

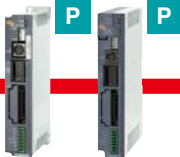
CONTROLLERS

An optimal controller can be selected from various command input formats.

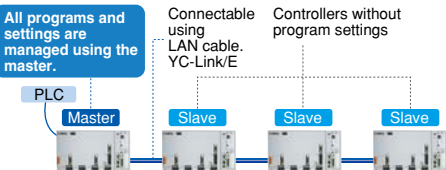
As servo parameters and deceleration patterns suitable for robots are pre-registered, robots can be operated quickly without complex settings.



High performance controllers supporting YAMAHA robots

		TRANSERVO		FLIP-X		PHASER	
		Stepping motor		[T4L/T5L] Small type servomotor (24 V · 30 W)	General-purpose servomotor (30 to 600 W)		Linear motor
1 axis	- I/O point trace - Remote command - Online command	 TS-S2 TS-SH			 TS-X	 TS-P	TS-S2/ TS-SH/ TS-X/TS-P P.492
	Pulse train	 TS-SD		 ERCD	 RDV-X	 RDV-P	TS-SD P.502 RDV-X/ RDV-P P.506 ERCD P.512
	- Program (YAMAHA SRC language) - I/O point trace - Remote command - Online command				 SR1-X	 SR1-P	SR1-X/ SR1-P P.518
2 axes	- Program (YAMAHA BASIC language) - I/O command - Remote command - Online command				 RCX222	 RCX221	RCX221/ RCX222 P.526
3, 4 axes	- Program (YAMAHA BASIC language) ^{Note 1} - I/O command ^{Note 2} - Remote command - Online command				 RCX240 RCX240S	 RCX340	RCX240/ RCX240S P.534 RCX340 P.544

Five or more axes can also be supported

5 to 8 axes	RCX240 YC-LINK couples single-axis controllers to a 4-axis controller Note : Up to four SR1 series controllers can be connected to the RCX series controller.	
up to 16 axes	RCX340 YC-Link/E Up to four RCX340 controllers (up to 16 controllable axes) can be connected.	 All programs and settings are managed using the master. Connectable using LAN cable. YC-Link/E Controllers without program settings PLC Master Slave Slave Slave

Note 1. The RCX340 uses YAMAHA BASIC2 language.
 Note 2. The I/O command is not applicable to the RCX340.

P : Robot positioner

D : Robot driver

C : Robot controller

POINT 1

Selectable from various control methods

Program input

A variety of operation settings, calculations, and conditional branching is possible

The single-axis robot controllers use the YAMAHA SRC language^{Note} which is simple yet contains all required functions, such as I/O outputs and conditional branching, etc. The multi-axis controller RCX series uses the YAMAHA BASIC language capable of more sophisticated programming and includes all types of arithmetic operations, flexible variable settings, and various conditional branching, etc. Both are easy to use robot language conforming to the BASIC. These languages support various needs from simple operations to expert user's sophisticated work.

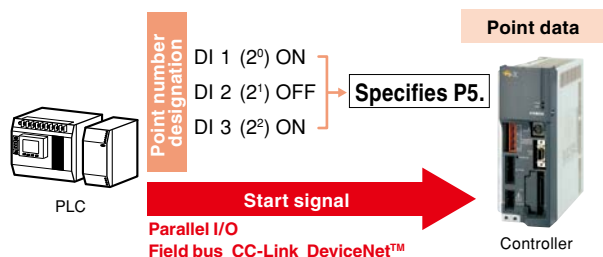
Note. The 2-axis controller DRCX also uses YAMAHA SRC language.

Single-axis robot controller	YAMAHA SRC language <Example>	MOVA 1, 100	Moves to point number 1 at 100 %-speed.
		DO 1, 1	Turns on general-purpose output number 1.
		WAIT 2, 1	Waits until general-purpose input number 2 turns on.
Multi-axis robot controller	YAMAHA BASIC language <Example>	IF DO(10)=1 THEN *END	Jumps to *END if general-purpose input number 10 turns on. Otherwise, moves to the next line.
		MOVE P, P2, STOPON DI(1) =1	Moves to point number 2. Stops when general-purpose input number 1 turns on during movement.
		WAIT ARM	Waits until the robot arm operation ends.
		P3=WHERE	Writes the current position into point number 3.
		*END:	Defines the label named "END".
		HOLD	Pauses the program.

I/O point trace

Program-less means easy

The host unit specifies a point number in binary format and the robot moves to the specified point when the start signal is input. The controller can operate only by teaching the point data without programs.

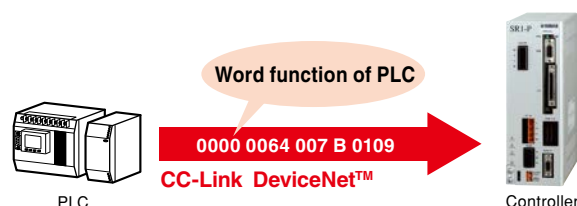


Remote command

Ideal for unified data management

The word function of the CC-Link or DeviceNetTM is used to issue various commands or data to the robot. The expandability of the word function from simple operation instructions to point data writing is fully utilized to freely use the robot controller functions from the host unit.

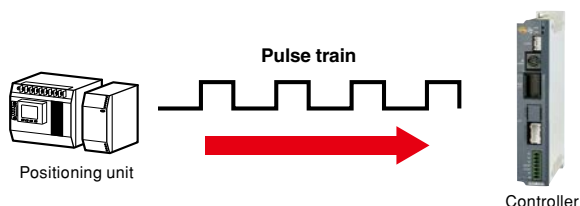
Note. This function is enabled when selecting an option network board.



Pulse train

Acceleration/deceleration curves can be created freely

The robot is controlled using pulse trains sent from the positioning unit. The controller does not need to have programs or point data. This pulse train is convenient when the control is centralized to the host unit.



Online command

Execute everything from a PC

The PC can issue various commands or data to the controller or receive the data or status through the RS-232C or Ethernet^{Note}. All executable operations from the teaching pendant can be executed from the PC.

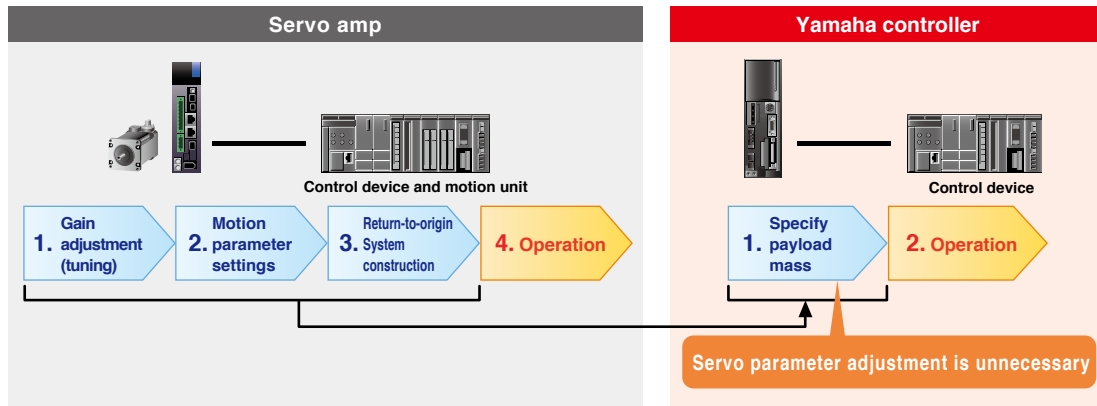
Note. Ethernet is enabled when selecting an option network board. (For the RCX340, Ethernet is provided as standard function.)



Easy optimal setup

Complicated parameter settings are unnecessary

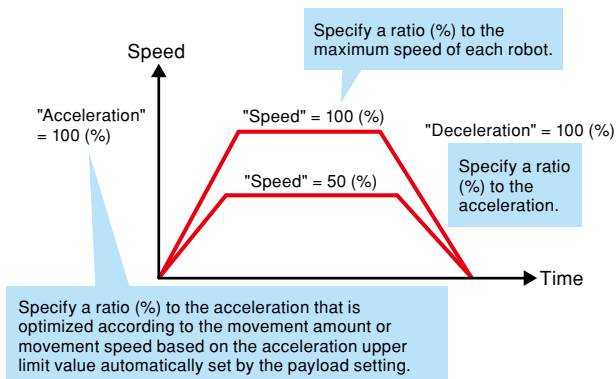
Robot controllers are specially designed for YAMAHA robots. Optimal values for servo parameters required for robot operation, such as gain are already registered beforehand. **Start operating immediately without any need for complicated settings or tuning, even if you don't have knowledge or experience about control.**



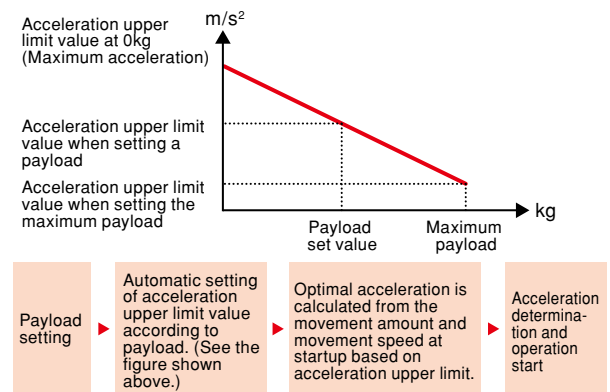
Easy acceleration/deceleration settings

The acceleration/deceleration is an important factor that affects the service life of the machine. **If too high acceleration is set, this may cause the service life of the machine to shorten. If the acceleration is too low, the motor power cannot be used effectively, causing the tact time to lower.** The acceleration/deceleration setting of YAMAHA robot controller is determined finely by load weight. Setting only payload parameters will automatically set optimal acceleration/deceleration by taking the service life of the machine and motor capability into consideration. Detailed robot knowledge from YAMAHA is what makes this possible. (Note: For the pulse train input, the customer may need to set the acceleration/deceleration.)

Concept of speed and acceleration



Acceleration calculation algorithm



Zone control (= Optimal acceleration/deceleration automatic setting) function

The SCARA robot also incorporates a zone control function that always operates the robot at its maximum performance level by considering changes in inertia due to the arm posture. Therefore, the robot does not exceed the tolerance value of the motor peak torque or speed reducer allowable peak torque only by entering the initial payload to bring out the full power of the motor and keep the high acceleration/deceleration.

For X-axis of YK500XG

The torque in the arm folded state is 5 or more times different from that in the arm extended state.

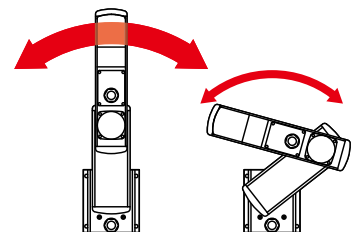
This may greatly affect the service life, vibration during operation, and controllability.

If the motor torque exceeds the peak value

→ **This may adversely affect the controllability and mechanical vibration, etc.**

If the torque exceeds the tolerable peak torque value of the speed reducer

→ **This may cause early breakage or shorten the service life extremely.**



POINT 3

Multi-function and expandability

■ Multi-axis controllers support up to 30,000 points (10,000 points for the RCX2 series, 1,000 points for the single-axis controller (255 points for the TS series)). Up to 100 programs can be created on each controller.

■ Various field networks, CC-Link, DeviceNet™, PROFIBUS, and EtherNet/IP™ are supported.

Note. Some models do not support all networks.

■ The TS series, RD series, SR1 series, and RCX series use a dual-power supply system with separate control power supply and power supply.

■ As the controllers conform to the CE marking that is safety standards in EU (Europe), they can be used safely even overseas.

The TS series (except for TS-S), SR1 series, and RCX series conform to up to safety category 4.

For details about functions of each controller, refer to controller details pages from P.481.

Name	Type	Number of points	Number of programs	Applicable network						Compliance with CE
				CC-Link	DeviceNet™	Ethernet	EtherNet/IP™	PROFIBUS	PROFINET	
TS-S2/TS-SH	1 axis robot positioner	255	-	○	○	-	○	-	○	○
TS-X/TS-P		255	-	○	○	-	○	-	○	○
TS-SD	1 axis robot driver	-	-	-	-	-	-	-	-	○
RDV-X/RDV-P		-	-	-	-	-	-	-	-	○
ERCD	1 axis robot controller	1,000	100	-	-	-	-	-	-	-
SR1-X/SR1-P		1,000	100	○	○	○	-	○	-	○
RCX221/RCX222	1 to 2 axes controller	10,000	100	○	○	○	-	○	-	○
RCX240	1 to 4 axes controller	10,000	100	○	○	○	○	○	-	○
RCX340		30,000	100	○	○	○	○	○	○	○

RDV-X/RDV-P

P.506

FLIP-X

PHASER

[Robot driver]



Operation method	Pulse train
Input power	Main power Single-phase/3-phase AC 200 V to 230 V Control power Single-phase AC 200 V to 230 V
Origin search method	Incremental

Dedicated pulse train control

The dedicated pulse train control has achieved a compact body and a low price.

Position setting time reduced by 40%

The response frequency is enhanced about two times in comparison with former models. The position setting time of uniaxial robots is reduced by about 40%.^{Note 1}

Large cost reduction possible

It is easy to assemble them in automated machinery. You can save much labor in designing, parts selection, setting and more. A large cost reduction is possible.

Contributing to saving space for the whole control board

The compact design has reduced the width up to a maximum of 38% in comparison with former models. In addition, the improvement of radiation efficiency makes it possible to arrange the devices with less space in between. Multiple units can be installed side by side in a neat arrangement.

Easy replacement

The parameter settings and fastening-hole pitches are the same as those of former models. It is easy to replace the software and the hardware as well.

Command input: Line driver (2 Mpps)

Command output: ABZ-phase output (with a divider function)

Real-time operation status monitoring

You can have analog outputs for speed, amperage, and more information to know the operation status in real time. RDV-Manager, the dedicated support software, is also available for a graphical view of the status.

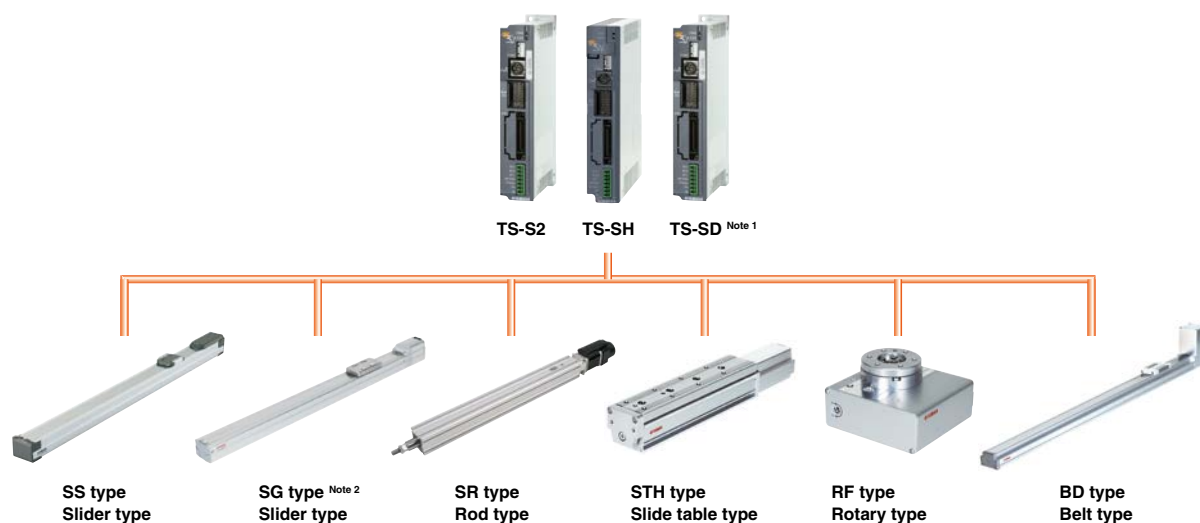
Main power: Single and three phases supported (200V)

The full-specification operation is available with a single-phase power supply.

Note 1. With a 400W servomotor, 20mm ball screw lead, and portability of 40kg.

TS-S2/TS-SH/TS-SD POINT

Usable for all TRANSERVO series models



Note 1. The STH type vertical specifications and RF type sensor specifications do not support the TS-SD.
Note 2. SG07 is only applicable to TS-SH.

TS-SD

P.502

TRANSERVO

[Robot driver]



TS-SD

Operation method	Pulse train	
Input power	Main power	DC 24 V +/- 10 %
	Control power	DC 24 V +/- 10 %
Origin search method	Incremental	

Pulse train input driver dedicated to "TRANSERVO"

A robot driver dedicated to the pulse train input for "TRANSERVO".

Torque decrease in high-speed area is suppressed

As a vector control method is used, the torque decrease in high-speed area is small and high-speed operation even with high payload can be performed. This greatly contributes to shortening of the tact time.

Excellent silence

High-pitched operation sounds unique to the stepping motor are suppressed to achieve silent operation sounds similar to the AC servo.

Easy operation with support software TS-Manager

In the same manner as the robot positioner TS series, the operation can be performed with the TS-Manager (Ver.1.3.0 or later) having various convenient functions, such as robot parameter setting, backup, and real-time trace (The handy terminal "HT1" cannot use this TS Manager).

Applicable to a wide variety of pulse train command inputs

This robot driver can be made applicable to the open collector method or line driver method using the parameter setting and signal wiring. In the open collector method, a wide voltage range from 5 V to 24 V is supported. So, the robot driver can be matched to the specifications of the host unit to be used.

TS-Manager: Real-time trace function

The current position, speed, load factor, current value, and voltage value, etc. can be traced at real-time. Additionally, as trigger conditions are set, the data when the conditions are satisfied can be automatically acquired. Furthermore, as a range is specified from the monitor results, the maximum value, minimum value, and average value can be calculated. So, this is useful for the analysis if a trouble occurs.

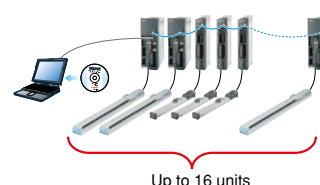
Real-time traceable items (up to four items)

• Voltage type	• Command position	• Current position
• Command speed	• Current speed	• Internal temperature
• Command current	• Current current value	• Motor load factor
• Input/output I/O state	• Input pulse count ^{Note 1}	• Movement pulse count ^{Note 1}
• Word input/output state ^{Note 2}		

Note. 1: TS-SD only Note. 2: TS controller only

Daisy chain function

As multiple TS series controllers and drivers are connected in a daisy chain, the data of a desired unit can be edited from the personal computer (up to 16 units).



TS-S2/TS-SH

P.492

TRANSERVO

TS-X/TS-P

P.492

FLIP-X

PHASER

[Robot positioner]



TS-S2 TS-SH

Operation method	Point trace Remote command Online command
Number of points	255 points
Input power	Main power DC 24 V +/- 10 % Control power DC 24 V +/- 10 %
Origin search method	TS-S2 Incremental TS-SH Absolute Incremental



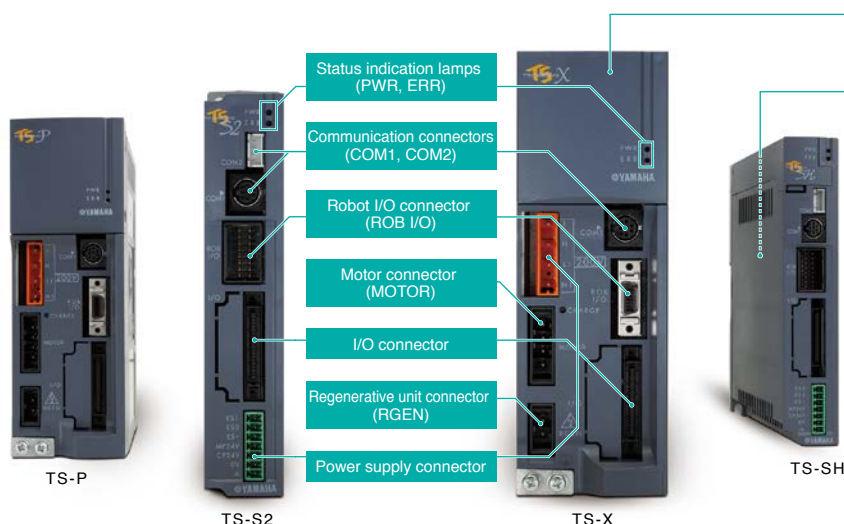
TS-X TS-P

Operation method	Point trace Remote command Online command
Number of points	255 points
Input power	AC 100 V / AC 200 V
Origin search method	TS-X Absolute Incremental TS-P Incremental Semi-absolute

Design that allows a clean installation

Unified installation sizes

Height and installation pitch are unified throughout the series. Units can be installed neatly within the control board.



Absolute battery is neatly accommodated

The absolute battery is stored inside the unit. Replacement can be performed easily from the front side. (TS-X and TS-SH supported)



TS-X

DIN rail installation

On-board installation is made easy by the DIN rail installation mechanism that is standard on the TS-SH. (Optionally installable on other models)



Selectable I/O interfaces

Two RS-232C ports provided

● Connect support tools

Intuitive operation supports controller design and maintenance.

● Daisy-chaining

Two ports can be used to daisy-chain up to 16 units.

● Communication commands

Easily understood ASCII text strings can be used to perform robot operations.



Selectable 100V/200V

- The TS-X/P let you select AC100/200V as the power input. (The 20A model is 200V only.)
- The TS-S2/SH is DC24V input.

A variety of I/O interfaces

In addition to NPN and PNP, you can choose CC-Link, DeviceNet™, EtherNet/IP™, and PROFINET field networks.



● Positioner interface

Functionality has been condensed into an I/O interface with 16 inputs and 16 outputs. In addition to easy positioning, this also includes functionality that enhances interoperability with the control device.

● Remote commands

Numerical data can be directly manipulated by using the four-word input and four-word output areas. You can add new direct positioning commands to further unify the data at the control device.

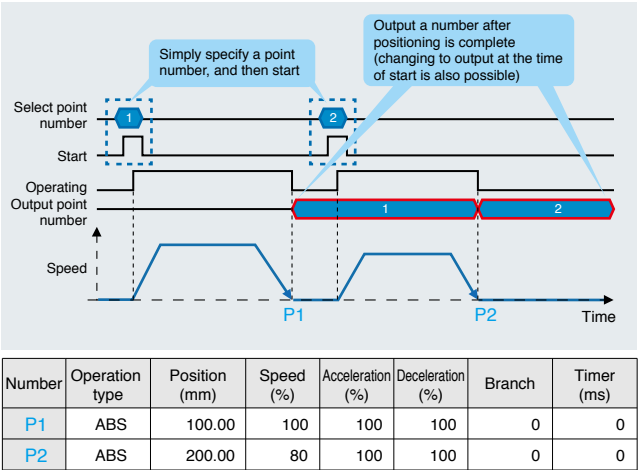
● Gateway function

New types of connection are provided to reduce network costs. (CC-Link, EtherNet/IP™, and PROFINET are supported.)

Positional interface

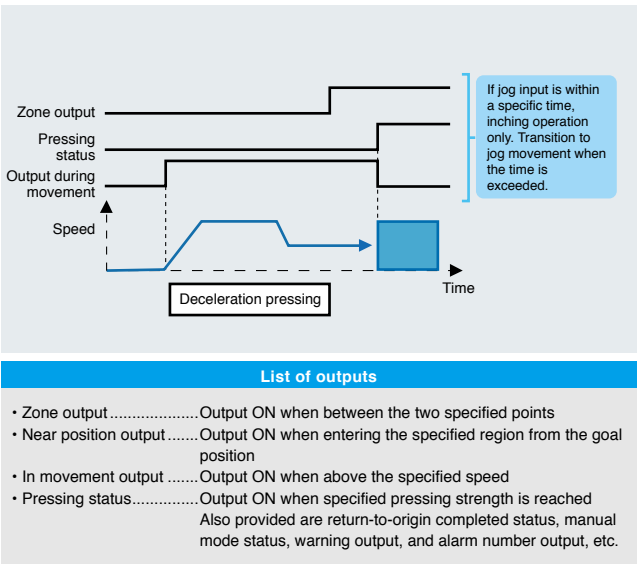
"Positioner function" for easy positioning

You can easily perform positioning operations by specifying the number of a point that is registered in the data, and entering a start command.



A variety of output functions

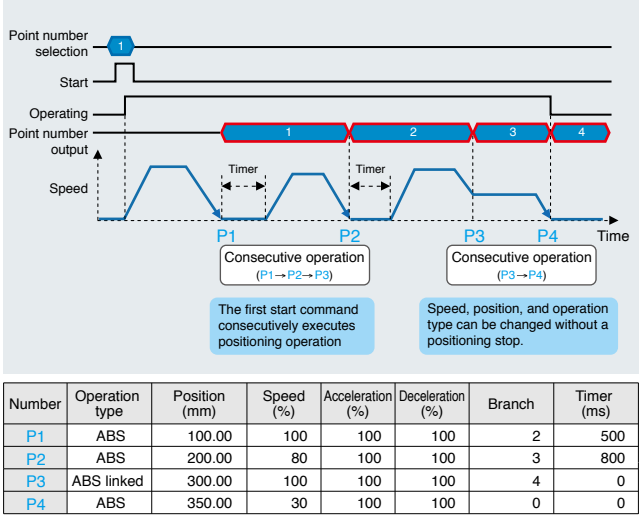
The TS controller provides a variety of status outputs that are linked with positioning operations. By selecting and using an output appropriate for the scene, this can contribute to cost-saving measures such as making the steps of the control device's program more efficient or by reducing the peripheral equipment.



List of outputs	
• Zone output	Output ON when between the two specified points
• Near position output	Output ON when entering the specified region from the goal position
• In movement output	Output ON when above the specified speed
• Pressing status	Output ON when specified pressing strength is reached
Also provided are return-to-origin completed status, manual mode status, warning output, and alarm number output, etc.	

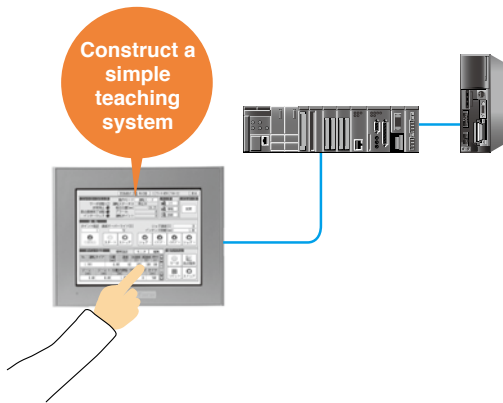
Consecutive operation, linked operation

By specifying a branch destination, it is possible to execute positioning operations consecutively. Additionally, by specifying linked operation, operation with the branch destination can be executed while changing the speed without positioning stops; this allows control programming to be simplified and takt to be shortened.



Jog and point teaching functions are provided as standard

Jog movement and point teaching functions are provided as standard for input signals. By linking these with buttons of a touch panel etc., a simple teaching system can be constructed.



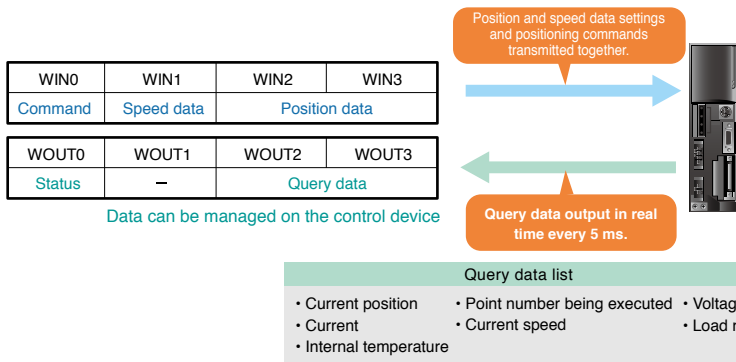
TS-S2/TS-SH/TS-X/TS-P

Remote commands

Ideal for unifying data management

Remote commands are functions by which the control device can directly handle data such as points and parameters using the word area of the field network.

Numerical data can be operated directly by using the word area. This promotes unification of data management.



New function

Direct positioning commands that directly specify position and speed data

As remote commands, "direct positioning commands" are provided, allowing the position and speed data to be specified directly and then positioning operations to be performed. In addition to unifying the positioning data on the control device, this allows it to be done with a single command, simplifying programming of the control device.

Consecutive queries for realtime update of various status information

Normally, remote commands only update data when responding, but if a consecutive query is issued, the data continues to be updated at a fixed interval until permission is given to stop. This is useful in various cases such as when it is desirable to obtain positioning data during operation for interoperability with peripheral devices, or to obtain current values in order to monitor the status of a robot.

Parallel processing of "positioner interface" and "remote commands"

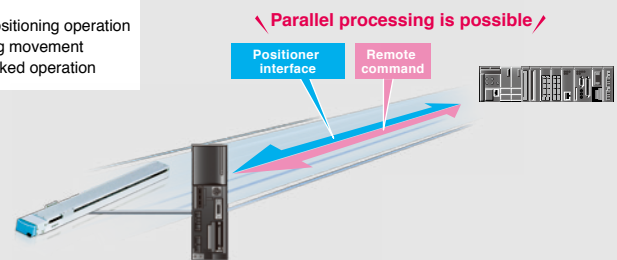
Since positioner interface and remote commands operate independently of each other, parallel processing is possible.

< Usage examples >

- Obtain the current position during positioning operation
- Obtain the current position during jog movement
- Change the target position during linked operation

		Positioner interface		Remote command
		Positioning operation	Jog movement	Positioning operation
Remote commands	Data write	○	○	—
	Data read	○	○	—
	Consecutive query	○	○	○

○ : Parallel processing possible

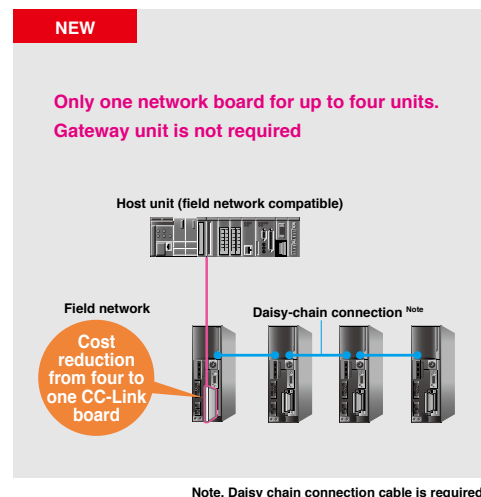
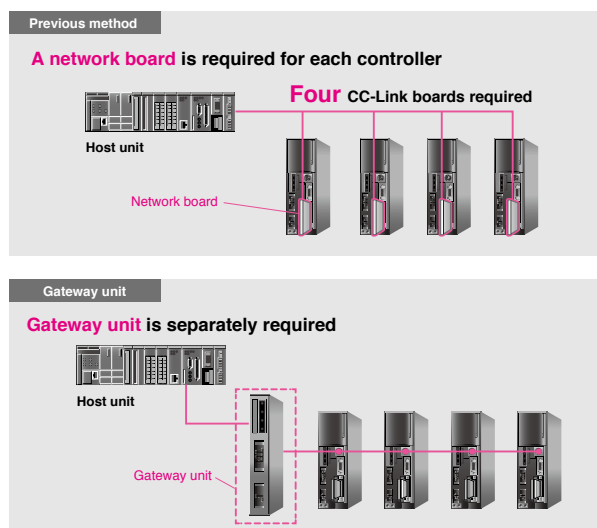


"Gateway function" — a new way to connect

New function

Decrease network cost

One controller equipped with a field network board can provide unified management of up to four I/O interfaces via a daisy-chain connection. This allows network cost to be decreased while enabling the same type of I/O control as when one board is installed for each unit. (CC-Link and EtherNet/IP™ are supported)



Daisy chain connection

No need to connect or disconnect cables during operation (up to 16 units)

From a single PC, handy terminal, or touch-panel display, it is possible to specify point data and parameters, perform operations, and monitor the status for up to 16 axes on daisy-chained controllers. For everything from design to maintenance, a connection to only the first controller is sufficient; any desired controller can be accessed simply by switching the station number, without having to connect or disconnect cables.

Communication commands

An easily handled command protocol using ASCII text strings supports a wide range of needs from data editing to operation and status monitoring. By daisy-chaining multiple devices, simple multi-axis control can be performed.



"KEYENCE PROTOCOL STUDIO Lite" serial communication settings software

By loading a TS settings file into PROTOCOL STUDIO Lite, communication settings and main communication commands can be registered automatically. Ladder-less data editing and daisy-chaining can be easily accomplished.

Contact for questions regarding PROTOCOL STUDIO Lite
Keyence Corporation, www.keyence.co.jp/red/kv01/

Daisy-chain connections (up to 16 axes)

Communication with the KV-L21V uses a Yamaha-made communication cable (D-sub type). By using daisy-chain connections, up to 16 axes can be managed together.



Automatic device assignment for each communication command

If the communication type is specified as cyclic, the desired information to be obtained is automatically stored in data memory.



Touch operator interface "Pro-Face" GP4000 Series

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

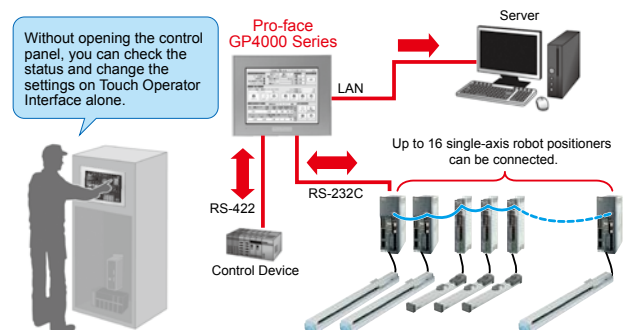
Free download of the program file from the Pro-face home page
<http://www.proface.com>

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

Supports 3 languages

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



SR1-X/SR1-P

P.518

FLIP-X

PHASER

[Single-axis robot controller]



SR1-X

SR1-P

Operation method	Program Point trace Remote command Online command
Number of points	1000 points
Input power	AC 100 V AC 200 V
Origin search method	SR1-X Absolute Incremental SR1-P Incremental Semi-absolute

Various command methods

An optimal method can be selected from various command methods, such as program, point trace, remote command, and online command. The program uses the YAMAHA SRC language that is similar to the BASIC. Various operations, such as I/O output and conditional branching, etc. can be executed using simple operations.

Applicable to complete absolute position system

The SR1-X is applicable to complete absolute position system. No return-to-origin is needed. (The backup period is one year in the non-energizing state.)

I/O assignment function

As the I/O assignment is changed, the point trace operation, point teaching, and trace operation by specifying coordinate values can be selected in addition to the normal program operation. Since the JOG movement through the I/O is possible in the point teaching mode, the point teaching can be performed from the host unit without the HPB.

Current position output function

The position data is output as feedback pulse or binary data. This allows the host unit to understand the current robot position at real-time. Furthermore, functions, zone output or point zone output to output near point number are incorporated.

Torque limiting

As this function limits the maximum torque command value at desired timing, it is effective in operations such as pushing and workpiece gripping operations. Furthermore, in addition to the torque limiting by the parameter data value, the torque limiting by the analog input voltage can be performed.

ERCD

P.512

T4L/T5L

[Single-axis robot controller]



ERCD

Operation method	Program Point trace Online command Pulse train
Number of points	1000 points
Input power	DC 24 V
Origin search method	Incremental

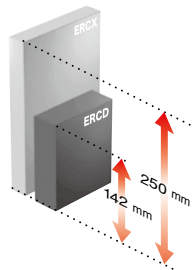
Four command formats

A desired command format can be selected from four command formats, program operation using various commands, point trace operation only by instructing a point number, online command, and pulse train input.

Compact design

Compact box size of W 44 × H 142 × D 117mm is achieved with the functions improved.

The volume ratio of the robot controller is downsized to approximately 62 % when compared to YAMAHA's conventional model ERCX. The flexibility of the installation space is improved.



Various input/output functions

As a feedback pulse output function is provided, the host control unit can easily manage the current position. Additionally, as the movement point number can be output in binary format during point trace, the operation can be checked easily. As a teaching function using the I/O is added, the flexibility and usability of the system configuration are further improved.

This output is enabled in the program or point trace operation and the number of outputs can be changed to a desired level using the division setting.

Various monitor functions

The controller status can be checked using the input/output status monitor, duty monitor, and LED status display.

Error history and alarm history

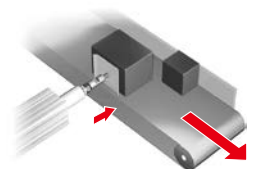
The error or alarm history that occurred in the past can be displayed and checked on the HPB or personal computer screen.

Robot number management

As the controller is initialized by the robot number of the robot to be controlled, parameters suitable for each robot model are automatically registered and no complicated servo adjustment is needed.

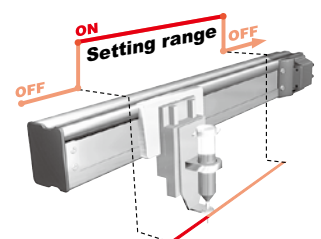
Torque limiting control

The torque limiting control can be performed using the program command. The axis can be stopped with the torque applied. This torque limiting control can be used for continuous positioning of workpieces with different sizes, press-fitting work, and workpiece holding operation.



Zone output function

The general-purpose output on/off setting between desired points can be performed using the parameter setting. The positive logic/negative logic setting can be made and the axis position can be easily judged by an external unit. Up to four patterns can be set.

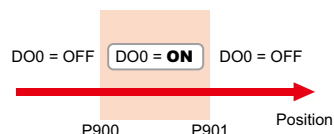


SR1-X/SR1-P/ERCD Various functions

Position data output function

Zone output

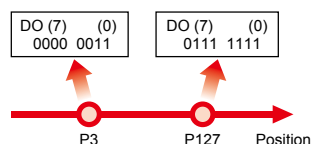
Outputs whether or not the robot position is within the specified range.



It is possible to reverse the output logic.

Point zone output

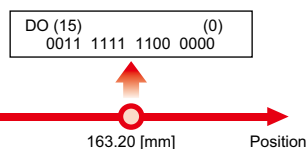
Outputs the point number near the robot position in binary format.



It is also possible to limit to only the moving point.

Binary output

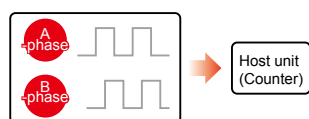
Outputs the current robot position in 16-bit binary format. (This function is available only in the SR1.)



It is possible to adjust the unit of the output position data to be output using parameters.

Feedback pulse output

Outputs the current position counter value of the robot through the A/B-phase line driver.



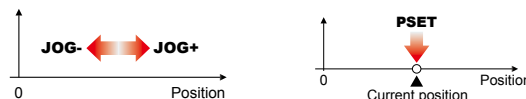
It is possible to perform the monitoring by host unit at real-time.
A frequency division function is built-in.

Point teaching

The JOG movement of the robot and the point reaching can be performed from the host unit.

Concept

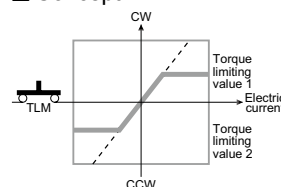
- The robot is moved to the teaching position using the JOG+/-JOG-command.
- The current position is registered into the point number specified by the PSET input.



Torque limiting function

As the torque limiting is performed during operation, the operation, such as pushing and workpiece gripping can be performed.

Concept



Features

SR1

- Host unit manages the limiting time using the TLM input.
- Limiting status is understood using the torque limiting status output (TLON).
- Torque limit value is changed (up to 4 patterns) using the input.
- Torque can be limited using the program command.
- Torque can be limited using the analog input (0 to +10 V / 12 bit).

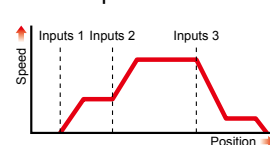
ERCD

- Torque can be limited using the T program command.

Movement data change function

The movement speed or target position can be changed during movement. (This function is available only in the SR1.)

Concept



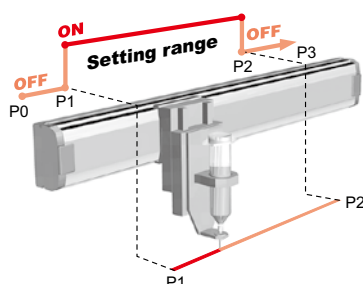
Features

- Host unit manages the limiting time using the movement command input.
- Movement command is ABS-PT (absolute movement command) or ABS-BN (binary specified movement command).
- Change speed can be specified in a range of 1 to 100 % (up to 4 patterns).
- Changing is disabled in the deceleration zone.

YAMAHA SRC language convenient functions

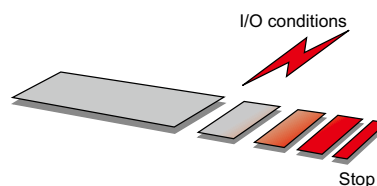
Multi-task function

This function can execute multi tasks, such as robot peripheral units in parallel at the same time. Up to four tasks can be executed. With the multi-task function combined with JMPP command, the I/O signals can be output when the robot passes through the specified point during movement.



Conditional stop function during movement

The arm can be decelerated and stopped using I/O conditions of the MOVF command while it is moving. This function is useful when searching for the target position with the sensor.



RCX2 series RCX221/222 RCX240/240S

P.526

P.534

[Multi-axis robot controller]



RCX221

Operation method	Program Remote command Online command
Number of points	10000 points
Input power	AC 200 V
Origin search method	Incremental Semi-absolute



RCX222

Operation method	Program Remote command Online command
Number of points	10000 points
Input power	AC 200 V
Origin search method	Absolute Incremental



RCX240

Operation method	Program Remote command Online command
Number of points	10000 points
Input power	Single phase : AC200V to 230V +/-10% maximum
Origin search method	Absolute Incremental

■ Applicable to all YAMAHA robot models

The RCX series is applicable to all YAMAHA robot models, such as PHASER, FLIP-X, and XY-X, etc. As the single-axis robot (FLIP-X/ PHASER) can be combined with the Cartesian robot freely, various applications can be supported (except for some compact single-axis robots).

■ Complete absolute position system

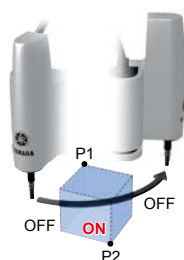
The RCX uses complete absolute specifications that need no return-to-origin when the power turns on. The completely same system can be applicable to the incremental specifications. (When the PHASER series uses the magnetic scale, it is applicable to the semi-absolute or incremental specifications.)

■ Extension of absolute data backup time

As the backup circuit is improved to the energy saving, the absolute position data retention period in the non-energizing state is greatly extended. The maximum one month of the conventional model is extended to approximately one year. The current position information is monitored during long vacations, equipment storage, or even during transportation, and no return-to-origin is needed when energized again. This allows quick production start.

■ Area check output function

This function can output the I/O signals when the robot enters a set area during operation. Up to eight check areas can be set.



■ Applicable to dual-drive

A dual-drive function is incorporated that controls two axes synchronously. This function is effective for heavy workpiece transfer or Y-axis long stroke of the Cartesian robot. The function can perform the operation using the high-speed and high acceleration/ deceleration of YAMAHA robots.

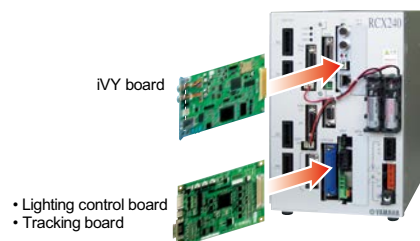
Note. The dual-drive is supported as a custom order. For detail, please consult YAMAHA.

■ Example of dual-drive



■ Applicable to robot vision "iVY System"

The RCX series also supports the YAMAHA robot vision "iVY System" that is capable of easy setup and applicable to a wide variety of applications. As the vision board is incorporated into the controller main body, the calibration work requiring a long time and labor is then greatly simplified. As the position is corrected by the image recognition, the versatility and applicability of the equipment is widened greatly (only supported by the RCX240).

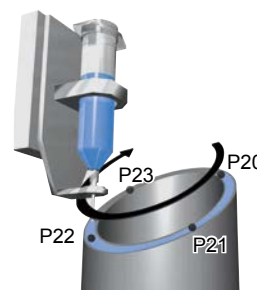


■ Double-carrier anti-collision function

When using the double-carrier, collisions between both carriers can be prevented by the control in the controller. Collision preventions by the zone judgments or external sensors are no longer needed to make the double-carrier easier to use.

■ 3D linear/circular interpolation control

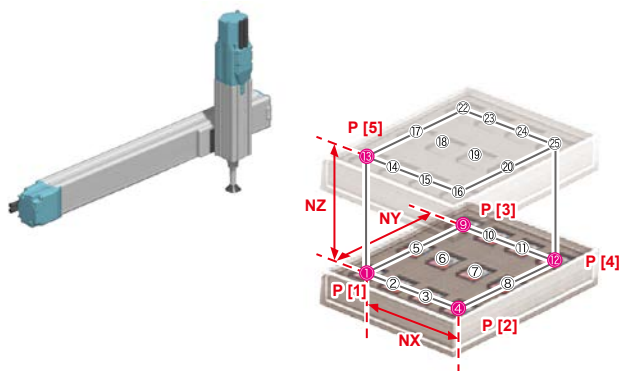
2D and 3D linear and circular interpolation controls are possible. This ensures the smooth and highly accurate operations suitable for the sealing work. (The 3D interpolation is not available in the RCX221/222.)



Palletizing function

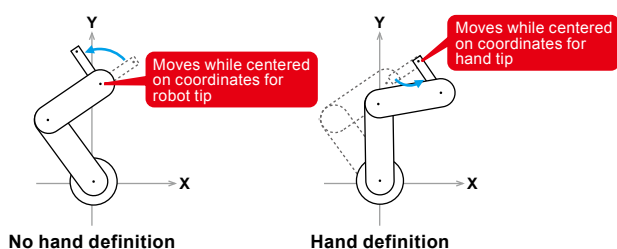
This function can easily define up to 20 kinds of pallets only by entering four corner positions on the pallet as the teaching points. When entering the teaching point in the height direction, even three-dimensional pallets are supported.

When specifying the defined pallet number and executing the movement command, the palletizing work is then performed. Various operations, one point → pallet, pallet → one point, and pallet → pallet, can be performed using the programs.



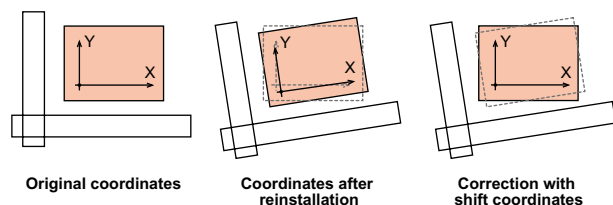
Hand definition

This function operates the robot based on coordinates of the offset tool tip when the tool is attached to the tip of the robot axis in the offset state. Particularly, this function is effective during tool rotation of SCARA robots or robots including the rotation axis.



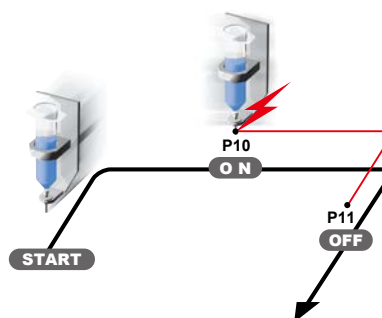
Shift coordinates

A deviation may occur in the coordinate system when re-installing or replacing the robot during maintenance work. In this case, the coordinate system can be corrected using the shift coordinate function. So, the point data can be used as it is. No re-teaching is needed.



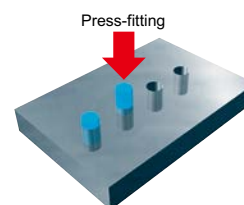
Passing point output control

The general-purpose output on/off can be controlled by specified points without stopping the axis operation during interpolation operation. The dispense can be turned on or off with the axis operated during sealing to allow smooth and stable dispensing.



Torque limiting function

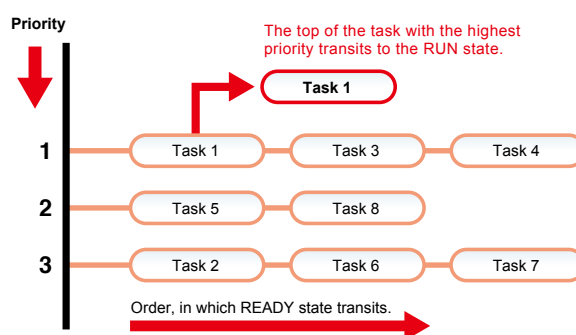
The motor torque can be limited during gripping or press-fitting.



Multi-task function

This function can execute multi tasks (up to eight tasks), such as robot peripheral units in parallel at the same time. When there are multiple tasks, the task can be changed by means of the time sharing method and a priority can be put on the task. Additionally, the priority can also be changed while the task is running. The multi-task function simplifies the control configuration of the entire system to improve the operation efficiency.

Task scheduling



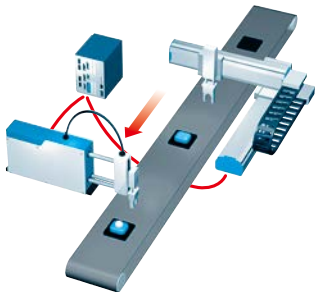
Sequence program

In addition to the normal task, a task to individually control the input/output (parallel, serial, memory, timer) can be executed.

As the sequence program can be enabled even in the manual mode, this is effective to construct a safety system linked with peripheral units.

2-robot control

Two robots that are assigned to the main and sub robots can be simultaneously controlled using one controller. As this function is used together with the multi-task, advanced and smooth linking of two robots can be performed using one controller.



Applicable to auxiliary axis addition function "YC-Link system"

This YC-Link is a system that controls the single-axis robot controller SR1 from the multi-axis controller RCX series through the serial communication.

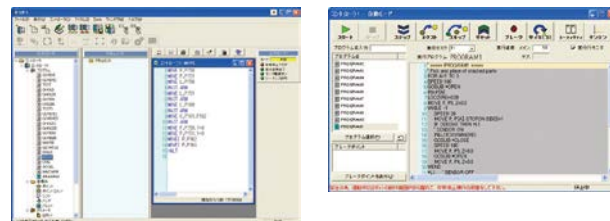
By installing the YC-Link system, the RCX series can be easily linked with the SR1 series. As multiple controllers can be linked as required, up to eight axes (up to six axes for simultaneous control) can be controlled.



Powerful support software: VIP+ (plus)

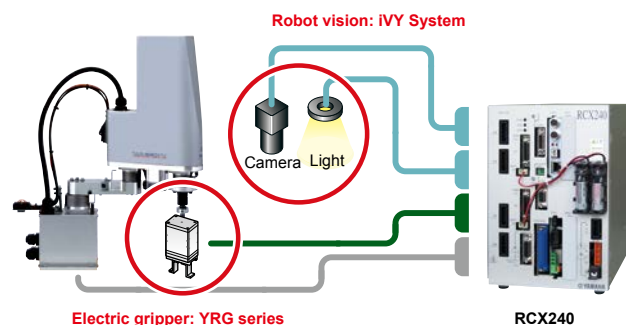
This application software allows you to easily and visually operate the robot, create and edit programs, and teach points.

The user interface is greatly improved and made easier to use when compared to the conventional support software VIP.



Applicable to electric gripper "YRG series"

All grippers can be controlled using one RCX240 controller. Data exchanging with the host unit, such as PLC is not needed. The setup or startup is very easy.



RCX240/RCX340 POINT

RCX240 and RCX340 are applicable to all single-axis, Cartesian, SCARA, and P&P robots ^{Note}

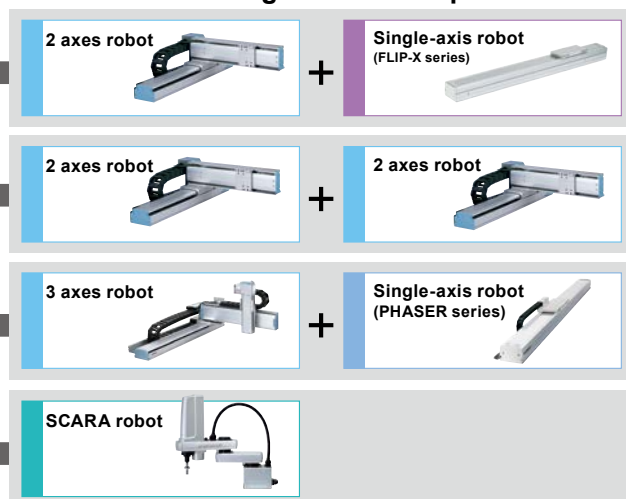
The 4-axis robot controller RCX240 and RCX340 are applicable to all robot models including single-axis, Cartesian, SCARA, and Pick & Place robots.

As the mixed control of the ball screw type FLIP-X series and linear motor type PHASER series can be performed, the robots can be combined freely according to the applications. Additionally, when preparing the robot controllers for the maintenance work of multiple robots, it is enough to prepare only one robot controller. This robot controller can be used for any model only by changing the setting.

Note. Except for 24 V specification models.



Robot configuration examples



[Multi-axis robot controller]



RCX340

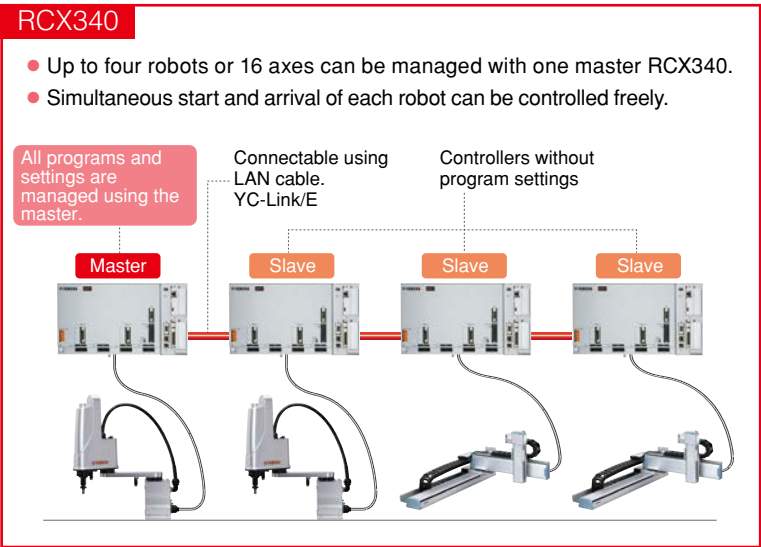
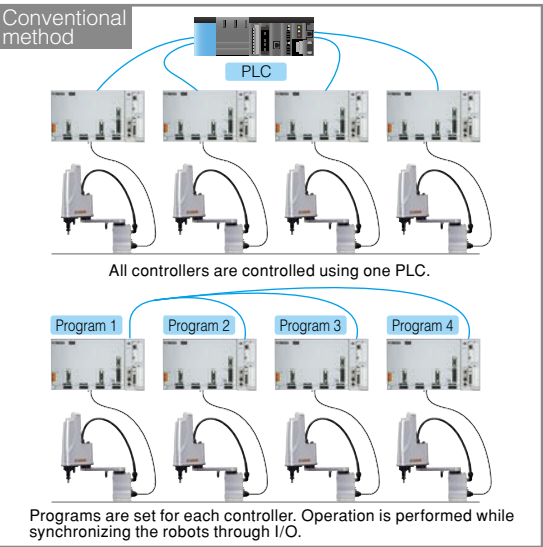
Operation method	Program Remote command Online command
Number of points	30000 points
Input power	Single phase : AC200V to 230V +/-10% maximum
Origin search method	Absolute Incremental Semi-absolute

Advanced functionality allowing construction of high-level equipment

Multiple robots can be operated synchronously through the high-speed communication. Use of linking among controllers makes it possible to store programs into only one controller. Use of a newly developed algorithm achieves shortening of the positioning time and improvement of the tracking accuracy.

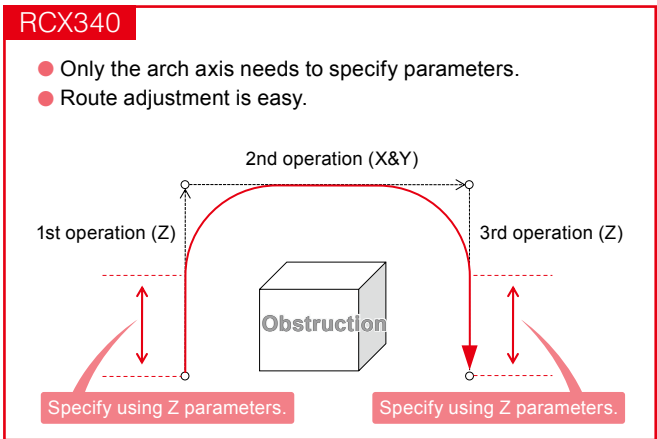
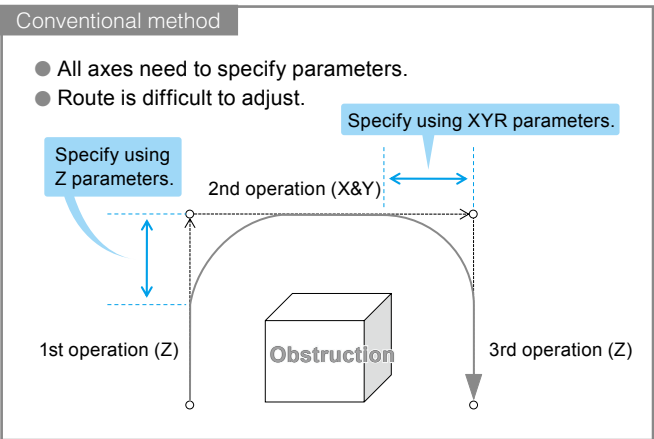
The control of multiple robots can be managed using one master controller

The RCX340 controller allows high-speed communication among the controllers. As the operation command can be sent to the controller of each slave from the master controller, the programs or points can be managed only using the host master controller. Additionally, as this controller supports multi tasks flexibly, data exchanging with the PLC can be simplified. Simultaneous start and simultaneous arrival of each robot can be controlled freely. Complicated and precision robot system using many axes can be constructed at a low cost.



Arch motion can be specified more intuitively

As the arch motion route designation method is changed and the designation method is simplified, the arch motion can be specified more intuitively.



RCX340

Smooth movement is achieved by greatly improving motion functions

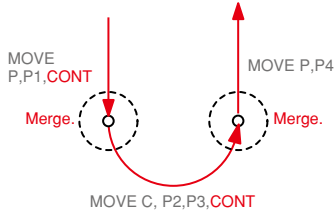
As a new servo motion engine is incorporated, various operations can be merged. Use of a newly developed algorithm achieves shortening of the positioning time and improvement of the tracking accuracy.

Expansion of CONT option function

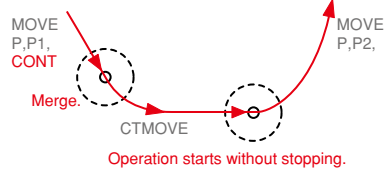
Different type operations, such as PTP, interpolation operation, and conveyor tracking, etc. are merged to improve the speed.

RCX340

[Example: PTP ↔ CP]



[Example: PTP ↔ Conveyor tracking]

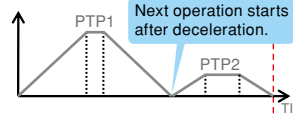


Improvement of operation speed ^{Note}

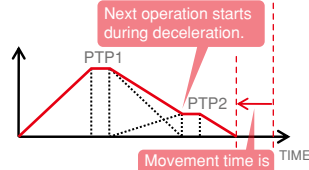
All operations can be merged as much as possible using the merge PTP.

As even operations with different acceleration or deceleration time are merged at maximum level with priority put on the operation time, the movement time is shortened greatly.

Conventional method



Merge PTP operation

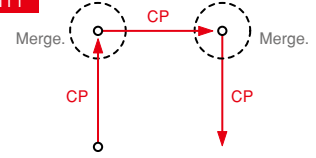


- The PTP1/PTP2 operation pattern is calculated as the merge is preconditioned.
- Maximum merge can be made regardless of operation types to be merged. So, the merge effect is large.

Proper use according to application ^{Note}

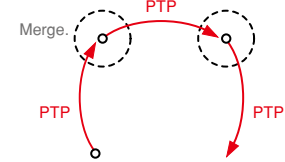
When performing the continuous operation, an optimal operation can be selected according to the application, like traditional PATH is used for constant-speed operation, such as sealing and merge PTP is used for operation with priority put on the movement time.

PATH



Interpolation operation to the final target position is performed at a specified speed.

Merge PTP operation



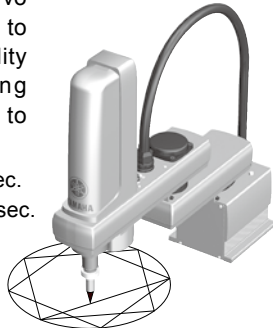
- PTP operation is performed so that the movement time until the final target position becomes the shortest.

Note. It is necessary to upgrade the firmware to its latest version.

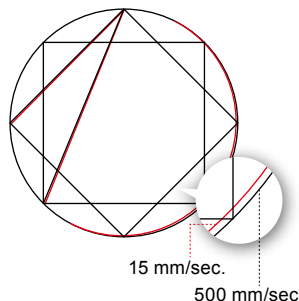
Improvement of tracking accuracy

Use of visualization with servo analyze function and high responsiveness with new servo function makes it possible to increase the follow-up ability and improve the tracking accuracy when compared to the conventional models.

15 mm/sec.
500 mm/sec.

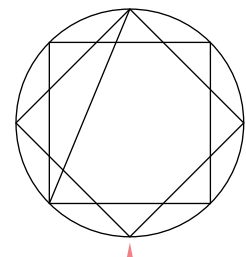


RCX240



15 mm/sec.
500 mm/sec.

RCX340



Tracking deviation is reduced greatly.

Improved basic performance

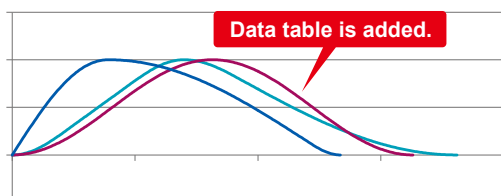
Functions, such as robot language, multi-task, sequence function, communication, and field bus are improved and made easier to use.

Motion optimization

The optimization of the motion to meet the operation pattern is further strengthened to bring out the robot performance at its maximum level. Higher quality robot operations, such as shortening of the operation time and suppression of vibrations during stopping are achieved.

Optimal acceleration/deceleration motion

Acceleration/deceleration motion is generated that can perform the high-speed operation while suppressing vibrations.



Compact design

The outside dimensions are approximately 355 mm (W) × 195 mm (H) × 130 mm (D). The volume ratio is reduced to approximately 85 % and the body size is made compact when compared to the conventional 4-axis controllers so as to make the installation inside the control panel easy.

RCX240



RCX340



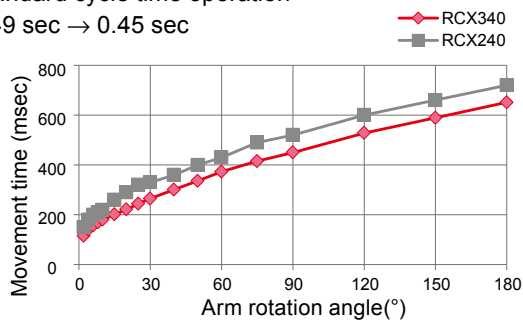
Downsized approximately 15 % when compared to the RCX240.

Improvement of cycle time

The speed-up of the YK-XG series is achieved.

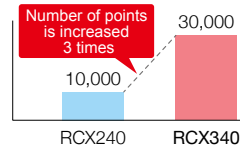
Example: YK400XG

- Standard cycle time operation
0.49 sec → 0.45 sec



User memory capacity increase

- Number of points is greatly increased.



- Total capacity of program and point

RCX240	RCX340
364KB	2.1MB

Built-in regenerative unit

As the regenerative unit (equivalent to RGU3) is built-in, no additional regenerative unit is needed when connecting to the existing robot.

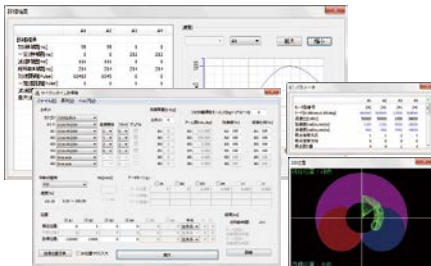
Support tool with visibility and operability improved New support software RCX-Studio Pro

The program debug function is strengthened to support the multi-task. Use of convenient operability and program input support function makes it possible to perform the quick setup.

YAMAHA robot becomes easier to use, faster setup, efficient maintenance

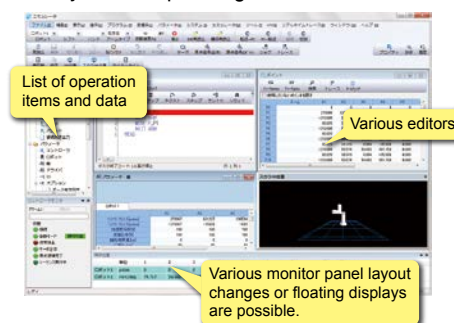
Evaluation

- Emulator function provided
- Cycle time calculator

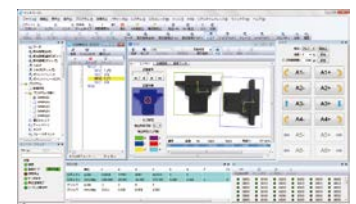


Design

- Easy-to-use operating controls

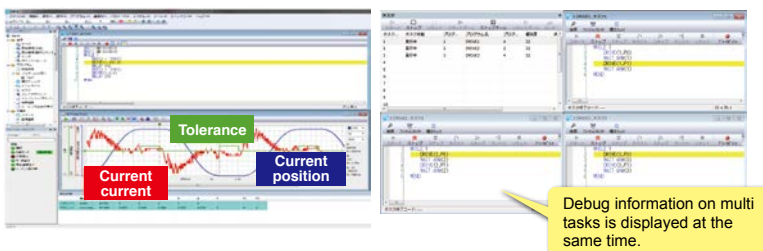


- Inter-operation with other manufacturer's line simulators
- iVY2 editor provided



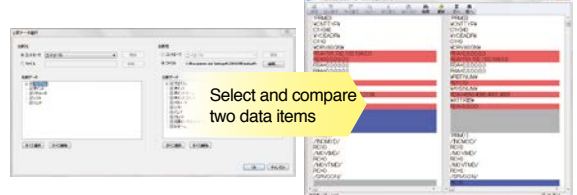
After installation

- Realtime trace
- Application debugging function



Maintenance

- Data comparison tool



Programing box PBX

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.



RCX340

Enhanced expandability

RS-232C and Ethernet ports are provided as standard equipment. A wide variety of high-speed and large capacity field networks, such as CC-Link, DeviceNet™, and EtherNet/IP™ are supported as options. Connections with general-purpose servo amplifier or other company's VISION are easy. So, the RCX340 is called "connectable controller".

Communication
between controllers

YC-Link/E

Up to four RCX340 controllers (up to 16 controllable axes) can be connected.

More flexible robot configuration

Easy programming

Centralized control of multiple robots

Cost reduction

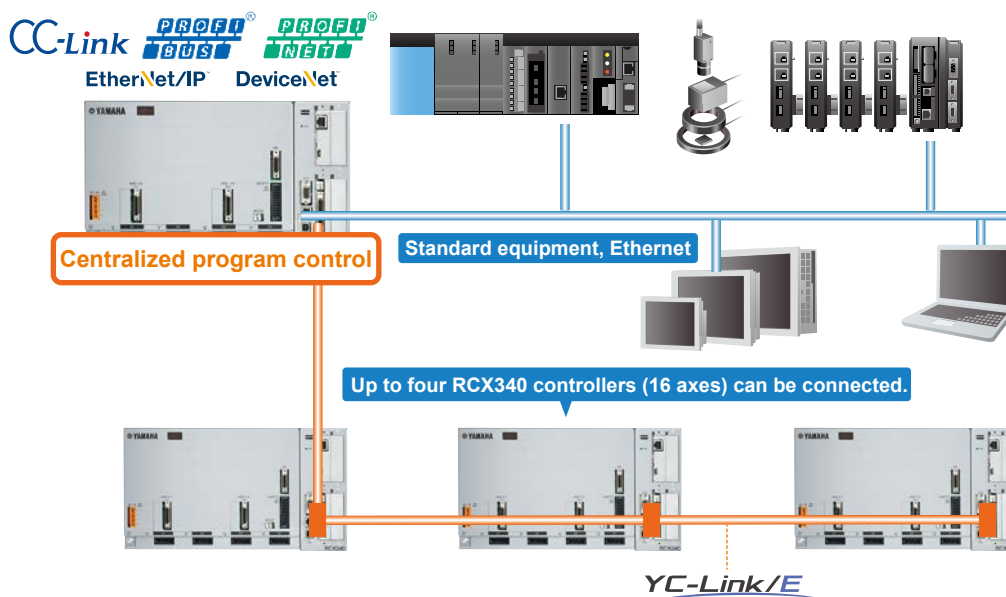
Applicable to various field buses/centralized control of robots through connections of up to four controllers

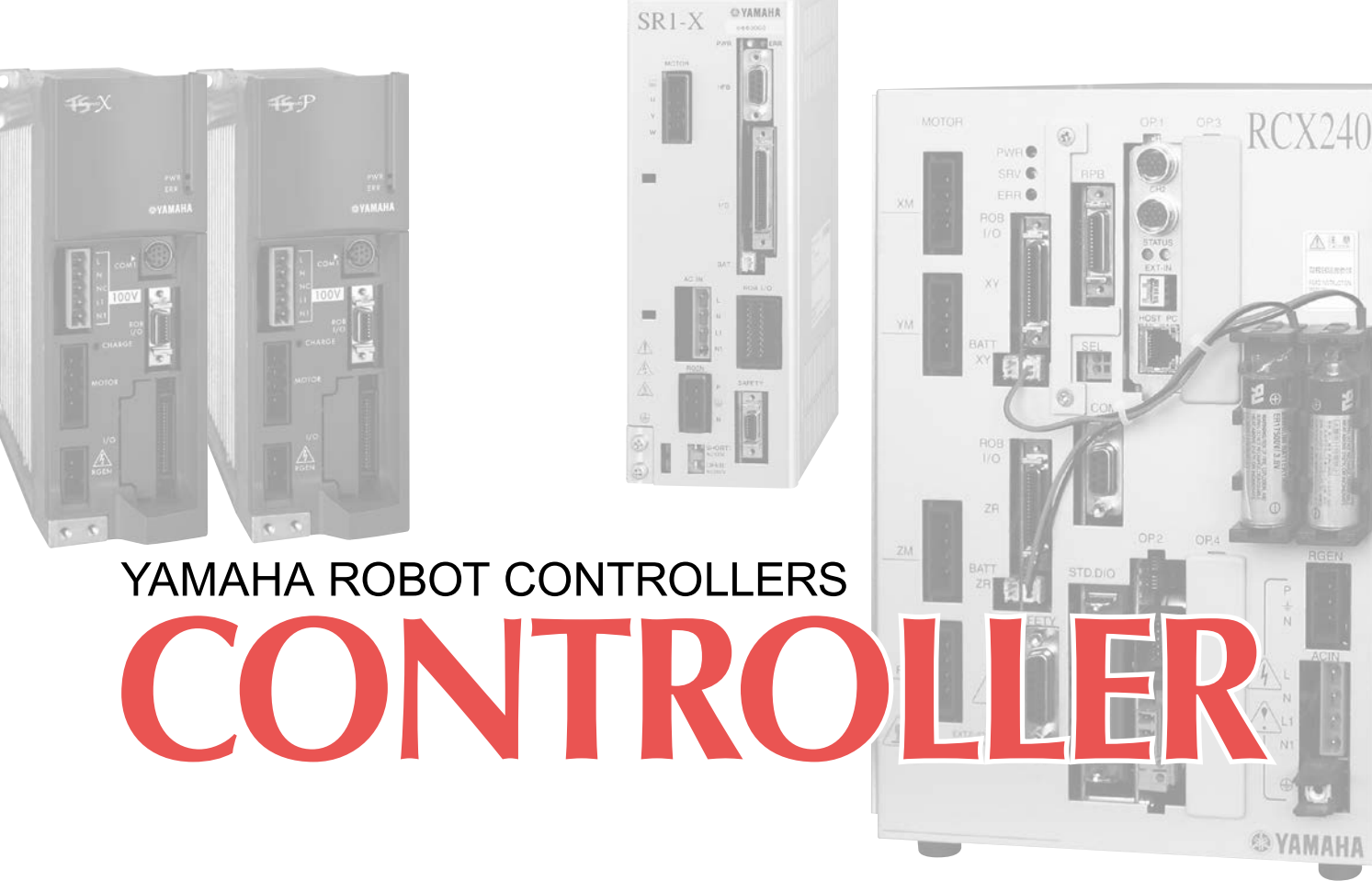
RS-232C and Ethernet ports are provided as standard equipment. Additionally, fulfilling field buses, such as CC-Link, EtherNet/IP™, DeviceNet™, PROFIBUS, and PROFINET ^{Note 1} can be supported to connect and control a wide variety of devices. For 5 or more axes, use of YC-Link/E makes it possible to connect up to four RCX340 controllers so as to perform the centralized control of multiple robots. Additionally, when using YC-Link/E ^{Note 2}, multiple robots can be handled as if they are operated using one controller. This ensures very easy robot programming and management.

Therefore, this robot controller contributes to reduction of unseen costs, such as labor cost necessary for the setup work.

Note 1. Supports PROFINET Ver. 2.2

Note 2. When ordering YC-Link/E, please specify what robot is connected to what number controller.





YAMAHA ROBOT CONTROLLERS

CONTROLLER

CONTENTS

CONTROLLER

LCC140 486

POSITIONER

TS-S2/TS-SH/TS-X/TS-P 492

DRIVER

TS-SD 502

RDV-X/RDV-P 506

CONTROLLER

ERCD 512

SR1-X/SR1-P 518

RCX221/RCX222 526

RCX240/RCX240S 534

RCX340 544

OPTION DETAILS

- Support software for PC
 - TS-Manager 554
 - POPCOM+ 556
 - VIP+ 558
 - RDV-Manager 560
 - RCX-Studio Pro 561
- Handy terminal
 - HT1/HT1-D 562
- Programming box
 - HPB/HPB-D 563
 - RPB/RPB-E 564

PBX/PBX-E 565

● LCD Monitor option

TS-Monitor 566

● Touch operator interface

Pro-face 567

● Field network system with minimal wiring (network)

LCC140 568

TS-S2/TS-SH/TS-X/TS-P 569

SR1-X/SR1-P 570

RCX221/RCX222/RCX240/RCX240S/

RCX340 571

RCX240/RCX240S/RCX340 572

RCX340 573

ROBOT VISION iVY SYSTEM

iVY System 574

ROBOT VISION iVY2 SYSTEM

iVY2 System 578

ELECTRIC GRIPPER

YRG Series 584

● Compact single cam type

YRG-2005SS 585

● Single cam type

YRG-2010S/2815S/4225S 586

● Double cam type

YRG-2005W/2810W/4220W 587

● Screw type strait style
YRG-2020FS/2840FS 588

● Screw type "T" style
YRG-2020FT/2840FT 589

● Three fingers type
YRG-2004T 590

YRG-2013T/2820T/4230T 591

CONTROLLER FEATURE DESCRIPTION

Single-axis

Dedicated robot controller for the LCM100

Linear conveyor module

LCC140

Linear conveyor module LCM100

P486



Operating method	Programming/I/O point tracing/ Remote command/Operation using RS-232C communication
Points	10,000 points
Input power	Single phase 200 to 230V AC +/-10% maximum (50/60Hz)
Origin search method	Incremental
Field networks	CC-Link, DeviceNet™, EtherNet/IP™

Single-axis robot positioner

TS-S2/TS-SH

Dedicated compact single-axis... TRANSERVO ^{Note 1}

P492



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

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

Single-axis robot positioner

TS-X/TS-P

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

P492



Operating method	I/O point tracing/Remote command/ Operation using RS-232C communication
Points	255 points
Input power	AC100V/AC200V
Origin search method	TS-X : Absolute Incremental TS-P : Incremental Semi-absolute
Field networks	CC-Link, DeviceNet™, EtherNet/IP™, PROFINET

Single-axis robot driver

TS-SD

Dedicated compact single-axis... TRANSERVO

P502



Operating method	Pulse train control
Input power	Main power supply DC24V +/-10% Control 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

P506



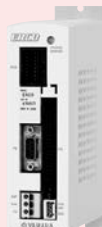
Operating method	Pulse train control
Input power	Main power supply Single phase/3-phase 200V to 230V Control power supply Single phase 200V to 230V
Origin search method	Incremental
Field networks	Not supported

Single-axis robot controller

ERCD

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

P512



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

Single-axis robot controller

SR1-X/SR1-P

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

P518



Operating method	Programming/I/O point tracing/ Remote command/Operation using RS-232C communication
Points	1000 points
Input power	AC100V/AC200V
Origin search method	SR1-X : Absolute Incremental SR1-P : Incremental Semi-absolute
Field networks	CC-Link, DeviceNet™, PROFIBUS

1 to 2 axis

Multi-axis robot controller

RCX221/ RCX221HP

Single-axis robot..... FLIP-X
Linear motor single-axis PHASER
Cartesian robot XY-X
Pick & place..... YP-X

P.526



Operating method	Programming/Remote command/ Operation using RS-232C communication
Points	10000 points
Input power	AC200V
Origin search method	Incremental Semi-absolute
Field networks	CC-Link, DeviceNet™, Ethernet, PROFIBUS

Multi-axis robot controller

RCX222/ RCX222HP

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

P.526



Operating method	Programming/Remote command/ Operation using RS-232C communication
Points	10000 points
Input power	AC200V
Origin search method	Absolute Incremental
Field networks	CC-Link, DeviceNet™, Ethernet, PROFIBUS

1 to 4 axis

Multi-axis robot controller

RCX240/ RCX240S

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

P.534



Operating method	Programming/Remote command/ Operation using RS-232C communication
Points	10000 points
Input power	Single phase 200 to 230V AC +/-10% maximum (50/60Hz)
Origin search method	Absolute Incremental
Field networks	CC-Link, DeviceNet™, EtherNet/IP™, Ethernet, PROFIBUS

Multi-axis robot controller

RCX340

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

P.544



Operating method	Programming/Remote command/ Operation using RS-232C communication
Points	30000 points
Input power	Single phase 200 to 230V AC +/-10% maximum (50/60Hz)
Origin search method	Absolute Incremental
Field networks	CC-Link, DeviceNet™, EtherNet/IP™, Ethernet, PROFIBUS, PROFINET

Articulated robots
YA

Linear conveyor
modules
LCM100

Compact
single-axis robots
TRANSERVO

Single-axis robots
FLIP-X

Linear motor
single-axis robots
PHASER

Cartesian
robots
XY-X

SCARA
robots
YK-X

Pick & place
robots
YP-X

CLEAN

CONTROLLER

INFORMATION

Robot
positioner

Pulse string
driver

Robot
controller

IV/V/V2
Electric
grripper

Option

CONTROLLER SPECIFICATION SHEET

Category		Robot controller	Robot positioner				Robot driver			
Name		LCC140	TS-S2	TS-SH	TS-X	TS-P	TS-SD	RDV-X	RDV-P	
External view										
Operating method		Programming/ I/O point tracing/ Remote command/ Operation using RS-232C communication	I/O point tracing/Remote command/ Operation using RS-232C communication				Pulse train control			
Applicable robot	LCM100	●	—	—	—	—	—	—	—	
	TRANSERVO	—	● ^{Note 2}	●	—	—	●	—	—	
	FLIP-X	T4L/T5L/C4L/C5L	—	—	—	—	—	—	—	
		FLIP-X other than above	—	—	—	●	—	—	●	—
	PHASER	—	—	—	—	●	—	—	●	
	XY-X	—	—	—	—	—	—	—	—	
	YK-X	—	—	—	—	—	—	—	—	
YP-X	—	—	—	—	—	—	—	—		
Input power	Main power supply	Single phase 200 to 230V AC +/-10% maximum (50/60Hz)	DC24V +/-10% maximum		● AC100V specifications ^{Note 1} (105 / 110 driver) Single phase 100 to 115V AC +/-10% maximum (50/60Hz) ● AC200V specifications (205 / 210 / 220 driver) Single phase 200 to 230V AC +/-10% maximum (50/60Hz)		DC24V +/-10% maximum	Single phase / 3-phase 200 to 230V +10% to -15% (50/60Hz +/-5%)		
	Control power supply		DC24V +/-10% maximum				DC24V +/-10% maximum	Single phase 200 to 230V AC +10% to -15% (50/60Hz +/-5%)		
Number of controllable axes		Single-axis	Single-axis				Single-axis			
Origin search method		Incremental	Incremental	Absolute/ Incremental	Absolute/ Incremental	Incremental/ Semi-absolute	Incremental			
Maximum number of programs		100	(program not required)				—	—		
Maximum number of steps per program		999 steps	(program not required)				—	—		
Points		10,000 points	255 points				—	—		
Multitasks		4	—	—	—	—	—	—		
I/O points	Dedicated I/O	8 points/4 points	16 points/16 points	16 points/16 points	16 points/16 points	16 points/16 points	—	—		
	General I/O	16 points/16 points	—	—	—	—	—	—		
Field network support	CC-Link	●	●	●	●	●	—	—	—	
	DeviceNet	●	●	●	●	●	—	—	—	
	EtherNet/IP	●	●	●	●	●	—	—	—	
	Ethernet	—	—	—	—	—	—	—	—	
	PROFINET ETHERCAT	—	—	—	—	—	—	—	—	
	ETHERCAT	—	●	●	●	●	—	—	—	
CE marking		—	●	●	●	●	●	●	●	
Programming box		HPB / HPB-D (with enable switch)	HT1 / HT1-D (with enable switch)				—	—		
Support software for PC		POPCOM ⁺	TS-Manager				TS-Manager	RDV-Manager		
Detailed info page		P.486	P.492				P.502	P.506		

Note 1. 20A specifications provide only 200V.

Note 2. Exclude SG07

Note 3. Exclude YK400XR

Note 4. 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 5. Maximum number of general-purpose I/O points when option OP.DIO boards (4 boards) are installed.

	Robot controller						
	ERCD	SR1-X	SR1-P	RCX221 RCX221HP	RCX222 RCX222HP	RCX240 RCX240S	RCX340
							
	Pulse train control/ Programming/ I/O point tracing/ Operation using RS-232C communication	Programming/I/O point tracing/ Remote command/ Operation using RS-232C communication		Programming/Remote command/ Operation using RS-232C communication			
	—	—	—	—	—	—	—
	—	—	—	—	—	—	—
	●	—	—	—	—	—	—
	—	●	—	●	●	●	●
	—	—	●	●	—	●	●
	—	—	—	●	●	●	●
	—	—	—	—	—	● Note 3	●
	—	—	—	—	●	●	●
	DC24V +/-10% maximum	● 05 / 10 driver Single phase 100 to 115V/200 to 230V AC +/-10% maximum (50/60Hz)		Single phase 200 to 230V AC +/-10% maximum (50/60Hz)			
		● 20 driver Single phase 200 to 230V AC +/-10% maximum (50/60Hz)					
	Single-axis	Single-axis		2 axes maximum	2 axes maximum	4 axes maximum Max. number of controllable axes 8	Max. number of robots 4 Max. number of controllable axes 16
	Incremental	Absolute/ Incremental	Incremental/ Semi-absolute	Incremental/ Semi-absolute	Absolute/ Incremental	Absolute/ Incremental/ Semi-absolute	Absolute/ Incremental/ Semi-absolute
	100	100		100	100	100	100
	1024 steps	3000 steps		9999 steps	9999 steps	9999 steps	9999 steps
	1000 points	1000 points		10000 points	10000 points	10000 points	30000 points
	4	4		8	8	8	16
	8 points/3 points	8 points/4 points		10 points/12 points	10 points/12 points	10 points/11 points	8 points/9 points
	6 points/6 points	16 points/16 points		40 points/24 points(Max.) ^{Note 4}	40 points/24 points(Max.) ^{Note 4}	112 points/72 points (Max.) ^{Note 5}	96 points/64 points (Max.) ^{Note 5}
	—	●	●	●	●	●	●
	—	●	●	●	●	●	●
	—	—	—	—	—	●	●
	—	—	—	●	●	●	●
	—	●	●	●	●	●	●
	—	—	—	—	—	—	●
	—	●	●	●	●	●	●
	HPB / HPB-D (with enable switch)			RPB / RPB-E (with enable switch)			PBX / PBX-E (with enable switch)
	POPCOM ⁺			VIP ⁺			RCX-Studio Pro
	P.512	P.518		P.526		P.534	P.544

Controller operating methods

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

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.15



Programming box
▶ HPB/HPB-D
P.563



Support software for PC
▶ POPCOM+
P.556

Basic specifications

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

Controllable robot	LCM100 P.122
CE marking	—
Field networks	CC-Link DeviceNet EtherNet/IP

Model Overview

Name	LCC140
Controllable robot	Linear conveyor module LCM100
Power	Single-phase AC200 to 230V +/-10% or less (50/60Hz)
Operating method	Programming/I/O point tracing/Remote command/ Operation using RS-232C communication

Ordering method

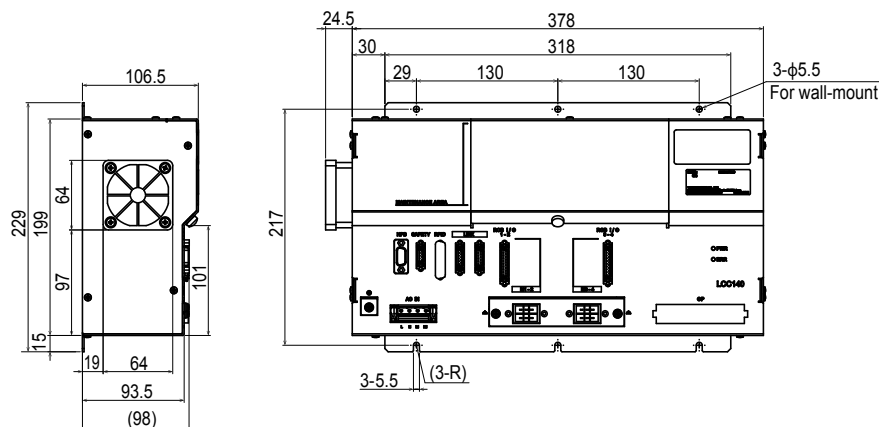
LCC140 - 10

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

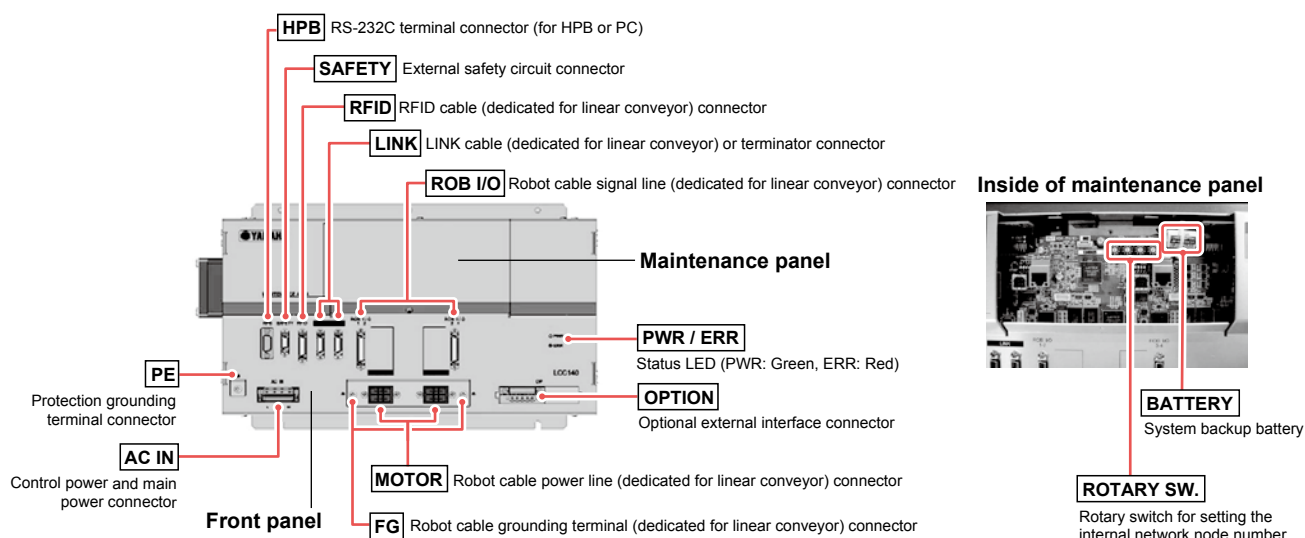
Note. For 2MT, be sure to select an appropriate network option.

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

■ Dimensions

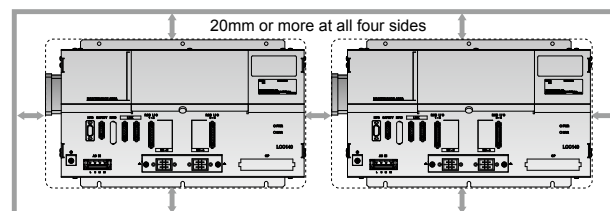


■ Part names



■ Installation conditions

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



■ Reference for power supply capacity and heat generation quantity

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

● Reference values for actual operation (per LCC140 controller)

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

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

● Maximum capacity values (per LCC140 controller)

Model	Power supply capacity	Heat generated
LCM100	1200VA	70W

Option parts

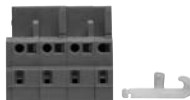
LCC140



Options

● Power connector + wiring connection lever

One set of parts per LCC140 is required.



Model	KAS-M5382-00
-------	--------------

LCC140
TS-X
TS-P
SR1-X
SR1-P
RCX221
RCX222
RCX240/S
RCX340

● HPB dummy connector

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



Model	KDK-M5163-00
-------	--------------

LCC140
SR1-X
SR1-P

● SAFETY connector

One connector per LCC140 is required.



Not wired (plug + shell kit) Wired ^{Note}

Model	Not wired	KDK-M5370-10
	Wired ^{Note}	KDK-M5370-00

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

LCC140

● LINK cable

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



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

LCC140

● Terminator connector

When connecting modules, two connectors per line are required.



Model	KDK-M5361-00
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LCC140

● Dust cover (for LINK connector)

This dust cover is attached to the insertion port, into which the LINK cable terminator connector is not inserted.

When using only one module without connections, two dust covers are required.



Model	KDK-M658K-00 (for MDR20 pin)
-------	------------------------------

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

LCC140

● Programming box HPB/HPB-D

P563

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



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

LCC140
ERCD
SR1-X
SR1-P

● Support software for PC POPCOM+

P556

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



Model	KBG-M4966-00
-------	--------------

LCC140
ERCD
SR1-X
SR1-P

● POPCOM+ environment

OS	Microsoft Windows XP / Vista (32bit / 64Bit) / 7 (32bit / 64Bit) / 8.1 (32bit/64bit)
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/ERCX/DRCX/TRCX/SRCP/SRCD/ERCD/SR1/LCC140 ^{Note 1}

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

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

Continues on next page

Options

Data cables

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



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

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

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

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

LCC140
ERCD
SR1-X
SR1-P
RCX221
RCX222
RCX240/S
RCX340

RFID

RFID

(manufactured by BALLUFF GmbH)

Reader/writer cable



Model	KDK-M6300-00
-------	--------------

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	KDK-M6300-A0
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Note. Whether or not the RFID system can be used may vary depending on the destination place (country).

Before selecting a RFID system, please contact YAMAHA.

Dust cover (for RFID)

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



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

Before selecting a RFID system, please contact YAMAHA.

Maintenance parts

Robot cable for LCM100



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

LCC140

Lithium battery for system backup



Model	KDK-M4252-00
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LCC140

Replacement filter for LCC140
(5 pcs. in package)

Model	KDK-M427G-00
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LCC140

Articulated robots YA	Linear conveyor modules LCM100	Compact single-axis robots TRANSEKO	Single-axis robots FLIP-X	Linear motor single-axis robots PHASER	Cartesian robots XY-X	SCARA robots YK-X	Pick & place robots YP-X	CLEAN	CONTROLLER	INFORMATION	Robot positioner	Pulse string driver	Robot controller	IV/V/V2 Electric grripper	Option
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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.60



Handy terminal
▶ HT1/HT1-D
P.562



Support software for PC
▶ TS-Manager
P.554



TS-S2

TS-SH

TS-X

TS-P

■ Basic specifications

■ TS-S2/TS-SH

Item		Model	TS-S2	TS-SH
Basic specifications	Number of controllable axes		Single-axis	
	Controllable robots		TRANSERVO series	
	Current consumption		2.5A (Rating) 4.5A (Max.)	3.5A (Rating) 6.5A (Max.)
	Dimensions		W30 × H162 × D82mm	W30 × H162 × D123mm
	Weight		Approx. 0.2kg	Approx. 0.3kg
Input power supply	Control power supply		DC24V +/-10%	
	Motor power supply		DC24V +/-10%	
Axis control	Control method		Closed loop vector control method	
	Operating method		I/O point tracing (Positioning operation by specifying point number) / Remote command	
	Operation types		Positioning, merge-positioning, push, and jog operations	
	Position detection method		Resolver	Resolver with multi-turn absolute function
	Resolution		20480 pulses/rev. or 4096 pulses/rev. depending on the robot	
Points	Origin search method		Incremental	Absolute / Incremental
	Points		255 points	
	Point type setting		(1) Standard setting: Set speed and acceleration in percent of the respective maximum settings. (2) Custom setting: Set speed and acceleration in SI units.	
	Point teaching method		Manual data input (coordinates input), Teaching, Direct teaching	
	I/O interface		Selectable from the following: NPN, PNP, CC-Link, DeviceNet™, EtherNet/IP™, PROFINET	
External input/output	Input		Servo ON (SERVO), reset (RESET), start (START), interlock (/LOCK) origin search (ORG), manual mode (MANUAL), jog motion - (JOG-), jog motion + (JOG+), Point number selection (PIN0 to PIN7)	
	Output		Servo status (SRV-S), alarm (/ALM), operation end (END), operation in-progress (BUSY), control outputs (OUT0 to 3), Point number output 0 to 7 (POUT0 to POUT7)	
	External communications		RS-232C 1CH	
	Safety circuit		Emergency stop input, emergency stop contact output (1 system: When the HT1 is used.)	
	Handy terminal		HT1, HT1-D (with enable switch)	
Options	Support software for PC		TS-Manager	
	Operating temperature / Operating humidity		0°C to 40°C, 35% to 85%RH (non-condensing)	
General specifications	Storage temperature/ Storage humidity		-10°C to 65°C, 10% to 85%RH (non-condensing)	
	Atmosphere		Indoor location not exposed to direct sunlight. No corrosive, flammable gases, oil mist, or dust particles	
	Anti-vibration		All XYZ directions 10 to 57Hz unidirectional amplitude 0.075mm 57 to 150Hz 9.8m/s ²	
	Protective functions		Position detection error, temperature error, overload, overvoltage, low voltage, excessive position deviation, overcurrent, motor current error, motor cable faulty wiring, Excitation power failure error ^{Note 1}	

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

Controllable robot	TS-S2/TS-SH ▶ TRANSERVO P.129	TS-X ▶ FLIP-X P.171	TS-P ▶ PHASER P.217
CE marking		Field networks	CC-Link DeviceNet EtherNet/IP 

Model Overview

Name	TS-S2	TS-SH	TS-X/TS-P
Controllable robot	Dedicated compact single-axis TRANSERVO		TS-X: Single-axis robot FLIP-X TS-P: Linear motor single-axis PHASER
Input power	Main power supply	DC24V +/-10%	● AC100V specifications Main power supply AC100 to 115V+/-10% Control power supply AC100 to 115V+/-10%
	Control power supply	DC24V +/-10%	● AC200V specifications Main power supply AC200 to 230V+/-10% Control power supply AC200 to 230V+/-10%
Operating method	I/O point tracing / Remote command / Operation using RS-232C communication		
Maximum number of controllable axes	Single-axis		
Origin search method	Incremental	Absolute / Incremental	TS-X: Absolute / Incremental TS-P: Absolute / Semi-absolute

Ordering method

TS-S2/TS-SH (TRANSERVO)

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

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

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

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

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

TS-X/TS-P

Item			Model	TS-X / TS-P			
				100V AC input		200V AC input	
Basic specifications	Driver model		TS-X105 / TS-P105	TS-X110 / TS-P110	TS-X205 / TS-P205	TS-X210 / TS-P210	TS-X220 / TS-P220
	Number of controllable axes		Single-axis				
	Controllable robots		TS-X: Single-axis robot FLIP-X series TS-P: Linear motor single-axis robot PHASER series				
	Power capacity		400VA	600VA	400VA	600VA	1400VA
	Dimensions		W58 × H162 × D131mm				W70 × H162 × D131mm
	Weight		Approx. 0.9kg				Approx. 1.1kg
	Input power supply	Control power supply	Single phase AC100 to 115V +/-10% 50/60Hz		Single phase AC200 to 230V +/-10% 50/60Hz		
Motor power supply		Single phase AC100 to 115V +/-10% 50/60Hz		Single phase AC200 to 230V +/-10% 50/60Hz			
Axis control	Control method		Closed loop vector control method				
	Operating method		I/O point tracing (Positioning operation by specifying point number) / Remote command				
	Operation types		Positioning, merge-positioning, push, and jog operations				
	Position detection method		TS-X: Resolver with multi-rotation absolute function TS-P: Magnetic type linear scale				
	Resolution		TS-X: 16384 pulses/rev. or 20480 pulses/rev. depending on the robot TS-P: 1μm				
Origin search method		TS-X: Absolute / Incremental TS-P: Incremental / Semi-absolute					
Points	Number of points		255 points				
	Point type setting		(1) Standard setting: Set speed and acceleration in percent of the respective maximum settings. (2) Custom setting: Set speed and acceleration in SI units.				
	Point teaching method		Manual data input (coordinates input) , Teaching, Direct teaching				
External input/output	I/O interface		Selectable from the following: NPN, PNP, CC-Link, DeviceNet™, EtherNet/IP™, PROFINET				
	Input		Servo ON (SERVO), reset (RESET), start (START), interlock (/LOCK) origin search (ORG), manual mode (MANUAL), jog motion - (JOG-), jog motion + (JOG+), Point number selection (PIN0 to PIN7)				
	Output		Servo status (SRV-S), alarm (/ALM), operation end (END), operation in-progress (BUSY), control outputs (OUT0 to 3), Point number output 0 to 7 (POUT0 to POUT7)				
	External communications		RS-232C 1CH				
	Power supply for brake		DC24V +/-10% 300mA (prepared by the customer)				
Options	Safety circuit		Emergency stop input, main power input ready output, emergency stop contact output (1 system: When the HT1 is used.)				
	Handy terminal		HT1, HT1-D (with enable switch)				
	Support software for PC		TS-Manager				
General specifications	Operating temperature / Operating humidity		0°C to 40°C, 35% to 85%RH (non-condensing)				
	Storage temperature / Storage humidity		-10°C to 65°C, 10% to 85%RH (non-condensing)				
	Atmosphere		Indoor location not exposed to direct sunlight. No corrosive , flammable gases, oil mist, or dust particles				
	Anti-vibration		All XYZ directions 10 to 57Hz unidirectional amplitude 0.075mm 57 to 150Hz 9.8m/s ²				
	Protective functions		Position detection error, power module error, temperature error, overload, overvoltage, low voltage, excessive position deviation, overcurrent, motor current error				
Protective structure		IP20					

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

TS-X / TS-P specification selection table

Some specifications are automatically determined by the robot model.

TS-X

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

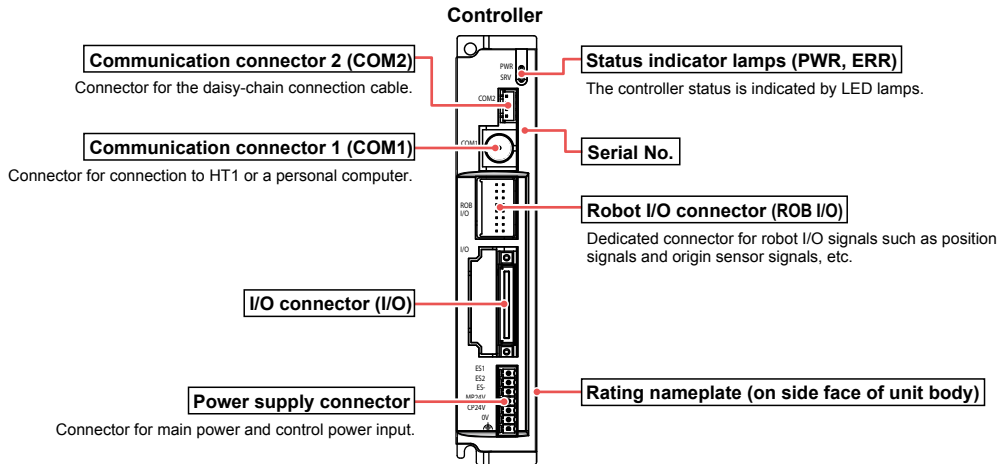
- (1) Regenerative unit is needed if using in a perpendicular position and movement stroke is 700mm or more.
- (2) Regenerative unit is needed if using in a perpendicular position.
- (3) [The following arrangements require a regeneration unit.]
- Using in the upright position.
 - To move at a speed exceeding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

TS-P

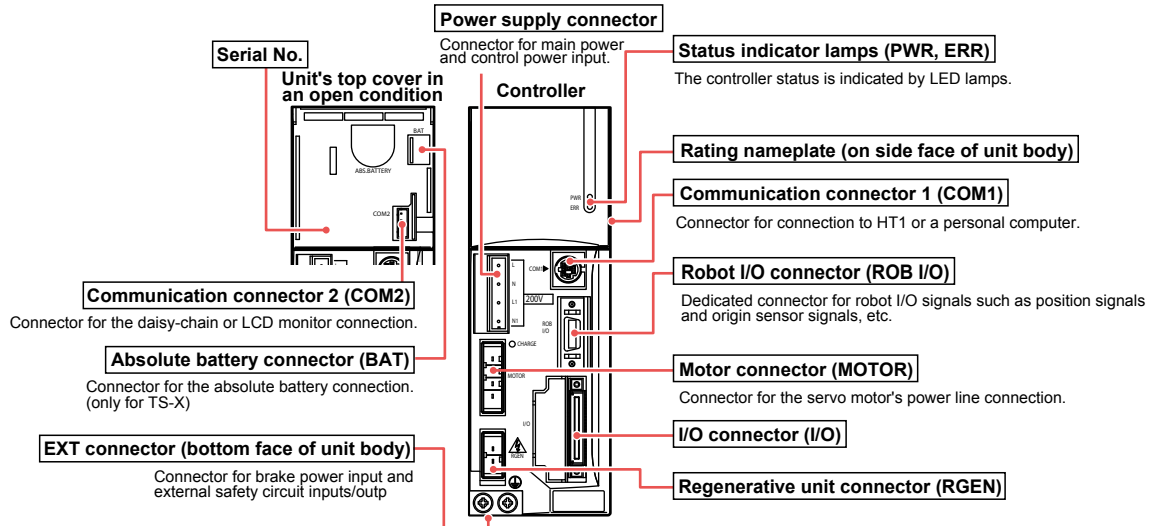
		MR12/12D	MF7/7D	MF15/15D	MF20/20D	MF30/30D	MF75/75D
Power supply voltage / Current sensor	TS-P	105	●				
		110		●		●	
		205	●				
		210		●		●	
		220				●	●
Regenerative unit	No entry (None)	●	●	●			
	R (RGT)				●	●	
	R (RGU-2)						●

Part names

TS-S2/TS-SH

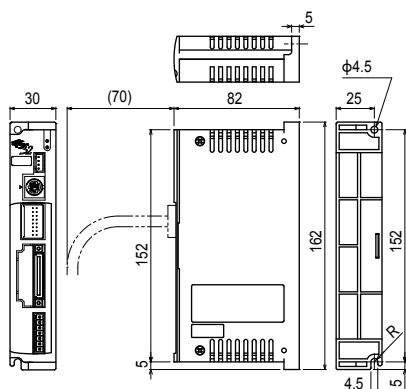


TS-X/TS-P

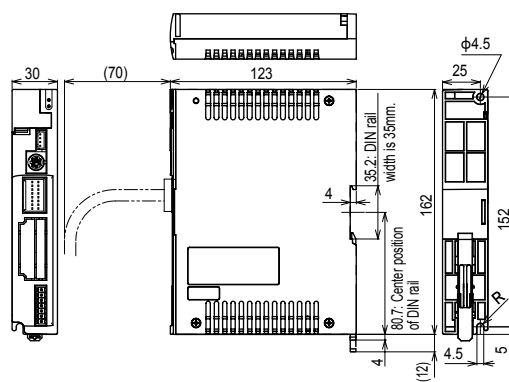


■ Dimensions

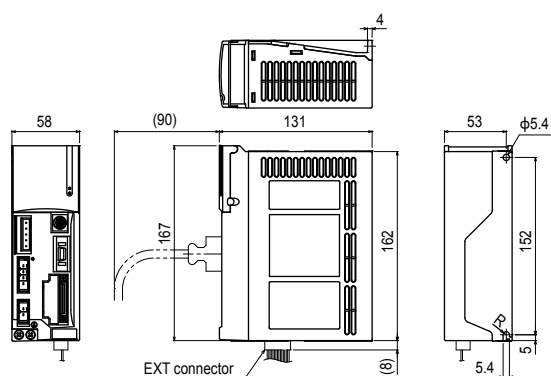
■ TS-S2



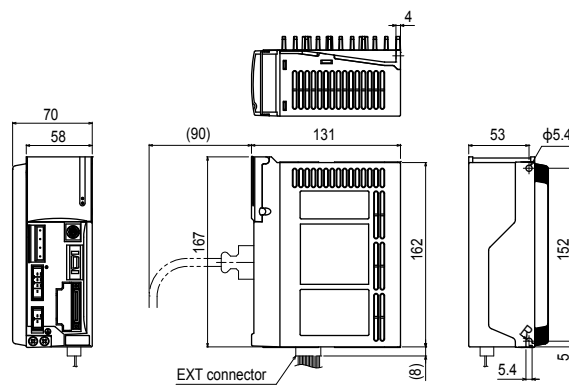
■ TS-SH



■ TS-X/TS-P (105/110/205/210)



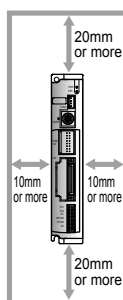
■ TS-X/TS-P (220)



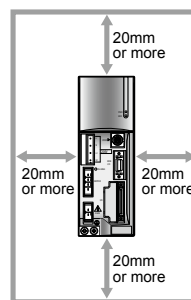
■ Installation conditions

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

■ TS-S2/TS-SH



■ TS-X/TS-P



■ Cautions on TS-S2 / TS-SH

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

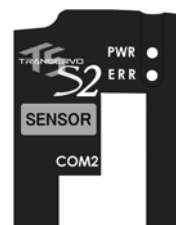
TS-S2 / TS-SH (Standard specifications)

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



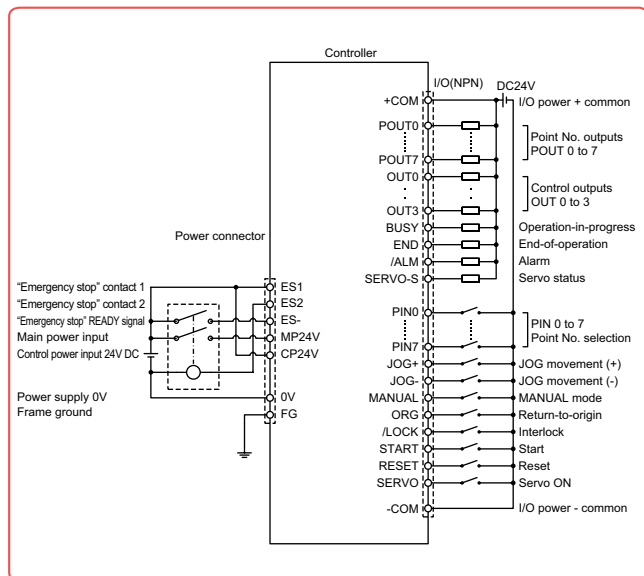
TS-S2S / TS-SHS (Sensor specifications)

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

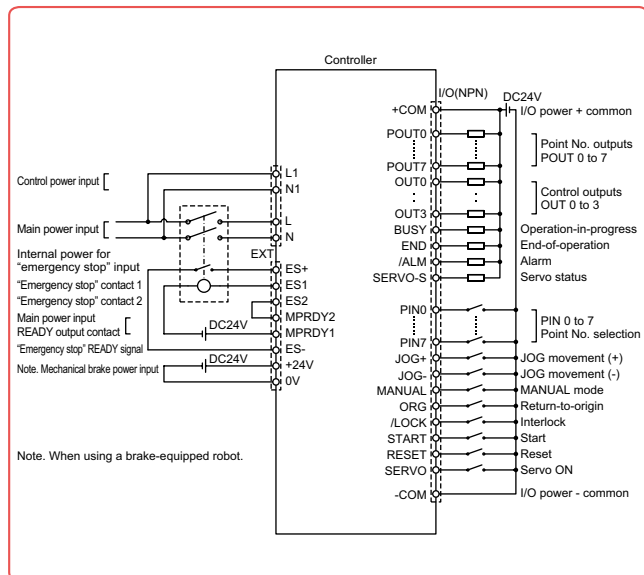


NPN type input / output wiring diagram

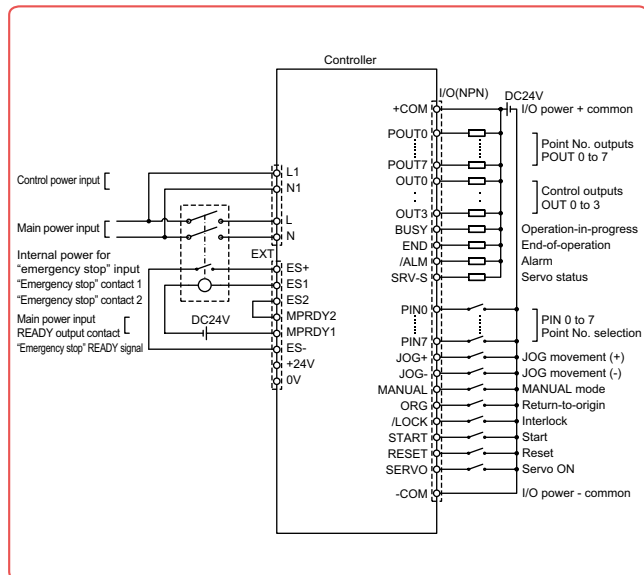
TS-S2/TS-SH



TS-X

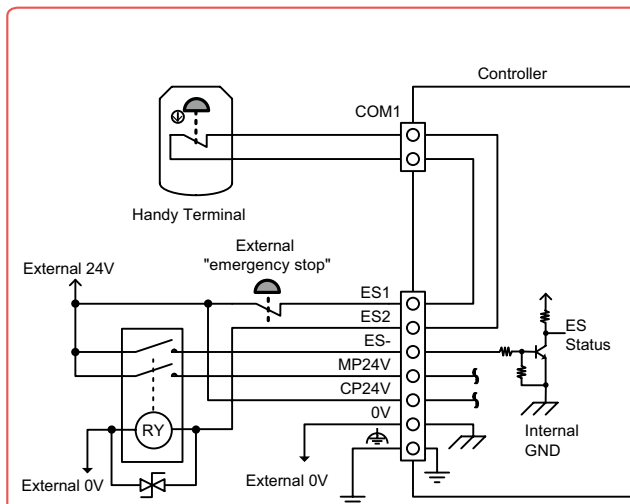


TS-P



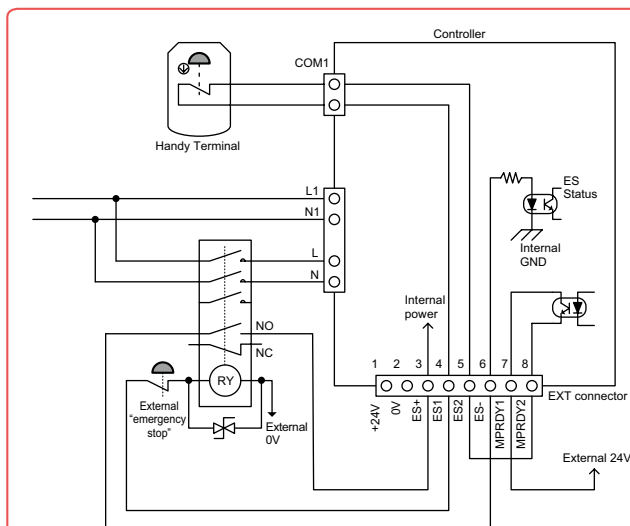
Emergency stop circuit example

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



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

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



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

Installing an external safety circuit will satisfy safety category class 4 standards. See P.615 for more information.

I/O Specifications

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

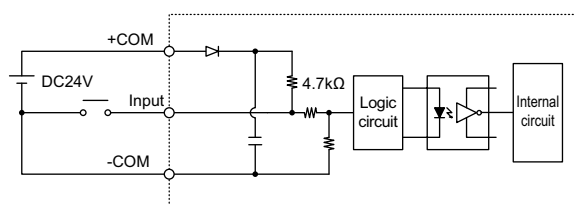
TS-S2/TS-SH/TS-X/TS-P

I/O signals (NPN / PNP)

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

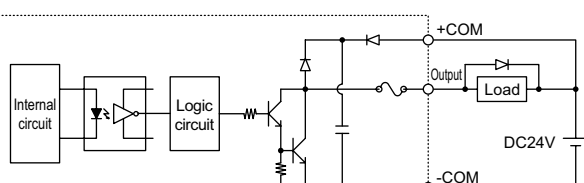
NPN type I/O circuit details

Input circuit



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

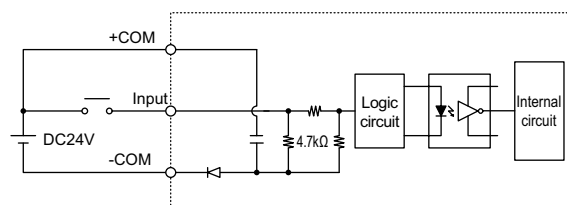
Output circuit



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

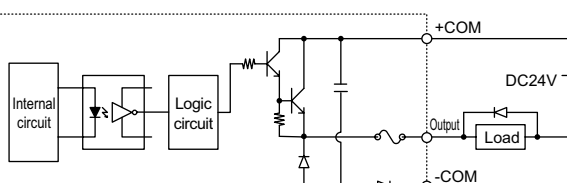
PNP type I/O circuit details

Input circuit



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

Output circuit



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

Accessories and part options

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



Standard accessories

Power connector



Model KCC-M4421-00

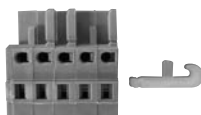
TS-S2

TS-SH

TS-SD

Power connector (AC100V specifications)

Included when 100V model is purchased



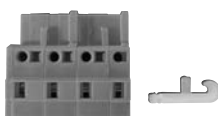
Model KCA-M5382-00

TS-X

TS-P

Power connector (AC200V specifications)

Included when 200V model is purchased



Model KAS-M5382-00

LCC140

TS-X

TS-P

SR1-X

SR1-P

RCX221

RCX222

RCX240/S

RCX340

EXT connector

For braking power and safety circuit connections.



Model KCA-M5370-00

TS-X

TS-P

Dummy connector



Model KCA-M5163-00

TS-S2

TS-SH

TS-X

TS-P

I/O cables (2m/20-core×2)



Model KCA-M4421-20

TS-S2

TS-SH

TS-X

TS-P

Absolute battery

Absolute battery basic specifications

Item	For TS-X	For TS-SH
Battery type	Lithium metallic battery	
Battery capacity	3.6V / 1,650mAh	3.6V / 2,750mAh
Data holding time	About 1 year (in state with no power applied)	
Dimensions	φ18 × L50mm	φ17 × L53mm
Weight	24g	22g



For TS-X



For TS-SH

Model KCA-M53G0-10 (For TS-X)
KCA-M53G0-01 (For TS-SH)

TS-X

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.

CC-Link connector (CC-Link specifications)

Included when CC-Link model is purchased



Connector



Jump socket

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

TS-S2

TS-SH

TS-X

TS-P

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

See next page for optional parts

Options

Handy terminal HT1/HT1-D

P.562



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

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

Support software TS-Manager

P.554



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

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

TS-Manager environment

OS	Microsoft Windows 2000 / XP / Vista (32bit/64bit) / 7 (32bit/64bit)
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-S2 / TS-SH / TS-X / TS-P / TS-SD

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

Data cables

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



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

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

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

Daisy chain and gateway connection cable



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

CC-Link termination connector (CC-Link specifications)



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

TS-Monitor (LCD monitor)

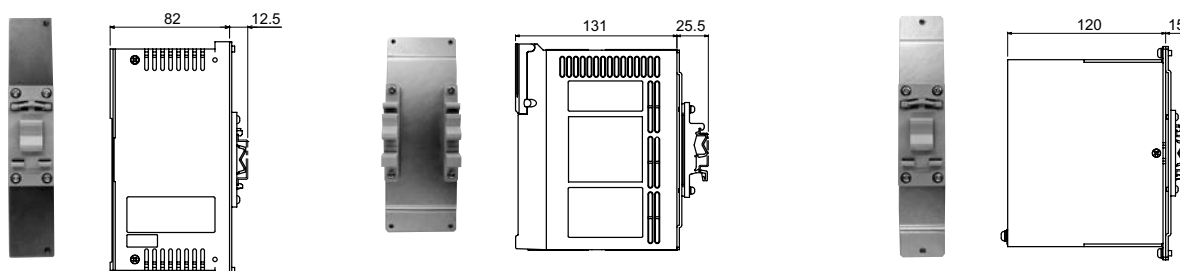
P.566



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

TS-X
TS-P

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



Model	For TS-S2
	KCC-M499A-00

TS-S2

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

TS-X
TS-P

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

TS-X
TS-P

Articulated robots YA	Linear conveyor modules LCM100	Compact single-axis robots TRANSEVO	Single-axis robots FLIP-X	Linear motor single-axis robots PHASER	Cartesian robots XY-X	SCARA robots YK-X	Pick & place robots YP-X	CLEAN	CONTROLLER	INFORMATION	Robot positioner	Pulse string driver	Robot controller	IV/V/V2 Electric grripper	Option
--------------------------	--------------------------------------	---	------------------------------	--	-----------------------------	-------------------------	--------------------------------	-------	------------	-------------	---------------------	------------------------	---------------------	---------------------------------	--------

TS-SD

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

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

Main functions ▶ P.59



Support software for PC

▶ TS-Manager

P.554



TS-SD

Basic specifications

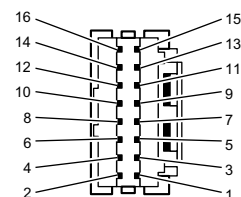
Item	Model	TS-SD
Number of controllable axes	Single-axis	
Controllable robots	TRANSERVO series ^{Note}	
Current consumption	3A (Rating) 4.5A (Max.)	
Dimensions	W30 × H162 × D82mm	
Weight	Approx. 0.2kg	
Input power supply	Control power supply	DC24V +/-10%
	Main power supply	DC24V +/-10%
Operating method	Pulse train control	
Control method	Closed loop vector control method	
Position detection method	Resolver	
Resolution	20480 P/rev, 4096 P/rev	
Origin search method	Incremental	
External input/output	Pulse train command input	Line driver method : 500 kpps or less Open collector method : 100 kpps or less (DC5 to 24V +/-10%)
	Input	Servo ON (SERVO), reset (RESET) origin search (ORG)
	Output	Servo status (SRV-S), alarm (/ALM), positioning completion (IN-POS), return-to-origin end status (ORG-S)
	External communications	RS-232C 1CH
Options	Support software for PC	TS-Manager
General specifications	Operating temperature	0°C to 40°C
	Storage temperature	-10°C to 65°C
	Operating humidity	35% to 85%RH (non-condensing)
	Storage humidity	10% to 85%RH (non-condensing)
	Atmosphere	Indoor location not exposed to direct sunlight. No corrosive, flammable gases, oil mist, or dust particles
	Anti-vibration	All XYZ directions 10 to 57Hz unidirectional amplitude 0.075mm 57 to 150Hz 9.8m/s ²
Protective functions	Position detection error, overheat, overload, overvoltage, low voltage, position deviation, control power voltage drop, overcurrent, motor current error, CPU error, motor line disconnection, command speed over, pulse frequency over	

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

I/O signal table

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

I/O connector



Controllable robot	TRANSERVO P129
CE marking	
Field networks	—

Model Overview

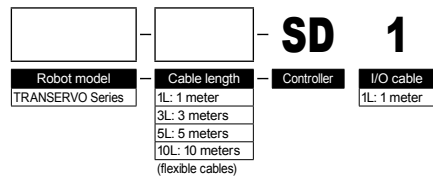
Name	TS-SD
Controllable robot	Dedicated compact single-axis TRANSERVO
Input power	Main power supply
	Control power supply
Operating method	Pulse train control
Maximum number of controllable axes	Single-axis
Origin search method	Incremental

Ordering method

Controller only

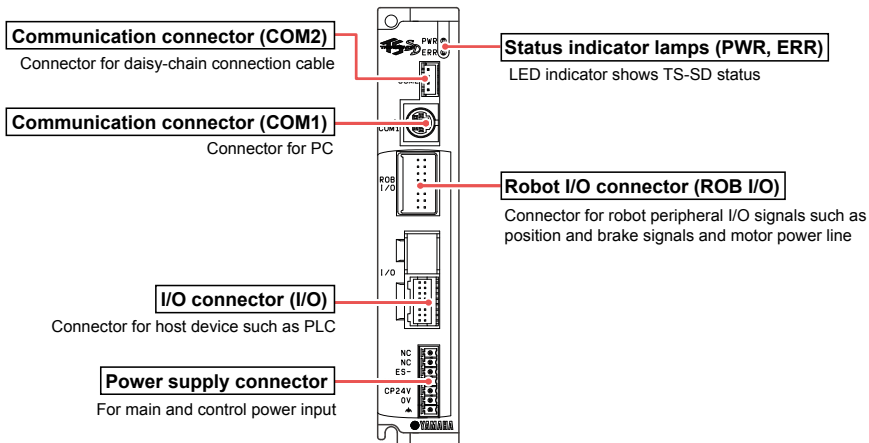
TS-SD^{Note}
Controller

Robot + Controller

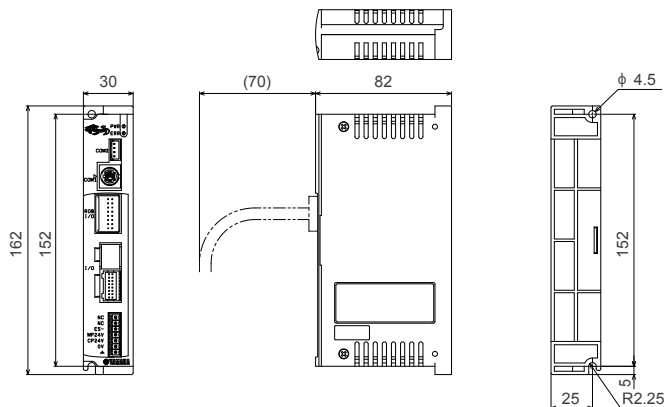


Note. I/O cable (1 meter) comes supplied with unit.

Part names

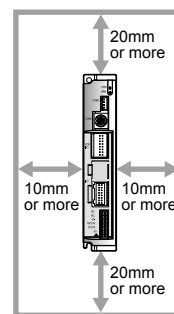


Dimensions



Installation conditions

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

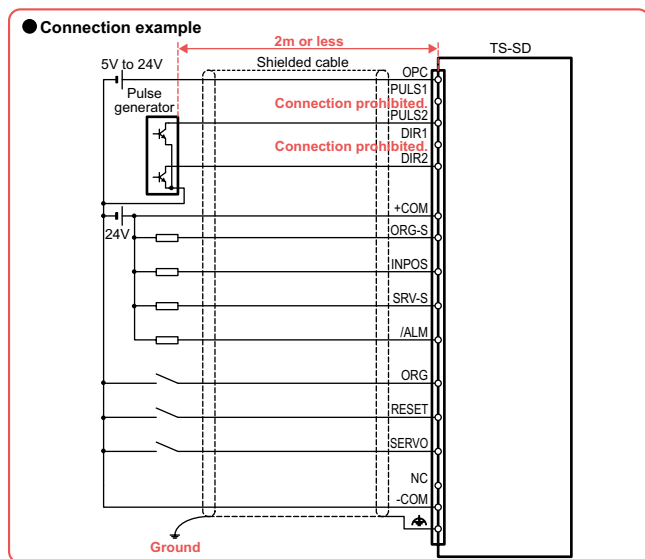


I/O signal list

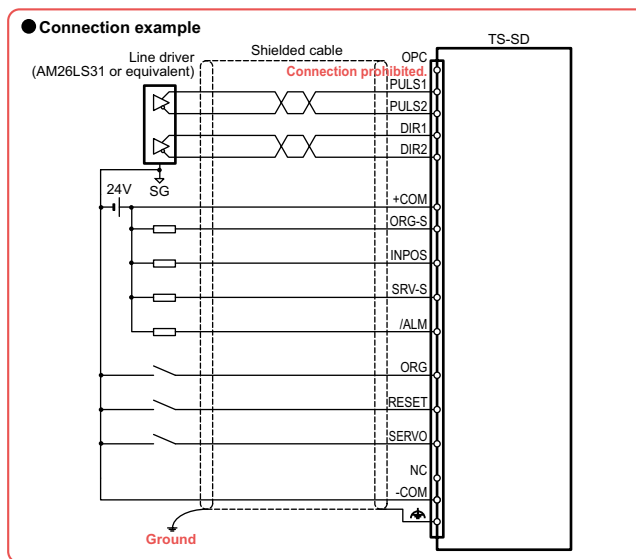
Type	Signal Name	Open collector	Line driver	Description
Inputs	OPC	Open collector power supply input	(Connection prohibited. ^{Note 2})	Input the power supply for the open collector. (DC5 to 24V +/- 10%)
	PULS1	(Connection prohibited. ^{Note 1})	Command pulse input (+)	Input terminal for pulse train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

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

Input / output signal connection diagram [open collector]



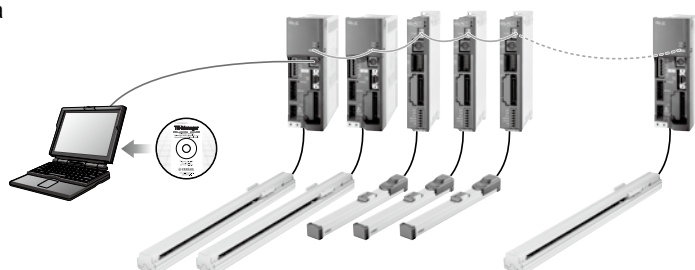
Input / output signal connection diagram [line driver]



Daisy chain function

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

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



Accessories and part options

TS-SD



Standard accessories

Power connector



Model KCC-M4421-00

TS-S2
TS-SH
TS-SD

I/O cables (1m)



Model KCC-M5362-00

TS-SD

Options

Support software TS-Manager

P.554



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

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

TS-Manager environment

OS	Microsoft Windows 2000 / XP / Vista (32bit/64bit) / 7 (32bit/64bit) / 8, 8.1 (32bit/64bit)
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-S2 / TS-SH / TS-X / TS-P / TS-SD

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

Data cables

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



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

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

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

Daisy chain and gateway connection cable



Model KCA-M532L-00 (300mm)

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

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.58



Support software for PC

▶ RDV-Manager

P.560



RDV-X

RDV-P

Basic specifications

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

Controllable robot	RDV-X ▶ FLIP-X Note 1 P.171	RDV-P ▶ PHASER P.217
CE marking		Field networks

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

Model Overview

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

Ordering method

RDV-X

RDV-X			
Controller	Power-supply voltage 2: AC200V	Driver Note 05: 100W or less 10: 200W or less 20: 600W or less	Regenerative unit Note RBR1 RBR2

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

RDV-P

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

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

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

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

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

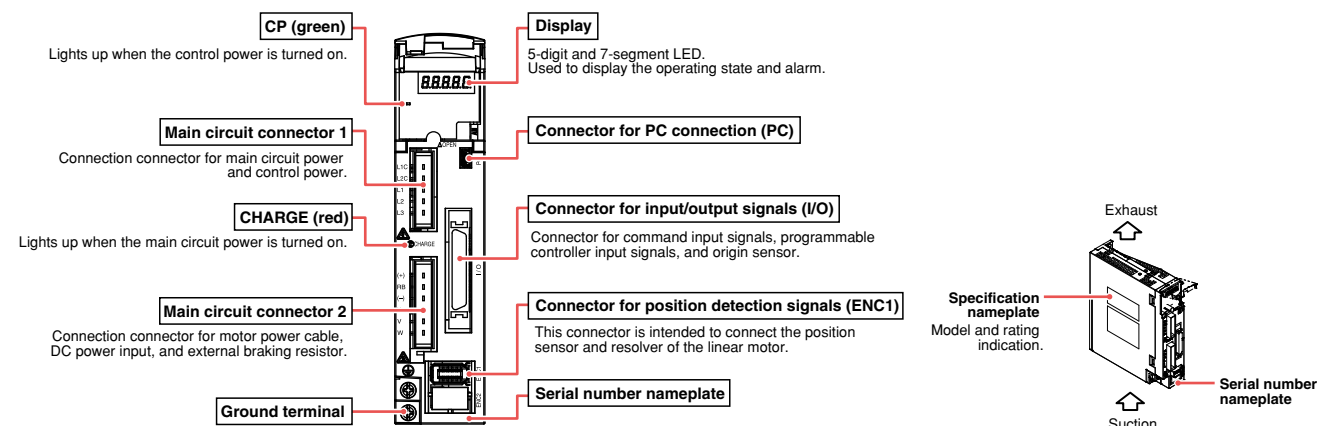
Note 3. GXL-8FB (made by SUNX) or FL7M-1P5B6-Z (made by YAMATAKE) is used for the origin sensor. The power consumption of the origin sensor is 15mA or less (at open output) and only 1 unit of the origin sensor is connected to each robot driver. (future specification)

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

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

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

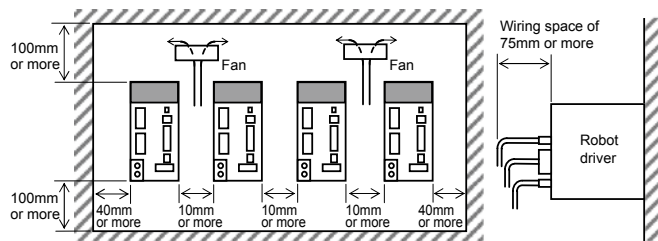
Part names



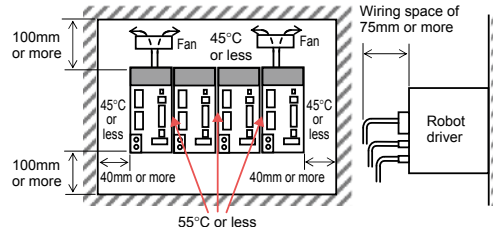
Installation conditions

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

Stored inside RDV-X/RDV-P panel

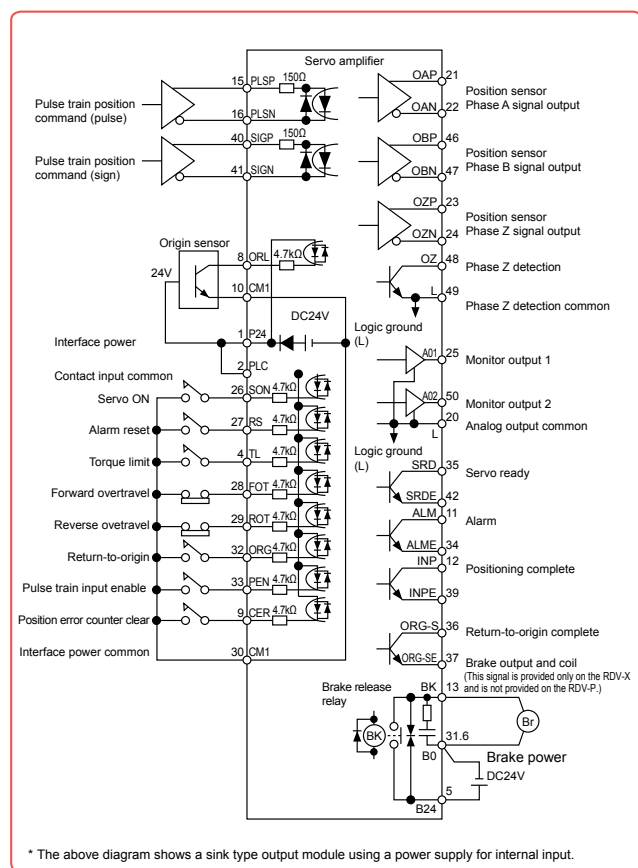


Side-by-side installation



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

Input / output signal connection diagram



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

List of RDV-P / RDV-X terminal functions

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

Note 1. B24, B0 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)



Model KBH-M4420-00

RDV-X

RDV-P

I/O connector (with brake wiring)



Model KBH-M4421-00

RDV-X

RDV-P

Power supply connector



Model KEF-M4422-00

RDV-X

RDV-P

Options

Support software RDV-Manager

P.560



Model KEF-M4966-00

RDV-X

RDV-P

Environment

OS	Microsoft Windows Vista (32bit) ^{Note 1} / 7 (32bit/64bit) / 8, 8.1 (32bit/64bit)
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-X / RDV-P

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

Note. Windows Vista, Windows 7, and Windows 8 / Windows 8.1 are trademarks of Microsoft Corporation registered in U.S.A. and other countries.

Communication cable

Communication cable to connect PC and a controller.



Model KEF-M538F-00

RDV-X

RDV-P

Articulated robots YA	Linear conveyor modules LCM100	Compact single-axis robots TRANSEVO	Single-axis robots FLIP-X	Linear motor single-axis robots PHASER	Cartesian robots XY-X	SCARA robots YK-X	Pick & place robots YP-X	CLEAN	CONTROLLER	INFORMATION	Robot positioner	Pulse string driver	Robot controller	IV/V/V2 Electric grripper	Option
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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.

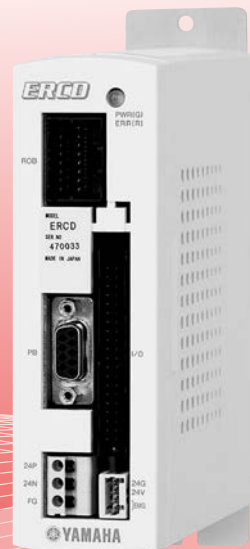
Main functions ▶ P.64



Programming box
▶ HPB/HPB-D
P.563



Support software for PC
▶ POPCOM+
P.556



ERCD

Basic specifications

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

Controllable robot	FLIP-X Dedicated for T4L/T5L P.176	Dedicated for C4L/C5L P.444
CE marking	—	Field networks —

Model Overview

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

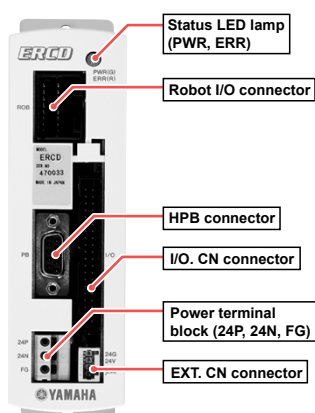
Ordering method

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

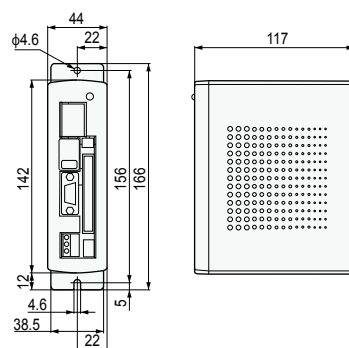
Item	Model	ERCD
Options	Programming box	HPB, HPB-D (with enable switch)
	Support software for PC	POPCOM+
General specifications	Operating temperature	0°C to 40°C
	Storage temperature	-10°C to 65°C
	Operating humidity	35% to 85%RH (non-condensing)
	Noise resistance capacity	IEC61000-4-4 Level 2
	Protective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

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

Part names

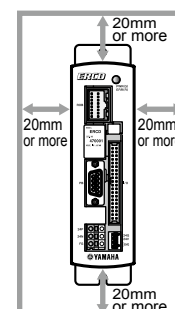


Dimensions



Installation conditions

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



Connector I/O signals

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

Pulse train I/O connector signals

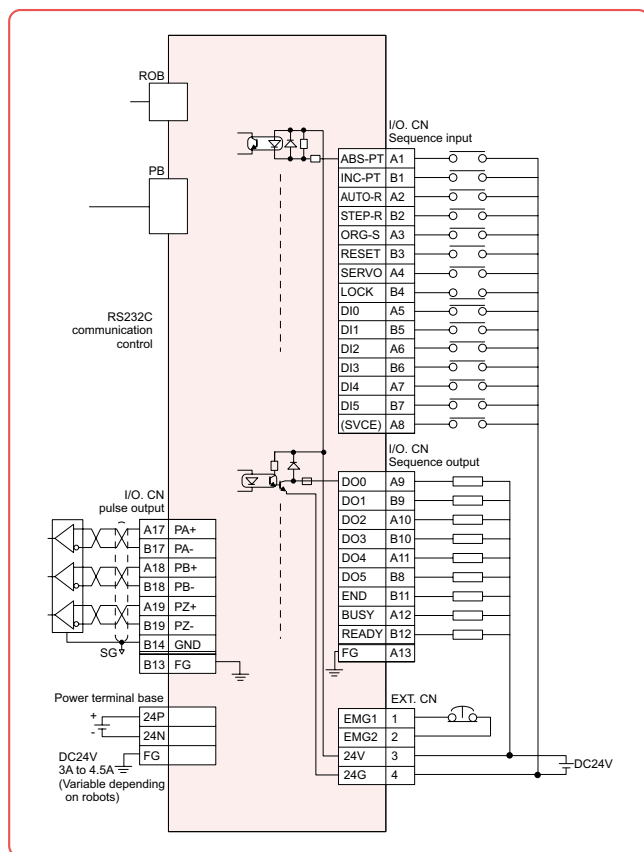
Terminal number	Signal name	Function
A-1	NC	Reserved (use inhibited)
B-1	NC	Reserved (use inhibited)
A-2	NC	Reserved (use inhibited)
B-2	PCLR	Differential clear input
A-3	ORG-S	Return to the origin input
B-3	RESET	Alarm reset input
A-4	SERVO	Servo-ON input
B-4	INH	Command pulse inhibition input
A-5	DI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

Robot Language Table

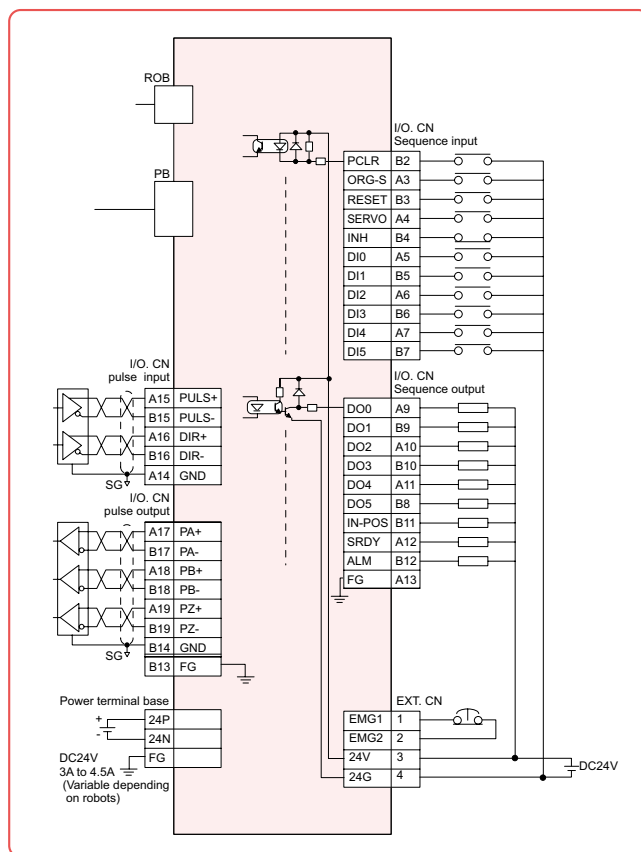
Command	Description
MOVA	Moves to a point data position.
MOVI	Moves from current position by amount of point data.
MOVF	Moves until a specified DI input is received.
JMP	Jumps to a specified label in the specified program.
JMPF	Jumps to a specified label in a specified program according to the input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

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

Input / output wiring diagram



Pulse train input / output wiring diagram



Pulse train input form

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

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

Articulated robots
YA

Linear / conveyer
modules
LCM100

Compact
single-axis robots
TRANSERVO

Single-axis robots
FLIP-X

Linear motor
single-axis robots
PHASER

Cartesian
robots
XX-X

SCARA
robots
YK-X

Pick & place
robots
YP-X

CLEAN

CONTROLLER

INFORMATION

Robot
positioner

Pulse string
driver

Robot
controller

IV/V/V2
Electric
grripper

Option

Accessories and part options

ERCD



Standard accessories

24V power connector (for EXT. CN)



Model KAU-M4422-00

ERCD

I/O flat cable (CN1): 1m

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



Model KAU-M4421-00

ERCD

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

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

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



Model KAU-M4421-10

ERCD

Options

Support software for PC **P.556** 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	Microsoft Windows XP / Vista (32bit / 64Bit) / 7 (32bit / 64Bit)
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/ERCX/DRCX/TRCX/SRCP/SRCD/ERCD/SR1/LCC140

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

Data cables

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



USB

D-Sub

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

LCC140

ERCD

SR1-X

SR1-P

RCX221

RCX222

RCX240/S

RCX340

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.

Programming box **P.563** HPB/HPB-D

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



HPB

HPB-D

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

LCC140

ERCD

SR1-X

SR1-P

Articulated robots YA	Linear conveyor modules LCM100	Compact single-axis robots TRANSEKO	Single-axis robots FLIP-X	Linear motor single-axis robots PHASER	Cartesian robots XY-X	SCARA robots YK-X	Pick & place robots YP-X	CLEAN	CONTROLLER	INFORMATION	Robot positioner	Pulse string driver	Robot controller	IV/V/V2 Electric grripper	Option
--------------------------	--------------------------------------	---	------------------------------	--	-----------------------------	-------------------------	--------------------------------	-------	------------	-------------	---------------------	------------------------	---------------------	---------------------------------	--------

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.64



Programming box
 ▶ HPB/HPB-D
P.563



Support software for PC
 ▶ POPCOM+
P.556



SR1-X

SR1-P

Basic specifications

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

Controllable robot	SR1-X ▶ FLIP-X P.171	SR1-P ▶ PHASER P.217
CE marking		Field networks CC-Link DeviceNet 

Model Overview

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

Ordering method

SR1-X

SR1-X					
Controller	Driver	Usable for CE	Regenerative unit ^{Note1}	Input/Output Selection	Battery
	05: 100W or less 10: 200W 20: 400 to 600W	No entry: Standard E: CE marking	No entry: None R: RG1	N: NPN P: PNP CC: CC-Link DN: DeviceNet TM PB: PROFIBUS YC: YC-Link ^{Note2}	No entry: None (Incremental specification) B: Battery (Absolute specification)

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

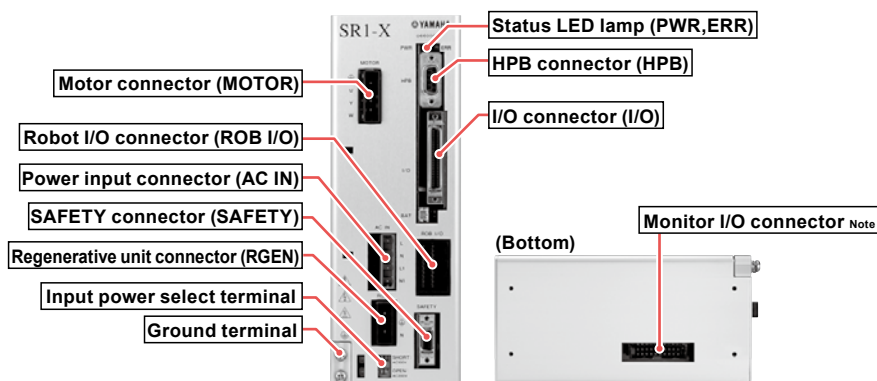
SR1-P

SR1-P				
Controller	Driver	Usable for CE	Regenerative unit ^{Note1}	Input/Output Selection
	05: 100W or less 10: 200W 20: 400 to 600W	No entry: Standard E: CE marking	No entry: None R: RG1	N: NPN P: PNP CC: CC-Link DN: DeviceNet TM PB: PROFIBUS YC: YC-Link ^{Note2}

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

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

Part names



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

Driver / regenerative unit selection table

SR1-X

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

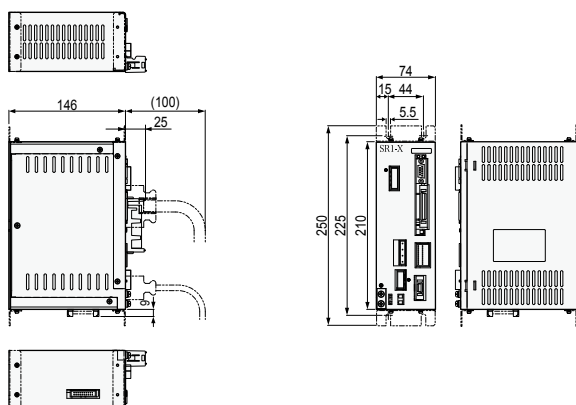
- ① Regenerative unit is needed if using in a perpendicular position and movement stroke is 700mm or more.
 ② Regenerative unit is needed if using in a perpendicular position.
 ③ Regenerative unit is needed if using in a perpendicular position, using at maximum speeds exceeding 1000mm per second, or if using high leads (40).
 ④ Regenerative unit is needed if using at maximum speeds exceeding 1000mm per second.
 ⑤ Regenerative unit is needed if using at maximum speeds exceeding 1250mm per second.
 ⑥ Regenerative unit is needed if using at maximum speeds exceeding 750mm per second.

SR1-P

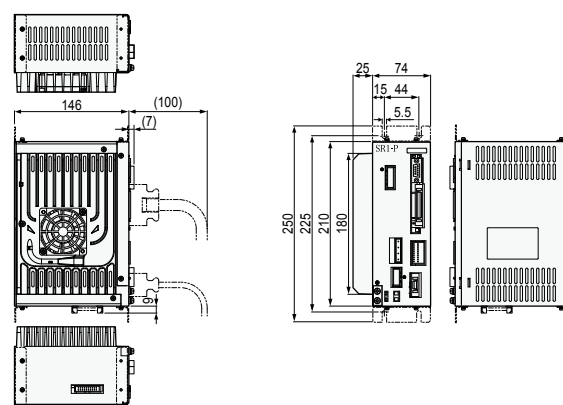
			PHASER									
			MR12/ MR12D	MR16/ MR16D	MR16H/ MR16HD	MR20/ MR20D	MR25/ MR25D	MF7/ MF7D	MF15/ MF15D	MF20/ MF20D	MF30/ MF30D	MF75/ MF75D
Driver selection	SR1-P	05	●	●								
		10			●		●	●	●	●		
		20				●					●	●
Regenerative unit	No entry (None)		●	●	●	●	●	●				
	R (RG1)								●	●		
	R (RGU-2)											●

Dimensions

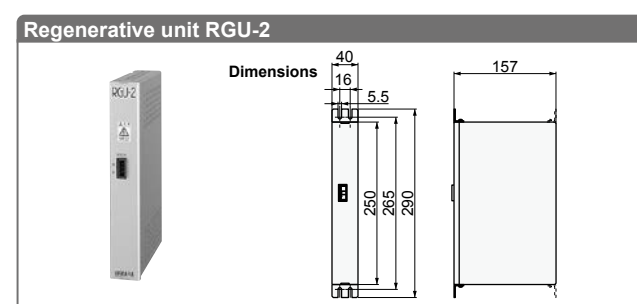
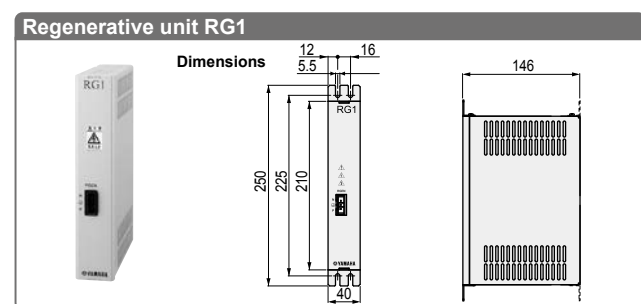
SR1-X/SR1-P 05 - 10



SR1-X/SR1-P 20



Regenerative unit RG1 / RGU-2



Basic specifications

Item	RG1
Model	KBG-M4107-0A (Including accessory)
Dimensions	W40 × H210 × D146mm
Weight	0.8kg
Regenerative voltage	Approx. 380V or more
Regenerative stop voltage	Approx. 360V or less
Accessory	Cable for connection with controller (300mm)

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

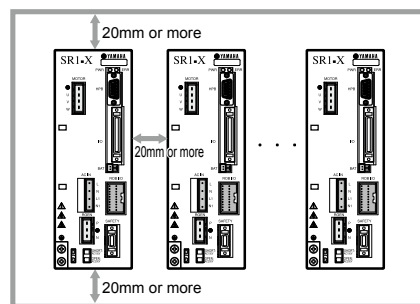
Basic specifications

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

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

■ Installation conditions

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



■ [NPN, PNP type] Input/Output list

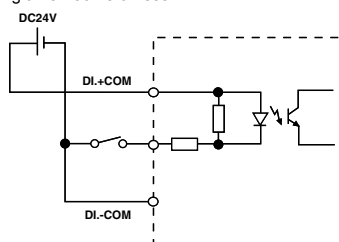
Terminal number	Signal name	Function
1	DI.+COM	Input supply+common
2	SERVO	Return to servo on
3	INC-PT	Relative point transfer
4	ABS-PT	Absolute point transfer
5	STEP-R	Step run
6	DI 0	General input 0
7	DI 1	General input 1
8	DI 2	General input 2
9	DI 3	General input 3
10	DI 4	General input 4
11	DI 5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

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

■ NPN type input/output circuit

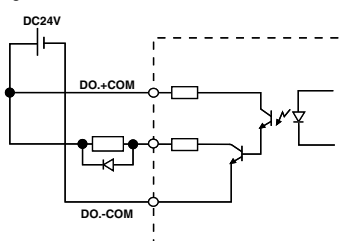
Input circuit

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



Output circuit

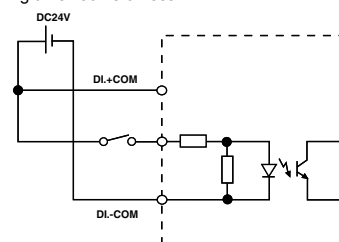
- Form : NPN open collector output (negative common type)
Photo coupler insulation type
- Load : 50mA/point
- Answering time : 1ms or less



■ PNP type input/output circuit

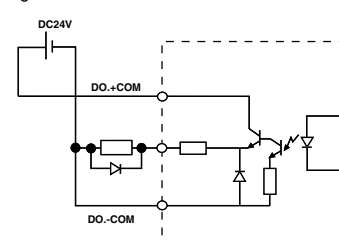
Input circuit

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



Output circuit

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



SAFETY connector signals

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

Robot Language Table

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

Accessories and part options

SR1-X/SR1-P



Standard accessories

Power connector + wiring connection lever



Model KAS-M5382-00

LCC140
TS-X
TS-P
SR1-X
SR1-P
RCX221
RCX222
RCX240/S
RCX340

Safety connector



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

SR1-X
SR1-P

HPB dummy connector

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



Model KDK-M5163-00

LCC140
SR1-X
SR1-P

NPN / PNP connector



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

SR1-X
SR1-P
RCX340

L type stay

Use to install the controller.



Model KBG-M410H-00

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

SR1-X
SR1-P

Absolute battery

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

Basic specifications

Item	Absolute battery
Battery type	Lithium metallic battery
Battery capacity	3.6V/2,750mAh
Data holding time	About 1 year (in state with no power applied)
Dimensions	φ17 × L53mm
Weight ^{Note1}	22g



Model KAS-M53G0-11

Note 1. Weight of battery itself.

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

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

SR1-X
RCX222
RCX240/S

Battery case

This is the absolute battery holder.



Model KBG-M5395-00

SR1-X
RCX222
RCX240/S

See next page for optional parts

Options

Cable for monitor I/O

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



Model KBG-M4421-00

SR1-X
SR1-P

Support software for PC **P.556** 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	Microsoft Windows XP / Vista (32bit/64bit) / 7 (32bit/64bit) 8.1 (32bit/64bit)
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/ERCX/DRCX/TRCX/SRCP/SRCD/ERCD/SR1/LCC140 ^{Note 1}

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

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

Data cables

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



USB



D-Sub

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

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

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

LCC140
ERCD
SR1-X
SR1-P
RCX221
RCX222
RCX240/S
RCX340

Programming box **P.563** HPB/HPB-D

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



HPB

HPB-D

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

LCC140
ERCD
SR1-X
SR1-P

Y-Link board (with connection cable)

Model KBG-M4400-60

SR1-X
SR1-P

Note. Use the converter cable if changing to the SR1-X, SR1-P from a system using SRCX, SRCP. (See P.605).

Articulated robots YA	Linear conveyor modules LCM100	Compact single-axis robots TRANSEKO	Single-axis robots FLIP-X	Linear motor single-axis robots PHASER	Cartesian robots XY-X	SCARA robots YK-X	Pick & place robots YP-X	CLEAN	CONTROLLER	INFORMATION	Robot positioner	Pulse string driver	Robot controller	IV/V/V2 Electric grripper	Option
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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.66



Programming box
▶ RPB/RPB-E

P.564



Support software for PC
▶ VIP+

P.558



RCX221

RCX222

Basic specifications

Item		Model	RCX221	RCX221HP	RCX222	RCX222HP
Basic specifications	Number of controllable axes		2 axes maximum			
	Controllable robots		Single-axis robot FLIP-X, Linear motor single-axis robot PHASER, Cartesian robot XY-X, Pick & place robot YP-X		Single-axis robot FLIP-X, Cartesian robot XY-X, Pick & place robot YP-X	
	Connected motor 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
	Maximum power consumption		1700VA	2400VA	1700VA	2400VA
	Dimensions		W130 × H210 × D158mm			
	Weight		Approx. 2.9kg	Approx. 3.1kg	Approx. 2.9kg	Approx. 3.1kg
	Input power supply	Control power supply	Single phase AC200 to 230V +/-10% maximum (50/60Hz)			
		Motor power	Single phase AC200 to 230V +/-10% maximum (50/60Hz)			
Axis control	Drive method		AC full-digital software servo			
	Position detection method		Resolver, Magnetic linear scale		Multi-turn resolver with data backup function	
	Operating method		PTP (Point to Point), Linear interpolation, Circular interpolation, Arch motion			
	Coordinate system		Joint coordinates, Cartesian coordinates			
	Position indication units		Pulses, mm (millimeters), deg (degrees)			
	Speed setting		1% to 100% (In units of 1%. However speed is in units of 0.01% during single-axis operation by DRIVE statement.)			
	Acceleration setting		1. Automatic acceleration setting based on robot model type and end mass parameter 2. Setting based on acceleration and deceleration parameter (Setting by 1% unit)			
	Resolution		1μm		16384 P/rev	
	Origin search method		Incremental / Semi-absolute		Absolute / Incremental	
Program	Program language		YAMAHA BASIC (Conforming to JIS B8439 SLIM Language)			
	Multitasks		8 tasks maximum			
	Sequence program		1 program			
	Point-data input method		Manual data input (coordinate value input), Direct teaching, Teaching playback			
Memory	Memory capacity		364KB (total capacity of program and points) (available program capacity during use of maximum number of points is 84KB)			
	Programs		100 program 9,999: maximum lines per program 98KB: maximum capacity per program			
	Points		10,000 points : maximum numbers of points			
	Memory Backup battery		Lithium metallic battery (service life 4 years at 0℃ to 40℃)			
	Internal flash memory		512KB (ALL data only)			
	External memory backup		SD memory card			

Controllable robot	RCX221 ▶ XY-X P.241 , FLIP-X P.171 , PHASER P.217 , YP-X P.429
	RCX222 ▶ XY-X P.241 , FLIP-X P.171 , YP-X P.429
CE marking	
Field networks	CC-Link  DeviceNet  Ethernet 

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

RCX221/RCX221HP

Controller ^{Note 1}	Usable for CE	Regenerative unit ^{Note 2}	Input/Output Selection 1	Input/Output Selection 2
RCX221	No entry: Standard	No entry: None	N: NPN	No entry: None
RCX221HP	E: CE marking	R: RG2	P: PNP	N1: OP.DIO24/16 (NPN)
			CC: CC-Link	P1: OP.DIO24/16 (PNP)
			DN: DeviceNet™	EN: Ethernet ^{Note 4}
			PB: PROFIBUS	
			EN: Ethernet	
			YC: YC-Link ^{Note 3}	

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 4. Only when you have selected CC, DN or PB for Input/Output selection 1, you can select EN for Input/Output selection 2.

RCX222/RCX222HP

Controller ^{Note 1}	Usable for CE	Regenerative unit ^{Note 2}	Input/Output Selection 1	Input/Output Selection 2
RCX222	No entry: Standard	No entry: None	N: NPN	No entry: None
RCX222HP	E: CE marking	R: RG2	P: PNP	N1: OP.DIO24/16 (NPN)
			CC: CC-Link	P1: OP.DIO24/17 (PNP)
			DN: DeviceNet™	EN: Ethernet ^{Note 4}
			PB: PROFIBUS	
			EN: Ethernet	
			YC: YC-Link ^{Note 3}	

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.

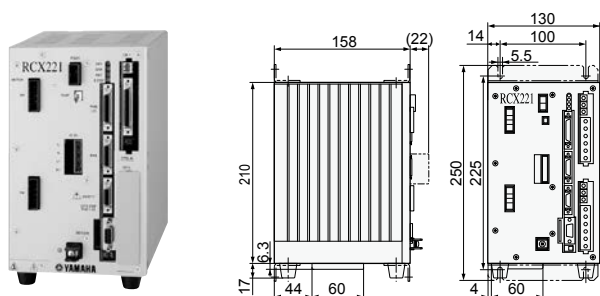
Note 3. Available only for the master.

Note 4. Only when you have selected CC, DN or PB for Input/Output selection 1, you can select EN for Input/Output selection 2.

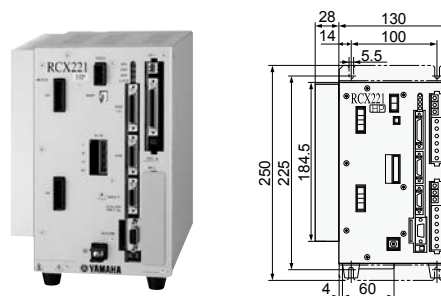
Item		Model	RCX221	RCX221HP	RCX222	RCX222HP
External input/output	STD.DIO	I/O input	Dedicated input 10 points, General input 16 points			
		I/O output	Dedicated Output12 points, General output 8 points			
	SAFETY		Emergency stop input (Relay contact), Service mode input (NPN/PNP specification is set according to STD.DIO setting)			
	Brake output		Relay contact			
	Origin sensor input		Connectable to DC 24V normally-closed contact sensor			
	External communications		RS232C: 1CH D-SUB9 (female) RS422 : 1CH (RPB)			
	Options	Slots	2 (inc.STD.DIO)			
		Type	STD.DIO (NPN/PNP): Dedicated input 10 points, Dedicated output 12 points, General input 16 points, General output 8 points			
			Optional input/output (NPN/PNP): General input 24 points / General output 16 points			
			CC-Link: Dedicated input 16 points, Dedicated output 16 points, General input 96 points, General output 96 points (4 nodes occupied)			
DeviceNet™: Dedicated input 16 points, Dedicated output 16 points, General input 96 points, General output 96 points						
PROFIBUS: Dedicated input 16 points, Dedicated output16 points, General input 96 points, General output 96 points						
Ethernet: IEEE802.3 10Mbps (10BASE-T)						
Options	Programming box		RPB, RPB-E (with enable switch)			
	Support software for PC		VIP+ / VIP			
General specifications	Operating temperature		0°C to 40°C			
	Storage temperature		-10°C to 65°C			
	Operating humidity		35% to 85%RH (non-condensing)			
	Absolute backup battery		—		Lithium metallic battery 3.6V 5400mAh (2700nAH × 2)	
	Absolute data backup period		—		1 year (in state with no power applied)	
	Noise immunity		IEC61000-4-4 Level3			
	Protecting structure		IP10			

■ Dimensions

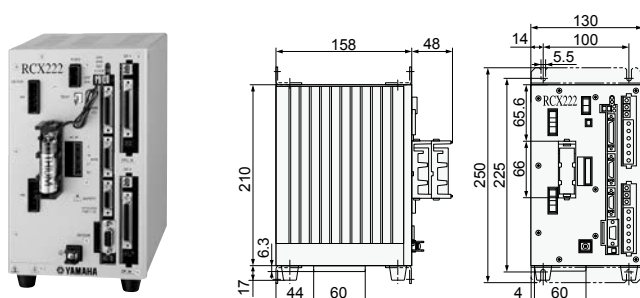
■ RCX221



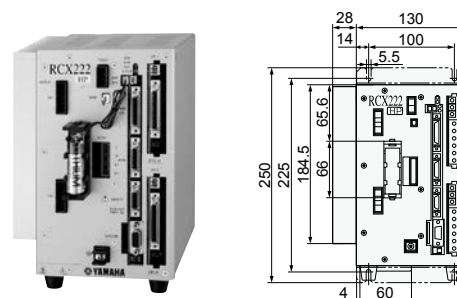
■ RCX221HP



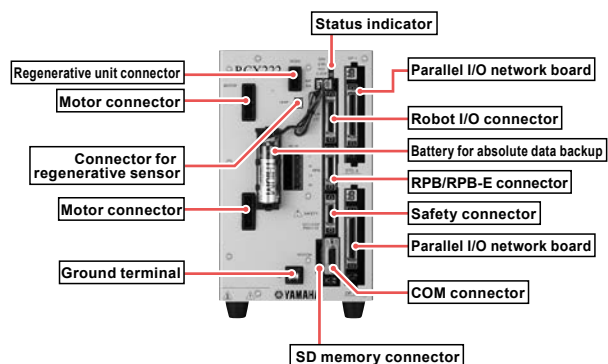
■ RCX222



■ RCX222HP

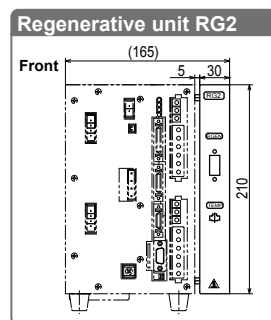


■ Part names



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 unit.

● 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

	PHASER					
	MR12D	MF7D	MF15D	MF20D	MF30D	MF50D
RCX221	●	●	●	●	●	●
RCX221HP	●	●	●	●	●	●
Regenerative unit R (RG2)	●	●	●	●	●	●

● : Applicable

■ RCX222/RCX222HP

		FLIP-X		XY-X												YP-X	Clean																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																			
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		N15D	N18D	PXYx	FXYx	FXYBx	SXYx	SXYBx	NXY	MXYx	HXYx	HXYLx	SXYx (ZF)	SXYx (ZFL20)	SXYBx (ZF)			SXYBx (ZFL20)	MXYx	HXYx																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																
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● : Applicable ○ : Select per conditions

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

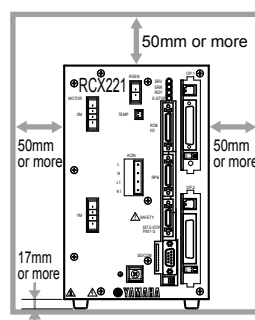
Note. Motor output of the B14H is 200W but the current sensor is 05.

Conditions where regenerative unit is needed on multi robots

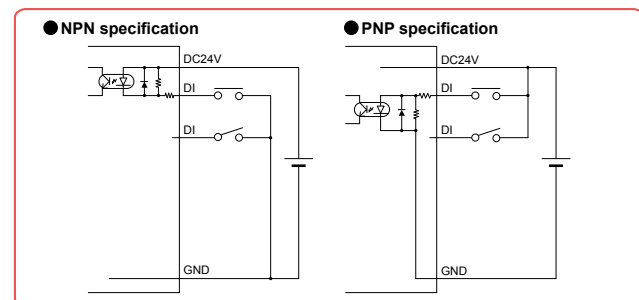
- Motor capacity exceeds a total of 450W.
- Motor capacity for perpendicular axis exceeds a total of 240W.
- The following conditions apply when perpendicular axis capacity is 240W or less.
 - perpendicular axis is 200W.
 - perpendicular axis is 100W and stroke is 700mm or more.
 - there are 2 perpendicular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

Installation conditions

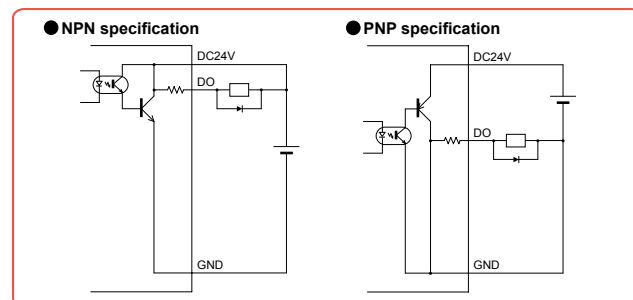
- Install the RCX221/RCX222 inside the control panel.
- Install the RCX221/RCX222 on a flat, level surface.
- Install the RCX221/RCX222 in a well ventilated location, with space on all sides of the RCX221/RCX222 (See fig. at right.).
- Do not block the heat-sink on the side panel.
- Do not block the fan on the bottom of the controller.
- Ambient temperature : 0 to 40°C
- Ambient humidity : 35 to 85% RH (no condensation)



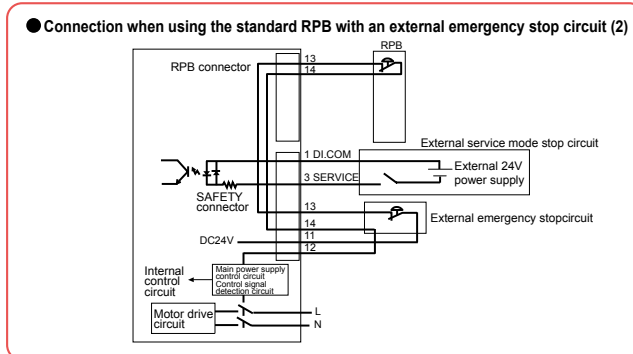
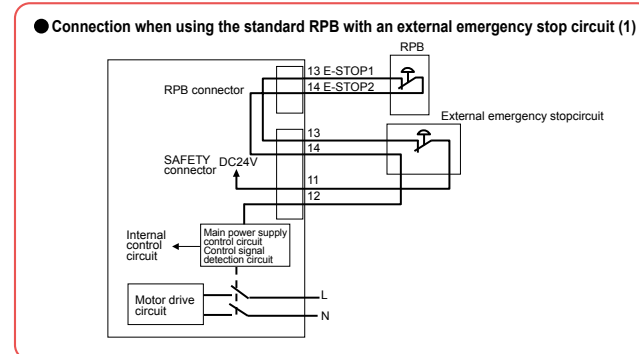
Example of input signal connection



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 number	Signal name	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, 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 number	Signal 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	DI46	General input	
31	DI47	General input	
32	DI60	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

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.
OUT	Turns ON the bits of the specified output ports and the 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	1. Waits until the condition in DI/DO conditional expression are met. 2. Waits until positioning on the robot axes is complete (within the tolerance range).

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-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

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

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



Model KAS-M5382-00

LCC140
TS-X
TS-P
SR1-X
SR1-P
RCX221
RCX222
RCX240/S
RCX340

Safety connector



Model KAS-M5370-00

RCX221
RCX222

RPB terminator (dummy connector)

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



Model KAS-M5163-30

RCX221
RCX222
RCX240/S

Standard I/O (STD.DIO) connector



Model KAS-M533G-00

RCX221
RCX222

Option I/O (OP.DIO) connector



Model KAS-M533G-10

RCX221
RCX222

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

Use to install the controller.



Model KAS-M410H-00

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

RCX221
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/2,750mAh
Data holding time	About 1 year ^{Note1} (in state with no power applied)
Dimensions	φ17 × L53mm
Weight ^{Note2}	22g



Model KAS-M53G0-11

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.

SR1-X
RCX222
RCX240/S

Important

Absolute battery installation conditions

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

SR1-X
RCX222
RCX240/S

Options

● Programming box RPB/RPB-E

P564

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
RCX240/S

● Support software for PC VIP+

P558

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
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RCX221
RCX222
RCX240/S

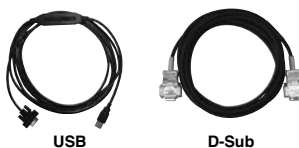
● Environment

OS	Microsoft Windows 2000 / XP / Vista (32bit / 64Bit) / 7 (32bit / 64Bit)
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 RCX series controller is required.
Applicable robot controllers	RCX221 / RCX222 / RCX141 / RCX142 / RCX240 / RCX240S

Note. Microsoft and Windows are registered trademarks of Microsoft Corporation.
 Note. ADOBE and ADOBE READER are registered trademarks of Adobe Systems Incorporated.
 Note. Ethernet is a registered trademark of Xerox Corporation.

● 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. 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
RCX221
RCX222
RCX240/S
RCX340

Articulated robots
YA

Linear conveyer modules
LCM100

Compact single-axis robots
TRANSEVO

Single-axis robots
FLIP-X

Linear motor single-axis robots
PHASER

Cartesian robots
XX-X

SCARA robots
YK-X

Pick & place robots
YP-X

CLEAN

CONTROLLER

INFORMATION

Robot positioner

Pulse string driver

Robot controller

IV/V/V2 Electric gripper

Option

RCX240/RCX240S

Robot controller with advanced functions

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

Main functions ▶ P.66



Programming box
▶ RPB/RPB-E

P.564



Support software for PC
▶ VIP+

P.558



RCX240



RCX240S

Basic specifications

Item		Model	RCX240 / RCX240S
Basic specifications	Number of controllable axes		4 axes maximum (Control simultaneously: 4 axes)
	Controllable robots		Single-axis robot FLIP-X, Linear motor single-axis robot PHASER, Cartesian robot XY-X, SCARA robot YK-XG, Pick & place robot YP-X
	Maximum power consumption		2500VA (RCX240) / 1500VA (RCX240S)
	Capacity of the connected motor		1600W (RCX240) / 800W (RCX240S)
	Dimensions		W180 × H250 × D235mm
Axis control	Weight		6.5kg
	Input power supply	Control power supply	Single phase AC200 to 230V +/-10% maximum (50/60Hz)
		Motor power supply	Single phase AC200 to 230V +/-10% maximum (50/60Hz)
	Drive method		AC full-digital software servo
	Position detection method		Multi-turn resolver with data backup function, Magnetic linear scale
Program	Operating method		PTP (Point to Point), Linear interpolation, Circular interpolation, ARCH
	Coordinate system		Joint coordinates, Cartesian coordinates
	Position indication units		Pulses, mm (millimeters), deg (degrees)
	Speed setting		1% to 100% (In units of 1%. However speed is in units of 0.01% during single-axis operation by DRIVE statement.)
	Acceleration setting		1. Automatic acceleration setting based on robot model type and end mass parameter 2. Setting based on acceleration and deceleration parameter (Setting by 1% unit)
Memory	Origin search method		Incremental, Absolute, Semi-absolute
	Program language		YAMAHA BASIC (Conforming to JIS B8439 SLIM Language)
	Multitasks		8 tasks maximum
	Sequence program		1 program
	Point-data input method		Manual data input (coordinate value input), Direct teaching, Teaching playback
Memory	Memory capacity		364KB (total capacity of program and points) (available program capacity during use of maximum number of points is 84KB)
	Programs		100 program (Max.) 9,999: maximum lines per program 98KB: maximum capacity per program
	Points		10,000 points: maximum numbers of points
	Memory Backup battery		Lithium metallic battery (service life 4 years at 0°C to 40°C)
	Internal flash memory		512KB (ALL data only)

Controllable robot	XY-X P241	YK-X P369	FLIP-X P171	PHASER P217	YP-X P429
CE marking		Field networks			
		    			

Model Overview

Name	RCX240/RCX240S
Controllable robot ^{Note}	Cartesian robot XY-X / SCARA robot YK-X / Single-axis robot FLIP-X / Linear motor single-axis robot PHASER / Pick & place robot YP-X
Input power	Single phase : AC200V to 230V +/-10% maximum (50/60Hz)
Operating method	Programming / Remote command / Operation using RS-232C communication
Maximum number of controllable axes	4 axes maximum
Origin search method	Incremental/Absolute

Note. For details, please refer to the controller model selection table on the next page.

Ordering method

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

Note 1. The RCX240S controller is limited to use with robots that handles 200W or lower on each axis. Check the following controller selection table to find the matching model.

Note 2. The regenerative unit (option) is required when operating a model designated by YAMAHA or a load with a large inertia. Please refer to the following regenerative unit selection table.

Note 3. YK500XG to YK1000XG are for RGU-3.

Note 4. Use N to N4 when NPN is selected on the I/O board, and P to P4 when PNP is selected.

Note 5. Available only for the master. (The YC-Link system controls an SR1 series single-axis controller in accordance with communications received from an RCX series multi-axis controller. Using the YC-Link system allows control of up to 8 axes (or up to 6 axes with synchronous control)).

Note 6. Use battery-less model if connecting to all-axis linear motor, or to incremental models.

Note 7. If any or Single-axis among the XY axes are absolute specifications then 2 batteries are required.

Note 8. If any or Single-axis among the ZR axes are absolute specifications then 2 batteries are required.

☆ Please note that:

The current sensor on the RCX240S cannot be set to 20A.

As a controller stocked for maintenance, please order an RCX240 that can be set to any of 05A, 10A and 20A.

Item		Model	RCX240 / RCX240S		
External input/output	STD.DIO	I/O input	Dedicated input 10 points, General input 16 points (NPN / PNP specifications selectable)		
		I/O output	Dedicated output 11 points, General output 8 points		
	SAFETY		Emergency stop input (Relay contact), Service mode input (NPN/PNP specification is set according to STD. DIO setting), Enabling switch input (Enabled only when the RPB-E is used.)		
	Brake output		Relay contact		
	Origin sensor input		Connectable to DC 24V normally-closed contact sensor		
	External communications		RS-232C: 1CH D-SUB9 (female) RS-422: 1CH (Dedicated RPB)		
	Regenerative unit connection		RGEN connector		
	Options	Slots	4		
		Type	Optional input/output (NPN/PNP)	General input 24 points, General output 16 points	
			CC-Link	Dedicated input 16 points, Dedicated Output 16 points, General input 96 points, General output 96 points (4 nodes occupied)	
			DeviceNet™	Dedicated input 16 points, Dedicated Output 16 points, General input 96 points, General output 96 points	
			PROFIBUS	Dedicated input 16 points, Dedicated Output 16 points, General input 96 points, General output 96 points	
			Ethernet	IEEE802.3 10Mbps (10BASE-T)	
			EtherNet/IP™	Dedicated input 16 points, dedicated output 16 points, General-purpose input 96 points, general-purpose output 96 points Conforms to Ethernet (IEEE 802.3) 10Mbps/100Mbps.	
			iVY	Camera input (2ch), camera trigger input, PC connection input	
			Tracking	AB phase input, lighting trigger input, lighting power supply input/output	
			Lighting control	Lighting trigger input, lighting power supply input/output	
			Gripper control	No. of axes: 1 axis, Position detection method: Optical rotary encoder, Min. setting distance: 0.01mm	
			Options	Programming box	
	Support software for PC			VIP+	
	Regenerative unit			RGU-2, RGU-3	
	General specifications	Operating temperature		0°C to 40°C	
		Storage temperature		-10°C to 65°C	
		Operating humidity		35% to 85%RH (non-condensing)	
		Absolute backup battery		Lithium metallic battery 3.6V 5400mAH (2700mAH × 2)	
		Absolute data backup period		1 year (in state with no power applied)	
		Noise immunity		IEC61000-4-4 Level 3	
	Protective structure		IP10		

■ Controller model selection table

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

[illegible]

■ Multi-robot: Driver list for each model

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

		FLIP-X																		PHASER							
		T4LH	T5LH	T6L	T9	T9H	F8/F8L/F8H	F10	F14	F14H	GF14XL	F17/F17L	GF17XL	F20/F20N	N15	N18	B10	B14/B14H	R5	R10	R20	MR12	MF7	MF15	MF20	MF30	MF75
Driver	05A	●	●	●	●		●	●	●								●	●	●	●		●					
	10A					●				●	●		●	●	●	●			●	●	●		●	●	●		
	20A														●	●					●					●	

■ Regenerative unit selection table

[illegible]

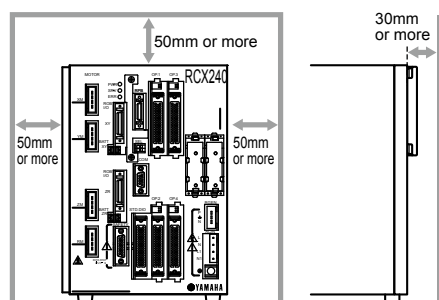
● : Required ○ : If Z axis is 200W specifications then regenerative unit RGU-2 is required.

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.
- B14H which maximum speed exceeds 1250mm per second.
- 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.

■ Installation conditions

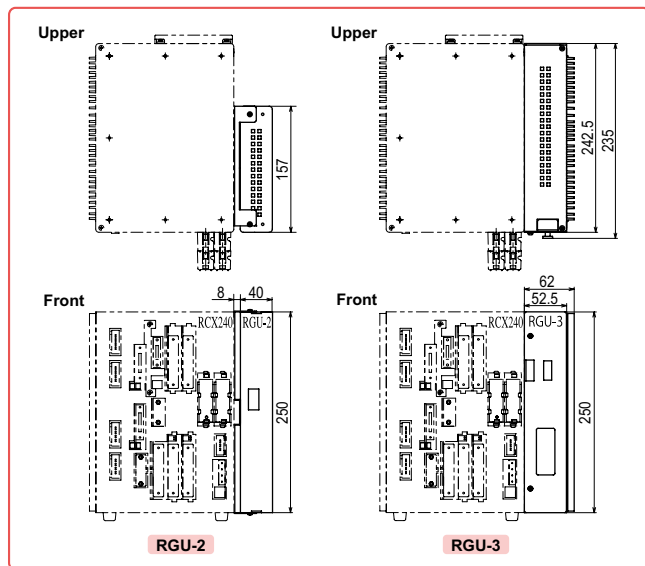
- Install the RCX240/RCX240S inside the control panel.
- Install the RCX240/RCX240S on a flat, level surface.
- Install the RCX240/RCX240S in a well ventilated location, with space on all sides of the RCX240/RCX240S (See fig. at right.).
- Do not block the heat-sink on the side panel.
- Do not block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



Articulated robots	Linear conveyor modules	Comp single-axis robots	Single-axis robots	Linear motor single-axis robots	Cartesian robots	SCARA robots	Pick & place robots	CLEAN CONTROLLER INFORMATION	Robot positioner	Pulse string driver	Robot controller	INVTWY2 Electric gripper	Option
YA	LCM100	TRANSERO	FLIP-X	PHASER	XY-X	YK-X	YP-X						



Regenerative unit



RGU-2 basic specifications



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

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

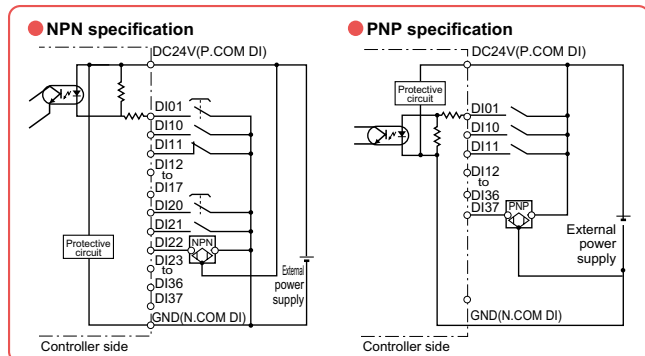
RGU-3 basic specifications



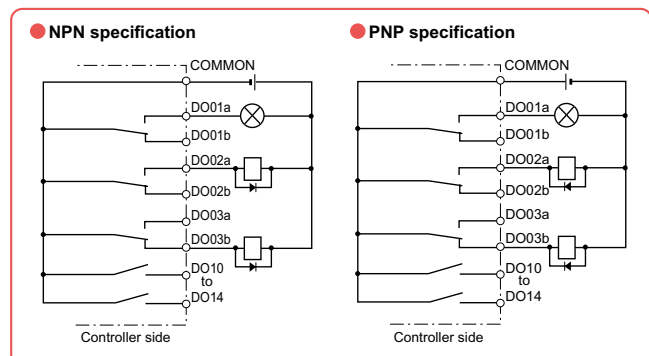
Item	RGU-3
Model	KX0-M4107-30 (including cable supplied with unit)
Dimensions	W62 × H250 × D242.5mm
Weight	3.7kg
Regenerative voltage	Approx. 380V or more
Regenerative stop voltage	Approx. 360V or less
Accessory	Cable for connection with controller (300mm)

Note. Cannot be installed as a separate unit.

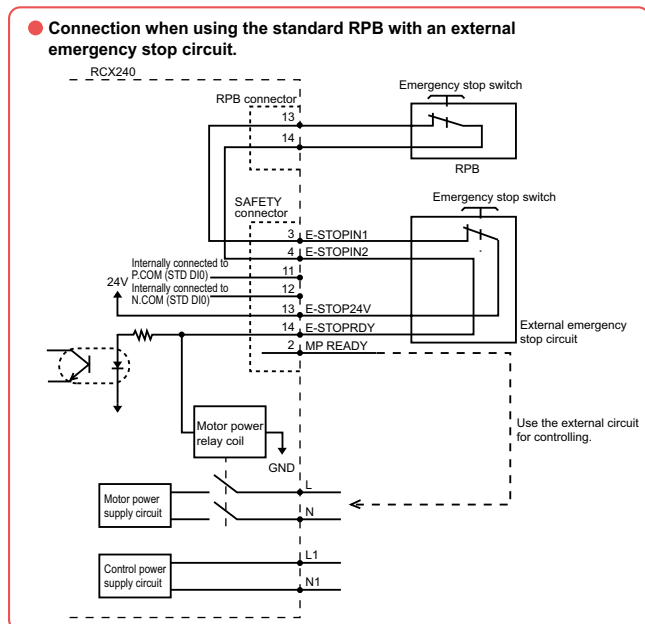
Example of input signal connection



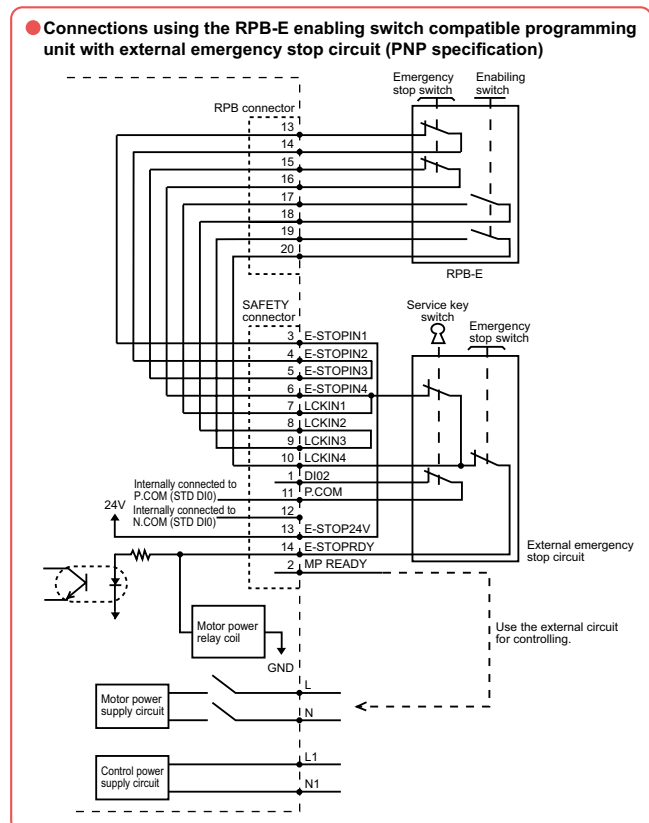
Example of output signal connection



Emergency input signal connections



Installing an external safety circuit will satisfy safety category class 4 standards. See P.617 for more information.



■ Connector input / output signals

PIN	I/O No.	Name	Note	PIN	I/O No.	Name	Note
1	DI05	I/O command execution trigger input		27	COMMON	Relay common	
2	DI01	Servo ON input		28	DO01b	CPU_OK (B contact)	
3	DI10	Sequence control		29	DO01a	CPU_OK (A contact)	
4	DI11	Interlock		30	DO02b	Servo ON output (B contact)	(Relay output)
5	DI12	Program start		31	DO02a	Servo ON output (A contact)	Maximum capacity of each terminal (resistance load)
6	DI13	AUTO mode input		32	DO03b	Alarm (B contact)	: DC 24V 0.5A
7	DI14	Return-to-origin		33	DO03a	Alarm (A contact)	Common terminal
8	DI15	Program reset		34	DO10	AUTO mode output	: COMMON
9	DI16	MANUAL mode input		35	DO11	Return-to-origin complete	
10	DI17	Absolute reset / Return-to-origin	Common terminal	36	DO12	Sequence program in-progress	
11	DI20	General input 20	: P.COMDI	37	DO13	Robot program in-progress	
12	DI21	General input 21	N.COMDI	38	DO14	Program reset	
13	DI22	General input 22		39	DO20	General output 20	
14	DI23	General input 23	(Photo-coupler input)	40	DO21	General output 21	(Transistor output)
15	DI24	General input 24	NPN specification	41	DO22	General output 22	NPN specification or PNP specification
16	DI25	General input 25	: Source type	42	DO23	General output 23	Maximum capacity of each terminal (resistance load) : 0.1A
17	DI26	General input 26	PNP specification	43	DO24	General output 24	+ Common terminal : DC+24V
18	DI27	General input 27	: Sink type	44	DO25	General output 25	- Common terminal : GND
19	DI30	General input 30		45	DO26	General output 26	
20	DI31	General input 31		46	DO27	General output 27	
21	DI32	General input 32		47	DC24V	DC+24V (P.COMDI)	External power supply input
22	DI33	General input 33		48			
23	DI34	General input 34		49	GND	GND (N.COMDI)	
24	DI35	General input 35		50			
25	DI36	General input 36					
26	DI37	General input 37					

Note. When using the CC-Link, DeviceNet™, EtherNet/IP™, or PROFIBUS, the dedicated inputs other than the interlock signal (DI11) of the STD.DIO that are provided on the RCX240 controller are disabled.
Additionally, when the external 24V monitor control of the system parameters is set disabled, the interlock signal (DI11) becomes disabled.

■ SAFETY connector signals

Terminal number	RPB connected		RPB-E connected	
	I/O No.	Name	I/O No.	Name
1	DI02	SERVICE mode	DI02	SERVICE mode
2	MP READY	Motor power ready signal	MP READY	Motor power ready signal
3	E-STOPIN 1	Emergency stop input 1	E-STOPIN 1	Emergency stop input 1
4	E-STOPIN 2	Emergency stop input 2	E-STOPIN 2	Emergency stop input 2
5	NC	NC	E-STOPIN 3	Emergency stop input 3
6	NC	NC	E-STOPIN 4	Emergency stop input 4
7	NC	NC	LCKIN 1	Enabling switch input 1
8	NC	NC	LCKIN 2	Enabling switch input 2
9	NC	NC	LCKIN 3	Enabling switch input 3
10	NC	NC	LCKIN 4	Enabling switch input 4
11	P.COM	DC+24V (P.COM DI)	P.COM	DC+24V (P.COM DI)
12	N.COM	GND (N.COM DI)	N.COM	GND (N.COM DI)
13	E-STOP 24V	Emergency stop input supply	E-STOP 24V	Emergency stop input supply
14	E-STOPRDY	Emergency stop READY signal	E-STOPRDY	Emergency stop READY signal
15	NC	NC	NC	NC

■ Standard functions of the controller

Function	Description
Operation mode	Automatic mode (main task: execution of program, execution of step), Program mode (main task: creation of program), Manual mode (main task: jog movement, point teaching), System mode (main task: parameter editing, data initialization), Utility mode (main task: operation of motor power source)
Command	Array declarator command (DIM statement), Assignment command (numeric value assignment statement, character string assignment statement, point definition statement), Movement related command (MOVE statement, DRIVE statement, PMOVE statement), Condition branching command (IF statement, FOR statement, WHILE statement), External output command (DO statement, MO statement, LO statement, TO statement, SO statement), Parameter command (ACCEL statement, OUTPOS statement, TOLE statement), Task related command (START statement, SUSPEND statement, CUT statement), Condition wait command (WAIT statement), etc.
Function	Arithmetic function (SIN function, COS function, TAN function), Character string function (STR\$ function, LEFT\$ function, MID\$ function, RIGHT\$ function), Point function (WHERE function, JTOXY function, XYTOJ function), Parameter function (ACCEL statement, OUTPOS statement, TOLE statement), etc.
Variable	Simple variable (integer type variable, real number type variable, character string type variable), Array variable (integer type variable, real number type variable, character string type variable), Point variable, Shift variable, Element variable (point element variable, shift element variable), Input/output variable, etc.
Operator	Arithmetic operator (+, -, *, /, MOD), Logical operator (AND, OR, XOR), Comparison operator (=, <, >, <=, >=)
Monitor	Monitor of input/output (200ms interval)
On-line command	Key operation command (AUTO, RUN, RESET, STEP), Data handling command (READ, WRITE, ?VER, ?CONFIG), Utility command (COPY, ERA, INIT), Robot language command (independently executable command)
Data file	Program, Point, Parameter, Shift, Hand, All, Error history, etc.
Internal timer	10ms interval
Program break point	4 points at maximum

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

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.
OUT	Turns ON the bits of the specified output ports and the 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	1. Waits until the condition in DI/DO conditional expression are met. 2. Waits until positioning on the robot axes is complete (within the tolerance range).

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.
DECCEL	Changes the deceleration rate parameter of the main group.
ORGORD	Sets the axis sequence parameter to perform return-to-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

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

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

RCX240/RCX240S



Standard accessories

Power connector + wiring connection lever



Model KAS-M5382-00

LCC140
TS-X
TS-P
SR1-X
SR1-P
RCX221
RCX222
RCX240/S
RCX340

Safety connector



Model KX0-M5163-00

RCX240/S

RPB terminator (dummy connector)

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



Model KAS-M5163-30

RCX221
RCX222
RCX240/S

Standard I/O (STD.DIO) connector



Model KX0-M533G-00

RCX240/S

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

Use to install the controller.



Model KX0-M410H-00

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

RCX240/S

Absolute battery

Battery for absolute data back-up.

Basic specifications

Item	Absolute battery
Battery type	Lithium metallic battery
Battery capacity	3.6V/2,750mAh
Data holding time	About 1 year ^{Note1} (in state with no power applied)
Dimensions	φ17 × L53mm
Weight ^{Note2}	22g



Model KAS-M53G0-11

Note 1. When using two batteries for each two axes.
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.

SR1-X
RCX222
RCX240/S

Important

Absolute battery installation conditions

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

SR1-X
RCX222
RCX240/S

See next page for optional parts

Options

L type stay (for side surface installation)

Use to install the controller.



Model KX0-M410H-10

RCX240/S

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

Programming box RPB/RPB-E

P.564

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

RCX240/S

Support software for PC VIP+

P.558

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

RCX240/S

Environment

OS	Microsoft Windows 2000 / XP / Vista (32bit / 64Bit) / 7 (32bit / 64Bit)
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 RCX series controller is required.
Applicable robot controllers	RCX221 / RCX222 / RCX141 / RCX142 / RCX240 / RCX240S

Note. Microsoft and Windows are registered trademarks of Microsoft Corporation.

Note. ADOBE and ADOBE READER are registered trademarks of Adobe Systems Incorporated.

Note. Ethernet is a registered trademark of Xerox Corporation.

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. 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

RCX221

RCX222

RCX240/S

RCX340

YC-Link board

Model KX0-M4400-A1

RCX240/S

Articulated robots YA	Linear conveyor modules LCM100	Compact single-axis robots TRANSEKO	Single-axis robots FLIP-X	Linear motor single-axis robots PHASER	Cartesian robots XY-X	SCARA robots YK-X	Pick & place robots YP-X	CLEAN	CONTROLLER	INFORMATION	Robot positioner	Pulse string driver	Robot controller	IV/V/V2 Electric grripper	Option
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RCX340

● Robot controller with advanced functions

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

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



RCX340

Main functions ▶ P.69



Programming box
▶ PBX/PBX-E
P.565



Support software for PC
▶ RCX-Studio Pro
P.561

■ Basic specifications

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

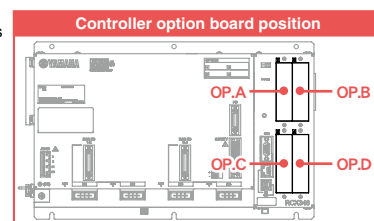
Controllable robot	XY-X P241	YK-X P369	FLIP-X P171	PHASER P217	YP-X P429			
CE marking		Field networks	 CC-Link	 DeviceNet	 EtherNet/IP	 Ethernet	 PROFIBUS	 PROFINET

Ordering method

RCX340							
Controller	No. of control-able axes	Safety standards	Controller option A (OP.A)	Controller option B (OP.B)	Controller option C (OP.C)	Controller option D (OP.D)	Controller option E (OP.E)
	4: 4 axes 3: 3 axes 2: 2 axes	N: Normal E: CE	No entry: Non-selection NS: STD.DIO(NPN) Note 1 Note 4 NE: EXP.DIO(NPN) Note 2 Note 4 PS: STD.DIO(PNP) Note 1 Note 4 PE: EXP.DIO(PNP) Note 2 Note 4 GR: Gripper TR: Tracking Note 5 YM1: YC-Link/E master Note 6 YS2 to 4: YC-Link/E slave Note 6 EP: EtherNet/IP™ Note 7 PB: PROFIBUS Note 7 CC: CC-Link Note 7 DN: DeviceNet™ Note 7 PT: PROFINET Note 7	No entry: Non-selection NE: EXP.DIO(NPN) Note 2 Note 4 PE: EXP.DIO(PNP) Note 2 Note 4 GR: Gripper TR: Tracking Note 5 YM1: YC-Link/E master Note 6 YS2 to 4: YC-Link/E slave Note 6 EP: EtherNet/IP™ Note 7 PB: PROFIBUS Note 7 CC: CC-Link Note 7 DN: DeviceNet™ Note 7 PT: PROFINET Note 7	No entry: Non-selection NE: EXP.DIO(NPN) Note 2 Note 4 PE: EXP.DIO(PNP) Note 2 Note 4 GR: Gripper TR: Tracking Note 5 YM1: YC-Link/E master Note 6 YS2 to 4: YC-Link/E slave Note 6 EP: EtherNet/IP™ Note 7 PB: PROFIBUS Note 7 CC: CC-Link Note 7 DN: DeviceNet™ Note 7 PT: PROFINET Note 7	No entry: Non-selection NE: EXP.DIO(NPN) Note 2 Note 4 PE: EXP.DIO(PNP) Note 2 Note 4 GR: Gripper TR: Tracking Note 5 YM1: YC-Link/E master Note 6 YS2 to 4: YC-Link/E slave Note 6 EP: EtherNet/IP™ Note 7 PB: PROFIBUS Note 7 CC: CC-Link Note 7 DN: DeviceNet™ Note 7 PT: PROFINET Note 7	No entry: Non-selection VY: iVY2 without light VL: iVY2 with light 4: 4 pcs. 3: 3 pcs. 2: 2 pcs. 1: 1 pc. 0: 0 pc.

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

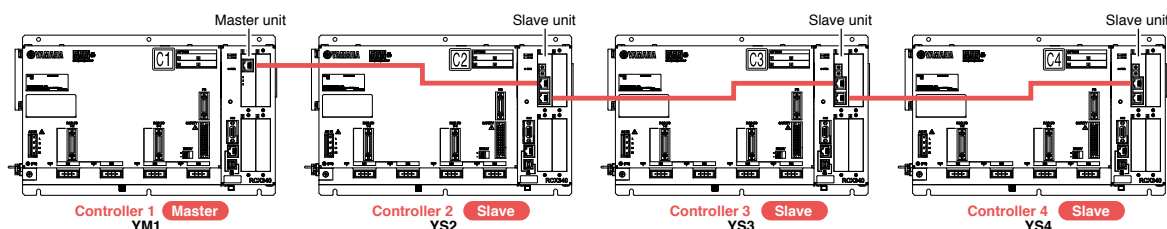
- Note 1. [STD.DIO] Parallel I/O board standard specifications
Dedicated input 8 points, dedicated output 9 points, general-purpose input 16 points, general-purpose output 8 points
Do not mix with field bus (CC/DN/PB/EP/PT).
- Note 2. [EXP.DIO] Parallel I/O board expansion specifications
General-purpose 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. Be careful not to mix NPN and PNP of DIO.
- Note 5. Only one tracking board can be selected.
- Note 6. Select only one master or slave board for YC-Link/E.
For details, refer to "YC-Link/E ordering explanation" below.
Additionally, when ordering YC-Link/E, please specify what robot is connected to what number controller.
- Note 7. Be careful not to mix field networks (CC/DN/PB/EP/PT).



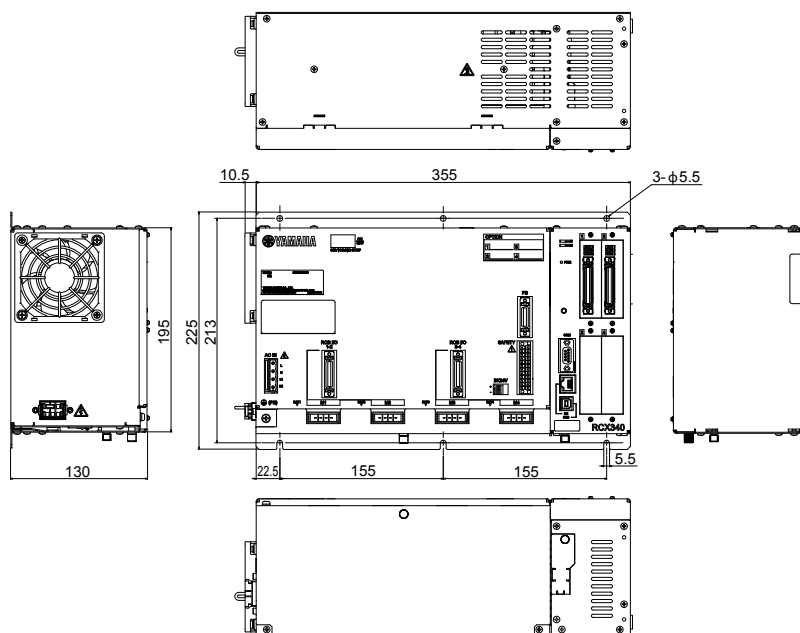
Item			RCX340
General specifications	Operating temperature		0 to 40°C
	Storage temperature		-10 to 65°C
	Operating humidity		35 to 85% RH (no condensation)
	Noise immunity		Conforms to IEC61000-4-4 Level 3
	Protective structure		IP20
	Appliance classes		Class I
Options	Option board	Parallel I/O board	Standard specifications Dedicated input 8 points, dedicated output 9 points General-purpose input 16 points, general-purpose output 8 points NPN/PNP specifications are selected. (maximum 1 board) Expansion specifications General-purpose input 24 points, general-purpose output 16 points NPN/PNP specifications are selected. (maximum 4 boards)
		CC-Link board Ver1.1/2.0	Remote I/O
		DeviceNet™ board	Dedicated input/output: 16 points each
		EtherNet/IP™ board	General-purpose input/output: 96 points each
		PROFIBUS board	Remote register
		PROFINET board	Input/output: 16 words each
	Tracking board	YC-Link/E board (master/slave)	Communication cycle: 1 ms, control cycle: minimum 1 ms / maximum 8 ms, maximum number of robot units: four units Maximum number of control axes: total 16 axes (including four master controller axes), maximum 12 axes for slaves only
		YRG (gripper) board	Position detection method: optical rotary encoder, minimum setting distance: 0.01 mm Speed setting: 20 to 100% relative to the maximum parameter speed, number of connected gripper units: maximum four units Drive power: DC 24V +/-10%, 1.0A Max
		Tracking board	Number of connected encoders: maximum two units, supported encoders: 26LS31/26C31 equivalent line driver (RS422 compliant) Encoder power supply: DC5V (2 counter (ch) total 500 mA or less) (supplied from controller)
	iVY2 unit		Camera pixels: maximum 2 million pixels, number of registered models: 254 models, number of connected cameras: maximum two units Power supply: DC24V +/-10% 1.5A Max
	Programming box		PBX, PBX-E
	Absolute battery		3.6V 2750mAh / axis Backup retention time: About 1 year
	Support software for personal computer		RCX-Studio Pro

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

YC-Link/E ordering explanation



■ Dimensions



■ Power supply capacity and heat emission

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

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

(1) When connected to SCARA robot

Robot type					Power capacity (VA)	Generated heat amount (W)
Standard type	Clean type	Dust-proof & drip-proof type	Ceiling-mount	Wall-mount / Inverse type		
YK120XG, YK150XG	—	—	—	—	300	58
YK180XG, YK180X YK220X	YK180XC, YK220XC	—	—	—	500	63
YK250XG, YK350XG YK400XG, YK500XGL YK600XGL, YK400XR	YK250XCH, YK350XCH YK400XCH, YK250XGC YK350XGC, YK400XGC YK500XGLC, YK600XGLC	YK250XGP, YK350XGP YK400XGP, YK500XGLP YK600XGLP	—	YK300XGS, YK400XGS	1000	75
—	YK500XC, YK600XC	—	—	—	1500	88
YK500XG, YK600XG 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 (VA)	Generated heat amount (W)
X axis	Y axis		
05	05	600	65
10	05	800	70
20	05	1100	78
10	10	1000	75
20	10	1300	83
20	20	1700	93

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

Axial current sensor value ^{Note}			Power capacity (VA)	Generated heat amount (W)
X axis	Y axis	Z axis		
05	05	05	700	68
10	05	05	900	73
20	05	05	1200	80
10	10	05	1000	75
20	10	05	1300	83
20	20	05	1600	90
10	10	10	1200	80
20	10	10	1500	88
20	20	10	1800	95
20	20	20	2000	100

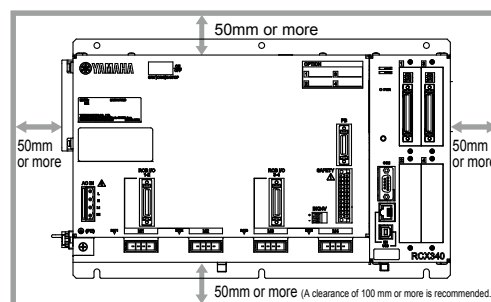
(4) When connected to 4 axis (Cartesian robot and/or multi-axis robot)

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

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

■ Installation conditions

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



■ Standard specification I/O connector signal list

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

■ Expanded specification I/O connector signal list

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

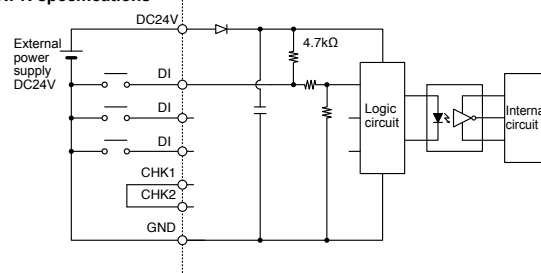
Note. The IDs are set using the parameter.

Standard specification I/O connector pin assignment lists

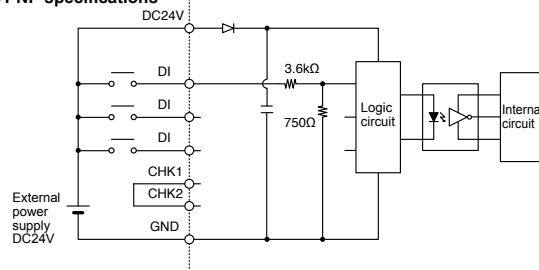
Pin	I/O No.	Name
1	DI01	Servo ON
2	DI10	SEQ enable
3	DI03	(Spare)
4	CHK1	Check input 1
5	DI05	(Spare)
6	DI06	STOP
7	DI07	(Spare)
8	DI20	General-purpose input
9	DI21	General-purpose input
10	DI22	General-purpose input
11	DI23	General-purpose input
12	DI24	General-purpose input
13	DI25	General-purpose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

Typical input signal connection

NPN specifications

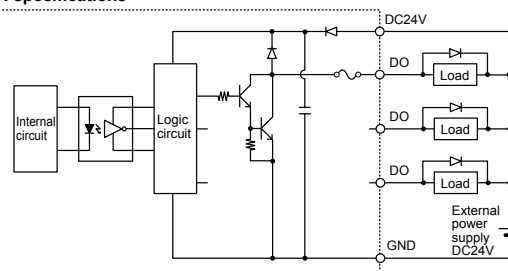


PNP specifications

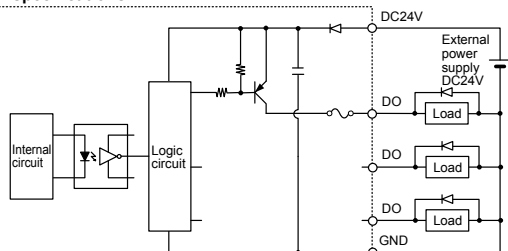


Typical output signal connection

NPN specifications



PNP specifications

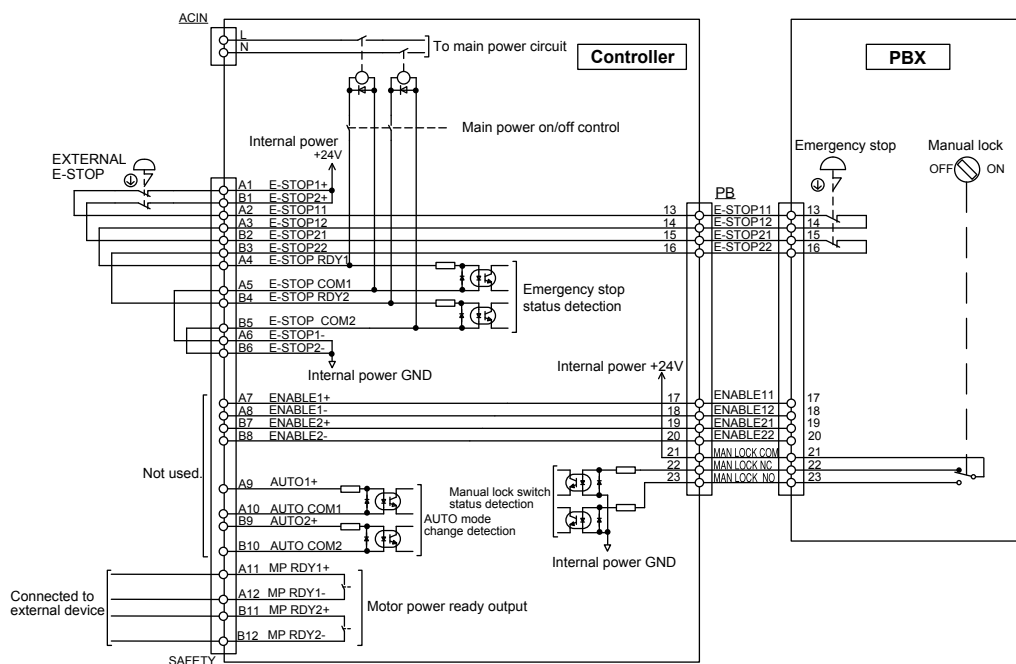


Basic functions

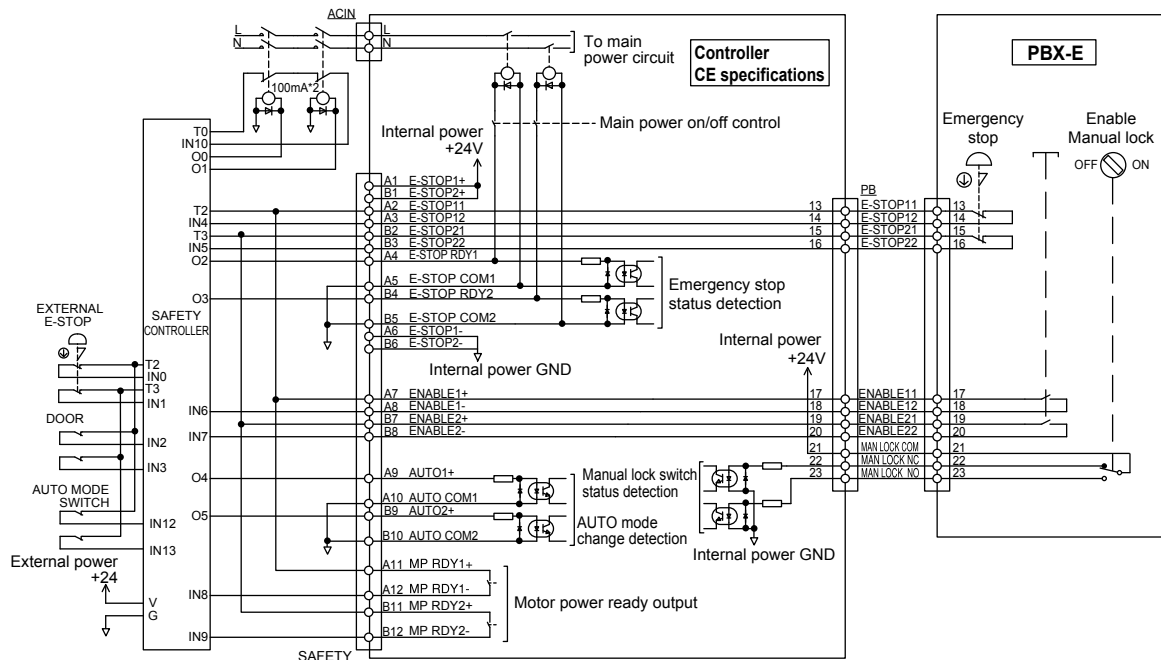
Function	Description
Operation modes	AUTO mode (Major functions: program creation, program execution, step execution, etc.) MANUAL mode (Major functions: jog movement, point data teaching, parameter editing, etc.)
Commands	Array declaration commands (DIM statement) Assignment commands (Numeric assignment,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

Emergency input signal connections

Connection example of controller with normal specifications and PBX



Connection example of controller with CE specifications and PBX-E



Robot Language Table

General commands

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

Arithmetic commands

Command	Description
ABS	Acquires the absolute value of a specified value.
ATN	Acquires the arctangent of the specified value.
ATN2	Acquires the arctangent of the specified X-Y coordinates.
COS	Acquires the cosine value of a specified value.
DEGRAD	Converts a specified value to radians ($\leftrightarrow$ 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. ($\leftrightarrow$ RSHIFT)
RADDEG	Converts a specified value to degrees. ($\leftrightarrow$ DEGRAD)
RSHIFT	Shifts a value to the right by the specified bit count. ($\leftrightarrow$ 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 ($\leftrightarrow$ VAL).
VAL	Converts the numeric value of a specified character string to an actual numeric value. ($\leftrightarrow$ 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. ($\leftrightarrow$ 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. ($\leftrightarrow$ JTOXY).

Branching commands

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

Error control

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

Program control

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

Task control

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

Robot operations

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

● Status acquisition

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

● Status change

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

● PATH control

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

● Torque control

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

● Input/output control

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

● Communication control

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

Articulated robots
YA

Linear/CONVEYOR
modules
LCM100

Compact
single-axis robots
TRANSERO

Single-axis robots
FLIP-X

Linear motor
single-axis robots
PHASER

Cartesian
robots
XX-X

SCARA
robots
YK-X

Pick & place
robots
YP-X

CLEAN

CONTROLLER

INFORMATION

Robot
positioner

Pulse string
driver

Robot
controller

IV/VII/V2
Electric
gripper

Option

Accessories and part options

RCX340



Standard accessories

Power connector + wiring connection lever



Model KAS-M5382-00

LCC140
TS-X
TS-P
SR1-X
SR1-P
RCX221
RCX222
RCX240/S
RCX340

Safety connector



Model KCX-M5370-00

RCX340

PBX terminator (dummy connector)

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



Model KAS-M5163-30

RCX221
RCX222
RCX240/S
RCX340

NPN / PNP connector



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

SR1-X
SR1-P
RCX340

Absolute battery

Battery for absolute data back-up.

Basic specifications

Item	Absolute battery
Battery type	Lithium metallic battery
Battery capacity	3.6V/2,750mAh
Data holding time	About 1 year ^{Note1} (in state with no power applied)
Dimensions	φ17 × L53mm
Weight ^{Note2}	22g



Model KCA-M53G0-01

Note 1. When using two batteries for each two axes.
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.

RCX340

Important Absolute battery installation conditions

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.

Dust cover for COM connector

Model KR7-M5395-10

RCX340

Dust cover for LAN connector

Model KCX-M658K-00

RCX340

Dust cover for USB connector

Model KCX-M658K-00

RCX340

Options

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



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

P.565

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



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

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

P.561

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



Model	RCX-Studio Pro (USB key included)	KCX-M4990-10	RCX340
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Note. Although it is possible to install this software on multiple PCs, the functionality is limited if there is no USB key (see table below).
Additional USB keys (additional licenses) are available at a special price. Please contact Yamaha for details.

- **Environment**

OS	Microsoft Windows XP / Vista (32/64bit) / 7 (32/64bit) / 8 (32/64bit) / 8.1 (32/64bit)
CPU	Intel® Core™ 2 Duo 2 GHz or higher is recommended
Memory	1 GB or more is recommended
Hard disk	80MB or more free space in the RCX-Studio Pro installation destination
Communication port	Communication cable: serial communication port, Ethernet, or USB port USB key: USB port (one port)
Display	1024×768 or higher resolution, 256 colors or higher
Other	CD-ROM drive Dedicated communication cable (for D-Sub or for USB) Ethernet cable (category 5 or higher)
Applicable robot controllers	RCX340

Note. Microsoft, Windows, Windows XP, Windows Vista, Windows 7, Windows 8 and Windows 8.1 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.

Functional limitations depending on USB key presence

Function	USB key present	USB key absent
Connecting to the controller	○	×
Saving the file data	○	×
Emulator function	○	○
Real Time Trace	○	△ Emulator only
Cycletime Calculator	○	×
iVY2 editor	○	×
Data Difference	○	△ Except data saving

- **Data cables**

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



Model	USB type (5m)	KBG-M538F-00	LCC140
	D-Sub type 9pin-9pin (5m)	KAS-M538F-10	ERCD

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.

SR1-X
SR1-P
RCX221
RCX222
RCX240/S
RCX340

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

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

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

Model	KCX-M6479-10	RCX340
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Articulated robots
YA
Linear conveyor modules
LCM100
Compact single-axis robots
TRANSEVO
Simple-axis robots
FLIP-X
Linear motor single-axis robots
PHASER
Cartesian robots
XX-X
SCARA robots
YK-X
Pick & place robots
YP-X
CLEAN
CONTROLLER
INFORMATION
Robot positioner
Pulse string driver
Robot controller
iVY/VY2 Electric gripper
Option

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	P492
TS-P	
TS-SD	P502

■ 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.

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

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

Turns ON or OFF the operation point monitoring.

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

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

Shows the current position at real-time.

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

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

2 Real-time trace

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.

Traces data at real-time.

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.

I/O status monitor panel

Detailed status monitor panel

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.

Point data list

Operation setting list

Result display list

Displays the detailed simulation results graphically.

■ TS-Manager



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

■ TS-Manager environment

OS	Microsoft Windows 2000/XP/Vista (32bit/64bit)/7 (32bit/64bit)
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-S2/TS-SH/TS-X/TS-P/TS-SD

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.



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

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.

Articulated robots
YA

Linear CONVEYOR
modules
LCM100

Compact
single-axis robots
TRANSEVO

Single-axis robots
FLIP-X

Linear motor
single-axis robots
PHASER

Cartesian
robots
XV-X

SCARA
robots
YK-X

Pick & place
robots
YP-X

CLEAN

CONTROLLER

INFORMATION

Robot
positioner

Pulse string
driver

Robot
controller

IV/VN/VZ
Electric
gripper

Option

Option details

Support software for PC

POPCOM+

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



▼Applicable controllers

LCC140	P486
ERCD	P512
SR1-X	P518
SR1-P	

■ Features

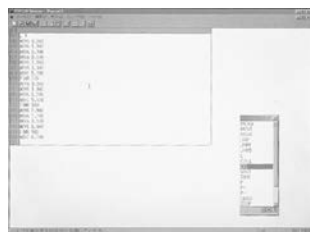
1 Easy to use

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



2 Program editing

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



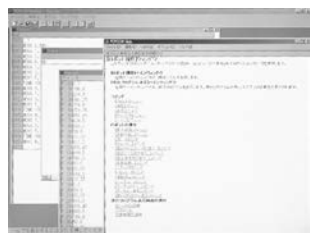
3 Point editing

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



4 Help function

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



5 Robot operation

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

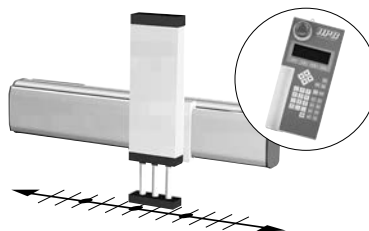


6 Creating point data

There are three methods available for creating the point data.

● MDI (Manual Data Input) teaching

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



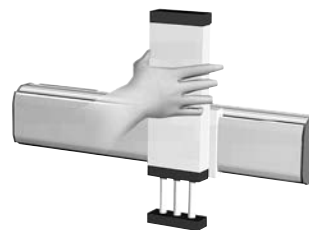
● Remote teaching

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



● Direct teaching

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



■ PC supporting software POPCOM+



POPCOM+ software model | KBG-M4966-00

■ POPCOM+ environment

OS	Microsoft Windows XP / Vista (32bit/64bit) / 7 (32bit/64bit) / 8,8.1 (32bit/64bit)
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/ERCX/DRCX/TRCX/SRCP/SRCD/ERCD/SR1/LCC140 ^{Note 1}

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

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

■ Data cables (5m)

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



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

LCC140	ERCD
SR1-X	SR1-P
RCX221	RCX222
RCX240/S	RCX340

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.

■ 9Pin-25Pin converter adapter

This is an adapter for converting the female D-sub25Pin to a female D-sub9Pin.
This adapter is needed if using the ERCX and DRCX.



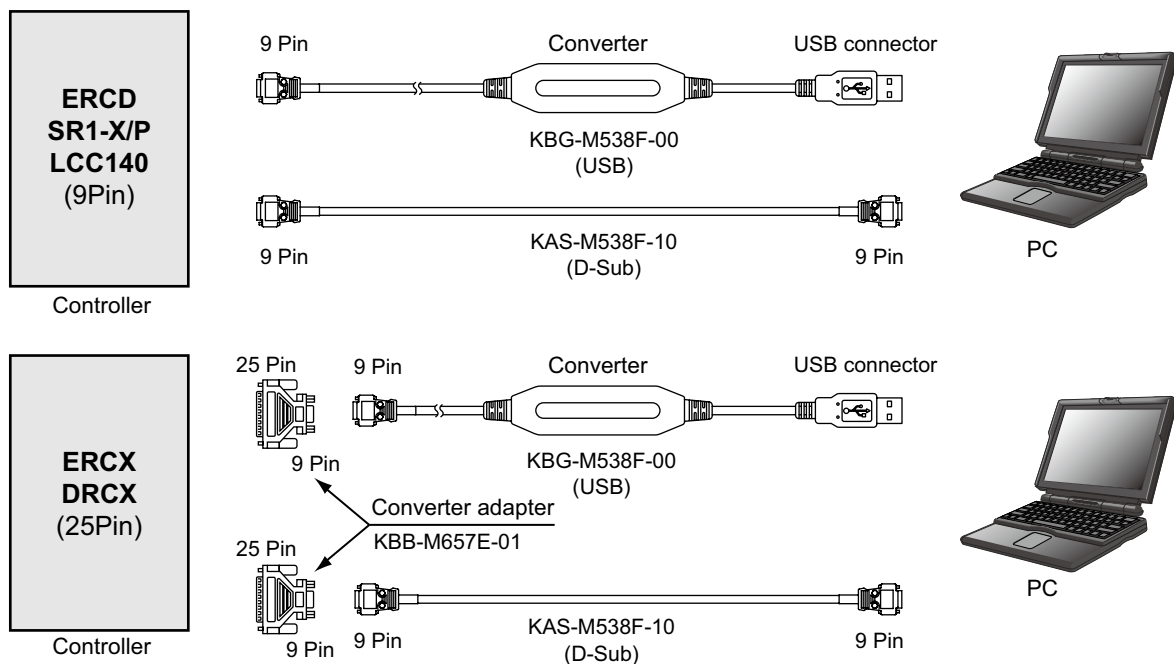
Model | KBB-M657E-01

Note. It is unnecessary when using ERCD or SR1-X, SR1-P.

■ Controller & data cable / converter adapter matchup table

Controller	ERCD SR1-X/SR1-P LCC140 (9Pin)	ERCX DRCX (25Pin)
Data cables		
[9Pin-9Pin cable] • KAS-M538F-10 (SSC-2-5L)	Needs no converter adapter	9Pin-25Pin converter adapter KBB-M657E-01

■ Controller and data cable connection diagrams



Option details

Support software for PC

VIP+ Windows

Visual Integrated Programming

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.



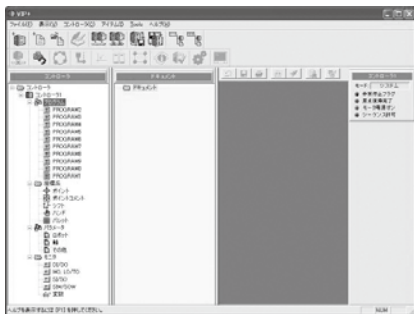
▼Applicable controllers

RCX221	P.526
RCX222	
RCX240	P.534
RCX240S	

■ 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.



2 Data displayed in the tree view form

The data included in the controller is displayed legibly.



3 Fully equipped tool bar

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



4 Expanded monitor function

The I/O conditions 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 input/output and others.

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.



Select the data to be stored.

Drag the selected data to the document window and drop it there.

Specify the file name and this completes the storage procedure.

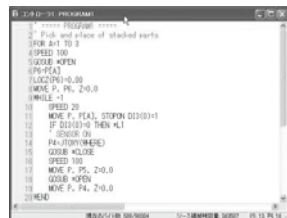
6 Input the data in the work sheet form (Parameter, Point data)

It is also possible to copy and paste the data from the other spread sheet (chart calculation software).



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.



8 Program execution monitor

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



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

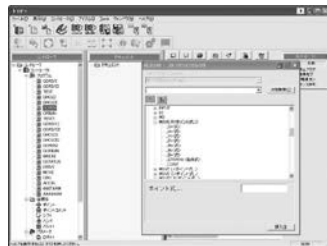
1 Easy to use

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



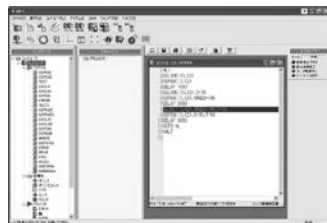
2 Programming editing

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.



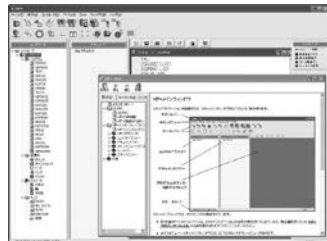
3 Data check function

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



4 Help function

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



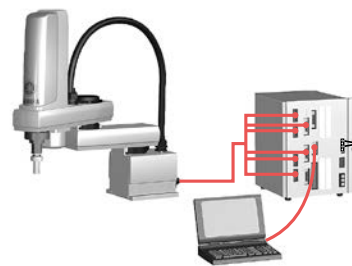
5 Robot operation

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



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.

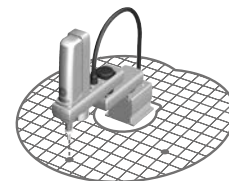


7 Creating point data

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.



● 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.

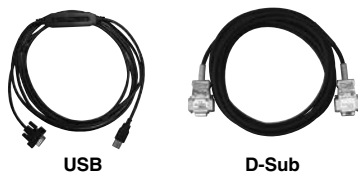
Support software for PC VIP+



Model	KX0-M4966-00
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Data cables (5m)

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



USB

D-Sub

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

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.

Environment

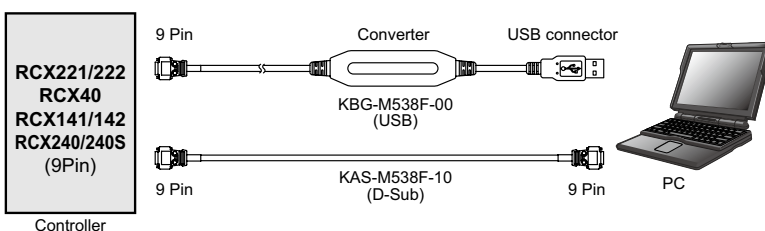
OS	Microsoft Windows 2000 / XP / Vista (32bit / 64Bit) / 7 (32bit / 64Bit)
CPU	Processor that meets or exceeds the suggested requirements for the OS being used.
Memory	Suggested amount of memory or more for the OS being used.
Hard disk	40MB of available space required on installation drive.
Communication method	RS-232C, Ethernet
Applicable robot controllers	RCX221 / RCX222 / RCX141 / RCX142 / RCX240 / RCX240S

Note. Microsoft and Windows are registered trademarks of Microsoft Corporation.

Note. ADOBE and ADOBE READER are registered trademarks of Adobe Systems Incorporated.

Note. Ethernet is a registered trademark of Xerox Corporation.

Controller and data cable connection diagrams

Articulated robots
VALinear / conveyor
modules
LCM100Compact
single-axis robots
TRANSEVOSingle-axis robots
FLIP-XLinear motor
single-axis robots
PHASERCartesian
robots
XX-XSCARA
robots
YK-XPick & place
robots
YP-X

CLEAN

CONTROLLER

INFORMATION

Robot
positionerPulse string
driverRobot
controllerIV/V/V2
Electric
gripper

Option

Option details

Support software for PC

RDV-Manager

▼Applicable controllers

**RDV-X
RDV-P**

P.506

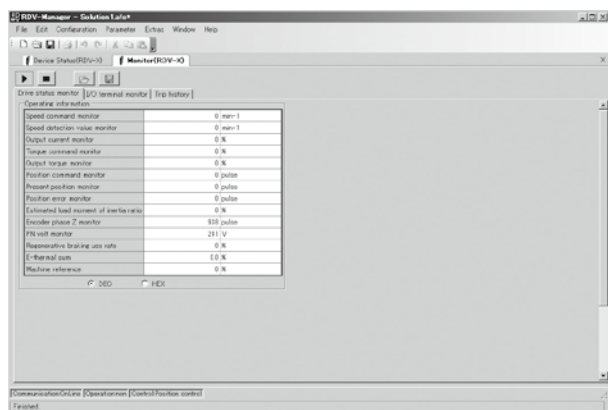
RDV-Manager is software for RDV-X/RDV-P. Using the Windows operating computer, it is possible to set parameters, to monitor the position, speed and torque and to have graphics displayed, assuring pleasant and easy operation in the Windows Vista, Windows 7 or Windows 8 / Windows 8.1 environment.



Features

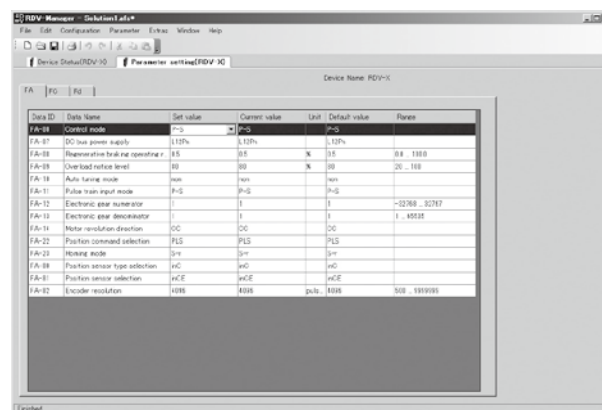
1 Monitoring function

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



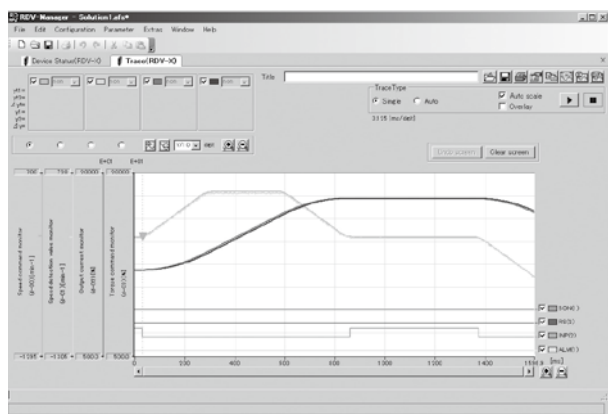
2 Setting parameters

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



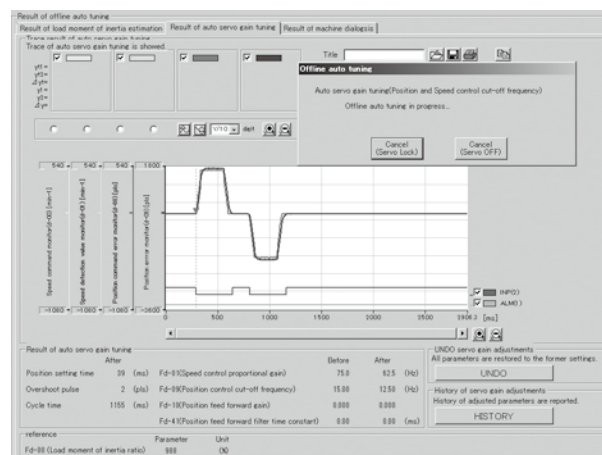
3 Operation tracing function

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



4 Offline auto tuning function

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



Support software RDV-Manager

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



Model KEF-M4966-00

Environment

OS	Microsoft Windows Vista(32bit) Note 1 / 7(32bit/64bit) / 8, 8.1(32bit/64bit)
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-X / RDV-P

Note 1. SP1 (service pack 1) or higher.
Note. Windows Vista, Windows 7, and Windows 8 / Windows 8.1 are trademarks of Microsoft Corporation registered in U.S.A. and other countries.

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

Communication cable to connect PC and a controller.



Model KEF-M538F-00

Support software for PC

RCX-Studio Pro

▼Applicable controllers

RCX340

P.544

This is dedicated support software for the RCX340 controller.
It is a further advance in ease-of-use over the previous RCX-Studio.
Emulator functionality is also provided, contributing to full-scale system startup.



Features

1 Evaluation

● Emulator function provided

By operating the controller on a PC, programs can be created and debugged even without a controller.
Cycle time can also be calculated, greatly reducing the time for software design.

● Cycle time calculator

Cycle time between two points can be easily calculated in two steps.
Choosing a model is easily done; simply select a model and enter the position.



2 Design

● Easy-to-use operation allows speedy setup

Program entry support functionality is provided.
Program editing and data editing.

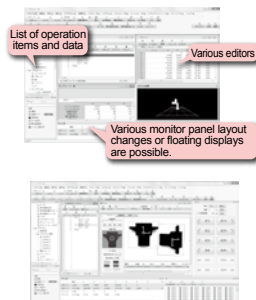
● Inter-operation with other manufacturer's line simulators

Software made by other companies can be connected to the emulator of the RCX-Studio Pro, allowing checking for interference between robots in the facility.

Note. Software made by other companies is provided by the customer.

● iVY2 editor provided

Integration of iVY2 Studio makes it unnecessary to switch between software; this improves productivity.



3 After installation

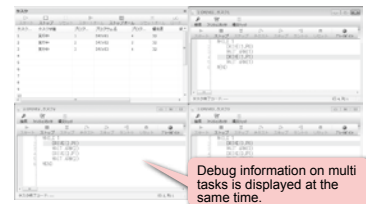
● Realtime trace

Continuous output of the controller's internal data allows the status to be checked at any time.
Even if no measuring device is present, the current waveform can be obtained for peace of mind.



● Application debugging function

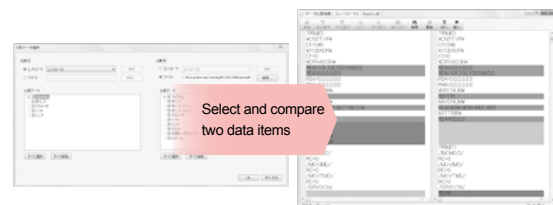
Debugging information for multiple tasks can be displayed simultaneously.



4 Maintenance

● Data comparison tool

Two specified data items can be compared, and the difference shown.
Comparison of entire ALL files and comparison of individual programs is also possible.
Direct comparison with online data is also possible, greatly shortening the time required for maintenance tasks.



RCX-Studio Pro software



USB key (Dongle)

Model	RCX-Studio Pro (USB key included)	KCX-M4990-10
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Note. Although it is possible to install this software on multiple PCs, the functionality is limited if there is no USB key (see P.553).
Additional USB keys (additional licenses) are available at a special price. Please contact Yamaha for details.

Environment

OS	Microsoft Windows XP / Vista (32/64bit) / 7 (32/64bit) / 8 (32/64bit) / 8.1 (32/64bit)
CPU	Intel® Core™ 2 Duo 2 GHz or higher is recommended
Memory	1 GB or more is recommended
Hard disk	80MB or more free space in the RCX-Studio Pro installation destination
Communication port	Communication cable: serial communication port, Ethernet, or USB port USB key: USB port (one port)
Display	1024×768 or higher resolution, 256 colors or higher
Other	CD-ROM drive Dedicated communication cable (for D-Sub or for USB) Ethernet cable (category 5 or higher)
Applicable robot controllers	RCX340

Note. Microsoft, Windows, Windows XP, Windows Vista, Windows 7, Windows 8 and Windows 8.1 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 (5m)

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



USB



D-Sub

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

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

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

LCC140	ERCD
SR1-X	SR1-P
RCX221	RCX222
RCX240/S	RCX340

Option details

Handy terminal

HT1/HT1-D

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

▼Applicable controllers

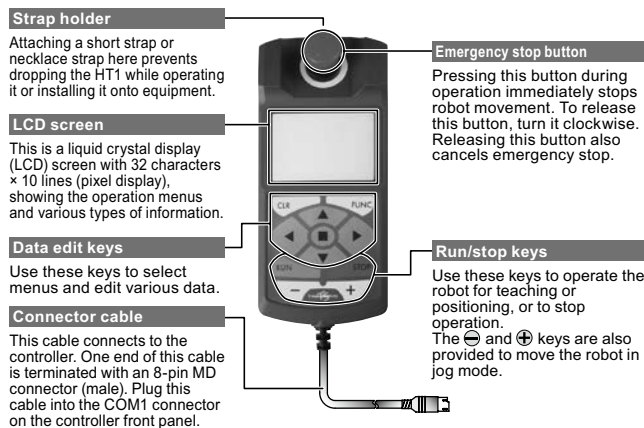
TS-S2
TS-SH
TS-X
TS-P

P492

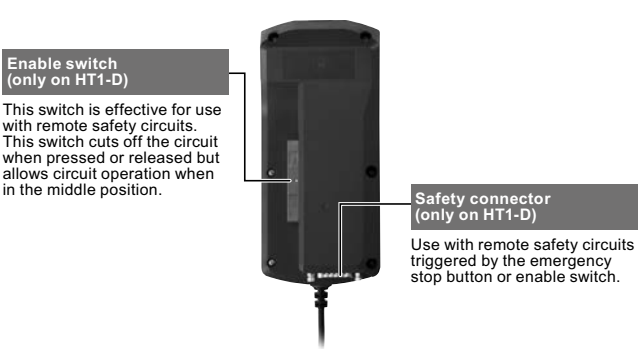
■ HT1 / HT1-D basic specifications

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

■ Part names and function



■ HT1-D rear side



Programming box

HPB/HPB-D

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

▼Applicable controllers

LCC140 **P.486**ERCD **P.512**SR1-X **P.518**
SR1-P

■ HPB / HPB-D basic specifications

Name	HPB	HPB-D
External view		
Model	Using with ERCD, SR1-X, SR1-P Using with ERCX, SRCP30, DRCX	KBB-M5110-01 (without a conversion adaptor) KBB-M5110-0A (with a conversion adaptor) KBB-M5110-21 (without a conversion adaptor) KBB-M5110-2A (with a conversion adaptor)
Display	LCD (20characters × 4 lines)	
Emergency stop button	Normally closed contact point (with lock function)	
Enable switch	–	3-position
CE marking	Not supported	Applicable
Memory back-up device	SD Memory card	
Operating temperature	0°C to 40°C	
Operating humidity	35% to 85%RH (non-condensing)	
Dimensions	W107 × H230 × D53mm (Strap holder, emergency stop button not included.)	
Weight	650g	
Cable length	3.5m	

■ Part names and function

Emergency stop button

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

Liquid crystal display

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

Connector cable

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

Strap hole

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

SD memory card connector

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

Operation keys

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

■ HPB-D rear side

Safety connector (HPB-D only)

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

3-position enable switch (HPB-D only)

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

■ A conversion adapter for HPB

The adapter converts from 25 pins to 9 pins. If the HPB was ordered along with a converter adapter then this adapter comes packed along with the unit.



Model KBB-M657E-01

Note. It is unnecessary when using ERCD or SR1-X, SR1-P.

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.526

RCX240
RCX240S

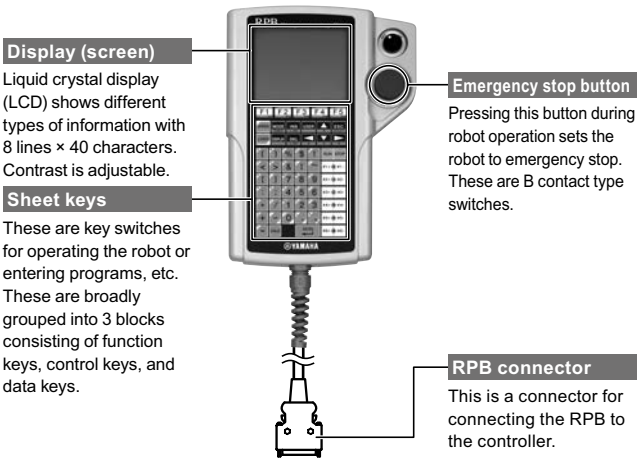
P.534

Customers using the RCX141 / RCX142 controllers should use the connector converter cable (See P.605.)

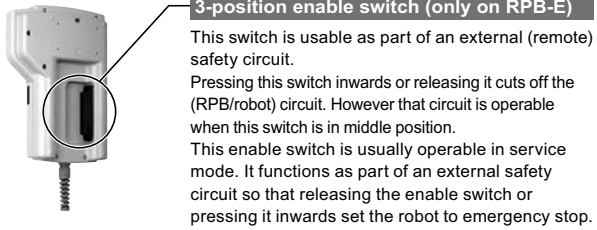
■ RPB / RPB-E basic specifications

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 stop button not included.)	
Weight	600g	
Cable length	5m (Standard), 12m (Options)	

■ Part names and function



■ RPB-E rear side



Programming box

PBX/PBX-E

▼Applicable controllers

RCX340

P.544

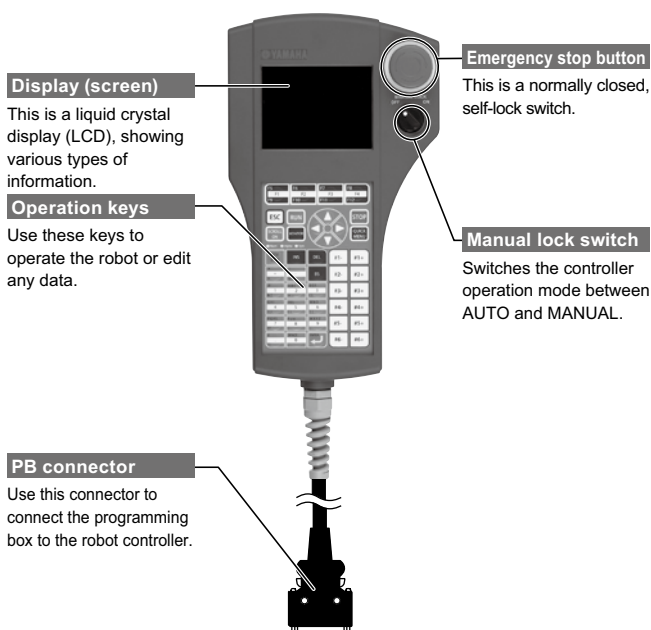
This programming box is applicable to three languages, “Japanese”, “English”, and “Chinese”. Use of a color display makes it possible to improve the visibility. Work to add or edit functions becomes easy, allowing even personnel without programming skill to operate this programming box.

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

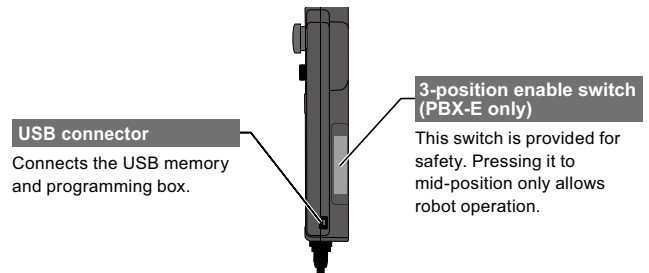
■ PBX/PBX-E basic specifications

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

■ Part names and function



■ PBX-E rear side



■ Display language switching USB for PBX

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

Option details

LCD Monitor option

TS-Monitor

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

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

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

▼Applicable controllers

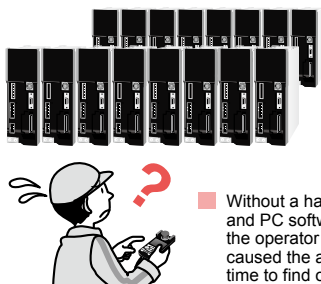
TS-X
TS-P

P492



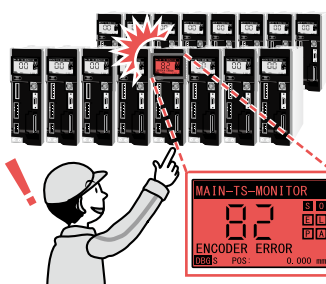
The TS Monitor Advantage

Before installing TS Monitor



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

After installing TS-Monitor



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

Features

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

Error

Desired character string specified by the user.

Simple status display
■ ON / □ OFF

Run mode

Current position
DBGS POS: 0.000 mm

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

Alarm occurs.

Error or warning alarm number

Alarm name

DBGS POS: 0.000 mm

Simple status display

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

Run mode

Display	Meaning
NRM	Normal mode
MON	Monitor mode
DBG	Debug mode

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

I/O

IN: F E D C B A 9 8 7 6 5 4 3 2 1 0

OUT: F E D C B A 9 8 7 6 5 4 3 2 1 0

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

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

Bit signal correspondence table

	F	E	D	C	B	A	9	8
IN	SERVO	RESET	START	LOCK	ORG	MANUAL	JOG	JOG+
	7	6	5	4	3	2	1	0
	PIN7	PIN6	PIN5	PIN4	PIN3	PIN2	PIN1	PIN0
	F	E	D	C	B	A	9	8
OUT	SRV-S	ALM	END	BUSY	OUT3	OUT2	OUT1	OUT0
	7	6	5	4	3	2	1	0
	POUT7	POUT6	POUT5	POUT4	POUT3	POUT2	POUT1	POUT0

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

INFORMATION

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

Controller name

Controller software version

Robot name

Point type

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

STATUS

SRV-S □ E-STOP
ORGSEN □ P-BLK
TLM-S □ ORG-S
MOVE □ WARN

Status display
■ ON, □ OFF

Status display

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

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

CHECK

VOLT: 270.0 V
TEMP: 36 °C
TIME: 4:01:23
DIST: 15.827 km

Internal voltage of controller

Temperature inside controller

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

Total movement distance of robot

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

RUN

POS: 500.000 mm
SPD: 600.00 mm/s
LOAD: 69 %

Run type

Robot current position

Run point

Robot operation speed

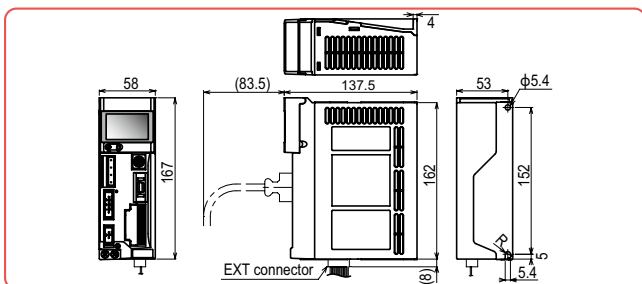
Load rate

Run type

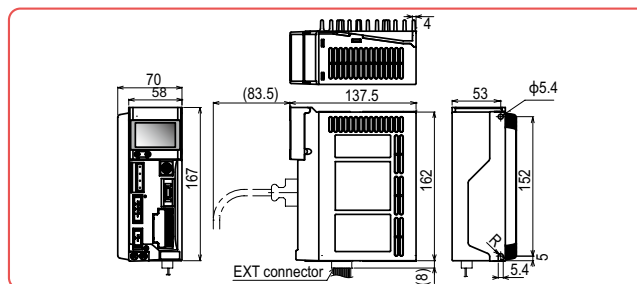
Display	Meaning
HOLD	Servo is off or robot is stopping
ABS	ABS
INC	INC
ABS MERGE	ABS merge operation
INC MERGE	INC merge operation
ABS PUSH	ABS push operation
INC PUSH	INC push operation
ABS → PUSH	ABS deceleration push operation
INC → PUSH	INC deceleration push operation
ORG	Return-to-origin

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

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



● TS-X/TS-P (220) with TS-Monitor



TS-Monitor basic specifications

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

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

Touch operator interface

Pro-face

GP4000 series

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

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

▼Applicable controllers

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

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■ Features

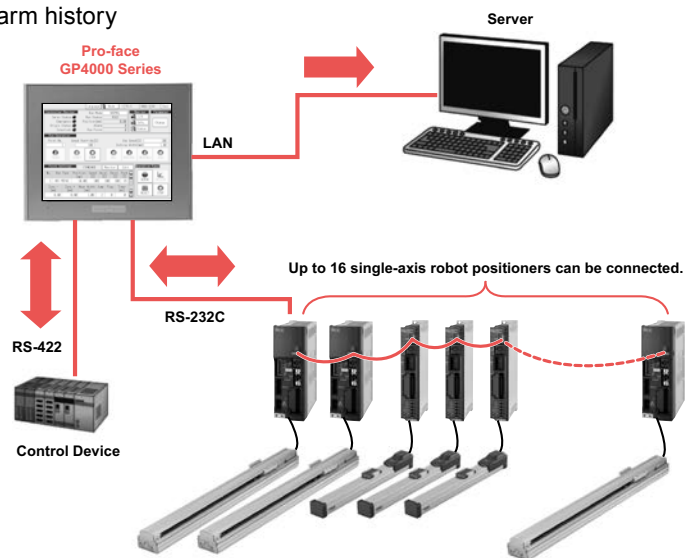
1 Can easily check a state and change settings.

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

2 Supports 3 languages

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

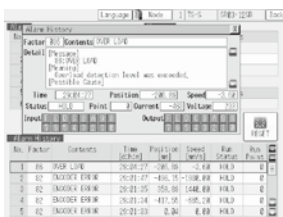
Without opening the control panel, you can check the status and change the settings on Touch Operator Interface alone.



■ Screen details

Diagnostic Screen

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



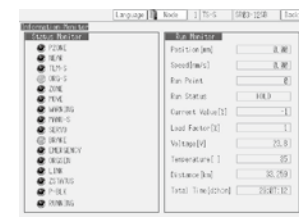
I/O Monitor Screen

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



Information Monitor Screen

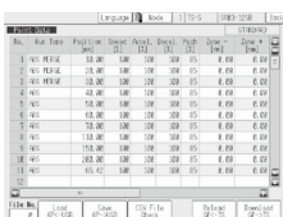
The screen can display the robot status and the operation status. You can check immediately the robot condition.



Position Data Editing Screen

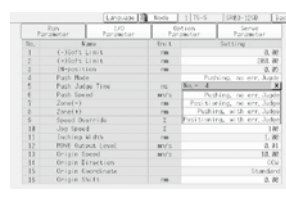
You can edit and back up point data (255 points).

Note. Settings for it and a USB storage required.



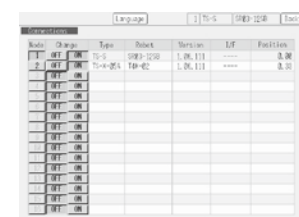
Parameter Editing Screen

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



Connecting Selection Screen

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



Contact; Pro-face TEL:06-6613-1101 FAX:06-6613-5888

Option details

Field network system with minimal wiring

NETWORK

LCC140

P.486

■ CC-Link Basic specifications for network modules

Item	Network modules 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 modules

Item	Network modules DeviceNet™
Applicable controllers	LCC140
Applicable DeviceNet™ specifications	Volume 1 Release2.0 Volume 2 Release2.0
DeviceNet™ Conformance test	Compliant with CT24
Device profile / Device type number	Generic Device (keyable) / 2B Hex
Vendor name/Vendor ID	YAMAHA MOTOR CO.,LTD. / 636
Product code	21
Product revision	1.0
EDS file name	Yamaha_LCC1(DEV).eds
MAC ID setting	0 to 63 (Set using HPB or POPCOM+.)
Communication speed setting	500K/250K/125Kbps (Set using HPB or POPCOM+.)
Communication data	Predefined Master/Slave Connection Set: Group 2 only server Dynamic connection support (UCMM): None Support for divided transmission of explicit message: Yes
Network length	Total length 100m/500Kbps, 250m/250Kbps, 500m/125Kbps Branch length/Total branch length 6m or less/39m or less, 6m or less/78m or less, 6m or less/156m or less
Monitor LED	None
Number of DeviceNet™ I/O points/ number of occupied channels	General-purpose input 32 points, General-purpose output 32 points Dedicated input 16 points, Dedicated output 16 points Input register 8 words Output register 8 words
	Input: 24byte Output: 24byte

■ EtherNet/IP Basic specifications for network modules

Item	Network modules EtherNet/IP™
Applicable controllers	LCC140
Applicable software version	LCC140: Ver. 64.07 or higher HPB/HPB-D: Ver. 24.06 or higher POPCOM+: Ver. 2.1.0 or higher
Applicable EtherNet/IP™ specifications	Volume 1: Common Industrial protocol(CIP™) Edition 3.14 Volume 2: EtherNet/IP™ Adaptation of CIP Edition 1.15
EtherNet/IP™ Conformance test	Compliant with CT11
Device profile/Device type number	Generic Device (keyable) / 2B Hex
Vendor name/Vendor ID	YAMAHA MOTOR CO.,LTD. / 636
Product code	23
Product revision	1.1
EDS file name	Yamaha_LCC1(EIP2).eds
Communication speed	10Mbps / 100Mbps
Connector specifications	RJ-45 connector (8-pole modular connector), 2 ports
Applicable cable specifications	STP cable (double shield) with CAT 5e or higher
Maximum cable length	100m
Monitor LED	Module Status(MS), Network Status(NS), Link/Activity: Port1-2
Number of EtherNet/IP™ I/O points/ number of occupied channels	General-purpose input 32 points, General-purpose output 32 points Dedicated input 16 points, Dedicated output 16 points Input register 8 words Output register 8 words
	Input: 24byte Output: 24byte

Field network system with minimal wiring

NETWORK

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

P.492

 Basic specifications for network modules

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

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

 Basic specifications for network modules

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

 Basic specifications for network modules

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

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

 Basic specifications for network modules

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

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

Option details

Field network system with minimal wiring

NETWORK

SR1-X/SR1-P

P518

CC-Link

Basic specifications for network modules

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

Note 1. Controller I/Os are updated every 10ms.

Note 2. These values apply when a cable that supports CC-Link Ver 1.10 is used.

DeviceNet

Basic specifications for network modules

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

Note 1. Inputs / Outputs are 12ch each when using SR1-P / SR1-X with extension model.

Note 2. Controller I/Os are updated every 10ms.

Note 3. General Inputs / Outputs are 32 each when using SR1-P / SR1-X with extension model.

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

PROFIBUS

Basic specifications for network modules

Item	Network modules PROFIBUS
Applicable controllers	ERCX / SR1-P / S R1-X / SRCP30 / DRCX
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.

Ethernet

Basic specifications for network modules

Item	Network modules Ethernet
Applicable controllers	ERCX / SRCP30 / DRCX
Network specification	As specified for Ethernet (IEEE802.3)
Connector specification	RJ-45 connector (8-pole modular connector) 1 port
Baud rate / Communication mode	10Mbps (10BASE-T) / 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 HPB / HPB-D
Monitor LED	Run, Collision, Link, Transmit, Receive

Field network system with minimal wiring

NETWORK

RCX221/RCX222 P.526 RCX240/RCX240S P.534 RCX340 P.544

CC-Link Basic specifications for network modules

Item	Network modules CC-Link
Applicable controllers	RCX221 / RCX222 / RCX240 / RCX240S / 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 (set from the Rotary switch on board)
Communication speed setting	10Mbps, 5Mbps, 2.5Mbps, 625Kbps, 156Kbps (set from the Rotary switch on board)
No. of CC-Link I/O ^{Note1}	General input 96 points, General output 96 points, Dedicated input 16 points, Dedicated output 16 points
Parallel external I/O ^{Note2}	A function that simulates serial communication enables individual control of the various points from a master sequencer, regardless of the robot program.
Shortest distance between nodes ^{Note3}	0.2 m or more
Overall length ^{Note3}	100m/10Mbps, 150m/5Mbps, 200m/2.5Mbps, 600m/625Kbps, 1200m/156Kbps
Monitor LED	RUN, ERR, SD, RD

Note 1. Controller I/Os are updated every 10ms.

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.

DeviceNet Basic specifications for network modules

Item	Network modules DeviceNet™
Applicable controllers	RCX221 / RCX222 / RCX240 / RCX240S / RCX340
Applicable DeviceNet™ specifications	Volume 1 Release2.0 / Volume 2 Release2.0
Device Profile Name	Generic Device (device number 0)
Number of occupied CH ^{Note1}	Normal: Input/output 24ch each, Compact: Input/output 2ch each
MAC ID setting	0 to 63
Transmission speed setting	500Kbps, 250Kbps, 125Kbps (set using DIP switch on board)
DeviceNet™ I/O ^{Note2}	Normal: General input 96 points, General output 96 points, Dedicated input 16 points, Dedicated output 16 points Compact: General input 16 points, General output 16 points, Dedicated input 16 points, Dedicated output 16 points
Parallel external I/O ^{Note3}	The master module and up to four ports can be controlled regardless of the robot program by using the pseudoserialization function.
Network length ^{Note4}	Overall length: 100m/500Kbps, 250m/250Kbps, 500m/125Kbps Branch length / Overall branch length: 6m max./39m max., 6m max./78m max., 6m max./156m max.
Monitor LED	MS (Module Status), NS (Network Status)

Note 1. Use the robot parameter to select Normal or Compact. However, with the controllers earlier than Ver.9.08 of RCX221 / 222, this selection is not available and the setting remains the same as Normal.

Note 2. Controller I/Os are updated every 10ms.

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.

PROFIBUS Basic specifications for network modules

Item	Network modules PROFIBUS
Applicable controllers	RCX221 / RCX222 / RCX240 / RCX240S / 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 input 16 points, Dedicated output 16 points
Parallel external I/O ^{Note2}	The master module and up to four ports can be controlled regardless of the robot program by using the pseudoserialization function.
Overall length	100m/3M-6M-12Mbps, 200m/1.5Mbps, 400m/500Kbps, 1000m/187.5Kbps, 1200m/9.6K-19.2K-93.75Kbps
Monitor LED	RUN, ERR, SD, RD, DATA-EX

Note 1. 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.

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 Basic specifications for network modules

Item	Network modules Ethernet
Applicable controllers	RCX221 / RCX222 / RCX240 / RCX240S / 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 / IP 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

Option details

Field network system with minimal wiring

NETWORK

RCX240/RCX240S P.534 RCX340 P.544

■ EtherNet/IP™ Basic specifications for network modules

Item	Network modules EtherNet/IP™		
Controller model	RCX240 / RCX240S / RCX340		
Software version	HOST : Ver.10.64 or higher VIP+ : Ver.2.5.0 or higher		
Network specifications	Conforms to Ethernet (IEEE 802.3).		
Applicable EtherNet/IP™ specifications	Volume 1 : Common Industrial protocol (CIP™) Edition 3.8 Volume 2 : EtherNet/IP™ Adaptation Edition 1.9		
Device type	Generic Device (Device No. 43)		
Data size	48 bytes each for input/output		
Transmission speed	10 Mbps/100 Mbps		
Connector specifications	RJ-45 connector (8-pole modular connector) 1 port		
Cable specifications	Refer to "4.1. LAN cable" in Chapter 2 of this user's manual.		
Max. cable length	100 m		
EtherNet/IP™ input/output points Note	Input (48 bytes in total)	byte 0-3	Dedicated word input : 2 words
		byte 4-31	General purpose word input : 14 words
	Output (48 bytes in total)	byte 32-33	Dedicated bit input : 16 points
		byte 34-47	General-purpose bit input : 96 points
		byte 0-3	Dedicated word output : 2 words
		byte 4-31	General-purpose word output : 14 words
		byte 32-33	Dedicated bit output : 16 points
		byte 34-47	General-purpose bit output : 96 points
Parallel external input	Regardless of the robot program, the master module and up to four ports can be controlled using the emulated serialization function.		
Settings, such as IP address	The settings are made with the programming box (RPB) or VIP+ (via a COM port or telnet).		
Monitor LEDs	Activity, Network Status, Link, Module Status		
CPU BOARD ASSY	KX0-M4210-2XX (Refer to "3. Installing into the robot controller" in Chapter 1 of this user's manual.)		

Note. Controller's I/O update intervals are 10 ms at shortest, but actual I/O update intervals may vary depending on the update time for the master station.

NETWORK

RCX340

P.544



Basic specifications for network modules

Item	Network modules PROFINET	
Applicable controllers	RCX340	
Supported software versions	RCX340 : V1.21 or later PBX/PBX-E : V1.08 or later RCX-Studio : V1.0.1 or later	
Network specification conformance	PROFINET IO V2.2	
Conformance class	Conformance Class B / IO Device	
Vendor Name / Vendor_ID	YAMAHA MOTOR CO.,LTD. / 0x02D5	
Station Type / Device_ID	YAMAHA RCX3 PROFINET / 0x0001	
Product revision	1.00	
GSD file name	GSDML-V2.3-YMC-RCX3-20150203.xml	
Transmission speed	100Mbps (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	100m	
Monitor LEDs	Module Status(MS), Network Status(NS), Link/Activity:Port1-2	
Input/output data size	Input : 48bytes	Dedicated word input 2 words (4 bytes)
		General-purpose word input 14 words (28 bytes)
		Dedicated bit input 16 bits (2 bytes)
		General-purpose bit input 96 bits (12 bytes)
		Reserved area 2 bytes
	Output : 48bytes	Dedicated word output 2 words (4 bytes)
		General-purpose word output 14 words (28 bytes)
		Dedicated bit output 16 bits (2 bytes)
		General-purpose bit output 96 bits (12 bytes)
		Reserved area 2 bytes

iVY System

Applicable controllers ▶ RCX240/RCX240S

● Robot with image processing functions

“SEARCH and TAKE” “CHECK POSITION and ASSEMBLE”

YAMAHA offers a whole new production line concept that eliminates time-consuming teaching and positioning tasks with “iVY-system”.

Main functions ▶ P.74

■ Ordering method

RCX240

Controller

Usable for CE

Regenerative unit

Option I/O

Network Option

iVY System Option board

 No entry: None
 VY: iVY (VISION)

Light/Tracking

 No entry: None
 TR: Light+Tracking
 LC: Light

Gripper

Battery

Note. For details on the various selection items, refer to P.535



■ Basic specifications

● iVY board

Item	iVY board
Basic specifications	Applicable controllers
	RCX240 / RCX240S
	Pixels
	640 (H) × 480 (V) (300,000 pixels, VGA)
	Settable part types
	40 part types
	Connectable cameras
Image input	Maximum 2 units
	Note. Note. If connecting 2 units, then must be the same model
	Camera types
	Double speed compatible analog camera
	Memory
Functions	128MB SDRAM, 256MB miniSD card
	External I/F
	Ethernet (100BASE-TX)
Search method	Edge search (Correlative edge filter, Sobel filter)
Image input	Trigger
	S/W trigger, H/W trigger, Camera internal synch
External trigger input	2 points
Search function	Position offset, Auto registry of point data
ID recognition (usage planned)	QR-Code [Model2], DataMatrix
Setup support functions	Calibration, image save function, model registration ^{Note} , fiducial mark registration ^{Note} , monitor function ^{Note}

Note. Requires Windows PC.

● Lighting control board (option)

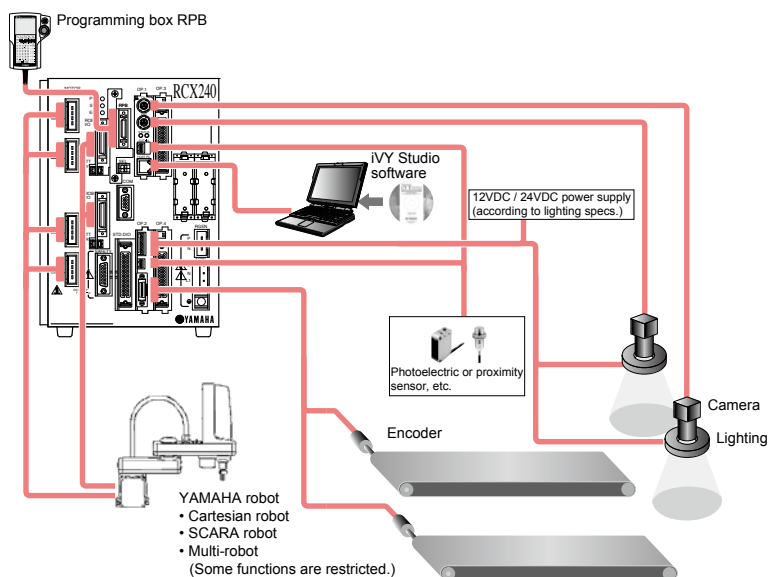
Item	Lighting control board (option)
Basic specifications	Applicable controllers
	RCX240 / RCX240S
	Number of lighting connected units
	Up to 2 units
	Light adjusting system
	PWM control (0 to 100%) (Cycle 60kHz)
	Stroboscopic light (10 to 33000us)
Trigger	S/W trigger, H/W trigger
External trigger input	2 points
Lighting power input	12VDC or 24VDC (Supplied from outside commonly to 2 channels)
Lighting output	When DC12V is supplied:
	Less than 30W with 2 channels totaled
	When DC24V is supplied:
	Less than 60W with 2 channels totaled

● Tracking board (Options)

Item	Tracking board (option)
Basic specifications	Applicable controllers
	RCX240 / RCX240S
	Light adjusting system
	Up to 2 units
	Light adjusting system
	PWM control (0 to 100%) (Cycle 60kHz)
	Stroboscopic light (10 to 33000us)
Trigger	S/W trigger, H/W trigger
External trigger input	2 points
Lighting power input	12VDC or 24VDC (Supplied from outside commonly to 2 channels)
Lighting output	When DC12V is supplied:
	Less than 30W with 2 channels totaled
	When DC24V is supplied:
	Less than 60W with 2 channels totaled
Number of encoder connected units	Up to 2 units
Encoder power source	DC5V (Less than 500mA with 2 channels totaled) (Supplied from controller)
Applicable encoder	Line driver equivalent to 26LS31 / 26C31 (Conforming to RS-422)
Input phase	A, $\bar{A}$, B, $\bar{B}$, Z, $\bar{Z}$
Maximum response frequency	2MHz
Counter / Step-up multiplication	0 to 65535 / Double, quadruple
Other	Provided with broken wire detect function

Note. The tracking board is required when using the tracking function.

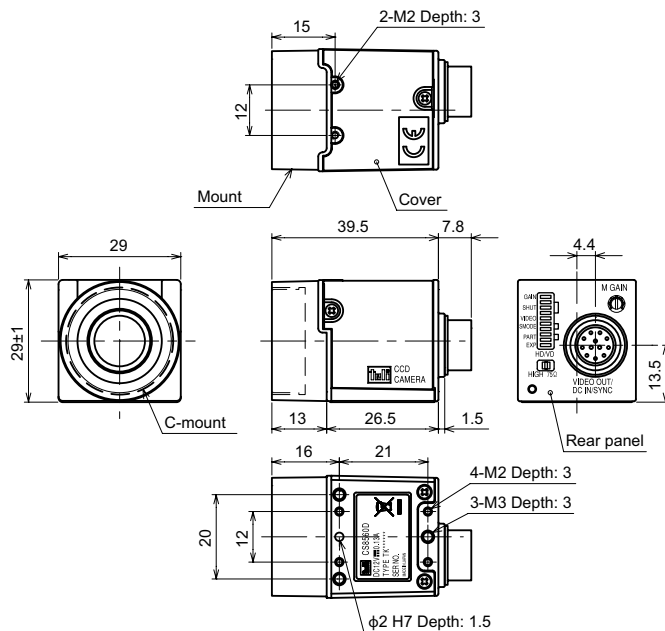
System configuration illustration



* The above configuration example shows a system where the iVY board and tracking board are used.
 * Connections to the STD.DIO, ACIN, and SAFETY connectors is not shown in the above illustration.

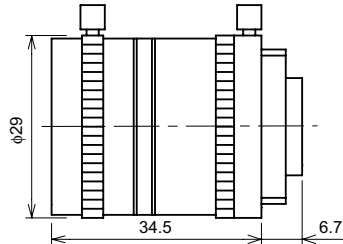
Dimensional outlines CCD camera

● CCD camera dimensions (Model No. : KX0-M7913-00)

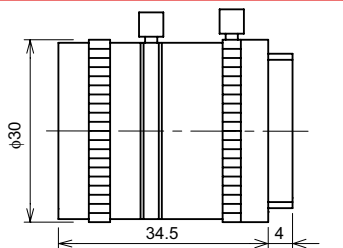


Lenses

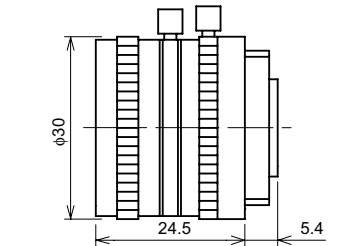
8mm lens [ML-0813] (Model No. : KM7-M7214-60)



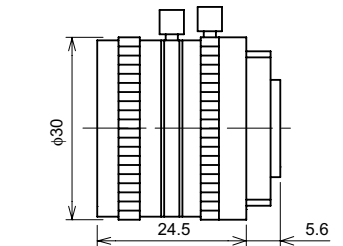
12mm lens [ML-1214] (Model No. : KM7-M7214-40)



16mm lens [ML-1614] (Model No. : KM7-M7214-40)



25mm lens [ML-2514] (Model No. : KM7-M7214-20)



Standard lens angle-of-view table

	Focal length (mm)	Aperture value (F No.)	Angle-of-view (degrees)		Closest approach distance (m)
			Vertical	Horizontal	
8mm lens [ML-0813]	8	F1.3-CLOSE	45.0	57.8	0.2
12mm lens [ML-1214]	12	F1.4-CLOSE	21.9	29.0	0.3
16mm lens [ML-1614]	16	F1.4-CLOSE	23.0	30.4	0.4
25mm lens [ML-2514]	25	F1.4-CLOSE	21.6	28.5	0.5

Note. Field-of-view table for our standard lenses. As the field-of-view widens, distortion on image edges may increase.

Viewing angle, WD, and magnification when using close-up ring

Close-up ring (mm)	8mm lens [ML-0813]				12mm lens [ML-1214]			
	Viewing angle (mm×mm)		WD (mm)	Magnification	Viewing angle (mm×mm)		WD (mm)	Magnification
	Vertical	Horizontal			Vertical	Horizontal		
None	72	96	148	0.05	77	103	248	0.05
0.5	32	43	59	0.11	41	55	125	0.09
	57	77	115	0.06	89	119	289	0.04
1	21	27	34	0.18	28	38	80	0.13
	29	38	52	0.13	45	59	136	0.08
1.5	26	34	22	0.24	21	29	57	0.17
	19	26	31	0.19	30	40	85	0.12
2	—	—	—	—	17	23	42	0.21
	—	—	—	—	22	30	59	0.16
5	—	—	—	—	—	—	—	—
	—	—	—	—	—	—	—	—

Close-up ring (mm)	16mm lens [ML-1614]				25mm lens [ML-2514]			
	Viewing angle (mm×mm)		WD (mm)	Magnification	Viewing angle (mm×mm)		WD (mm)	Magnification
	Vertical	Horizontal			Vertical	Horizontal		
None	82	109	358	0.04	65	87	458	0.06
0.5	48	64	206	0.07	48	64	338	0.08
	117	156	515	0.03	181	242	1270	0.02
1	34	45	143	0.11	38	50	269	0.10
	58	78	252	0.06	91	121	637	0.12
1.5	26	35	108	0.14	31	42	223	0.12
	39	52	164	0.09	60	81	425	0.06
2	22	29	86	0.17	27	36	191	0.13
	29	39	120	0.12	45	60	320	0.08
5	10	14	35	0.35	14	19	103	0.25
	12	16	42	0.31	18	24	130	0.20

Notes

- This table shows viewing angles when using the standard lens and close-up ring. (If no close-up ring this is closest approach.)
- If not using a close-up ring, then a WD smaller than the value in this table cannot be used.
- If using a close-up ring, then only a WD close to this value can be used.
- The values in this table are at most only a reference and do not signify an absolute index.
- To find viewing angle and WD other than for our standard lens, visit our website at: <http://www.moritec.co.jp/products/>.

Accessories and part options

iVY System

Standard accessories

iVY board



Model	Without power supply harness	KX0-M4402-10
	With power supply harness	KX0-M4402-00

Note. If newly adding an iVY, choose the model with harness.

iVY board accessories

Name	Single unit model	Set Model
Camera trigger input cable connector	KX0-M657L-00	KX0-M657K-00
Custom tool	KX0-M657M-00	

Support software for PC iVY Studio

iVY Studio is support software for the iVY 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.



Environment

Software model	KX0-M4988-00
OS	Microsoft Windows 2000 / XP / Vista Note. The 64 bit version is not subject to the operation warranty.
CPU	Exceeding the environment recommended by the OS being used
Memory	64MB or more (Recommend)
Hard disk	Vacant capacity of more than 40MB in the installation destination drive Note. Besides the above, also requires memory space for storing images and data.
Display	800 × 600 dots or more, 32768 colors (16bit High Color) or more (recommended)
Network	TCP/IP Ethernet port × 1

Options

● Lighting control board

Model	KX0-M4400-G0
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● Required options for the lighting control board

Name	Single unit model	Set Model
Lighting power cable connector	KX0-M657L-10	KX0-M657K-10
Wiring lever	KX0-M657M-10	
Lighting input trigger cable connector	KX0-M657L-00	KX0-M657K-00
Custom tool	KX0-M657M-00	

● Tracking board

Model	KX0-M4400-E0
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● Required options for the tracking board

Name	Single unit model	Set Model
Lighting power cable connector	KX0-M657L-10	KX0-M657K-10
Wiring lever	KX0-M657M-10	
Lighting input trigger cable connector	KX0-M657L-00	KX0-M657K-00
Custom tool	KX0-M657M-00	
AB phase input cable connector	KX0-M657L-20	KX0-M657K-20
AB phase input cable connector case	KX0-M657M-20	

● Camera cable

Cable for connecting the camera to the iVY board.



Model	3.5m	KX0-M66F3-00
	6m	KX0-M66F3-10
	9.5m (relay 3.5m+6m)	KX0-M66F0-20
	Relay cable 3.5m	KX0-M66F4-00
	7m (relay 1m+6m)	KX0-M66F0-30
	Relay cable 1m	KX0-M66F4-10

Note. When installing a camera cable in a moving section, use a relay cable so that it can be easily replaced if needed.

● CCD camera



Model	KX0-M7913-00
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● Lens



Model	8mm	KM7-M7214-60 (ML-0813)
	12mm	KM7-M7214-40 (ML-1214)
	16mm	KM7-M7214-30 (ML-1614)
	25mm	KM7-M7214-20 (ML-2514)

● Close-up ring



Model	0.5mm	KX0-M7215-00
	1.0mm	KX0-M7215-10
	2.0mm	KX0-M7215-20
	5.0mm	KX0-M7215-30

● LAN cable with shield cloth (5m)



Model	KX0-M55G0-00
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● Tracking encoder cable (10m)



Model	KX0-M66AF-00
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Articulated robots
YA

Linear conveyor modules
LCM100

Compact single-axis robots
TRANSEVO

Single-axis robots
FLIP-X

Linear motor single-axis robots
PHASER

Cartesian robots
XX-X

SCARA robots
YK-X

Pick & place robots
YP-X

CLEAN

CONTROLLER

INFORMATION

Robot positioner

Pulse string driver

Robot controller

iVY

Option

iVY2 System

Applicable controllers ▶ RCX340

● Robot with image processing functions

Integrated Robot Vision System with “plug-and-play” simplicity.

Basic specifications have been dramatically enhanced while retaining the current iVY system’s ease of use.

Main functions ▶ P.80

■ Ordering method

RCX340

Controller

No. of controllable axes

Safety standards

Controller option A to D (OP.A to D)

TR: Tracking

Controller option E (OP.E)

No entry: Non-selection
VY: iVY2 without light
VL: iVY2 with light

Absolute battery

Note. For details on the various selection items, refer to P.545

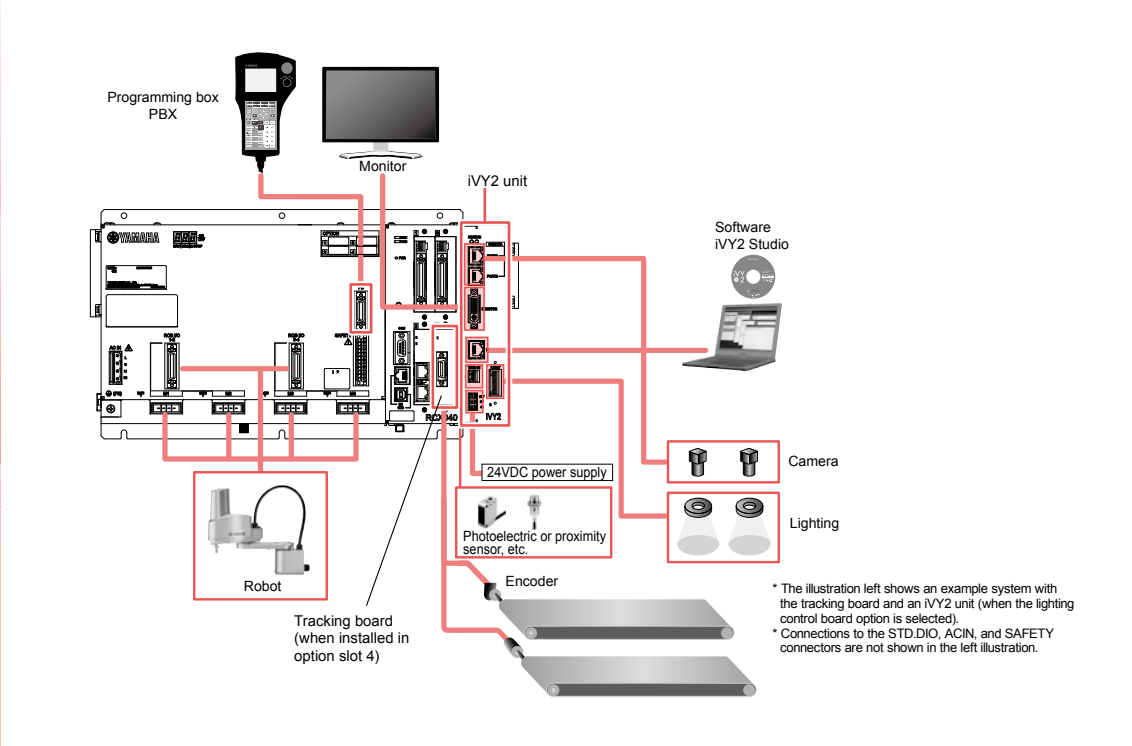


■ Basic specifications

● Robot vision basic specifications

Item		iVY2 unit
Basic specifications	Applicable controllers	RCX340
	Number of screen pixels	648(H) × 494(V) (300,000 pixels, VGA) 1280(H) × 966(V) (1,300,000 pixels, SXGA) 1624(H) × 1236(V) (2,000,000 pixels, UXGA) 2592(H) × 1944(V) (5,000,000 pixels, QSXGA)
	Model setting capacity	254 models
	Number of connectable cameras	Max. 2 cameras
	Connectable camera	GigE camera (VGA, SXGA, UXGA) PoE: IEEE802.3af 1 ch up to 7W
	External interface	Ethernet (1000BASE-T) Note. For setting and monitor operations
	External monitor output	DVI-I Note. Also usable with an analog monitor by using a conversion adaptor. Monitor resolution: 1024 × 768
	Power supply	DC24V +/-10% 1.5A Max.
	Dimensions	W45 × H195 × D130 (iVY2 unit only)
	Weight	0.8kg (iVY2 unit only, when the lighting control board option is selected)
Search method		Edge search (correlated edge filter, Sobel filter)
Image capturing	Trigger mode	S/W trigger, H/W trigger
	External trigger input	2 points
Function		Position detection, automatic point data generation
Camera installation position		Fixed to the fixed camera (up, down) or robot (Y-axis, Z-axis). Perpendicular to the workpiece to be captured.
Setting support function		Calibration, image save function, model registration ^{Note} , fiducial mark registration ^{Note} , monitor function ^{Note} Note. iVY2 Studio function (requires a Windows PC)
Lighting control options	Number of connectable lighting units	Max. 2 lighting units
	Modulated light format	PWM modulated light control (0 to 100%), PWM frequency switchable 62.5 kHz/125 kHz Continuous light, strobe light (follows camera exposure)
	Lighting power input	12VDC or 24VDC (external supply shared by both channels)
	Lighting output	For 12VDC supply: Total of less than 40W for both channels. For 24VDC supply: Total of less than 80W for both channels.

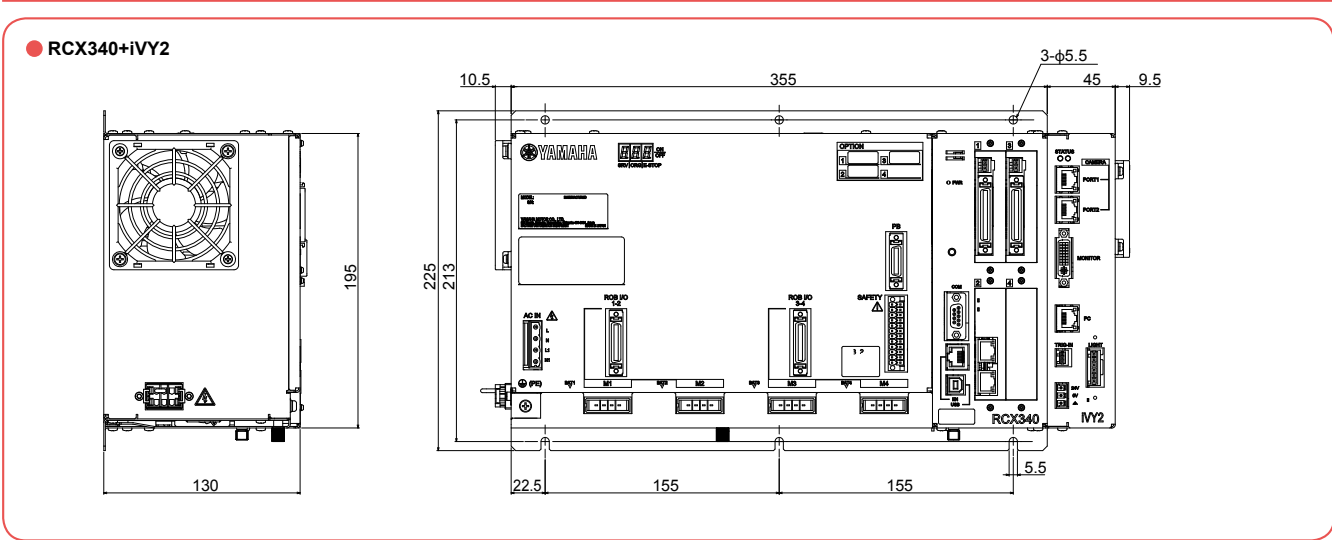
System configuration illustration



Tracking board basic Specifications

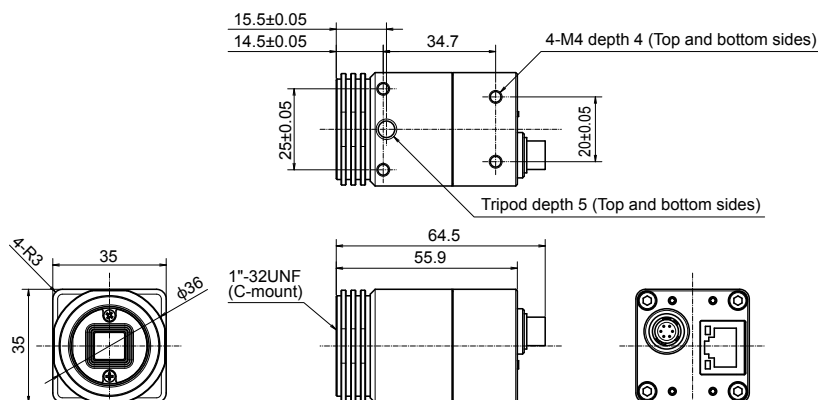
Item		Tracking board
Basic specifications	Applicable controllers	RCX340
	Number of connected encoders	Up to 2 units.
	Encoder power supply	5VDC (2 counters total 500 mA or less) (Supplied from controller)
	Applicable encoder	26LS31/26C31 or equivalent line driver (RS-422 compliance).
	Input phase	A,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

Dimensional outlines



■ Dimensional outlines

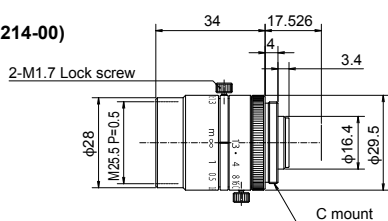
● CCD camera



■ Lenses

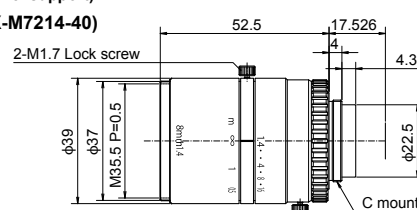
● 8mm lens

(Model No. : KCX-M7214-00)



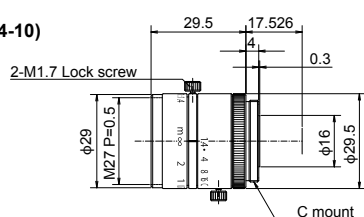
● 8mm lens (megapixel support)

(Model No. : KCX-M7214-40)



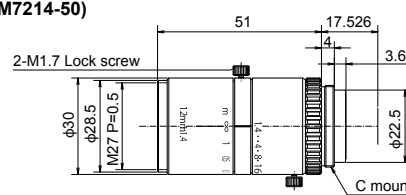
● 12mm lens

(Model No. : KCX-M7214-10)



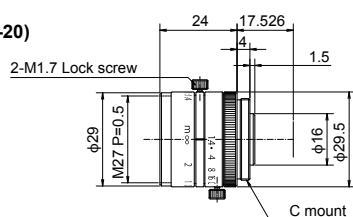
● 12mm lens (megapixel support)

(Model No. : KCX-M7214-50)



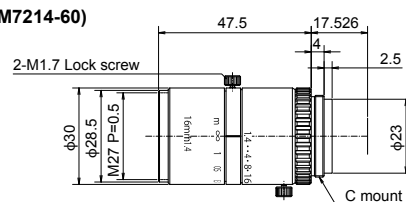
● 16mm lens

(Model No. : KCX-M7214-20)



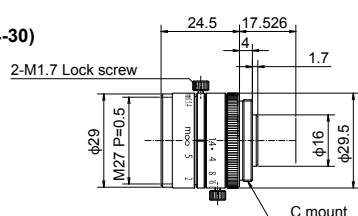
● 16mm lens (megapixel support)

(Model No. : KCX-M7214-60)



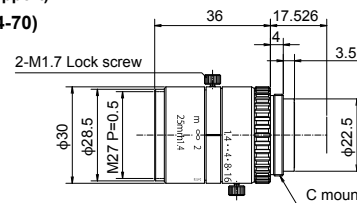
● 25mm lens

(Model No. : KCX-M7214-30)



● 25mm lens (megapixel support)

(Model No. : KCX-M7214-70)



■ Lens characteristics

Lens	Model	Focal length [mm]	Aperture value [F No.]	Angle-of-view (degrees)		Angle-of-view (degrees)		Closest approach distance [m]
				With 1/3 inch sensor KCX-M6541-00 (300,000 pixel camera) KCX-M6541-10 (1,300,000 pixel camera)		With 1/1.8 inch sensor KCX-M6541-20 (2,000,000 pixel camera)		
				Vertical	Horizontal	Vertical	Horizontal	
8mm	KCX-M7214-00	8	F1.3—CLOSE	25.21	33.2	37.08	47.59	0.2
12mm	KCX-M7214-10	12	F1.4—CLOSE	16.48	21.86	24.51	31.88	0.3
16mm	KCX-M7214-20	16	F1.4—CLOSE	12.57	16.71	18.77	24.51	0.4
25mm	KCX-M7214-30	25	F1.4—CLOSE	8.18	10.89	12.25	16.06	0.5
8mm (megapixel support)	KCX-M7214-40	8	F1.4—F16	25.36	33.4	37.3	47.86	0.1
12mm (megapixel support)	KCX-M7214-50	12	F1.4—F16	16.65	22.08	24.76	32.2	0.1
16mm (megapixel support)	KCX-M7214-60	16	F1.4—F16	12.68	16.85	18.92	24.72	0.1
25mm (megapixel support)	KCX-M7214-70	25	F1.4—F16	8.24	10.97	12.33	16.16	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 ring [mm]			Lens							
			8 mm KCX-M7214-00		12 mm KCX-M7214-10		16 mm KCX-M7214-20		25 mm KCX-M7214-30	
None	WD [mm]		200		300		400		500	
	Angle-of-view size X × Y [mm]	KCX-M6541-00 (300,000 pixels)	96.2 × 126.2		91.4 × 119.9		91.4 × 119.9		71.7 × 94.1	
		KCX-M6541-10 (1,300,000 pixels)	95.4 × 126.4		90.6 × 120		90.6 × 120		71.1 × 94.2	
		KCX-M6541-20 (2,000,000 pixels)	143.2 × 188.1		136 × 178.7		136 × 178.7		106.7 × 140.1	
0.5	Optical magnification		0.038		0.040		0.040		0.051	
	WD [mm]		69.5 118.6		143 296.8		222 524.1		358.5 1269.4	
	Angle-of-view size X × Y [mm]	KCX-M6541-00 (300,000 pixels)	36.6 × 48 59 × 77.4		45.7 × 60 91.4 × 119.9		51.5 × 67.6 118 × 154.7		51.5 × 67.6 182.8 × 239.8	
		KCX-M6541-10 (1,300,000 pixels)	36.3 × 48 58.5 × 77.5		45.3 × 60 90.6 × 120		51.1 × 67.7 116.9 × 154.9		51.1 × 67.7 181.1 × 240	
KCX-M6541-20 (2,000,000 pixels)		54.4 × 71.5 87.8 × 115.3		68 × 89.4 136 × 178.7		76.6 × 100.7 175.5 × 230.5		76.6 × 100.7 271.9 × 357.3		
1.0	Optical magnification		0.100 0.062		0.080 0.040		0.071 0.031		0.071 0.020	
	WD [mm]		38.7 53.8		91.3 142.3		152 257.1		280.8 635.9	
	Angle-of-view size X × Y [mm]	KCX-M6541-00 (300,000 pixels)	22.6 × 29.6 29.5 × 38.7		30.5 × 40 45.7 × 60		36.2 × 47.5 60 × 78.7		40.2 × 52.7 91.4 × 119.9	
		KCX-M6541-10 (1,300,000 pixels)	22.4 × 29.7 29.3 × 38.8		30.2 × 40 45.3 × 60		35.9 × 47.6 59.4 × 78.7		39.9 × 52.8 90.6 × 120	
KCX-M6541-20 (2,000,000 pixels)		33.6 × 44.2 43.9 × 57.7		45.4 × 59.6 68 × 89.4		53.9 × 70.8 89.2 × 117.2		59.8 × 78.6 136 × 178.7		
1.5	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	
	Angle-of-view size X × Y [mm]	KCX-M6541-00 (300,000 pixels)			22.8 × 29.8 30.3 × 39.7		27.7 × 36.4 39.8 × 52.2		33 × 43.2 61 × 80	
		KCX-M6541-10 (1,300,000 pixels)			22.5 × 29.9 30 × 39.7		27.5 × 36.4 39.4 × 52.2		32.7 × 43.3 60.4 × 80	
KCX-M6541-20 (2,000,000 pixels)				33.8 × 44.4 45 × 59.1		41.2 × 54.2 59.2 × 77.7		49 × 64.4 90.7 × 119.1		
2.0	Optical 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	
	Angle-of-view size X × Y [mm]	KCX-M6541-00 (300,000 pixels)			18.2 × 23.9 22.8 × 29.8		22.6 × 29.6 30 × 39.4		28.2 × 36.9 46.3 × 60.7	
		KCX-M6541-10 (1,300,000 pixels)			18.1 × 23.9 22.5 × 29.9		22.4 × 29.7 29.7 × 39.4		27.9 × 37 45.9 × 60.8	
KCX-M6541-20 (2,000,000 pixels)				27.1 × 35.6 33.8 × 44.4		33.6 × 44.2 44.6 × 58.6		41.9 × 55 68.9 × 90.5		
5.0	Optical magnification				0.201 0.161		0.162 0.122		0.130 0.079	
	WD [mm]								104.2 129	
	Angle-of-view size X × Y [mm]	KCX-M6541-00 (300,000 pixels)							14.7 × 19.2 18.4 × 24.1	
		KCX-M6541-10 (1,300,000 pixels)							14.5 × 19.2 18.3 × 24.2	
KCX-M6541-20 (2,000,000 pixels)								21.8 × 28.6 27.4 × 36		
Optical magnification								0.250 0.199		

Note. WD is the lens tip reference.

Close-up ring [mm]			Lens							
			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	
None	WD [mm]		100		100		100		150	
	Angle-of-view size X × Y [mm]	KCX-M6541-00 (300,000 pixels)	52.3 × 68.5		36.6 × 48		26.9 × 35.3		24.6 × 32.2	
		KCX-M6541-10 (1,300,000 pixels)	51.8 × 68.6		36.3 × 48		26.7 × 35.3		24.4 × 32.3	
		KCX-M6541-20 (2,000,000 pixels)	77.7 × 102.1		54.4 × 71.5		40 × 52.6		36.5 × 48	
Optical magnification			0.070		0.100		0.136		0.149	
0.5	WD [mm]		46		113.6		66.1		283.2	
	Angle-of-view size X × Y [mm]	KCX-M6541-00 (300,000 pixels)	27.7 × 36.4		58.1 × 76.2		25.4 × 33.3		89.2 × 117	
		KCX-M6541-10 (1,300,000 pixels)	27.5 × 36.4		57.5 × 76.2		25.2 × 33.4		88.4 × 117.1	
		KCX-M6541-20 (2,000,000 pixels)	41.2 × 54.2		86.4 × 113.5		37.8 × 49.7		132.7 × 174.3	
Optical magnification			0.132		0.063		0.166		0.031	
1.0	WD [mm]				47.2		131.9		62.6	
	Angle-of-view size X × Y [mm]	KCX-M6541-00 (300,000 pixels)			19.8 × 26		45.2 × 59.2		18.6 × 24.4	
		KCX-M6541-10 (1,300,000 pixels)			19.6 × 26		44.8 × 59.3		18.4 × 24.4	
		KCX-M6541-20 (2,000,000 pixels)			29.4 × 38.7		67.2 × 88.3		27.7 × 36.3	
Optical magnification					0.185		0.081		0.197	
1.5	WD [mm]				35.2		81.4		51.5	
	Angle-of-view size X × Y [mm]	KCX-M6541-00 (300,000 pixels)			16.3 × 21.4		32.7 × 42.9		16.1 × 21.1	
		KCX-M6541-10 (1,300,000 pixels)			16.1 × 21.4		32.4 × 42.9		15.9 × 21.1	
		KCX-M6541-20 (2,000,000 pixels)			24.2 × 31.8		48.6 × 63.8		23.9 × 31.4	
Optical magnification					0.225		0.112		0.228	
2.0	WD [mm]				26.9		56.2		43	
	Angle-of-view size X × Y [mm]	KCX-M6541-00 (300,000 pixels)			13.8 × 18.1		22.5 × 29.5		14.2 × 18.6	
		KCX-M6541-10 (1,300,000 pixels)			13.7 × 18.1		22.3 × 29.5		14 × 18.6	
		KCX-M6541-20 (2,000,000 pixels)			20.5 × 26.9		33.4 × 43.9		21 × 27.6	
Optical magnification					0.266		0.163		0.259	
5.0	WD [mm]									
	Angle-of-view size X × Y [mm]	KCX-M6541-00 (300,000 pixels)								
		KCX-M6541-10 (1,300,000 pixels)								
		KCX-M6541-20 (2,000,000 pixels)								
Optical magnification										

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

iVY2 System

Standard accessories

● iVY2 unit

The iVY2 unit adds robot vision to the RCX340 robot controller.



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

● iVY2 unit accessories

Name	Individual model
Camera trigger input cable connector	KX0-M657K-00
24V power supply connector	KCF-M5382-00

● Support software for PC iVY2 Studio

iVY2 Studio is support software for the iVY2 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.



● Environment

Software model	KCX-M4988-00
OS	Microsoft Windows XP / Vista (32bit/64bit) / 7 (32bit/64bit) / 8, 8.1 (32bit/64bit)
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	16MB of available space required on installation drive.
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 are registered trademarks of the Microsoft Corporation, USA.

● Tracking encoder cable (10m)



Model	KX0-M66AF-00
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Options

● Camera



CCD camera	300,000 pixel	648×494 (VGA)	KCX-M6541-00
	1,300,000 pixel	1280×966 (SXGA)	KCX-M6541-10
	2,000,000 pixel	1624×1236 (UXGA)	KCX-M6541-20
CMOS camera	5,000,000 pixel	2592×1944 (QXGA)	KCX-M6541-30

● Lens



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

● Close-up ring



Model	0.5mm	KX0-M7215-00
	1.0mm	KX0-M7215-10
	2.0mm	KX0-M7215-20
	5.0mm	KX0-M7215-30

● Lighting control board

This board adds lighting control functionality to the iVY2 system. (Installed in the iVY2 unit when shipped)

Model	KCX-M4403-L0
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● Lighting control board accessories

Name	Model
Lighting power cable connector	KX0-M657K-10

● Tracking board

This board adds conveyor tracking functionality to the RCX340 controller.

Model	KCX-M4400-T0
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● Tracking board accessories

Name	Single unit model
AB phase input cable connector	KX0-M657K-20

● Recommended option cable ^{Note}

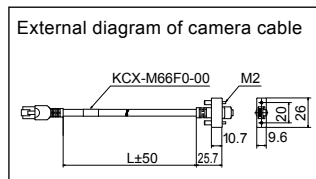
Name	Single unit model
AB phase input cable (10 m, only for counter 1)	KX0-M66AF-00

Note. Not included.

We can provide an option that is pre-wired to the AB phase input cable connector.

● Camera cable

Cable for connecting the camera to the iVY2 board.



Model	5m	KCX-M66F0-00
	10m	KCX-M66F0-10
	15m	KCX-M66F0-20

● LAN cable with shield cloth (5 m)



Model	KX0-M55G0-00
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Articulated robots
YA

Linear conveyor modules
LCM100

Compact single-axis robots
TRANSERVO

Single-axis robots
FLIP-X

Linear motor single-axis robots
PHASER

Cartesian robots
XV-X

SCARA robots
YK-X

Pick & place robots
YP-X

CLEAN

CONTROLLER

INFORMATION

Robot positioner

Pulse string driver

Robot controller

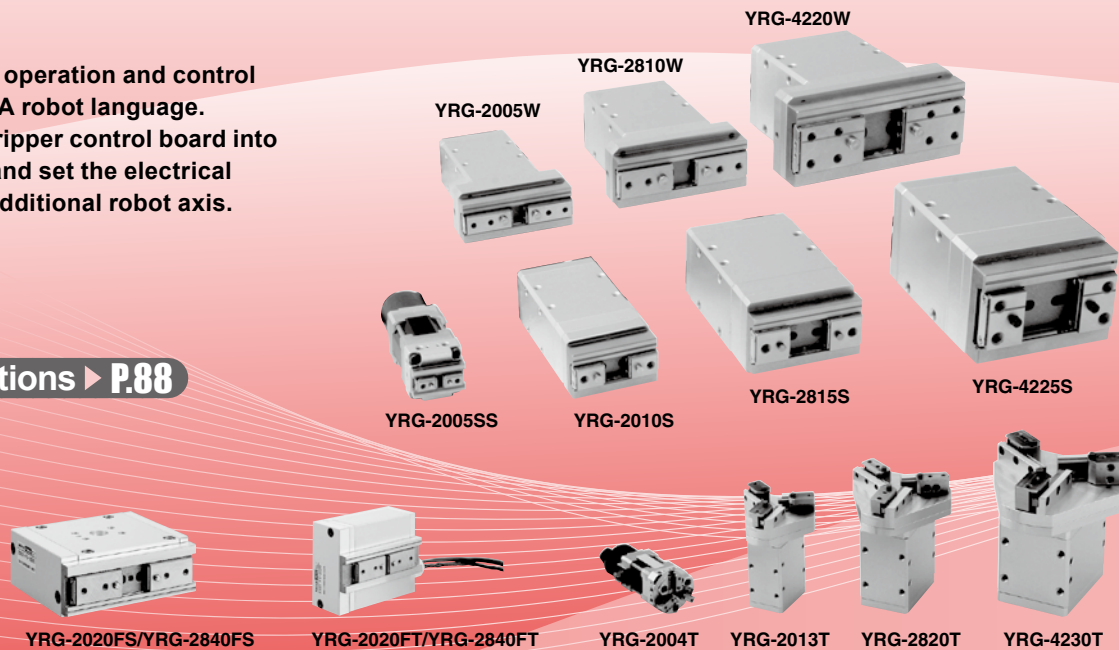
iVY2

Option

YRG Series

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.88



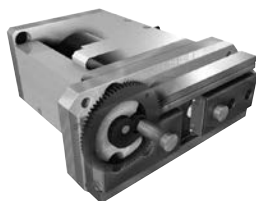
Structure

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 compact.

Ball screw structure



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

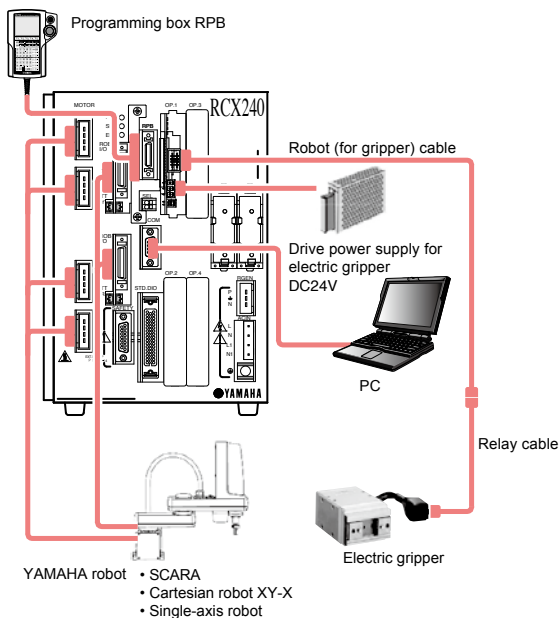
Compact ball guide structure



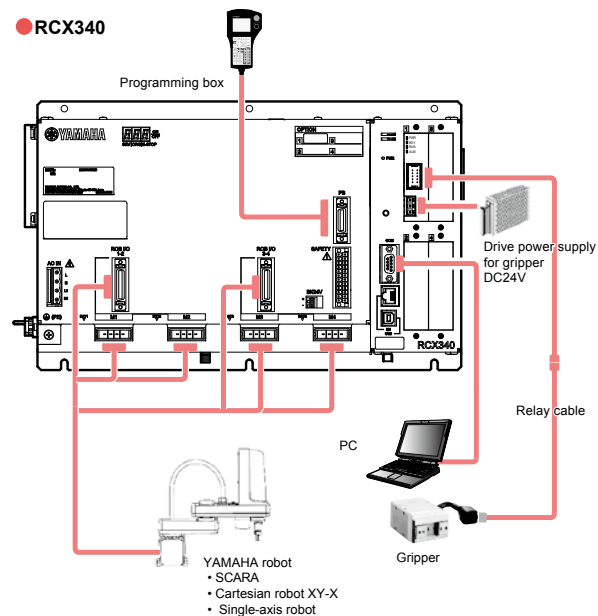
Use of special cams provides light weight and compactness. Ideal for grasping and moving a round workpiece made of glass or similar material.

System configuration illustration

RCX240



RCX340



YRG-2005SS



■ Gripping power vs. gripping power setting (%)

Model name		YRG-2005SS
Model number		KCF-M2010-A0
Holding power	Max. continuous rating (N)	5
	Min. setting (% (N))	30 (1.5)
	Resolution (% (N))	1 (0.05)
Open/close stroke (mm)		3.2
Speed	Max. rating (mm/sec)	100
	Min. setting (% (mm/sec))	20 (20)
	Resolution (% (mm/sec))	1 (1)
	Holding speed (Max.) (%)	50
Repetitive positioning accuracy (mm)		+/-0.02
Guide mechanism		Linear guide
Max. holding weight ^{Note 1} (kg)		0.05
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.

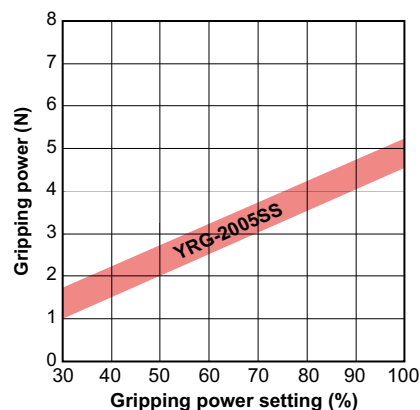
Note. Design the finger as short and lightweight as possible.

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. Design the weight of a workpiece to be held so that it is approximately 1/10 to 1/20 of the holding power. (Consider further allowance when moving and swinging the gripper that keeps holding a workpiece.)

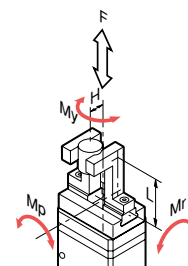


- Graph shows a general guide to gripping power versus gripping power setting (%). Variations will appear in the actual gripping power.

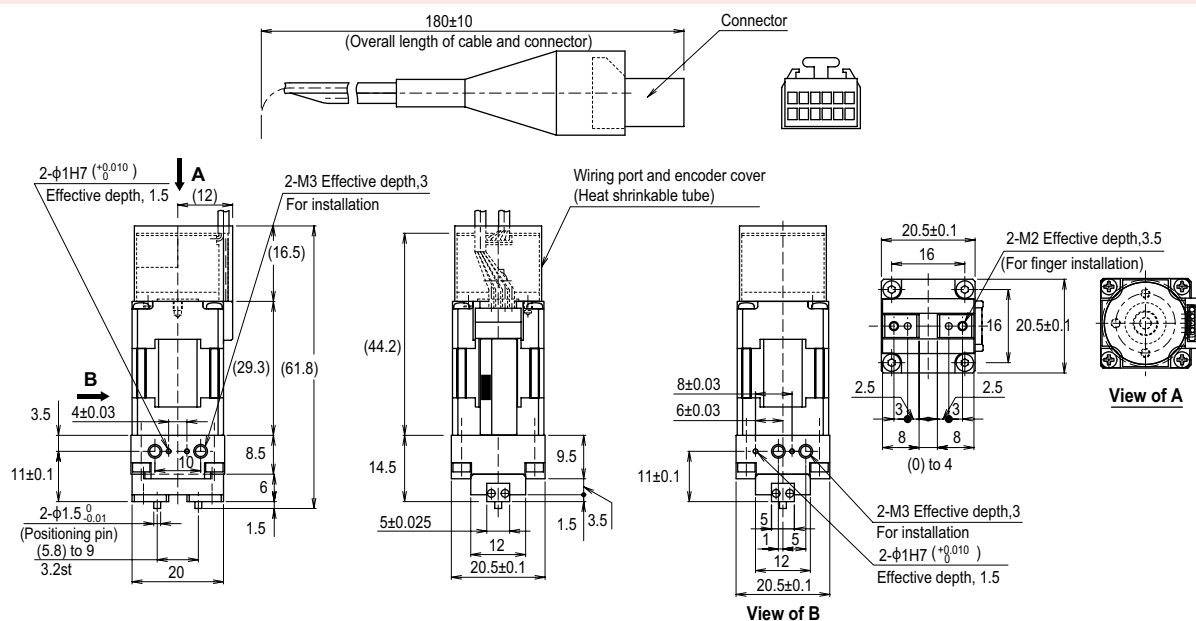
■ Allowable load and load moment

				YRG-2005SS
Guide	Allowable load	F	N	12
	Allowable pitching moment	Mp	N•m	0.04
	Allowable yawing moment	My	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	H	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.



YRG-2005SS



Note. Avoid extreme winding of the cable and fix the cable securely so that it does not move.
Take appropriate measures so that any excessive force is not applied to the root of the cable.

YRG Series

Single cam type

YRG-2010S/2815S/4225S



Basic specifications

Model name	YRG-2010S	YRG-2815S	YRG-4225S
Model number	KCF-M2011-A0	KCF-M2011-B0	KCF-M2011-C0
Holding power	Max. continuous rating (N)	6	22
	Min. setting (% (N))	30 (1.8)	30 (6.6)
	Resolution (% (N))	1 (0.06)	1 (0.22)
Open/close stroke (mm)		7.6	14.3
			23.5
Speed	Max. rating (mm/sec)	100	
	Min. setting (% (mm/sec))	20 (20)	
	Resolution (% (mm/sec))	1 (1)	
	Holding speed (Max.) (%)	50	
Repetitive positioning accuracy (mm)		+/-0.02	
Guide mechanism		Linear guide	
Max. holding weight ^{Note 1} (kg)		0.06	0.22
Weight (g)		160	300

- Holding 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.

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

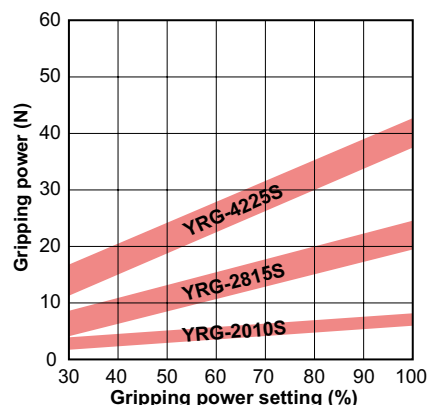
Note. Set the parameters and holding power (%) of the holding movement command so that any excessive shock is not applied to the finger during operation.

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. Design the weight of a workpiece to be held so that it is approximately 1/10 to 1/20 of the holding power. (Consider further allowance when moving and swinging the gripper that keeps holding a workpiece.)

Gripping power vs. gripping power setting (%)

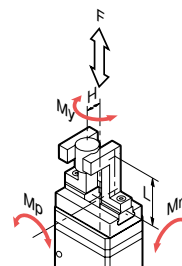


- Graph shows a general guide to gripping power versus gripping power setting (%). Variations will appear in the actual gripping power.

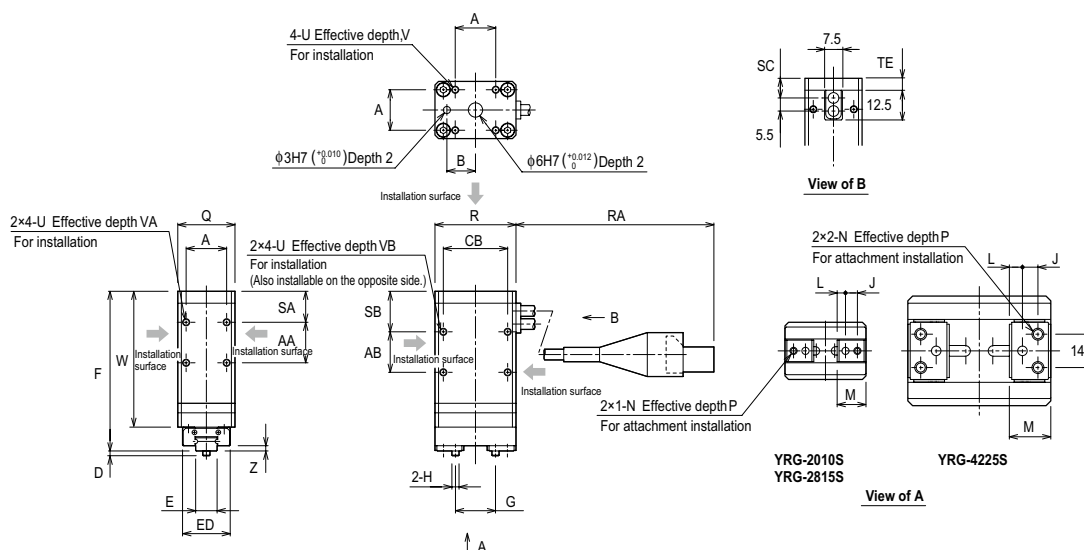
Allowable load and load moment

			YRG-2010S	YRG-2815S	YRG-4225S
Guide	Allowable load	F	N	450	350
	Allowable pitching moment	Mp	N•m	0.7	0.5
	Allowable yawing moment	My	N•m	0.8	0.6
	Allowable rolling moment	Mr	N•m	2.3	2.8
Finger	Max. weight (1 pair)		g	15	30
	Max. holding position	L	mm	20	25
	Max. overhang	H	mm	20	25

- 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.



YRG-2010S/2815S/4225S



	A	AA	AB	B	CB	D	E	ED	F	G	H	J	L
YRG-2010S	17	17	17	12	27	2	9 ⁰ _{-0.05}	20	71	8.4 to 16	φ3 ⁰ _{-0.01}	5	3.5
YRG-2815S	24	24	14	15	38	2	14 ⁰ _{-0.05}	25	78	9.6 to 23.9	φ3 ⁰ _{-0.01}	6	4.3
YRG-4225S	36	25	13	20	50	3	24 ⁰ _{-0.05}	40	86	12 to 35.5	φ4 ⁰ _{-0.012}	6.5	5.5

	M	N	P	Q	R	RA	SA	SB	SC	TE	U	V	VA	VB	W	Z
YRG-2010S	12.1	M3	5	24	34	165+/-10	13	17	8.3	5	M3	5	6	6	61	2.2
YRG-2815S	15	M4	5	32	46	140+/-10	16	21	9.3	6	M4	6	8	8	69	2
YRG-4225S	17.4	M5	8	46	60	235+/-10	18	24	10.8	7.5	M5	7.5	8	10	72	3

Double cam type

YRG-2005W/2810W/4220W



Basic specifications

Model name	YRG-2005W	YRG-2810W	YRG-4220W
Model number	KCF-M2012-A0	KCF-M2012-B0	KCF-M2012-C0
Holding power	Max. continuous rating (N)	50	150
	Min. setting (% (N))	30 (15)	30 (45)
	Resolution (% (N))	1 (0.5)	1 (1.5)
Speed	Open/close stroke (mm)	5	10
	Max. rating (mm/sec)	60	60
	Min. setting (% (mm/sec))	20 (12)	20 (12)
Resolution (% (mm/sec))	Resolution (% (mm/sec))	1 (0.6)	1 (0.7)
	Holding speed (Max.) (%)	50	50
	Repetitive positioning accuracy (mm)	+/-0.03	+/-0.03
Guide mechanism			
Linear guide			
Max. holding weight ^{Note 1} (kg)			
0.5			
Weight (g)			
200			

- Holding 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.

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.

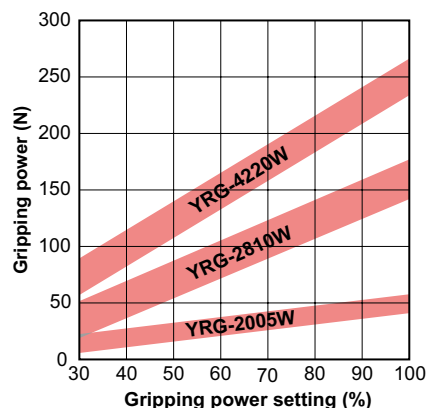
Note 1. Design the weight of a workpiece to be held so that it is approximately 1/10 to 1/20 of the holding power. (Consider further allowance when moving and swinging the gripper that keeps holding a workpiece.)

Allowable load and load moment

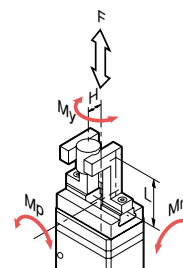
			YRG-2005W	YRG-2810W	YRG-4220W
Guide	Allowable load	F	1000	1000	2000
	Allowable pitching moment	Mp	N·m	6.7	8.1
	Allowable yawing moment	My	N·m	4	4.8
	Allowable rolling moment	Mr	N·m	5.1	7.8
Finger	Max. weight (1 pair)		g	40	80
	Max. holding position	L	mm	30	30
	Max. overhang	H	mm	20	20

- 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.

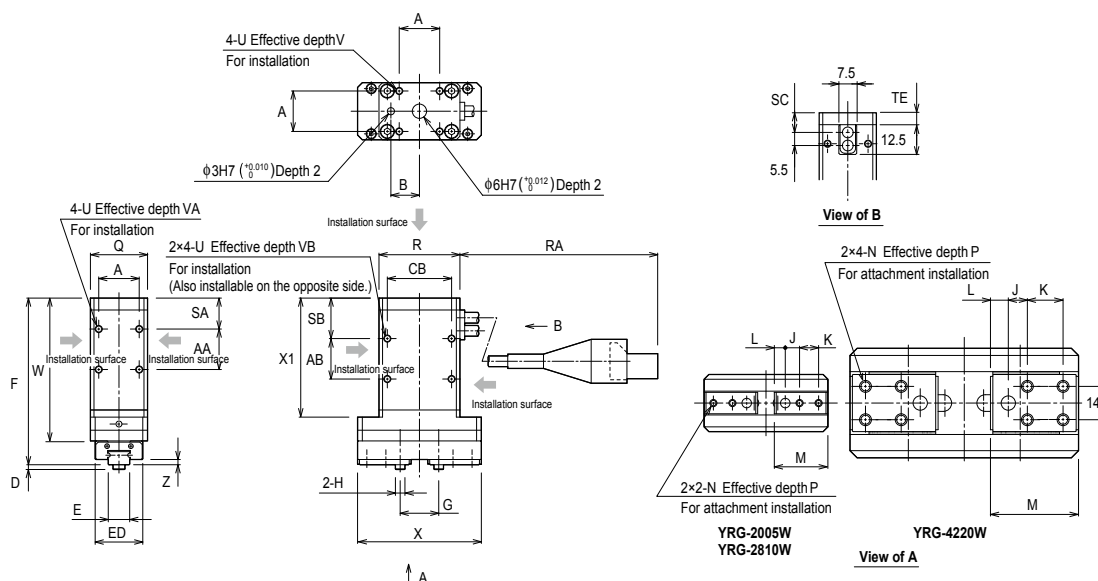
Gripping power vs. gripping power setting (%)



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



YRG-2005W/2810W/4220W



	A	AA	AB	B	CB	D	E	ED	F	G	H	J	K	L
YRG-2005W	17	17	17	12	27	2	9 ⁰ _{-0.05}	20	74	10.6 to 15.6	φ4 ⁰ _{-0.012}	6	8	4.6
YRG-2810W	24	24	14	15	38	2	14 ⁰ _{-0.05}	25	80	12.6 to 22.6	φ5 ⁰ _{-0.012}	7	10	5.65
YRG-4220W	36	25	13	20	50	3	24 ⁰ _{-0.05}	40	90	17.0 to 36.3	φ6 ⁰ _{-0.012}	8	15	7.5

	M	N	P	Q	R	RA	SA	SB	SC	TE	U	V	VA	VB	W	X	X1	Z
YRG-2005W	22.5	M3	5	24	34	165+/-10	13	17	8.3	5	M3	5	6	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
YRG-4220W	37	M5	8	46	60	235+/-10	18	24	10.8	7.5	M5	7.5	8	10	76	96	63	3

YRG-2020FS/2840FS



Basic specifications

Model name	YRG-2020FS	YRG-2840FS
Model number	KCF-M2013-A0	KCF-M2013-B0
Holding power	Max. continuous rating (N)	50
	Min. setting (% (N))	30 (15)
	Resolution (% (N))	1 (0.5)
Speed	Max. rating (mm/sec)	50
	Min. setting (% (mm/sec))	20 (10)
	Resolution (% (mm/sec))	1 (0.5)
Repetitive positioning accuracy (mm)	Holding speed (Max.) (%)	50
		50
		50
Guide mechanism	Linear guide	
Max. holding weight ^{Note 1} (kg)	0.5	1.5
Weight (g)	420	880

- Holding 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.

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

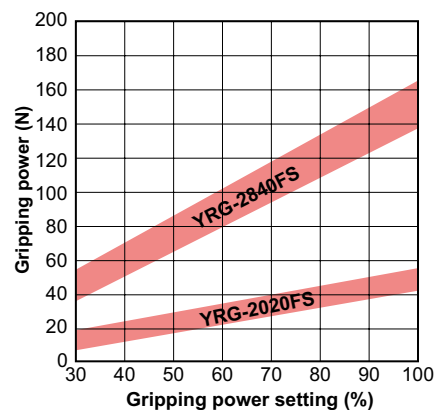
Note. Set the parameters and holding power (%) of the holding movement command so that any excessive shock is not applied to the finger during operation.

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. Design the weight of a workpiece to be held so that it is approximately 1/10 to 1/20 of the holding power. (Consider further allowance when moving and swinging the gripper that keeps holding a workpiece.)

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.

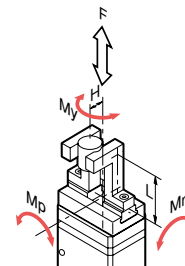
Allowable load and load moment

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

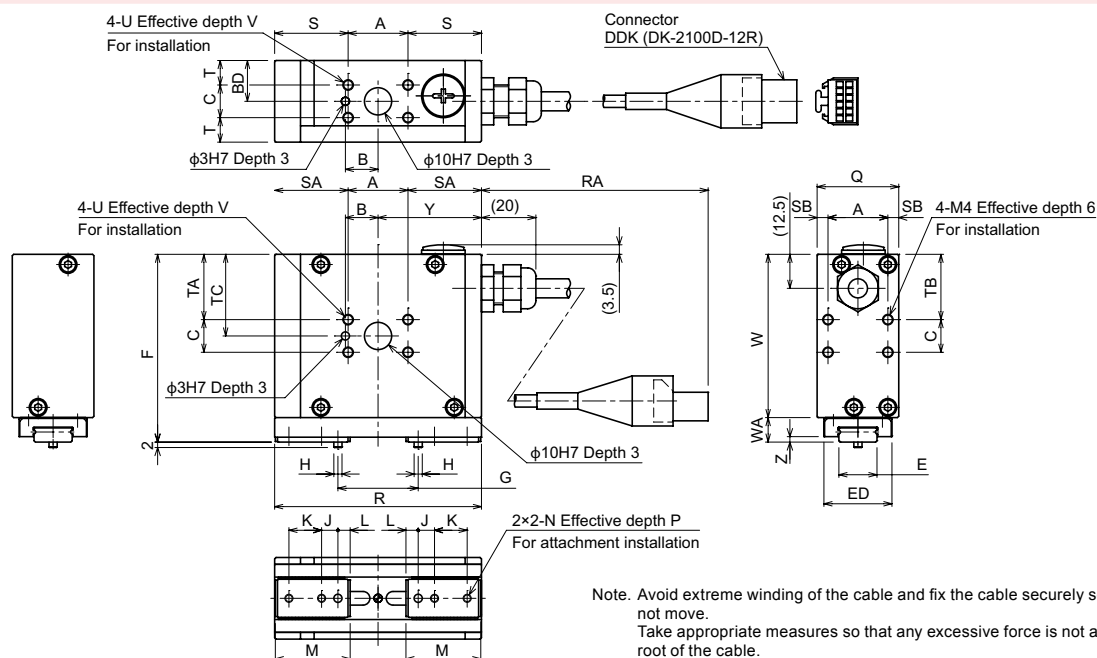
- Mount the finger so that the allowable load and load moment of the guide do not exceed the values stated in the table above.

- 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.



YRG-2020FS/2840FS



Note. Avoid extreme winding of the cable and fix the cable securely so that it does not move. Take appropriate measures so that any excessive force is not applied to the root of the cable.

	A	B	BD	C	D	E	ED	F	G	H	J	K	L	M	N
YRG-2020FS	22	12	15	12	2	14 _{0-0.05}	25	69	10.5 to 29.5	φ3 _{0-0.01}	6	12	4.5	27.5	M3
YRG-2840FS	30	15	20	16	2	18 _{0-0.05}	30	84	13 to 51	φ4 _{0-0.012}	8	14	5.5	34.5	M4

	P	Q	R	RA	S	SA	SB	T	TA	TB	TC	TD	U	V	W	WA	Y	Z
YRG-2020FS	5	30	76	175+/-10	27	27	4	9	24	24	30	12.5	M4	6	60	9	38	2
YRG-2840FS	7.5	40	110	135+/-10	40	40	5	12	28	28	36	14	M5	7.5	72	12	55	3

Screw type "T" style

YRG-2020FT/2840FT



Basic specifications

Model name	YRG-2020FT	YRG-2840FT
Model number	KCF-M2014-A0	KCF-M2014-B0
Holding power	Max. continuous rating (N)	50
	Min. setting (% (N))	30 (15)
	Resolution (% (N))	1 (0.5)
Speed	Open/close stroke (mm)	19
	Max. rating (mm/sec)	50
	Min. setting (% (mm/sec))	20 (10)
	Resolution (% (mm/sec))	1 (0.5)
	Holding speed (Max.) (%)	50
Repetitive positioning accuracy (mm)		+/-0.01
Guide mechanism		Linear guide
Max. holding weight ^{Note 1} (kg)		0.5
Weight (g)		420

• Holding 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.

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.

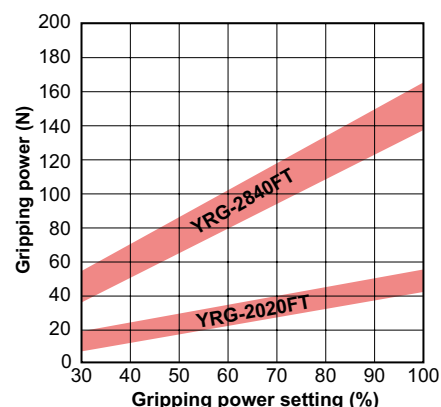
Note 1. Design the weight of a workpiece to be held so that it is approximately 1/10 to 1/20 of the holding power. (Consider further allowance when moving and swinging the gripper that keeps holding a workpiece.)

Allowable load and load moment

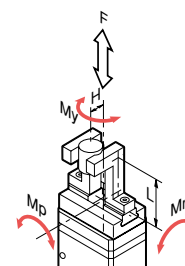
Guide			YRG-2020FT	YRG-2840FT
			F	N
Guide	Allowable load		1000	1300
	Allowable pitching moment	Mp	N·m	3.5
	Allowable yawing moment	My	N·m	4.2
	Allowable rolling moment	Mr	N·m	7.3
Finger	Max. weight (1 pair)		g	40
	Max. holding position	L	mm	30
	Max. overhang	H	mm	20

- 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.

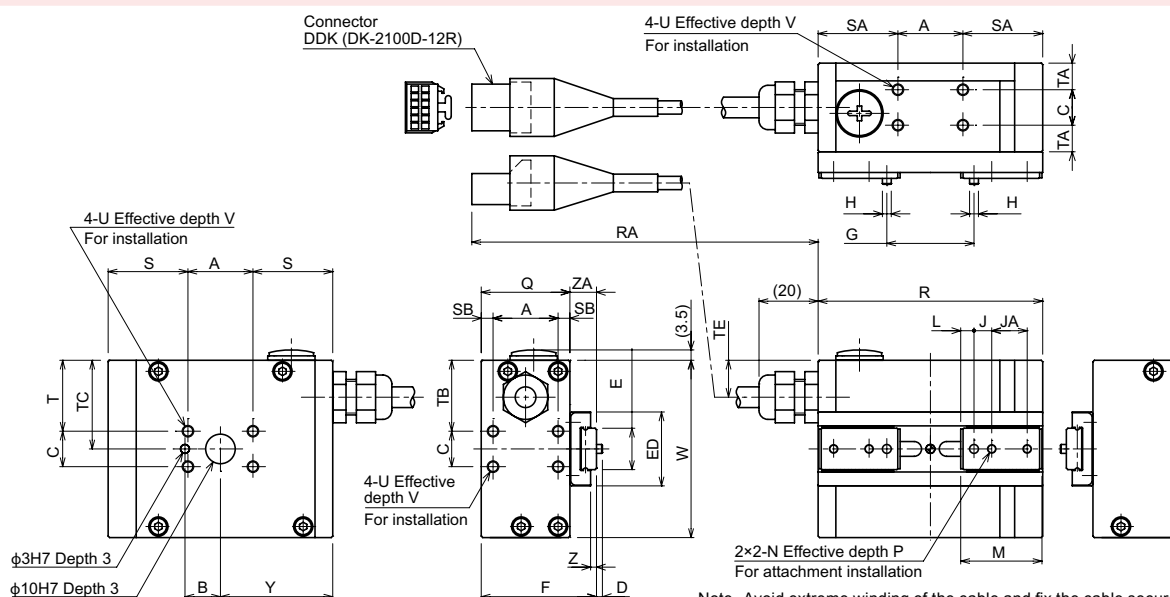
Gripping power vs. gripping power setting (%)



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



YRG-2020FT/2840FT



Note. Avoid extreme winding of the cable and fix the cable securely so that it does not move.
 Take appropriate measures so that any excessive force is not applied to the root of the cable.

	A	B	C	D	E	ED	F	G	H	J	JA	K	L	M	N	P
YRG-2020FT	22	12	12	2	14 _{0.05}	25	39	10.5 to 29.5	Φ3 _{0.01}	6	12	12	4.5	27.5	M3	5
YRG-2840FT	30	15	16	2	18 _{0.05}	30	52	13 to 51	Φ4 _{0.012}	8	14	14	5.5	34.5	M4	7.5

	Q	R	RA	S	SA	SB	T	TA	TB	TC	TD	TE	U	V	W	Y	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
YRG-2840FT	40	110	135+/-10	40	40	5	28	12	28	36	14	14	M5	7.5	72	55	3	12



Basic specifications

Model name	YRG-2004T
Model number	KCF-M2015-A0
Holding power	Max. continuous rating (N) 2.5
	Min. setting (% (N)) 30 (0.75)
	Resolution (% (N)) 1 (0.025)
Open/close stroke (mm)	3.5
Speed	Max. rating (mm/sec) 100
	Min. setting (% (mm/sec)) 20 (20)
	Resolution (% (mm/sec)) 1 (1)
	Holding speed (Max.) (%) 50
Repetitive positioning accuracy (mm)	+/-0.03
Guide mechanism	Linear guide
Max. holding weight ^{Note 1} (kg)	0.02
Weight (g)	90

• Holding 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.

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. Design the weight of a workpiece to be held so that it is approximately 1/10 to 1/20 of the holding power. (Consider further allowance when moving and swinging the gripper that keeps holding a workpiece.)

Allowable load and load moment

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

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

$$F = F_a + W \times g$$

$$M = F_b \times L$$

F_a : External force [N]

F_b : External force [N]

W : Workpiece weight [Kg]

g : Gravity acceleration [m/s^2]

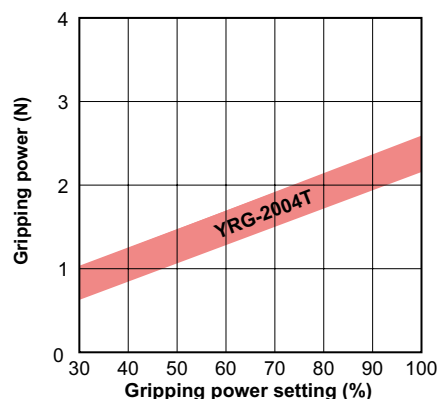
H : Distance of holding point [m]

F : Load [N]

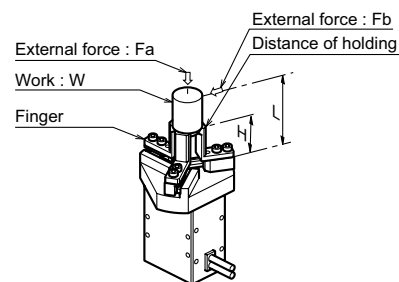
M : Moment [N·m]

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

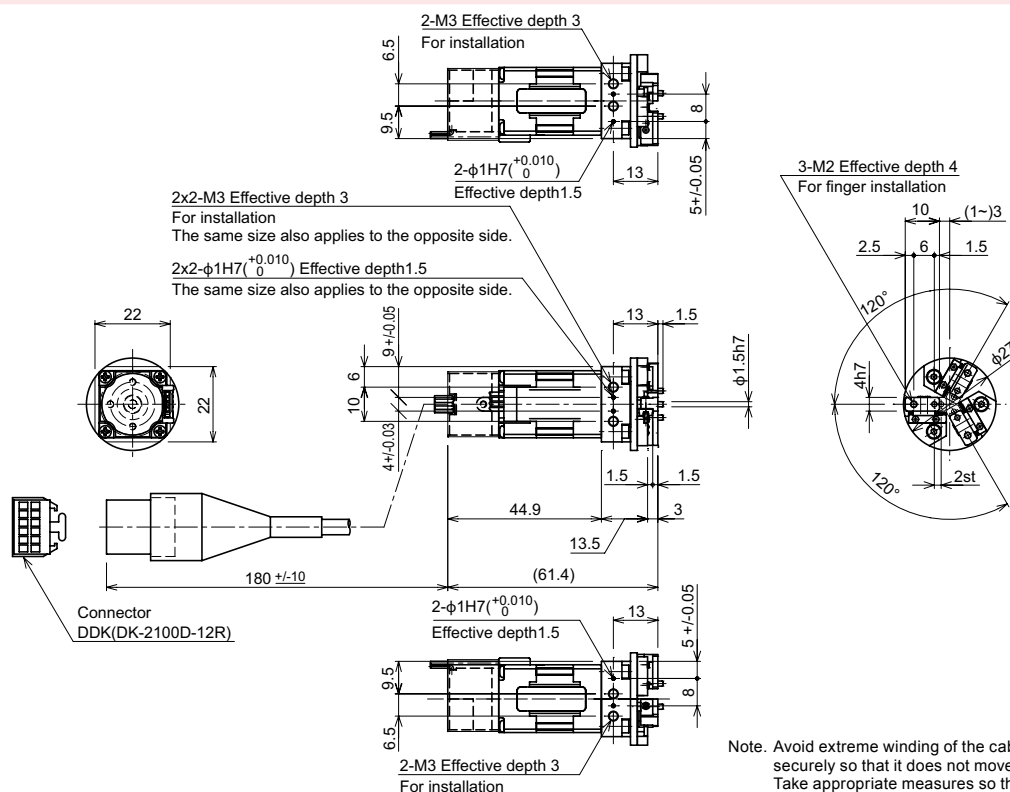
Gripping power vs. gripping power setting (%)



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



YRG-2004T



Note. Avoid extreme winding of the cable and fix the cable securely so that it does not move. Take appropriate measures so that any excessive force is not applied to the root of the cable.

Three fingers type

YRG-2013T/2820T/4230T



Basic specifications

Model name	YRG-2013T	YRG-2820T	YRG-4230T
Model number	KCF-M2015-B0	KCF-M2015-C0	KCF-M2015-D0
Holding power	Max. continuous rating (N)	2	10
	Min. setting (% (N))	30 (0.6)	30 (3)
	Resolution (% (N))	1 (0.02)	1 (0.1)
Speed	Open/close stroke (mm)	13	20
	Max. rating (mm/sec)	100	20 (20)
	Min. setting (% (mm/sec))	1 (1)	1 (1)
Repetitive positioning accuracy (mm)	Resolution (% (mm/sec))	1 (1)	1 (1)
	Holding speed (Max.) (%)	50	50
		50	50
Guide mechanism	Linear guide		
Max. holding weight ^{Note 1} (kg)	0.02	0.1	0.2
Weight (g)	190	340	640

• Holding 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.

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. Design the weight of a workpiece to be held so that it is approximately 1/10 to 1/20 of the holding power. (Consider further allowance when moving and swinging the gripper that keeps holding a workpiece.)

Allowable load and load moment

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

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

$$F = Fa + W \times g$$

$$M = Fb \times L$$

Fa : External force [N]

Fb : External force [N]

W : Workpiece weight [Kg]

g : Gravity acceleration [m/s²]

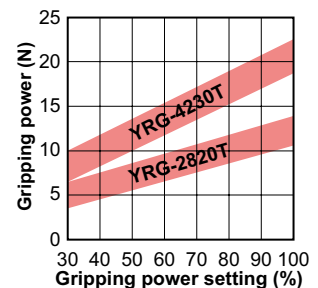
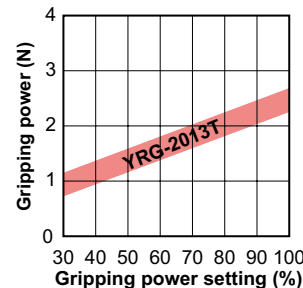
H : Distance of holding point [m]

F : Load [N]

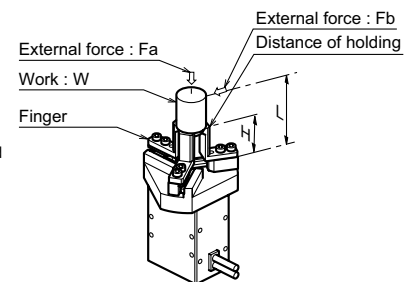
M : Moment [N·m]

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

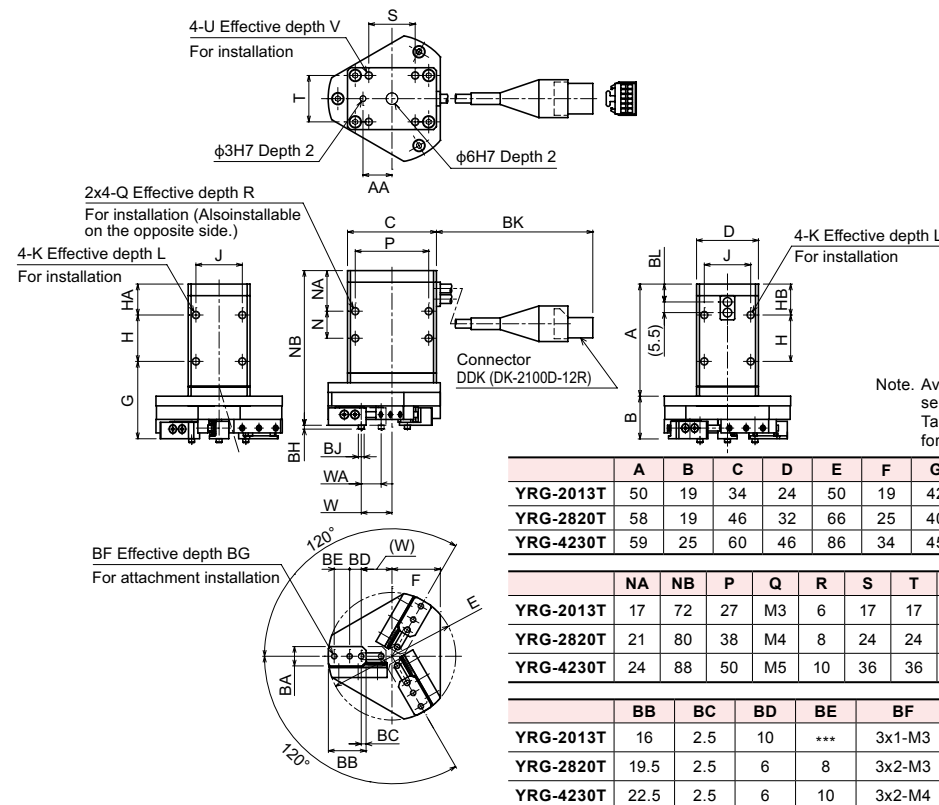
Gripping power vs. gripping power setting (%)



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



YRG-2013T/2820T/4230T



Note. Avoid extreme winding of the cable and fix the cable securely so that it does not move. Take appropriate measures so that any excessive force is not applied to the root of the cable.

	A	B	C	D	E	F	G	H	HA	HB	J	K	L	N
YRG-2013T	50	19	34	24	50	19	42	17	13	13	17	M3	6	17
YRG-2820T	58	19	46	32	66	25	40	24	16	16	24	M4	8	14
YRG-4230T	59	25	60	46	86	34	45	25	18	18	36	M5	8	13

	NA	NB	P	Q	R	S	T	U	V	W	WA	AA	BA
YRG-2013T	17	72	27	M3	6	17	17	M3	5	11.4 to 4.6	6.8st	12	10 ⁰ _{-0.02}
YRG-2820T	21	80	38	M4	8	24	24	M4	6	15.9 to 5.6	10.3st	15	10 ⁰ _{-0.02}
YRG-4230T	24	88	50	M5	10	36	36	M5	7.5	21.9 to 6.6	15.3st	20	14 ⁰ _{-0.02}

	BB	BC	BD	BE	BF	BG	BH	BJ	BK	BL
YRG-2013T	16	2.5	10	***	3x1-M3	8	2	φ3 ⁰ _{-0.01}	165+/-10	8.3
YRG-2820T	19.5	2.5	6	8	3x2-M3	6	2	φ3 ⁰ _{-0.01}	140+/-10	9.3
YRG-4230T	22.5	2.5	6	10	3x2-M4	8	3	φ4 ⁰ _{-0.012}	235+/-10	10.8

Electric gripper basic specifications

Item		Specifications	
Basic specifications	Applicable controller	RCX240/RCX240S	RCX340
	Number of connection grippers	Max. 2 units (One unit per slot, max. 2 slots)	Max. 4 units
Axis control	Control method	PTP motion	
	Min. setting unit	0.01mm	
	Position indication unit	Pulses, mm (millimeters)	
	Speed setting	20 to 100% (in 1% steps, Changeable by the program.)	
Programming	Acceleration setting	1 to 100% (in 1% steps, Setting by the acceleration parameter)	
	Teaching	MDI (coordinate data input), direct teaching, teaching playback, offline teaching (data input from external unit)	

Gripper control board specifications

Item		Specifications	
Axis control	No. of axes	1 axis	
	Position detection method	Optical rotary encoder	
	Min. setting distance	0.01mm	
	Speed setting	Set in the range of 20 to 100% to the max. parameter speed.	
Protective alarm		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.	

Part names and functions

RCX240

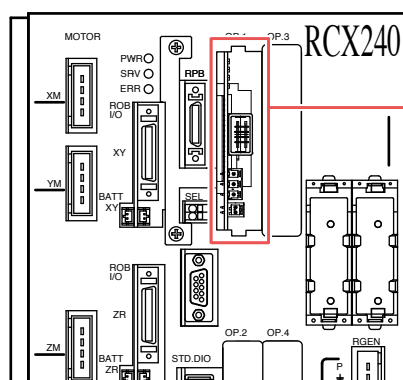
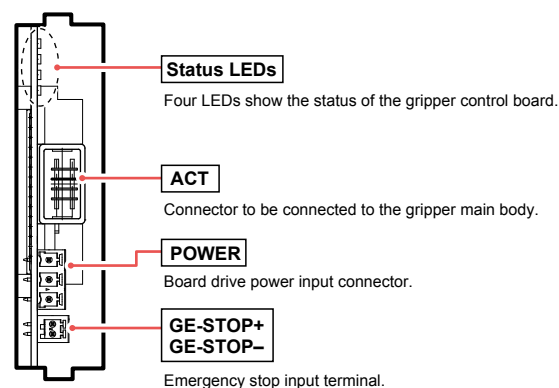


Figure when viewed from the front of the controller



RCX340

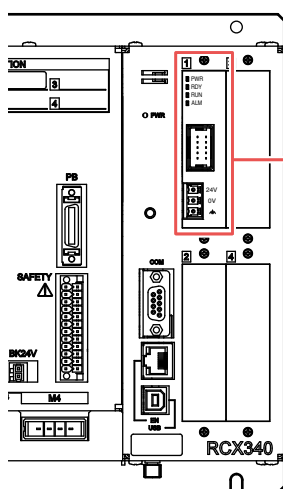
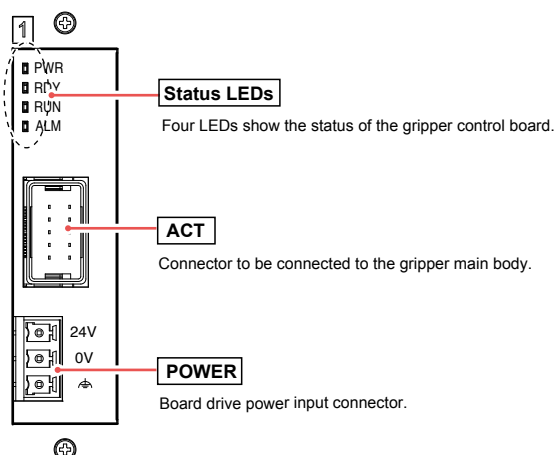


Figure when viewed from the front of the controller



Accessories and part options

YRG Series



Standard accessories

● Gripper control board

Model	For RCX240/RCX240S	KX0-M4400-F1	RCX240/S
	For RCX340	KCX-M4400-G0	RCX340

Note. This board includes a 24V supply connector.

● Robot (for gripper) cable



Model	3.5m	KCF-M4751-31	RCX240/S RCX340
	5m	KCF-M4751-51	
	10m	KCF-M4751-A1	

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	RCX240/S RCX340
	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	

● Connector for 24V power supply



Model	KCF-M5382-00	RCX240/S
		RCX340

● Connector for gripper emergency stop



Model	KCF-M5370-00	RCX240/S
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Note. Not included with the RCX340.

Articulated robots
YALinear conveyor
modules
LCM100Compact
single-axis robots
TRANSEVOSingle-axis robots
FLIP-XLinear motor
single-axis robots
PHASERCartesian
robots
XX-XSCARA
robots
YK-XPick & place
robots
YP-X

CLEAN

CONTROLLER

INFORMATION

Robot
positionerPulse string
driverRobot
controllerElectric
gripper

Option