.

. (	TS-S2	)
(	TS-SH	)
(	TS-X	)
(	TS-P	j
(	TS-SD	Ī

TS-S2

Daisy chain and gateway connection cable



		TS-SH
Model	KCA-M532L-00 (300mm)	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.



Main functions ▶ P.92



RDV-X

RDV-P

### ■ Basic specifications

Item		RDV-X			RDV-P						
Driver model		RDV-X205	RDV-X210	RDV-X220	RDV-P205	RDV-P210	RDV-P220	RDV-P225			
Number of controllable axes		Single-axis									
Controllable robots					Linear motor sir	Linear motor single-axis robot PHASER					
sic specificatio	Capacity of the connected motor		200V 100W or less 200V 200W or less 200V 600W or less 200V 100W		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×D1	W40×H160×D140mm W40×H160×D170mm		W40×H160×D1	40mm	W40×H160×D170mm	W55×H160×D170mm		
	Weight		0.7kg 1.1kg			0.7kg 1.1kg 1.2kg			1.2kg		
	Input power	Control power supply	Single phase 200 to 230V +10% to -15%, 50/60Hz +/-5			Hz +/-5%	<u>-</u> +/-5%				
	supply	Main power supply	Single phase / 3	Single phase / 3-phase 200 to 230V +10% to -15%, 50/60Hz +/-5%							
<u>0</u>	Position detec	tion method	Resolver Magnetic linear				scale				
ontr	Control system	1	Sine-wave PWM (pulse width modulation)								
Axis control	Control mode		Position control	Position control							
₹	Maximum spee	ed Note 1	5000rpm 3.0m/s								
	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/output related function	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								
nt re	Output signal		Open collector signal output (usable for sink/source) (1) Servo ready (2) Alarm (3) Positioning completed (4) Return-to-origin complete								
t p	Relay output signal		Braking cancel signal (24V 375mA) -								
Input/o	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.								
	Display		5-digit number indicator, Control power LED								
Б.	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.								
di	Regenerative I	oraking circuit	Included (but without braking resistor)								
Internal function	Dynamic brake Note 4		Included (Operation conditions can be set.) (No DB resistor, connection: 2-phase short circuit) be set.) (we 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)				, y y						
	Protective fund	ctions	Over-current, overload, braking resistor overload, main circuit overvoltage, memory error, etc.								

RDV-X ► FLIP-X<sup>Note 1</sup> (2295) RDV-P ► PHASER (2341) Controllable robot Note 1. Exclude T4 / T5 / C4 / C5 / YMS Field networks CE marking

■ Model O	verview						
	Name	RDV-X	RDV-P				
Co	ntrollable robot	Single-axis robot FLIP-X Note 1 Linear motor single-axis robot PHAS					
Input nower	Control power supply	Single phase 200 to 230V +10% to -15% (50/60Hz +/-5%)					
Input power	Main power supply	Single phase / 3-phase 200 to 230V +10% to -15% (50/60Hz +/-5%)					
Ор	erating method	Pulse train control					
Maximum nu	mber of controllable axes	Single-axis					
Origi	in search method	Incremental					

## ■ Ordering method RDV-X RDV-P **RDV-P RDV-X** Driver Regenerative unit Regenerative unit 100W or less No entry: None No entry: None 10: 200W or less RBR1 10: 200W or less RBR1 20: 400W or less 25: 750W or less Note. Driver selection and regenerative unit selection depend on the robot type 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 See the selection table on the next page for selecting the driver/regenerative

						_	,				
	Item		RDV-X			RI	OV-P				
Driver	model	RDV-X205	RDV-X210	RDV-X220	RDV-P205	RDV-P210	RDV-P220	RDV-P225			
Options	Support software for PC	RDV-Manager									
SUS	Operating temperature	0°C to +55°C	0°C to +55°C								
eral	Storage temperature Note 5	-10°C to +70°C									
General	Operating humidity	20% to 90%RH	I (non-condensi	ng)							
sbe	Vibration Note 6	5.9m/s <sup>2</sup> (0.6G)	10 to 55Hz		-	-					

circuit

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.

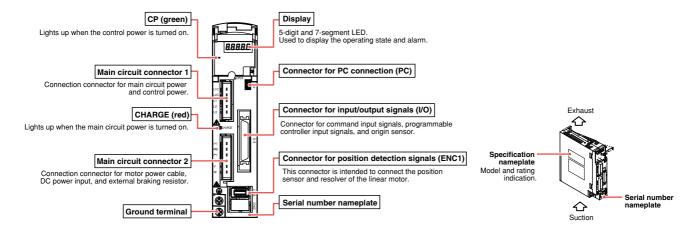
Note 3. GXL-8FB (made by SUNX) or FL7M-1P5B6-Z (made by YAMATAKE) is used for the origin sensor. The power consumption of the origin sensor is 15mA or less (at open output) and only 1 unit of the origin sensor is connected to each robot driver. (future specification)

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

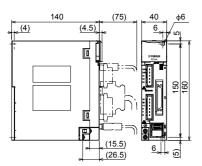
circuit.

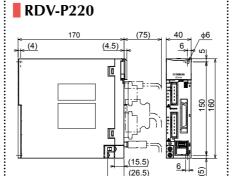


## ■ Dimensions

## RDV-X205/210

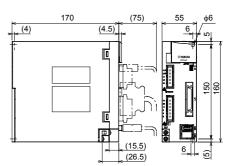
RDV-P205/210





RDV-X220

## RDV-P225



## ■ Driver / regenerative unit selection table

## RDV-X

																FLI	P-X													
			T4LH/ C4LH	T5LH/ C5LH	T6L/ C6L	Т9	т9Н	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	R2
		05	•	•	•	•		•	•	•	•		•												•	•		•	•	
Driver selection	RDV-X	10					•					•		•													•			•
selection		20													•	•	•	•	•	•	•	•	•	•						
Regenera-	No en (None	try )	•	•																										
ive unit	RBR	1			•	•	•	•	•	•	•	•	•	•	•	0	0	•	0	•	•	•	•	•	•	•	•	•	•	•
	RBR	2														0	0		0											

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

## RDV-P

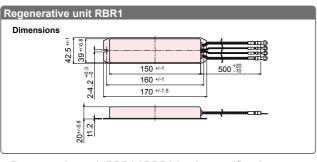
					PHASER		
			MF7/ MF7D	MF15/ MF15D	MF20/ MF20D	MF30/ MF30D	MF75/ MF75D
		05					
Driver	RDV-P	10	•	•	•		
selection		20				•	
		25					•
Regenera-	RBR1		•	•	•	•	
tive unit	RBR2						•

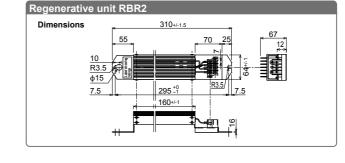
## ■ Regenerative unit RBR1 / RBR2 dimensions

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 / RBR2 basic specifications

• Regenerative and Refer / Re	Dite busic speci	noutions
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.

stopping the servo amplifier or making the deceleration time longer.

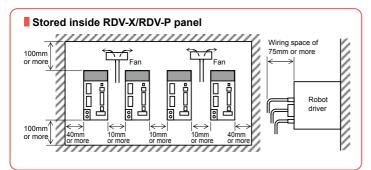
Note. With the regenerative unit, specifications and whether or not required may vary depending on each robot and its operation conditions.

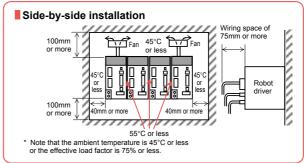
**RDV-X/RDV-P** 

Option

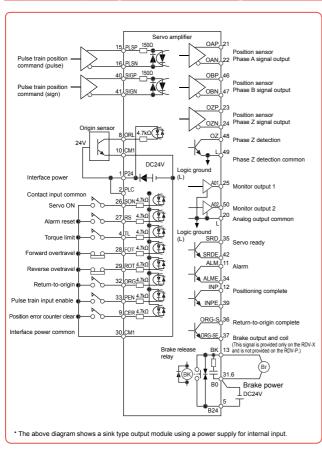
## ■ Installation conditions

- · 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.





## ■ Input / output signal connection diagram



	St of K	DA-5 / KDA	-X terminal functions
Туре	Terminal symbol	Terminal name	Description

	symbol	reminarname	Description				
	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).				
gnal	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.				
Inputsignal	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	When this signal is OFF, the robot will not run in				
		overtravel Reverse	forward direction. (Forward direction limit signal) When this signal is OFF, the robot will not run in				
	ROT	overtravel	reverse direction. (Reverse direction limit signal)				
	ORL	Origin sensor	Input an origin limit switch signal showing the				
			origin area.				
	ORG	Return-to-origin Pulse train input	Inputting this signal starts return-to-origin operation When this signal is turned on, the pulse train				
	PEN	enable	position command input is enabled.				
	CER	Position error counter clear	Inputting this signal clears the position deviation (position error) counter. (Position command value is viewed as current position.)				
_	SRD 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)				
Output signal	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.)				
Outbr	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-SE	Return-to-origin complete	This signal is output when the return-to-origin is completed successfully.				
Relay output	BK (B24) <sup>Note 1</sup>	Brake release relay output	When the servo is ON, this terminal outputs a signal to allow releasing the brake. (FLIP-X series only)				
ち	AO1	Monitor output 1	Outputs speed detection values, torque commands				
Monitor output	AO2	Monitor output 2	<ul> <li>etc. as analog signal voltages for monitoring.</li> <li>Signals to output are selected by setting parameters.</li> <li>These signals are only for monitoring. Do not use fo control.</li> </ul>				
Mor	L	Monitor output common	This is the ground for the monitor signal.				
	PLSP	Position					
ح ک	PLSN	command pulse	Select one of the following signal forms as the pulse-train position command input.				
itio		(pulse signal)	Command pulse + direction signal     Forward direction pulse train + reverse direction pulse train     Phase difference 2-phase pulse				
Position	SIGP	Position command pulse					
- ŏ	SIGN	(sign signal)					
	OAP	Position sensor					
ō	OAN	Phase A signal	Outputs monitor signal obtained by dividing "phase A" signal of position sensor.				
	OBP						
onit	OBN	Position sensor Phase B signal	Outputs monitor signal obtained by dividing "phase B" signal of position sensor.				
r monit		1					
nsor monit		D:4:					
sensor monit	OZP	Position sensor Phase Z signal					
tion sensor monit	OZP OZN	Phase Z signal	signal.				
osition sensor monit	OZP	Phase Z signal Phase Z detection	signal.  Outputs monitor signal for position sensor "phase Z				
Position sensor monitor	OZP OZN	Phase Z signal Phase Z detection Phase Z detection	signal.				
	OZP OZN OZ L	Phase Z signal Phase Z detection Phase Z detection common	Outputs monitor signal for position sensor "phase Z signal.				
	OZP OZN OZ	Phase Z signal Phase Z detection Phase Z detection common	signal.  Outputs monitor signal for position sensor "phase Z				

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

I/O connector (no brake wiring)



RDV-X Model KBH-M4420-00 RDV-P

I/O connector (with brake wiring)



( RDV-X ) KBH-M4421-00 RDV-P

Power supply connector



(RDV-X) Model KEF-M4422-00 RDV-P

## ■ Options

Support software **RDV-Manager** 





|--|

RDV-X RDV-P

## Environment

OS	Windows Vista SP1 (32bit) Note 1, 7, 8 / 8.1
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



Model	KEF-M538F-01	

RDV-X RDV-P

## **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.

## Main functions ▶ P.98







**ERCD** 

## ■ Basic specifications

			Item		ERCD			
Nu	mb	er of controll	lable axes		Single-axis			
Со	ntro	ollable robots	3		Single-axis robot FLIP-X series T4L / T5L / C4L / C5L			
tions	Ca	pacity of the	connected	motor	DC24V 30W or less			
cifica	Dir	mensions			W44 × H166 × D117mm			
Basic specifications	We	eight			0.45kg			
Basi	Inp	out power su	pply		DC24V +/-10% maximum 3A to 4.5A (Variable depending on robots in use.)			
	Dri	ive method			AC full-digital software servo			
	Ро	sition detect	ion method		Resolver			
trol	H.	erating meth			Normal mode: point trace movement, program operation, operation using RS-232C communication Pulse Train mode: operation by pulse train input			
ő	Po	sition indica	tion units		mm (millimeters)			
Axis control	Sp	eed setting			1% to 100% (Setting by 1% unit)			
â	_	celeration se	etting		Automatic speed setting per robot No. and payload     Setting based on acceleration and deceleration parameter 1% to 100% (Setting by 1% unit)			
	-	solution			16384 P/rev			
	_	igin search r			Incremental			
am	_	ogram langu	age		YAMAHA SRC			
og	Μu	ıltitasks			4 tasks			
₫	Po	int-data inpu	ıt method		Manual data input (coordinates input), Direct teaching, Remote teaching			
or y	RA	AM			32 Kbytes with lithium battery backup (5-year life) Retains programs, point data, parameters and alarm history			
em	Pro	RAM Programs Points			100 programs (Maximum program number) 255 steps per program 1024 steps / total or less			
Ž	Ро	ints			1000 points (256 when point tracing)			
		Normal	Sequence inp	out	Dedicated input 8 points, General input 6 points			
		mode Note 1	Sequence ou	tput	Dedicated input 3 points, General input 6 points, Open collector output			
			Sequence inp	out	Dedicated input 5 points, General input 6 points			
		D 1 1 1	Sequence ou	tput	Dedicated input 3 points, General input 6 points, Open collector output			
Ħ	ace	Pulse train mode Note 1	0	Туре	1.Phase A / phase B, 2.Pulse / code, 3.CW / CCW			
External input/output	I/O interface		Command pulse input	Mode	Line driver (+5V)			
¥	Ξ			Frequency	Maximum 2 Mpps			
ü	2			Terminal name	PA+, PA-, PB+, PB-, PZ+, PZ-			
nal		Feedback		Туре	Phase A / phase B / phase Z			
çter		pulse outpu	ıt	Mode	Line driver (+5V)			
ш				Number of pulse	16 to 4096 P/rev			
		Power supp	oly for seque	nce I/O	External DC +24V input			
	Em	nergency sto	p input		Normal close contact point input			
	Bra	ake output			Relay output (for 24V/300mA brake) 1CH			
	Ex	ternal comm	nunications		RS-232C 1CH (For communication with HPB or PC)			

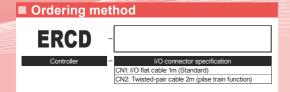
Controllable robot

FLIP-X Dedicated for T4L/T5L CEID Dedicated for C4L/C5L CEID

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



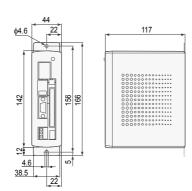
	Item	ERCD
Options	Programming box	HPB, HPB-D (with enable switch)
Ö	Support software for PC	POPCOM+
2	Operating temperature	0°C to 40°C
atio	Storage temperature	-10°C to 65°C
ig su	Operating humidity	35% to 85%RH (non-condensing)
Genera	Noise resistance capacity	IEC61000-4-4 Level 2
g	Protective functions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

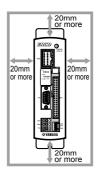
# Robot I/O connector Robot I/O connector HPB connector I/O. CN connector Power terminal block (24P, 24N, FG) EXT. CN connector

## ■ Dimensions



## ■ Installation conditions

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



■ Connector I/O signals	
-------------------------	--

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

## ■ Pulse train I/O connector signals

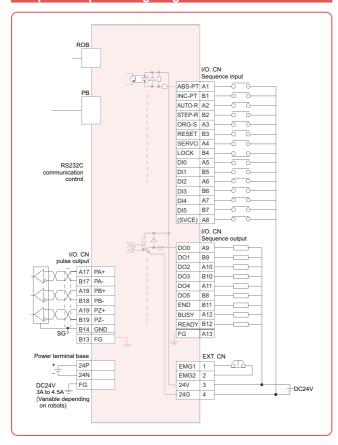
Terminal number	Signal name	Function
A-1	NC	Reserved (use inhibited)
B-1	NC	Reserved (use inhibited)
A-2	NC	Reserved (use inhibited)
B-2	PCLR	Differential clear input
A-3	ORG-S	Return to the origin input
B-3	RESET	Alarm reset input
A-4	SERVO	Servo-ON input
B-4	INH	Command pulse inhibition input
A-5	DI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

## ■ Robot Language Table

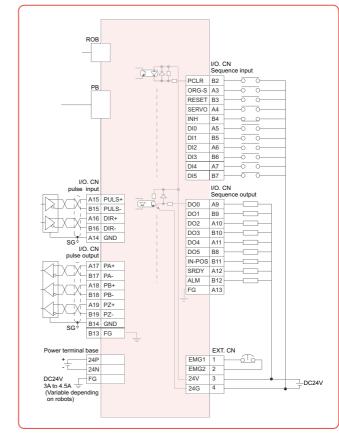
Command	Description	
MOVA	Moves to a point data position.	
	·	
MOVI	Moves from current position by amount of point data.	
MOVF	Moves until a specified DI input is received.	
JMP	Jumps to a specified label in the specified program.	
JMPF	Jumps to a specified label in a specified program according to the input condition.	
JMPB	Jumps to a specified label when general-purpose input or memory input is in the specified state.	
L	Defines the jump destination for a JMP or JMPF statement, etc.	
CALL	Runs another program.	
DO	Turns general-purpose output or memory output on or off.	
WAIT	Waits until general-purpose input or memory input is in the specified state.	
TIMR Waits the specified amount of time before advancing next step.		
Р	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.
С	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
	Phase A / phase B		
Positive logic	Pulse / code	7777	
	CW / CCW		

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

## **Accessories and part options**



## **ERCD**

## Standard accessories

24V power connector (for EXT. CN)



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.



KAU-M4421-10 Model

( ERCD )

## ■ Options

Support software for PC (2691) 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 type (5m)	KBG-M538F-00
Model	D-Sub type 9pin-9pin (5m)	KAS-M538F-10

Note. This USB cable supports Windows 2000/XP or

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

RCX340 (LCC140)

(LCC140) ERCD SR1-X

SR1-P

RCX320

RCX221 RCX222

## Programming box 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

## SR1-X/SR1-P

## Robot controller with advanced functions

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

## Main functions ▶ P.98



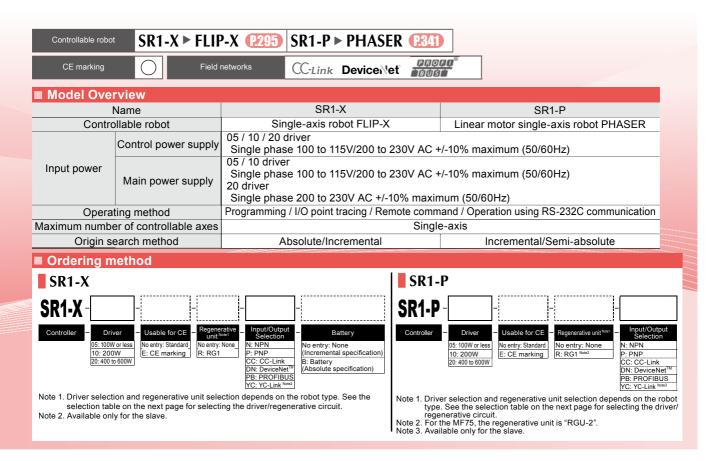




## ■ Basic specifications

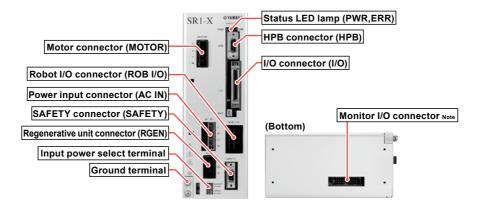
		Item		SR1-X			SR1-P				
	Driver model		SR1-X05	SR1-X10	SR1-X20	SR1-P05	SR1-P10	SR1-P20			
	Applicable mot	or output	200V 100W or less	200V 200W or less	200V 600W or less	200V 100W or less	200V 200W or less	200V 600W or less			
	Number of conf	trollable axes	Single-axis								
Suc	Controllable rol	bots	Single-axis robot	FLIP-X (exclude T4	L, T5L)	Linear motor sing	gle-axis robot PHAS	ER			
atio	Maximum power	er consumption	400VA	600VA	1400VA	400VA	600VA	1400VA			
iţi	Capacity of the	connected motor	100W	200W	600W	100W	200W	600W			
Basic specifications	Dimensions		W74 × H210 × D	146mm	W99 × H210 × D146mm	W74 × H210 × D	146mm	W99 × H210 × D146mm			
sic	Weight		1.54kg		1.92kg	1.54kg		1.92kg			
Bas		Control power supply	Single phase AC	100 to 115/200 to 23	30V +/-10% maximu	m 50/60Hz					
	Input power supply	Main power supply	Single phase AC2230V +/-10% max		Single phase AC200 to 230V +/-10% maximum 50/60Hz	Single phase AC 230V +/-10% ma	100 to 115/200 to ximum 50/60Hz	Single phase AC200 to 230V +/-10% maximum 50/60Hz			
	Drive method		AC full-digital soft	ware servo							
	Position detecti	ion method	Multi-turn resolver with data backup function Magnetic linear scale								
<u>0</u>	Operating meth	nod	Programming, I/O point tracing, Remote command, Operation using RS-232C communication								
s control	Position indicat	tion units	mm (millimeters), deg (degrees)								
8	Speed setting		1% to 100% (Sett								
	Acceleration se	etting	2. Setting based	Automatic speed setting per robot No. and payload     Setting based on acceleration and deceleration parameter (Setting by 1% unit)							
	Resolution		16384 P/rev			1µm					
	Origin search n		Absolute, Incremental Incremental, Semi-absolute								
co.	Program langua	age	YAMAHA SRC								
oge	Multitasks		4 tasks maximum								
Ā	Point-data inpu	t method	Manual data input (coordinate value input), Direct teaching, Teaching playback								
mory	Programs Points			100 programs 255 steps / 1 programs 3000 steps / total							
ž	Points			1000 points							
	STD.DIO	I/O input		Dedicated input 8 points, General input16 points							
		I/O output		4 points, General o		_					
Ħ	SAFETY		0 , 1	nput (Normal close	contact point input)	service mode inp	ut				
utb	Brake output		Relay contact			_					
1,0	Origin sensor ir			Connectable to DC 24V normally-closed contact sensor							
ndı	External comm	unications	RS-232C: 1CH (I	RS-232C: 1CH (For communication with HPB / HPB-D or PC)							
. <u>=</u>	Analog input/or	utput	Input 1ch (0 to +1	Input 1ch (0 to +10V) Output 2ch (0 to +10V)							
rna		Slots	1								
External input/output								eral output 16 points			
Ш	Options	Type						neral output 32 points			
		Турс						neral output 32 points			
			PROFIBUS: Dec	PROFIBUS: Dedicated input 16 points, Dedicated Output 16 points, General input 32 points, General output 32 points							

Option



Item	SR1-X		SR1-P			
	HPB, HPB-D (with enable switch)					
Support software for PC	POPCOM+					
© Operating temperature	0°C to 40°C					
Storage temperature	-10°C to 65°C					
ভি Operating humidity	35% to 85%RH (non-condensing)					
Absolute backup battery	Lithium metallic battery		_			
Absolute data backup period	1 year (in state with no power applied)		_			
Noise immunity	IEC61000-4-4 Level 3					

## ■ Part names



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

## ■ Driver / regenerative unit selection table

## SR1-X

															FLI	P-X												
			T4LH/ C4LH	T5LH/ C5LH	T6L/ C6L	Т9	Т9Н	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
		05	•	•	•	•		•	•	•	•		•										•	•	•	•	•	
Driver selection	SR1-X	10					•					•		•	•													•
Selection		20														•	•	•	•	•	•	•						
Regenera-	No entry (I	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 Reger	① Regenerative unit is needed if using in a perpendicular position and movement stroke  ④ Regenerative unit is needed if using at maximum speeds exceeding 1000mm per second.																											

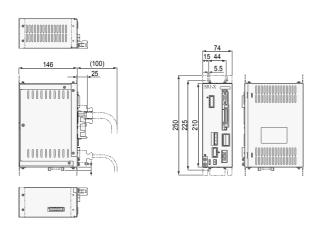
- ① Regenerative unit is needed if using in a perpendicular position and movement stroke
- Regenerative unit is needed if using at maximum speeds exceeding 1250mm per second.
   Regenerative unit is needed if using at maximum speeds exceeding 750mm per second. is 700mm or more.
  ② Regenerative unit is needed if using in a perpendicular position. Regenerative unit is needed if using in a perpendicular position, using at maximum speeds exceeding 1000mm per second, or if using high leads (40).

## SR1-P

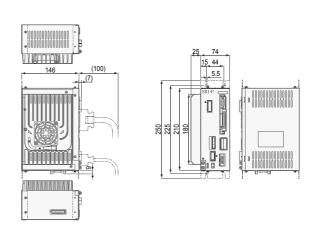
				PHASER		
		MF7/ MF7D	MF15/ MF15D	MF20/ MF20D	MF30/ MF30D	MF75/ MF75D
	05					
SR1-P	10	•	•	•		
	20				•	•
		•	•			
R (RG1)				•	•	
R (RGU-2)						•
	No enti (None) R (RG1	SR1-P 10 20 No entry (None) R (RG1)	MF7D  05  SR1-P 10 20  No entry (None)  R (RG1)	MF7/ MF15/ MF15D  SR1-P 10	MF7/ MF15/ MF20/ MF15D   MF20D	MF7D   MF15D   MF20D   MF30D

## ■ Dimensions

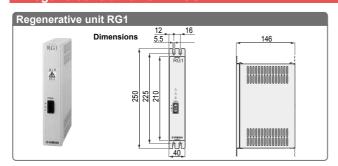
## SR1-X/SR1-P 05 - 10



## SR1-X/SR1-P 20



## ■ Regenerative unit RG1 / RGU-2



## Basic specifications

• Dasic 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

## Regenerative unit RGU-2 157 Dimensions 16 5.5 Hin H 250 265 290 Liui.

## Basic specifications

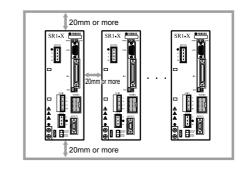
Item	RGU-2
Model	KS5-M4107-0A (Including accessory)
Dimensions	W40 × H250 × D157mm
Weight	0.9kg
Regenerative voltage	Approx. 380V or more
Regenerative stop voltage	Approx. 360V or less
Accessory	Cable for connection with controller (300mm)

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

Option

## ■ 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)

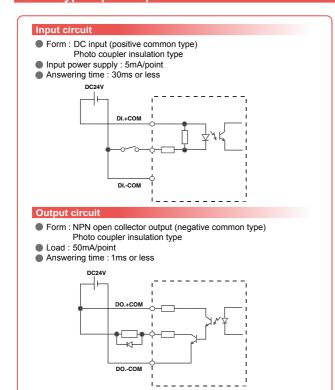


## ■ [NPN, PNP type] Input/Output list

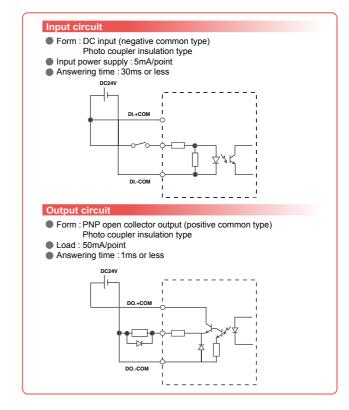
- INLIN	, FINE Lype	input/Output list
Terminal number	Signal name	Function
1	DI.+COM	Input supply+common
2	SERVO	Return to servo on
3	INC-PT	Relative point transfer
4	ABS-PT	Absolute point transfer
5	STEP-R	Step run
6	DI 0	General input 0
7	DI 1	General input 1
8	DI 2	General input 2
9	DI 3	General input 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	DICOM	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	DOCOM	Output supply-common
40	DOCOM	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



## ■ PNP type input/output circuit



■ 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					

12	EMG2	Emergency stop 2				
13	NC	NC				
14	NC	NC				
■ Rob	ot Language	e Table				
Command		Description				
MOVA		int data position.				
MOVI		irrent position by amount of point data.				
MOVF		specified DI input is received.				
JMP		ecified label in the specified program.				
-		ecified label in a specified program				
JMPF	according to th	ne input condition.  ecified label in a specified program when				
JMPB	general-purpostate.	se input or memory input is in the specified				
L	Defines the jur statement.	mp destination for a JMP or JMPF				
CALL	Runs another					
DO		urpose 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.					
Р	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 retur	Performs return-to-origin.				
TON	Runs a specified task.					
TOFF	Stops a specif	ied task.				
JMPP	Jumps to a specified label when the axis position condition meets the specified conditions.					
MAT	Defines a matr	ix.				
MSEL	Specifies a ma	atrix to move.				
MOVM	Moves to a spe	ecified pallet work position on matrix.				
JMPC		ecified label when the counter array als the specified value.				
JMPD	Jumps to a spe equals the spe	ecified label when the counter variable D cified value.				
CSEL	Specifies an ar	ray element for counter array variable C.				
С	Defines counte	er array variable C.				
C+	Adds a specific	ed value to counter array variable C.				
C-		cified value from counter array variable C.				
D	Defines counte	er variable D.				
D+	Adds a specific	ed value to counter variable D.				
D-	Subtracts a sp	ecified value from counter variable D.				
SHFT	Shifts the coor point data.	dinate position by amount of specified				
IN		mation on specified general-purpose input ut into counter variable D.				
OUT	Outputs the va	llue of counter variable D to specified se output or memory output.				
LET		dinate position by amount of specified				

## **Accessories and part options**

SR1-X/SR1-P

## Standard accessories

Power connector + wiring connection lever



Model KAS-M5382-00

RCX340

LCC140 TS-X TS-P SR1-X

SR1-P

RCX320 RCX221 RCX222

Safety connector



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

SR1-X SR1-P

LCC140

HPB dummy connector

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



Model KDK-M5163-00

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

SR1-X

(RCX222)

Absolute battery

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

## Basic specifications

Buolo opcol	iloutions.
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	ф17 × 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.

## Battery case

This is the absolute battery holder.



		Model	KBG-M5395-00
--	--	-------	--------------

SR1-X RCX222

See next page for optional parts

## Options

## Cable for monitor I/O

Cable to connect I/O connector of SR1 monitor. The cable is 1.5m long with its end cut and left

Required when using analog input / output and feedback pulse output.



Madal	KDC M4404 00	SR1-X
Model	KBG-M4421-00	SR1-P
		3K I-P

## Support software for PC (2690) 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.



LCCITO		
ERCD	KDC M4066 00	Model
SR1-X	KBG-M4966-00	Model
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	

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<sup>+</sup>. Select from USB cable or D-sub cable.





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

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

Note. USB driver for communication cable can also be

downloaded from our website.

RCX221 RCX222 RCX340

(LCC140) ERCD SR1-X

SR1-P

RCX320

ICC 140

## Programming box 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
21_	ERCD
	SR1-X
	SR1-P

## YC-Link board (with connection cable)

		SR1-X
Model	KBG-M4400-60	SR1-P
	<del> </del>	SKI-P

Note. Use the converter cable if changing to the SR1-X, SR1-P from a system using SRCX, SRCP. (See P.743).

629

## **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.

@YAMAHA

**RCX320** 

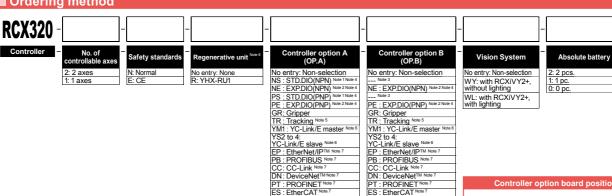
## Main functions ▶ P.102





Support software for PC RCX-Studio 2020

## Ordering method



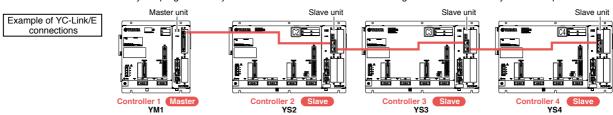
EP : EtherNet/IP<sup>TM NO</sup> PB : PROFIBUS NOTE 7 CC: CC-Link Note 7
DN: DeviceNet<sup>TM</sup> Note
PT: PROFINET Note 7

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 controlled
- 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

## 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.



- 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.

Ether CAT.

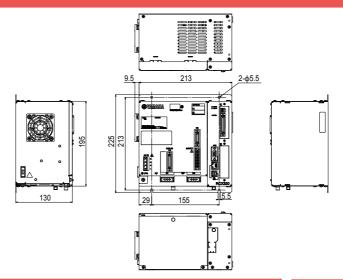
Support software for personal computer RCX-Studio 2020

Controllable robot	XY-X	P.363	FLIP-X	P.295	PHASER	P.341	YP-X	P.553	
CE marking		Field	networks	CC-L	ink DeviceN	et Ethe	ri\\et/IP`	Ethernet	egogo" Bedsi

	BUS NEIL CAR.
■ Basic specifications	
Item	RCX320
Applicable robots	YAMAHA single-axis robots, linear single-axis robots, P&P robots
Connected motor capacity Power capacity Dimensions Weight	1200W or less (in total for 2 axes) 2400VA
Dimensions	W213 × H195 × D130mm (main unit only)
Weight	3.6kg (main unit only)
© Input power supply	Single-phase 200 to 230V AC +/-10% maximum, 50/60Hz
<sup>™</sup> supply Main power	Single-phase 200 to 230V AC +/-10% maximum, 50/60Hz
supply	Max. 2 axes
No. of controllable 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
S Coordinate systems	Joint coordinates, Cartesian coordinates
Speed setting	Pulses, mm (1/1000 steps), degree (1/1000 steps)
≪ Speed setting	0.01 to 100% (below 1% can be changed by programming)  Optimized by robot model and tip weight parameter
	Setting by acceleration coefficient and deceleration rate parameters (1% steps)
Acceleration/deceleration setting	* Can be changed by programming.
Program language	Zone control (For SCARA robots only, optimized according to arm posture)  YAMAHA BASIC II conforming to JIS B8439 (SLIM language)
Multi-task	Max. 16 tasks
Sequence program	1 program
	2.1MB (Total of program and point data)
Memory capacity E Program	(Available capacity for program when the maximum number of points is used: 300KB)
E Program	100 programs (maximum number of programs) 9999 lines (maximum number of lines per program)
o 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
Input	Emergency stop ready input, 2 systems Auto mode input, 2 systems (Enabled only when the global specifications are used.)
SAFETY	Emergency stop contact output, 2 systems
O Output	Enable contact output, 2 systems (Enabled only when the PBX-E is used.)
Output	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  RS-232C: 1CH (D-SUB 9-pin (female))
	Ethernet: 1CH (In conformity with IEÉE802.3u/IEEE802.3)
External communications	100Mbps/10Mbps (100BASE-TX/10BASE-T) Applicable to Auto Negotiation
	RS-422: 1CH (Dedicated to PBX)
Operating temperature	0 to 40°C
Storage temperature	-10 to 65°C
S Operating humidity	35 to 85% RH (no condensation)
Atmosphere Anti-vibration	Indoor location not exposed to direct sunlight. *No corrosive , flammable gases, oil mist, or dust particles
용 Anti-vibration	All XYZ directions 10 to 57Hz unidirectional amplitude 0.075mm 57 to 150Hz 9.8m/s <sup>2</sup> Position detection error, power module error, temperature error, overload, overvoltage, low voltage, excessive position
Protective functions	deviation, overcurrent, motor current error
Protective functions  Noise immunity	Conforms to IEC61000-4-4 Level 3
Protective structure	IP20
Appliance classes	Class I
Standard	Dedicated input 8 points, dedicated output 9 points
Parallel specifications	General-purpose input 16 points, general-purpose output 8 points NPN/PNP specifications are selected. (maximum 1 board)
I/O board Expansion	General-purpose input 24 points, general-purpose output 16 points
specifications	NPN/PNP specifications are selected. (maximum 4 boards)
CC-Link board Ver1.1/2.0  DeviceNet <sup>™</sup> board	Remote I/O
DeviceNet <sup>™</sup> board  EtherNet/IP™ board  PROFIBLIS board	Dedicated input/output: 16 points each
	General-purpose input/output: 96 points each
PROFINET board	Remote register Input/output: 16 words each
EtherCAT board	Communication cycle: 1 ms, control cycle: minimum 1 ms / maximum 8 ms, maximum number of robot units; four units
YC-Link/E board (master/slav	<sup>e)</sup>  Maximum number of control axes: total 14 axes (including two master controller axes), maximum 12 axes for slaves only
	Position detection method: optical rotary encoder, minimum setting distance: 0.01 mm
YRG (gripper) board	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)
Tracking board	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  2.6V/2700mAH / avia. Packup retention time: About 1 years
Absolute battery	3.6V 2700mAH / axis Backup retention time: About 1 year

Option

## ■ Dimensions



## ■ Power supply capacity and heat emission

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

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

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

Axial current	sensor value	Power	Generated			
X axis Y axis		capacity (VA)	heat amount (W)			
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						

Motor capacity vs. current sensor table

Connected motor

Current sensor

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

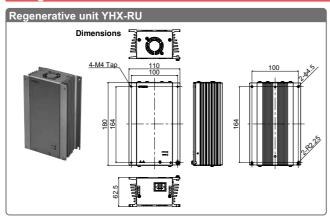
Note. Motor output of the B14H is 200W but the current sensor is 05.

## 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 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

interchanged no problem will occur.



## Basic specifications

Item		YHX-RU1				
Model		KEK-M4107-0A (including cable supplied with unit)				
Dimensions		W62.5×H180×D110mm				
Weight		1.45kg				
Absorbable	electric power	100 W (Equivalent to RGU 3)				
Power Supply	Input	254 to 357 V DC (Controller DCBUS Connecting)				
Connector		Regenerative unit connector (for unit connection and extension)				
	Working Temperature	0 to 40 °C				
	Working Humidity	35 to 85% RH (No Condensation)				
Installation Environment	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 C	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 mode

Whether the regenerative unit is	s n	eed	ded	İS	aut	om	atic	ally	/ de	eter	mir	ned	l by	the	ro	bot	m	ode	ıl.							
	PHASER				FLI	P-X	XY-X  Arm type, Gantry type, Moving arm type, Pole type  XZ type							у-Х	Clean											
	MF7D	15D	F20D	F30D	MF50D	MF75D	N15D	N18D	PXYx	FXYx	FXYBx	SXYx	SXYBx	NXY	MXYx	HXYx	HXYLx	SXYx (ZF)	SXYx (ZFL20)	SXYBx (ZF)	SXYBx (ZFL20)	MXYx	нхүх	YP220BX	YP320X	SXYxC
		Ē	Ĕ	Σ	Ĕ	Ĕ	Σ	Σ							2	axe	s							7	₹	2 axes
No entry (None)	•	•							•	•	•	•	0					•		•				•	•	•
Regenerative unit			•	•	•	•	•	•					0	•	•	•	•		•		•	•	•			

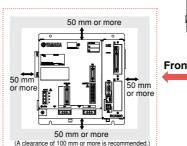
• : Applicable : Select per conditions

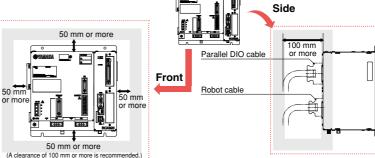
## ■ Installation conditions

• 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 : 35 to 85% RH · Ambient humidity (no condensation)





Pin (ID=1) (ID=2) (ID=3) (ID=4)

1         DI 01         Dedicated input: Servo ON input           2         DI 10         Dedicated input: Sequence control           3         DI 03         Spare         Do no           4         CHK 1         Check signal 1         Short-with C           5         DI 05         Spare         Do no           6         DI 06         Dedicated input: Stop           7         DI 07         Spare         Do no           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	circuit CHK2. t use.
2         DI 10         Dedicated input: Sequence control           3         DI 03         Spare         Do no           4         CHK 1         Check signal 1         Shortwith Converted with Converted with Converted Provided Provid	circuit CHK2. t use.
3 DI 03 Spare Do no 4 CHK 1 Check signal 1 Short-with C 5 DI 05 Spare Do no 6 DI 06 Dedicated input: Stop 7 DI 07 Spare Do no 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	circuit CHK2. t use.
4 CHK 1 Check signal 1 Short-with C  5 DI 05 Spare Do no  6 DI 06 Dedicated input: Stop  7 DI 07 Spare Do no  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	circuit CHK2. t use.
4         CHK 1         Check signal 1         with C           5         DI 05         Spare         Do no           6         DI 06         Dedicated input: Stop         Do no           7         DI 07         Spare         Do no           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	t use.
6 DI 06 Dedicated input: Stop 7 DI 07 Spare Do no 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	
7 DI 07 Spare Do no 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	t 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	t use.
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	
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	
11 Dl 23 General-purpose input 23 12 Dl 24 General-purpose input 24 13 Dl 25 General-purpose input 25 14 Dl 26 General-purpose input 26 15 Dl 27 General-purpose input 27	
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	
13 Dl 25 General-purpose input 25 14 Dl 26 General-purpose input 26 15 Dl 27 General-purpose input 27	
14 DI 26 General-purpose input 26 15 DI 27 General-purpose input 27	
15 DI 27 General-purpose input 27	
	4
	t 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	
1 0 1	t use.
25 DO 17 Spare Do no	
26 DI 12 Dedicated input: Automatic operation start	
27 DI 13 Spare Do no	t 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	
38 DI 36 General-purpose input 36 39 DI 37 General-purpose input 37	
40 CHK 2 Check signal 2 Short-	circuit
41 DO 02 Dedicated output: Servo ON output	HK1.
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

Signal name

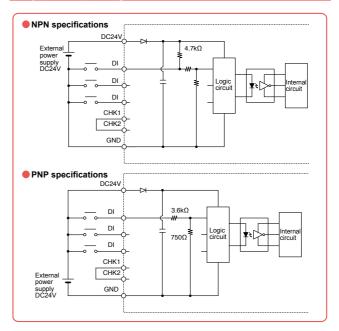
Pin	(ID=1)	(ID=2)	(ID=3)	(ID=4)	Signal name
_ 1					Reserved
2	DI 10	DI 40	DI 70	DI 120	General-purpose input 10,40,70,120
3					Reserved
4	DI 11	DI 41	DI 71	DI 121	General-purpose input 11,41,71,121
5					Reserved
6					Reserved
7					Reserved
8	DI 20	DI 50	DI 100	DI 130	General-purpose input 20,50,100,130
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 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 12	DO 33	DO 52	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 12	DI 43	DI 73	DI 122	
28	DI 13	DI 44	DI 74	DI 123	General purpose input 13,43,73,123
29	DI 14	DI 44	DI 74	DI 124	General-purpose input 14,44,74,124 General-purpose input 15,45,75,125
	DI 16	DI 46	DI 76	DI 125	
30	DI 16	DI 46		DI 126	General purpose input 16,46,76,126
_			DI 77	DI 127	General purpose input 17,47,77,127
32	DI 30	DI 60	DI 110		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	
39	DI 37	DI 67	DI 117	DI 147	General-purpose input 37,67,117,147
40					Reserved
41					Reserved
42					Reserved
43	1				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 42		DO 102	
46	DO 23	DO 43	DO 63	DO 103	
47		DO 44		DO 104	
48	DO 25	DO 45	DO 65		General-purpose output 25,45,65,105
49	DO 26	DO 46		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 a	re set usi	na the na	rameter	

Option

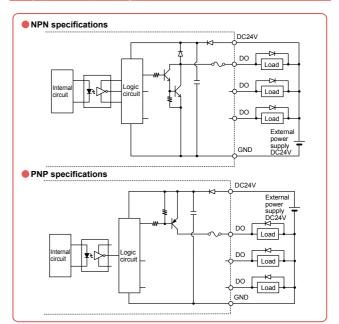
## ■ Standard specification I/O connector pin assignment lists

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 42	DO02	SERVO ALARM
42	DO03	
43	DO20 DO21	General purpose output
44	DO21	General purpose output
45	DO22	General purpose output
46	DO23	General purpose output
48	DO24 DO25	General-purpose output General-purpose output
49	DO25	General-purpose output  General-purpose output
50	DO26	General-purpose output
50	DUZI	Oerierai-pui pose output

## ■ Typical input signal connection



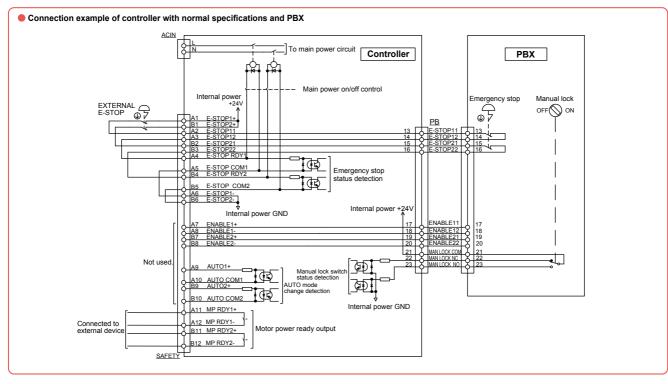
## ■ Typical output signal connection

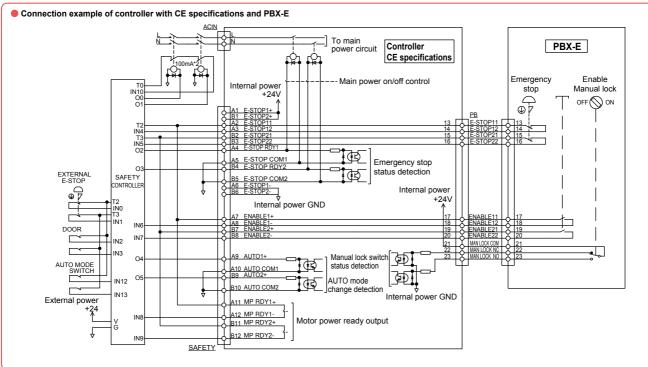


## ■ Basic functions

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

## **■** Emergency input signal connections





## conveyor

## Command Description Declares the arra

■ Robot Language Table

DIM Declares the array variable name and the number of elements.

LET Executes a specified assignment statement.

Expresses a comment statement.

## Arithmetic commands

• 7 (1 1 (1 1 1 1 1 1 1	iio communico
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
	Acquires the error code number of an error which has occurred / the line number where an error occurred.
ON ERROR	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

0	Di-ti	
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

Description	
Acquires the machine reference value for specified robot axes. (Valid only for axes whose return-to-origin method is set as "mark".)	
Acquires the current arm status of a specified robot.	
Specifies/acquires the current "hand system" setting of a specified robot.	
Specifies/acquires the "hand system" setting of a specified robot.	
Acquires the current torque value ratio of a specified axis to the rated torque.	
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".)	
Acquires the motor load factor of the specified axis.	
Acquires the status at the end of the PUSH statement.	
Specifies/acquires the push speed parameter.	
Specifies/acquires the push time parameter.	
Waits until the axis operation of a specified robot is completed.	
Reads out the current position of the arm of a specified robot in joint coordinates (pulse).	
Reads out the current position of the arm of a specified robot as Cartesian coordinates (mm, degrees).	

## Status change

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- hand 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.	
МО	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.	
ТО	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

Power connector + wiring connection lever



Model KAS-M5382-00

(	LCC140	)
(	TS-X	)
(	TS-P	)
(	SR1-X	)
(	SR1-P	)
(	RCX320	)
(	RCX221	)
(	RCX222	)

Safety connector



Model KCX-M5370-00 RCX320 RCX340

RCX340

PBX terminator (dummy connector) Attach this to the PBX connector during operation with the programming box PBX removed.



Model KFR-M5163-00 RCX320 RCX221 RCX222 RCX340

NPN / PNP connector



Connector plug model KBH-M4424-00 Connector cover model KBH-M4425-00 SR1-P RCX320 RCX340

RCX320 RCX340

TS-SH

SR1-X

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	ф17 × 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.

Absolute battery **Important** 

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.

RCX320 Dust cover for COM connector Model KR7-M5395-10 RCX340

Dust cover for LAN connector

RCX320 Model KCX-M658K-10 RCX340

Dust cover for USB connector

RCX320 KCX-M658K-00 Model RCX340

RCX320 RCX340

LCC140 ERCD SR1-X

SR1-P

RCX320

RCX221

RCX222

## **■** Options

## **Programming box** PBX/PBX-E

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



Туре	Language	Cable length	Model
	Innanaa	5m	KCX-M5110-1J
	Japanese	12m	KCX-M5110-3J
PBX	English	5m	KCX-M5110-1E
PDA	English	12m	KCX-M5110-3E
	Chinese	5m	KCX-M5110-1C
		12m	KCX-M5110-3C
	Japanese	5m	KCX-M5110-0J
PBX-E		12m	KCX-M5110-2J
(with	English	5m	KCX-M5110-0E
enable		12m	KCX-M5110-2E
switch)	Chinese	5m	KCX-M5110-0C
	Crimese	12m	KCX-M5110-2C
			Model

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

## Support software for PC (1916) RCX-Studio 2020

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.



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

RCX320 RCX340

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.696.

## Basic specifications

Supported language	pported language Japanese, English, Chinese	
OS <sup>Note1</sup>	Microsoft Windows 7 SP1(32/64bit) / 8.1 (32 bit / 64 bit) / 10 (32 bit / 64 bit)	
Execution environment	.NET Framework 4.5 or more	
Recommended: Intel Core i5 2 GHz or more, Minimum: Intel Core 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 Other company names and product names listed in this manual may be the trademarks or registered trademarks of their respective companies.

## Data cables

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



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

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

Maralal KOV

	KCX340
•••••	
-M4400-M0	RCX320
-1014400-1010	(20/200

	YC-Lin	k/E mas	ster board
--	--------	---------	------------

Model	KCX-M4400-M0	DCX340
		nCA340

## YC-Link/E slave board

YC-Link/E slave board	Model	KCX-M4400-S0	RCX320
			(KCA340)

## YC-Link/E cable (1m)

	I	 RCX320
Model	KCX-M6479-10	RCX340
		 KCA34U

## **RCX221/RCX222**

Robot controller with advanced functions

A 2-axis robot controller with a full range of advanced functions in a compact, space-saving size. Very easy to use.

## Main functions ▶ P.100







RCX222

## ■ Basic specifications

Item		Item	RCX221	RCX221HP	RCX222	RCX222HP	
	Number of con	trollable axes	2 axes maximum			'	
specifications	Controllable robots			r motor single avia robot DHASED		Single-axis robot FLIP-X, Cartesian robot XY-X, Pick & place robot YP-X	
ifice	Connected mo	tor capacity	2 axes total: 800W or less	2 axes total: 900W to 1200W	2 axes total: 800W or less	2 axes total: 900W to 1200W	
bec	Maximum power consumption		1700VA	2400VA	1700VA	2400VA	
ics	Dimensions		W130 × H210 × D158mm				
Basic	Weight		Approx. 2.9kg	Approx. 3.1kg	Approx. 2.9kg	Approx. 3.1kg	
Т	Input power	Control power supply	Single phase AC200 to 230	V +/-10% maximum (50/60H	z)		
	supply	Main power supply	Single phase AC200 to 230	V +/-10% maximum (50/60H	z)		
	Drive method		AC full-digital software serv	/0			
	Position detect	ion method	Resolver, Magnetic linear s	cale	Multi-turn resolver with data	a backup function	
	Operating met	nod	PTP (Point to Point), Linear interpolation, Circular interpolation, Arch motion				
_	Coordinate sys	tem	Joint coordinates, Cartesian coordinates				
control	Position indication units		Pulses, mm (millimeters), deg (degrees)				
Axis co	Speed setting		1% to 100% (In units of 1%. However speed is in units of 0.01% during single-axis operation by DRIVE statement.)				
1	Acceleration setting		1.Automatic acceleration setting based on robot model type and end mass parameter     2.Setting based on acceleration and deceleration parameter (Setting by 1% unit)				
	Resolution		1µm		16384 P/rev		
	Origin search r	nethod	Incremental / Semi-absolut	e	Absolute / Incremental		
_	Program langu	age	YAMAHA BASIC (Conform	ing to JIS B8439 SLIM Langu	uage)		
Iran	Multitasks		8 tasks maximum				
Program	Sequence prog	gram	1 program				
ш.	Point-data inpu	ıt method	Manual data input (coordina	ate value input), Direct teach	ing, Teaching playback		
	Memory capac	ity	364KB (total capacity of program and points) (available program capacity during use of maximum number of points is 84KB)				
~	Programs		100 program 9,999: maximum lines per program 98KB: maximum capacity per program				
ē	Points		10,000 points : maximum n	umbers of points			
Me	Programs Points Memory Backu	p battery	Lithium metallic battery (se	rvice life 4 years at 0℃ to 40°	C)		
	Internal flash n		512KB (ALL data only)				
	External memo	ory backup	SD memory card				

CLEAN CONTROLLER

RCX221 ► XY-X (2363), FLIP-X (2295), PHASER (2341), YP-X (2553) Controllable robot RCX222 ► XY-X (2363), FLIP-X (2295), YP-X (2553) CC-Link DeviceNet Bus CE marking

■ Model Overview						
Name	RCX221/RCX221HP	RCX222/RCX222HP				
Controllable robot	Cartesian robot XY-X / Single-axis robot FLIP-X / Linear motor single-axis robot PHASER/ Pick & place robot YP-X	Cartesian robot XY-X / Single-axis robot FLIP-X / Pick & place robot YP-X				
Power	Single phase: AC200V to 230V +/-10% maximum (50/60Hz)					
Operating method	Programming / Remote command / Operation using RS-232C communication					
Maximum number of controllable axes	2 axes maximum					
Origin search method	Incremental/Semi-absolute Absolute/Incremental					
■ Ordering method						

## rdering method RCX222/RCX222HP RCX221/RCX221HP RCX221 -RCX222 -N: NPN P: PNP CC: CC-Link DN: DeviceNet™ PB: PROFIBUS YC: YC-Link Note3 No entry: None N1: OP.DIO24/16 (NPN) P1: OP.DIO24/17 (PNP) No entry: Standard E: CE marking No entry: None R: RG2 No entry: None No entry: None RCX221HP E: CE marking R: RG2 N1: OP.DIO24/16 (NPN) P1: OP.DIO24/16 (PNP) RCX222HP 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 Specification selection table on following page. Note 2. The regenerative unit (option) is required when operating a model designated by YAMAHA or a load with a large inertia. Note 3. Available only for the master. Note 1. Driver selection and regenerative unit selection depends on the robot type.

See Specification selection table on following page.

Note 2. The regenerative unit (option) is required when operating a model designated by YAMAHA or a load with a large inertia.

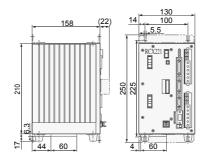
Note 3. Available only for the master.

Item		RCX221	RCX221 RCX221HP RCX222 RCX222HP			
STD.DIO	I/O input	Dedicated input 10 points,	Dedicated input 10 points, General input 16 points			
310.010	I/O output	Dedicated Output12 points	Dedicated Output12 points, General output 8 points			
SAFETY		Emergency stop input (Rela DIO setting)	Emergency stop input (Relay contact), Service mode input (NPN/PNP specification is set according to STD. DIO setting)			
Brake outpu	t	Relay contact				
전 Origin sense	or input	Connectable to DC 24V no	rmally-closed contact sensor	•		
External cor	nmunications	RS232C: 1CH D-SUB9 (fer	male) RS422 : 1CH (RPB)			
put	Slots	2 (inc.STD.DIO)				
External con		STD.DIO (NPN/PNP): Dedicated input 10 points, I	STD.DIO (NPN/PNP): Dedicated input 10 points, Dedicated output 12 points, General input 16 points, General output 8 points			
xte		Optional input/output (NPN/PNP): General input 24 points / General output 16 points				
Options	Туре	CC-Link: Dedicated input 16 points, Dedicated output 16 points, General input 96 points, General output 96 points (4 nodes occupied)				
		DeviceNet <sup>™</sup> : Dedicated input 16 points, Dedicated output 16 points, General input 96 points, General output 96 points				
		PROFIBUS: Dedicated input 16 points, Dedicated output16 points, General input 96 points, General output 96 points				
g Programmin	g box	RPB, RPB-E (with enable s	switch)			
Support soft	ware for PC	VIP+ / VIP	VIP+ / VIP			
တ္ Operating te	emperature	0°C to 40°C				
Operating to Storage tem	perature	-10°C to 65°C				
Operating h	umidity	35% to 85%RH (non-conde	35% to 85%RH (non-condensing)			
Absolute ba	ckup battery	-		Lithium metallic battery 3.6	V 5400mAH (2700nAH × 2)	
Absolute da	ta backup period	_		1 year (in state with no power	er applied)	
Noise immunity		IEC61000-4-4 Level3	IEC61000-4-4 Level3			
Protecting s	tructure	IP10				

## ■ Dimensions

## **RCX221**

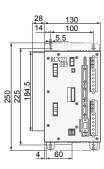




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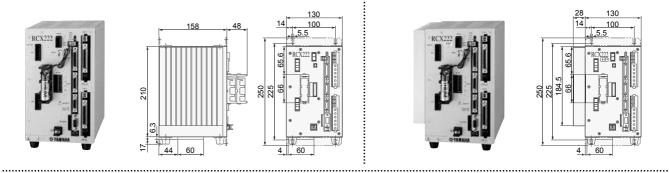
## RCX221HP





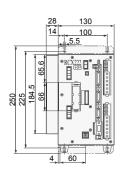
## **RCX222**



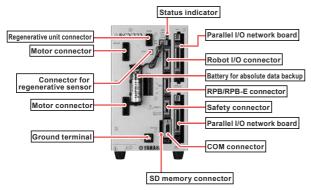


## ..... RCX222HP



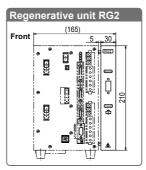


## ■ Part names



Note. Photograph shows RCX222. The component names on the RCX221 are the same but it does not come with an absolute backup battery.

## ■ Regenerative unit RG2



Note. Depth (D) is 158mm. Installs on the right side of the RCX221 (HP), RCX222 (HP). Cannot be installed as a separate

## Basic specifications

Item	RG2
Model	KAS-M4130-00 (including cable supplied with unit)
Dimensions	W35 × H210 × D158mm
Weight	0.8kg
Regenerative voltage	Approx. 380V or more
Regenerative stop voltage	Approx. 360V or less
Accessory	Cable for connection with controller (300mm)

Note. Installs on the right side of the RCX221 (HP), RCX222 (HP).Cannot be installed as a separate unit

## ■ Specification selection table

The robot type automatically determines the normal specifications or HP specifications.

## RCX221/RCX221HP

RCX221/RCX221HP							
			F	РΗΑ	SEI	R	
		MF7D	MF15D	MF20D	MF30D	MF50D	MF75D
RCX221		•	•	•	_	_	_
RCX221HP					•	•	•
Regenerative	No entry (None)		•				
unit	R (RG2)			•	•	•	•

• : Applicable

## ■ RCY222/RCY222HP

RCAZZZ/RCAZZZIIF																					
					XY-X																
			FLIP-X Arm type, Gantry type, Moving arm type, Pole type XZ type							YP-X		Clean									
		50	8D	PXYx	FXYx	FXYBx	SXYx	SXYBx	NXY	MXYx	HXYx	HXYLx	SXYx (ZF)	SXYx (ZFL20)	SXYBx (ZF)	SXYBx (ZFL20)	MXYx	HXYx	YP220BX	YP320X	SXYxC
		N15D	N18D							2	axe	s					,		7	₹	2 axes
RCX222				•	•	•	•	•	•	•			•	•		•	•	•	•	•	•
RCX222HP		•	•								•	•									
Regenerative	No entry (None)			•	•	•	•	0					•						•	•	•
unit	R (RG2)	lacktriangle	•					0	•	•	•	•		•		•	•	•			

 : Applicable : Select per conditions

Option

## ■ Power capacity

Required power supply capacity varies according to the robot type and number of axes. Prepare a power supply using the following table as a general guide.

## When connected to 2 axes (Cartesian robot or multi-axis robot)

Axial current	sensor value	Power capacity (VA)			
X axis	Y axis				
05	05	500			
10	05	700			
10	10	900			
20	05	1500			
20	10	1700			
20	20	2000			
20	20	2400 (HP)			

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

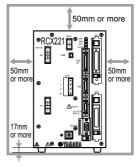
- Motor capacity exceeds a total of 450W.
- Motor capacity for perpendicular axis exceeds a total of 240W.
- The following conditions apply when perpendicular axis capacity is 240W or less.
  - perpendicular axis is 200W.
  - perpendicular axis is 100W and stroke is 700mm or more.
  - there are 2 perpendicular axes at 100W, and includes leads of 5mm.
- B14H which maximum speed exceeds 1250mm per second.

## ■ Installation conditions

- Install the RCX221/RCX222 inside the control panel.
- Install the RCX221/RCX222 on a flat, level surface.
- Install the RCX221/RCX222 in a well ventilated location, with space on all sides of the RCX221/RCX222 (See fig. at right.).
- Do not block the heat-sink on the side panel.
- Do not block the fan on the bottom of the controller.

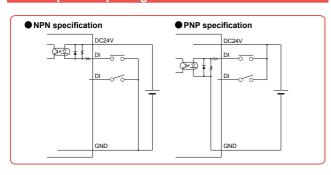
• Ambient temperature : 0 to 40°C

• Ambient humidity : 35 to 85% RH (no condensation)

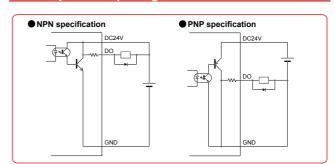


\*Provide the same space dimensions for RCX222.

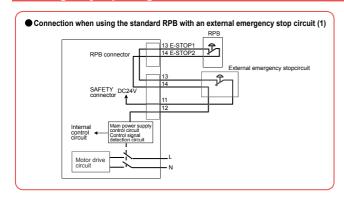
## ■ Example of input signal connection

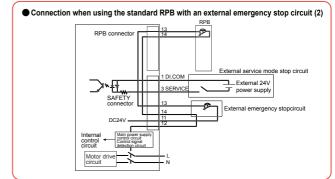


## ■ Example of output signal connection



## ■ Emergency input signal connections





## ■ SAFETY connector signals

Terminal number	I/O No.	Name
1	DI.COM	Dedicated input common
2	INTERLOCK	Interlock signal
3	SERVICE	SERVICE mode input
4	DO.COM	Dedicated output common
5	MPRDY	Main power supply ready
6	SERVO OUT	Servo-on state output
7	NC	No connection
8	KEY1	RPB key switch contact
9	KEY2	RPB key switch contact
10	24VGND	EMG 24V, GND

Terminal number	I/O No.	Name
11	EMG24V	Power supply for emergency stop input
12	EMGRDY	Emergency stop ready signal
13	EMGIN1	Emergency stop input 1
14	EMGIN2	Emergency stop input 2
15	EMGIN3	Emergency stop input 3
16	EMGIN4	Emergency stop input 4
17	LCKIN1	Enable switch input 1
18	LCKIN2	Enable switch input 2
19	LCKIN3	Enable switch input 3
20	LCKIN4	Enable switch input 4

## ■ Standard I/O [connector name: STD. DIO] signal table

Terminal	Signal	Name
number	name	RCX221 RCX222
1	DI01	Servo ON
2	DI10	Sequence program control
3	DI03	Step run
4	CHK1	Check input 1
5	DI05	I/O command run
6	DI06	Spare Note 1
7	DI07	Spare Note 1
8	DI20	General input 20
9	DI21	General input 21
10	DI22	General input 22
11	DI23	General input 23
12	DI24	General input 24
13	DI25	General input 25
14	DI26	General input 26
15	DI27	General input 27
16	DO00	EMG monitor (emergency stop monitor)
17	DO01	CPU OK
18	DO10	AUTO mode
19	DO11	Return-to-origin complete
20	DO12	Sequence program in progress
21	DO13	Auto operation in progress
22	DO14	Program reset output
23	DO15	Battery alarm output Note 2
24	DO16	END
25	DO17	BUSY
26	DI12	Auto operation start
27	DI13	AUTO mode switching
28	DI14	ABS reset (Not in use normally) Return-to-origin Note 3
29	DI15	Program reset
30	DI16	MANUAL mode
31	DI17	Return-to-origin (In use normally) ABS reset Note 4
32	DI30	General input 30
33	DI31	General input 31
34	DI32	General input 32
35	DI33	General input 33
36	DI34	General input 34
37	DI35	General input 35
38	DI36	General input 36
39	DI37	General input 37
40	CHK2	Check input 2
41	DO02	Servo-on state
42	DO03	Alarm
43	DO20	General output 20
44	DO21	General output 21
45	DO22	General output 22
46	DO23	General output 23
47	DO24	General output 24
48	DO25	General output 25
49	DO26	General output 26
50	DO27	General output 27
Note 1. Use	of DI06, DI	07 is prohibited.

Note 1. Use of DI06, DI07 is prohibited.

Note 2. DO15 is a memory backup battery voltage drop alarm output.

Note 3. Set origin return for axes using incremental specifications and axes using semi-absolute specifications.

Note 4. Set origin return on axes using absolute specifications.

Area check output can be assigned to DO20 to DO157. (Area check output assignment differs depending on the controller software version. See the user's manual for details.)

## ■ Option I/O [connector name: OP. DIO] signal table

Terminal	Signal	None
number	name	Name
1	_	Spare
2	DI40	General input
3	_	Spare
4	DI41	General input
5	_	Spare
6	_	Spare
7	_	Spare
8	DI50	General input
9	DI51	General input
10	DI52	General input
11	DI53	General input
12	DI54	General input
13	DI55	General input
14	DI56	General input
15	DI57	General input
16	_	Spare
17	_	Spare
18	DO30	General output
19	DO31	General output
20	DO32	General output
21	DO33	General output
22	DO34	General output
23	DO35	General output
24	DO36	General output
25	DO37	General output
26	DI42	General input
27	DI43	General input
28	DI44	General input
29	DI45	General input
30 31	DI46	General input
32	DI47 DI60	General input General input
33	DI61	General input
34	DI62	General input
35	DI63	General input
36	DI64	General input
37	DI65	General input
38	DI66	General input
39	DI67	General input
40	_	Spare
41	_	Spare
42	_	Spare
43	DO40	General output
44	DO41	General output
45	DO42	General output
46	DO43	General output
47	DO44	General output
48	DO45	General output
49	DO46	General output
50	DO47	General output

## ■ Robot Language Table

## General commands

Language	Function
DECLARE	Declares that a label or sub-procedure is in an external program.
DEF FN	Defines a function that is available to the user.
DIM	Declares the name of an array variable and the number of elements.
EXIT FOR	Terminates a FOR statement to NEXT statement loop.
FOR to NEXT	Controls repetitive operations
GOSUB to RETURN	Jumps to a subroutine with the label specified by a GOSUB statement and executes the subroutine.
GOTO	Unconditionally jumps to the line specified by a label.
HALT	Stops a program and resets it.
HOLD	Pauses a program.
IF	Allows control flow to branch according to conditions.
LET	Executes a specified assignment statement.
ON to GOSU	Jumps to a subroutine with each label specified by a GOSUB statement according to conditions and executes the subroutine.
ON to GOTO	Jumps to each line specified by a label according to conditions.
REM	All characters that follow REM or an apostrophe (') are viewed as comments.
SELECT CASE to END SELECT	Allows control flow to branch according to conditions.
SWI	Switches the currently executed program to a specified
	program, and executes from the first line after compiling.
WHILE to WEND	Controls repetitive operations.
Label statement	Defines "labels" in program lines.

## Robot operation

Language	Function
ABSRST	Performs return-to-origin along robot absolute motor axes.
DRIVE	Performs an absolute movement of each axis in the main group.
DRIVEI	Performs a relative movement of each axis in the main group.
MOVE	Performs an absolute movement of the main robot axes.
MOVEI	Performs a relative movement of the main robot axes.
ORIGIN	Performs return-to-origin on an incremental mode axis or absolute search on a semi-absolute mode axis.
PMOVE	Performs a pallet movement of the main robot axes.
SERVO	Controls the servo ON/OFF of the specified axes in the main group or all axes (in main group and sub group).

## I/O control

ĺ	Language	Function
	DELAY	Waits for the specified length of time (ms).
	DO	Outputs the specified value to the DO ports.
	LO	Outputs the specified value to the LO port to prohibit axis movement or permit axis movement.
	MO	Outputs the specified value to the MO ports.
ı	OUT	Turns ON the bits of the specified output ports and the
	001	command statement ends.
	RESET	Turns OFF the bits of the specified output ports.
	SET	Turns ON the bits of the specified output ports
	SO	Outputs the specified value to the SO port.
	TO	Outputs the specified value to the TO port.
	WAIT	<ol> <li>Waits until the condition in DI/DO conditional expression are met.</li> <li>Waits until positioning on the robot axes is complete (within the tolerance range).</li> </ol>

## Coordinate control

Language	Function
CHANGE	Switches the hand of the main robot.
HAND	Defines the hand of the main robot.
RIGHTY / LEFTY	Selects whether the main robot will be "right-handed" or "left-handed" when moving to a point specified on a Cartesian coordinate system.
SHIFT	Sets the shift coordinates for the main robot by using the shift data specified by a shift variable.

## Condition change

Language	Function
ACCEL	Changes the acceleration coefficient parameter of the main group.
ARCH	Changes the arch position parameter of the main group.
ASPEED	Changes the automatic movement speed of the main group.
AXWGHT	Changes the axis tip weight parameter of the main group.
DECEL	Changes the deceleration rate parameter of the main group.
ORGORD	Sets the axis sequence parameter to perform return-to-
ONGOND	origin and absolute search in the main group.
OUTPOS	Changes the OUT position parameter of the main group.
PDEF	Defines the pallet used to execute a pallet movement command.
SPEED	Changes the program speed for the main group.
TOLE	Changes the tolerance parameter of the main group.
WEIGHT	Changes the tip weight parameter of the main robot.

## Communication control

Language	Function
ONLINE / OFFLINE	Changes communication mode and initialize the communication port.
SEND	Sends the read file data into a write file.
	_

## Screen control

Language	Function
PRINT	Displays the value of specified variable on the MPB/RPB screen.

## Key control

Language	Function
INPUT	Assigns a value to the variable specified from the MPB/RPB.

## Procedure

- 1 1000 4410		
Language	Function	
CALL	Calls up sub-procedures defined by the SUB and END SUB statements.	
EXIT SUB	Terminates the sub-procedure defined by the SUB and END SUB statements.	
SHARED	Does not permit variables declared with a program written outside a subprocedure (SUB to END SUB) to be passed on as dummy arguments, but allows them to be referred to with a sub-procedure.	
SUB to END SUB	Defines a sub-procedure.	

## Task control

Tuok control	
Language	Function
CHGPRI	Changes the priority of the specified task.
CUT	Terminates a task currently being executed or temporarily stopped.
EXIT TASK	Terminates its own task currently being executed.
RESTART	Restarts a task that is temporarily stopped.
START	Sets the task number and priority of the specified task and starts that task.
SUSPEND	Temporarily stops another task being executed.

## Error control

Language	Function	
ON ERROR GOTO	If an error occurs during program execution, this command allows the program to jump to the error processing routine specified by the label without stopping the program, or stops the program and displays the error message.	
RESUME	Resumes the program execution after recovery from an error. This command is used in the error processing routine.	
ERL	Gives the line number where an error occurred.	
ERR	Gives the error code number when an error occurred.	

## PATH control

Language	Function
PATH	Sets the PATH motion on the main robot axis.
PATH END	Terminates the path setting for PATH motion.
PATH SET	Starts the path setting for PATH motion.
PATH START	Starts the PATH motion.

## Torque control

Language	Function	
DRIVE with torque limit option)	Executes an absolute movement command on each axis in the main group.	
TORQUE	Changes the maximum torque instruction for the specified main group axis.	
TRQTIME	Sets the current limit time-out period on the specified main group axis when using a torque limit setting option in the DRIVE statement.	
TRQTIME	Sets the current limit time-out period on the specified main group axis when using a torque limit setting option in the DRIVE statement	

## **Accessories and part options**

## **RCX221/RCX222**

## Standard accessories

Power connector + wiring connection lever





KAS-M5382-00 Model

SR1-P RCX320

LCC140 TS-X TS-P SR1-X

RCX221

RCX222 RCX340

Safety connector



KAS-M5370-00

RCX221 RCX222

RPB terminator (dummy connector)

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



Model KFR-M5163-00

RCX221 RCX222 RCX340

RCX320

Standard I/O (STD.DIO) connector



KAS-M533G-00 Model

RCX222

Option I/O (OP.DIO) connector



KAS-M533G-10 Model

(RCX221) RCX222

L type stay (for installing front side, rear side.)

Use to install the controller.



KAS-M410H-00

RCX221

Note. Model No. is for a single bracket (L type stay). (Two are required to install one controller.)

RCX222

SR1-X RCX222

## Absolute battery

Battery for absolute data back-up. (Not included with the RCX221)

Basic specifications		
Item	Absolute battery	
Battery type	Lithium metallic battery	
Battery capacity	3.6V/2,700mAh	
Data holding time	About 1 year Note1 (in state with no power applied)	
Dimensions	ф17 × L53mm	
Weight Note2	21g	



Model KAS-M53G0-12

Note 1. When using 2 batteries. Note 2. 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.

Important)

1 to 2 batteries are required for each 2 axes.

1 battery.....Data storage time of approximately 6 months (with no power applied)

2 batteries...Data storage time of approximately 1 year (with no power applied)

Note. Absolute battery is not required for either of the 2 axes if using incremental or semi-absolute specifications

## **Battery case**

This is the absolute battery holder.



Model	KBG-M5395-00
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SR1-X RCX222

#### **■** Options

#### Programming box RPB/RPB-E

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



	RPB	RPB-E
Model	KBK-M5110-10	KBK-M5110-00
Enable switch	-	3-position
CE marking	Not supported	Applicable

RCX221 RCX222

#### Support software for PC (2692) VIP+

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



VIP+ software model	KX0-M4966-00
---------------------	--------------

RCX221 RCX222

#### Environment

os	Windows 2000, XP (32bit), Vista, 7, 10 (Supported version: V.2.8.4 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	40MB of available space required on installation drive.
Communication method	RS-232C
Applicable robot controllers	RCX22x / 240

Note. Windows is the registered trademark of US Microsoft Corporation in U.S.A. and other countries Note. ADOBE and ADOBE READER are registered trademarks of Adobe Systems Incorporated.

#### Data cables

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





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

Note. This USB cable supports Windows 2000/XP or later. Note. I his USB cable supports Windows ZUUV/XP or later
Note. Data cable jointly used for POPCOM<sup>+</sup>, VIP<sup>+</sup>,
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 RCX221

RCX222

RCX340

# **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



Main functions ▶ P.102



Programming box ▶ PBX/PBX-E



Support software for PC RCX-Studio 2020

Basic specifications

Item Applicable robots

YAMAHA single-axis robots, linear single-axis robots, Cartesian robots, SCARA robots (except for YK120X and YK150X), P&P robots 1600W or less (in total for 4 axes)

Connected motor capacity Power capacity Dimensions

W355 × H195 × D130mm (main unit only)

Weight Input power Control power supply

6.2kg (main unit only) Single-phase 200 to 230V AC +/-10% maximum, 50/60Hz Single-phase 200 to 230V AC +/-10% maximum, 50/60Hz

Main power supply No. of controllable axes

Acceleration/deceleration setting

Max. 4 axes (simultaneous control: 6 axes) Expandable to a maximum of 16 axes (four robots) via controller link

Drive method Resolver or magnetic linear scale

AC full digital servo

Position detection method Control method Coordinate systems Speed setting Position display units

PTP motion (point to point), ARCH motion, linear interpolation, circular interpolation Joint coordinates, Cartesian coordinates

Pulses, mm (1/1000 steps), degree (1/1000 steps) 0.01 to 100% (below 1% can be changed by programming)

Optimized by robot model and tip weight parameter
Setting by acceleration coefficient and deceleration rate parameters (1% steps)
\* Can be changed by programming.
Zone control (For SCARA robots only, optimized according to arm posture)

Program language Multi-task Max. 16 tasks

YAMAHA BASIC II conforming to JIS B8439 (SLIM language)

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 Point

(Internal memory backup)

Input

External communications

SAFETY

100 programs (maximum number of programs) 9999 lines (maximum number of lines per program)

30000 points (maximum number of points) Point teaching method

MDI (coordinate data input), direct teaching, teaching playback, offline teaching (data input from external unit)

RCX340

Lithium battery (service life about 4 years at 0 to 40°C)

Internal flash memory 512 KB

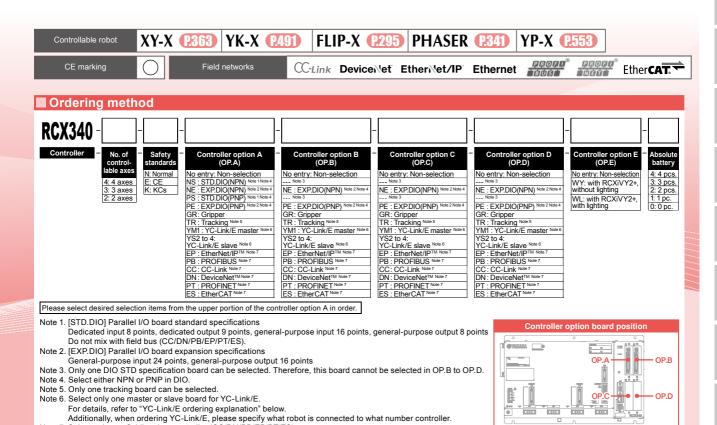
Emergency stop ready input, 2 systems
Auto mode input, 2 systems (Enabled only when the global specifications are used.)

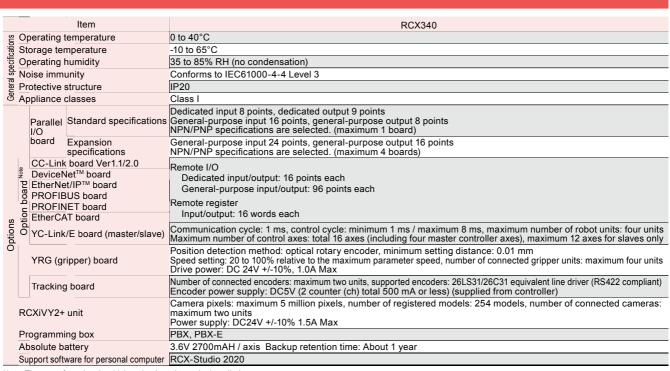
Emergency stop contact output, 2 systems Output

Enable contact output, 2 systems (Enabled only when the PBX-E is used.) Motor power ready output, 2 systems

External Brake output Transistor output (PNP open collector) Connectable to 24V DC B-contact (normally closed) sensor Origin sensor input

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)

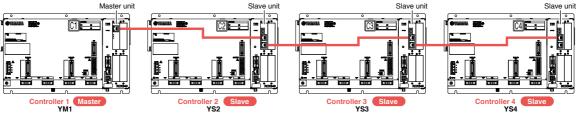




Note. There are four slots in which option boards can be installed

Note 7. Select only one fieldbus in a controller (CC/DN/PB/EP/PT/ES).

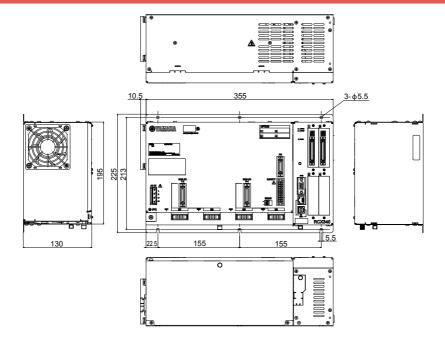
#### YC-Link/E ordering explanation



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.

Opt

#### ■ 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						Generated
Standard type	Clean type	Dust-proof & drip-proof type	Ceiling-mount	Wall-mount / Inverse type	capacity (VA)	heat amount (W)
YK120XG, YK150XG	_	_	_	_	300	58
YK180XG, YK180X YK220X	YK180XC, YK220XC	-	_	-	500	63
YK250XG, YK350XG YK400XG, YK500XGL YK600XGL, YK400XE-4	YK250XCH, YK350XCH YK400XCH, YK250XGC YK350XGC, YK400XGC YK500XGLC, YK600XGLC	YK250XGP, YK350XGP YK400XGP, YK500XGLP YK600XGLP	-	YK300XGS, YK400XGS	1000	75
-	YK500XC, YK600XC	-	_	_	1500	88
YK500XE-10, YK500XG YK610XE-10, YK600XG YK710XE-10, YK700XGL	-	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	Generated heat
X axis	Y axis	(VA)	amount (W)
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 cu	rrent sensor v	/alue Note	Power capacity	Generated heat
X axis	Y axis	Z axis	(VA)	amount (W)
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)

Axia	al current s	ensor value	Power capacity	Generated heat	
X axis	Y axis	Z axis	R axis	(VA)	amount (W)
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.

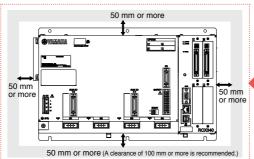
#### ■ Installation conditions

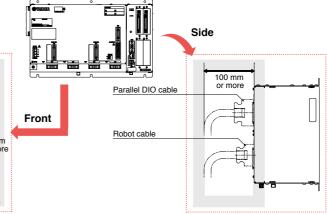
• Use the screws to secure the controller to the installation plate inside the control panel so that it is in a horizontal position. Be sure to use the metallic installation plate.

• 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

_ 3	tanuar	d specification I/O connector sig	iiai iist
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

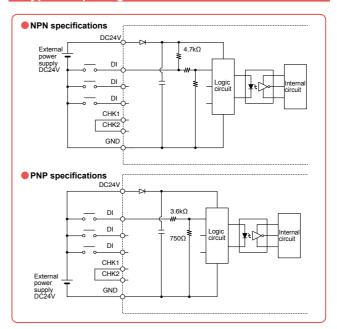
Pin	I/O No. (ID=1)	I/O No. (ID=2)	I/O No. (ID=3)	I/O No. (ID=4)	Signal name
1					Reserved
2	DI 10	DI 40	DI 70	DI 120	General-purpose input 10,40,70,120
3					Reserved
4	DI 11	DI 41	DI 71	DI 121	General-purpose input 11,41,71,121
5					Reserved
6					Reserved
7					Reserved
8	DI 20	DI 50	DI 100	DI 130	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 47			General-purpose output 27,47,67,107
	The IDe o				

Option

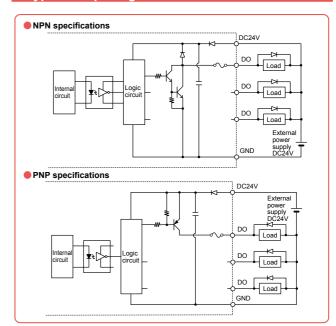
#### ■ Standard specification I/O connector pin assignment lists

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	СРИОК				
18	DO10	AUTO				
19	DO11	ORGOK				
20	DO12	SEQRUN				
21	DO13	RUN				
22	DO14	RESET				
23	DO15	WARNING				
24	DO16	(Spare)				
25	DO17	(Spare)				
26	DI12	RUN				
27	DI13	(Spare)				
28	DI14	ORIGIN (for INC axis)				
29	DI15	RESET				
30	DI16	ALMRST				
31	DI17	ORIGIN(for ABS axis)				
32	DI30	General-purpose input				
33	DI31	General-purpose input				
34	DI32	General-purpose input				
35	DI33	General-purpose input				
36	DI34	General-purpose input				
37	DI35	General-purpose input				
38	DI36	General-purpose input				
39	DI37	General-purpose input				
40	CHK2	Check input 2				
41	DO02	SERVO				
42	DO03	ALARM				
43	DO20	General-purpose output				
44	DO21	General-purpose output				
45	DO22	General-purpose output				
46	DO23	General-purpose output				
47	DO24	General-purpose output				
48	DO25	General-purpose output				
49	DO26	General-purpose output				
50	DO27	General-purpose output				

#### ■ Typical input signal connection



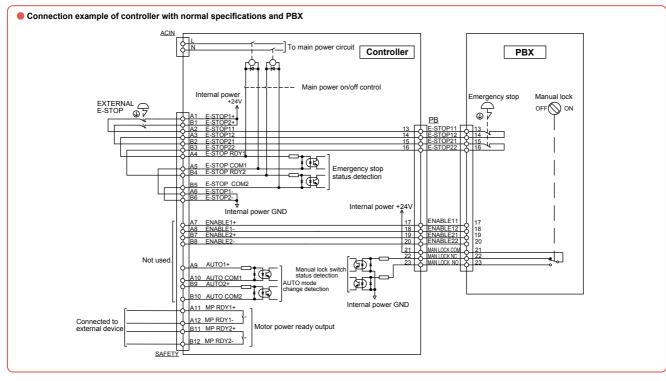
#### ■ Typical output signal connection

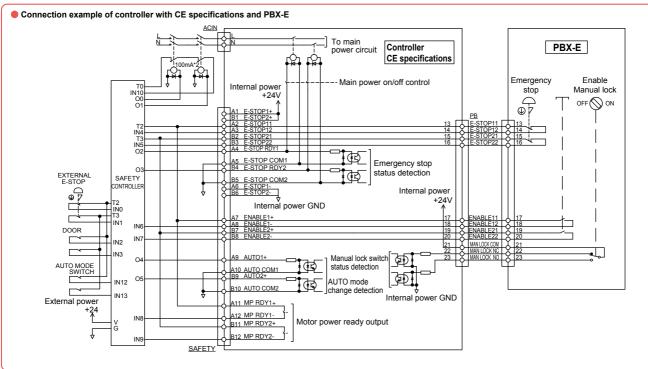


#### ■ Basic functions

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

#### **■** Emergency input signal connections





#### ■ 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

7		
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
	Acquires the error code number of an error which has occurred / the line number where an error occurred.
	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.
	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

Status			
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.		
МО	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.		
ТО	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

Power connector + wiring connection lever





Model KAS-M5382-00

SR1-P RCX320 RCX221 RCX222

LCC140 TS-X TS-P SR1-X

RCX340

Safety connector



Model KCX-M5370-00 RCX320 RCX340

PBX terminator (dummy connector)

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



KFR-M5163-00 Model

RCX320 RCX221 RCX222 RCX340

NPN / PNP connector



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

SR1-P RCX320 RCX340

SR1-X

Absolute battery

Battery for absolute data back-up.

Basic specifications

- Dasic 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	ф17 × 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

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

RCX320 KR7-M5395-10 Model RCX340

Dust cover for LAN connector

KCX-M658K-10 Model RCX340

Dust cover for USB connector

RCX320 Model KCX-M658K-00

RCX320

RCX340

ERCD SR1-X

SR1-P

RCX320

RCX221

RCX222

RCX340

(RCX320)

RCX340

#### ■ Options

#### External 24V power supply connector for brake + wiring lever



Model KCX-M6500-10

RCX340

#### Programming box PBX/PBX-E

P.701

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



Туре	Language	Cabl		Model	RCX320 RCX340
		5n	n	KCX-M5110-1J	
	Japanese	12n	n	KCX-M5110-3J	
PBX	English	5n	n	KCX-M5110-1E	
FDA	Eligiisii	12n	n	KCX-M5110-3E	
	Chinaga	5n	n	KCX-M5110-1C	
	Chinese	12n	n	KCX-M5110-3C	
	Japanese	5n	n	KCX-M5110-0J	
PBX-E		12n	n	KCX-M5110-2J	
(with enable switch)	English	5n	n	KCX-M5110-0E	
		12n	n	KCX-M5110-2E	
	Chinana	5n	n	KCX-M5110-0C	
	Chinese	12n	n	KCX-M5110-2C	
				Model	
Display language			1//	CV MC400 00	

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

#### Support software for PC (2596) RCX-Studio 2020

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)
RCX-Studio 2020
Pro (USB key purple)
KCX-M4990-40
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.696.

#### Basic specifications

Supported language Japanese, English, Chinese		
OS <sup>Note1</sup>	Microsoft Windows 7 SP1(32/64bit) / 8.1 (32 bit / 64 bit) / 10 (32 bit / 64 bit)	
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.



D-Sub

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

	USB type (5m)	KBG-M538F-00
Model	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.

YC-Link/E master board	Model	KCX-M4400-M0	RCX320 RCX340
YC-Link/E slave board	Model	KCX-M4400-S0	RCX320

YC-Link/E cable (1m)

/lodel	KCX-M6479-10

near conv modules

ngle-axis rot

Motor-less single axis actuator Robonity

NSERVO FI

Linear motor single-axis robots PHASER

artesian obots **Y-X** 

Pick & pla robots **YP-X** 

CLEAN

#### Option details

**Support software for PC** 

# **TS-Manager**

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

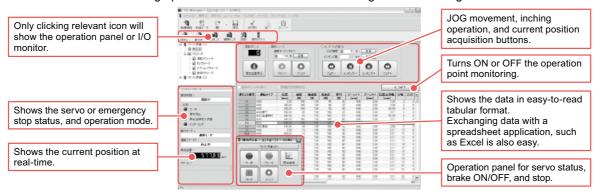


▼Applicable controllers	
TS-S2 TS-SH TS-X TS-P	P.626
TS-SD	P.636

#### **■** Features

#### 1 Basic functions

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



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

#### 2 Real-time trace

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.

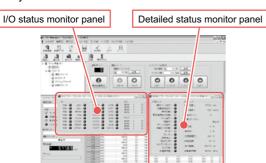
# Real-time traceable items (up to four items) • Voltage value • Commanded position • Current position • Command speed • Current speed • Internal temperature • Command current value • Present current value • Motor load factor • Input/output I/O status • Input pulse count \*1 • Movement pulse count \*1 • Word input/output status\*2 \*1: Only on TS-SD \*2: Only on TS controllers

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

#### 3 Various monitor functions and detailed error logs

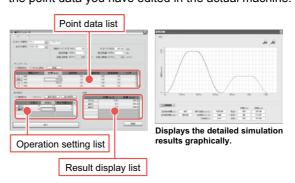
The robot operation status (operation mode or servo status) and I/O status can be monitored.

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



#### 4 Operation simulation

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. It is also possible to link this operation simulation function with the TS-Manager main software. This easily affects the point data you have edited in the actual machine.



#### ■ TS-Manager



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

#### ■ TS-Manager environment

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

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

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

#### ■ Data cables (5m)

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



 Model
 USB type (5m)
 KCA-M538F-A0

 D-Sub type (5m)
 KCA-M538F-01

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

# **Support software for PC**

**Option details** 

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

P.620 LCC140

**ERCD** 

SR1-X

P.652 SR1-P

#### ■ Features

#### 1 Easy to use

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



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.



#### 2 Program editing

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



#### Remote teaching

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



#### 3 Point editing

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



#### Direct teaching

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



#### 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).



#### ■ PC supporting software POPCOM+ ■ POPCOM+ environment



POPCOM+ software model KBG-M4966-00

os		Windows XP (32bit), Vista, 7, 8 / 8.1,
		10 (Supported version: V.2.1.1 or later)
	CDLI	Processor that meets or exceeds the suggested requirements for
CPU		the OS being used.
Memory Suggested amount of memory or more for the OS be		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.

LCC140 ERCD SR1-X SR1-P RCX320 RCX221 RCX222 RCX340

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

#### ■ Data cables (5m)

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





USB		USB	D-Sub
		USB type (5m)	KBG-M538F-00
	Model	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.

#### **Option details Support software for PC**

VIP+ 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

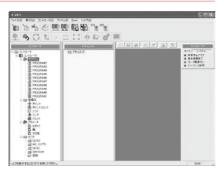
**RCX221 RCX222** 

P.670

#### ■ Features

#### 1 GUI updated for enhanced usability

The user interface has been improved with the VIP Windows function kept as it is so as to achieve more ease of use.



#### It is also possible to copy and paste the data from the other spread

6 Input the data in the work sheet form (Parameter, Point data)

sheet (chart calculation software).





#### 2 Data displayed in the tree view form

The data included in the controller is displayed legibly.



#### 7 Syntax coloring when editing the program

When reserved words (character string reserved as the robot language) are inputted, they are colored automatically, making them noted at one glance for easier program editing.



#### 3 Fully equipped tool bar

Each of various functions can be executed by simple one click on the tool bar.



#### 8 Program execution monitor

The step being performed during the program execution can be monitored. Thus, it ispossible to check which step is performed without stopping the program, thereby debugging of the program is made much easier.



#### 4 Expanded monitor function

and variables in the controller can be monitored at real time. In the advanced mode, it is also possible to attach any label (Note) to general purpose



Note. The label is stored in PC

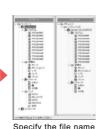
#### 5 Data operation using the new drag & drop function

The data can be stored easily by using the drag & drop function. Likewise, the stored data can be restored to the controller by operating the mouse only





to the document window and drop it there



Specify the file name and this completes the storage procedure

#### 9 List appointing (point where the system is restored)

It is possible to create the system restoration point at any timing. By doing so at important points in the system constructing process when, for example, something faulty is found after the system was changed, the system can be returned to the state before such change easily.



#### ■ VIP PLUS function

#### 1 Easy to use

With a number of robot operation items provided on one screen, any operator can operate easily without memorizing the menu construction.



#### 5 Robot operation

By connecting PC and controller with communication cable, robot operation will be available by the on-line command.



#### 2 Programming editing

The program, point, parameter, shift, and hand can be edited on the PC alone. Equipped with the function selector having the command searching function which enables to input the robot language with ease.



#### 6 On-line editing

Connecting a PC and the controller with a communication cable enable to edit data from robot controllers just as with RPB / RPB-E.



#### 3 Data check function

Provided with the equivalent data check function to that of a robot controller, it is possible to correct data errors before operation.



#### 7 Creating point data There are three methods available for creating the point data.

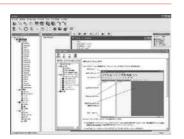
#### MDI (Manual Data Input) teaching

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



#### 4 Help function

When more information is needed during operation, press the [F1] or [HELP] key, and the help screen will appear.



#### 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.

#### ■ Support software for PC VIP+



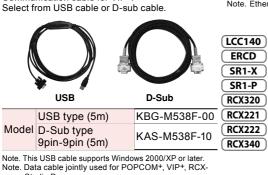
Model KX0-M4966-00

#### Environment

os	Windows 2000, XP (32bit), Vista, 7, 10 (Supported version: V.2.8.4 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	40MB of available space required on installation drive.
Communication method	RS-232C, Ethernet Note For Ethernet communication, Ethernet unit for BCX series controller is required.

#### ■ Data cables (5m)

Communication cable for VIP+



#### RCX222 RCX340

ERCD

SR1-X

SR1-P

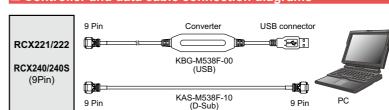
RCX320

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

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

#### ■ Controller and data cable connection diagrams

Note. Windows is the registered trademark of US Microsoft Corporation in U.S.A. and other countries. Note. ADOBE and ADOBE READER are registered trademarks of Adobe Systems Incorporated. Note. Ethernet is a registered trademark of Xerox Corporation.



Applicable robot controllers RCX22x / 240

#### **Support software for PC**

# **V-Manager**

**▼**Applicable controllers

**RDV-X RDV-P** 



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

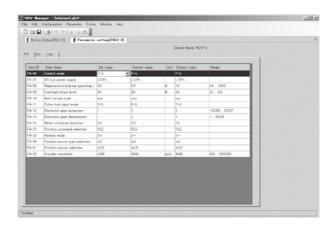
#### 1 Monitoring function

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.

DV-Managor - Solution Lafe*  Edit Configuration Parameter Ectus	Window Help	
Balaineix Dall		
Device Status(RD/s->)		
■ Ø Ø		
re status monitor   L/O terminal monitor   Trip h	steed 1	
perating information	-wy [	
peed command monitor	0 mm-1	
peed detection value monitor	0 min-1	
Sulput current monitor	0 X	
Torque command mornitor	0.8	
Autput torque monitor	0 X	
foother command monitor	0 pulse	
recent position monitor	0 pulso	
osition error monitor	0 pulse	
stimeted load moment of inertia ratio	0 X	
incoder phase Z monitor	\$18 pulse	
'N volt monitor	281 V	
lagonerative braking use rate	0 N	
-thermal sum	£0 X	
Sachine reference	0 N	
€ DEO C HEX		

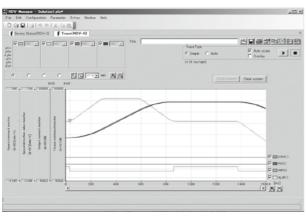
#### 2 Setting parameters

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



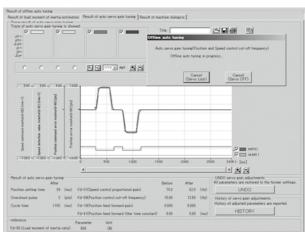
#### 3 Operation tracing function

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



#### 4 Offline auto tuning function

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



#### ■ Support software RDV-Manager ■ Environment

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



Model KEF-M4966-00

os	Windows Vista SP1 (32bit) Note 1, 7, 8 / 8.1, 10
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

Communication cable to connect PC and a controller.



KEF-M538F-01 Model

695

near converged modules

ingle-axis rob

Motor-less single axis actuator Robonity

Single-axis ro

PHASER

SCARA robots

robots
YP-X

#### **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.660

**RCX340** 

P.678

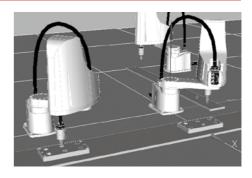
#### ■ Features

#### 1 3D simulator

Layout can be verified beforehand without connecting robot

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

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



#### 2 Program template (Program template automatic creation function)

Program creation time can be shortened greatly.

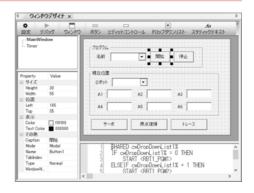
Program templates for 10 types of applications are incorporated. Just following the steps to perform the operation creates a program template automatically.



#### 3 Custom window creation

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

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



#### 4 Other existing functions

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

Cycle time calculator

Real time trace

Data comparison



#### ■ RCX-Studio 2020 software

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



LCC140 ERCD

SR1-X SR1-P RCX320 RCX221

(RCX222) (RCX340)

■ 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 <sup>Note3</sup>	Microsoft Windows 7 SP1(32/64bit) / 8.1 (32 bit /	64 bit) / 10 (32 bit / 64 bit)	
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 t	ransfer	Valid	Valid	Valid
Controller operation in or	nline 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
OAD data as ad	STL, OBJ, VRML	Valid	Valid	Valid
CAD data read	STEP	Invalid	Invalid	Valid
CAD to point conversion		Invalid	Invalid	Valid

Note. USB key color

#### ■ Data cables (5m)

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.

	USB type (5m)	KBG-M538F-00
Model	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.

#### **Option details**

#### **Handy terminal**

## /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.

#### **▼**Applicable controllers

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

TS-P

P.626

#### ■ HT1 / HT1-D basic specifications

= 11117 1111-D basic specifications			
Name		HT1	HT1-D
External v	iew		
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)
Model	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	
Emergend	y stop button	Normally closed contact point (with lock function)	
Enable sw	ritch	-	3-position
Safety cor	nnector	-	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 leng	gth	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 ontroller. 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  $\oplus$  and  $\oplus$  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 connecto (only on HT1-D)

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

# 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.

<b>▼</b> Applicable	controllers
LCC140	P620

**P.646** 

SR1-X SR1-P

#### ■ HPB / HPB-D basic specifications

Name	НРВ	HPB-D			
External view	STATE OF THE PARTY	Allers of the state of the stat			
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.



HPB

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

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.

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.

#### **Option details**

#### **Programming box**

## RPB/RPB-E

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

RCX221 RCX222

P.670

RCX240 RCX240S

P.762

#### ■ RPB / RPB-E basic specifications

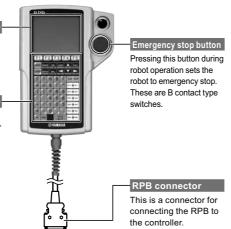
Name	RPB	RPB-E			
External view					
Applicable controllers	RCX221 / RCX222 / RCX240 / RCX240S				
Model	KBK-M5110-10	KBK-M5110-00			
Display	LCD (40characters 8 lines)				
Emergency stop button	Normally closed contact point (with lock function)				
Enable switch	-	3-position			
CE marking	Not supported	Applicable			
Operating temperature	0°C to 40°C				
Operating humidity	35% to 85%RH (non-condensing)				
Dimensions	W180 × H250 × D50mm (Strap holder, emergency s	top button not included.)			
Weight	600g				
Cable length	5m (Standard), 12m (Options)				

#### ■ Part names and function

# Display (screen) Liquid crystal display (LCD) shows different types of information with 8 lines × 40 characters. Contrast is adjustable.

Sheet keys

These are key switches for operating the robot or entering programs, etc. These are broadly grouped into 3 blocks consisting of function keys, control keys, and data keys.



#### **■** RPB-E rear side



#### 3-position enable switch (only on RPB-E)

This switch is usable as part of an external (remote) safety circuit.

Pressing this switch inwards or releasing it cuts off the (RPB/robot) circuit. However that circuit is operable when this switch is in middle position.

This enable switch is usually operable in service mode. It functions as part of an external safety circuit so that releasing the enable switch or pressing it inwards set the robot to emergency stop.

# (/PBX-E

**▼**Applicable controllers

**RCX320** P.660

**RCX340** 

P.678

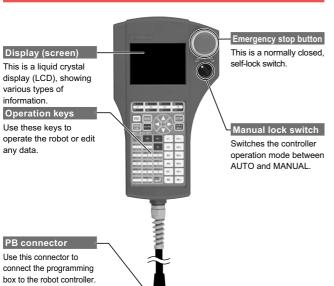
This programming box is applicable to three languages, "Japanese", "English", and "Chinese". Use of a color display makes it possible to improve the visibility. Work to add or edit functions becomes easy, allowing even personnel without programming skill to operate this programming box.

A function to save the controller data into the USB memory is incorporated.

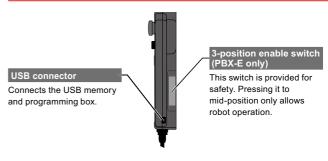
■ PBX/PBX-E basic specifications

Name		PBX	PBX-E			
Extern	al view					
Applic	able controllers	RCX320 / RCX340				
	Japanese language model	KCX-M5110-1J (5m) KCX-M5110-3J (12m)	KCX-M5110-0J (5m) KCX-M5110-2J (12m)			
Model	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)			
Displa	y screen	Color LCD (320 × 240 dot)				
Emerg	ency stop button	Normally-closed contract (with lock function)				
Enable	switch	Not provided	3-position type			
Manua	al 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)				
Dimen	sions (mm)	W141 × H245 × D45 (excluding projecting parts)				
Cable	length	5 m or 12 m (Select either)				
Weigh	t	440 g (excluding the cable)	460 g (excluding the cable)			

#### ■ Part names and function



#### **■** PBX-E rear side



#### [Accessories]

Model
KCX-M6498-00
KCX-M657E-00

The data for updating the PBX (language switch data) can be downloaded from the

https://global.yamaha-motor.com/business/robot/download/

701

#### **Option details**

#### **LCD Monitor option**

# onitor

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

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

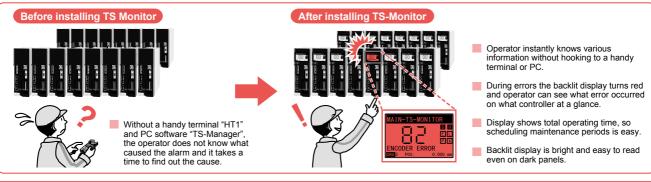
#### **▼**Applicable controllers

TS-X TS-P

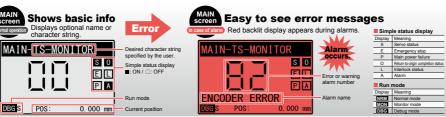
P.626



#### The TS Monitor Advantage

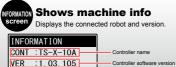


#### ■ Features

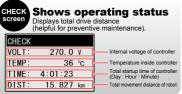


LOAD

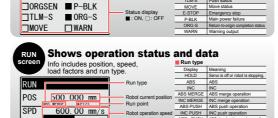
69 %



INFORMATION	
CONT :TS-X-10A	Controller name
VER :1. 03. 105	Controller software version
R0B0T:F14-20	Robot name
P. TYP: CUSTOM	Point type





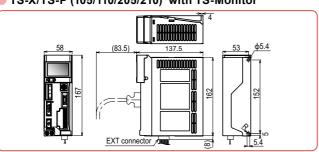


TLM-S

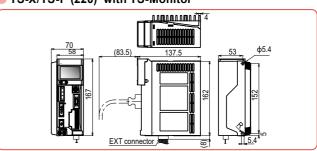
#### Shows I/O status Displays input/output bit states FEDCBA98 Input signal status \* Displays the status of input bit 0 to 15. 76543210 OUT FEDGBA98 Output signal status \* Displays the status output bit 0 to 15 765432110 7 6 5 4 3 2 1 0 PIN7 PIN6 PIN5 PIN4 PIN3 PIN2 PIN1 PIN0 F E D C B A 9 8 SRV-S /ALM END BUSY OUT3 OUT2 OUT1 OUT0

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

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

## **GP4000 series**

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

Free download of the program file from the Pro-face home page

https://www.proface.com

**▼**Applicable controllers

**TS-S2** 

TS-SH TS-X

P.626 TS-P

■ Features

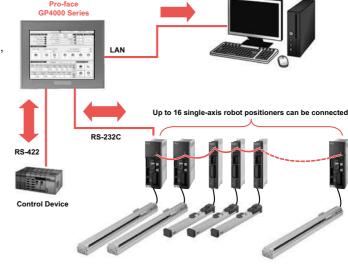
#### 1 Can easily check a state and change settings.

- · 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)





#### 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.



#### **Position Data Editing Screen**

You can edit and back up point data (255 points). No

Note. Settings for it and a USB storage required.

1210	et Outu		a year	[B] 10		15-5	10.40	STRONO	B
Ib.	Run Type	Position [mn]	Speed	Accel.	Decel.	Puth [2]	Zose - [m]	Zone + [rm]	100
- 1	FES MORSE	13,96	136	108	128	85	83.3	8.08	ľ
	FES MERGE	23,90	136	106	108	85	83.3	83.3	ŀ
1	HE MERKE	10,00	136	106	108	85	63.3	6.08	
4	FBS	43, 96	126	108	108	85	83.3	83.3	
5	RES	53,96	136	108	308	85	83.3	83.3	
-6	RIS	63, 98	136	106	109	85	63.3	6.08	
- 7	RES	73,96	126	106	109	85	6.69	6.08	
\$	RBS	110,96	136	108	109	- 85	8.83	8.08	
9	RIS	150,00	136	108	108	85	83.3	83.08	
18	RES	283, 96	126	106	109	85	63.3	83.3	
11	HES .	65, 42	126	100	308	85	8.83	8.88	k
									ſ
ile	Bo Lood B GPC-U		We	CSV F			Relead OFC-15	Boenlo W-of	M

#### I/O Monitor Screen

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

(A) See 10		Node 1 TS-S	SR83-1258 [1o
NAME OF TAXABLE PARTY.	_		
ins e	J00+ 🚓	F0078 @	00B @
	.300- @	F00TE	(01)
	JOS- NYMANL @ ORG @ JLOCK @ START @ RESET @	F0012 @	007)
110 @	089 😩	F0013 @	0JT3 @
110 @	/L000 @	F0014 @	800Y @
25 @	STAT @	10075	00 @
216 🐼	RESET @	F0076 @	MUT @
117 @	SER10 @	F00TY @	5001-0 🕝
2.3		807	
316		97.004	e e
101	0	HOUTE	6
INC.	0	10072	0
100		MOUTS	8

#### **Parameter Editing Screen**

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

Pa	Run rosetor	E/O Parameter	100	ption	Serve Paramete	_
No.	8.	mo.	Eni t		Setting	
1		init	rm			0, 80
		init	res		29	13, 26
3	DM-positi		788			0.00
4	Fush Bod				shing, no err, .	Rugde
5	Push Jub	so Time	196	No 4		×
6	Push Spe-	sd	WV/s	- 0	shing, no err.	
7	Zone(+)		788	Posi ti	oning, no err,	Judge
8	Zone(+)		798	Pupi	ing, with err,	Judge
5	Speed Ou	rrido	Y	Position	ing, with err,	Judge
18	Jon Street		T.			180
11	Inching i	0.00	788			1, 80
12	HOVE Out:	set Level	WY/S			25, 21
13	Origin S	end	W1/1			0, 20
14	Origin \$					COM
15	Origin C	encinate			Sta	ndand
15	Origin St		788			0.80

#### Information Monitor Screen

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

Status Miniter	Run Honitor	
<b>₽</b> P2061	Fosition [em]	×
€ NEAR € TUN-S	Speed[rm/s] (t	×
@ 002-5	Rin Point	.0
201E 2016	Run Status HILD	
€ WISON € THE-S	Carreet Value[1]	-1
@ SERO	Load Factor [X]	
© DEFERENCY	Voltage[V] 23.	8
● ORGEDN	Temperature[ ]	15
♣ LINK ♠ ZSTWTUS	Distance [kn] 33.2	69
€ PHILE	Total Time(dohon) 20007:	12
♠ RONGING		

#### **Connecting Selection Screen**

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

		La	nguage	1 15:	5 578	3-1298   15
SSIES	etions					
Koća	Change	Typo	Robet	Version	1/F	Position
1	OFF ON	TS-S	SR#3-1258	1, 86, 111		0.00
2	OFF ON	TS-X-054	T4H-62	1, 06, 111		0.30
3	OFF ON	1				
4	OFF ON					
5	OFF ON					
.6	OFF ON	1				
7	OFF ON	ì				
8	OFF ON					
9	OFF ON	1				
112	OFF ON	1				
111	OFF ON	ì				
112	OFF ON					
13	OFF ON					
114.	OFF ON	i .				
15	OFF ON	ì				
10.0	OFF ON	1				

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

CONTROLLER

#### Option details

#### Field network system with minimal wiring

## **NETWORK**

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

## YHX

P.610

#### EtherNet/IP Basic specifications for network

Item	EtherNet/IP <sup>TM</sup>
Applicable controllers	YHX
Network specifications	As specified for Ethernet (IEEE802.3)
Applicable EtherNet/IP™ specifications	Volume 1: Common Industrial protocol(CIP <sup>™</sup> ) Edition 3.21 Volume 2: EtherNet/IP <sup>™</sup> 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

#### PROFU® NETI

#### 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

### Ether CAT 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	

### ■ 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 <sup>™</sup>	
Applicable	e controllers	LCC140	
Applicable	e DeviceNet™ specifications	Volume 1 Release2.0 Volume 2 Release2.0	
DeviceNe	t™ Conformance test	Compliant with CT24	
Device pr	ofile / Device type number	Generic Device (keyable) / 2B Hex	
Vendor na	ame/Vendor ID	YAMAHA MOTOR CO.,LTD. / 636	
Product c	ode	21	
Product re	evision	1.0	
EDS file n	name	Yamaha_LCC1(DEV).eds	
MAC ID s	etting	0 to 63 (Set using HPB or POPCOM+.)	
Communi	cation speed setting	500K/250K/125Kbps (Set using HPB or POPCOM+.)	
Predefined Master/Slave Connection Set: Group 2 only server  Dynamic connection support (UCMM): None  Support for divided transmission of explicit message: Yes			
Network	Total length	100m/500Kbps, 250m/250Kbps, 500m/125Kbps	
length	Branch length/Total branch length	6m or less/39m or less, 6m or less/78m or less, 6m or less/156m or less/156m or less/39m or less/156m or less/39m or less/156m or less/39m	ess
Monitor L	ED	None	
	of DeviceNet™ I/O points/ f 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 <sup>™</sup>	
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

Linear motor single-axis robots PHASER

Cartesian robots

SCARA robots

robots

CONTR

LER INFORMATIO

Robo

Pulse string driver

Robot controller

Electric gripper

Option

#### 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.626

## ■ 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 <sup>Note1</sup>	0.2m or more
Overall extension distance <sup>Note1</sup>	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.

#### Device Vet Basic specifications for network

	Item	DeviceNet™
Applicable	controllers	TS-S2 / TS-SH / TS-X / TS-P
Applicable	e DeviceNet <sup>™</sup> specifications	Volume 1 Release2.0/Volume 2 Release2.0
Device typ	pe	Generic Device (device number 0)
Number o	f occupied CH	Input 6ch, Output 6ch
MAC ID so	etting	0 to 63
Communi	cation speed setting	500Kbps, 250Kbps, 125Kbps
DeviceNe	t <sup>™</sup> inputs/outputs	Input 16 points, Output 16 points
Matrical	Overall extension distance	100m/500Kbps, 250m/250Kbps, 500m/125Kbps
Network length	Branch length	6m or less
	Overall branch length	39m or less/500Kbps, 78m or less/250Kbps, 156m or less/125Kbps
Monitor LI	ΞD	Module, Network

#### EtherNet/IP Basic specifications for network

Item	EtherNet/IP <sup>™</sup>
Applicable controllers	TS-S2 / TS-SH / TS-SH / TS-X / TS-P <sup>Note</sup>
Applicable EtherNet/IP <sup>™</sup> 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).

## PROFU®

#### Basic specifications for network

Item	PROFINET
Applicable controllers	TS-S2 / TS-SH / TS-X / TS-P <sup>Note</sup>
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).

# SR1-X/SR1-P

P.652

## ■ 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.

#### **Device Vet** Basic specifications for network

Item		DeviceNet <sup>™</sup>	
Applicable controllers		SR1-X / SR1-P	
Applicable [	DeviceNet <sup>™</sup> 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	
Communica	ition speed setting	500Kbps, 250Kbps, 125Kbps	
DeviceNet <sup>TM</sup> 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.	
	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.

#### 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**

**Option details** 

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

## RCX320 RED RCX221/RCX222 RED RCX340

## ■ CC-Link Basic specifications for network

_ ooznak			
Item	- CC-Link		
Applicable controllers	RCX320 / RCX221 / RCX222 / RCX340		
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/RCX221/RCX222 (Set from the rotary switch on the board) RCX340 (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/RCX221/RCX222, the controller I/Os are updated every 10ms.

For RCX 340, 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 RCX221 / 222, 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.

#### Device et Basic specifications for network

Item		DeviceNet <sup>™</sup>	
Applicable controllers		RCX320 / RCX221 / RCX222 / RCX340	
Applicable DeviceNet <sup>™</sup> specifications		Volume 1 Release2.0 / Volume 2 Release2.0	
Device Profile Name		Generic Device (device number 0)	
Number of o	ccupied 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 <sup>™</sup>	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	Overall length Note4	100m/500Kbps, 250m/250Kbps, 500m/125Kbps	
length	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 RCX221 / 222, this selection is not available and the setting remains the same as Normal.

Note 2. In case of RCX320/RCX221/RCX222, the controller I/Os are updated every 10ms.
For RCX 340, 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 RCX221 / 222, 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.

## PROFO®

#### Basic specifications for network

Item	PROFIBUS
Applicable controllers	RCX320 / RCX221 / RCX222 / RCX340
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/RCX221/RCX222, the shortest I/O update interval of the controller is 10ms but the actual I/O update time varies depending on the update time

For RCX 340, 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 RCX221 / 222, the exclusive input of the parallel I/O cannot be used. (The interlock input terminal is located on the SAFETY connector side.)

#### EtherNet/IP Basic specifications for network

Item			EtherNet/IP™	
Applicable controllers	RCX320 / RCX340			
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 (D	evice No. 43)		
Data size	48 bytes each for i	nput/output		
Transmission speed	10 Mbps/100 Mbps			
Connector specifications	RJ-45 connector (8	3-pole modular	connector) 2 port	
Cable specifications	Refer to "2.1 LAN o	cable" in Chapt	er 2 of this user's manual.	
Max. cable length	100 m			
	Input (48 bytes in total)	byte 0-3 byte 4-31	Dedicated word input General purpose word input	: 2 words : 14 words
Fals - Note   Note		byte 32-33 byte 34-47	Dedicated bit input General-purpose bit input	: 16 points : 96 points
EtherNet/IP <sup>™</sup> input/output points Note	Output (48 bytes in total)	byte 0-3 byte 4-31	Dedicated word output General-purpose word output	: 2 words : 14 words
		byte 32-33 byte 34-47	Dedicated bit output General-purpose bit output	: 16 points : 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

#### Basic specifications for network

Item		PROFINET		
Applicable controllers	RCX320 / RCX340			
Supported software versions	PBX/PBX-E: V1.0 RCX-Studio: V1.0	RCX320 / RCX340 : V1.21 or later RBX/PBX-E : V1.08 or later RCX-Studio : V1.0.1 or later RCX-Studio Pro : V2.0.0 or later		
Network specification conformance	PROFINET IO V2.	2		
Conformance class	Conformance Clas	ss B / IO Device		
Vendor Name / Vendor_ID	YAMAHA MOTOR	CO.,LTD. / 0x02D5		
Station Type / Device_ID	YAMAHA RCX3 PI	ROFINET / 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	s), Network Status(NS), Link/Activity:Port1-2		
	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)		
Input/output data size Note		Reserved area 2 bytes		
input/output data size	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.

#### Option details

#### Field network system with minimal wiring

## **NETWORK**

https://global.yamaha-motor.com/business/robot/download/fieldbus/

RCX320 P.660 RCX340 P.678

## Ether CAT Basic specifications for network

Item		EtherCAT		
Applicable controllers	RCX320 / RCX34	RCX320 / RCX340		
Supported software versions	RCX320 / RCX34 PBX/PBX-E: V1.' RCX-Studio Pro:	13 or later		
ESI file name	YAMAHA RCX34	0 EtherCAT 1_00.xml		
Transmission speed	100 Mbps (Auto-r	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	100 m		
Monitor LEDs	RUN, ERROR, Li	nk/Activity:Port1-2		
		Dedicated word input 2 words (4 bytes)		
		General-purpose word input 14 words (28 bytes)		
	Input: 48bytes	Dedicated bit input 16 bits (2 bytes)		
		General-purpose bit input 96 bits (12 bytes)		
Input/output data size Note		Reserved area 2 bytes		
input/output data size		Dedicated word output 2 words (4 bytes)		
		General-purpose word output 14 words (28 bytes)		
	Output : 48bytes	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

·			
	7		
Item	Ethernet		
Applicable controllers	RCX320 / RCX340		
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		

# 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.





#### Main functions ▶ P.108

#### Ordering method For details on the various selection items RCX340 -RCX320 ▶ (P.660) Controller — No. of controllable axes — Safety standards — Controller option A to D (OP.A to D) - Absolute battery Controller option E (OP.E) RCX340 ▶ (P.679) RCX320 -Vision System No entry: Non-selection WY: with RCXiVY2+, without lighting WL: with RCXiVY2+, with lighting Note1. Only one tracking board can be selected.

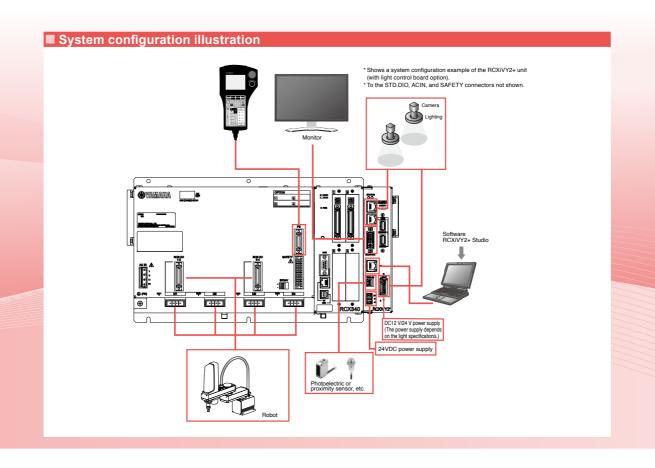
#### ■ Basic specifications

#### Robot vision basic specifications

Robot vision basic specifications					
Item		1	RCXiVY2+ unit		
	Applicable	e controllers	RCX340 / RCX320		
	Number of	f 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 set	ting capacity	254 models		
	Number of	f connectable cameras	2 cameras (8 units when the HUB is used.)		
	Connectal	ble camera	GigE camera PoE: IEEE802.3af 1 ch up to 7W		
Basic	External in	nterface	Ethernet (1000BASE-T) Note2 USB 2.0 2Ch (Up to 5V 2.5W / ch)		
specifications	External monitor output		DVI-I Note3  Monitor resolution: 1024 × 768  Vertical periodic frequency: 60 Hz  Horizontal periodic frequency: 48.4 kHz		
	Power sup	oply	24 VDC +/- 10%, Maximum 1.5 A		
	Dimension	ns	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	Trigger mo	ode	S/W trigger, H/W trigger		
capturing	External to	rigger input	2 points		
Function			Position detection, coordinate conversion, automatic point data generation, distortion and inclination correction		
Camera installation position		n	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		
		lumber of connectable ghting units	Maximum 2		
Lighting control	options	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)		
	L	ighting power input	12V DC or 24V DC (external supply shared by both channels)		
	L	ighting 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.

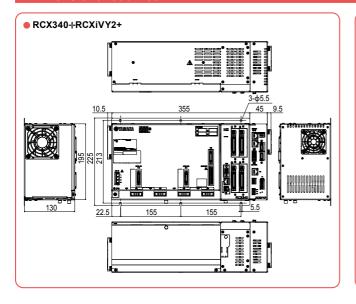
Note2. For setting and monitor operations
Note3. Also usable with an analog monitor by using a conversion adaptor.
Note4. RCXiVY2+ Studio function (requires a Windows PC)

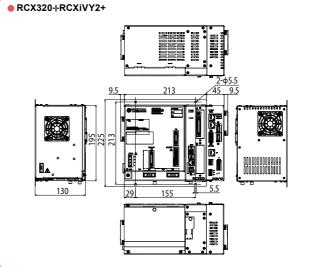


#### Tracking board basic Specifications

Item		Tracking board	
	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).	
Basic specifications	Input phase	$A, \overline{A}, B, \overline{B}, Z, \overline{Z}$	
specifications	Max. response frequency	2MHz or less	
	Counter	0 to 65535	
	Multiplier	4x	
	Other	With disconnection detection function	

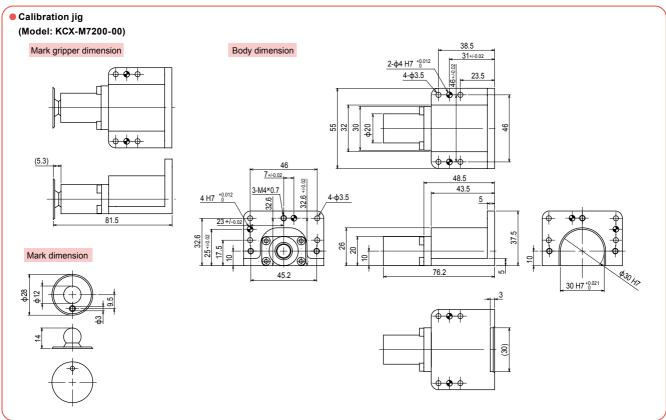
#### ■ Dimensional outlines

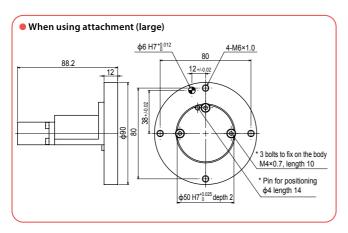


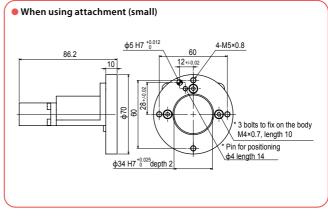


#### ■ Dimensional outlines

#### Calibration jig

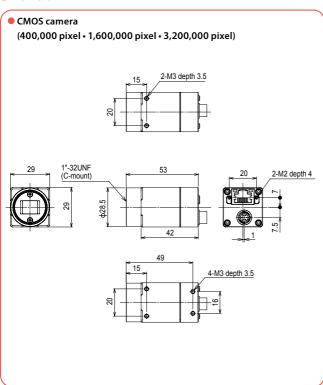


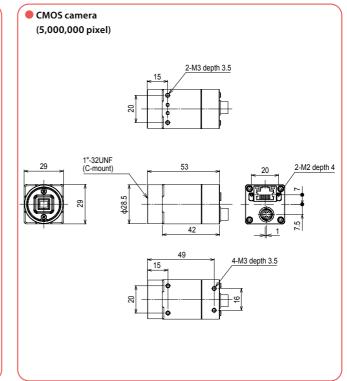




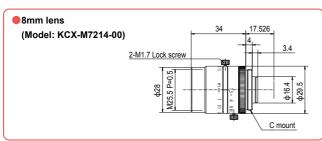
#### ■ Dimensional outlines

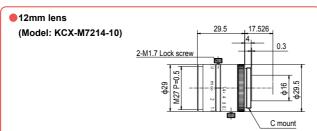
#### Camera

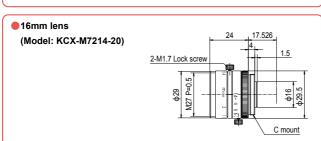


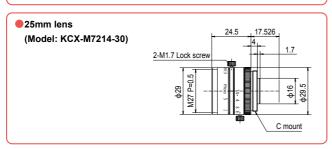


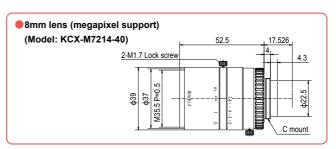
#### Lenses

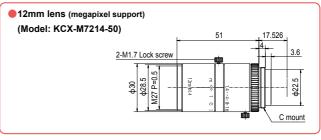


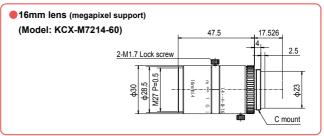


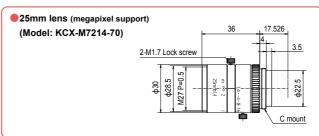












#### ■ Lens characteristics

				Angle-of-view (degrees)						Closest		
Lens	Model	Focal length [mm]	Aperture value [F No.]		6541-00 xel camera)		6541-10 pixel camera)		6541-20 pixel camera)		6541-30 pixel camera)	approach distance
			[, ,,,,,	Vertical	Horizontal	Vertical	Horizontal	izontal Vertical	Horizontal	Vertical	Horizontal	[m]
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.

#### ■ Angle-of-view size, WD, and magnification when close-up ring is used

Close-up			Lens							
ring				nm		mm		mm		mm
[mm]				7214-00		7214-10		7214-20		7214-30
		WD [mm]		00		00	400		500	
	Angle-of-view size	KFR-M6541-00 (400,000 pixels)	97.8 ×			: 124		124		× 97.2
None	~ ~ ~ ~	KFR-M6541-10 (1,600,000 pixels)	98.6 × 130.5		93.7 × 124		93.7 × 124		73.5 × 97.2	
110110	[mm]	KFR-M6541-20 (3,200,000 pixels)	139.2			× 176.5		× 176.5		× 138.4
		KFR-M6541-30 (5,000,000 pixels)		× 150		× 142.5		× 142.5		111.7
	O	otical magnification		38		040		)40		051
		WD [mm]	69.5	118.6	143	296.8	222	524.1	358.5	1269.4
	Angle-of-view size	KFR-M6541-00 (400,000 pixels)	37.2 × 49.6	60 × 80	46.5 × 62	93 × 124	52.3 × 69.8	120 × 160	53.1 × 70.8	186 × 248
0.5	X × Y	KFR-M6541-10 (1,600,000 pixels)		60.4 × 80	46.8 × 62	93.7 × 124	52.8 × 69.8	120.9 × 160	53.5 × 70.8	187.5 × 248
0.0	[mm]	KFR-M6541-20 (3,200,000 pixels)		85.3 × 113.8	66.1 × 88.2	132.2 × 176.5		170.6 × 227.7		264.5 × 353
	, ,	KFR-M6541-30 (5,000,000 pixels)	42.7 × 57	68.8 × 91.9	53.3 × 71.2	106.7 × 142.5		137.7 × 183.8		213.5 × 285
	<u>O</u>	otical magnification	0.100	0.062	0.080	0.040	0.071	0.031	0.070	0.020
		WD [mm]	38.7	53.8	91.3	142.3	152	257.1	280.8	635.9
		KFR-M6541-00 (400,000 pixels)	22.9 × 30.6	30 × 40	31 × 41.3	46.5 × 62	36.8 × 49.1	60.9 × 81.3	40.8 × 54.5	93 × 124
1.0	X × Y [mm]	KFR-M6541-10 (1,600,000 pixels)	23.1 × 30.6	30.2 × 40	31.2 × 41.3	46.8 × 62	37.1 × 49.1	61.4 × 81.3	41.2 × 54.5	93.7 × 124
1.0		KFR-M6541-20 (3,200,000 pixels)		42.6 × 56.9	44 × 58.8	66.1 × 88.2	$52.3 \times 69.9$	86.7 × 115.7	58.1 × 77.5	132.2 × 176.5
		KFR-M6541-30 (5,000,000 pixels)	26.3 × 35.1	34.4 × 45.9	35.5 × 47.5	53.3 × 71.2	42.2 × 56.4	70 × 93.4		106.7 × 142.5
	Optical magnification		0.162	0.124	0.120	0.080	0.101	0.061	0.091	0.040
		WD [mm]			65.4	90.8	114.5	168.1	230.9	424.7
		KFR-M6541-00 (400,000 pixels)			23.1 × 30.8	30.7 × 40.9	28.1 × 37.5	40.4 × 53.9	33.5 × 44.6	62 × 82.6
1.5	~ X × V	KFR-M6541-10 (1,600,000 pixels)_			23.2 × 30.8	30.9 × 40.9	28.4 × 37.5	40.7 × 53.9	33.7 × 44.6	62.5 × 82.6
1.5	[mm]	KFR-M6541-20 (3,200,000 pixels)			32.8 × 43.8	43.7 × 58.3	40 × 53.4	57.5 × 76.7	47.6 × 63.6	88.1 × 117.6
	[iiiiii]	KFR-M6541-30 (5,000,000 pixels)			26.5 × 35.4	35.2 × 47.1	32.3 × 43.1	46.4 × 61.9	38.4 × 51.3	71.1 × 95
	0	otical magnification			0.161	0.121	0.132	0.092	0.111	0.060
		WD [mm]			50	65.1	91.2	123.6	196.3	319.1
		KFR-M6541-00 (400,000 pixels)			18.5 × 24.6	23.1 × 30.8	22.9 × 30.6	30.4 × 40.6	28.6 × 38.1	47 × 62.7
2.0	~ ~ ~ ~	KFR-M6541-10 (1,600,000 pixels)			18.6 × 24.6	23.2 × 30.8	23.1 × 30.6	30.7 × 40.6	28.8 × 38.1	47.4 × 62.7
2.0	[mm]	KFR-M6541-20 (3,200,000 pixels)			26.3 × 35.1	32.8 × 43.8	32.6 × 43.5	43.3 × 57.8	40.6 × 54.3	66.9 × 89.3
	. ,	KFR-M6541-30 (5,000,000 pixels)			21.2 × 28.3	26.5 × 35.4	26.3 × 35.1	35 × 46.7	32.8 × 43.8	54 × 72.1
	Optical magnification				0.201	0.161	0.162	0.122	0.130	0.079
		WD [mm]							104.2	129
		KFR-M6541-00 (400,000 pixels)							14.8 × 19.8	18.6 × 24.9
5.0	Angle-of-view size	KFR-M6541-10 (1,600,000 pixels)							15 × 19.8	18.8 × 24.9
5.0	X × Y [mm]	KFR-M6541-20 (3,200,000 pixels)							21.1 × 28.2	26.5 × 35.4
		KFR-M6541-30 (5,000,000 pixels)							17 × 22.8	21.4 × 28.6
	01	otical magnification							0.250	0.199

Note. WD is the lens tip reference.

Close-up	Lens									
ring [mm]			8 mm lens for megapixel KCX-M7214-40		12 mm lens for megapixel KCX-M7214-50		16 mm lens for megapixel KCX-M7214-60		25 mm lens for megapixel KCX-M7214-70	
	WD [mm]		100		100		100		150	
		KFR-M6541-00 (400,000 pixels)	53.1 × 70.8		37.2	× 49.6	27.3	× 36.4	24.9	× 33.2
None	Angle-of-view size	KFR-M6541-10 (1,600,000 pixels)	53.5 × 70.8		37.5 × 49.6		27.5	× 36.4	25.1	× 33.2
None	[mm]	KFR-M6541-20 (3,200,000 pixels)	75.5 ×	100.8	52.9	× 70.6	38.8	× 51.9	35.5	× 47.3
		KFR-M6541-30 (5,000,000 pixels)		81.4		× 57		× 41.9		× 38.2
	0	ptical magnification	0.0			100		36	0.149	
		WD [mm]	46	113.6	66.1	283.2	77.8	505.4	130.3	1232.2
	A	KFR-M6541-00 (400,000 pixels)	28.1 × 37.5	59 × 78.7	25.8 × 34.4	90.7 × 120.9		120 × 160	22 × 29.3	186 × 248
0.5	Angle-of-view size	KFR-M6541-10 (1,600,000 pixels)	28.4 × 37.5	59.5 × 78.7	26 × 34.4	91.4 × 120.9	22.5 × 29.8	120.9 × 160	22.1 × 29.3	187.5 × 248
0.5	[mm]	KFR-M6541-20 (3,200,000 pixels)	40 × 53.4	83.9 × 112	36.7 × 49	129 × 172.1		170.6 × 227.7		264.5 × 353
	. ,	KFR-M6541-30 (5,000,000 pixels)	32.3 × 43.1	67.7 × 90.4	29.6 × 39.5	104.1 × 139		137.7 × 183.8		213.5 × 285
	O <sub>1</sub>	ptical magnification	0.132	0.063	0.144	0.041	0.166	0.031	0.169	0.020
		WD [mm]			47.2	131.9	62.6	243	114.6	607.2
		KFR-M6541-00 (400,000 pixels)			20.1 × 26.8	45.9 × 61.2	18.8 × 25.1	60 × 80	19.6 × 26.2	93 × 124
1.0	[mm]	KFR-M6541-10 (1,600,000 pixels)			20.2 × 26.8	46.2 × 61.2	19 × 25.1	60.4 × 80	19.8 × 26.2	93.7 × 124
1.0		KFR-M6541-20 (3,200,000 pixels)			28.5 × 38.1	65.3 × 87.1		85.3 × 113.8		132.2 × 176.5
		KFR-M6541-30 (5,000,000 pixels)			23 × 30.8	52.7 × 70.3				106.7 × 142.5
	Optical magnification				0.185	0.081	0.197	0.062	0.189	0.040
		WD [mm]			35.2	81.4	51.5	155.5	102	398.9
	[mm]	KFR-M6541-00 (400,000 pixels)			16.5 × 22	33.2 × 44.2	16.3 × 21.7	40 × 53.3	17.7 × 23.7	62 × 82.6
1.5		KFR-M6541-10 (1,600,000 pixels)			16.6 × 22	33.4 × 44.2	16.4 × 21.7	40.3 × 53.3	17.9 × 23.7	62.5 × 82.6
1.5		KFR-M6541-20 (3,200,000 pixels)			23.5 × 31.3	47.2 × 63	23.2 × 30.9	56.8 × 75.9	25.3 × 33.7	88.1 × 117.6
		KFR-M6541-30 (5,000,000 pixels)			18.9 × 25.3	38.1 × 50.8	18.7 × 25	45.9 × 61.2	20.4 × 27.2	71.1 × 95
	O <sub>1</sub>	ptical magnification			0.225	0.112	0.228	0.093	0.209	0.060
		WD [mm]					43	111.7	91.5	294.7
	Anala afrikanska	KFR-M6541-00 (400,000 pixels)					14.3 × 19.1	30.2 × 40.3	16.2 × 21.6	46.5 × 62
2.0	Angle-of-view size X × Y	KFR-M6541-10 (1,600,000 pixels)					14.4 × 19.1	30.4 × 40.3	16.3 × 21.6	46.8 × 62
2.0	[mm]	KFR-M6541-20 (3,200,000 pixels)					20.4 × 27.2	43 × 57.3	23.1 × 30.8	66.1 × 88.2
	[iiiiii]	KFR-M6541-30 (5,000,000 pixels)					16.4 × 22	34.7 × 46.3	18.6 × 24.8	53.3 × 71.2
	Optical magnification						0.259	0.123	0.229	0.080
		WD [mm]							53.9	107.2
	A l f i i	KFR-M6541-00 (400,000 pixels)							10.6 × 14.2	18.6 × 24.8
5.0	Angle-of-view size	KFR-M6541-10 (1,600,000 pixels)							10.7 × 14.2	18.7 × 24.8
3.0	[mm]	KFR-M6541-20 (3,200,000 pixels)							15.1 × 20.2	26.4 × 35.3
	[iiiii]	KFR-M6541-30 (5,000,000 pixels)							12.2 × 16.3	21.3 × 28.5
	O	ptical magnification							0.349	0.200

Note. The above table shows the field of view when the standard lens and close-up ring are used. (Closest distance value is shown in No Close-up Ring column).

Note. If a close-up ring is not used, a WD less than the value shown in this table cannot be used.

Note. If a close-up ring is used, only WD in the region of this value can be used.

Note. Values in this table are for reference only; Actual values may vary.

### **Accessories and part options**

### RCXiVY2+ System

#### Standard accessories

#### RCXiVY2+ unit

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



#### RCXiVY2+ unit

	Model	No lighting	KFR-M4400-V0
'	Model	With lighting	KFR-M4400-V0 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)
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.

## Option

#### ■ Options

#### CMOS camera



	400,000 pixel	720(H) × 540(V)	KFR-M6541-00
Madal	1,600,000 pixel 3,200,000 pixel	1440(H) × 1080(V)	KFR-M6541-10
wodei	3,200,000 pixel	2048(H) × 1536(V)	KFR-M6541-20
	5,000,000 pixel	2592(H) × 1944(V)	KFR-M6541-30

#### Lens



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

<sup>\*</sup> Common to iVY2.

### Close-up ring



	0.5mm	KX0-M7215-00	
Madal	1.0mm	KX0-M7215-10	
Model	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		

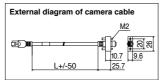
#### Tracking board accessories

Name	Model		
Tracking encoder connector	KX0-M657K-20		

\* Common to iVY2.

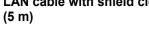
#### Camera cable

Cable for connecting the camera to the RCXiVY2+ board.



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

### LAN cable with shield cloth





Model	KX0-M55G0-00

#### Tracking encoder cable (10 m)



	Model	KX0-M66AF-00
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#### Calibration jig (Large and small attachments are provided.)





Model	KCX-M7200-00



Simple gripper operation and control via the YAMAHA robot language. Just install a gripper control board into the controller and set the electrical gripper as an additional robot axis.

### Main functions ▶ P.124





YRG-2020FS/YRG-2840FS



YRG-2020FT/YRG-2840FT



YRG-2004T YRG-2013T





YRG-4230T

#### ■ Structure

Single cam structure



Unique cam structure is simple and compact. The fingers work due to external force since no self-locking is used.

Double cam structure



Unique double cam structure with gear. Simple design gives high gripping power yet body is

Ball screw structure



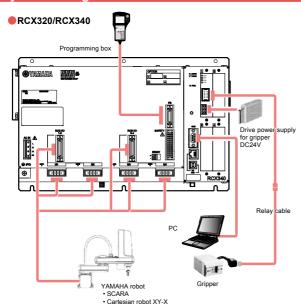
Belt-driven ground ball screw delivers a long stroke with high efficiency and high precision.

Compact ball guide structure



Use of special cams provides light weight and compactness. Ideal for grasping and moving a round workpiece made of glass or similar material.

#### System configuration illustration



· Single-axis robot

Compact single cam type

# **RG-2005SS**



Basic specifications				
Model name		YRG-2005SS		
Model number		KCF-M2010-A0		
	Max. continuous rating (N)	5		
Holding power	Min. setting (% (N))	30 (1.5)		
Resolution (% (N))		1 (0.05)		
Open/close stroke (mm)		3.2		
Max. rating (mm/sec) Min. setting (% (mm/sec))		100		
		20 (20)		
Speeu	Resolution (% (mm/sec))	1 (1)		
Holding speed (Max.) (%)		50		
Repetitive positioning accuracy (mm)		+/-0.02		
Guide mechanism		Linear guide		
Max. ho	lding weight Note 1 (kg)	0.05		
Weight	(g)	90		

- Hoding power control: 30 to 100% (1% steps)
   Acceleration control: 1 to 100% (1% steps)
   Multipoint position control: 10,000 max.

Note. Design the finger as short and lightweight as possible.

Note. Set the parameters and holding power (%) of the holding movement command so that any excessive shock is not applied to the finger during operation.

Note. When installing or uninstalling the finger, tighten the bolts while the finger is being held securely so that any excessive force or shock is not applied to the guide block.

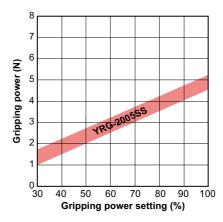
Note. Workpiece weight that is able to be held may greatly vary depending on the material, shape, and/or holding surface conditions of the finger.

Note 1. The maximum gripping weight is the upper limit weight when the workpiece is gripped with maximum continuous rated gripping force.

Determine the weight of the workpiece to be gripped by considering the upper limit weight and the inertia force due to acceleration/deceleration and rotary

operation in the gripped state

#### ■ Gripping power vs. gripping power setting (%)

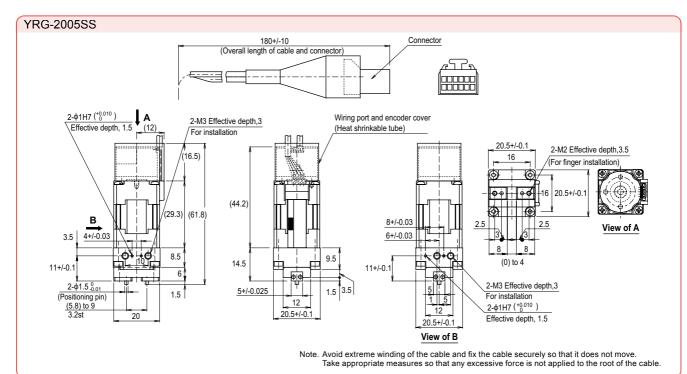


• Graph shows a general guide to gripping power versus gripping power setting (%). Variations will appear in the actual gripping power.

#### Allowable load and load moment

				YRG-2005SS
	Allowable load	F	N	12
Guide	Allowable pitching moment	Мр	N•m	0.04
Guide	Allowable yawing moment	Му	N•m	0.04
	Allowable rolling moment	Mr	N•m	0.08
Finger	Max. weight (1 pair)		g	10
	Max. holding position	L	mm	20
	Max. overhang	Н	mm	20

- Mount the finger so that the allowable load and load moment of the guide do not exceed the values stated in the table above.
- Make the adjustment so that the finger weight, holding length (L) from the installation surface to the holding point, and overhang (H) do not exceed the values stated in the table above
- Please contact your YAMAHA sales dealer for further information on combination of L and H.



## Single cam type

**YRG Series** 

## RG-2010S/2815S/4225S



■ Basic specifications								
Model name		YRG-2010S	YRG-2815S	YRG-4225S				
Model number		KCF-M2011-A0 KCF-M2011-B0 KCF-M2011						
I I a I alian a	Max. continuous rating (N)	6	22	40				
Holding power	Min. setting (% (N))	30 (1.8)	30 (6.6)	30 (12)				
power	Resolution (% (N))	1 (0.06)	1 (0.22)	1 (0.4)				
Open/close stroke (mm)		7.6	14.3	23.5				
Max. rating (mm/sec)		100						
Speed	Min. setting (% (mm/sec))	20 (20)						
Speeu	Resolution (% (mm/sec))	1 (1)						
	Holding speed (Max.) (%)	50						
Repetitiv	e positioning accuracy (mm)	+/-0.02						
Guide m	nechanism		Linear guide					

Hoding power control: 30 to 100% (1% steps)
 Speed control: 20 to 100% (1% steps)
 Acceleration control: 1 to 100% (1% steps)
 Multipoint position control: 10,000 max

0.06

160

0.22

300

0.4

580

Max. holding weight Note 1 (kg)

Weight (g)

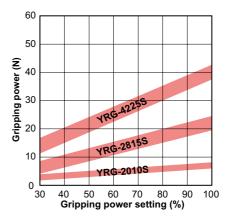
- Note. Design the finger as short and lightweight as possible.

  Note. Set the parameters and holding power (%) of the holding movement command so that any excessive shock is not applied to the finger during operation.

  Note. When installing or uninstalling the finger, tighten the bolts while the finger is being
- held securely so that any excessive force or shock is not applied to the guide block. Note. Workpiece weight that is able to be held may greatly vary depending on the mate-
- rial, shape, and/or holding surface conditions of the finger. Note 1. The maximum gripping weight is the upper limit weight when the workpiece is gripped with maximum continuous rated gripping force.

  Determine the weight of the workpiece to be gripped by considering the upper limit weight and the inertia force due to acceleration/deceleration and rotary operation in the gripped state.

#### ■ Gripping power vs. gripping power setting (%)



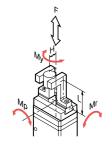
 Graph shows a general guide to gripping power versus gripping power setting (%). Variations will appear in the actual gripping power.

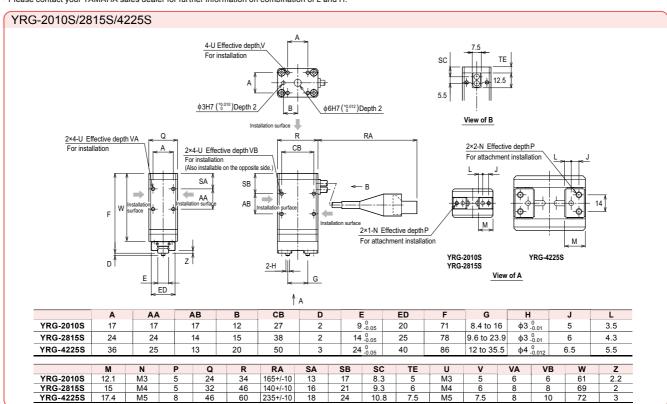
#### Allowable load and load moment

				YRG-2010S	YRG-2815S	YRG-4225S
	Allowable load	F	N	450	350	600
Guide	Allowable pitching moment	vable load F N vable pitching moment Mp N•m vable yawing moment My N•m vable rolling moment Mr N•m veight (1 pair) g holding position L mm	0.7	0.5	1.1	
Guide	Allowable yawing moment	Му	N•m	0.8	0.6	1.3
	Allowable rolling moment	Mr	N•m	2.3	2.8	8.6
	Max. weight (1 pair)		g	15	30	50
Finger	Max. holding position	L	mm	20	20	25
-	Max. overhang	Н	mm	20	25	30
• Mount th	e finger so that the allowable load and load	moment o	of the guid	le do not exceed the	values stated in the t	able above.

Make the adjustment so that the finger weight, holding length (L) from the installation surface to the holding point, and overhang (H) do not exceed the values stated in the table above.

• Please contact your YAMAHA sales dealer for further information on combination of L and H.





Double cam type

## YRG-2005W/2810W/4220W



■ Basic specifications						
Model n	ame	YRG-2005W YRG-2810W YRG-4220W				
Model n	umber	KCF-M2012-A0	KCF-M2012-B0	KCF-M2012-C0		
	Max. continuous rating (N)	50	150	250		
Holding Min. setting (% (N	Min. setting (% (N))	30 (15)	30 (45)	30 (75)		
power	Resolution (% (N))	1 (0.5) 1 (1.5) 1 (2.5)				
Open/cl	ose stroke (mm)	5	5 10 19.3			
Max. rating (mm/sec)		60	60	45		
Speed Min. setting (% (mm/sec))		20 (12)	20 (12)	20 (9)		
Speed	Resolution (% (mm/sec))	1 (0.6)	1 (0.7)	1 (0.45)		
Holding speed (Max.) (%)		50				
Repetitive positioning accuracy (mm)		+/-0.03				
Guide mechanism		Linear guide				
Max. ho	lding weight Note 1 (kg)	0.5	1.5	2.5		
Weight (	(g)	200	350	800		

- Hoding power control : 30 to 100% (1% steps) Acceleration control : 1 to 100% (1% steps) · Speed control : 20 to 100% (1% steps) Multipoint position control

Note. Design the finger as short and lightweight as possible.

Note. Set the parameters and holding power (%) of the holding movement command so that any excessive shock is not applied to the finger during operation.

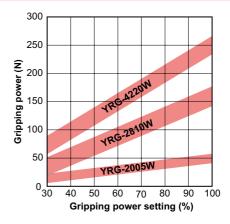
Note. When installing or uninstalling the finger, tighten the bolts while the finger is being held securely so that any excessive force or shock is not applied to the guide block.

Note. Workpiece weight that is able to be held may greatly vary depending on the material, shape, and/or holding surface conditions of the finger.

Note 1. The maximum gripping weight is the upper limit weight when the workpiece is gripped with maximum continuous rated gripping force.

Determine the weight of the workpiece to be gripped by considering the upper limit weight and the inertia force due to acceleration/deceleration and rotary operation in the gripped state.

#### ■ Gripping power vs. gripping power setting (%



• Graph shows a general guide to gripping power versus gripping power setting (%). Variations will appear in the actual gripping power.

#### Allowable load and load moment

M5

46

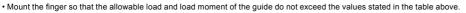
8

60

37

YRG-4220W

				YRG-2005W	YRG-2810W	YRG-4220W
	Allowable load	F	N	1000	1000	2000
Guide	Allowable pitching moment	ble load         F         N         1000         10           ble pitching moment         Mp         N•m         6.7         8           ble yawing moment         My         N•m         4         4           ble rolling moment         Mr         N•m         5.1         5           reight (1 pair)         g         40         6           olding position         L         mm         30         6	8.1	20.1		
Guide	Allowable yawing moment	Му	N•m	4	4.8	12
	Allowable rolling moment	Mr	N•m	5.1	7.8	25.9
	Max. weight (1 pair)		g	40	80	200
Finger	Max. holding position	L	mm	30	30	50
	Max. overhang	Н	mm	20	20	30



• Make the adjustment so that the finger weight, holding length (L) from the installation surface to the holding point, and overhang (H)

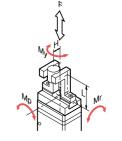
235+/-10

18

24

on of exceed the values stated in the table above.

• Please contact your YAMAHA sales dealer for further information on combination of L and H.



,-																		
'RG-2005V	V/2810	)W/42	20W															
	411	Effective de		4-U Effect For install	epth 2	B		φ6H7(*%	<sup>012</sup> )Depth 2				7.5 6C	<b>*</b>				
		nstallation	pui vA		Install	ation surface							View of	В				
F V V	Installation s		For instal	allable on th	e opposite sid		G	stallation surf	B Bace			ective (	For a For a M M Jepth P Installation	N Effective d ttachment ins		M M	14	
	Α	A	Δ	AB	В	СВ		D	Ē	ED	F		G	Н	J		K	L
YRG-2005W	17	17		17	12	27		2	9 .0.05	20	7		10.6 to 15.6	φ4 <sup>0</sup> <sub>-0.012</sub>	6		8	4.6
YRG-2810W	24	24		14	15	38		2	14 -0.05	25	8		12.6 to 22.6	φ5 .0.012	7		10	5.65
YRG-4220W	36	25		13	20	50		3	24 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	40	9		17.0 to 36.3	φ6 -0.012 φ6 -0.012	8		15	7.5
	M	N				D4	0.4	00		TE			,		101		V.	
VDC 200514	M	N	Р	Q	R	RA	SA	SB	sc	TE	U	٧		VB	W	X	X1	Z
YRG-2005W	22.5	M3	5	24	34	165+/-10	13	17	8.3	5	M3	5		6	64	52	54	2.2
YRG-2810W	27.5	M4	5	32	46	140+/-10	16	21	9.3	6	M4	6	8	8	71	67	61	2

10.8

7.5

M5

7.5

10

76

96

63

Screw type strait style

## RG-2020FS/2840FS



Bas	ic specifications				
Maralal is		VDC 2020EC	VDC 2040EC		
Model n	ame	YRG-2020FS	YRG-2840FS		
Model n	umber	KCF-M2013-A0	KCF-M2013-B0		
11-1-1:	Max. continuous rating (N)	50	150		
Holding power	Min. setting (% (N))	30 (15)	30 (45)		
power	Resolution (% (N))	1 (0.5)	1 (1.5)		
Open/cl	ose stroke (mm)	19	38		
	Max. rating (mm/sec)	50	50		
Speed	Min. setting (% (mm/sec))	20 (10)	20 (10)		
Speeu	Resolution (% (mm/sec))	1 (0.5)	1 (0.5)		
	Holding speed (Max.) (%)	50	50		
Repetitiv	ve positioning accuracy (mm)	+/-0.01	+/-0.01		
Guide n	nechanism	Linear	guide		
Max. ho	olding weight Note 1 (kg)	0.5	1.5		
Weight	(g)	420	880		

- : 30 to 100% (1% steps) : 1 to 100% (1% steps) Speed control : 20 to 100% (1% steps)
   Multipoint position control : 10,000 max Hoding power control
   Acceleration control

Note. Design the finger as short and lightweight as possible.

Note. Set the parameters and holding power (%) of the holding movement command so that any excessive shock is not applied to the finger during operation.

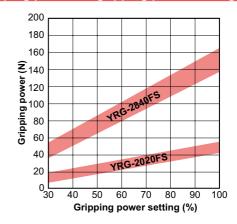
Note. When installing or uninstalling the finger, tighten the bolts while the finger is being held securely so that any excessive force or shock is not applied to the guide block.

Note. Workpiece weight that is able to be held may greatly vary depending on the material, shape, and/or holding surface conditions of the finger.

Note 1. The maximum gripping weight is the upper limit weight when the workpiece is gripped with maximum continuous rated gripping force.

Determine the weight of the workpiece to be gripped by considering the upper limit weight and the inertia force due to acceleration/deceleration and rotary operation in the

#### ■ Gripping power vs. gripping power setting (%)



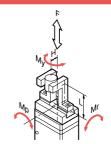
• Graph shows a general guide to gripping power versus gripping power setting (%). Variations will appear in the actual gripping power.

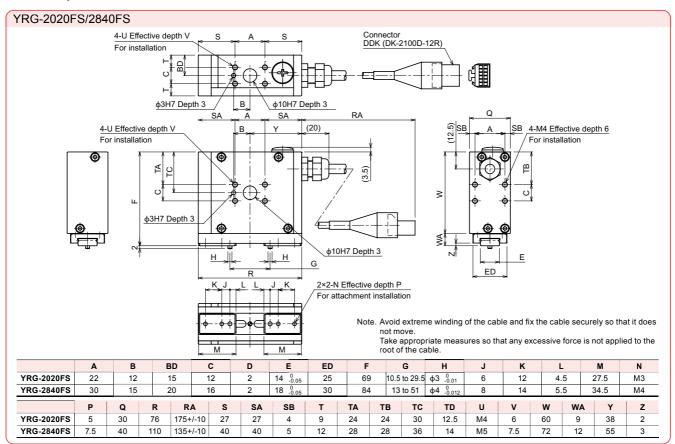
#### Allowable load and load moment

				YRG-2020FS	YRG-2840FS
	Allowable load			1000	1300
Guide	Allowable pitching moment	Мр	N∙m	3.5	5
Guide	Allowable yawing moment	My	N•m	4.2	6
	Allowable rolling moment	Mr	N∙m	7.3	12.7
	Max. weight (1 pair)		g	40	80
Finger	Max. holding position	L	mm	30	30
	Max. overhang	Н	mm	20	20

- · Mount the finger so that the allowable load and load moment of the guide do not exceed the values stated in the table above
- Make the adjustment so that the finger weight, holding length (L) from the installation surface to the holding point,
- and overhang (H) do not exceed the values stated in the table above.

   Please contact your YAMAHA sales dealer for further information on combination of L and H

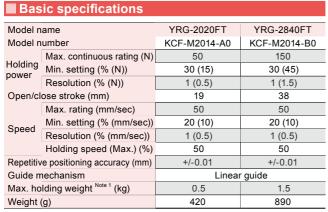




Screw type "T" style

## RG-2020FT/2840FT





- Hoding power control : 30 to 100% (1% steps) Acceleration control : 1 to 100% (1% steps) Speed control : 20 to 100% (1% steps)
   Multipoint position control : 10,000 max

Note. Design the finger as short and lightweight as possible.

Note. Set the parameters and holding power (%) of the holding movement command so that any excessive shock is not applied to the finger during operation.

Note. When installing or uninstalling the finger, tighten the bolts while the finger is being held securely so that any excessive force or shock is not applied to the guide block.

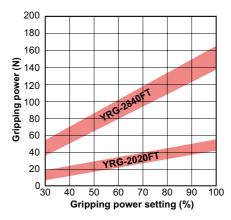
Note. Workpiece weight that is able to be held may greatly vary depending on the material, shape, and/or holding surface conditions of the finger.

Note 1. The maximum gripping weight is the upper limit weight when the workpiece is gripped with maximum continuous rated gripping force.

Determine the weight of the workpiece to be gripped by considering the upper limit

weight and the inertia force due to acceleration/deceleration and rotary operation in the

#### ■ Gripping power vs. gripping power setting (%)



• Graph shows a general guide to gripping power versus gripping power setting (%). Variations will appear in the actual gripping power.

#### ■ Allowable load and load moment

YRG-2840FT

40

110 | 135+/-10 | 40

40

28

12

28

36

14

М5

7.5

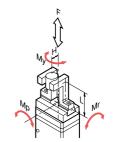
72

55

				YRG-2020FT	YRG-2840FT
	Allowable load	F	N	1000	1300
Guide	Allowable pitching moment	Мр	N•m	3.5	5
Guide	Allowable yawing moment	My	N•m	4.2	6
	Allowable rolling moment	Mr	N∙m	7.3	12.7
	Max. weight (1 pair)		g	40	80
Finger	Max. holding position	L	mm	30	30
	Max. overhang	Н	mm	20	20

- Mount the finger so that the allowable load and load moment of the guide do not exceed the values stated in the table above
- Make the adjustment so that the finger weight, holding length (L) from the installation surface to the holding point,
- and overhang (H) do not exceed the values stated in the table above.

   Please contact your YAMAHA sales dealer for further information on combination of L and H.



/RG-2020F	T/284	0FT																
				Conn DDK	(DK-210	D-12R)			_	J Effective r installatio		s/	<b>D</b>	<del>\</del>	SA	TA C TA		
	4-U Effection	llation		S					RA	<b>3</b>		<u>H</u> <u>G</u>			<u>+</u>	<del>-</del>		
<b>↓</b>	1	•		- A	#1-	s P B	iB A	ZA SE	В ш	(3.5)	(20)		F	L J	JA		•	
U C	<u> </u>	•		•	depth	ffective V		•		<b>M</b>	<u> </u>		<b>+ </b>	• •	<b>∳</b>	-	<b>(</b>	
<u>ф3H7 Dep</u> ф10H7 De	th 3	B	Y					Z <sub>&gt;</sub>	D		For attac Avoid e it does Take ap	xtreme w	stallation vinding of e. e measur	f the cab		x the cabl	e secure	y so that ot applied
	Α	В	С	D		E	ED	F	G	Н	J	JA	K		L	М	N	Р
YRG-2020FT	22	12	12	2	14	0 -0.05	25	39	10.5 to 29.5	ф3 0	6	12	12	2 4	1.5	27.5	МЗ	5
YRG-2840FT	30	15	16	2		0	30	52	13 to 51	φ4 <sup>0</sup> <sub>-0.012</sub>	8	14	14	4 5	5.5	34.5	M4	7.5
	Q	R	RA	S	SA	SB	Т	TA	ТВ	тс	TD	TE	U	V	W	Υ	Z	ZA
YRG-2020FT	30	76	175+/-10	27	27	4	24	9	24	30	12.5	12.5	M4	6	60	38	2	9
		-					+ -	+	+		-			-	1	+	+	+

Three fingers type

## **YRG-2004T**



■ Bas	ic specifications					
Model n	ame	YRG-2004T				
Model n	umber	KCF-M2015-A0				
	Max. continuous rating (N)	2.5				
Holding power	Min. setting (% (N))	30 (0.75)				
power	Resolution (% (N))	1 (0.025)				
Open/cl	ose stroke (mm)	3.5				
	Max. rating (mm/sec)	100				
Speed	Min. setting (% (mm/sec))	20 (20)				
Speeu	Resolution (% (mm/sec))	1 (1)				
	Holding speed (Max.) (%)	50				
Repetitiv	re positioning accuracy (mm)	+/-0.03				
Guide m	nechanism	Linear guide				
Max. ho	lding weight Note 1 (kg)	0.02				
Weight	(g)	90				

- Hoding power control : 30 to 100% (1% steps) Acceleration control : 1 to 100% (1% steps) Speed control : 20 to 100% (1% steps)
   Multipoint position control : 10,000 max
- Note. Design the finger as short and lightweight as possible.

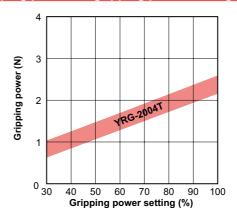
  Note. Set the parameters and holding power (%) of the holding movement command so that any excessive shock is not applied to the finger during operation.

  Note. When installing or uninstalling the finger, tighten the bolts while the finger is being held securely so that any excessive force or shock is not applied to the guide block.

  Note. Workpiece weight that is able to be held may greatly vary depending on the material, shape, and/or holding surface conditions of the finger.
- Note 1. The maximum gripping weight is the upper limit weight when the workpiece is gripped with maximum continuous rated gripping force.

  Determine the weight of the workpiece to be gripped by considering the upper limit weight and the inertia force due to acceleration/deceleration and rotary operation in the

#### Gripping power vs. gripping power setting (%)



• Graph shows a general guide to gripping power versus gripping power setting (%). Variations will appear in the actual gripping power.

#### ■ Allowable load and load moment

				YRG-2004T
	Allowable load		N	6
Einger	Allowable pitching moment		N•m	0.02
Finger	Max. weight (1 pair)		g	10
	Max. holding position	L	mm	15

• When the external forces Fa and Fb are applied to a potion the distance (L) apart from the finger installation surface, the load (F) and moment (M) are calculated from the formulas shown below.

Fb

w·

Fa :External force [N]

:External force [N]

Workpiece weight [Kg] Gravity acceleration [m/s²]

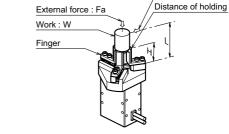
 $\begin{array}{ll} g \; : \; \text{Gravity acceleration primes J} \\ \text{H} \; : \; \text{Distance of holding point [m]} \end{array}$ 

 $F = Fa + W \times g$  $M = Fb \times L$ 

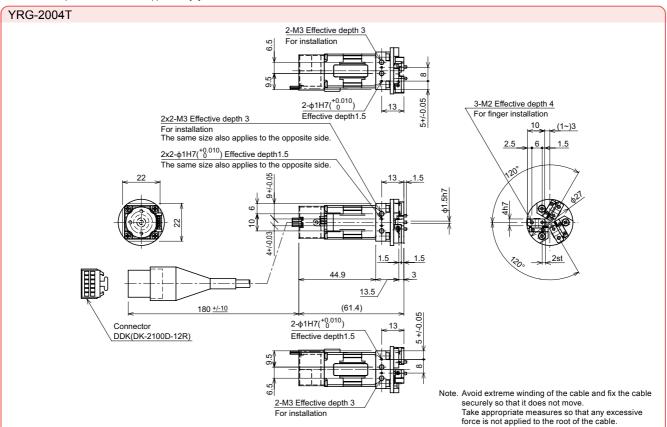
Load [N]

Moment [N•m]

L : Distance of point of external force application [m]



External force : Fb

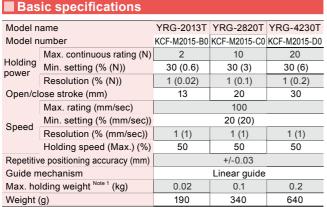


External force : Fb Distance of holding

Three fingers type

## RG-2013T/2820T/4230T





- : 30 to 100% (1% steps) : 1 to 100% (1% steps) • Speed control : 20 to 100% (1% steps)
  • Multipoint position control : 10,000 m Hoding power control
   Acceleration control

Note. Design the finger as short and lightweight as possible.

Note. Set the parameters and holding power (%) of the holding movement command so that any excessive shock is not applied to the finger during operation.

Note. When installing or uninstalling the finger, tighten the bolts while the finger is being held securely so that any excessive force or shock is not applied to the guide block.

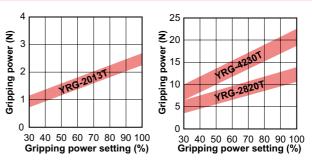
Note. Workpiece weight that is able to be held may greatly vary depending on the material, shape, and/or holding surface conditions of the finger.

Note 1. The maximum gripping weight is the upper limit weight when the workpiece is gripped with maximum continuous rated gripping force.

Determine the weight of the workpiece to be gripped by considering the upper limit

weight and the inertia force due to acceleration/deceleration and rotary operation in the

#### ■ Gripping power vs. gripping power setting (%)



· Graph shows a general guide to gripping power versus gripping power setting (%) Variations will appear in the actual gripping power

> External force: Fa Work: W Finger

#### Allowable load and load moment

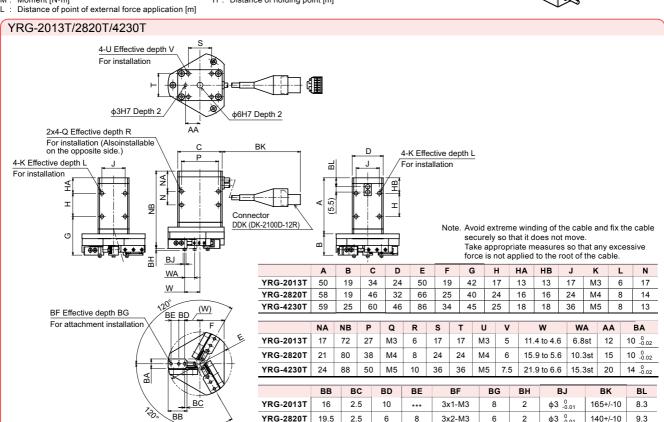
				YRG-2013T	YRG-2820T	YRG-4230T
	Allowable load		N	20	30	50
Finger	Allowable pitching moment		N•m	0.1	0.2	0.4
riligei	Max. weight (1 pair)		g	20	30	50
	Max. holding position	L	mm	20	30	40

· When the external forces Fa and Fb are applied to a potion the distance (L) apart from the finger installation surface, the load (F) and moment (M) are calculated from the formulas shown below.

 $F = Fa + W \times g$ M = Fb × L

Load [N]

:External force [N] :External force [N] Workpiece weight [Kg] Gravity acceleration [m/s²] w Distance of holding point [m]



YRG-2820T

YRG-4230T

19.5

22.5

2.5

2.5

6

6

8

10

3x2-M3

3x2-M4

6

8

2

3

φ3 <sub>-0.01</sub>

ф4 \_0.012

140+/-10

235+/-10

9.3

10.8

#### ■ Electric gripper basic specifications

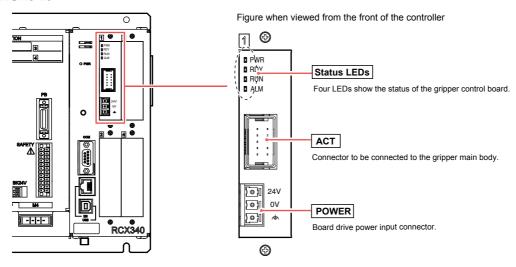
	Item	Specifications			
Basic	Applicable controller	RCX320 / RCX340			
specifications	Number of connection grippers	Max. 4 units			
	Control method	PTP motion			
	Min. setting unit 0.01mm				
Axis control	Position indication unit	Pulses, mm (millimeters)			
	Speed setting	20 to 100% (in 1% steps, Changeable by the program.)			
	Acceleration setting	1 to 100% (in 1% steps, Setting by the acceleration parameter)			
Programming		MDI (coordinate data input), direct teaching, teaching playback,offline teaching (data input from external unit)			

#### Gripper control board specifications

Item		Specifications					
	No. of axes	1 axis					
A:	Position detection method	Optical rotary encoder					
Axis control	Min. setting distance	0.01mm					
	Speed setting	Set in the range of 20 to 100% to the max. parameter speed.					
Protective alarr	m	Overcurrent, overload, voltage failure, system failure, position deviation over, feedback error, etc.					
LED status indication		POWER (Green), RUN (Green), READY (Yellow), ALARM (Red)					
Power supply Drive power DC 24V +/-10% 1.0A Max.		DC 24V +/-10% 1.0A Max.					

#### ■ Part names and functions

#### RCX320 / RCX340



## **Accessories and part options**



### **YRG Series**

#### ■ Standard accessories

Gripper control board

Model	KCX-M4400-G0					
Note Thi	Note. This board includes a 24\/ supply connector					

RCX320 RCX340

Robot (for gripper) cable



	3.5m	KCF-M4751-31
Model	5m	KCF-M4751-51
	10m	KCF-M4751-A1

RCX320 RCX340

Note. Be sure to adjust the total length of the robot (for gripper) cable and relay cable to 14m or less.

Relay cable



	Model	0.5m	KCF-M4811-11
		1m	KCF-M4811-21
		1.5m	KCF-M4811-31
		2m	KCF-M4811-41
		2.5m	KCF-M4811-51
		3m	KCF-M4811-61
		3.5m	KCF-M4811-71
		4m	KCF-M4811-81

RCX320 RCX340

Connector for 24V power supply



		RCX320
Model	KCF-M5382-00	
-		——— (RCX340)

.... ¥