YHX controller is introduced on another page. ▶ P.22

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

YHX controller for LCMR200/GX series ▶ P.22
Controller LCC140 for LCM100 ▶ P.33

		TRANSERVO	Robonity	FLIP-X		PHASER
		Stepping motor	[ABAS/ABAR/AGXS] General-purpose servomotor	[T4L/T5L] Small type servomotor (24 V・30 W)	General-purpose servomotor (30 to 600W)	Linear motor
1 axis	● I/O point trace ● Remote command ● Online command	P TS-S2 P.115 P TS-SH P.115	P EP-01 P.113		P TS-X P.115	P TS-P P.115
	● Pulse train	D TS-SD P.114		C ERCD P.119	D RDV-X P.112	D RDV-P P.112
	● Program (YAMAHA SRC language) ● I/O point trace ● Remote command ● Online command				C SR1-X P.119	C SR1-P P.119
2 axis	● Program (YAMAHA BASIC 2 language) ● I/O command ● Remote command ● Online command				C RCX320 P.121	
3, 4 axes	● Program (YAMAHA BASIC 2 language) ● Remote command ● Online command				C RCX340 P.121	

Five or more axes can also be supported

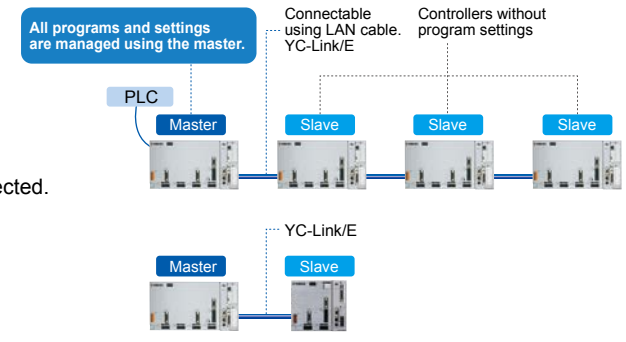
up to 16 axes

RCX320 RCX340

YC-Link/E

Up to four RCX320, RCX340 controllers (up to 16 controllable axes) can be connected.

The RCX340 controller and RCX320 controller can be connected.



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

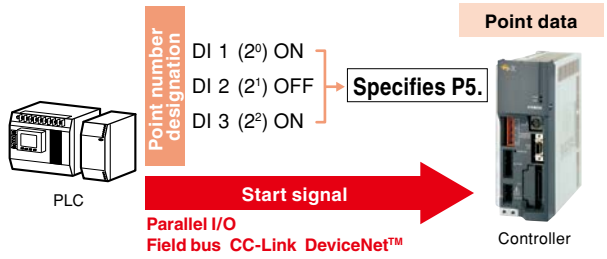
The single-axis robot controllers use the YAMAHA SRC language [Note] which is simple yet contains all required functions, such as I/O outputs and conditional branching, etc. The multi-axis controller RCX series uses the YAMAHA BASIC 2 language capable of more sophisticated programming and includes all 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.

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 2 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.

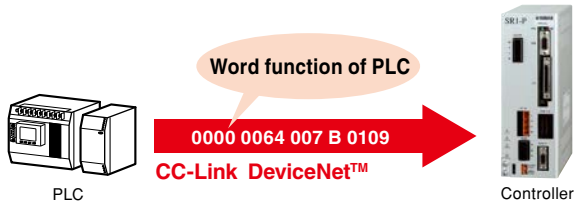


Remote command

Ideal for unified data management

The word function of the CC-Link or DeviceNet™ 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.

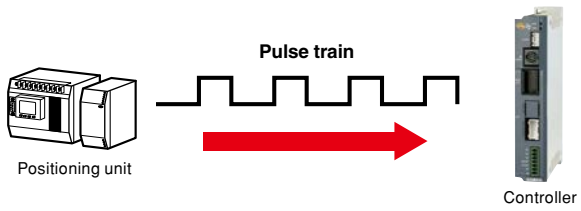
Note. This function is enabled when selecting an option network board.



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.

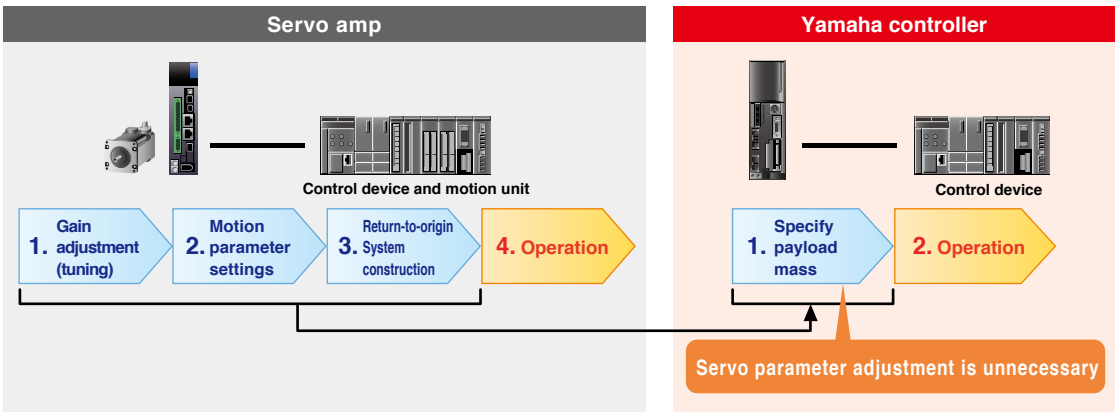
Note. Ethernet is enabled when selecting an option network board.
(For the RCX320 and RCX340, Ethernet is provided as standard function.)

POINT 2

Easy optimal setup

Complicated parameter settings are unnecessary

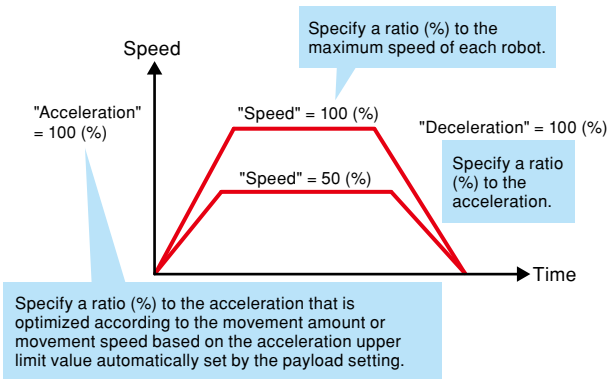
Robot controllers are specially designed for YAMAHA robots. Optimal values for servo parameters required for robot operation, such as gain are already registered beforehand. Start operating immediately without any need for complicated settings or tuning, even if you don't have knowledge or experience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



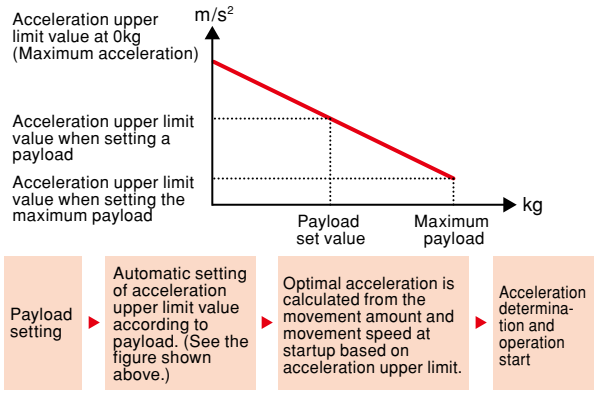
Easy acceleration/deceleration settings

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

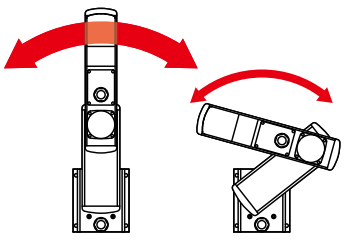


Zone control (= Optimal acceleration/deceleration automatic setting) function

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.

f 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 while single-axis controllers support up to 1,000 points. 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.

Name	Type	Number of points	Number of programs	Applicable network						Industrial Ethernet	Compliance with CE
				CC-Link	DeviceNet™	EtherNet/IP™	PROFIBUS	PROFINET	EtherCAT		
TS-S2/TS-SH	1 axis robot positioner	255	–	○	○	○	–	○	–	–	○
TS-X/TS-P		255	–	○	○	○	–	○	–	–	○
EP-01		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	○	○	–	○	–	–	–	○
RCX320	1 to 2 axes controller	30,000	100	○	○	○	○	○	○	○	○
RCX340	1 to 4 axes controller	30,000	100	○	○	○	○	○	○	○	○

RDV-X/RDV-P

FLIP-X PHASER

[Robot driver]


RDV-X


RDV-P

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.

EP-01

P.68

Robonity ABAS/AGXS/ABAR

[Robot positioner]

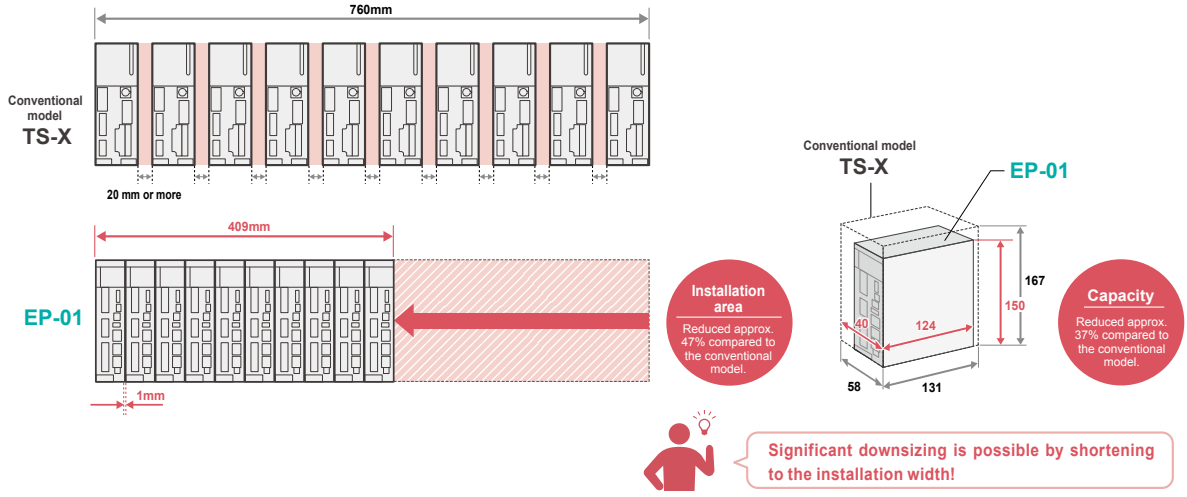
EP-01-A10

EP-01-A30

Operation method		Point trace (positioning operation by specifying the point number) / remote command
Input power	Main power	Single-phase 200 to 230 V AC ± 10%, 50/60 Hz
	Control power	Single-phase 200 to 230 V AC ± 10%, 50/60 Hz
Return-to-origin method		Absolute

Ideal for space saving

The controllers can be installed by narrowing the distance between them.



Support software “EP-Manager”

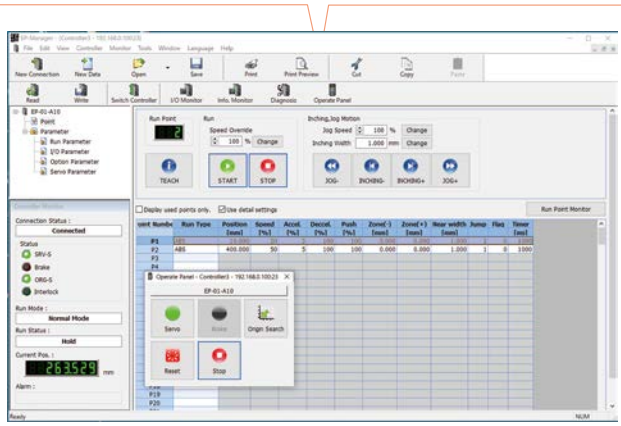
Free download available

Support software “EP-Manager” that allows you to perform “Setting” → “Pre-check” → “Debug” → “Maintenance” in a single step is provided free of charge.
Easy edit for robot operation, positioning, timing, or monitoring motor load.

Download from the web site (member site).

What you can do with EP-Manager.

- Parameter setting
- Point setting
- Debug (real-time trace)
- Robot operation
- Operation simulation
- Maintenance (alarm history check)



Main window

Extensive functions from pre-check to maintenance

Pre-check

Operation simulator

Operation simulator function is included to enable offline simulation.

Debug

Real-time trace

This function traces the current position, speed, load percentage, current, and voltage at real-time. Additionally,once trigger conditions are set, data can be automatically obtained when these conditions are met. Furthermore, by specifying a zone from the monitor results, the maximum value, minimum value, and average value can be calculated. These values are handy for trouble shooting.

Maintenance

Alarm history check

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

TS Series Common features

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.

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 speed
- Command current value
- Input/output I/O state
- Word input/output state Note 2
- Command position
- Current speed
- Current current value
- Input pulse count Note 1
- Current position
- Internal temperature
- Motor load factor
- Movement pulse count Note 1

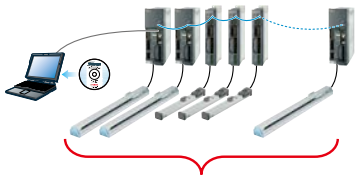
Note. 1: TS-SD only Note. 2: TS controller only

Excellent silence Note

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

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).

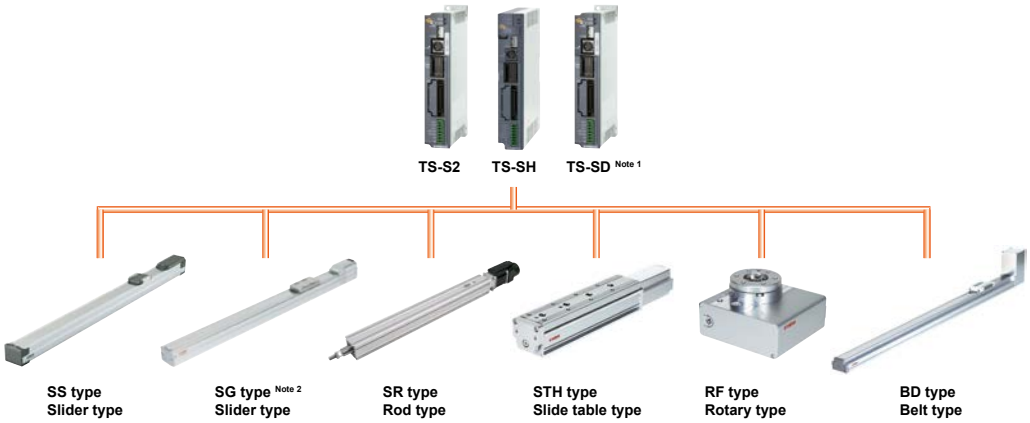


Up to 16 units

Note. TRANSERVO series

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 TRANSERVO

[Robot driver]

TS-SD

Operation method	Pulse train	
Input power	Main power Control power	DC 24 V +/- 10 % 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”.

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, back-up, 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-S2/TS-SH TRANSERVO TS-X/TS-P 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

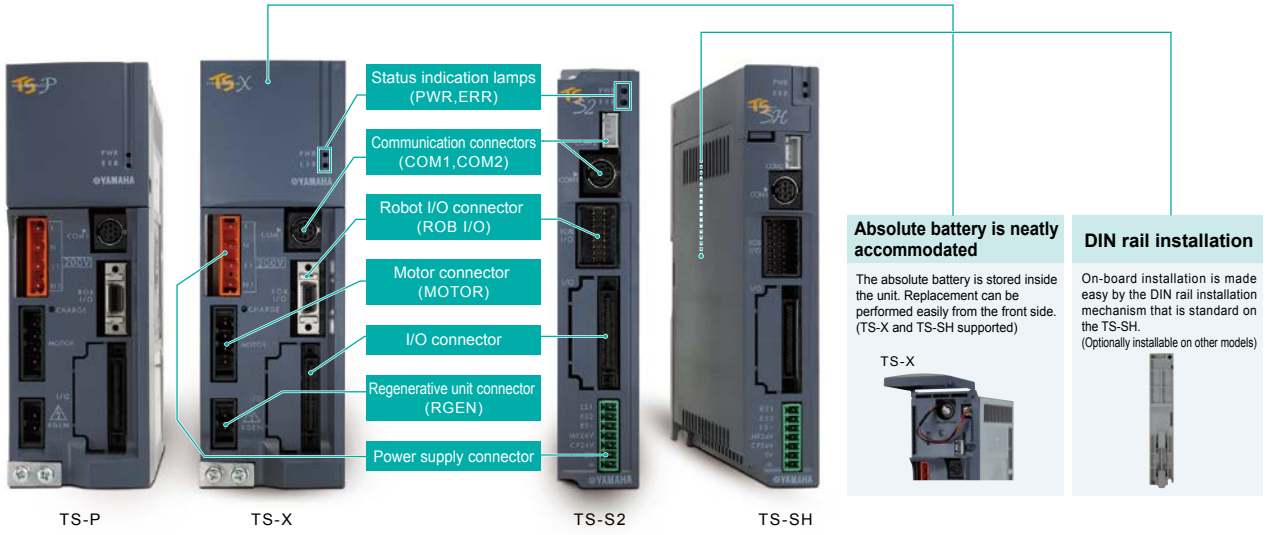
TS-X TS-P

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.

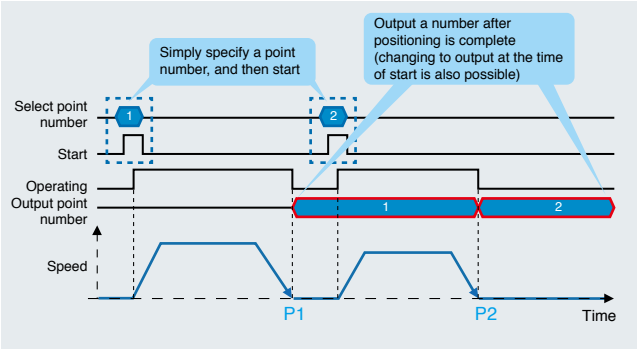
- **Gateway function**

  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

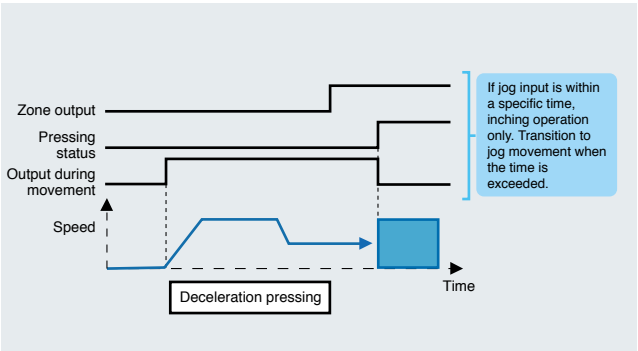
You can easily perform positioning operations by specifying the number of a point that is registered in the data, and entering a start command.



Number	Operation type	Position (mm)	Speed (%)	Acceleration (%)	Deceleration (%)	Branch	Timer (ms)
P1	ABS	100.00	100	100	100	0	0
P2	ABS	200.00	80	100	100	0	0

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.



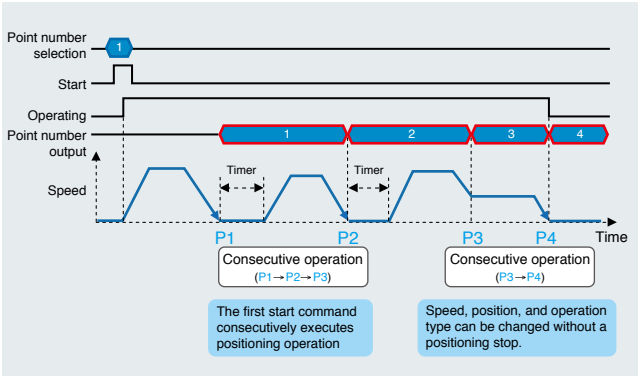
List of outputs

- 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

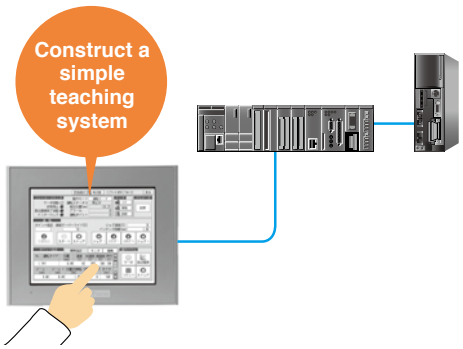
By specifying a branch destination, it is possible to execute positioning operations consecutively. Additionally, by specifying linked operation, operation with the branch destination can be executed while changing the speed without positioning stops; this allows control programming to be simplified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



Number	Operation type	Position (mm)	Speed (%)	Acceleration (%)	Deceleration (%)	Branch	Timer (ms)
P1	ABS	100.00	100	100	100	2	500
P2	ABS	200.00	80	100	100	3	800
P3	ABS linked	300.00	100	100	100	4	0
P4	ABS	350.00	30	100	100	0	0

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.



Remote commands

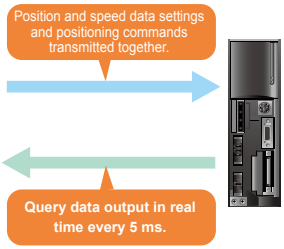
Ideal for unifying data management

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.

WIN0	WIN1	WIN2	WIN3
Command	Speed data	Position data	

WOUT0	WOUT1	WOUT2	WOUT3
Status	–	Query data	

Data can be managed on the control device



Query data list

- Current position
- Current
- Internal temperature
- Point number being executed
- Current speed
- Voltage
- Load ratio

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 interoperation with peripheral devices, or to obtain current values in order to monitor the status of a robot.

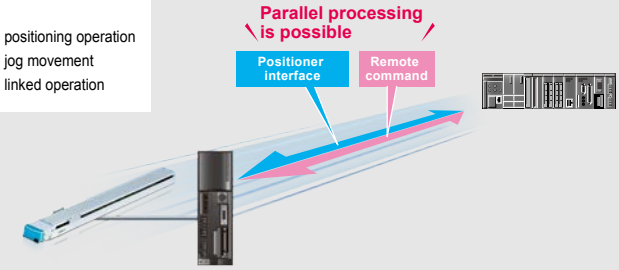
Parallel processing of "positioner interface" and "remote commands"

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

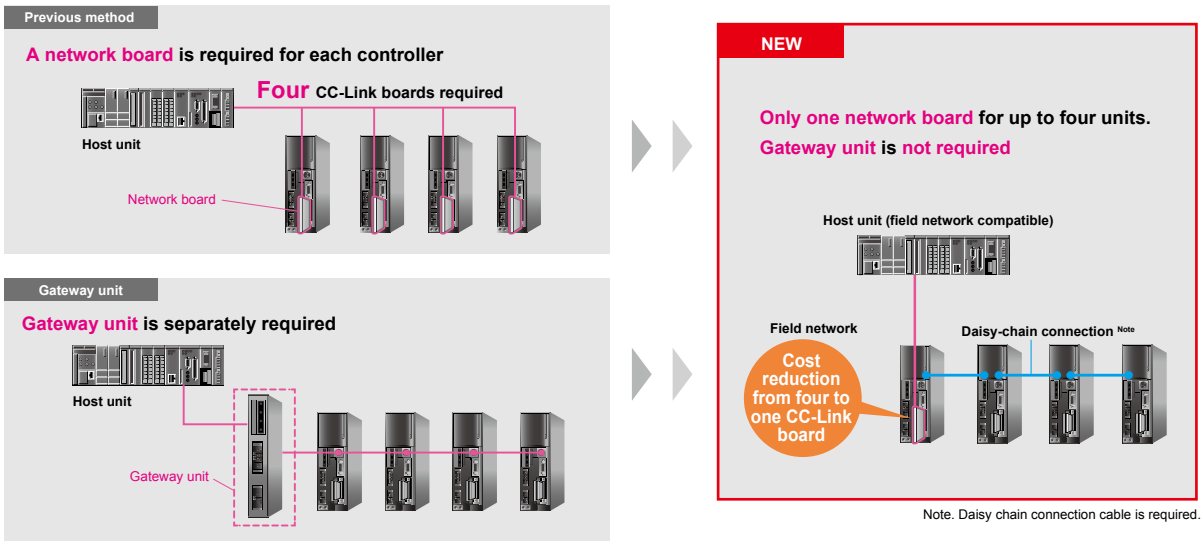


“Gateway function” — a new way to connect

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)

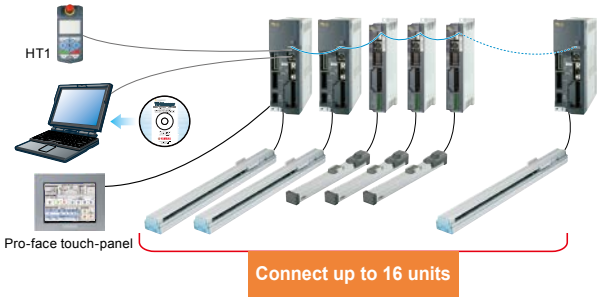


Note. Daisy chain connection cable is required.

Daisy chain connection

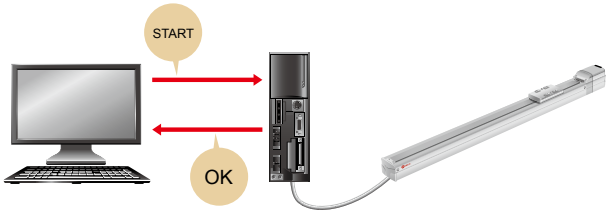
No need to connect or disconnect cables during operation (up to 16 units)

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.



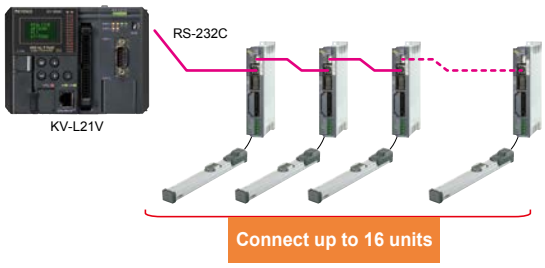
“KEYENCE PROTOCOL STUDIO Lite” serial communication settings software

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.

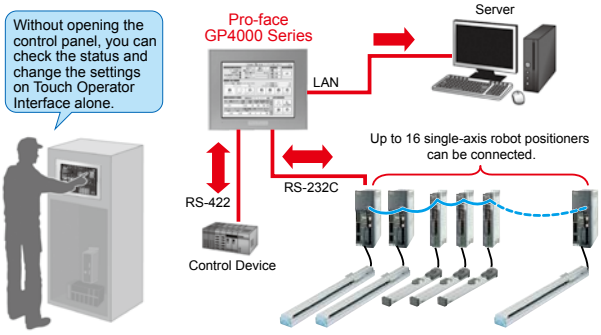
Free download of the program file from the Pro-face home page
http://www.proface.com

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

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	Control power	Single phase 100 to 115/200 to 230V AC +/-10% maximum
	Main power	SR1-X05/SR1-X10 Single phase 100 to 115/200 to 230V AC +/-10% maximum SR1-X20 Single phase 200 to 230V AC +/-10% maximum SR1-P05/SR1-P10 Single phase 100 to 115/200 to 230V AC +/-10% maximum SR1-P20 Single phase 200 to 230V AC +/-10% maximum
Origin search method		SR1-X Absolute, Incremental SR1-P Incremental, Semi-absolute

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

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 +/-10% maximum
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 installation space can be reduced greatly.

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

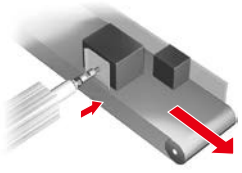
The error or alarm history that occurred in the past can be displayed and checked on the HPB or personal computer screen.

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.

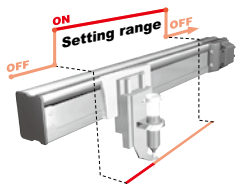
Torque limiting control

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.

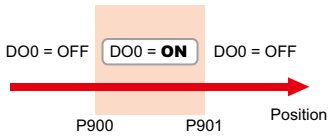


SR1-X/SR1-P/ERCD Various functions

Position data output function

Zone output

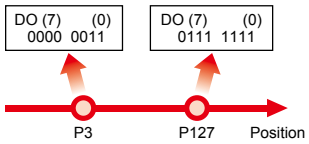
Outputs whether or not the robot position is within the specified range.



It is possible to reverse the output logic.

Point zone output

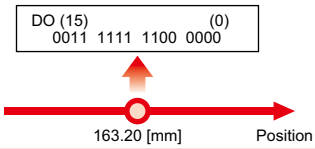
Outputs the point number near the robot position in binary format.



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

Binary output

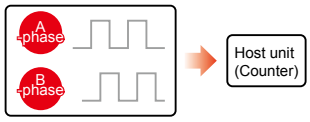
Outputs the current robot position in 16-bit binary format. (This function is available only in the SR1.)



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

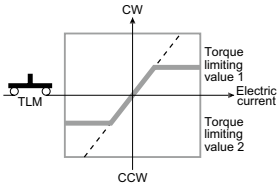
- The robot is moved to the teaching position using the JOG+/JOG- command.

- 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).

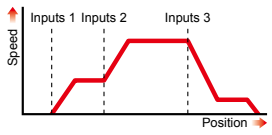
ERCD

- 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



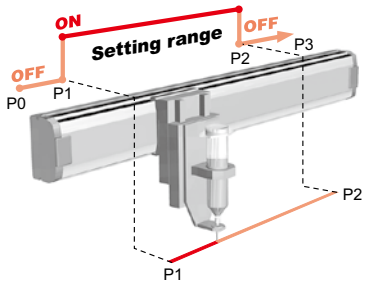
Features

- 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

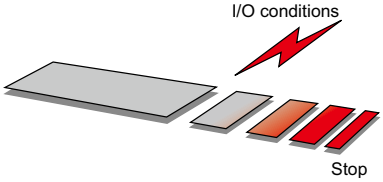
Multi-task function

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.



RCX3 series

RCX320 2 axes

RCX340 3 to 4 axes

[Multi-axis robot controller]

RCX320

Number of axes		2 axes
Operation method		Program, Remote command Online command
Number of points		30000 points
Input power	Control power	Single phase 200 to 230V AC +/-10% maximum
	Main power	Single phase 200 to 230V AC +/-10% maximum
Origin search method		Absolute, Incremental Semi-absolute

RCX340

Number of axes		3 to 4 axes
Operation method		Program, Remote command Online command
Number of points		30000 points
Input power	Control power	Single phase 200 to 230V AC +/-10% maximum
	Main power	Single phase 200 to 230V AC +/-10% maximum
Origin search method		Absolute, Incremental Semi-absolute

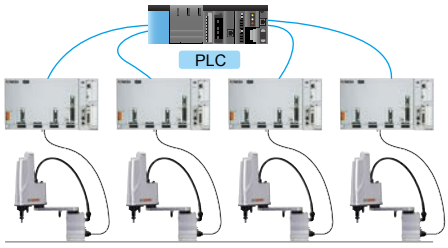
Advanced functionality allowing construction of high-level equipment

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.

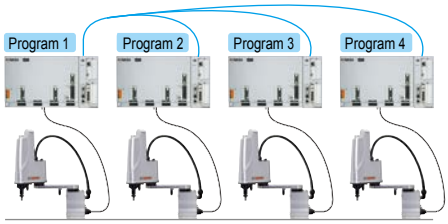
The control of multiple robots can be managed using one master controller

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, since the controller flexibly supports multitasking, interactions using PLCs can be simplified, making it easier to build systems at lower costs.

Conventional method



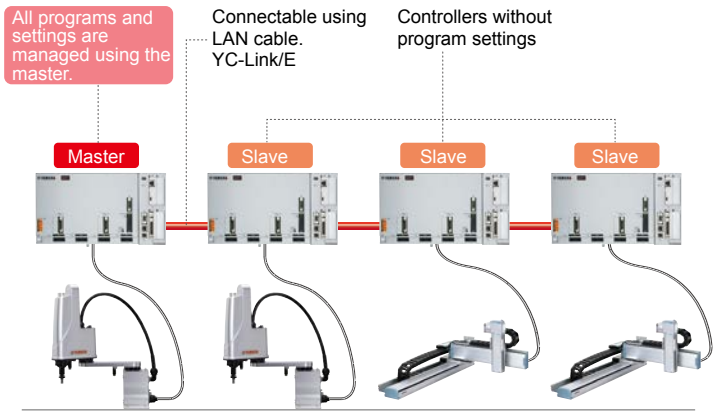
All controllers are controlled using one PLC.



Programs are set for each controller. Operation is performed while synchronizing the robots through I/O.

RCX340

- Up to four robots or 16 axes can be managed with one master RCX340.
- Simultaneous start and arrival of each robot can be controlled freely.

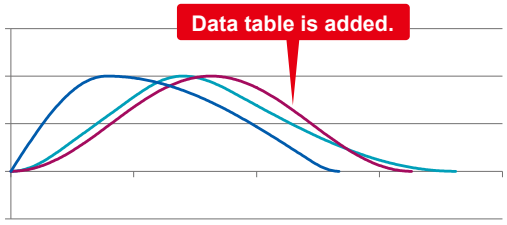


Motion optimization

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.



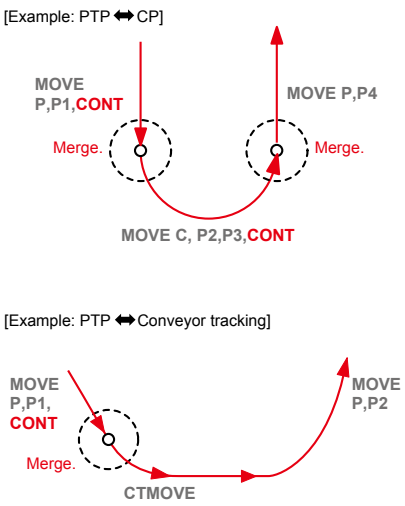
Smooth movement is achieved by greatly improving motion functions

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.

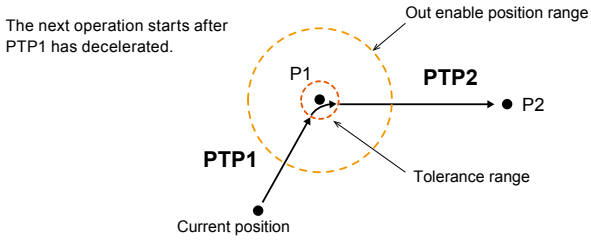
Different type operations can be merged.



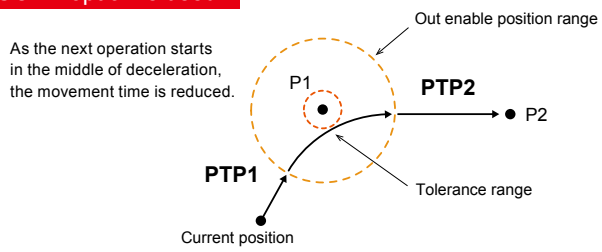
Improvement of continuous operation

By using the CONT option, such as when passing through a relay point in the middle of an operation to avoid an obstacle, it is possible to smoothly merge operations without decelerating and stopping for each operation. Regardless of the type of operation (PTP, interpolation operation), operations can be merged.

Normal movement



CONT option is used.

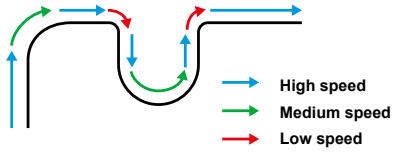


Proper use according to application Note

In merge PTP, priority is given to the movement time, and the movement speed is changed between the straight line section and circular interpolation section. In PATH, by registering paths in advance, it is possible to operate at a constant speed even on complex paths, and tracking accuracy is further improved. This is ideal for applications such as sealing.

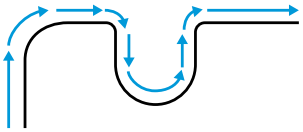
Merge PTP

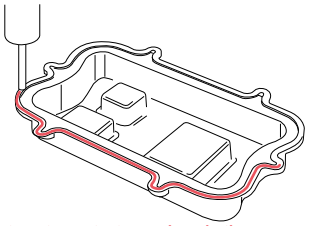
The operation speed is different between the straight line section and circular arc section.



PATH

Moves at constant speed along all paths.





Operates at constant speed on both straight line and circular arc sections.

PBX with USB port for backup

Simple and easy operation for adding function or editing work.

Storing backup data is a simple task.

The operation menu supports Japanese, English, and Chinese.

Convenient LED Display for Error Status.

The operation status is displayed on the “7-segment LED display” located on the front panel of the controller.

If an error occurs, the relevant error message is displayed. The error status can visibly recognized without connecting the programming box.

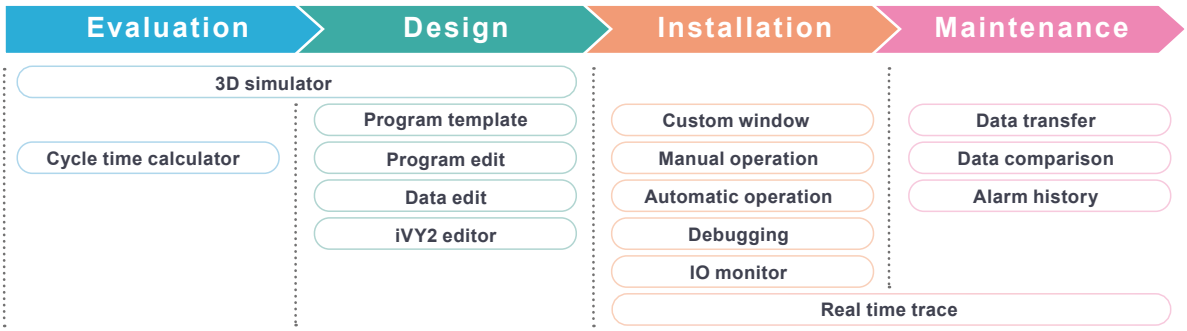
▲ 7-segment LED display

Built-in regenerative unit RCX340

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

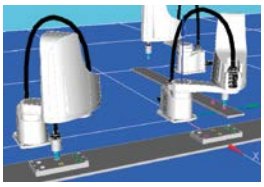
PC Programming Software “RCX-Studio 2020”

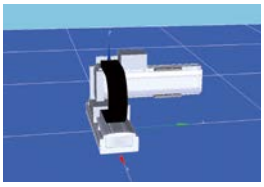
New functions such as 3D simulator function and program template (program template automatic creation function) are added for ease of user operation.



3D simulator

Layout can be verified beforehand without connecting robot.





Robots and peripheral devices are displayed in 3D, and the robot operation is simulated on PC. (This function supports SCARA and Cartesian robots.)

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

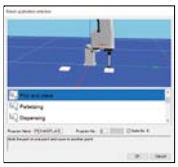
Program template (Program template automatic creation function)

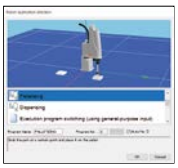
Program creation time can be shortened greatly.

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

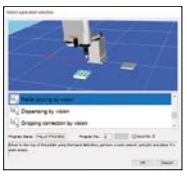
Supported applications

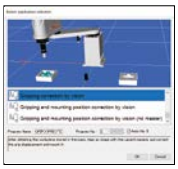
- Pick & place
- Palletizing
- Dispensing work
- Execution program switching
- Conveyor tracking
- Pallet picking using vision
- Dispensing with vision
- Gripping deviation correction using vision
- Parts orientation adjustment on the fly with vision
- Parts orientation adjustment on the fly with vision (without master)


Pick & place


Palletizing


Conveyor tracking


Pallet picking using vision

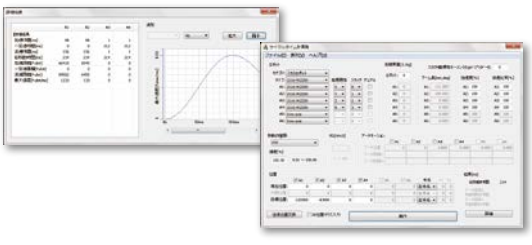

Parts orientation adjustment on the fly with vision


Switching execution program

Program automatic conversion function

Controller program for RCX240 and earlier is converted to that for RCX3 series.

Other functions



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

Cycle time calculator	Real time trace
Data comparison	Custom window creation function

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™, EtherNet/IP™, and EtherCAT are supported as options. Connections with general-purpose servo amplifier or other company's VISION are easy. So, the RCX320 and RCX340 is called "connectable controller".

Communication between controllers

YC-Link/E

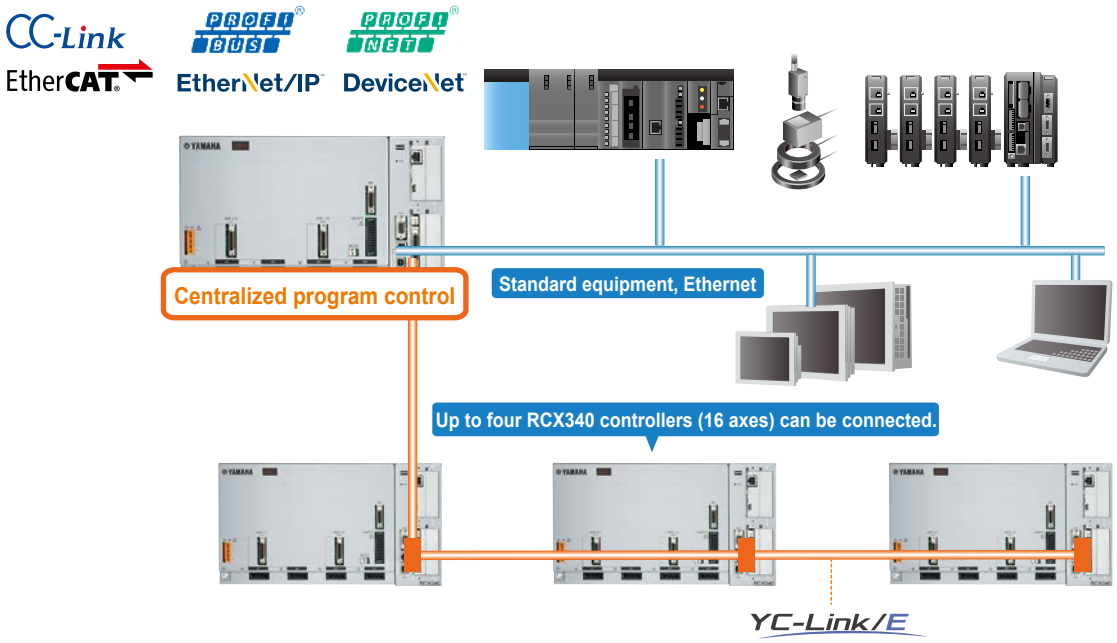
Up to four RCX320 and RCX340 controllers (up to 16 controllable axes) can be connected.

- 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

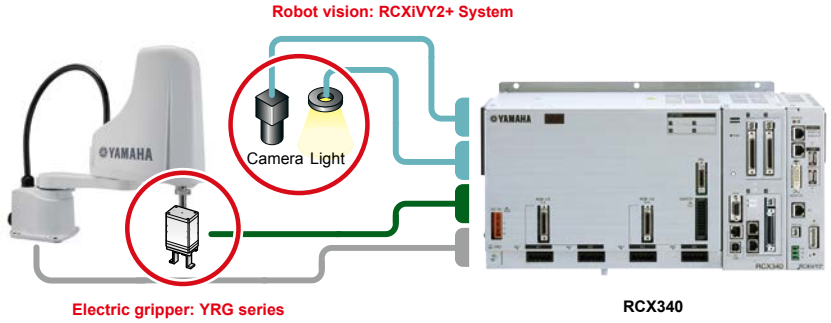
RS-232C and Ethernet ports are provided as standard equipment. Additionally, fulfilling field buses, such as CC-Link, EtherNet/IP™, DeviceNet™, PROFIBUS, PROFINET Note 1, and EtherCAT can be supported to connect and control a wide variety of devices. For 5 or more axes, use of YC-Link/E makes it possible 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.



Applicable to robot vision and electric gripper

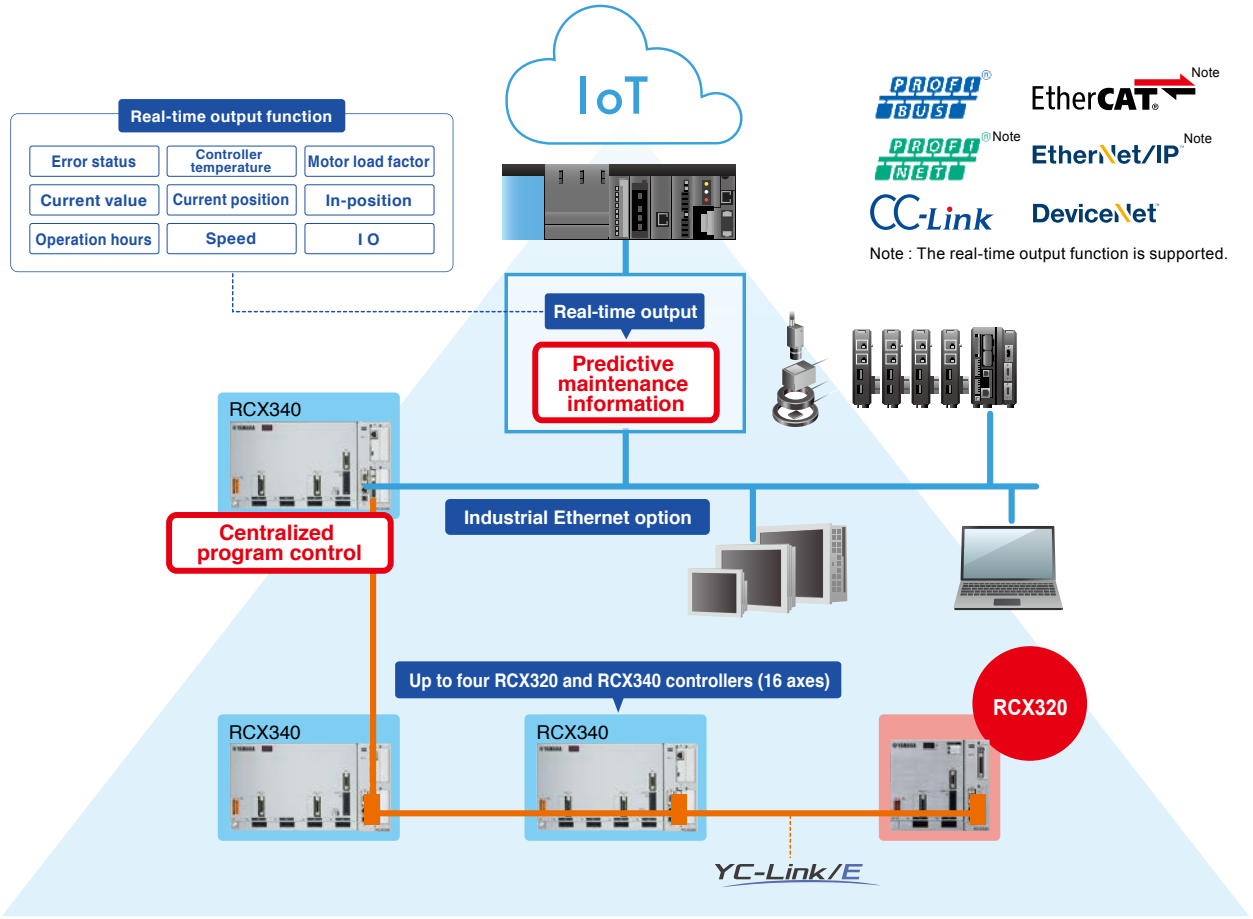
Robot integrated vision "RCXiVY2+" and electric gripper "YRG series" are supported. All control is possible with one robot controller. Data exchanging with the host unit, such as PLC is not needed. The setup or startup is very easy.



Real-Time output function for Preventive Maintenance.

Industrial Ethernet option Real-Time output function

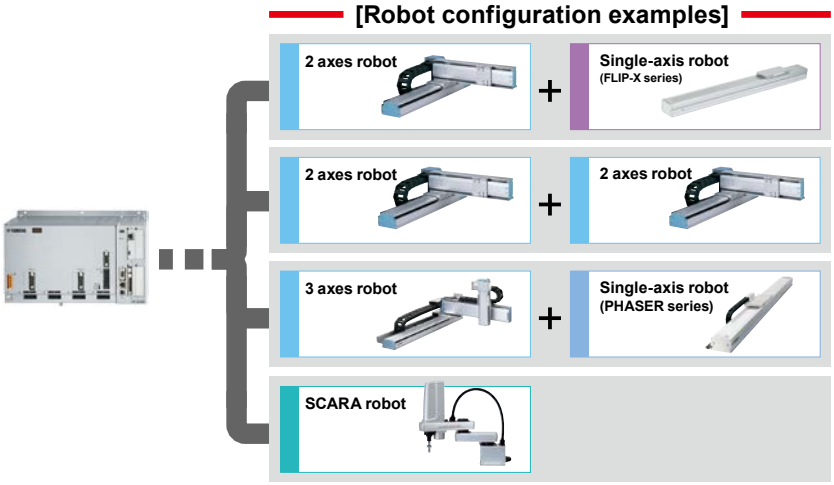
When the industrial Ethernet option (EtherNet/IP, EtherCAT, or Profinet) is selected, the information necessary for the predictive maintenance such as error status, current position, current value, motor load factor, operation hours, and others can be output in real-time to contribute to achievement of the “non-stop production line”.



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

The 4-axis robot controller 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.

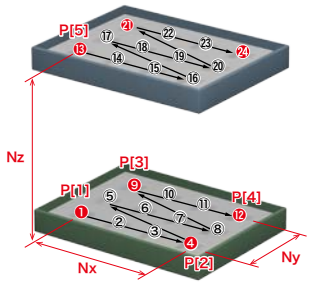


Major features and functions of RCX controller

To palletize.

Function: Palletize

By entering the coordinate values of the four corners on the palette and specifying the number of palettes in the vertical and horizontal directions, the coordinate values of each point are automatically generated. By specifying the coordinate values and the number of palettes in the height direction, a three-dimensional palette is also supported.
The maximum number of pallets that can be defined is 40, but the coordinate values of the four corners and the number of pallets in each direction can be changed by program, so virtually any number of pallets can be supported.



- **Number of pallets that can be used at the same time: 40**
- **2D/3D pallets are supported.**

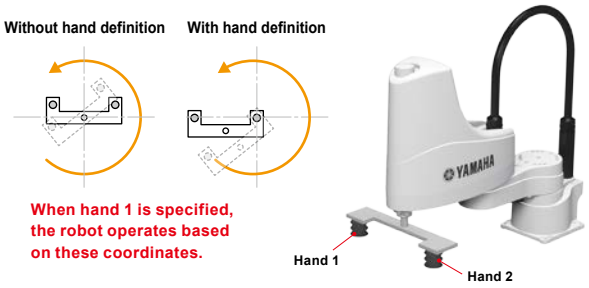
Sample program

PDEF(1)=3,4,2,P3991	···	Defines pallet definition 1 to Nx : 4, Ny : 3, and Nz : 2 using P3991 to P3995.
PMOVE(1,16),S=50	···	Moves the robot to the point at position number 16 of palette number 1 at 50% speed.

To use the tool offset from the tip of the robot.

Function: Hand definition

This function is used to operate the robot based on the coordinates of the offset tool tip when a tool is attached to the tip axis of the robot in an offset state. This function is especially effective when there are multiple hands or when a SCARA robot or a robot with rotation axis rotates around the tool.



- **Number of hands that can be registered: 32**
- **How to specify when there is R axis: 1) Angle based on +X direction**
  2) Hand length
  3) Z-axis offset amount

Sample program

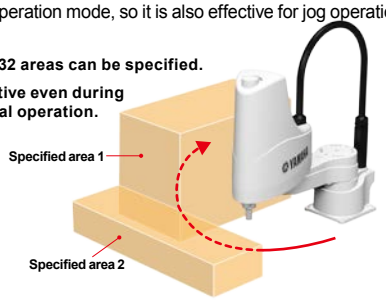
```
HAND H1= 0.000 150.000 0.000 R
HAND H2= -90.000 100.000 0.000 R
P1= 150.000 300.000 0.000 0.000 0.000 0.000
CHANGE H1   ··· Changes the hand data of robot 1 to hand 1.
MOVE P,P1   ··· Moves the tip of hand 1 of robot 1 to P1.
CHANGE H2   ··· Changes the hand data of robot 1 to hand 2.
MOVE P,P1   ··· Moves the tip of hand 2 of robot 1 to P1.
HALT
```

To prevent interference with peripheral devices.

Function: Area judgement output

When the robot enters the pre-registered range, a signal is output to the specified port. This function is useful when there are interfering objects in the equipment to limit the robot operation range or when multiple robots are used in a layout where they interfere with each other. This function operates regardless of the automatic or manual operation mode, so it is also effective for jog operation during teaching.

- **Max: 32 areas can be specified.**
- **Effective even during manual operation.**

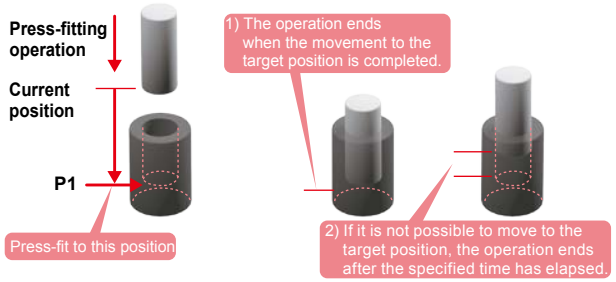


- **Number of areas that can be registered: 32**
- **Functions not only during automatic operation, but also during manual operation.**

To push the workpiece lightly.

Function: Torque limit (PUSH)

It is possible to operate by limiting the motor torque and movement speed when press-fitting a workpiece. If the movement to the target position is not completed even after the specified pressing time has elapsed, the operation stops.



- **Specified by axis.**
- **Pressing force designation: Specified by % to rated thrust.**
- **Pressing time value: 1 to 32767 msec**
- **Pressing speed designation: 1 to 100%**
- **STOPON condition designation: Movement stops when the conditions are met.**

Sample program

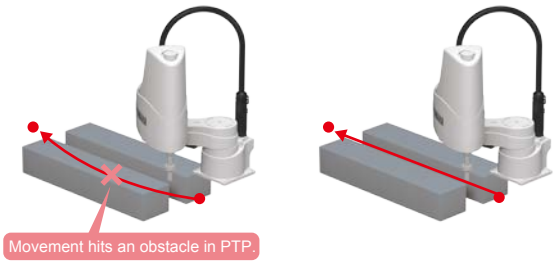
```
PUSH(3,P1),F=20,TIM=5000,S=10
        ··· Moves the 3rd axis to the position specified by P0 under the following
            conditions.
            Pressing force: 20% of rated thrust, Pressing time: 5 sec, Speed: 10%
            * The command ends when the pressing force reaches 20% for 5
              seconds or more.
```

To move along a specified path.

Function: Linear interpolation and circular interpolation (2D/3D)

2D/3D linear and circular interpolation control is possible. This function is effective for sealing work and when you want to specify a path to avoid obstacles.

For PTP movement **For linear interpolation**



- **Linear interpolation and circular interpolation are supported.**

<Option>

- **SPEED: Relative speed designation**
- **DSPEED: Absolute speed designation**
- **VEL: Linear speed designation (Specified in mm/s)**
- **STOPON condition designation: Deceleration stops when the conditions are met.**
- **CONT designation: Connects with next movement command.**
- **Acceleration/deceleration designation**
- **Port output designation: Outputs a signal after moving a specified distance.**

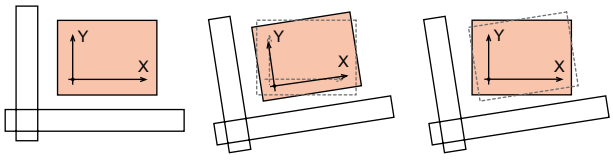
Sample program

```
MOVE L,P20          ··· Linear interpolation movement from the current position to P20
MOVE C,P21,P22,P23,P20  ··· Circular interpolation movement consisting of P21, P22, P23, and P20
MOVE L,P24          ··· Linear interpolation movement to P24
```

To remove the robot, but not to reteach it.

Function: 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.



- **Number of shifts that can be defined: 40**

Sample program

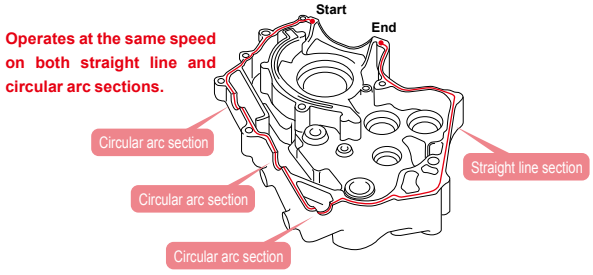
```
S0= 0.000 0.000 0.000 0.000      ··· Defines the shift coordinates of S0.
S1= 100.000 200.000 50.000 90.000  ··· Defines the shift coordinates of S1.
P3= 100.000                      ··· Defines the point data of P3.
SHIFT S0                         ··· Changes the shift coordinates to S0.
MOVE P,P3                        ··· PTP movement to P3.
SHIFT S1                         ··· Changes the shift coordinates to S1.
MOVE P,P3                        ··· PTP movement to P3.
HALT
```

To perform sealing at constant speed.

Function: PATH statement

Sealing requires the path accuracy and constant movement speed. PATH is a function that moves at a specified speed on a path consisting of straight lines and circular arcs, and is suitable for sealing applications because there is little speed fluctuation during movement.

It is possible to change the speed only for a part of the path or output a signal to a specified port at an arbitrary section during movement.



- **Moves at a "constant speed" along a specified path.**
- **After specifying the path in advance with "PATH SET, PATH, PATH END", start the movement with "PATH START".**
- **Up to 1000 points can be specified.**

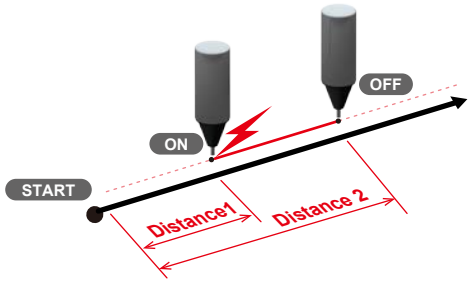
Sample program

```
PATH SET
PATH L,P1,DO(20)=1@10     ··· While moving from the current position to P1 by linear interpolation, set to output "1" to DO(20) at a 10 mm radius position from the start position.
PATH L,P2,DO(21)=1@12.5   ··· While moving to P2 by linear interpolation, set to output "1" to DO(21) at a 12.5 mm radius position from P1.
PATH END
PATH START
```

To output a signal during sealing movement.

Function: Passing point output

For applications such as turning discharge ON/OFF during sealing, general-purpose outputs can be controlled ON/OFF at a specified position without stopping the axis operation during interpolation operation. This function can be used with either the MOVE or PATH command.



- **Up to 3 decimal places can be specified (mm).**
- **Up to two times can be specified in one MOVE statement.**

Sample program

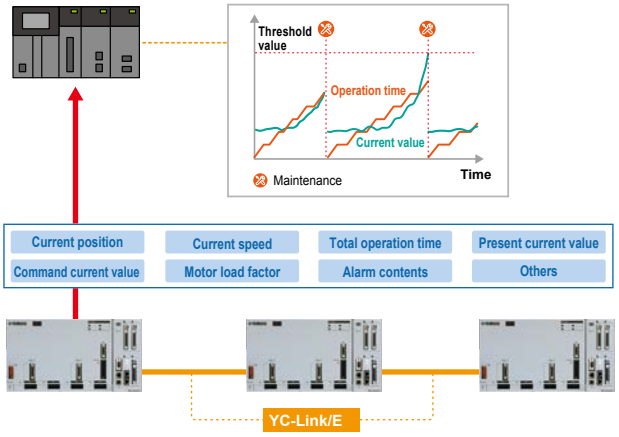
```
A!=10
B!=20
MOVE L,P1,DO(20)=1@A!,DO(20)=0@B!···After starting to move to P1, DO (20) is turned ON at the timing of 10 mm away and DO (20) is turned OFF at the timing of 20 mm away.
```

To output information necessary for predictive maintenance.

Function: Real-time output

Information necessary for predictive maintenance, such as error status, current position, current value, motor load factor, and operation time, can be output in real time.

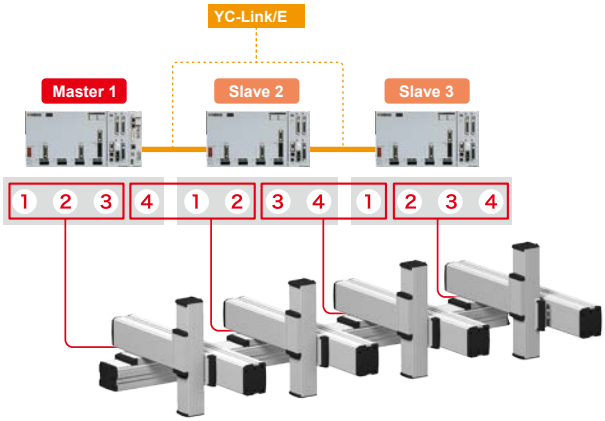
* Industrial Ethernet options (EtherNet/IP, EtherCAT, Profinet) are supported.



To control multiple robots with one controller.

Function: YC-Link/E

Multiple RCX controllers can be linked and controlled by one master controller. Single-axis, Cartesian, and SCARA robots can be mixed, and all network boards and vision units are mounted only on the master controller. Therefore, information on one camera can be shared by multiple robots.



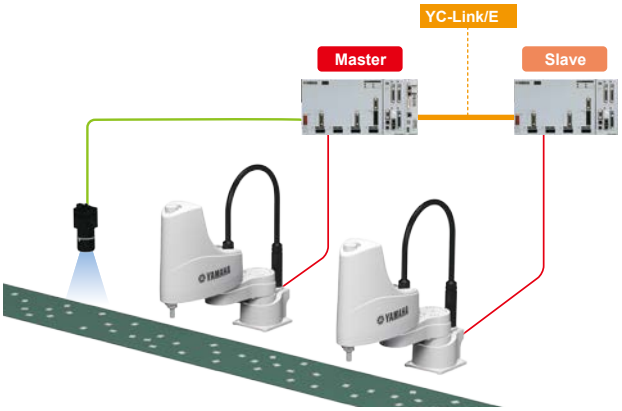
• Up to 4 controllers can be connected.
• When the RCX340 is used, up to 16 axes are supported.

To operate two robots efficiently.

Function: Multi-task

Multiple tasks (up to 16 tasks) such as robots and peripheral devices can be executed in parallel at the same time. Each task can be prioritized, and the priority can be changed while the task is running.

This is effective for applications such as simultaneously executing vision and robot operations in different tasks during conveyor tracking, and constantly monitoring the workpiece even during robot operation.



• Number of tasks that can be executed at the same time: 16
• Priority: 1 to 64 (high to low)

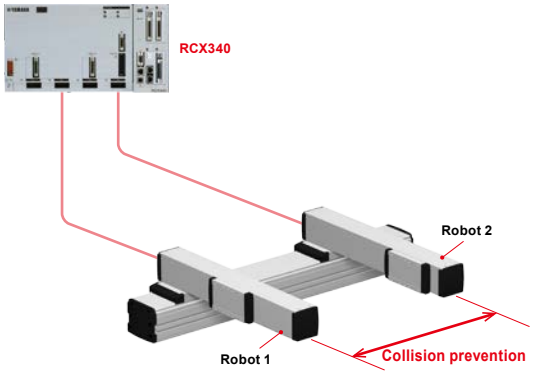
Sample program

```
Program name <TRACK_MAIN>
START<CONV_SCAN>,T2          ···Starts the search task.
*CONVEYOR:
WHILE CCHEKQUE(1)=-1         ···Repeats until no workpiece passes through
                                the work area.
CRMVQUE(1)                   ···Deletes workpiece elements that have
WEND                            passed through the area.
IF CCHKQUE(1)>0 THEN         ···Starts the work when workpiece enters
                                the work area.
(Robot operation routine)

ENDIF
GOTO *CONVEYOR               ···Repeats the routine.

Program name <CONV_SUB>
CTVISION ON(1)               ···Switches to vision use on conveyor 1.
*SCAN:
VSEARCH 1,2,0                ···Performs the search.
IF VGENCNT>0 THEN            ···Process when workpiece is detected.
FOR I%=0 TO VGETCNT-1        ···Adds search results to the position
                                monitoring array.
CADDQUEV 1,VGETPOS(I%),TG=I% ···Adds to the position monitoring queue.
NEXT I
ENDIF
GOTO *SCAN                   ···Repeats the search.
```

To control multiple robots with one controller.

Function: Multiple-robot setting

Each axis of one controller can be distributed and set to multiple robots.
The RCX320 supports up to 2 axes and the RCX340 supports up to 4 axes.
Furthermore, by connecting multiple controllers via YC-LINK/E, up to 4 robots and 16 axes can be set.

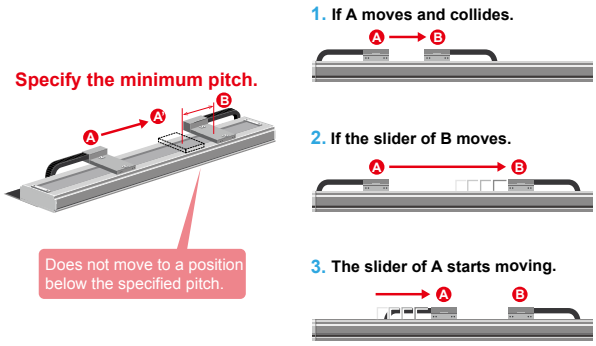


- Each robot can be operated using MOVE [1] to MOVE [4] commands.
- Using multi-task also allows smooth coordination of each robot.

To prevent pallet interference with the double carrier robot.

Function: Collision prevention function

With the double-carrier robot, collision of both carriers is prevented by control in the controller. No zone control or external sensor installation is required.
When a pallet larger than the carrier is mounted, the minimum distance between the carriers can be set using parameters.

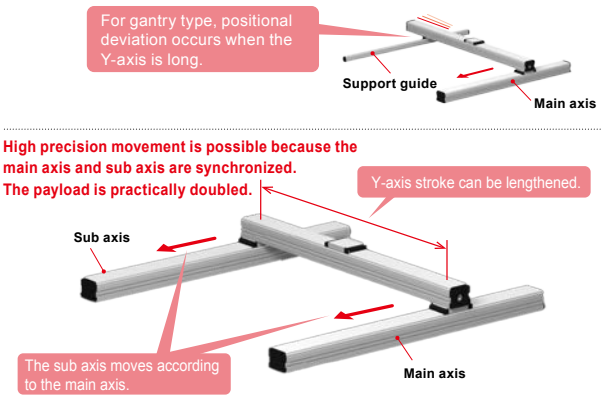


- Support for operating double-carrier robot with RCX (N15, N18, and PHASER series)

To lengthen the Y-axis stroke of the Cartesian robot.

Function: Dual drive

This function synchronously controls two robots of the same type. When the main axis is moved, the sub axis follows in accordance with the movement of the main axis.
This function is effective for transferring heavy objects and supporting the long Y-axis stroke of the Cartesian robot. It is also possible to synchronize two sliders with a double-carrier robot such as a linear motor.

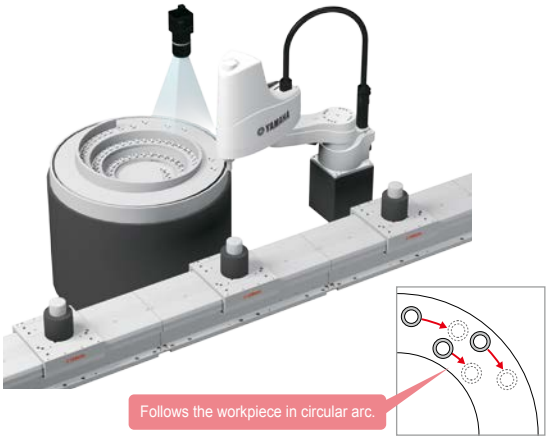


- Rigid dual: The main axis and sub axis are connected with high rigidity.
- Flexible dual: The main axis and sub axis do not have any force interference or are not connected.
- Tandem dual: Two sliders on the same axis are synchronized.

To pick up a workpiece while following a moving object.

Function: Conveyor tracking

Picking can be made by following the movement of the workpiece moving on the conveyor.
Straight line and circular arc tracking is supported. Since the follow-up operation is performed based on the encoder input signal, the follow-up operation is possible even when the conveyor speed fluctuates.
This function supports not only workpieces searched by robot vision, but also tracking by sensor signal input.



- Vision tracking and sensor tracking are supported.
- Number of encoders connected: 2
- Target encoder: Line driver equivalent to 26LS31/26C31
- Maximum response frequency: 2 MHz

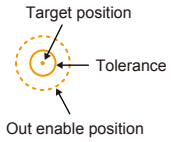
To increase the tact.

Function: Payload setting, arch motion, out enable position

Arch motion is effective for increasing the tact such as pick and place of workpieces. By specifying the linear movement distance when the Z-axis moves up or down, the operation can be performed with the optimal movement pattern.

In addition, increasing the value of the out enable position speeds up the timing for executing the next operation, which has the effect of reducing operation time.

* The robot is automatically set to the optimum acceleration when the payload is set. (Moment of inertia can also be set for SCARA robots.)



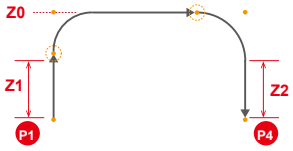
Out enable position:
When the axis tip enters this range, the next operation starts. When passing through relay points to avoid obstacles, etc., the operation time can be shortened by increasing this value.
* The value can be changed using the program.

Normal movement

Normally, P1 to P4 are specified. Each operation starts the next operation when it enters the out enable position range.

MOVE P,P2,CONT	··· Moves from the current position to P2.
MOVE P,P3,CONT	··· Moves to P3 without stopping when the out enable position is entered.
MOVE P,P4	··· Moves to P4 without stopping when the out enable position is entered.

Arch motion is used.



When the arch motion is operated,
- Only P1 and P4 are specified.
- Z-axis height during movement is specified. (Z0)
- The linear movement distances when ascending and descending are specified. (Z1, Z2)

A%=OUTPOS(3)	··· Assigns the parameter at the out enable position to A%.
OUTPOS(3)=2000	··· Changes the parameter at the out enable position to 2000.
MOVE P,P4,A3=0.00{50.00,70.00}	··· The A3-axis moves up to 0.00 mm when moving to P4. The A3 axis moves linearly 50.00 mm when ascending and 70.00 mm when descending.
OUTPOS(3)=A	··· Returns the parameter at the out enable position to the original value.

To improve the accuracy.

Function: WAIT ARM, tolerance setting, acceleration setting

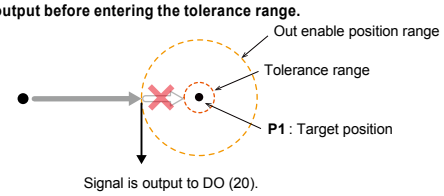
In a normal movement command, the next command is executed when the out enable position is entered. If positioning accuracy during operation is required, use “WAIT ARM” to execute the command after waiting for the position to fall within the tolerance range.

Additionally, since the tolerance range can be changed using the program, it is possible to move with different tolerance for each movement command.

- **WAIT ARM**
  Executes the next command after entering the tolerance range.
- **TOLE**
  Sets/acquires the tolerance parameter.

Normal movement

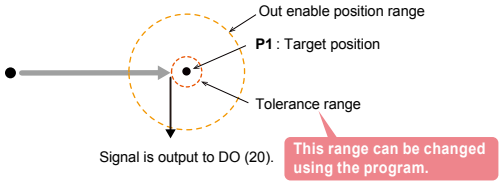
Signal is output before entering the tolerance range.



MOVE P,P1	··· Moves to P1.
DO(20)=1	··· “1” is output to DO20 when the out enable position is entered.

WAIT ARM is used.

Signal is output after entering the tolerance range.



MOVE P,P1	··· Moves to P1.
WAIT ARM	··· Continues to move until entering the tolerance.
DO(20)=1	··· “1” is output to DO20 when entering the tolerance range.

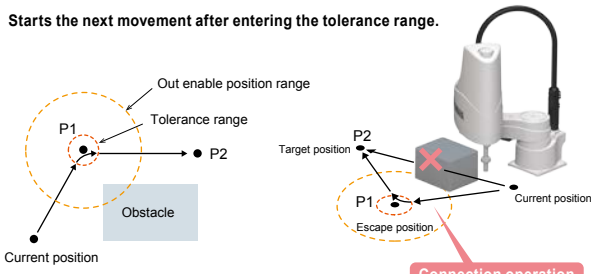
To operate without stopping at the avoidance point

Function: CONT option

When there is an obstacle on the robot movement path and an escape point is set to avoid it, use the CONT option in the movement command to enable smoother movement.
The normal MOVE command performs the positioning at each point, but when the CONT option is used, each movement is linked so that the movement continues without stopping in the middle.

Normal movement

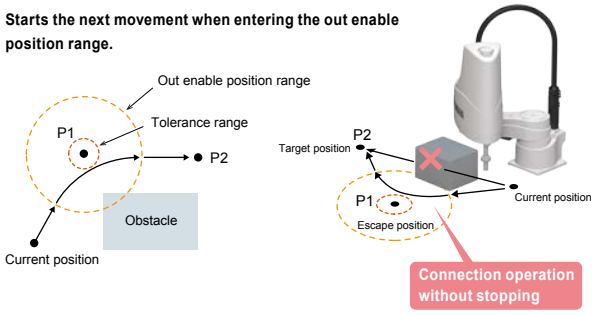
Starts the next movement after entering the tolerance range.



MOVE P,P1 ··· Moves to P1. When the movement axis enters the tolerance range, the movement to P2 starts.
MOVE P,P2

CONT option is used.

Starts the next movement when entering the out enable position range.



For out enable position

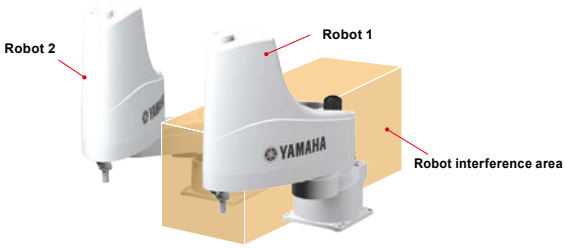
OUTPOS 10000 ··· Changes the OUTPOS parameters of all axes to 10000.
MOVE P,P1,CONT ··· Moves to P1. When the movement axis enters the out enable position range, the movement to P2 starts.
MOVE P,P2

To increase the tact using two robots.

Function: Area judgement output, internal output variable

When two robots are used to transfer a workpiece for tact-up purposes, the area judgment output can be used to ensure that the robots do not interfere with each other. In this case, by using the internal output variables (MI, MO), it is possible to exchange signals at high speed without using the host PLC.

Area judgement output setting



MO(20) ··· ON when robot 1 enters the area.
MO(40) ··· ON when robot 2 enters the area.

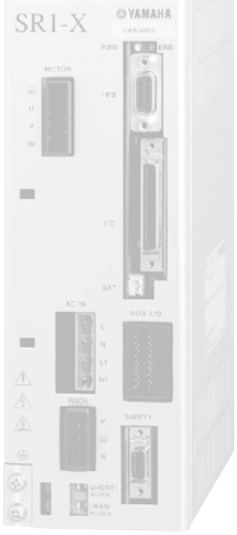
Program example

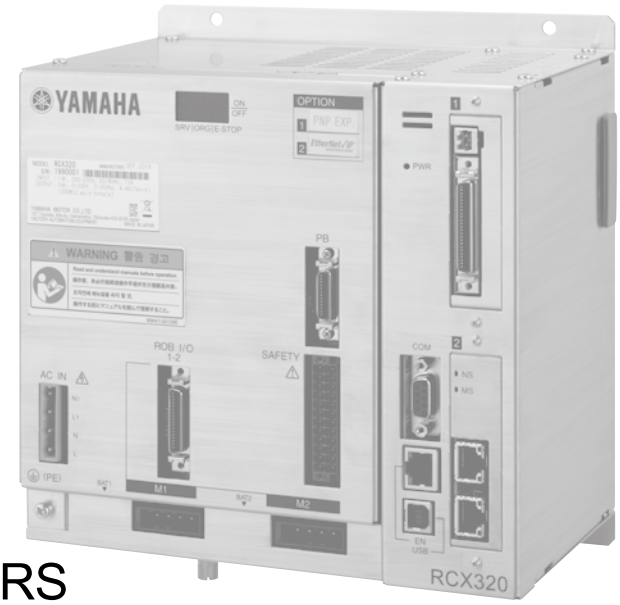
Program name <ROB1_MAIN>

```
START <ROB2_SUB>,T2      ··· Starts the sub task.
MOVE[1] P,P1,A3=0.00     ··· Moves to the standby position.
*LOOP1:
WAIT MO(50,40)=&B10      ··· Waits until robot 2 moves out of area.
MO(30)=0                 ··· Operating flag is OFF.
MOVE[1] P,P3             ··· Moves to the place position.
WAIT ARM[1]
MO(30)=1                 ··· Operating flag is ON.
MOVE[1] P,P2             ··· Moves to the pick position.
WAIT ARM[1]
GOTO *LOOP1
```

Program name <ROB2_SUB>

```
MOVE[2] P,P11,A3=0.00    ··· Moves robot 2 to the standby position.
*LOOP2:
MO(50)=1                 ··· Operating flag is ON.
MOVE[2] P,P12            ··· Moves to the pick position.
WAIT ARM[2]
WAIT MO(30,20)=&B10      ··· Waits until robot 1 moves out of area.
MO(50)=0                 ··· Operating flag is OFF.
MOVE[2] P,P13            ··· Moves to the place position.
WAIT ARM[2]
GOTO *LOOP2
```





YAMAHA ROBOT CONTROLLERS

CONTROLLER

CONTENTS

CONTROLLER FEATURE DESCRIPTION

LCMR200 / GX series

Robot controller

YHX

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

P.566

LCM100

Robot controller

LCC140

Linear conveyor module LCM100

P.576

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

Single-axis

Single-axis robot positioner

EP-01

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

P.582

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

Single-axis robot positioner

TS-S2/TS-SH

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

P.592

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

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

Single-axis robot positioner

TS-X/TS-P

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

P.592

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

Single-axis robot driver

TS-SD

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

P.602

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

Single-axis

Single-axis robot driver

RDV-X/RDV-P

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

P.606

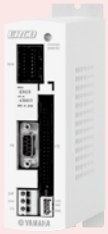
Operating method	Pulse train control
Input power	Control power supply: Single phase 200V to 230V +10% to 15 % Main power supply: Single phase/3-phase 200V to 230V +10% to 15 %
Origin search method	Incremental
Field networks	Not supported

Single-axis robot controller

ERCD

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

P.612



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

Single-axis robot controller

SR1-X/SR1-P

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

P.618

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

1 to 2 axis

Multi-axis robot controller

RCX320

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

P.626

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

1 to 4 axis

Multi-axis robot controller

RCX340/RCX341

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

[RCX341]
SCARA robot YK1200XG

RCX340 ▶ P.636 RCX341 ▶ P.646

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

RCX340

RCX341

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

CONTROLLER SPECIFICATION SHEET

Category			Robot controller		Robot positioner				
Name			YHX	LCC140	EP-01	TS-S2	TS-SH	TS-X	TS-P
External view									
Operating method			YHX Standard profile	Programming/ I/O point tracing/ Remote command/ Operation using RS-232C communication	I/O point tracing/ Remote command	I/O point tracing/Remote command/ Operation using RS-232C communication			
Applicable robot	LCMR200		●	—	—	—	—	—	—
	LCM100		—	●	—	—	—	—	—
	GX		●	—	—	—	—	—	—
	Robonity		—	—	—	●	—	—	—
	TRANSERVO		—	—		● Note 2	●	—	—
	FLIP-X	T4L/T5L/C4L/C5L	—	—	—	—	—	—	—
		FLIP-X other than above	—	—	—	—	—	●	—
	PHASER		—	—	—	—	—	—	●
	XY-X		—	—	—	—	—	—	—
	YK-X		—	—	—	—	—	—	—
	YP-X		—	—	—	—	—	—	—
	YK1200XG		—	—	—	—	—	—	—
Input power	Control power supply		Check the details page of the YHX controller.	Single phase 200 to 230V AC +/-10% maximum (50/60Hz)	Single phase 200 to 230V AC +/-10% (50/60Hz)	DC24V +/-10% maximum		● **AC100V specifications** Note 1 (105 / 110 driver) Single phase 100 to 115V AC +/-10% maximum (50/60Hz) ● **AC200V specifications** (205 / 210 / 220 driver) Single phase 200 to 230V AC +/-10% maximum (50/60Hz)	
	Main power supply								
Number of controllable axes				Single-axis					
Origin search method				Incremental	Absolute	Incremental	Absolute/ Incremental	Absolute/ Incremental	Incremental/ Semi-absolute
Maximum number of programs				100	—	(program not required)			
Maximum number of steps per program				999 steps	—	(program not required)			
Points				10,000 points	255 points	255 points			
Multitasks				4	—	—	—	—	—
I/O points	Dedicated I/O			8 points/4 points	16 points/16 points	16 points/16 points	16 points/16 points	16 points/16 points	16 points/16 points
	General I/O			16 points/16 points	—	—	—	—	—
Field network support	CC-Link		●	●	—	●	●	●	●
	CC-Link V2		—	—	●	—	—	—	—
	DeviceNet		—	●	—	●	●	●	●
	EtherNet/IP		●	●		●	●	●	●
	Ethernet		—	—	—	—	—	—	—
	PROFINET IRT		—	—	—	—	—	—	—
	PROFINET		●	—	●	●	●	●	●
	EtherCAT		●	—	●	—	—	—	—
CE marking			●	—	●	●	●	●	●
Programming box			YHX-PP (with enable switch)	HPB / HPB-D (with enable switch)	HT2 / HT2-D (with enable switch)	HT1 / HT1-D (with enable switch)			
Support software for PC			YHX-Studio for Standard Profile	POPCOM+	EP-Manager	TS-Manager			
Detailed info page			P.566	P.576	P.582	P.592			

Note 1. 20A specifications provide only 200V.
Note 2. Exclude SG07
Note 3. Maximum number of general-purpose I/O points when option OP.DIO boards (4 boards) are installed.

	Robot driver			Robot controller					
	TS-SD	RDV-X	RDV-P	ERCD	SR1-X	SR1-P	RCX320	RCX340	RCX341
									
	Pulse train control			Pulse train control/ Programming/ I/O point tracing/ Operation using RS-232C communication	Programming/I/O point tracing/ Remote command/ Operation using RS-232C communication		Programming/Remote command/ Operation using RS-232C communication		
	—	—	—	—	—	—	—	—	—
	—	—	—	—	—	—	—	—	—
	—	—	—	—	—	—	—	—	—
	—	—	—	—	—	—	—	—	—
	●	—	—	—	—	—	—	—	—
	—	—	—	●	—	—	—	—	—
	—	●	—	—	●	—	●	●	●
	—	—	●	—	—	●	●	●	●
	—	—	—	—	—	—	●	●	●
	—	—	—	—	—	—	—	●	●
	—	—	—	—	—	—	●	●	●
	—	—	—	—	—	—	—	—	●
	DC24V +/-10% maximum	Single phase 200 to 230V AC +10% to -15% (50/60Hz +/-5%)		DC24V +/-10% maximum	● **05 / 10 / 20 driver** Single phase 100 to 115V/200 to 230V AC +/-10% maximum (50/60Hz)		Single phase 200 to 230V AC +/-10% maximum (50/60Hz)		
		Single phase / 3-phase 200 to 230V +10% to -15% (50/60Hz +/-5%)			● **05 / 10 driver** Single phase 100 to 115V/200 to 230V AC +/-10% maximum (50/60Hz) ● **20 driver** Single phase 200 to 230V AC +/-10% maximum (50/60Hz)				
	Single-axis			Single-axis	Single-axis		2 axes maximum Max. number of robots 4	Max. number of robots 4 Max. number of controllable axes 16	
	Incremental			Incremental	Absolute/ Incremental	Incremental/ Semi-absolute	Absolute/Incremental/ Semi-absolute		
	—	—		100	100		100		
	—	—		1024 steps	3000 steps		9999 steps		
	—	—		1000 points	1000 points		30000 points		
	—	—		4	4		16		
	—	—		8 points/3 points	8 points/4 points		8 points/9 points		
	—	—		6 points/6 points	16 points/16 points		96 points/64 points (Max.) Note 3		
	—	—	—	—	●	●	●	●	●
	—	—	—	—	—	—	—	—	—
	—	—	—	—	●	●	●	●	●
	—	—	—	—	—	—	●	●	●
	—	—	—	—	—	—	●	●	●
	—	—	—	—	●	●	●	●	●
	—	—	—	—	—	—	●	●	●
	—	—	—	—	—	—	●	●	●
	●	●	●	—	●	●	●	●	●
	—	—		HPB / HPB-D (with enable switch)			PBX /PBX-E (with enable switch)		
	TS-Manager	RDV-Manager		POPCOM+			RCX-Studio 2020		
	P.602	P.606		P.612	P.618		P.626	P.636	P.646

Controller operating methods

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

YHX

Dedicated for LCMR200 / GX series

Order model: **YHX-HD** – [ ] – [ ]

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

*1. CC-Link is a registered trade mark of Mitsubishi Electric Corporation.
*2. PROFINET is a registered trade mark of PROFIBUS Nutzerorganisation e.V. (PNO).
*3. EtherNet/IP is a registered trade mark of ODVA, Inc.
*4. EtherCAT is a patented technology and a registered trademark licensed by Beckhoff Automation GmbH (Germany).

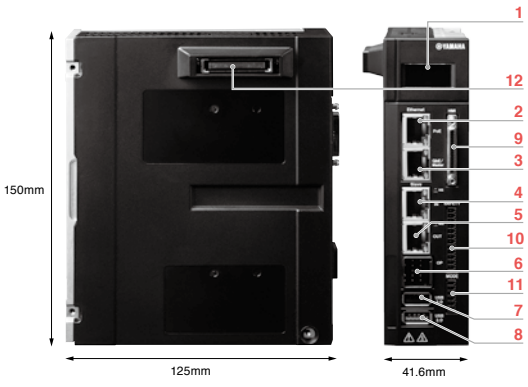
The YHX-HD is a set model of the host controller unit, driver power unit, and related components shown below. Each unit should be assembled by the customer.

YHX-HD Configuration parts

▶Control unit

Host

Host controller unit



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

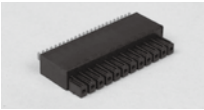
This unit can control multiple robots by combining with the linear conveyor. Although the unit is compact, it is multifunctional and has an enhanced interface.

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

Safety connector

Host YQLink

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



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

Mode connector

Host

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

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

HMI short circuit connector

Host

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

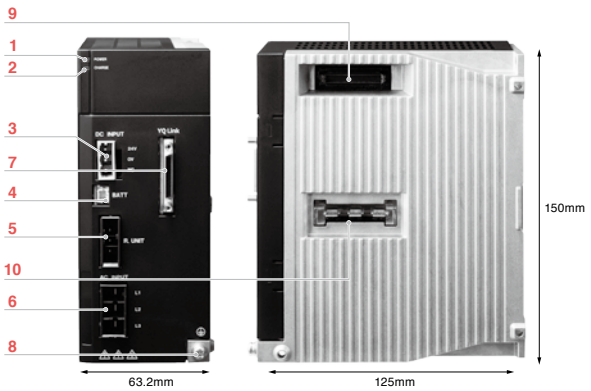
Model	YHX-CN-HMIS
Parts No.	KEK-M4429-00

Controller

▶Power unit

D. Power

Driver power unit



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

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

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

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

Control power supply connector

D. Power

Used when supplying the control power supply.

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

Main power supply connector

D. Power

Used when supplying the main power supply.

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

Regenerative unit short circuit connector

D. Power

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

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

Selection options

Field network

EtherCAT slave

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

EtherNet/IP adapter (slave)

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

PROFINET slave

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

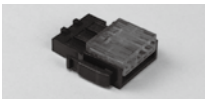
CC-Link slave (with adapter and connector)

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

Connector for CC-Link

CC-Link connector

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



CC-Link branch-out connector

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

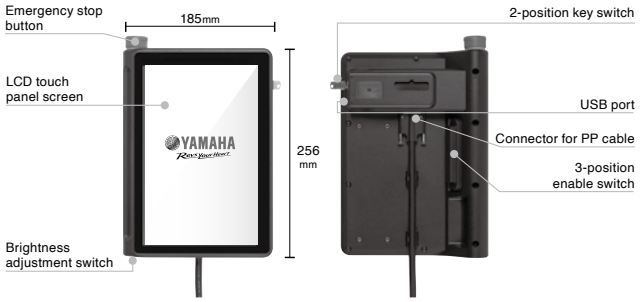
<Cautionary notes on field networks>
The YHX controllers are not equipped with a field network board.
Entering the activation code, which is issued for each host controller, into the host controller unit enables field network functions.
The activation code certificate comes with a host controller unit.

* If purchasing a field network only later on, inform us of the serial number of the host controller unit because it is necessary to issue the activation code.
* When the CC-Link option is selected, the CC-Link adapter × 1, CC-Link connector × 2, and CC-Link branch connector × 1 are supplied with the product. When the CC-Link terminating connector is needed, order it separately.

The parts with the marks below are their respective constituent parts. Host … Host controller unit D. Power … Driver power unit Regenerative unit … Regenerative unit YQLink …YQLink expansion Drivers … Driver unit

Programming pad (cable set)

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



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

Programming pad

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

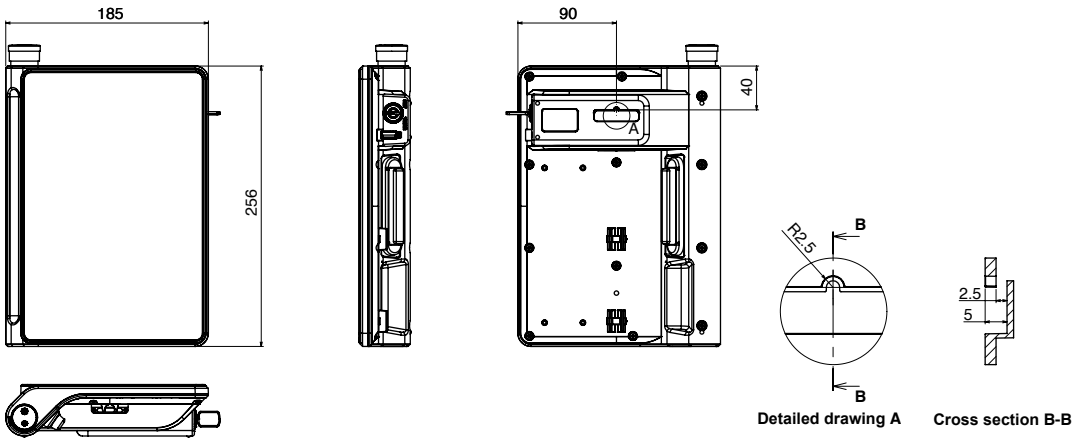
Programming pad cable

Host

Used when connecting a programming pad.

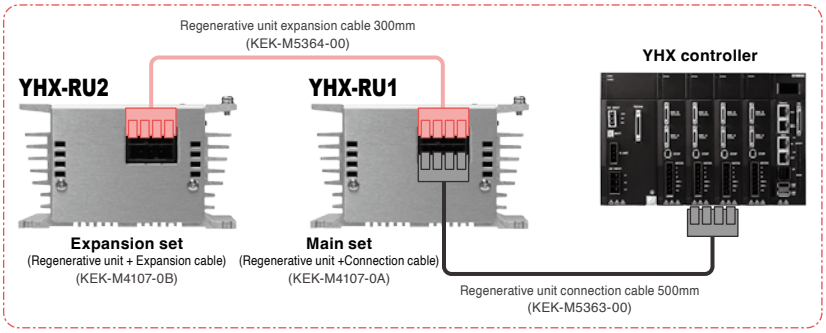
6 m	Model	YHX-PP-6M
	Parts No.	KEK-M5362-61
12 m	Model	YHX-PP-12M
	Parts No.	KEK-M5362-C0

Dimensions



Regenerative unit set

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



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

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

Regenerative unit

Regenerative unit (Main set)

Set model of regenerative unit and regenerative unit connection cable

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

Regenerative unit

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

Regenerative unit connection cable

D. Power | Regenerative unit

Used when connecting a regenerative unit.

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

Regenerative unit

Regenerative unit (Expansion set)

Set model of regenerative unit and regenerative unit expansion cable

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

Regenerative unit

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

Regenerative unit expansion cable

Regenerative unit

Used when adding a regenerative unit.

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

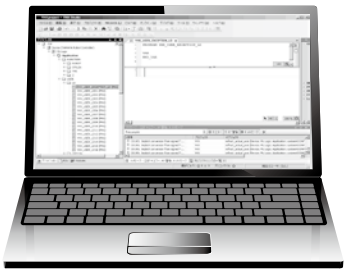
Development environment software YHX Studio for Standard Profile

Order model: YHX-SW-STUDIO-SP (KEK-M4990-10)

* No USB key is attached.

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

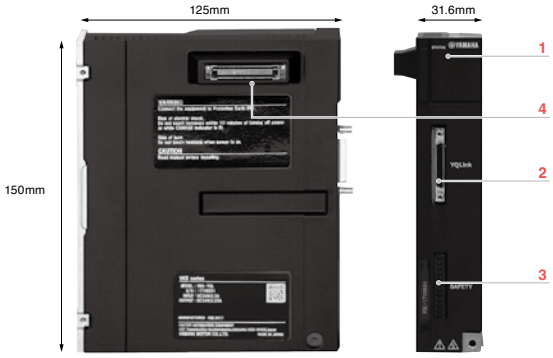
YHX Studio for Standard Profile is software that is used when the YHX host controller unit of the YAMAHA robot controller YHX series is set up.



Download from website

YQLink expansion unit set

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



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

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

YQLink

YQLink expansion unit

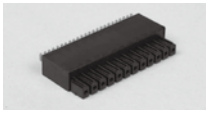
Model	YHX-YQL
Parts No.	KEK-M4406-0A

Safety connector

Host YQLink

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

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



Other options

Battery holder box

Order model: YHX-BATT-HLD

D Power

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

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

Battery holder connection cable

Order model: YHX-BATT-15C

D Power

Used when the battery holder box is connected.

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

CC-Link terminating connector

Order model: YHX-CN-CCTM

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

STOP connector

Order model: YHX-CN-STOIN

Drivers

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

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

Connector for brake power

Order model: YHX-CN-BU

Drivers

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

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

The parts with the marks below are their respective constituent parts. Host … Host controller unit D. Power … Driver power unit Regenerative unit … Regenerative unit YQLink …YQLink expansion Drivers … Driver unit

Driver for single-axis robot

Order model:

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

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

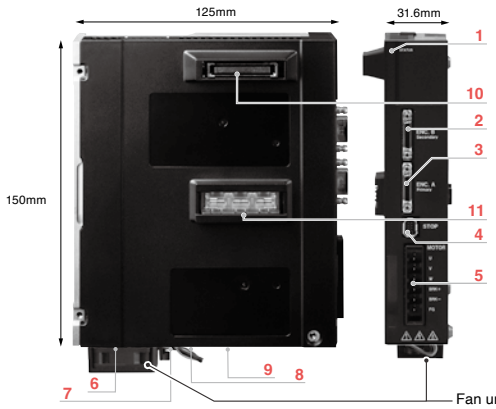
The customer assembles the necessary number of driver units between the host controller unit and driver power unit to use them.

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

▶Control unit

Drivers

Host controller unit 10A/30A



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

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

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

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

Stop short circuit connector

Drivers

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

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

Fan unit (30A specifications only)

Drivers

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

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

Selection options

ABS battery

D. Power Drivers

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

Brake unit

Drivers

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

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

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

The parts with the marks below are their respective constituent parts. Host … Host controller unit D. Power … Driver power unit Regenerative unit … Regenerative unit YQLink …YQLink expansion Drivers … Driver unit

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

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

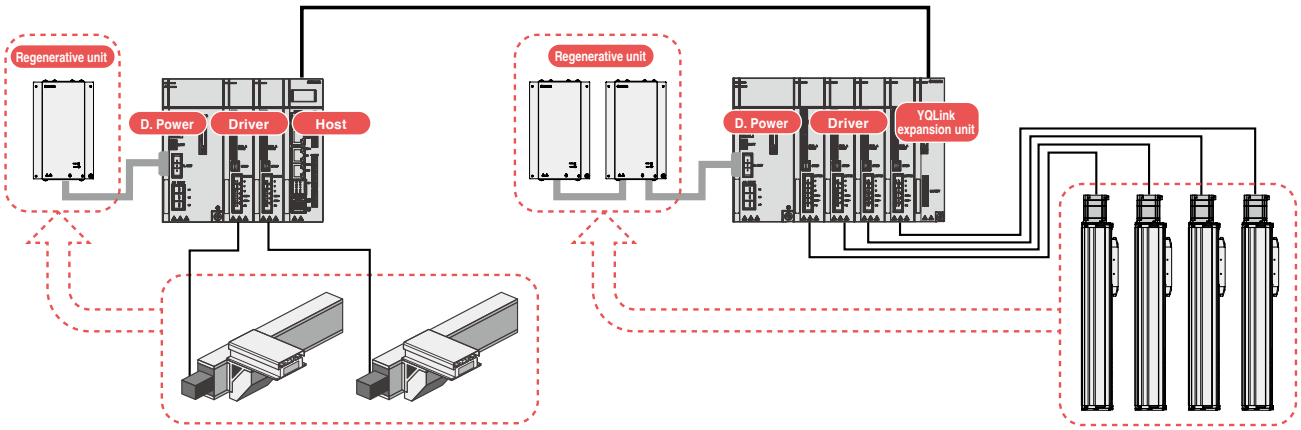
Number of regenerative units required for one D. Power.

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

*1 Add D. Power using the YQLink extension unit.
In addition, after the D. Power has been added, separate the junction axis and single-axis robot, and check the number of regenerative units required for each D. Power.

Example of selecting the required number of regenerative units

When two horizontal circulation units and four axes of the vertically installed GX20 are connected, this corresponds to *1 and add D. Power using the YQLink extension unit.
Then, separate the D. Power to which the junction axis (horizontal circulation unit) is connected and the D. Power to which the single-axis robot (GX20) is connected, and then select the number of regenerative units required for each D. Power.



Usage configuration of single-axis robot ①

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

Usage configuration of single-axis robot ②

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

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

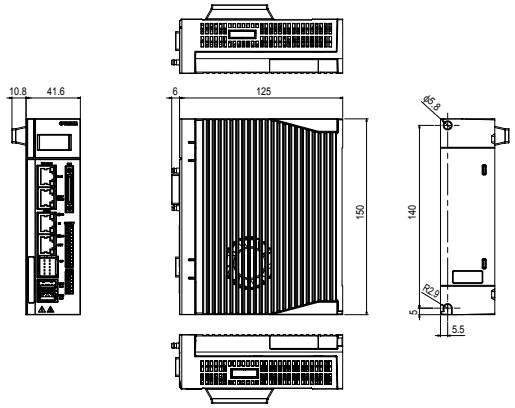
* The operating duty is calculated by the following formula.

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

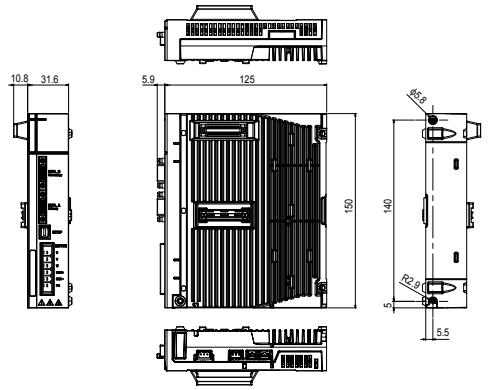
For the robot that reciprocates in one cycle, the total forward and backward movement time becomes the “total robot movement time”.

External view of each unit

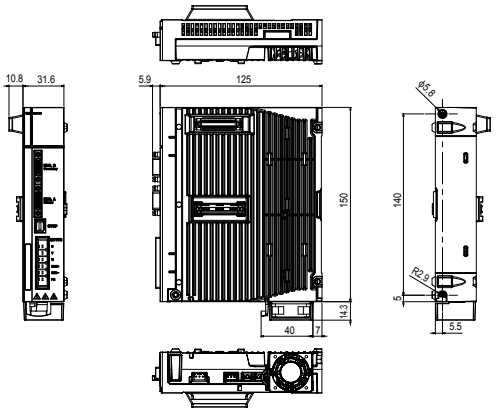
Host controller unit
YHX-HCU KEK-M4200-0A



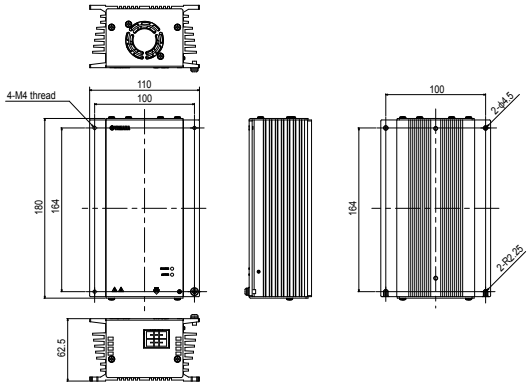
Driver unit 10A
YHX-A10 KEK-M5800-0A



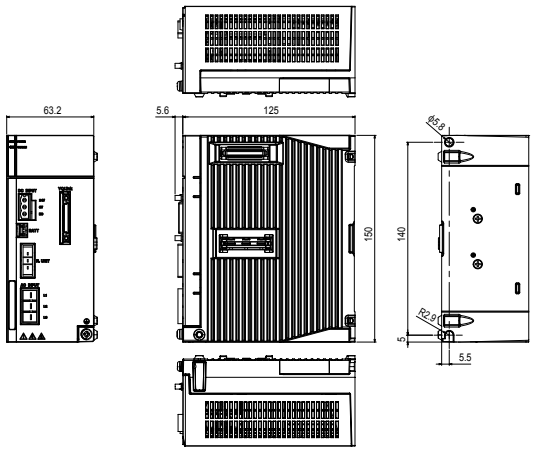
Driver unit 30A
YHX-A30 KEK-M5800-1A



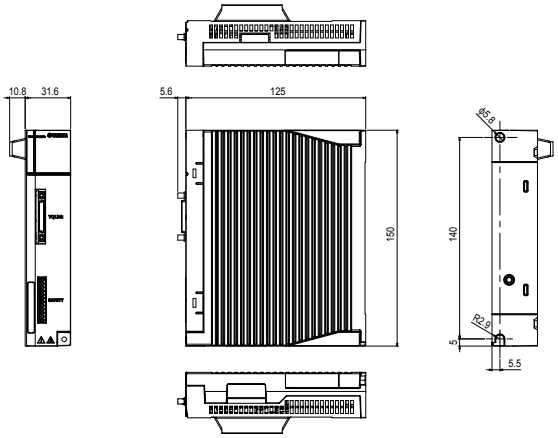
Regenerative unit
YHX-RU KEK-M5850-0A



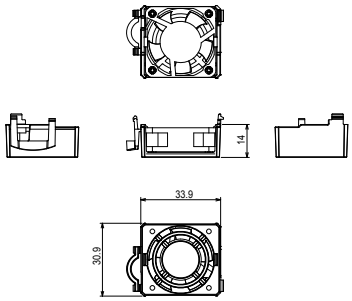
Driver power unit
YHX-DPU KEK-M5880-0A



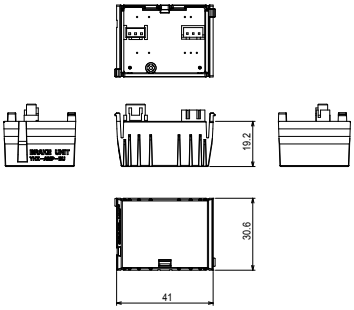
YQLink expansion unit
YHX-YQL KEK-M4406-0A



Fan unit
YHX-AMP-FU KEK-M6195-00



Brake unit
YHX-AMP-BU KEK-M5317-00



Basic specifications

Host

Host controller unit

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

Item		Host controller unit
Power supply	Control power supply	Voltage: 21.6 to 26.4V DC (24V +/-10%)
		Current: 3.5 A (Including PoE)
Connector	External I/F	Giga bit Ethernet · Compatible with PoE yet 1 port (23W) · Not compatible with PoE yet 1 port Field network (Slave) Select one from the following 4 kinds. · EtherCAT · CC-Link* · EtherNet/IP * A separate adaptor is necessary. · PROFINET USB · USB 2.0 1 Port (Bus power 0.5 A) · USB 3.0 1 port (Bus power 1.0 A)
	HMI	Connector for connecting programming pad
	SAFETY	Emergency stop contact output Enable switch contact output Emergency stop input
	MODE	CPU OK output Programming pad AUTO/MANUAL select key switch output
Indicator	LCD	128 x 64 dots, Yellow
Dimensions		41.6×150×125 (mm)
Weight		750g
Protection structure / Protection rating		IP20 / class 1

D. power

Driver power unit

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

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

Regenerative unit

Regenerative unit

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

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

YQLink

YQLink expansion unit

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

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

Driver

Driver unit

Servo motor specifications (10A)

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

Driver unit

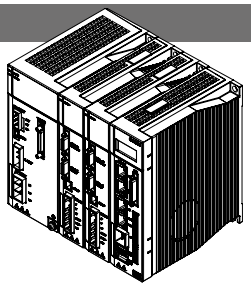
Servo motor specifications (30A)

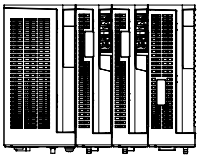
Model	YHX-A30
Parts No.	KEK-M5800-1A

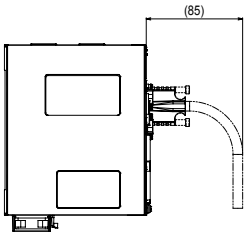
Item		Driver unit 10A/30A
Power supply	Control power supply	Voltage: 21.6 to 26.4V DC (24V +/-10%)
		Current: 0.8A (Including brake unit power supply)
Connector	ENC.A	Encoder input
	ENC.B	Encoder input (Dedicated use)
	STOP	Gate off input, 2 points Gate status output, 1 point
	MOTOR	Motor drive power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

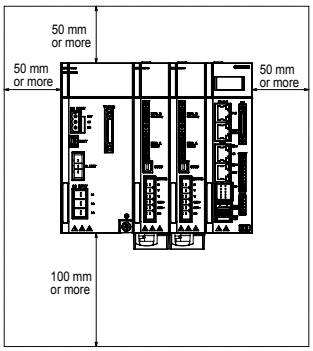
External view of YHX unit combination

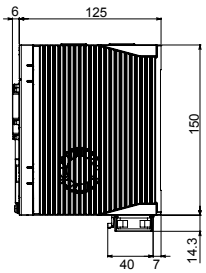
Combination of host controller (HCU), driver unit (A30), and driver power unit (DPU)

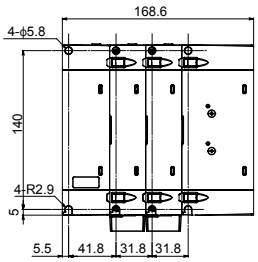


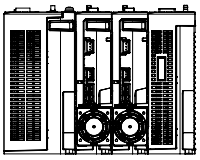




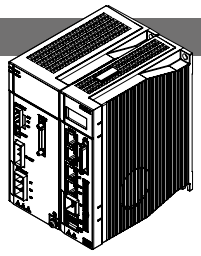


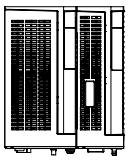


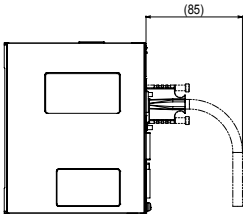


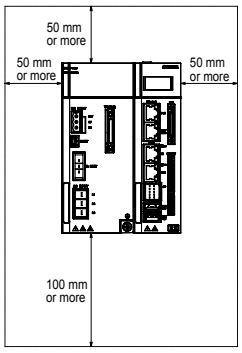


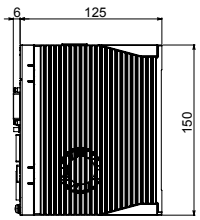
Combination of host controller (HCU) and driver power unit (DPU)

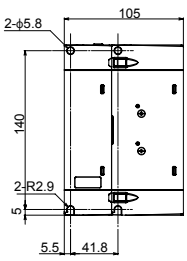


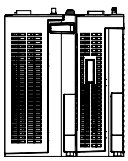












MEMO

LCC140

Dedicated controller for LCM100

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

LCC140

Programming box
▶ HPB/HPB-D
P.658

Support software for PC
▶ POPCOM+
P.650

Basic specifications

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

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

Model Overview

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

Ordering method

LCC140 - 10 -

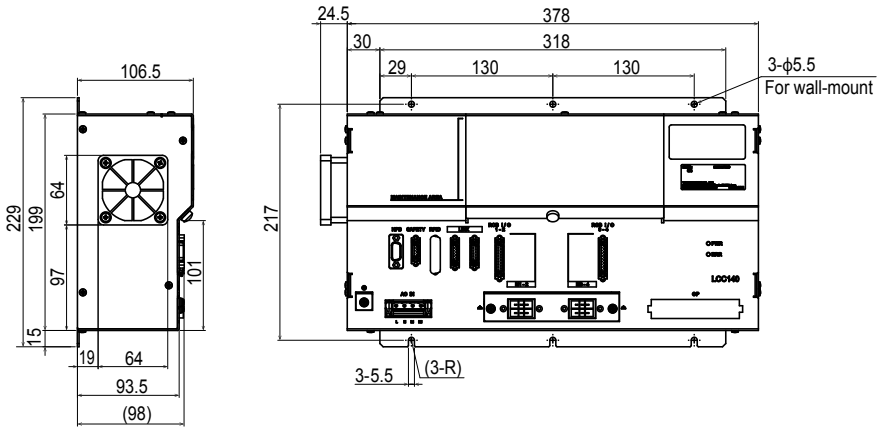
Controller	Current sensor	Network option Note
	10:10A	No entry: None
		CC: CC-Link
		DN: DeviceNet™
		EP: EtherNet/IP™

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

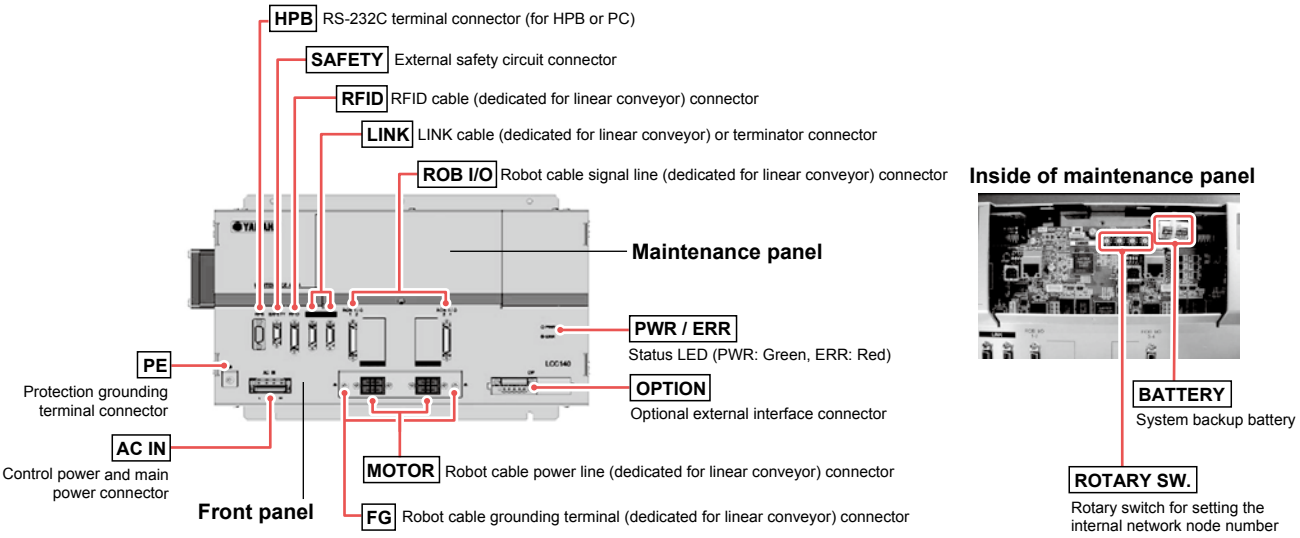
Item			LCC140	
DeviceNet™ unit	Applicable DeviceNet™ specifications		Volume 1 Release2.0, Volume 2 Release2.0	
	DeviceNet™ Conformance test		Compliant with CT24	
	Device profile/Device type number		Generic Device (keyable) / 2B Hex	
	Vendor name/Vendor ID		YAMAHA MOTOR CO.,LTD. / 636	
	Product code	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

LCC140

Dimensions

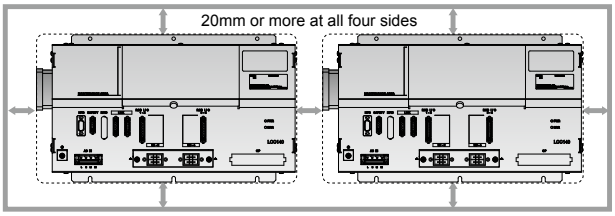


Part names



Installation conditions

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



Reference for power supply capacity and heat generation quantity

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

Reference values for actual operation (per LCC140 controller)

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

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

Maximum capacity values (per LCC140 controller)

Model	Power supply capacity	Heat generated
LCM100	1200VA	70W

Option parts

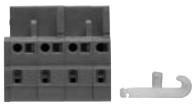
LCC140

Options

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

Power connector + wiring connection lever

One set of parts per LCC140 is required.



Model	KAS-M5382-00

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

HPB dummy connector

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

Model	KDK-M5163-00

LCC140 SR1-X SR1-P

SAFETY connector

One connector per LCC140 is required.

Not wired (plug + shell kit) Wired Note

Model	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

LCC140

Dust cover (for LINK connector)

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

Model	KDK-M658K-00 (for MDR20 pin)

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

LCC140

Programming box HPB/HPB-D P.658

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

HPB HPB-D

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

LCC140 ERCD SR1-X SR1-P

Support software for PC POPCOM+ P.650

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

Model	KBG-M4966-00

LCC140 ERCD SR1-X SR1-P

POPCOM+ environment

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

Note 1. LCC140 is applicable to Ver. 2.1.1 or later.
Note. Windows is the registered trademark of US Microsoft Corporation in U.S.A. and other countries.

Continues on next page

Options

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

Data cables

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

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

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

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

RFID

RFID * (manufactured by BALLUFF GmbH)

Reader/writer cable

* This cable is a flexible cable.

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

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

RFID (manufactured by OMRON)

Antenna amplifier controller cable

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

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

Dust cover (for RFID)

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

Model	KDK-M658K-10 (for MDR26 pin)

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

Maintenance parts

Robot cable for LCM100

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

LCC140

Lithium battery for system backup

Model	KDK-M4252-01

LCC140

Replacement filter for LCC140 (5 pcs. in package)

Model	KDK-M427G-00

LCC140

MEMO

EP-01

CE compliance

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

EP-01

Handy terminal
▶ HT2 / HT2-D
P.657

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

Basic specifications

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

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

Model Overview

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

Ordering method

EP-01 - [ ] - [ ] - [ ]

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

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

Specification selection table

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

<Standard acceleration/deceleration specifications>

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

Conditions required for regenerative unit

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

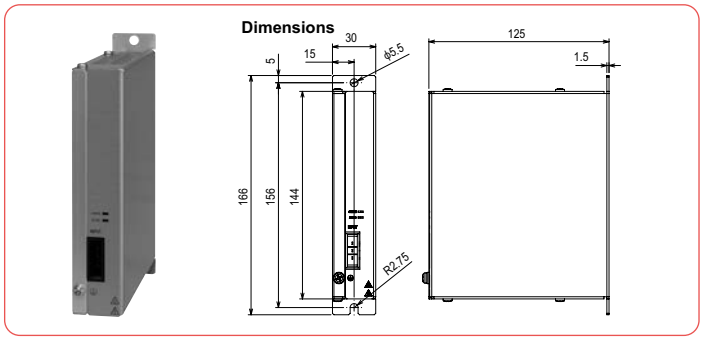
<High acceleration/deceleration specifications>

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

Conditions required for regenerative unit

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

Regenerative unit EP-RU



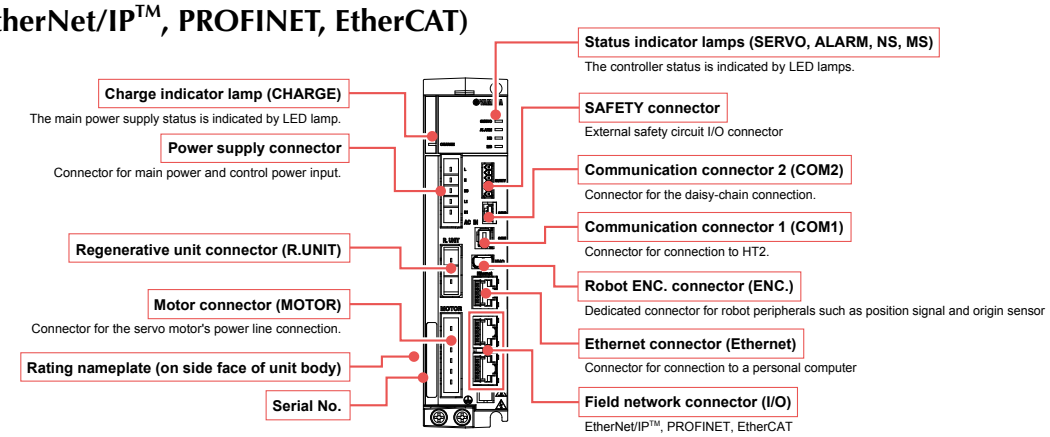
Basic specifications

Item	EP-RU
Model	KFX-M5850-00
Dimensions	W30 × H144 (Not including installation stay) × D125 mm
Weight	650 g
Regenerative voltage	Approx. 380V or more
Regenerative stop voltage	Approx. 360V or less
Absorbable electric power	40W
Accessory	Cable for connection with controller (300 mm)

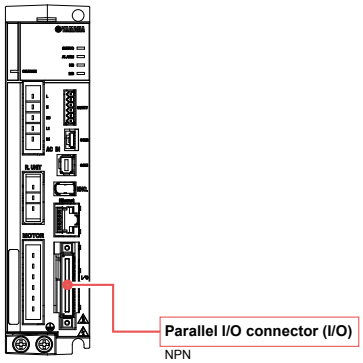
Note. Always leave an empty space (gap of about 20 mm) between this unit and the adjacent controller.
Also, always use the dedicated cable when connecting the controller.

Part names

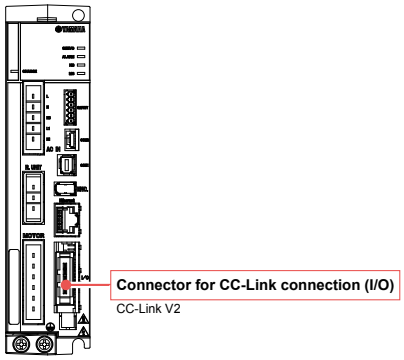
EP-01 (EtherNet/IP™, PROFINET, EtherCAT)



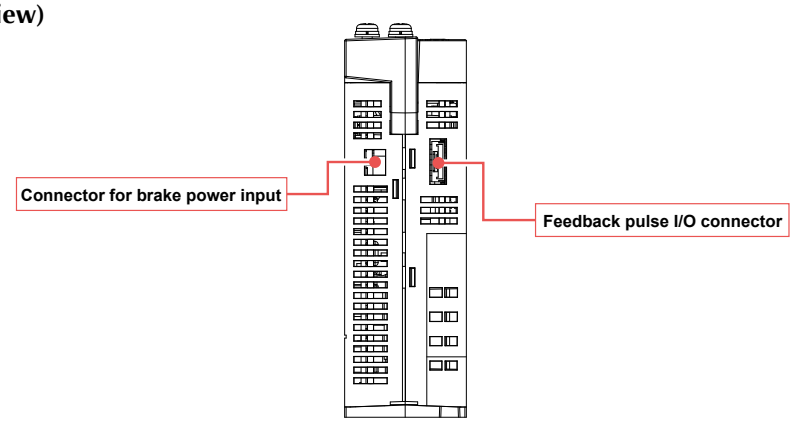
EP-01 (NPN)



EP-01 (CC-Link)

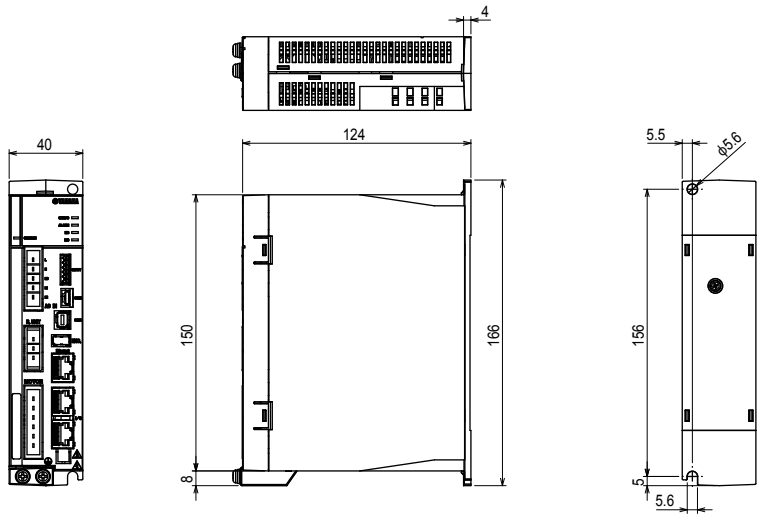


EP-01 (Bottom view)

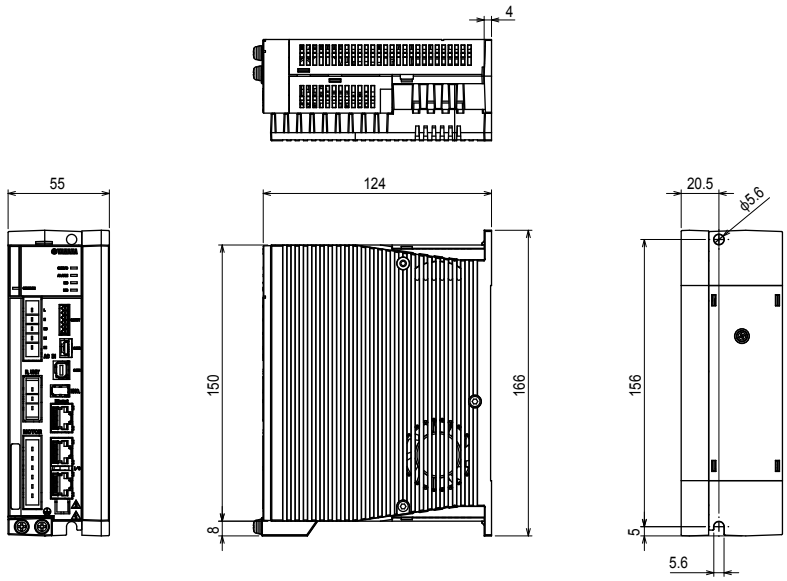


Dimensions

EP-01-A10



EP-01-A30



Installation conditions

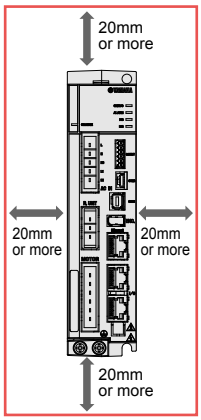
- Install the EP-01 inside the control panel.
- Install the EP-01 on a metal wall vertically.
- Install the EP-01 in a well ventilated location, with space on all sides of the EP-01 (See fig. at right.).

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

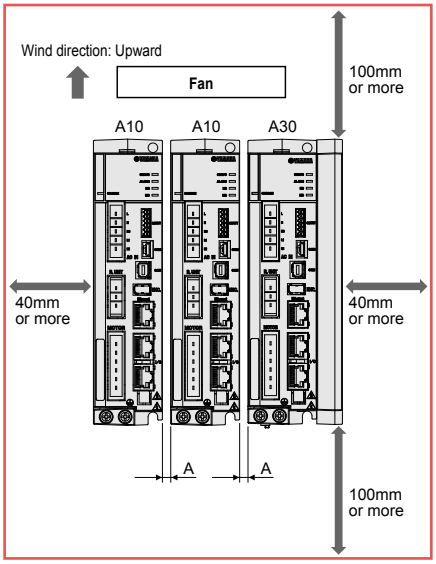
[When multiple EP-01 robot positioners are used]

- Install a fan to cool the controller main body sufficiently.
- When installing multiple controllers, keep at least 1 mm between the controllers.
- Install the controllers in a well-ventilated area with sufficient space around them. (See figure 2.)
- If the distance to the adjacent EP-01 is 20 mm or less (A in figure 2), set the effective load factor to 75% or less.

(Fig. 1)



(Fig. 2)



Data overview

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

Point data

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

Parameter data

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

Data structure

Data

- **Point data** — **P1 to P255**

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

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

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

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

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

Point data

Point data item list

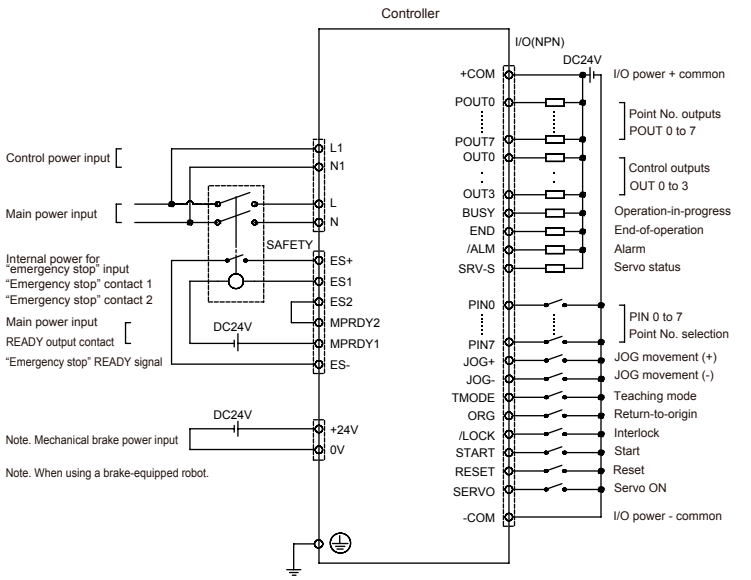
P1 to P255		
Item		Description
1	RUN type	Specifies the positioning operation pattern.
2	Position	Specifies the positioning target position or movement amount.
3	Speed	Specifies the positioning speed.
4	Accel.	Specifies the positioning acceleration.
5	Decel.	Specifies the positioning deceleration (as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

“Standard setting” and “custom setting”

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

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

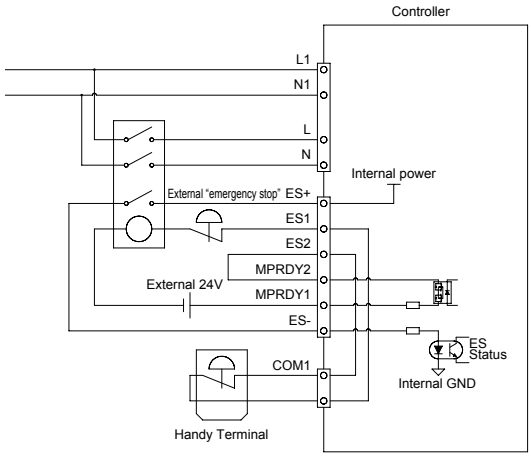
NPN type input / output wiring diagram



I/O Specifications

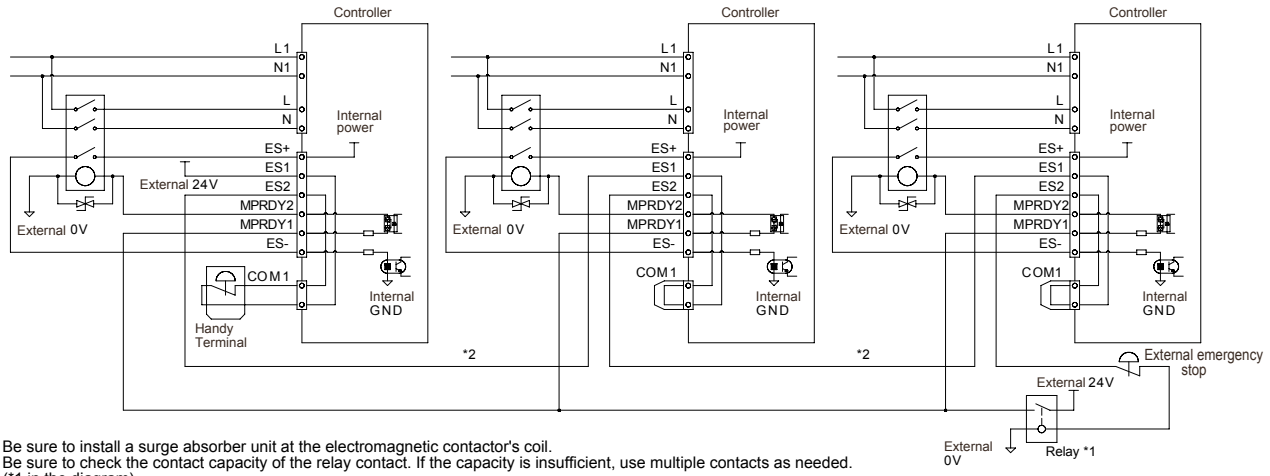
Item	Description
EtherNet/IP™	EtherNet/IP™ adapter (2 ports)
PROFINET	PROFINET Slave 1 node
EtherCAT	EtherCAT Slave 1 node
NPN	Input 16 points, 24VDC +/-10%, 5.1mA/point, positive common Output 16 points, 24VDC +/-10%, 50mA/point, sink type
CC-Link	CC-Link Ver.2.00 compatible, Remote station device (1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

Emergency stop circuit example



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

Emergency stop circuit example (Daisy chain)



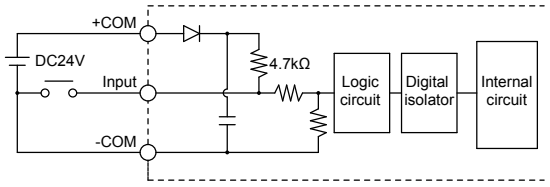
- Be sure to install a surge absorber unit at the electromagnetic contactor's coil.
- Be sure to check the contact capacity of the relay contact. If the capacity is insufficient, use multiple contacts as needed. (*1 in the diagram)
- Connect a load with a current of 300 mA or less to the emergency stop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

I/O signals (NPN)

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

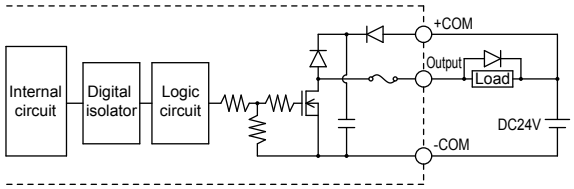
NPN type I/O circuit details

Input circuit



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

Output circuit



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

Feedback pulse I/O signal table

Basic specifications

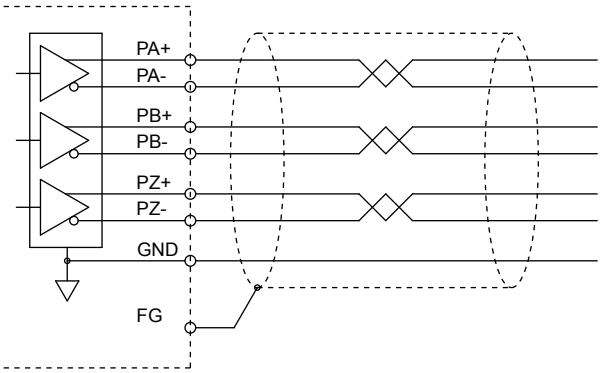
Item	Specification
Output signal	ABZ-phase pulse
Number of pulses per rotation	Variably changed in a range of 4 to 16384
Maximum rotation speed	6000 rpm
Maximum operating frequency	2 Mbps

Signal table

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

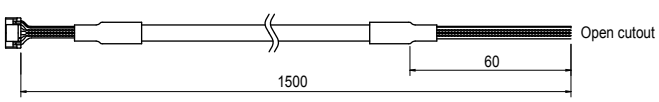
Details of feedback pulse output circuit

Output circuit



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

Feedback pulse output cable



Model	KFX-M532M-00

Accessories and part options

EP-01

Standard accessories

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

Power connector + Operation lever

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

Regeneration unit short-circuit connector

Model	KEK-M4431-00	EP-01 YHX RCX320

HT2 dummy connector

Model	KEK-M5869-00	EP-01 YHX

SAFETY connector

Model	KEK-M4432-10	EP-01 YHX

Brake power cable (1 m) Note

Note. Included in the robot with brake.

Model	KFX-M532K-10	EP-01

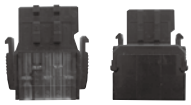
I/O cables (2 m/20-core×2) Note

Note. Included in the robot with NPN specifications.

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

CC-Link connector Note

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



Connector Jump socket

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

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

Ferrite core Note

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

Model	KK1-M6563-200	EP-01

See next page for optional parts

Options

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

Handy terminal HT2/HT2-D

P.657

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

EP-01

Support software EP-Manager

P.648

Download from website (member site)

Model	KFX-M4990-00

EP-Manager environment

OS	Microsoft Windows 10 (32bit/64bit) 11 (Supported version:V1.2.4 or later)
CPU	Exceeding the environment recommended by the OS being used
Memory	Exceeding the environment recommended by the OS being used
Communication port	Ethernet port (100BASE-TX) Ethernet cable (category 5 or higher)
Display	1024×768 or higher resolution, 256 colors or higher
Applicable controllers	EP-01

EP-01

Note. Windows is the registered trademark of US Microsoft Corporation in U.S.A. and other countries.
Note. Ethernet is a registered trademark of the XEROX Corporation, USA.

Absolute battery

Absolute battery basic specifications

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

Model	KFX-M53G0-00

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

EP-01

Battery holder kit

Model	KFX-M53G7-00

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

EP-01

CC-Link termination connector

Model	KCA-M4874-00

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

Feedback pulse output cable

Model	KFX-M532M-00

EP-01

Daisy chain and gateway connection cable

Model	KFX-M532L-00

EP-01

MEMO

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

● CE compliance

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

Handy terminal
▶ HT1/HT1-D
P.656

Support software for PC
▶ TS-Manager
P.648

Basic specifications

TS-S2/TS-SH

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

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

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

Model Overview

Name		TS-S2	TS-SH	TS-X/TS-P	
Controllable robot		Dedicated compact single-axis TRANSERVO		TS-X: Single-axis robot FLIP-X TS-P: Linear motor single-axis PHASER	
Input power	Control power supply	DC24V +/-10%		● AC100V specifications Control power supply Single phase 100 to 115V AC +/-10%	● AC200V specifications Control power supply Single phase 200 to 230V AC +/-10%
	Main power supply			Main power supply Single phase 100 to 115V AC +/-10%	Main power supply Single phase 200 to 230V AC +/-10%
Operating method		I/O point tracing / Remote command /Operation using RS-232C communication			
Maximum number of controllable axes		Single-axis			
Origin search method		Incremental	Absolute / Incremental	TS-X: Absolute / Incremental TS-P: Absolute / Semi-absolute	

Ordering method

TS-S2/TS-SH (TRANSERVO)

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

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

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

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

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

TS-X/TS-P

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

TS-X / TS-P specification selection table

Some specifications are automatically determined by the robot model.

TS-X

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

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

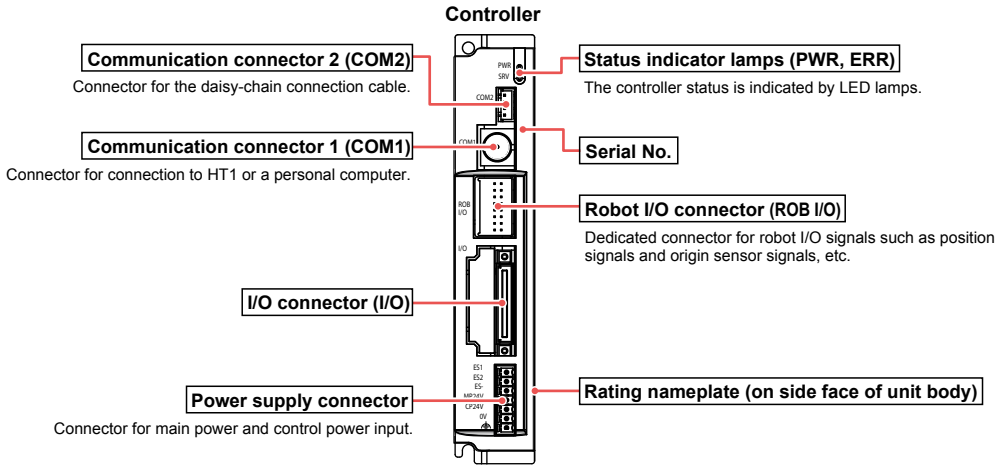
(4) Regenerative unit is needed if using at maximum speeds exceeding 1000mm per second.
(5) Regenerative unit is needed if using at maximum speeds exceeding 1250mm per second.
(6) Regenerative unit is needed if using at maximum speeds exceeding 750mm per second.

TS-P

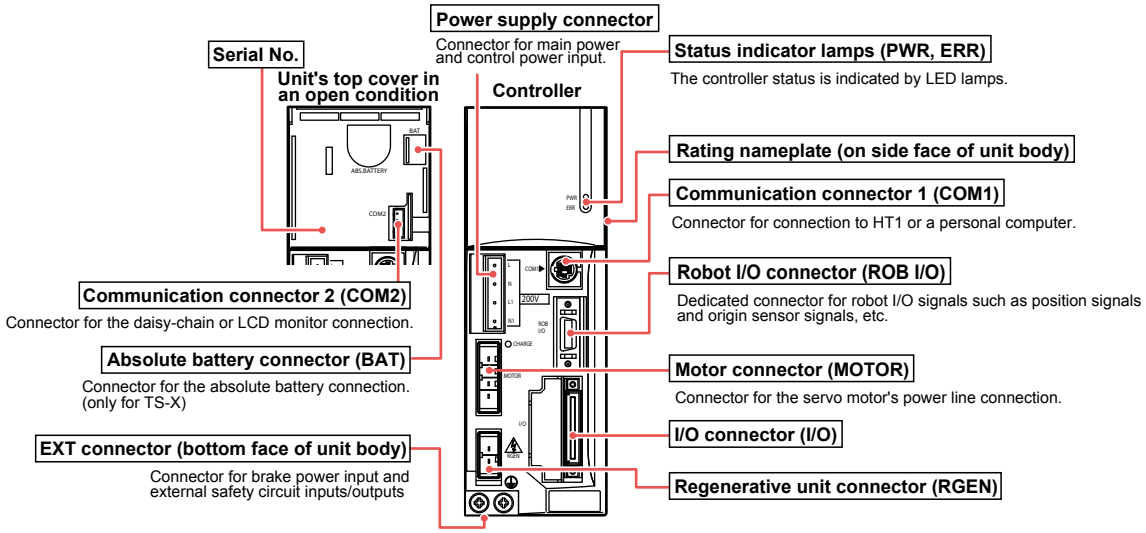
			MF7/7D	MF15/15D	MF20/20D	MF30/30D	MF75/75D
Power supply voltage / Current sensor	TS-P	105					
		110	●	●	●		
		205					
		210	●	●	●		
		220				●	●
Regenerative unit	No entry (None)		●	●			
	R (RGT)				●	●	
	R (RGU-2)						●

Part names

TS-S2/TS-SH

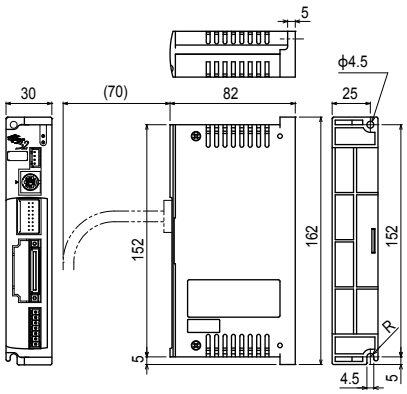


TS-X/TS-P

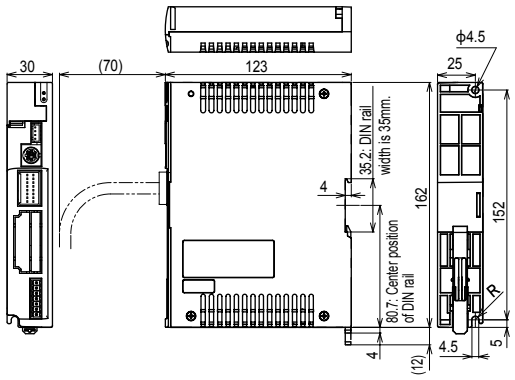


Dimensions

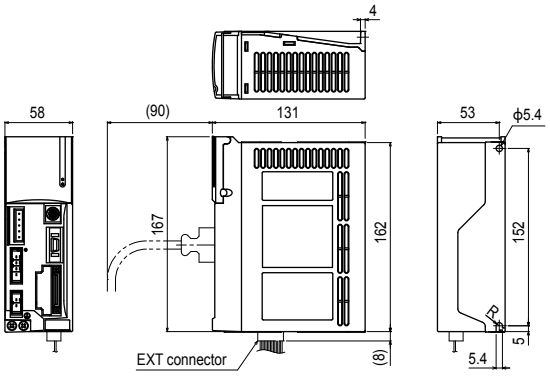
TS-S2



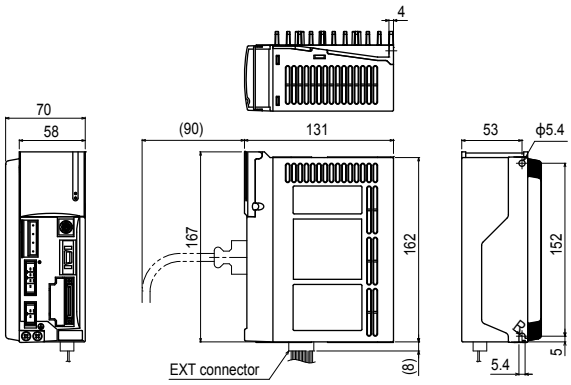
TS-SH



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



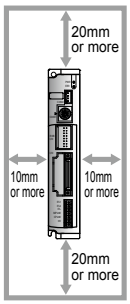
TS-X/TS-P (220)



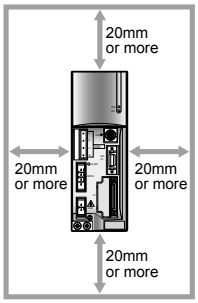
Installation conditions

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

TS-S2/TS-SH



TS-X/TS-P



Cautions on TS-S2 / TS-SH

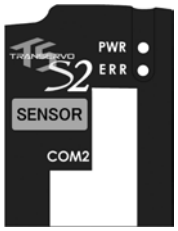
For the RF type sensor specifications, the controllers “TS-S2” and “TS-SH” become “TS-S2S” and “TS-SHS”, respectively.

TS-S2 / TS-SH (Standard specifications)

“BK” label is affixed to the front of the controller.

TS-S2S / TS-SHS (Sensor specifications)

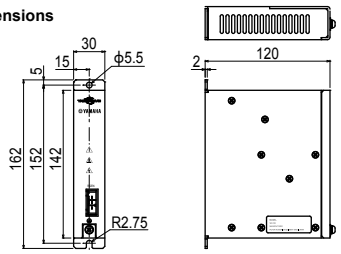
“SENSOR” label is affixed to the front of the controller.
(Be aware that “TS-S2S” is affixed to the front of the controller.)



Regenerative unit RGT/RGU-2

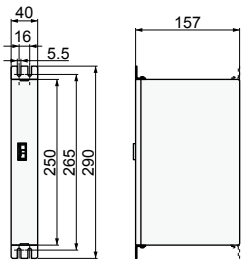
Regenerative unit RGT

Dimensions



Regenerative unit RGU-2

Dimensions



Basic specifications

Item	RGT
Model	KCA-M4107-0A (including cable supplied with unit)
Dimensions	W30 × H142 × D118mm (Not including installation stay)
Weight	470g
Regenerative voltage	Approx. 380V or more
Regenerative stop voltage	Approx. 360V or less
Accessory	Cable for connection with controller (300mm)

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

Basic specifications

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

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

Data overview

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

Point data

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

Parameter data

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

Data structure

Data → **Point data** → **P1 to P255**

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

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

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

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

Parameter data

- **K1 to K20** — RUN parameter: Specifies parameter settings related to positioning and return to-origin operations.
- **K21 to K39** — I/O parameter: Specifies parameter settings related to terminal assignments and I/O function selection.
- **K80 to K99** — Option parameter: Specifies parameter settings related to options such as CC-Link, etc.
- **K40 to K79, K100 to ...** — Servo parameter: Specifies parameter settings specified to the connected robot. These parameters are specified during initial processing.

Point data

Point data item list

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

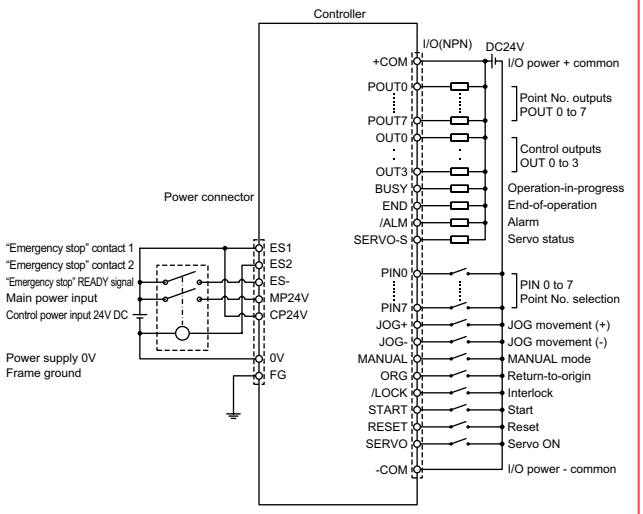
“Standard setting” and “custom setting”

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

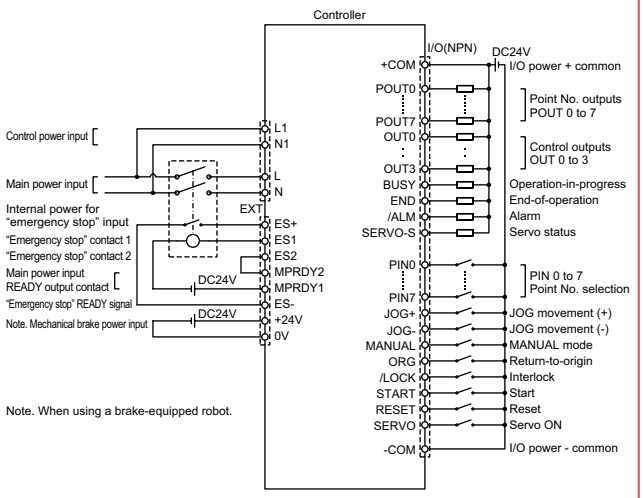
Setting Type	Description
Standard setting	Optimum positioning is provided simply by specifying the payload. This setting type is well-suited to assembly and transport applications.
Custom setting	Allows changing the speed and acceleration in SI units so the desired positioning operation can be set. This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

NPN type input / output wiring diagram

TS-S2/TS-SH

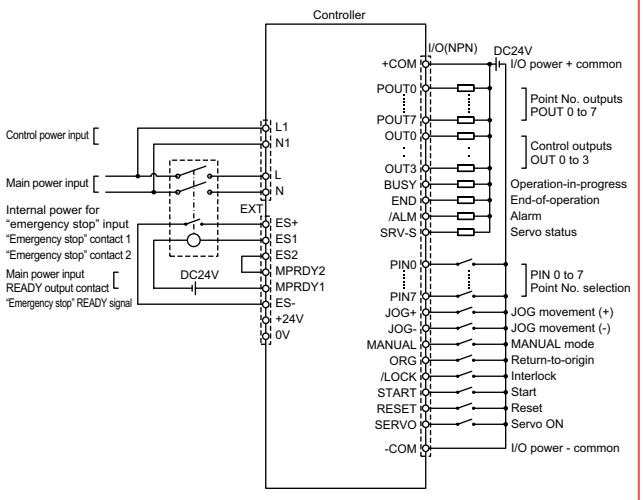


TS-X



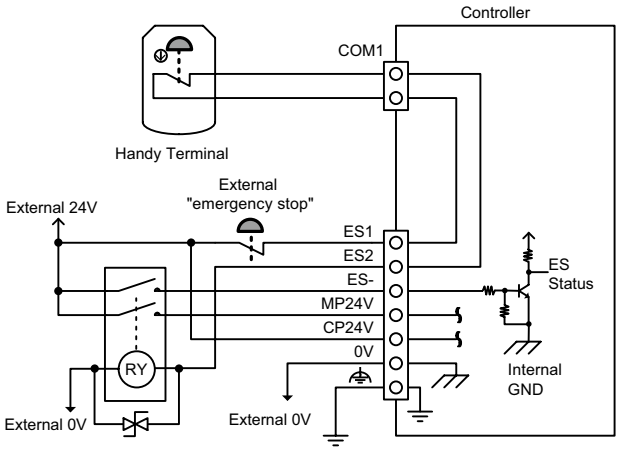
Note. When using a brake-equipped robot.

TS-P



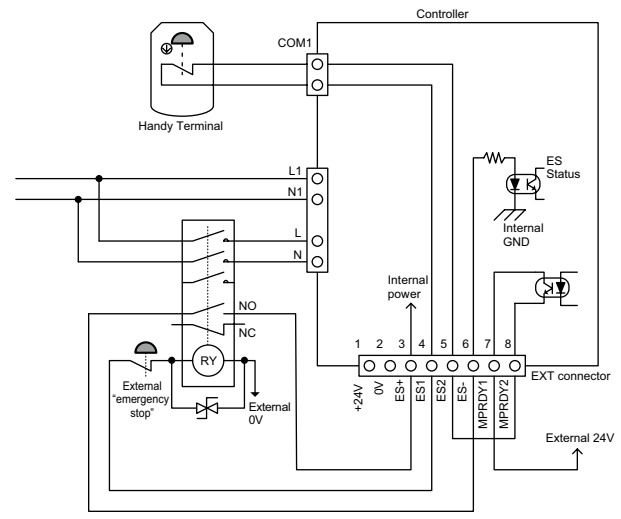
Emergency stop circuit example

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



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

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



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

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

I/O Specifications

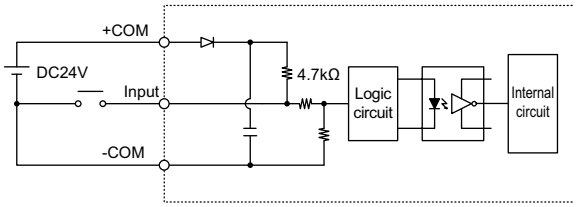
Item	Description
NPN	Input 16 points, 24VDC +/-10%, 5.1mA/point, positive common Output 16 points, 24VDC +/-10%, 50mA/point, sink type
PNP	Input 16 points, 24VDC +/-10%, 5.5mA/point, minus common Output 16 points, 24VDC +/-10%, 50mA/point, source type
CC-Link	CC-Link Ver.1.10 compatible, Remote station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

I/O signals (NPN / PNP)

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

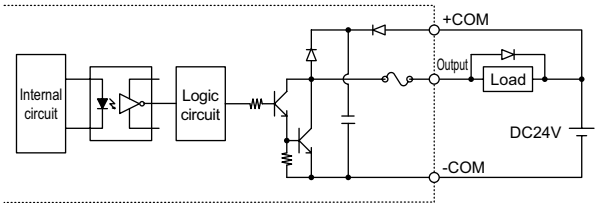
NPN type I/O circuit details

Input circuit



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

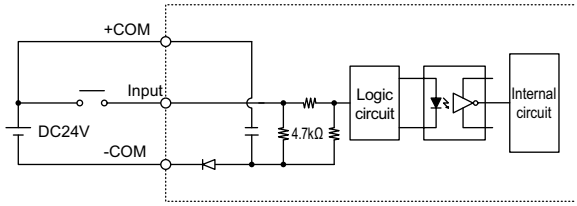
Output circuit



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

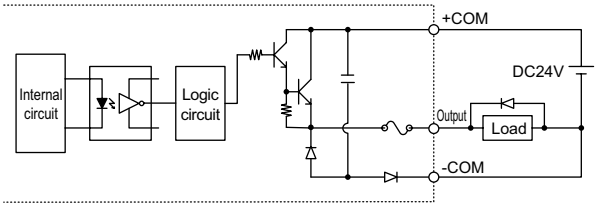
PNP type I/O circuit details

Input circuit



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

Output circuit



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

Accessories and part options

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

Standard accessories

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

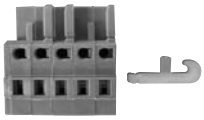
Power connector

Model	KCC-M4421-00

TS-S2 TS-SH TS-SD

Power connector (AC100V specifications)

Included when 100V model is purchased

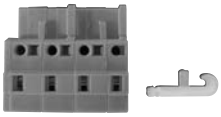


Model	KCA-M5382-00

TS-X TS-P

Power connector (AC200V specifications)

Included when 200V model is purchased



Model	KAS-M5382-00

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

EXT connector

For braking power and safety circuit connections.

Model	KCA-M5370-00

TS-X TS-P

Dummy connector

Model	KCA-M5163-00

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

I/O cables (2m/20-core×2)

Model	KCA-M4421-20

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

Absolute battery

Absolute battery basic specifications

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

For TS-X

For TS-SH

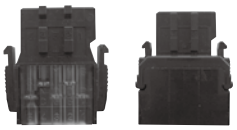
Model	KCA-M53G0-10 (For TS-X)
	KCA-M53G0-02 (For TS-SH)

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

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

CC-Link connector (CC-Link specifications)

Included when CC-Link model is purchased



Connector Jump socket

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

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

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

See next page for optional parts

Options

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

Handy terminal HT1/HT1-D P.656

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

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

Support software TS-Manager P.648

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

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

TS-Manager environment

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

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

Data cables

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

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

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

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

Daisy chain and gateway connection cable

Model	KCA-M532L-00 (300mm)

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

CC-Link termination connector (CC-Link specifications)

Model	KCA-M4874-00

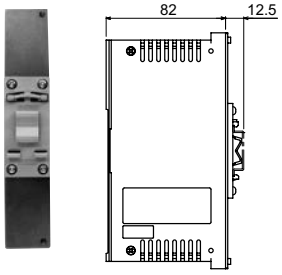
TS-S2 TS-SH TS-X TS-P

TS-Monitor (LCD monitor) P.660

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

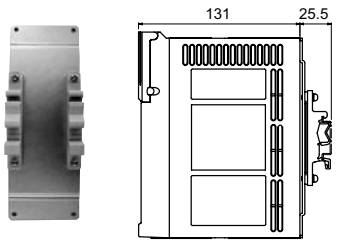
TS-X TS-P

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



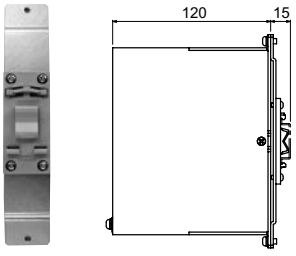
Model	For TS-S2
	KCC-M499A-00

TS-S2



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

TS-X TS-P



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

TS-X TS-P

MEMO

TS-SD

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

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

TS-SD

Support software for PC
▶ TS-Manager
P.648

Basic specifications

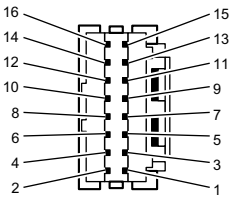
Item			TS-SD
Basic specifications	Number of controllable axes		Single-axis
	Controllable robots		TRANSERVO series Note
	Current consumption		3A (Rating) 4.5A (Max.)
	Dimensions		W30 × H162 × D82mm
	Weight		Approx. 0.2kg
	Input power supply	Control power supply	DC24V +/-10%
		Main power supply	DC24V +/-10%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

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

I/O signal table

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

I/O connector



Controllable robot	TRANSERVO P335
CE marking	◯
Field networks	—

Model Overview

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

Ordering method

Controller only

TS-SD[Note]

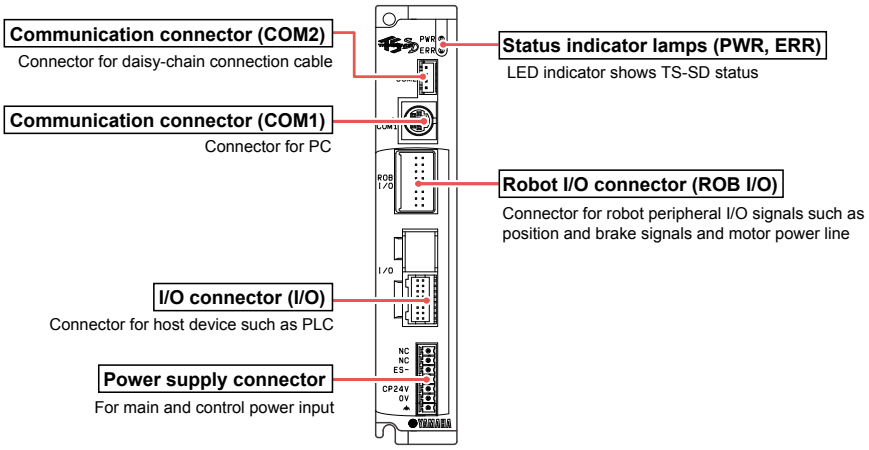
Controller

Robot + Controller

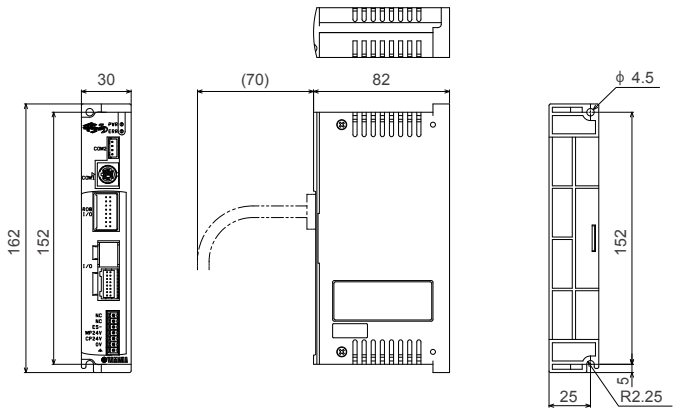
	–		–	SD	1
Robot model		Cable length		Controller	I/O cable
TRANSERVO Series		1L: 1 meter 3L: 3 meters 5L: 5 meters 10L: 10 meters (flexible cables)			1L: 1 meter

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

Part names



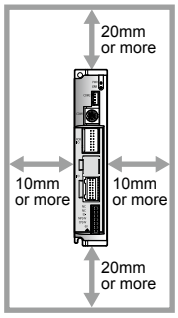
Dimensions



TS-SD

Installation conditions

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

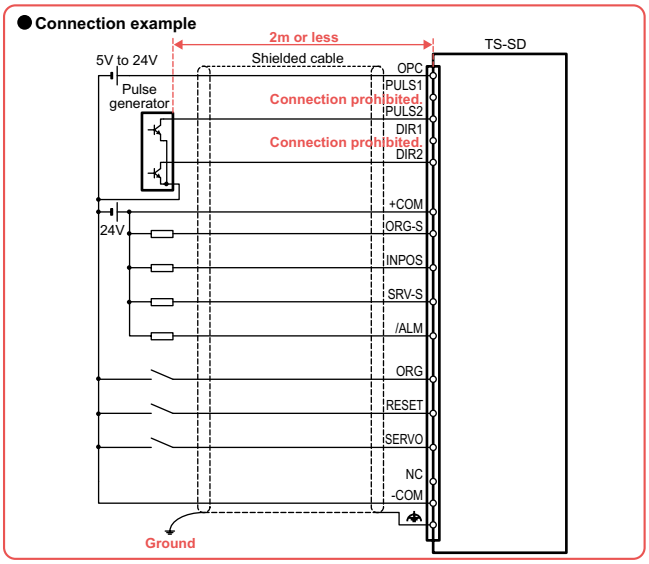


I/O signal list

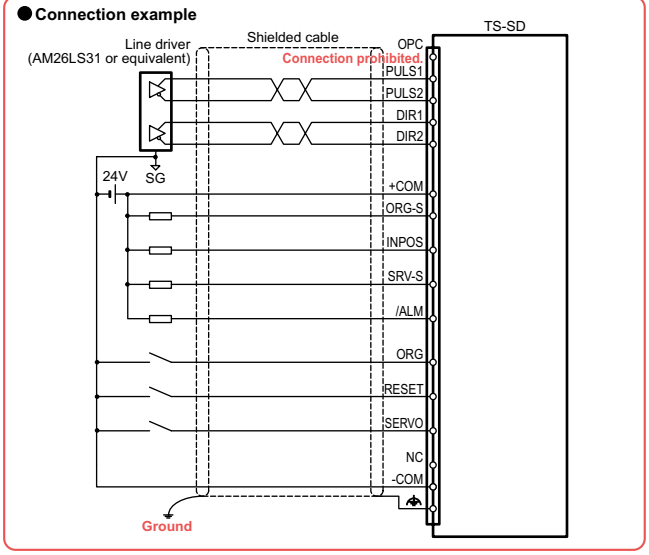
Type	Signal Name	Open collector	Line driver	Description
Inputs	OPC	Open collector power supply input	(Connection prohibited. Note 2)	Input the power supply for the open collector. (DC5 to 24V +/- 10%)
	PULS1	(Connection prohibited. Note 1)	Command pulse input (+)	Input terminal for pulse train input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

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

Input / output signal connection diagram [open collector]



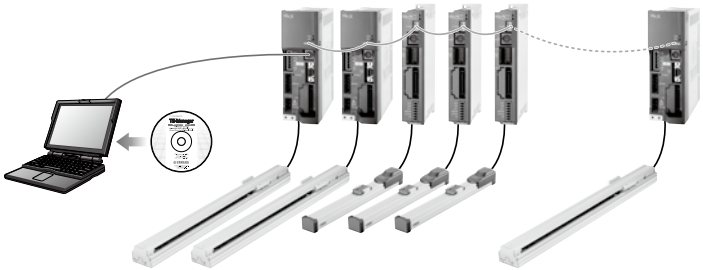
Input / output signal connection diagram [line driver]



Daisy chain function

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

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



Accessories and part options

TS-SD

Standard accessories

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

Power connector

Model	KCC-M4421-00

TS-S2 TS-SH TS-SD

I/O cables (1m)

Model	KCC-M5362-00

TS-SD

Options

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

Support software TS-Manager

P.648

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

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

TS-Manager environment

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

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

Data cables

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

USB

D-Sub

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

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

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

Daisy chain and gateway connection cable

Model	KCA-M532L-00 (300mm)

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

RDV-X/RDV-P

● Only for pulse train control

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

RDV-X RDV-P

Support software for PC
▶ RDV-Manager
P.652

Basic specifications

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

Controllable robot	RDV-X ▶ FLIP-X Note 1 P.289	RDV-P ▶ PHASER P.267
CE marking	◯	Field networks —

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

Model Overview

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

Ordering method

RDV-X

RDV-X **2** □ – □

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

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

RDV-P

RDV-P **2** □ – □

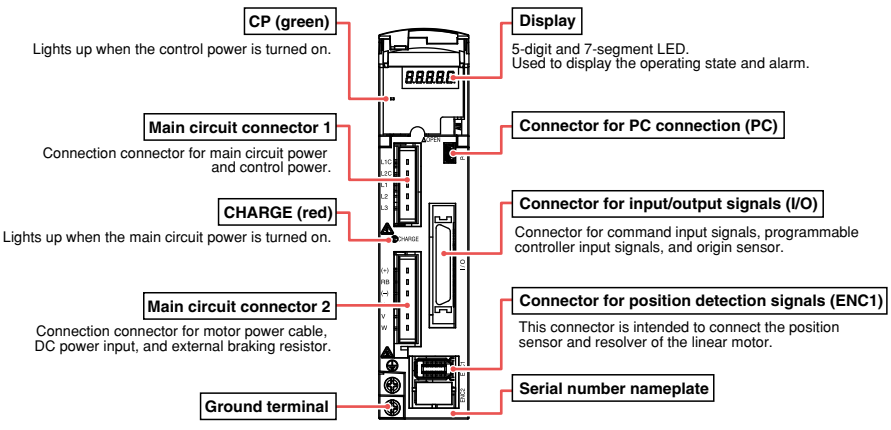
Controller	Power-supply voltage	Driver Note	Regenerative unit Note
	2: AC200V	05: 100W or less	No entry: None
		10: 200W or less	RBR1
		20: 400W or less	RBR2
		25: 750W or less	

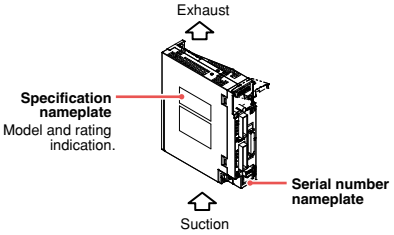
Note. Driver selection and regenerative unit selection depend on the robot type. See the selection table on the next page for selecting the driver/regenerative circuit.

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

Note 1. These data are parameters and calculation range in controlling the robot driver and do not indicate the capacity of the robot at the maximum speed.
Note 2. JIS C 0920 (IEC60529) is used as the base for the protection method.
Note 3. GXL-8FB (made by SUNX) or FL7M-1P5B6-Z (made by YAMATAKE) is used for the origin sensor. The power consumption of the origin sensor is 15mA or less (at open output) and only 1 unit of the origin sensor is connected to each robot driver. (future specification)
Note 4. Use the dynamic brake for emergency stop. Note that the braking may be less effective depending on the robot model.
Note 5. The storage temperature is the temperature in the non-energized state including transportation.
Note 6. The JIS C 60068-2-6:2010 (IEC 60068-2-6:2007) test method is uses as the base.

Part names

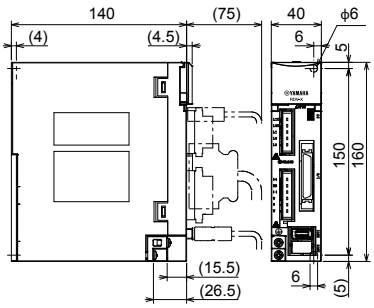




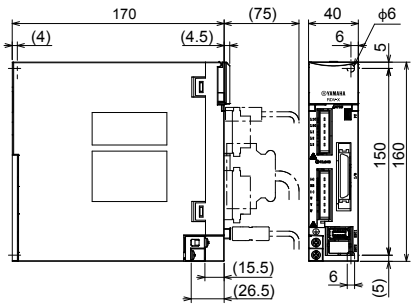
RDV-X/RDV-P

Dimensions

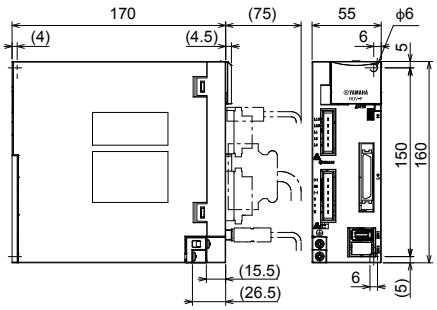
RDV-X205/210
RDV-P205/210



RDV-X220
RDV-P220



RDV-P225



Driver / regenerative unit selection table

RDV-X

			FLIP-X																										
			T4LH/ C4LH	T5LH/ C5LH	T6L/ C6L	T9	T9H	F8/ C8	F8L/ C8L	F8LH/ C8LH	F10/ C10	F10H	F14/ C14	F14H/ C14H	GF14XL	F17/ C17	F17L/ C17L	GF17XL	F20/ C20	F20N	N15	N18	N15D	N18D	B10	B14	B14H	R5	R10	R20
Driver selection	RDV-X	05	●	●	●	●		●	●	●	●		●												●	●		●	●	
		10					●					●		●													●			●
		20													●	●	●	●	●	●	●	●	●	●						
Regenerative unit	No entry (None)		●	●																										
	RBR1				●	●	●	●	●	●	●	●	●	●	●	❶	❶	●	❶	●	●	●	●	●	●	●	●	●	●	●
	RBR2															❶	❶		❶												

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

RDV-P

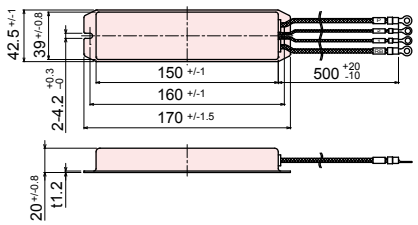
			PHASER				
			MF7/ MF7D	MF15/ MF15D	MF20/ MF20D	MF30/ MF30D	MF75/ MF75D
Driver selection	RDV-P	05					
		10	●	●	●		
		20				●	
		25					●
Regenerative unit	RBR1		●	●	●	●	
	RBR2						●

Regenerative unit RBR1 / RBR2 dimensions

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

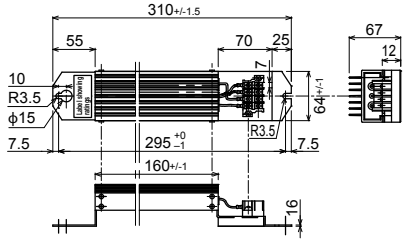
Regenerative unit RBR1

Dimensions



Regenerative unit RBR2

Dimensions



Regenerative unit RBR1 / RBR2 basic specifications

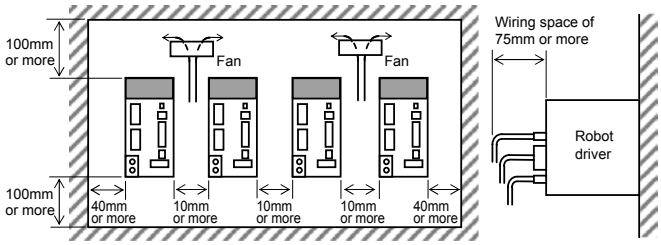
Item	RBR1	RBR2
Model	KBH-M5850-00	KBH-M5850-10
Capacity type	120W	200W
Resistance value	100Ω	100Ω
Permissible braking frequency	2.5%	7.5%
Permissible continuous braking time	12 sec.	30 sec.
Weight	0.27kg	0.97kg

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

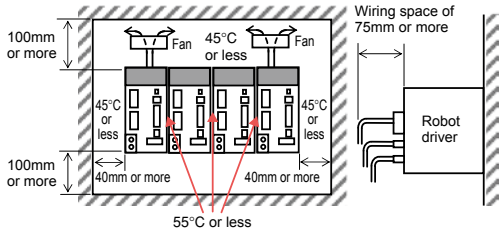
Installation conditions

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

Stored inside RDV-X/RDV-P panel

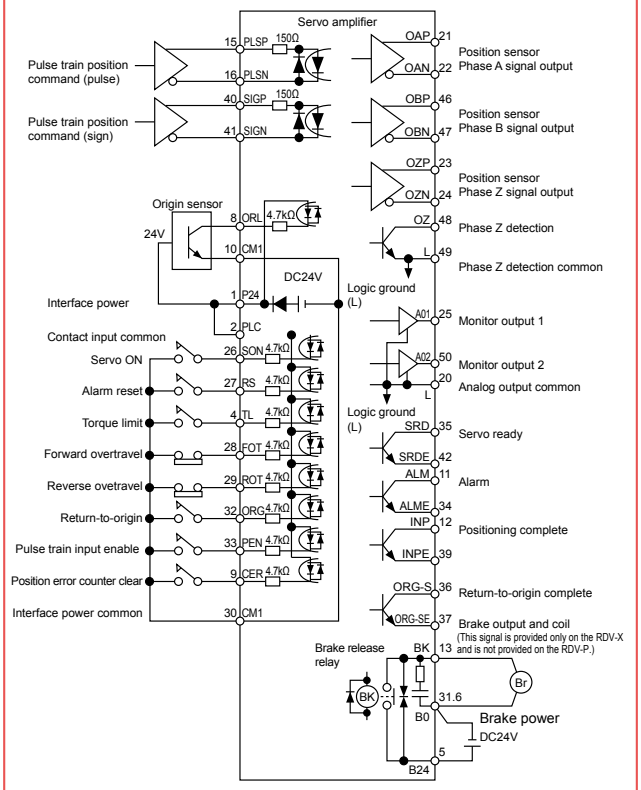


Side-by-side installation



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

Input / output signal connection diagram



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

List of RDV-P / RDV-X terminal functions

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

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

Accessories and part options

RDV-X/RDV-P

Standard accessories

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

I/O connector (no brake wiring)

Model	KBH-M4420-00

RDV-X RDV-P

I/O connector (with brake wiring)

Model	KBH-M4421-00

RDV-X RDV-P

Power supply connector

Model	KEF-M4422-00

RDV-X RDV-P

Options

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

Support software RDV-Manager

P.652

Model	KEF-M4966-00

RDV-X RDV-P

Environment

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

Note 1. SP1 (service pack 1) or higher.
Note. Windows is the registered trademark of US Microsoft Corporation in U.S.A. and other countries.

Communication cable

Communication cable to connect PC and a controller.

Model	KEF-M538F-01

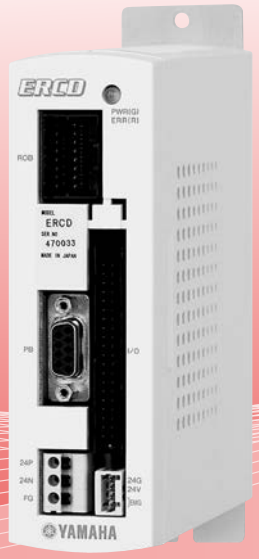
RDV-X RDV-P

MEMO

ERCD

● Dedicated for T4L / T5L / C4L / C5L

Low price and compact in size.
In addition to the conventional functions, a pulse train function is added for a wider application range.
This is a dedicated controller for the FLIP-X series models T4L, T5L, C4L, and C5L.



ERCD


Programming box
▶ HPB/HPB-D
P.658


Support software for PC
▶ POPCOM+
P.650

Basic specifications

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

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

Model Overview

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

Ordering method

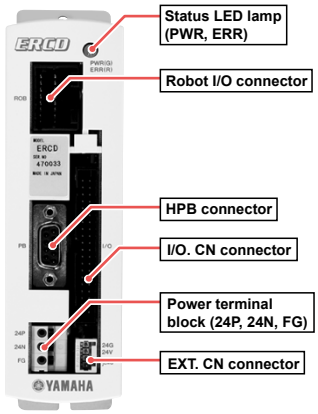
ERCD – [ ]

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

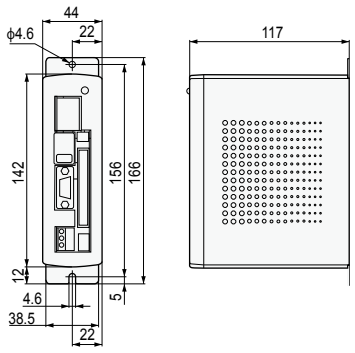
	Item	ERCD
Options	Programming box	HPB, HPB-D (with enable switch)
	Support software for PC	POPCOM+
General specifications	Operating temperature	0°C to 40°C
	Storage temperature	-10°C to 65°C
	Operating humidity	35% to 85%RH (non-condensing)
	Noise resistance capacity	IEC61000-4-4 Level 2
	Protective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

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

Part names

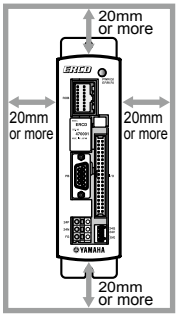


Dimensions



Installation conditions

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



Connector I/O signals

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

Pulse train I/O connector signals

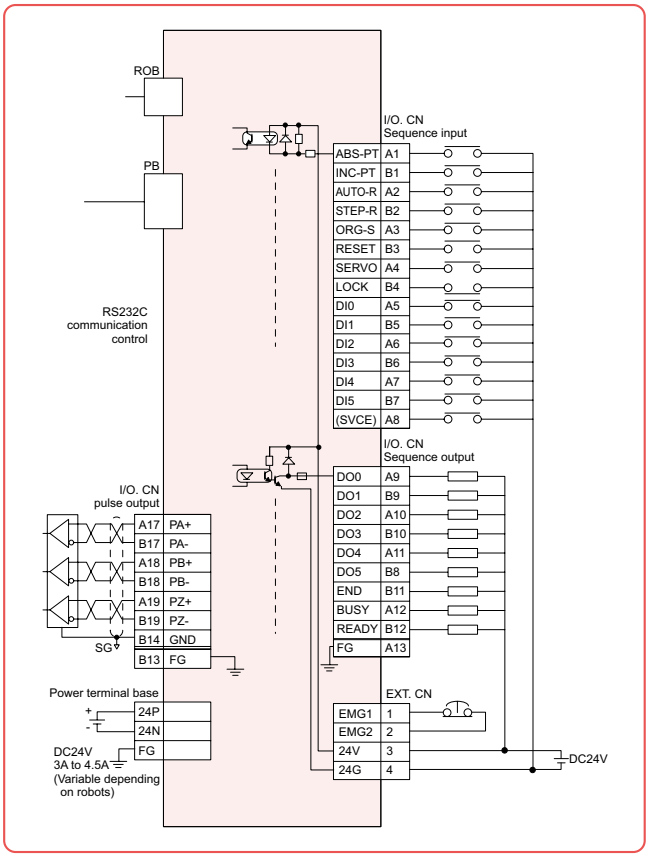
Terminal number	Signal name	Function
A-1	NC	Reserved (use inhibited)
B-1	NC	Reserved (use inhibited)
A-2	NC	Reserved (use inhibited)
B-2	PCLR	Differential clear input
A-3	ORG-S	Return to the origin input
B-3	RESET	Alarm reset input
A-4	SERVO	Servo-ON input
B-4	INH	Command pulse inhibition input
A-5	DI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

Robot Language Table

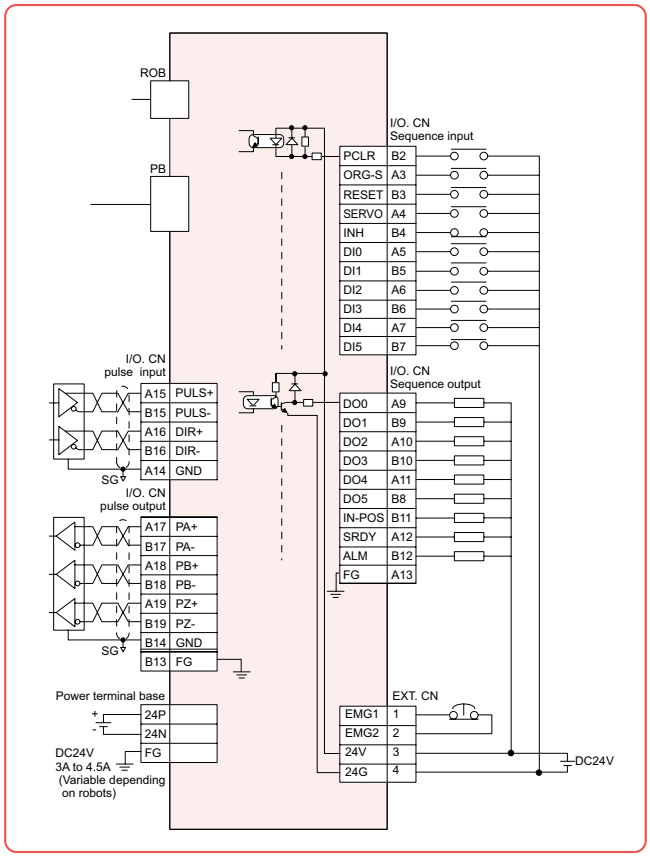
Command	Description
MOVA	Moves to a point data position.
MOVI	Moves from current position by amount of point data.
MOVF	Moves until a specified DI input is received.
JMP	Jumps to a specified label in the specified program.
JMPF	Jumps to a specified label in a specified program according to the input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

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

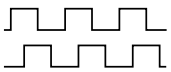
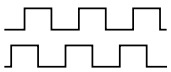
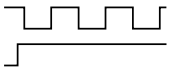
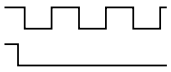
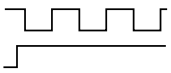
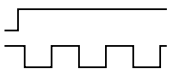
Input / output wiring diagram

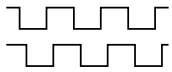
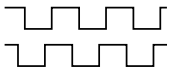
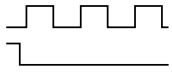
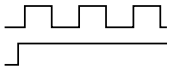
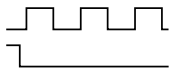
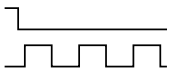


Pulse train input / output wiring diagram



Pulse train input form

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

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

Accessories and part options

ERCD

Standard accessories

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

24V power connector (for EXT. CN)

Model	KAU-M4422-00

ERCD

I/O flat cable (CN1): 1m

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

Model	KAU-M4421-00

ERCD

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

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

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

Model	KAU-M4421-10

ERCD

Options

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

Support software for PC POPCOM+ P.650

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

Model	KBG-M4966-00

LCC140
ERCD
SR1-X
SR1-P

Environment

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

Note 1. LCC140 is applicable to Ver. 2.1.1 or later.
Note. Windows is the registered trademark of US Microsoft Corporation in U.S.A. and other countries.

Data cables

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


USB


D-Sub

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

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

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

Programming box HPB/HPB-D P.658

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


HPB


HPB-D

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

LCC140
ERCD
SR1-X
SR1-P

MEMO

SR1-X/SR1-P

Robot controller with advanced functions

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

SR1-X

SR1-P

Programming box
▶ HPB/HPB-D
P.658

Support software for PC
▶ POPCOM+
P.650

Basic specifications

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

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

Model Overview

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

Ordering method

SR1-X

SR1-X - [ ] - [ ] - [ ] - [ ] - [ ] - [ ]

Controller	Driver	Usable for CE	Regenerative unit Note1	Input/Output Selection	Battery
	05: 100W or less 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™ 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

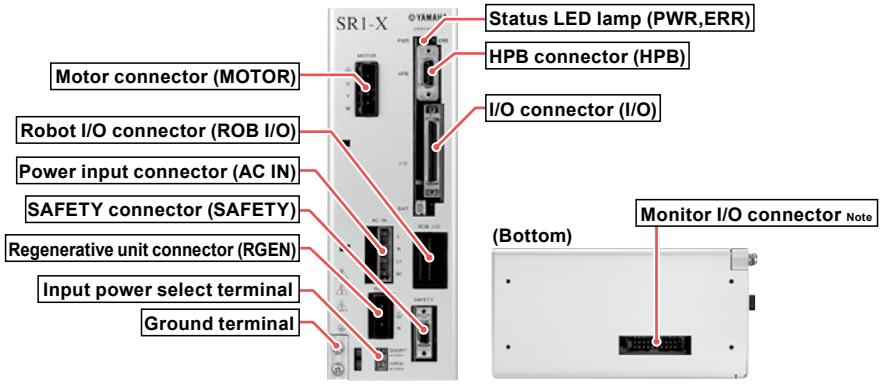
SR1-P - [ ] - [ ] - [ ] - [ ]

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 Note2	N: NPN P: PNP CC: CC-Link DN: DeviceNet™ PB: PROFIBUS YC: YC-Link Note3

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

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

Part names



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

SR1-X/SR1-P

Driver / regenerative unit selection table

SR1-X

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

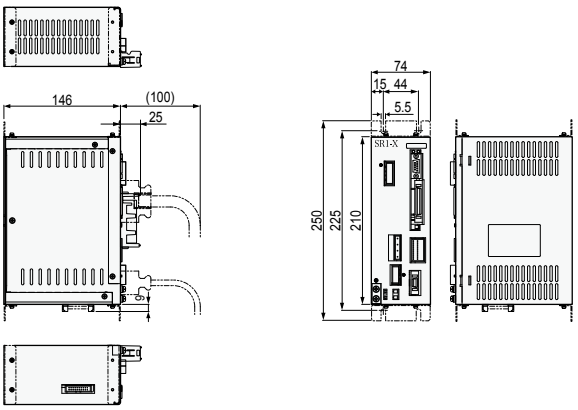
① Regenerative unit is needed if using in a perpendicular position and movement stroke is 700mm or more.
② Regenerative unit is needed if using in a perpendicular position.
③ Regenerative unit is needed if using in a perpendicular position, using at maximum speeds exceeding 1000mm per second, or if using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

SR1-P

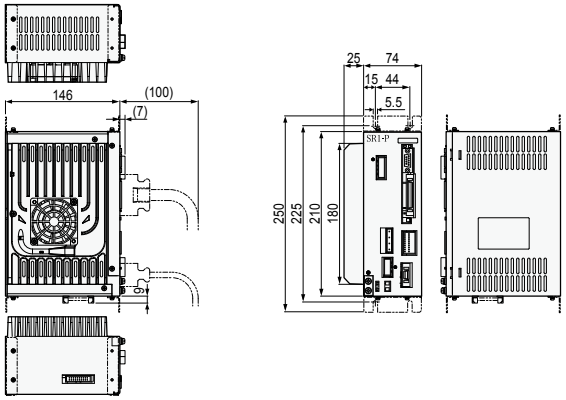
			PHASER				
			MF7/ MF7D	MF15/ MF15D	MF20/ MF20D	MF30/ MF30D	MF75/ MF75D
Driver selection	SR1-P	05					
		10	●	●	●		
		20				●	●
Regenerative unit	No entry (None)		●	●			
	R (RG1)				●	●	
	R (RGU-2)						●

Dimensions

SR1-X/SR1-P 05 - 10

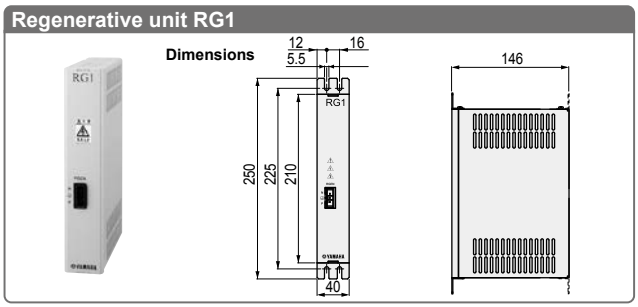


SR1-X/SR1-P 20

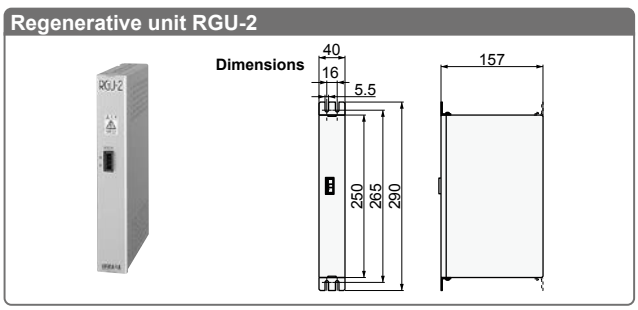


Regenerative unit RG1 / RGU-2

Regenerative unit RG1



Regenerative unit 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.

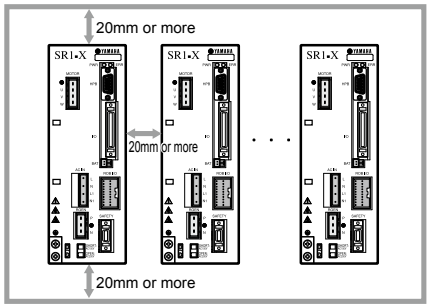
Basic specifications

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

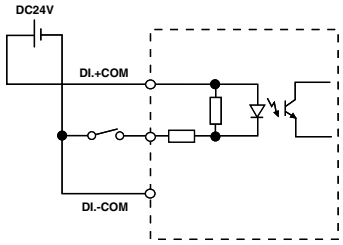
Terminal number	Signal name	Function
1	DI.+COM	Input supply+common
2	SERVO	Return to servo on
3	INC-PT	Relative point transfer
4	ABS-PT	Absolute point transfer
5	STEP-R	Step run
6	DI 0	General input 0
7	DI 1	General input 1
8	DI 2	General input 2
9	DI 3	General input 3
10	DI 4	General input 4
11	DI 5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

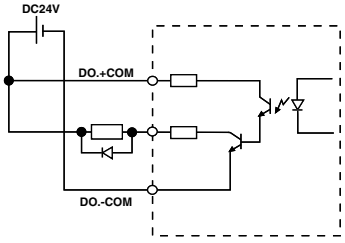
Input circuit

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



Output circuit

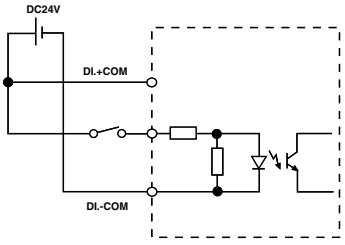
- Form : NPN open collector output (negative common type)
  Photo coupler insulation type
- Load : 50mA/point
- Answering time : 1ms or less



PNP type input/output circuit

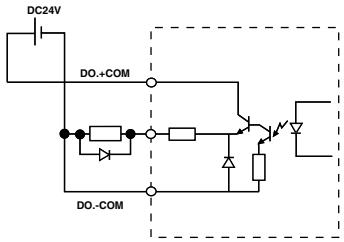
Input circuit

- 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

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

Power connector + wiring connection lever

Model	KAS-M5382-00

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

Safety connector

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

SR1-X SR1-P

HPB dummy connector

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

Model	KDK-M5163-00

LCC140 SR1-X SR1-P

NPN / PNP connector

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

SR1-X SR1-P RCX320 RCX340

L type stay

Use to install the controller.

Model	KBG-M410H-00

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

SR1-X SR1-P

Absolute battery

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

Basic specifications

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

Model	KAS-M53G0-12

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

SR1-X

Battery case

This is the absolute battery holder.

Model	KBG-M5395-00

SR1-X

See next page for optional parts

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 POPCOM+ P.650

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

Model	KBG-M4966-00

LCC140
ERCD
SR1-X
SR1-P

Environment

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

Note 1. LCC140 is applicable to Ver. 2.1.1 or later.
Note. Windows is the registered trademark of US Microsoft Corporation in U.S.A. and other countries.

Data cables

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

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

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

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

Programming box HPB/HPB-D P.658

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

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

LCC140
ERCD
SR1-X
SR1-P

YC-Link board (with connection cable)

Model	KBG-M4400-60

SR1-X
SR1-P

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

MEMO

RCX320

Robot controller with advanced functions

A 2-axis model of the RCX340 controller has been launched finally.
The high-level equipment construction such as simultaneous control of multiple robots is achieved by the advanced functionality and flexible expandability.

RCX320

Programming box
▶ PBX/PBX-E
P.659

Support software for PC
▶ RCX-Studio 2020
P.654

Ordering method

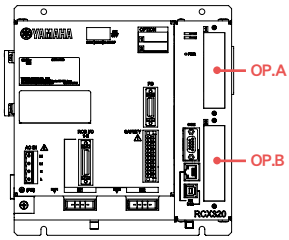
RCX320 – [ ] – [ ] – [ ] – [ ] – [ ] – [ ] – [ ]

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

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

Note 1. [STD.DIO] Parallel I/O board standard specifications
Dedicated input 8 points, dedicated output 9 points, general-purpose input 16 points, general-purpose output 8 points
Do not mix with field bus (CC/DN/PB/EP/PT/ES).
Note 2. [EXP.DIO] Parallel I/O board expansion specifications
General-purpose input 24 points, general-purpose output 16 points
Note 3. Only one DIO STD specification board can be selected. Therefore, this board cannot be selected in OP.B to OP.D.
Note 4. Select either NPN or PNP in DIO.
Note 5. Only one tracking board can be selected.
Note 6. Select only one master or slave board for YC-Link/E. For details, refer to "YC-Link/E ordering explanation" below.
Additionally, when ordering YC-Link/E, please specify what robot is connected to what number controller.
Note 7. Select only one fieldbus in a controller (CC/DN/PB/EP/PT/ES).
Note 8. The regenerative unit (option) is required when operating a model designated by YAMAHA or a load with a large inertia.

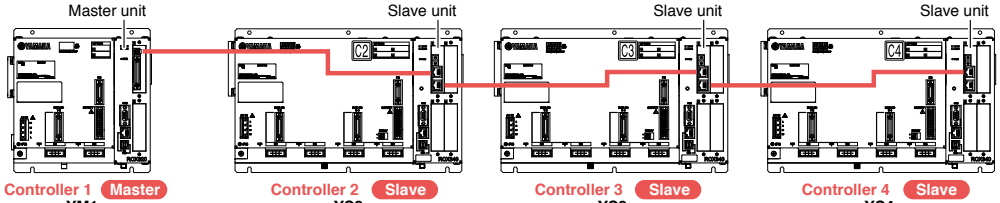
Controller option board position



YC-Link/E explanation

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

Example of YC-Link/E connections



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

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

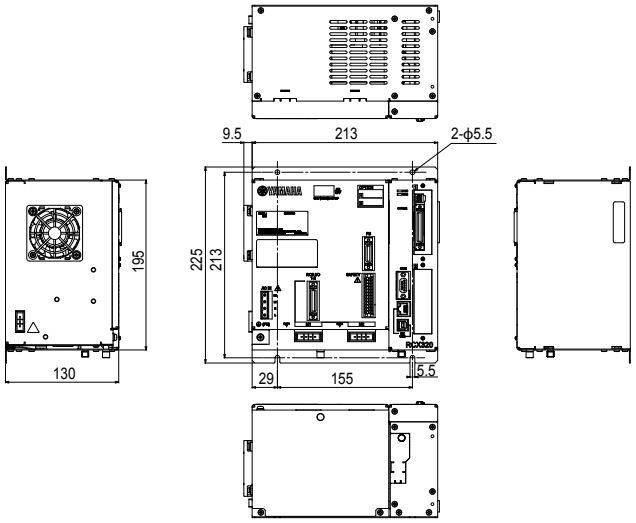
Controllable robot	XY-X P.377	FLIP-X P.289	PHASER P.267	YP-X P.505
CE marking	◯	Field networks	CC-Link DeviceNet EtherNet/IP Ethernet PROFIBUS PROFINET EtherCAT	

Basic specifications

Item			RCX320
Basic specifications	Applicable robots		YAMAHA single-axis robots, linear single-axis robots, P&P robots
	Connected motor capacity		1200W or less (in total for 2 axes)
	Power capacity		2400VA
	Dimensions		W213 × H195 × D130mm (main unit only)
	Weight		3.6kg (main unit only)
	Input power supply	Control power supply	Single-phase 200 to 230V AC +/-10% maximum, 50/60Hz
		Main power supply	Single-phase 200 to 230V AC +/-10% maximum, 50/60Hz
Axis control	No. of controllable axes		Max. 2 axes Up to four units of the RCX320 and RCX340 can be connected using the inter-controller communication “YC-Link/E”.
	Drive method		AC full digital servo
	Position detection method		Resolver or magnetic linear scale
	Control method		PTP motion (point to point), ARCH motion, linear interpolation, circular interpolation
	Coordinate systems		Joint coordinates, Cartesian coordinates
	Position display units		Pulses, mm (1/1000 steps), degree (1/1000 steps)
	Speed setting		0.01 to 100% (below 1% can be changed by programming)
	Acceleration/deceleration setting		Optimized by robot model and tip weight parameter Setting by acceleration coefficient and deceleration rate parameters (1% steps) * Can be changed by programming. Zone control (For SCARA robots only, optimized according to arm posture)
Programming	Program language		YAMAHA BASIC II conforming to JIS B8439 (SLIM language)
	Multi-task		Max. 16 tasks
	Sequence program		1 program
	Memory capacity		2.1MB (Total of program and point data) (Available capacity for program when the maximum number of points is used: 300KB)
	Program		100 programs (maximum number of programs) 9999 lines (maximum number of lines per program)
	Point		30000 points (maximum number of points)
	Point teaching method		MDI (coordinate data input), direct teaching, teaching playback, offline teaching (data input from external unit)
	System backup (Internal memory backup)		Lithium battery (service life about 4 years at 0 to 40°C)
	Internal flash memory		512 KB
External I/O	SAFETY	Input	Emergency stop ready input, 2 systems Auto mode input, 2 systems (Enabled only when the global specifications are used.)
		Output	Emergency stop contact output, 2 systems Enable contact output, 2 systems (Enabled only when the PBX-E is used.) Motor power ready output, 2 systems
	Brake output		Transistor output (PNP open collector)
	Origin sensor input		Connectable to 24V DC B-contact (normally closed) sensor
	External communications		RS-232C: 1CH (D-SUB 9-pin (female)) Ethernet: 1CH (In conformity with IEEE802.3u/IEEE802.3) 100Mbps/10Mbps (100BASE-TX/10BASE-T) Applicable to Auto Negotiation RS-422: 1CH (Dedicated to PBX)
General specifications	Operating temperature		0 to 40°C
	Storage temperature		-10 to 65°C
	Operating humidity		35 to 85% RH (no condensation)
	Atmosphere		Indoor location not exposed to direct sunlight. *No corrosive , flammable gases, oil mist, or dust particles
	Anti-vibration		All XYZ directions 10 to 57Hz unidirectional amplitude 0.075mm 57 to 150Hz 9.8m/s^2
	Protective functions		Position detection error, power module error, temperature error, overload, overvoltage, low voltage, excessive position deviation, overcurrent, motor current error
	Noise immunity		Conforms to IEC61000-4-4 Level 3
	Protective structure		IP20
	Appliance classes		Class I
Options	Option board	Parallel I/O board	Standard specifications	Dedicated input 8 points, dedicated output 9 points General-purpose input 16 points, general-purpose output 8 points NPN/PNP specifications are selected. (maximum 1 board)
			Expansion specifications	General-purpose input 24 points, general-purpose output 16 points NPN/PNP specifications are selected. (maximum 4 boards)
		CC-Link board Ver1.1/2.0		Remote I/O Dedicated input/output: 16 points each General-purpose input/output: 96 points each Remote register Input/output: 16 words each
		DeviceNet™ board		
		EtherNet/IP™ board		
		PROFIBUS board		
		PROFINET board		
		EtherCAT board		
		YC-Link/E board (master/slave)		Communication cycle: 1 ms, control cycle: minimum 1 ms / maximum 8 ms, maximum number of robot units: four units Maximum number of control axes: total 14 axes (including two master controller axes), maximum 12 axes for slaves only
		YRG (gripper) board		Position detection method: optical rotary encoder, minimum setting distance: 0.01 mm Speed setting: 20 to 100% relative to the maximum parameter speed, number of connected gripper units: maximum two units Drive power: DC 24V +/-10%, 1.0A Max
		Tracking board		Number of connected encoders: maximum two units, supported encoders: 26LS31/26C31 equivalent line driver (RS422 compliant) Encoder power supply: DC5V (2 counter (ch) total 500 mA or less) (supplied from controller)
	RCXiVY2+ unit			Camera pixels: maximum 5 million pixels, number of registered models: 254 models, number of connected cameras: maximum two units Power supply: DC24V +/-10% 1.5A Max
	Programming box			PBX, PBX-E
	Absolute battery			3.6V 2700mAH / axis Backup retention time: About 1 year
	Support software for personal computer			RCX-Studio 2020

RCX320

Dimensions



Power supply capacity and heat emission

The required power supply capacity and heat emission will vary depending on the robot type and number of axes.
Using the following table as a general guide consider the required power supply preparation and control panel size, controller installation, and cooling method.

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

Axial current sensor value		Power capacity (VA)	Generated heat amount (W)
X axis	Y axis		
05	05	500	53
10	05	700	58
20	05	1500	78
10	10	900	63
20	10	1700	83
20	20	2400	100

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

Motor capacity vs. current sensor table

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

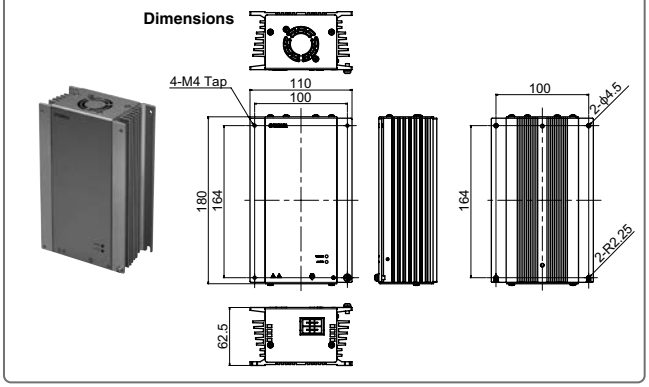
Note. Motor output of the B14H is 200W but the current sensor is 05.

Conditions where regenerative unit is needed on multi robots

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

Regenerative unit YHX-RU1

Regenerative unit YHX-RU



Basic specifications

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

Regenerative unit selection table

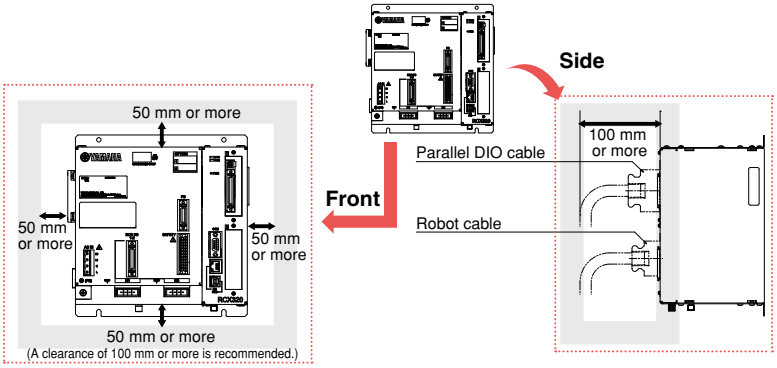
Whether the regenerative unit is needed is automatically determined by the robot model.

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

● : Applicable ○ : Select per conditions

Installation conditions

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



Standard specification I/O connector signal list

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

Expanded specification I/O connector signal list

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

Note. The IDs are set using the parameter.

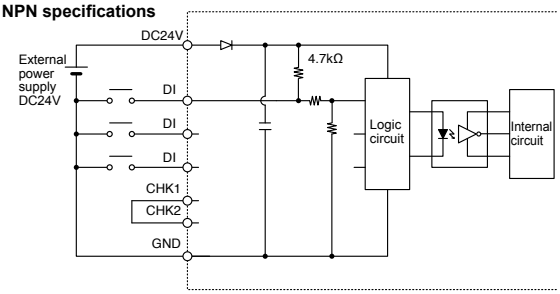
RCX320

Standard specification I/O connector pin assignment lists

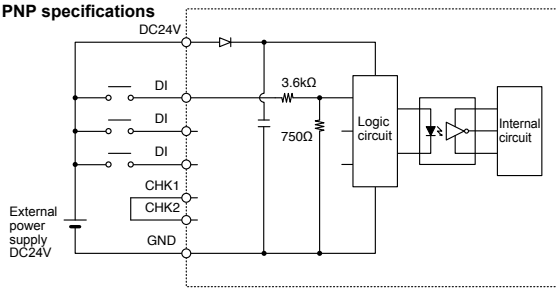
Pin	I/O No.	Name
1	DI01	Servo ON
2	DI10	SEQ enable
3	DI03	(Spare)
4	CHK1	Check input 1
5	DI05	(Spare)
6	DI06	STOP
7	DI07	(Spare)
8	DI20	General-purpose input
9	DI21	General-purpose input
10	DI22	General-purpose input
11	DI23	General-purpose input
12	DI24	General-purpose input
13	DI25	General-purpose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

Typical input signal connection

NPN specifications

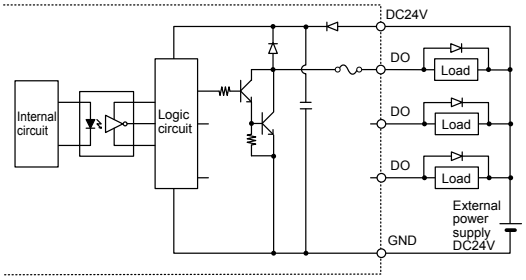


PNP specifications

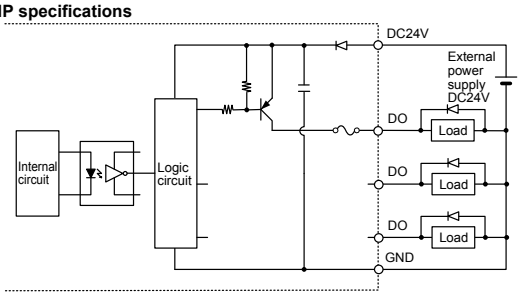


Typical output signal connection

NPN specifications



PNP specifications

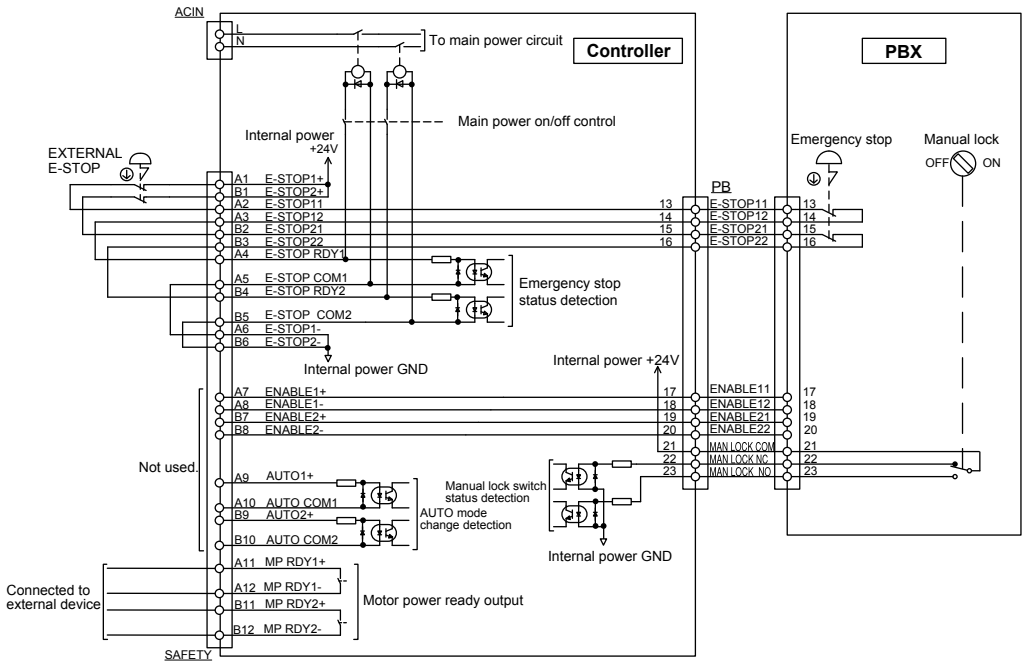


Basic functions

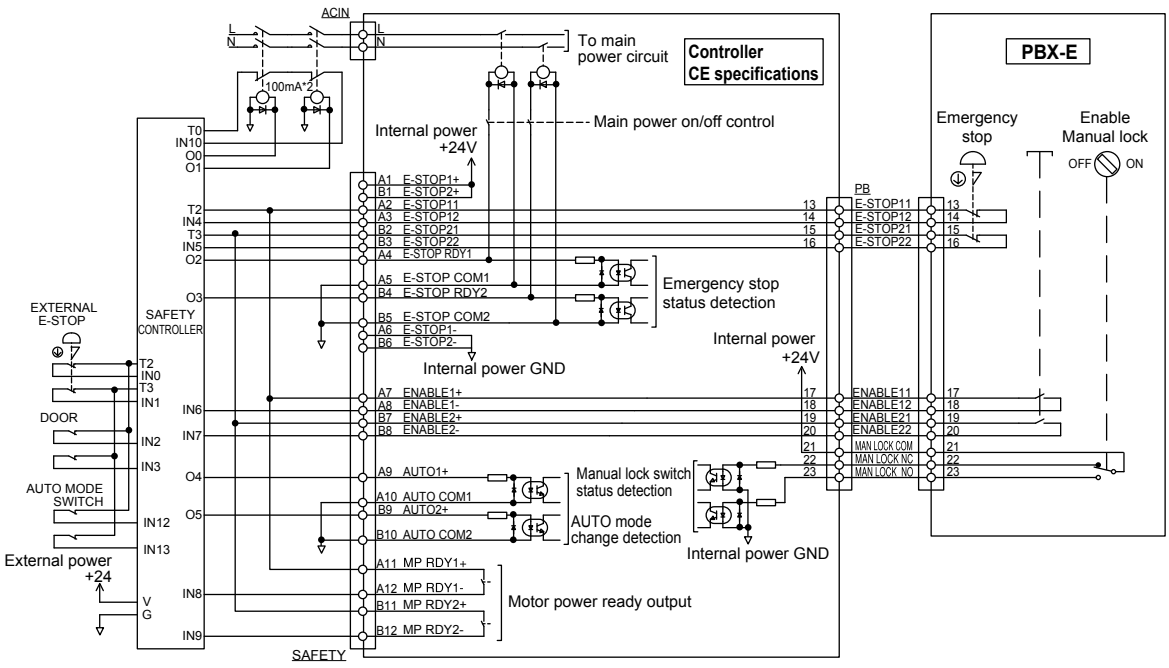
Function	Description
Operation modes	AUTO mode (Major functions: program creation, program execution, step execution, etc.) MANUAL mode (Major functions: jog movement, point data teaching, parameter editing, etc.)
Commands	Array declaration commands (DIM statement) Assignment commands (Numeric assignment,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

Emergency input signal connections

Connection example of controller with normal specifications and PBX



Connection example of controller with CE specifications and PBX-E



Robot Language Table

General commands

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

Arithmetic commands

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

Date / time

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

Character string operation

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

Point, coordinates, shift coordinates

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

Branching commands

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

Error control

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

Program control

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

Task control

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

Robot operations

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

Status acquisition

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

Status change

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

PATH control

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

Torque control

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

Input/output control

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

Communication control

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

Accessories and part options

RCX320

Standard accessories

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

Power connector + wiring connection lever

Model	KAS-M5382-00

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

Safety connector

Model	KCX-M5370-00

RCX320 RCX340/341

Regenerative unit short circuit connector

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

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

RCX320 YHX

PBX terminator (dummy connector)

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

Model	KFR-M5163-00

RCX320 RCX340/341

NPN / PNP connector

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

SR1-X SR1-P RCX320 RCX340/341

Absolute battery

Battery for absolute data back-up.

Basic specifications

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

Model	KCA-M53G0-02

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

RCX320 RCX340 TS-SH RCX3-SMU

Important — Absolute battery installation conditions

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

Dust cover for COM connector

Model	KR7-M5395-10

RCX320 RCX340/341

Dust cover for LAN connector

Model	KCX-M658K-10

RCX320 RCX340/341

Dust cover for USB connector

Model	KCX-M658K-00

RCX320 RCX340/341

Replacement fan filter (5 pcs.)

Model	KDK-M427G-00

RCX320

Options

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

Programming box PBX/PBX-E P.659

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

PBX

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

RCX320 / RCX340/341

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

Support software for PC RCX-Studio 2020 P.654

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

USB key

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

RCX320 / RCX340/341

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

Basic specifications

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

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

Data cables

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

USB

D-Sub

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

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

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

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

YC-Link/E master board

Model	KCX-M4400-M0

RCX320 / RCX340/341

YC-Link/E slave board

Model	KCX-M4400-S0

RCX320 / RCX340/341

YC-Link/E cable (1m)

Model	KCX-M6479-10

RCX320 / RCX340/341

RCX340

Robot controller with advanced functions

Next generation controller, all functions of which were reviewed to further improve the functions of conventional controllers.
This controller provides the features to achieve the high functionalities that can construct the equipment at high level.

RCX340

Programming box
▶ PBX/PBX-E
P.659

Support software for PC
▶ RCX-Studio 2020
P.654

Basic specifications

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

Controllable robot	XY-X P.377	YK-X P.69	FLIP-X P.289	PHASER P.267	YP-X P.505

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

Ordering method

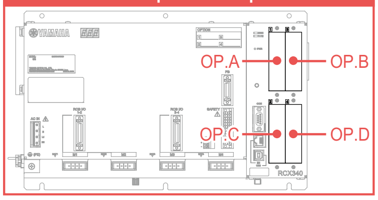
RCX340 - [ ] - [ ] - [ ] - [ ] - [ ] - [ ] - [ ] - [ ]

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

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

Note 1. For two axes, safety standard "S" cannot be selected.
Note 2. When the field bus (CC/DN/PB/EP/PT/ES) is selected in the parallel I/O board standard (OP.B) to (OP.D) and the field bus option is enabled, the dedicated inputs from the parallel I/O board are disabled except for the STOP signal.
Note 3. Parallel I/O board expansion specifications
Note 4. Since only one parallel I/O board can be selected for an option board, the parallel I/O board standard specifications cannot be selected for (OP.B) to (OP.D).
Note 5. Be careful not to mix NPN and PNP for parallel I/O board.
Note 6. Only one tracking board can be selected from (OP.A) to (OP.D).
Note 7. When using YC-Link/E, select only one of the four types of optional boards, master (YM1) or slave (YS2/YS3/YS4).
Also, specify what robot is connected to what number controller.
Note 8. Do not mix with field bus (CC/DN/PB/EP/PT/ES).
Note 9. When using the incremental specifications, no absolute battery is required. When using a linear motor with semi-absolute specifications, the semi-absolute specifications are handled as incremental specifications, so no absolute battery is required. When using the absolute specifications, it is necessary to specify the absolute batteries for the number of axes.

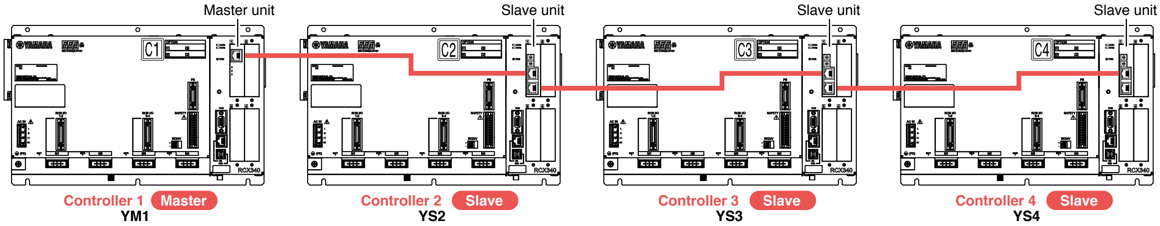
Controller option board position



Item			RCX340
General specifications	Operating temperature		0 to 40°C
	Storage temperature		-10 to 65°C
	Operating humidity		35 to 85% RH (no condensation)
	Noise immunity		Conforms to IEC61000-4-4 Level 3
	Protective structure		IP20
	Appliance classes		Class I
Options	Option board Note: Parallel I/O board	Standard specifications	Dedicated input 8 points, dedicated output 9 points General-purpose input 16 points, general-purpose output 8 points NPN/PNP specifications are selected. (maximum 1 board)
	Option board Note: Parallel I/O board	Expansion specifications	General-purpose input 24 points, general-purpose output 16 points NPN/PNP specifications are selected. (maximum 4 boards)
	Option board Note	CC-Link board Ver1.1/2.0 DeviceNet™ board EtherNet/IP™ board PROFIBUS board PROFINET board EtherCAT board	Remote I/O Dedicated input/output: 16 points each General-purpose input/output: 96 points each Remote register Input/output: 16 words each
	Option board Note	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
	Option board Note	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
	Option board Note	Tracking board	Number of connected encoders: maximum two units, supported encoders: 26LS31/26C31 equivalent line driver (RS422 compliant) Encoder power supply: DC5V (2 counter (ch) total 500 mA or less) (supplied from controller)
	RCXiVY2+ unit		Camera pixels: maximum 5 million pixels, number of registered models: 254 models, number of connected cameras: maximum two units Power supply: DC24V +/-10% 1.5A Max
	Programming box		PBX, PBX-E
	Absolute battery		3.6V 2700mAH / axis Backup retention time: About 1 year
	Support software for personal computer		RCX-Studio 2020

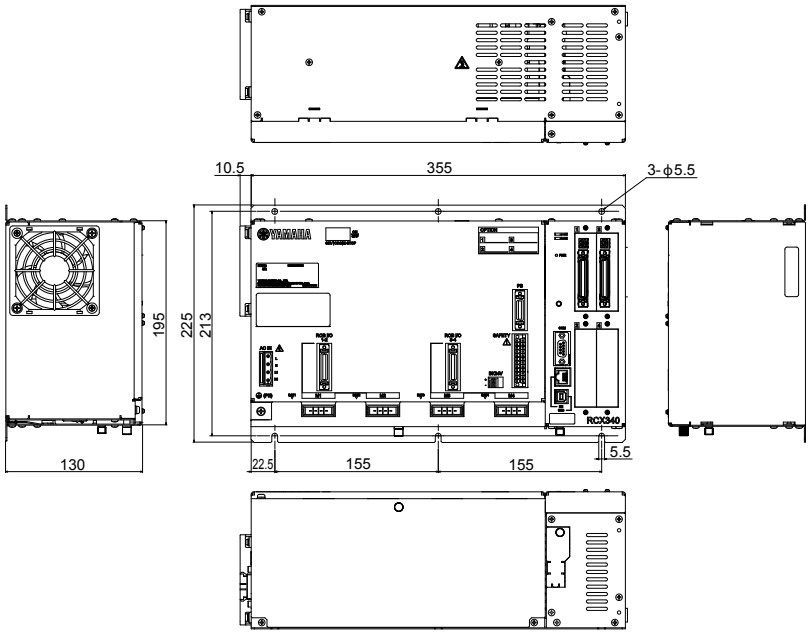
Note. There are four slots in which option boards can be installed.

YC-Link/E ordering explanation



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

Dimensions



Power supply capacity and heat emission

The required power supply capacity and heat emission will vary depending on the robot type and number of axes.
Using the following table as a general guide consider the required power supply preparation and control panel size, controller installation, and cooling method.

(1) When connected to SCARA robot

Robot type					Power capacity (VA)	Generated heat amount (W)
Standard type	Clean type	Dust-proof & drip-proof type	Ceiling-mount	Wall-mount / Inverse type		
YK120XG, YK150XG	–	–	–	–	300	58
YK180XG, YK180X YK220X	YK180XC, YK220XC	–	–	–	500	63
YK250XG, YK350XG YK400XG, YK500XGL YK600XGL, YK400XE-4	YK250XCH, YK350XCH YK400XCH, YK250XGC YK350XGC, YK400XGC YK400XEC-4, YK500XGLC, YK600XGLC	YK250XGP, YK350XGP YK400XGP, YK500XGLP YK600XGLP	–	YK300XGS, YK400XGS	1000	75
–	YK500XC, YK600XC	–	–	–	1500	88
YK500XE-10, YK500XG YK610XE-10, YK600XG YK710XE-10, YK700XGL	YK510XEC-10, YK610XEC-10 YK710XEC-10	YK500XGP, YK600XGP		YK500XGS, YK600XGS	1700	93
–	YK700XC, YK800XC YK1000XC	–	–	–	2000	100
YK600XGH, YK700XG YK800XG, YK900XG YK1000XG, YK1200X	–	YK600XGHP, YK700XGP YK800XGP, YK900XGP YK1000XGP	YK350TW YK500TW	YK700XGS, YK800XGS YK900XGS, YK1000XGS	2500	113

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

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

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

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

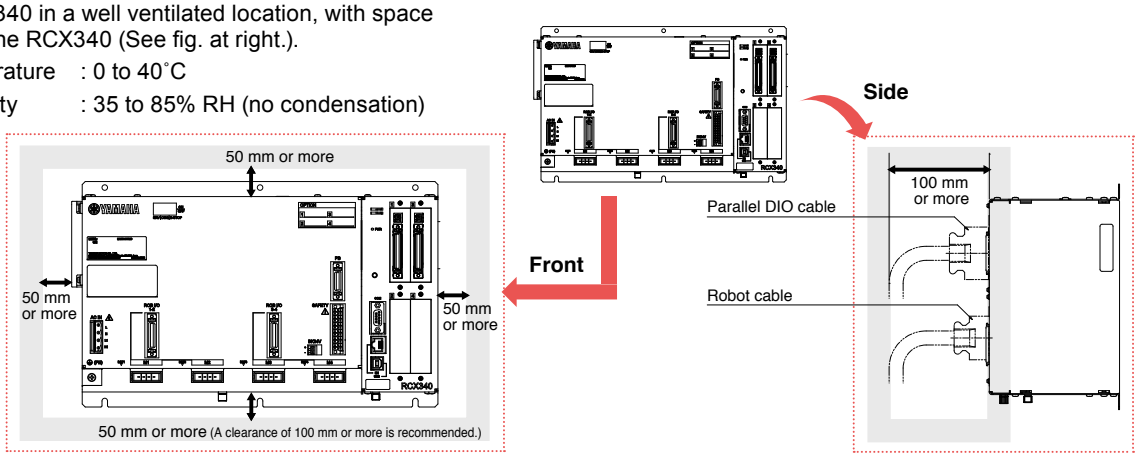
(4) When connected to 4 axis (Cartesian robot and/or multi-axis robot)

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

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

Installation conditions

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



Standard specification I/O connector signal list

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

Expanded specification I/O connector signal list

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

Note. The IDs are set using the parameter.

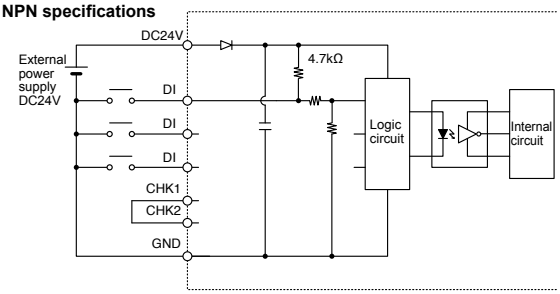
RCX340

Standard specification I/O connector pin assignment lists

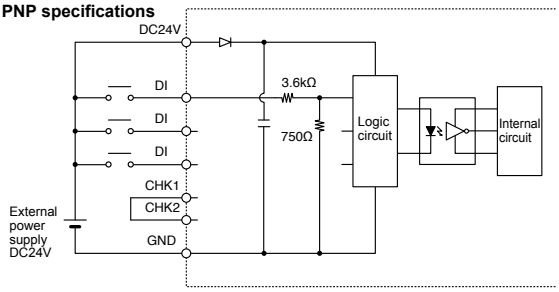
Pin	I/O No.	Name
1	DI01	Servo ON
2	DI10	SEQ enable
3	DI03	(Spare)
4	CHK1	Check input 1
5	DI05	(Spare)
6	DI06	STOP
7	DI07	(Spare)
8	DI20	General-purpose input
9	DI21	General-purpose input
10	DI22	General-purpose input
11	DI23	General-purpose input
12	DI24	General-purpose input
13	DI25	General-purpose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

Typical input signal connection

NPN specifications

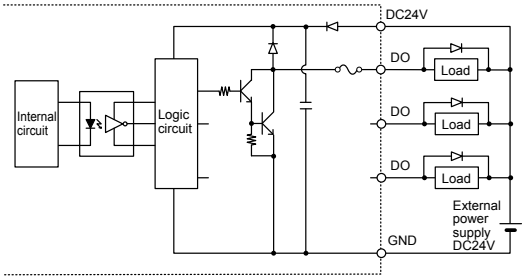


PNP specifications

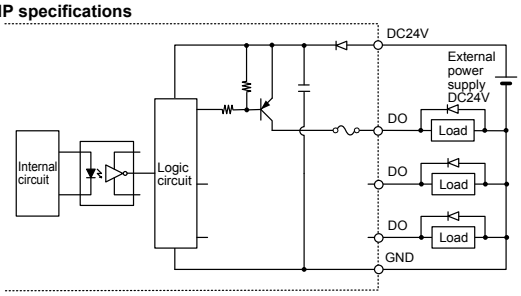


Typical output signal connection

NPN specifications



PNP specifications

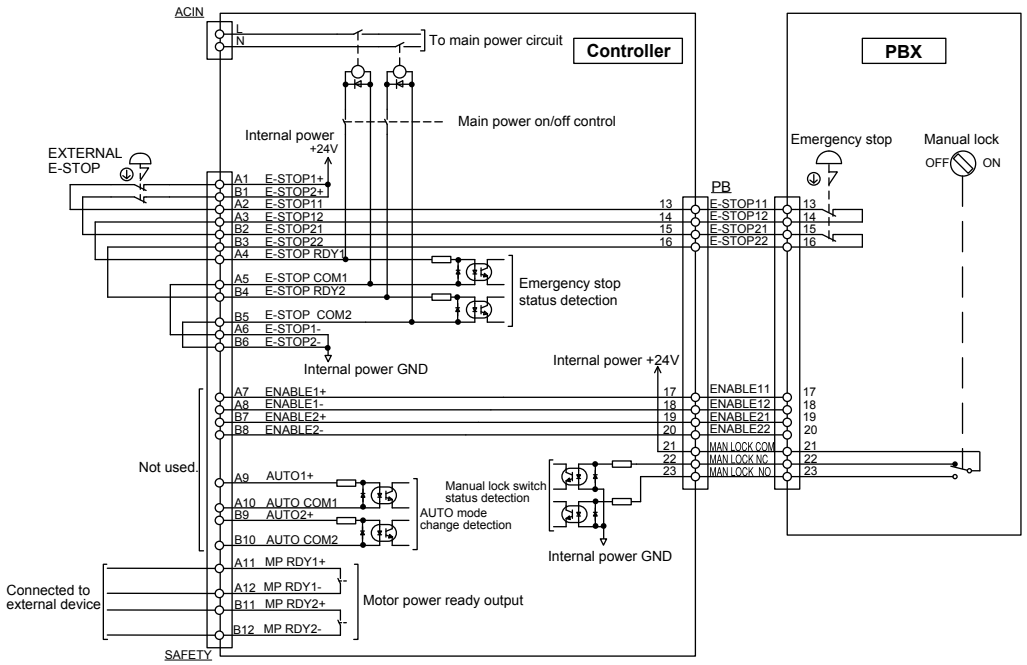


Basic functions

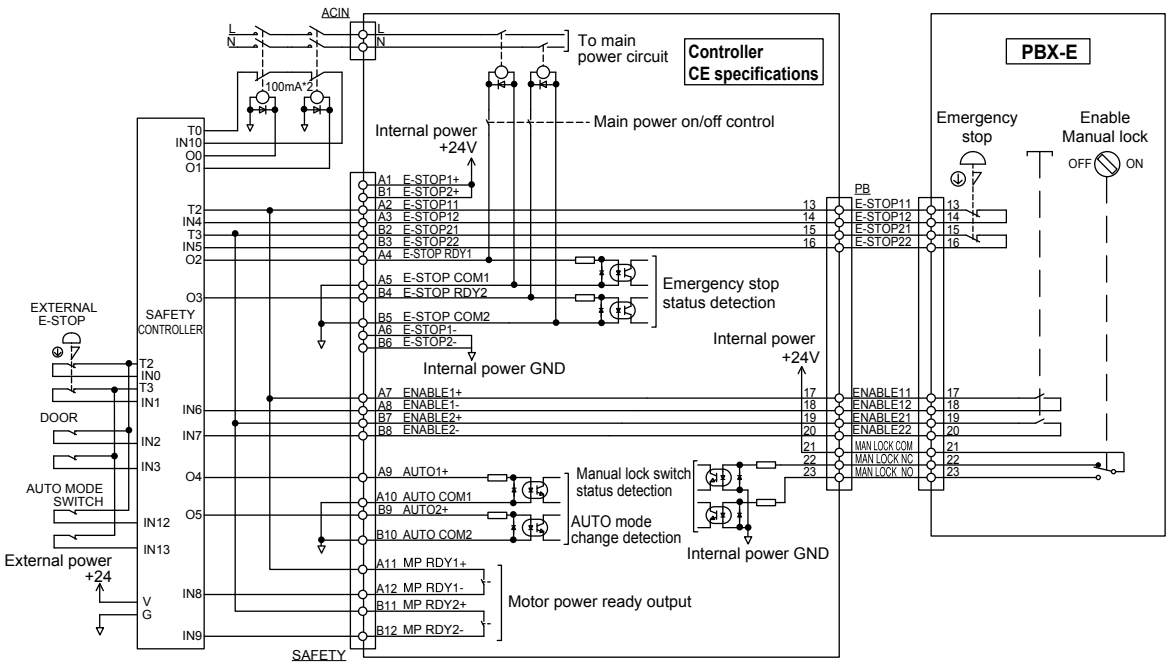
Function	Description
Operation modes	AUTO mode (Major functions: program creation, program execution, step execution, etc.) MANUAL mode (Major functions: jog movement, point data teaching, parameter editing, etc.)
Commands	Array declaration commands (DIM statement) Assignment commands (Numeric assignment,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

Emergency input signal connections

Connection example of controller with normal specifications and PBX



Connection example of controller with CE specifications and PBX-E



Robot Language Table

General commands

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

Arithmetic commands

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

Date / time

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

Character string operation

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

Point, coordinates, shift coordinates

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

Branching commands

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

Error control

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

Program control

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

Task control

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

Robot operations

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

Status acquisition

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

Status change

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

PATH control

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

Torque control

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

Input/output control

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

Communication control

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

Accessories and part options

RCX340

Standard accessories

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

Power connector + wiring connection lever

Model	KAS-M5382-00

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

Safety connector

Model	KCX-M5370-00

RCX320 RCX340/341

PBX terminator (dummy connector)

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

Model	KFR-M5163-00

RCX320 RCX340/341

NPN / PNP connector

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

SR1-X SR1-P RCX320 RCX340/341

Absolute battery

Battery for absolute data back-up.

Basic specifications

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

Model	KCA-M53G0-03

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

RCX320 RCX340/341 TS-SH RCX3-SMU

Important **Absolute battery installation conditions**

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

Dust cover for COM connector

Model	KR7-M5395-10

RCX320 RCX340/341

Dust cover for LAN connector

Model	KCX-M658K-10

RCX320 RCX340/341

Dust cover for USB connector

Model	KCX-M658K-00

RCX320 RCX340/341

Replacement fan filter (5 pcs.)

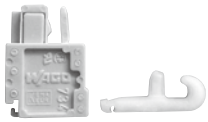
Model	KDK-M427G-00

RCX320

Options

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

External 24V power supply connector for brake + wiring lever



Model	KCX-M6500-10

RCX340/341

Programming box PBX/PBX-E

P.659

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

PBX

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

RCX320
RCX340/341

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

Support software for PC RCX-Studio 2020

P.654

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

USB key

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

RCX320
RCX340/341

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

Basic specifications

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

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

Data cables

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

USB

D-Sub

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

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

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

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

YC-Link/E master board

Model	KCX-M4400-M0

RCX320
RCX340/341

YC-Link/E slave board

Model	KCX-M4400-S0

RCX320
RCX340/341

YC-Link/E cable (1m)

Model	KCX-M6479-10

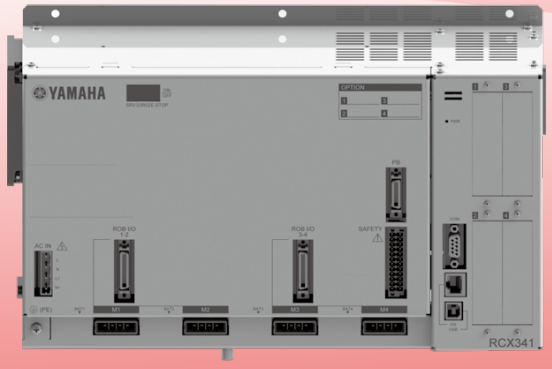
RCX320
RCX340/341

RCX341

Robot controller with advanced functions

**Based on the multi-axis controller "RCX340", which features advanced functionality that enables high-level equipment construction, the external regenerative unit "RU1" is installed to dissipate heat inside the controller.
The maximum output current has been increased while maintaining the same compact design as RCX340.**

RU1



RCX341

Programming box
▶ PBX/PBX-E
P.659

Support software for PC
▶ RCX-Studio 2020
P.654

Basic specifications

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

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

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

Controllable robot	YK1200XG P.106
CE marking	◯
Field networks	CC-Link, DeviceNet, EtherNet/IP, Ethernet, PROFIBUS, PROFINET, EtherCAT

Ordering method

RCX341-4 - [Safety standards] - R - [Controller option A] - [Controller option B] - [Controller option C] - [Controller option D] - [Controller option E] - [Absolute battery]

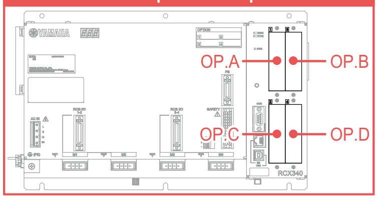
Controller	Safety standards	Regenerative unit	Controller option A (OP.A)	Controller option B (OP.B)	Controller option C (OP.C)	Controller option D (OP.D)	Controller option E (OP.E)	Absolute battery
RCX341-4	N: Normal	R	No entry: Non-selection	No entry: Non-selection	No entry: Non-selection	No entry: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

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

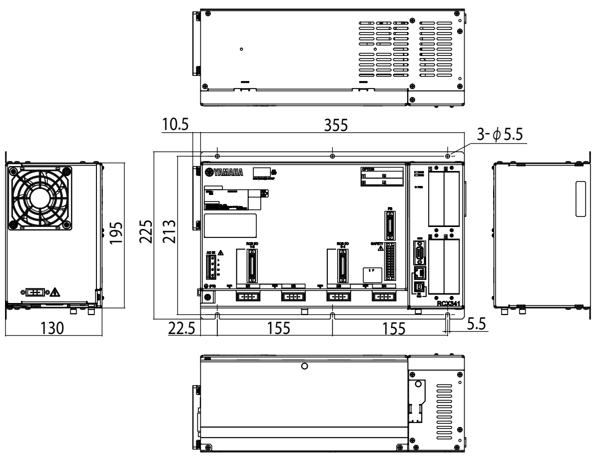
Please select desired selection items from the upper portion of the controller option A in order.

Note 1. When the field bus (CC/DN/PB/EP/PT/ES) is selected in the parallel I/O board standard (OP.B) to (OP.D) and the field bus option is enabled, the dedicated inputs from the parallel I/O board are disabled except for the STOP signal.
Note 2. Parallel I/O board expansion specifications
Note 3. Since only one parallel I/O board can be selected for an option board, the parallel I/O board standard specifications cannot be selected for (OP.B) to (OP.D).
Note 4. Be careful not to mix NPN and PNP for parallel I/O board.
Note 5. Only one tracking board can be selected from (OP.A) to (OP.D).
Note 6. When using YC-Link/E, select only one of the four types of optional boards, master (YM1) or slave (YS2/YS3/YS4).
Also, specify what robot is connected to what number controller.
Note 7. Do not mix with field bus (CC/DN/PB/EP/PT/ES).
Note 8. When using the incremental specifications, no absolute battery is required. When using the absolute specifications, it is necessary to specify the absolute batteries for the number of axes.

Controller option board position



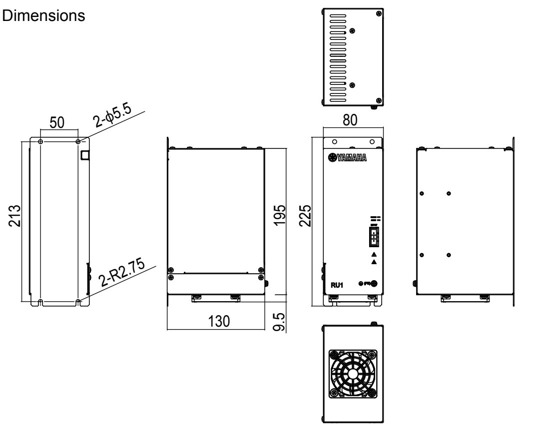
Dimensions



Regenerative unit RU1

Regenerative unit RU1

Dimensions



Basic specifications

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

Support software for PC

TS-Manager/EP-Manager

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

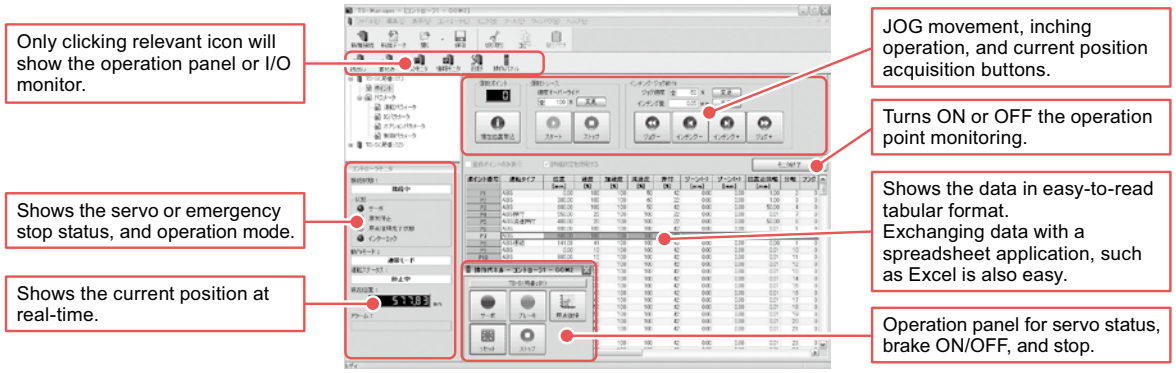
▼Applicable controllers

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

Features

1 Basic functions TS EP

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



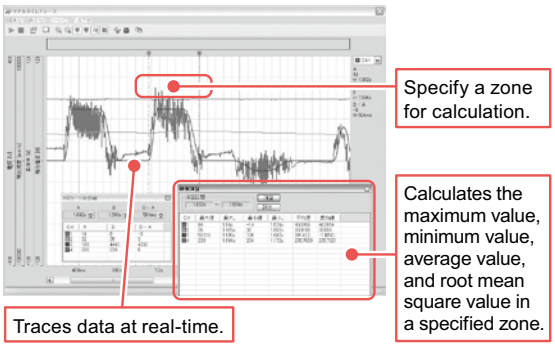
Note. Excel is a registered trademark of Microsoft Corporation in the United States and/or other countries.

2 Real-time trace TS EP

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

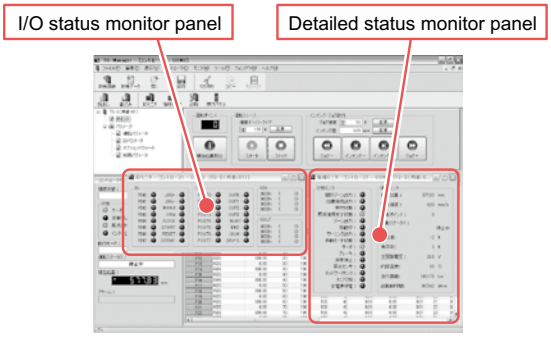
Real-time traceable items (up to four items)		
• Voltage value	• Commanded position	• Current position
• Command speed	• Current speed	• Internal temperature
• Command current value	• Present current value	• Motor load factor
• Input/output I/O status	• Input pulse count *1	• Movement pulse count *1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

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



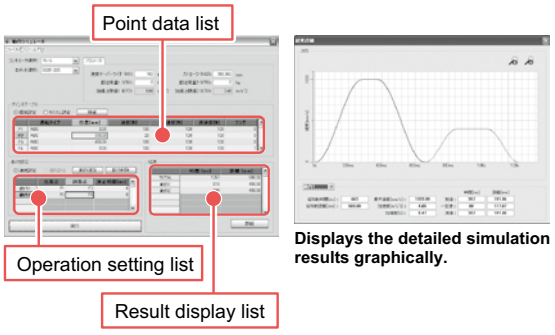
3 Various monitor functions and detailed error logs TS EP

The robot operation status (operation mode or servo status) and I/O status can be monitored.
Additionally, the Alarm Log screen also displays the input/output I/O status in addition to the carrier position, speed, operation status, current value, and voltage value in case of an alarm. This greatly contributes to the status analysis.



4 Operation simulation TS EP

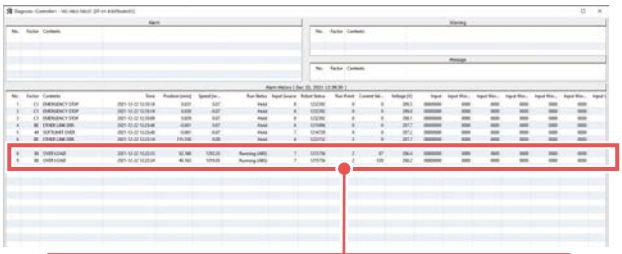
As the operation condition data or point data is input, a period of time necessary for operation is simulated.
Use of this function makes it possible to select an optimal model before purchase and simulate the speed and acceleration/deceleration settings without use of actual machine.
The TS-Manager/EP-Manager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



Displays the detailed simulation results graphically.

5 Alarm history TS EP

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



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

6 Free download EP

Support software “EP-Manager” that allows you to perform “Setting” → “Pre-check” → “Debug” → “Maintenance” in a single step is provided free of charge.
Easy edit for robot operation, positioning, timing, or monitoring motor load.

Free of charge

Download from website (member site)

TS-Manager TS

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

TS-Manager environment

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

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

Data cables (5m)

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

USB **D-Sub**

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

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

EP-Manager EP

Free of charge

Download from website (member site)

Model	KFX-M4990-00

EP-Manager environment

OS	Microsoft Windows 10 (32bit/64bit), 11 (Supported version: V.1.2.4 or later)
CPU	Exceeding the environment recommended by the OS being used
Memory	Exceeding the environment recommended by the OS being used
Communication port	Ethernet port (100BASE-TX) Ethernet cable (category 5 or higher)
Display	1024×768 or higher resolution, 256 colors or higher
Applicable controllers	EP-01

Note. Windows is the registered trademark of US Microsoft Corporation in U.S.A. and other countries.
Note. Ethernet is a registered trademark of the XEROX Corporation, USA.

Support software for PC

POPCOM+

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

▼Applicable controllers

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

Features

1 Easy to use

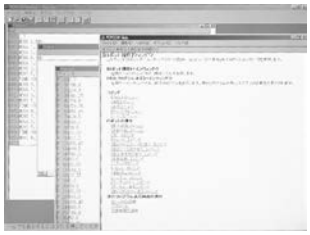
All items necessary for robot operation are displayed on single screen. There is no need to remember the menu structure so that it can be easily operated with mouse control by anybody.

2 Program editing

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

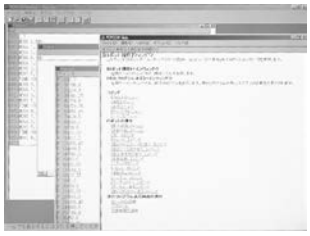
3 Point editing

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



4 Help function

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



5 Robot operation

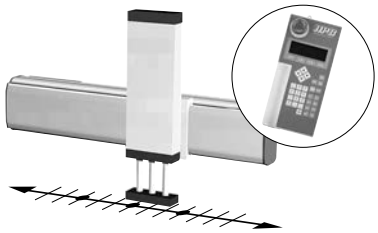
By connecting between a computer and the controller with a communication cable, the controller can control the robot in the same way as a HPB / HPB-D (programming box).

6 Creating point data

There are three methods available for creating the point data.

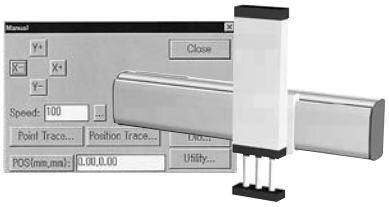
MDI (Manual Data Input) teaching

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



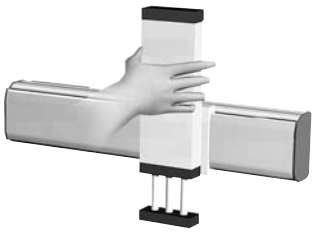
Remote teaching

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



Direct teaching

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



PC supporting software POPCOM+

POPCOM+ software model	KBG-M4966-00

POPCOM+ environment

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

Note 1. LCC140 is applicable to Ver. 2.1.1 or later.
Note. Windows is the registered trademark of US Microsoft Corporation in U.S.A. and other countries.

Data cables (5m)

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

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

USB

D-Sub

Model	USB type (5m)	KBG-M538F-00	LCC140 ERCD SR1-X SR1-P RCX320 RCX340/341
	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.

Support software for PC

RDV-Manager

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

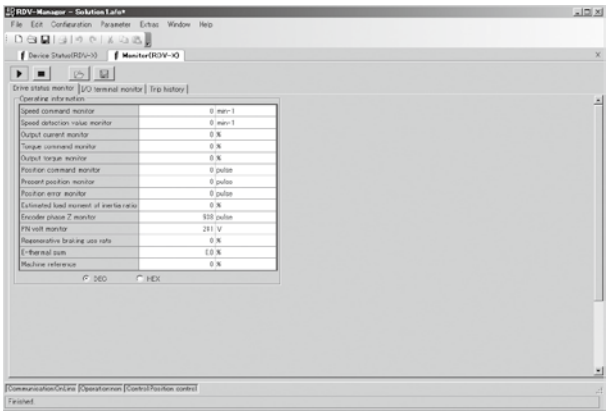
▼Applicable controllers

RDV-X
RDV-P
P.606

Features

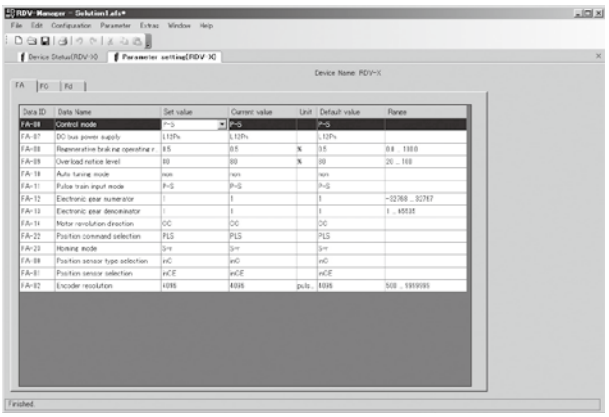
1 Monitoring function

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



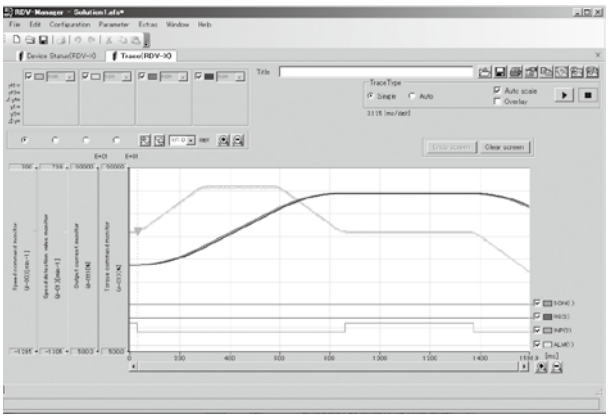
2 Setting parameters

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



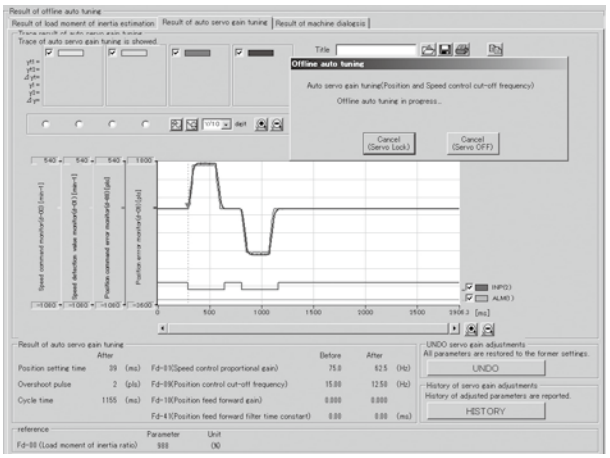
3 Operation tracing function

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



4 Offline auto tuning function

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



Support software RDV-Manager

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

Model	KEF-M4966-00

Environment

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

Note 1. SP1 (service pack 1) or higher.
Note. Windows is the registered trademark of US Microsoft Corporation in U.S.A. and other countries.

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

Communication cable to connect PC and a controller.

Model	KEF-M538F-01

MEMO

Support software for PC

RCX-Studio 2020

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

▼Applicable controllers

RCX320	P.626
RCX340	P.636

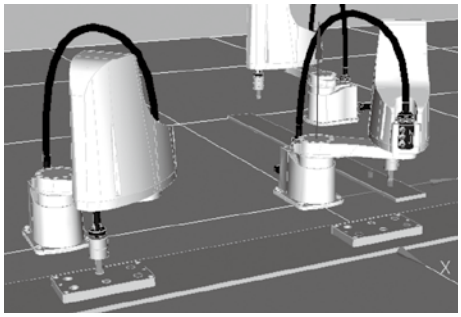
Features

1 3D simulator

Layout can be verified beforehand without connecting robot

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

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



2 Program template (Program template automatic creation function)

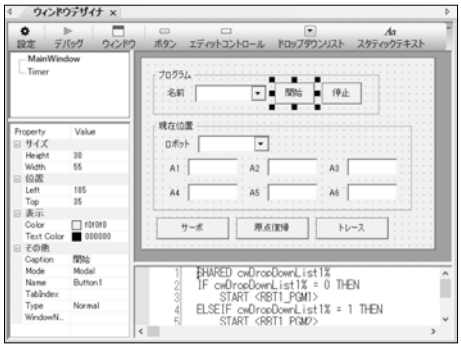
Program creation time can be shortened greatly.

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

3 Custom window creation

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

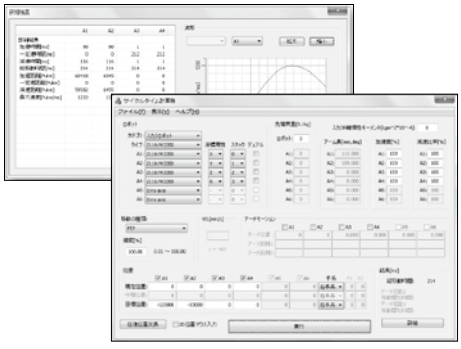
GUIs for operators that are displayed on the panel computer can be created.



4 Other existing functions

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

Cycle time calculator	Real time trace	Data comparison



RCX-Studio 2020 software

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

Basic specifications

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

Note 1. This shows the software package type. The software is common to two products and can be downloaded from YAMAHA's WEB site.
Note 2. Common to the conventional model RCX-Studio Pro.
Note 3. Microsoft, Windows 7, Windows 8.1, and Windows 10 are either registered trademarks or trademarks of Microsoft Corporation in the United States and/or other countries.
Other company names and product names listed in this manual may be the trademarks or registered trademarks of their respective companies.

USB key

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

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

Note. USB key color

Data cables (5m)

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

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

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

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

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

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

Handy terminal

HT1/HT1-D

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

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

▼Applicable controllers

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

P.592

■ HT1 / HT1-D basic specifications

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

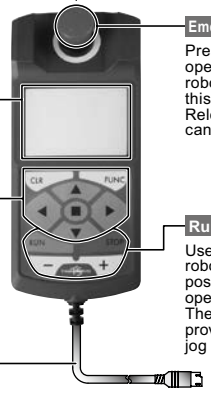
■ Part names and function

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

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

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

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

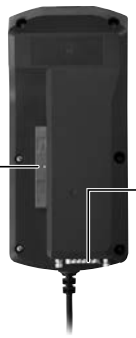


Emergency stop button
Pressing this button during operation immediately stops robot movement. To release this button, turn it clockwise. Releasing this button also cancels emergency stop.

Run/stop keys
Use these keys to operate the robot for teaching or positioning, or to stop operation.
The ⊖ and ⊕ keys are also provided to move the robot in jog mode.

■ HT1-D rear side

Enable switch (only on HT1-D)
This switch is effective for use with remote safety circuits. This switch cuts off the circuit when pressed or released but allows circuit operation when in the middle position.



Safety connector (only on HT1-D)
Use with remote safety circuits triggered by the emergency stop button or enable switch.

Handy terminal

HT2/HT2-D

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

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

▼Applicable controllers

EP-01 P.592

HT2 / HT2-D basic specifications

Name		HT2	HT2-D
External view			
Applicable controllers		EP-01	
Model	Japanese specifications	KFX-M5110-0J(3.5m) KFX-M5110-2J(10m)	KFX-M5110-1J(3.5m) KFX-M5110-3J(10m)
	English specifications	KFX-M5110-0E(3.5m) KFX-M5110-2E(10m)	KFX-M5110-0J(3.5m) KFX-M5110-2J10m)
Display		Dot matrix monochrome display (with backlighting) 32 characters × 10 lines	
Operation keys		Mechanical switch	
Emergency stop button		Normally closed contact point (with lock function)	
Enable switch		-	3-position
Safety connector		-	15 pin D-sub connector (male)
CE marking		Not supported	Applicable
Operating temperature		0°C to 40°C	
Operating humidity		35% to 85%RH (non-condensing)	
Dimensions		W88 × H191 × D45mm (Emergency stop button not included.)	
Weight		260g (not including cable)	300g (not including cable)
Cable length		3.5m / 10m	

Part names and function

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

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

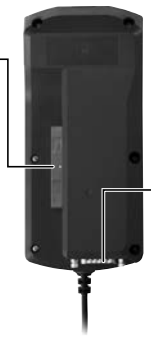
Data edit keys
Use these keys to select menus and edit various data.

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

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

Run/stop keys
Use these keys to operate the robot for teaching or positioning, or to stop operation.
The ⊖ and ⊕ keys are also provided to move the robot in jog mode.

HT2-D rear side



Enable switch (only on HT2-D)
This switch is effective for use with remote safety circuits. This switch cuts off the circuit when pressed or released but allows circuit operation when in the middle position.

Safety connector (only on HT2-D)
Use with remote safety circuits triggered by the emergency stop button or enable switch.

Programming box

HPB/HPB-D

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

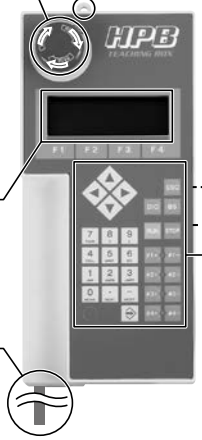
▼Applicable controllers

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

HPB / HPB-D basic specifications

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

Part names and function



Emergency stop button

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

Liquid crystal display

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

Connector cable

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

Strap hole

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

SD memory card connector

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

Operation keys

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

HPB-D rear side

Safety connector (HPB-D only)

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

3-position enable switch (HPB-D only)

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

Programming box

PBX/PBX-E

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

▼Applicable controllers

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

PBX/PBX-E basic specifications

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

Part names and function

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

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

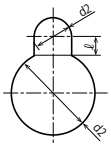
PB connector
Use this connector to connect the programming box to the robot controller.

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

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

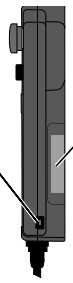
PBX back side

This section can be hooked onto an M5 screw.



d1=6mm
d2=10mm
ℓ =2mm

PBX-E rear side



USB connector
Connects the USB memory and programming box.

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

[Accessories]

Display language switching USB for PBX

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

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

LCD Monitor option

TS-Monitor

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.

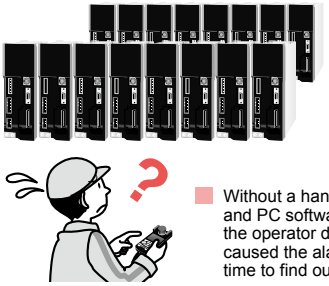
Note. The TS-Monitor cannot be installed on the controller when using a daisy-chain connection or when using a gateway connection.

▼Applicable controllers

TS-X
TS-P
P.592

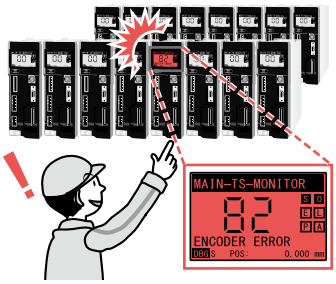
The TS Monitor Advantage

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

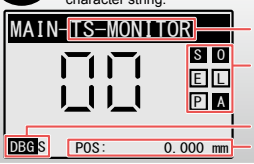


- Operator instantly knows various information without hooking to a handy terminal or PC.
- During errors the backlit display turns red and operator can see what error occurred on what controller at a glance.
- Display shows total operating time, so scheduling maintenance periods is easy.
- Backlit display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

Features

MAIN screen — Shows basic info

in normal operation — Displays optional name or character string.

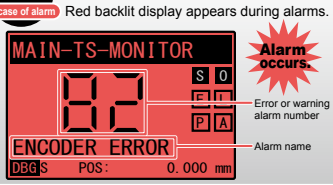


Desired character string specified by the user.
Simple status display ■: ON / □: OFF
Run mode
Current position

Error

MAIN screen — Easy to see error messages

in case of alarm — Red backlit display appears during alarms.



Error or warning alarm number
Alarm name

■ Simple status display

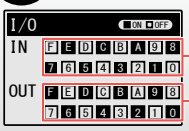
Display	Meaning
S	Servo status
E	Emergency stop
P	Main power failure
O	Return-to-origin completion status
L	Interlock status
A	Alarm

■ Run mode

Display	Meaning
NRM	Normal mode
MON	Monitor mode
DBG	Debug mode

I/O screen — Shows I/O status

Displays input/output bit states.



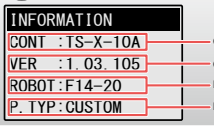
Input signal status
* Displays the status of input bit 0 to 15.
Output signal status
* Displays the status of output bit 0 to 15.

■ 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
OUT	F	E	D	C	B	A	9	8
	SRV-S	/ALM	END	BUSY	OUT3	OUT2	OUT1	OUT0
	7	6	5	4	3	2	1	0
	POUT7	POUT6	POUT5	POUT4	POUT3	POUT2	POUT1	POUT0

INFORMATION screen — Shows machine info

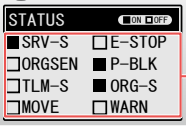
Displays the connected robot and version.



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.



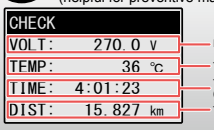
Status display ■: ON, □: OFF

■ 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

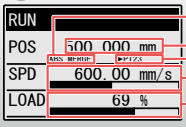
Displays total drive distance (helpful for preventive maintenance).



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.



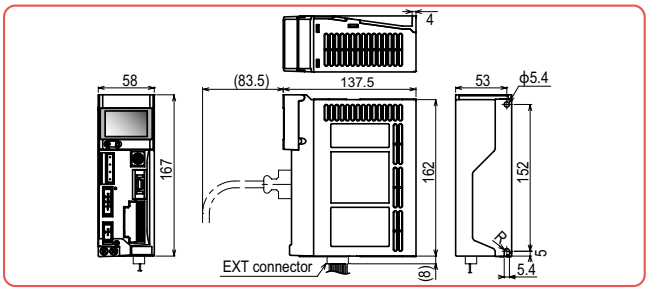
Run type
Robot current position
Run point
Robot operation speed
Load rate

■ Run type

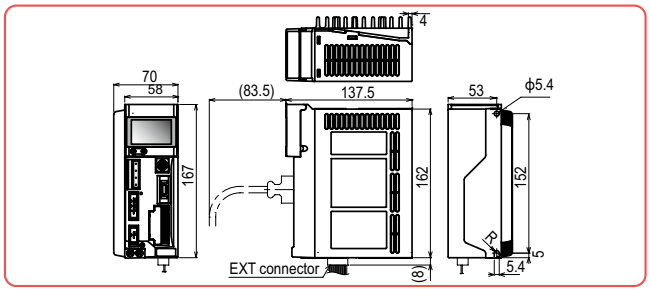
Display	Meaning
HOLD	Servo is off or robot is stopping
ABS	ABS
INC	INC
ABS MERGE	ABS merge operation
INC MERGE	INC merge operation
ABS PUSH	ABS push operation
INC PUSH	INC push operation
ABS->PUSH	ABS deceleration push operation
INC->PUSH	INC deceleration push operation
ORG	Return-to-origin

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
https://www.proface.com

▼Applicable controllers

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

P.592

Features

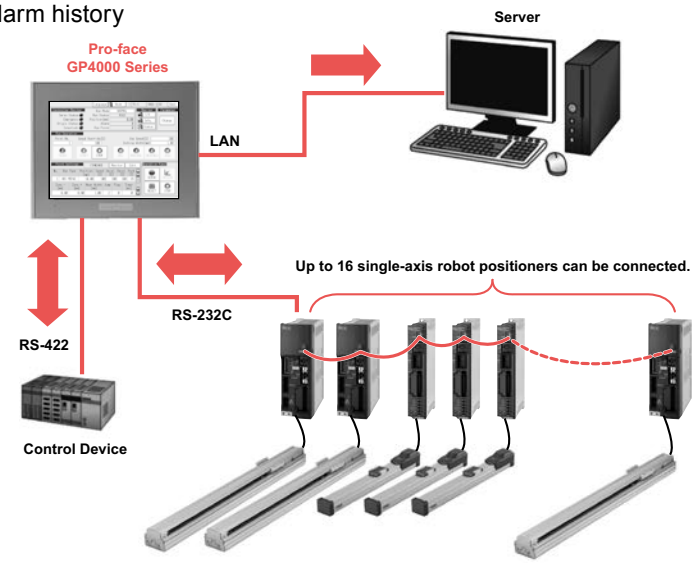
1 Can easily check a state and change settings.

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

2 Supports 3 languages

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

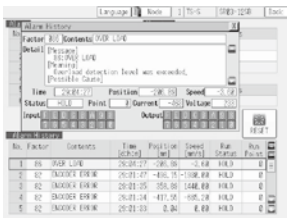
Without opening the control panel, you can check the status and change the settings on Touch Operator Interface alone.



Screen details

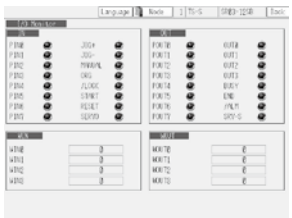
Diagnostic Screen

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



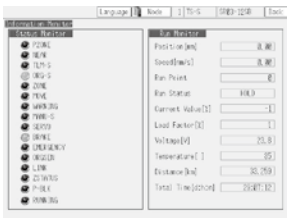
I/O Monitor Screen

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



Information Monitor Screen

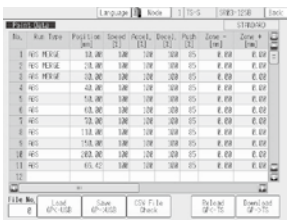
The screen can display the robot status and the operation status. You can check immediately the robot condition.



Position Data Editing Screen

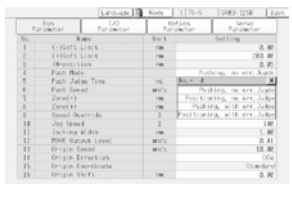
You can edit and back up point data (255 points).[Note]

Note. Settings for it and a USB storage required.



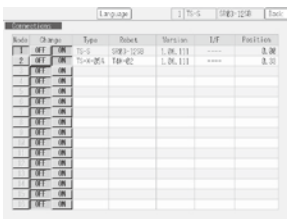
Parameter Editing Screen

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



Connecting Selection Screen

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



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

Software tool kit

RCX3-SDK

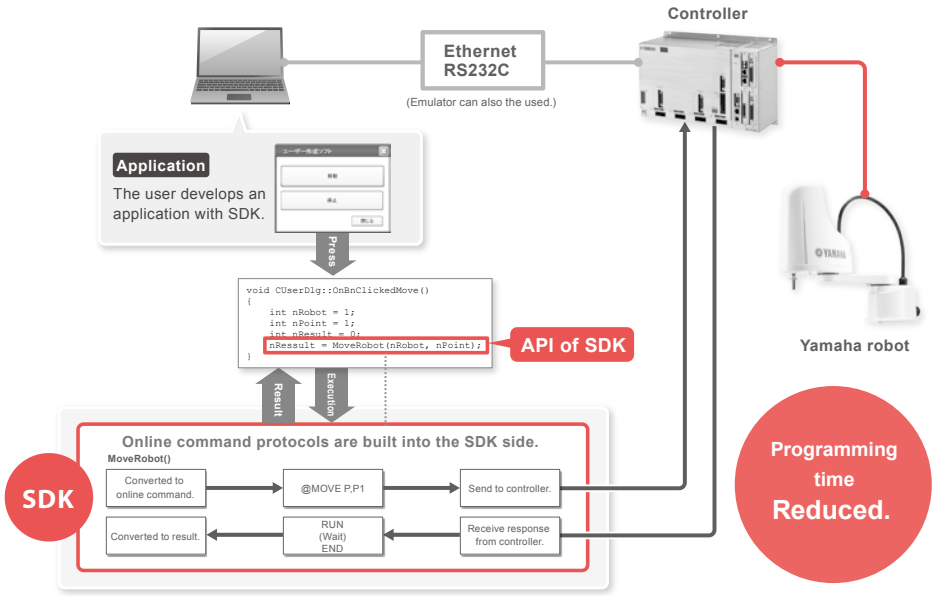
RCX3-SDK enables customers to create applications that can perform robot operations using their own development environment such as Microsoft Visual Basic.
There is no need to learn command protocols specific to robot controllers and the application development time can be shortened.

▼Applicable controllers

RCX320 P.626
RCX340 P.636

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

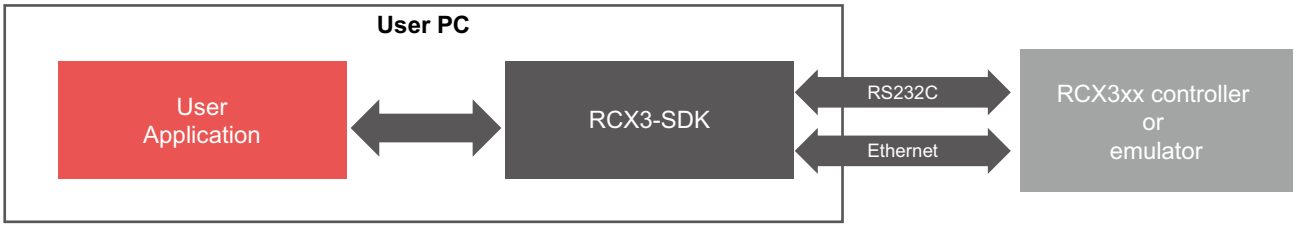
Configuration diagram



Function

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

The configuration using RCX3-SDK is described below.



Operating environment

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

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

Precautions for use

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

Model	KCX-M4987-00

Field network system with minimal wiring

NETWORK

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

YHX

P566

EtherNet/IP™ Basic specifications for network

Item	EtherNet/IP™
Applicable controllers	YHX
Network specifications	As specified for Ethernet (IEEE802.3)
Applicable EtherNet/IP™ specifications	Volume 1: Common Industrial protocol(CIP™) Edition 3.21 Volume 2: EtherNet/IP™ Adaptation Edition 1.22
Device type	Generic Device (device number 43)
Communication speed	10Mbps / 100 Mbps
Connector specifications	RJ-45 connector (8-pole modular connector), 2 ports
Cable specifications	EtherNet/IP™ Refer t o “2.1 LAN cable” in Chapter 2 of this user’s manual.
Maximum cable length	100 m
Input/output data size	Input: 1408byte (704 words) Output: 1408byte (704 words)
Setting of IP address, etc.	Set from YHX-Studio
Monitor LED	Module Status(MS), Network Status(NS), Link/Activity: Port1-2

PROFINET Basic specifications for network

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

EtherCAT Basic specifications for network

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

CC-Link Basic specifications for network

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

NETWORK

LCC140

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

P.576

CC-Link Basic specifications for network

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

DeviceNet Basic specifications for network

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

EtherNet/IP Basic specifications for network

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

Field network system with minimal wiring

NETWORK

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

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

P592

CC-Link Basic specifications for network

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

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

DeviceNet Basic specifications for network

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

EtherNet/IP Basic specifications for network

Item	EtherNet/IP™
Applicable controllers	TS-S2 / TS-SH / TS-SH / TS-X / TS-P Note
Applicable EtherNet/IP™ specifications	Volume1: Common Industrial Protocol (CIP™) Edition 3.8 Voluime2: EtherNet/IP™ Adaptation Edition 1.9
Device type	Generic Device (device number 43)
Number of occupied CH	Input 6ch, Output 6ch
Ethernet interface	10BASE-T/100BASE-TX
Network length	100m
Monitor LED	MS, NS, Activity, Link

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

PROFINET Basic specifications for network

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

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

Field network system with minimal wiring

NETWORK

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

SR1-X/SR1-P

P.618

CC-Link Basic specifications for network

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

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

DeviceNet™ Basic specifications for network

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

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

PROFIBUS Basic specifications for network

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

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

Field network system with minimal wiring

NETWORK

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

RCX320 P626 RCX340/RCX341 P646

CC-Link Basic specifications for network

Item	CC-Link
Applicable controllers	RCX320 / RCX340 / RCX341
Version supporting CC-Link	Ver. 1.10
Remote station type	Remote device node
Number of occupied stations	Fixed to 4 stations
Station number setting	1 to 61 RCX320 (Set from the rotary switch on the board) RCX340/RCX341 (Set from the programming box or support software)
Communication speed setting	10Mbps, 5Mbps, 2.5Mbps, 625Kbps, 156Kbps (set from the Rotary swich on board)
No. of CC-Link I/O Note1	General input 96 points, General output 96 points, Dedicated input 16 points, Dedicated output16 points
Parallel external I/O Note2	A function that simulates serial communication enables individual control of the various points from a master sequencer, regardless of the robot program.
Shortest distance between nodes Note3	0.2 m or more
Overall length Note3	100m/10Mbps, 150m/5Mbps, 200m/2.5Mbps, 600m/625Kbps, 1200m/156Kbps
Monitor LED	RUN, ERR, SD, RD

Note 1. In case of RCX320, the controller I/Os are updated every 10ms.
For RCX 340/341, the controller I/Os are updated every 5ms for the shortest. The actual update time changes depending on the communication cycle of the master unit.
Note 2. With RCX 141/142, the exclusive input of the parallel I/O cannot be used other than the interlock input. With RCX320, the exclusive input of the parallel I/O cannot be used. (The interlock input terminal is located on the SAFETY connector side.)
Note 3. These values apply when a cable that supports CC-Link Ver.1.10 is used.

DeviceNet Basic specifications for network

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

Note 1. Use the robot parameter to select Normal or Compact. However, with the controllers earlier than Ver.9.08 of RCX320, this selection is not available and the setting remains the same as Normal.
Note 2. In case of RCX320, the controller I/Os are updated every 10ms.
For RCX 340/341, the controller I/Os are updated every 5ms for the shortest. The actual update time changes depending on the communication cycle of the master unit.
Note 3. With RCX320, the exclusive input of the parallel I/O cannot be used. (The interlock input terminal is located on the SAFETY connector side.)
Note 4. These values apply when a thick cable is used. The distance is less when a fine cable is used or when thick and fine cables are mixed in use.

PROFIBUS Basic specifications for network

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

Note 1. In case of RCX320, the shortest I/O update interval of the controller is 10ms but the actual I/O update time varies depending on the update time with the master station.
For RCX 340/341, the controller I/Os are updated every 5ms for the shortest. The actual update time changes depending on the communication cycle of the master unit.
Note 2. With RCX320, the exclusive input of the parallel I/O cannot be used. (The interlock input terminal is located on the SAFETY connector side.)

Field network system with minimal wiring

NETWORK

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

RCX320 P.626 RCX340/RCX341 P.636

EtherNet/IP Basic specifications for network

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

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

PROFINET Basic specifications for network

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

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

Field network system with minimal wiring

NETWORK

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

RCX320 P.626 RCX340/RCX341 P.636

EtherCAT® Basic specifications for network

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

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

Ethernet Basic specifications for network

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

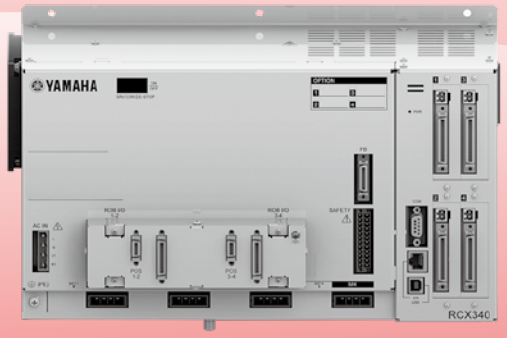
RCX3-SMU

For RCX340/RCX341 controller

Speed Monitoring Unit

The RCX3-SMU is the first Yamaha robot-related product that has acquired the functional safety certification. Yamaha robot controller RCX340/RCX341 enables functional safety support by connecting it to the dedicated optional unit "RCX3-SMU".

RCX3-SMU



RCX340/RCX341

Third-party certification by TÜV SÜD.

Compatible standards

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

Basic specifications

Basic specifications

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

Applicable standards

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

Ordering method

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

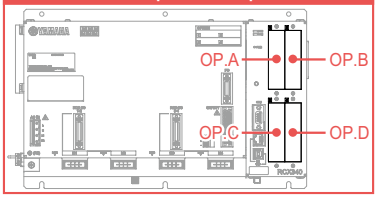
RCX340 – [ ] – [ ] – [ ] – [ ] – [ ] – [ ] – [ ] – [ ] – [ ]

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

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

Note 1. For two axes, safety standard “S” cannot be selected.
Note 2. When the field bus (CC/DN/PB/EP/PT/ES) is selected in the parallel I/O board standard (OP.B) to (OP.D) and the field bus option is enabled, the dedicated inputs from the parallel I/O board are disabled except for the STOP signal.
Note 3. Parallel I/O board expansion specifications
Note 4. Since only one parallel I/O board can be selected for an option board, the parallel I/O board standard specifications cannot be selected for (OP.B) to (OP.D).
Note 5. Be careful not to mix NPN and PNP for parallel I/O board.
Note 6. Only one tracking board can be selected from (OP.A) to (OP.D).
Note 7. When using YC-Link/E, select only one of the four types of optional boards, master (YM1) or slave (YS2/YS3/YS4).
Also, specify what robot is connected to what number controller.
Note 8. Do not mix with field bus (CC/DN/PB/EP/PT/ES).
Note 9. When using the incremental specifications, no absolute battery is required. When using a linear motor with semi-absolute specifications, the semi-absolute specifications are handled as incremental specifications, so no absolute battery is required. When using the absolute specifications, it is necessary to specify the absolute batteries for the number of axes.

Controller option board position



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

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

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

Operating environment

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

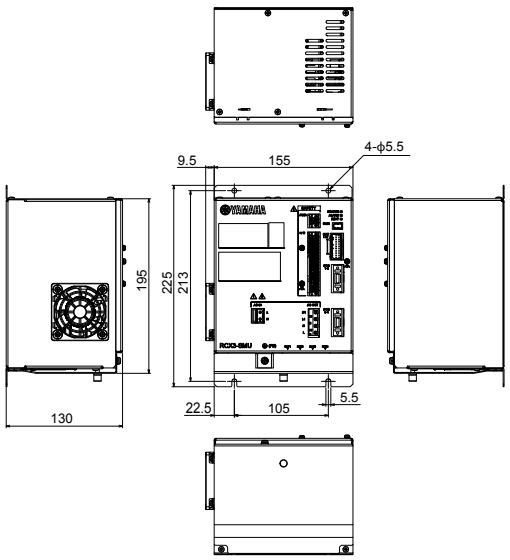
RCX3-SMU

List of safety functions

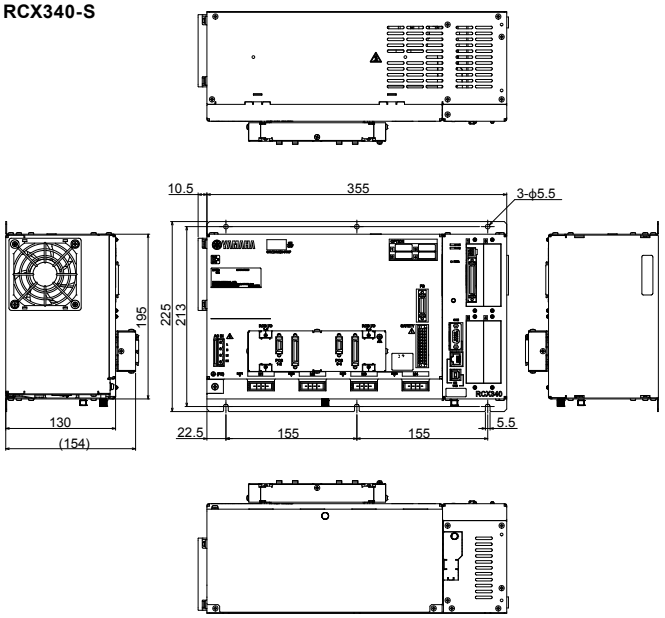
Functions	Descriptions
STO	Shuts off the main power supply of the controller and shifts to a safety status
SS1-r/t	Monitors the deceleration stop of the robot, and executes <SF001>STO if it deviates from the deceleration conditions specified by the parameter.
Speed monitoring (SLS)	Monitors whether the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

Dimensions

● **RCX3-SMU**



● **RCX340-S**



Accessories and part options

RCX3-SMU

RCX3-SMU + standard accessory set

- **RCX3-SMU**

Model	KNH-M4230-00

Standard accessories

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

The above includes the following accessories.

- **Power connector**

Model	KNH-M4421-00

- **Wiring lever**

Model	KNH-M657M-00

- **SAFETY PWR connector**

Model	KNH-M4422-00

- **SAFETY I/O connector**

Model	KNH-M4423-00

- **Absolute battery**

Battery for absolute data back-up.

Basic specifications

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

Model	KCA-M53G0-03

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

RCX320 RCX340/341 TS-SH RCX3-SMU

Important **Absolute battery installation conditions**

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

Optional parts

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

- **AC POWER cable**

Power cable that connects RCX3-SMU to RCX340

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

- **CNT I/F cable**

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

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

- **COM cable**

Communication cable between RCX3-SMU and RCX340.

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

- **ROBO I/O cable**

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

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

RCXiVY2+ System

Applicable controllers
RCX3 series

Robot with image processing functions

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

Ordering method

RCX340 – [Controller] – [No. of controllable axes] – [Safety standards] – [Controller option A to D (OP.A to D)] – [Controller option E (OP.E)] – [Absolute battery]

- Controller option A to D (OP.A to D): TR: Tracking Note1
- Controller option E (OP.E): No entry: without RCXiVY2+ / WY: with RCXiVY2+, without lighting / WL: with RCXiVY2+, with lighting

RCX320 – [Controller] – [No. of controllable axes] – [Safety standards] – [Regenerative unit] – [Controller option A / B (OP.A / OP.B)] – [Vision System] – [Absolute battery]

- Controller option A / B (OP.A / OP.B): TR: Tracking Note1
- Vision System: No entry: Non-selection / WY: with RCXiVY2+, without lighting / WL: with RCXiVY2+, with lighting

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

Note1. Only one tracking board can be selected.

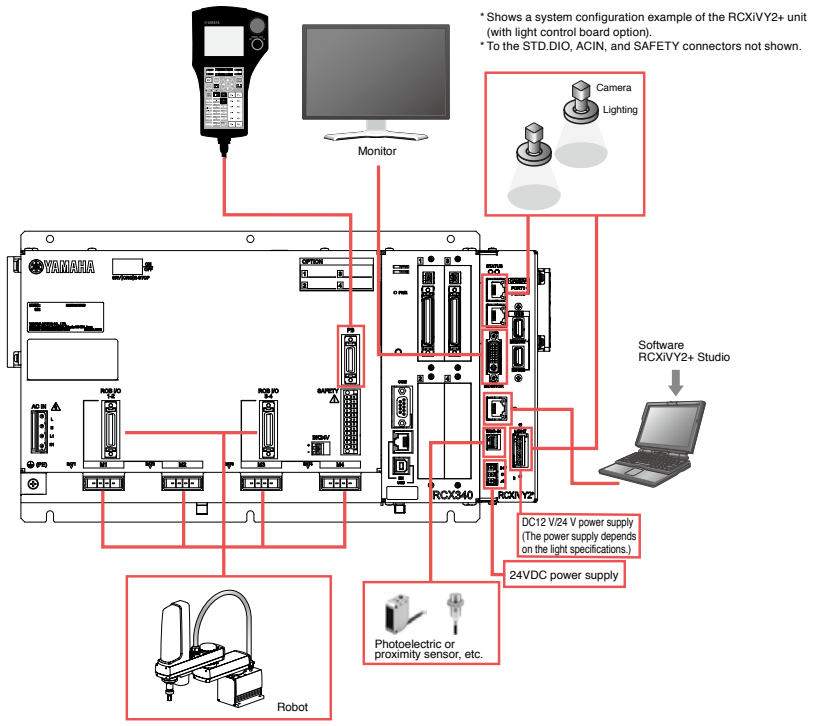
Basic specifications

Robot vision basic specifications

Item		RCXiVY2+ unit
Basic specifications	Applicable controllers	RCX340 / RCX320
	Number of screen pixels	720(H) × 540(V) (400,000 pixels) 1440(H) × 1080(V) (1,600,000 pixels) 2048(H) × 1536(V) (3,200,000 pixels) 2592(H) × 1944(V) (5,000,000 pixels) Note1
	Model setting capacity	254 models
	Number of connectable cameras	2 cameras (8 units when the HUB is used.)
	Connectable camera	GigE camera PoE: IEEE802.3af 1 ch up to 7W
	External interface	Ethernet (1000BASE-T) Note2 USB 2.0 2Ch (Up to 5V 2.5W / ch)
	External monitor output	DVI-I Note3 Monitor resolution: 1024 × 768 Vertical periodic frequency: 60 Hz Horizontal periodic frequency: 48.4 kHz
	Power supply	24 VDC +/- 10%, Maximum 1.5 A
	Dimensions	W45 × H195 × D130 (RCXiVY2+ unit only)
	Weight	0.8kg (RCXiVY2+ unit only, when the lighting control board option is selected)
	Operating environment	Compliant with the RCX340/RCX320 controller.
	Storage environment	Compliant with the RCX340/RCX320 controller.
Search method		Edge search, Measuring search, Blob search, Code search
Image capturing	Trigger mode	S/W trigger, H/W trigger
	External trigger input	2 points
Function		Position detection, coordinate conversion, automatic point data generation, distortion and inclination correction
Camera installation position		Fixed to the fixed camera (up, down) or robot (Y-axis, Z-axis). Vertical direction to the image capturing target workpiece is recommended.
Setting support function		Calibration, image save function, model registration Note4, fiducial mark registration Note4, measuring registration Note4, blob registration Note4, code registration Note4, monitor function Note4
Lighting control options	Number of connectable lighting units	Maximum 2
	Modulated light format	PWM modulated light control (0 to 100%), PWM frequency switchable 62.5 kHz/ 125 kHz Continuous light, strobe light (follows camera exposure)
	Lighting power input	12V DC or 24V DC (external supply shared by both channels)
	Lighting output	For 12V DC supply: Total of less than 40W for both channels. For 24V DC supply: Total of less than 80W for both channels.

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

System configuration illustration

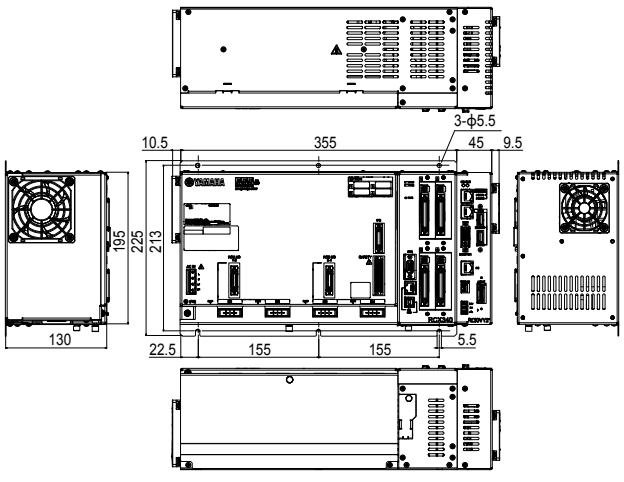


Tracking board basic Specifications

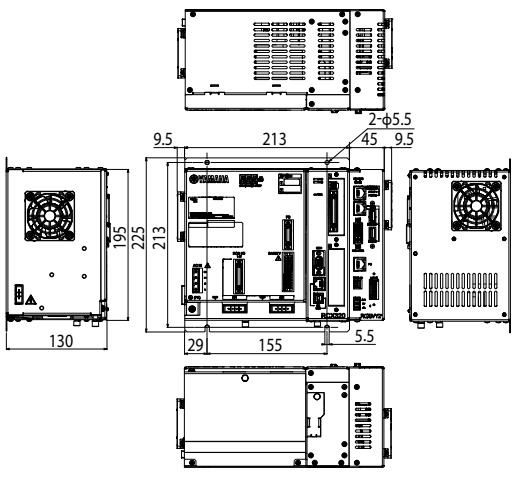
Item		Tracking board
Basic specifications	Applicable controllers	RCX340 / RCX320
	Number of connected encoders	Up to 2 units.
	Encoder power supply	5VDC (2 counters total 500 mA or less) (Supplied from controller)
	Applicable encoder	26LS31/26C31 or equivalent line driver (RS-422 compliance).
	Input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

Dimensional outlines

RCX340+RCXiVY2+



RCX320+RCXiVY2+

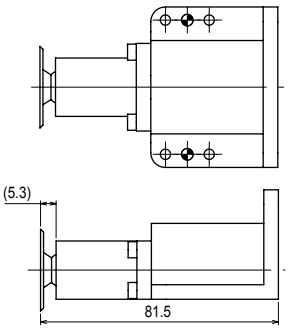


Dimensional outlines

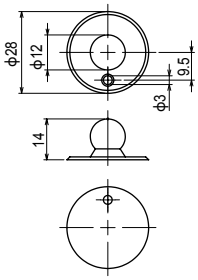
Calibration jig

Calibration jig
(Model: KCX-M7200-00)

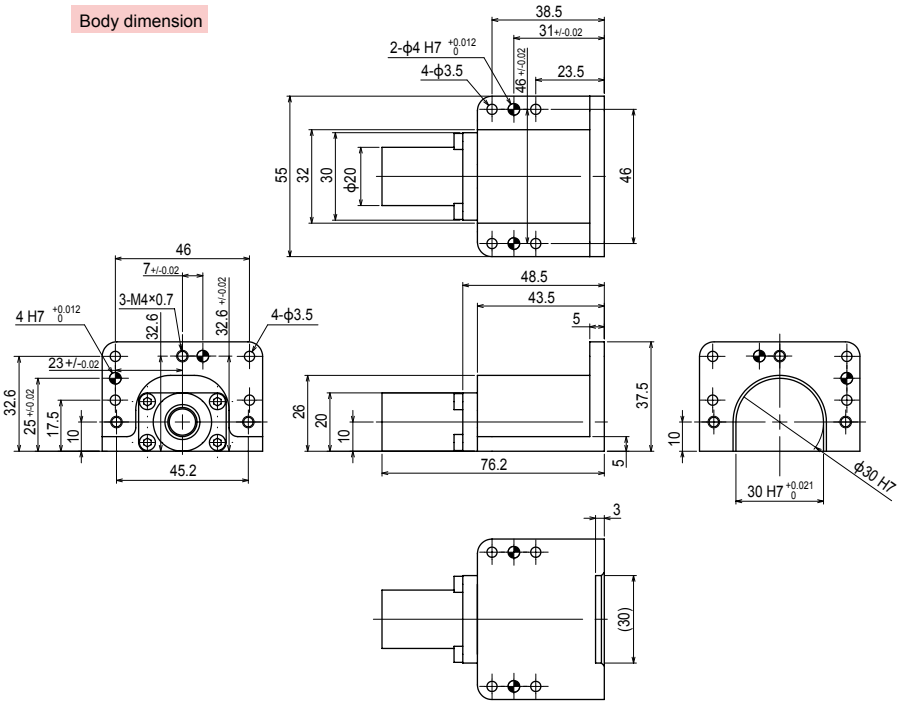
Mark gripper dimension



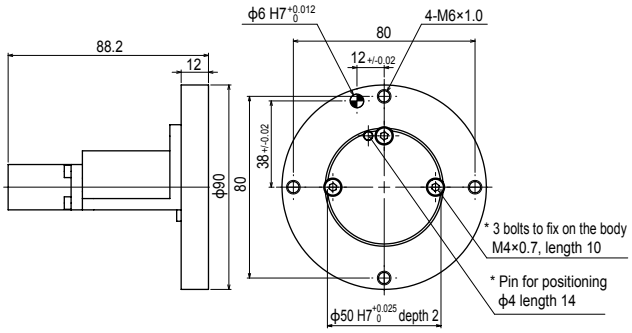
Mark dimension



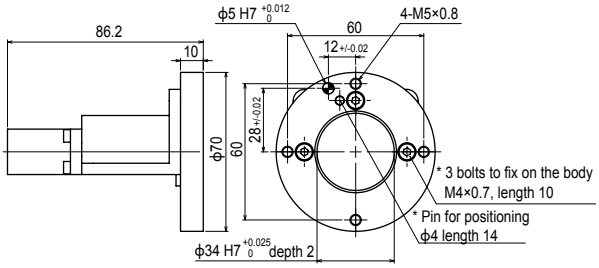
Body dimension



When using attachment (large)



When using attachment (small)

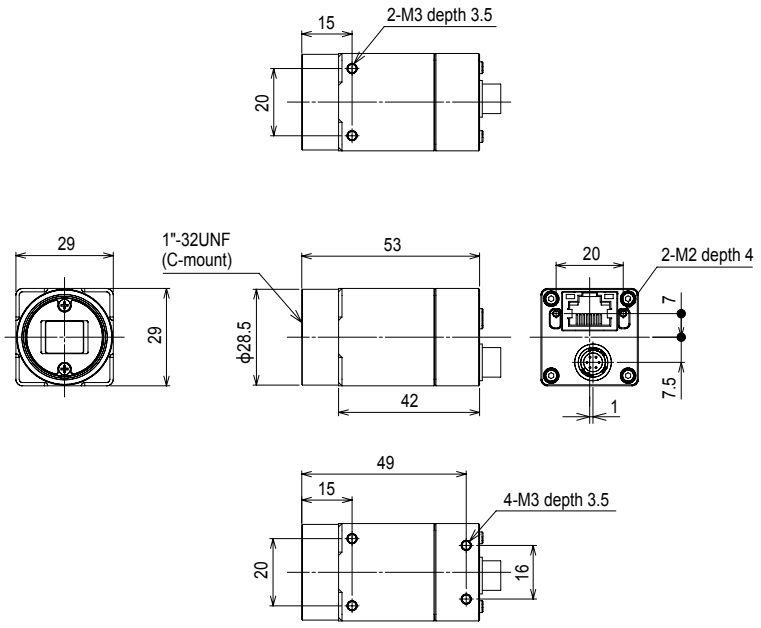


Dimensional outlines

Camera

CMOS camera

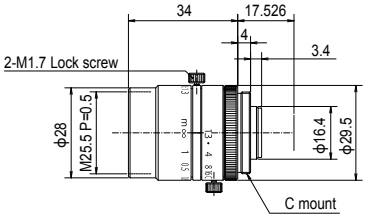
(400,000 pixel • 1,600,000 pixel • 3,200,000 pixel)



Lenses

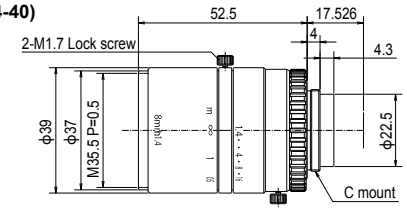
8mm lens

(Model: KCX-M7214-00)



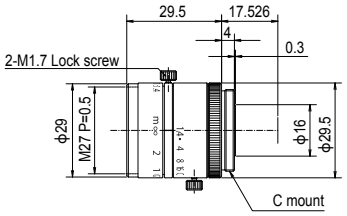
8mm lens (megapixel support)

(Model: KCX-M7214-40)



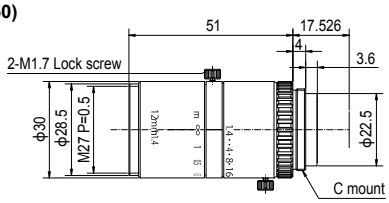
12mm lens

(Model: KCX-M7214-10)



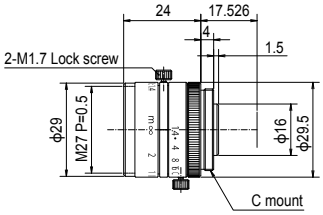
12mm lens (megapixel support)

(Model: KCX-M7214-50)



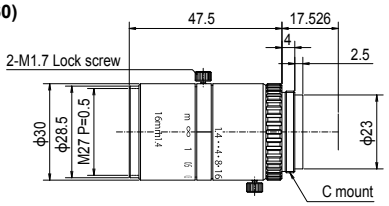
16mm lens

(Model: KCX-M7214-20)



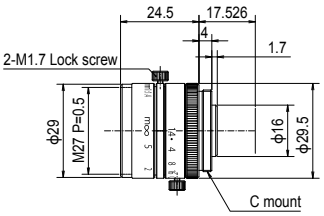
16mm lens (megapixel support)

(Model: KCX-M7214-60)



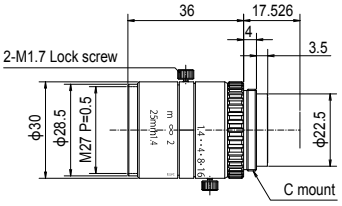
25mm lens

(Model: KCX-M7214-30)



25mm lens (megapixel support)

(Model: KCX-M7214-70)



RCXiVY2+ System

Lens characteristics

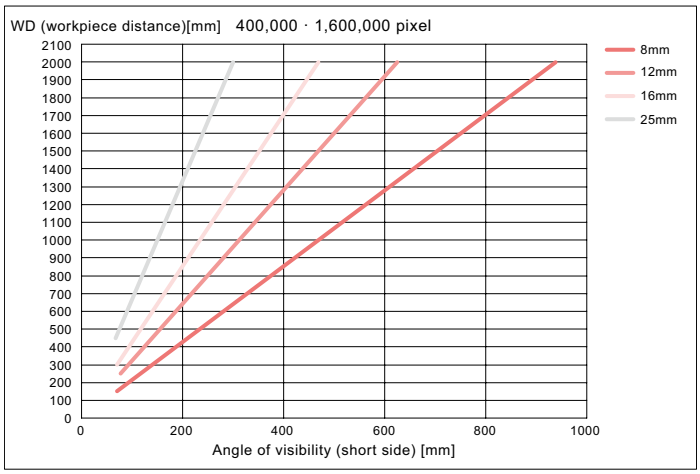
Lens	Model	Focal length [mm]	Aperture value [F No.]	Angle-of-view (degrees)								Closest approach distance [m]
				KFR-M6541-01 (400,000 pixel camera)		KFR-M6541-11 (1,600,000 pixel camera)		KFR-M6541-21 (3,200,000 pixel camera)		KFR-M6541-32 (5,000,000 pixel camera)		
				Vertical	Horizontal	Vertical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

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

Contact angle ⇔ WD (workpiece distance) table

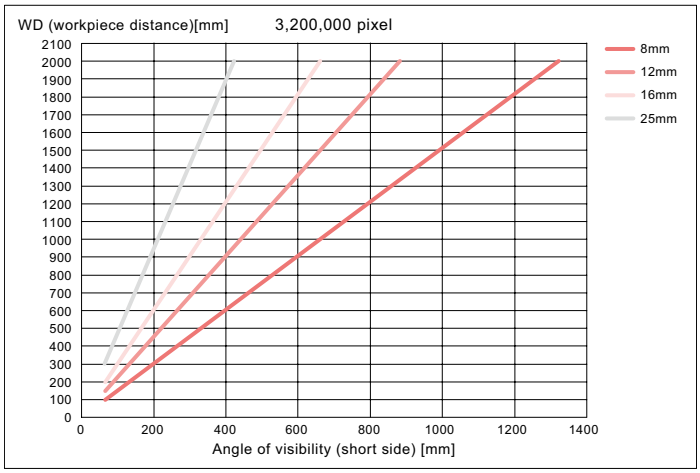
400,000 pixel (KFR-M6541-01) • 1,600,000 pixel (KFR-M6541-11)

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



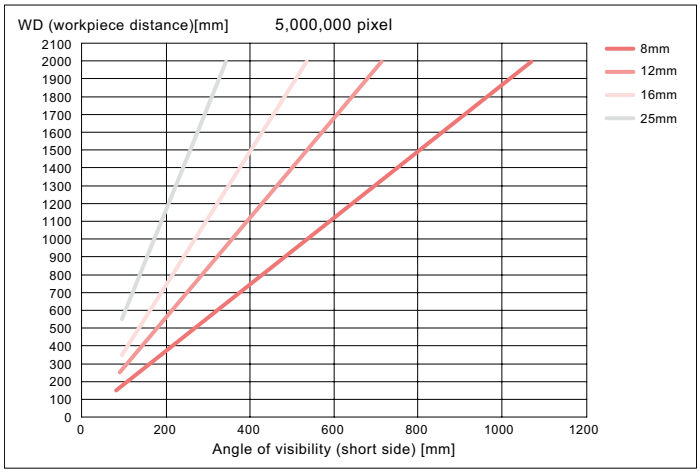
3,200,000 pixel (KFR-M6541-21)

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



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

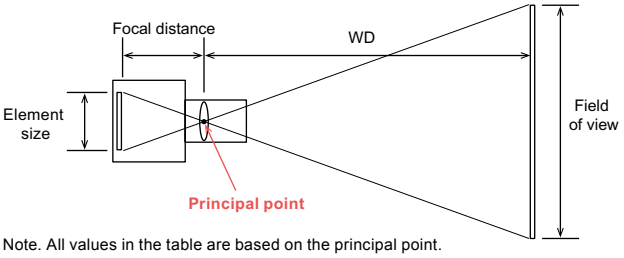
	Lens							
	8mm KCX-M721-40		12mm KCX-M721-50		16mm KCX-M721-60		25mm KCX-M721-70	
WD[mm]	Horizontal	Vertical	Horizontal	Vertical	Horizontal	Vertical	Horizontal	Vertical
100	71	54	48	36	36	27		
150	107	80	71	54	53	40	34	26
200	143	107	95	71	71	54	46	34
250	178	134	119	89	89	67	57	43
300	214	161	143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



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

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

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



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

Accessories and part options

RCXiVY2+ System

Standard accessories

RCXiVY2+ unit

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

RCXiVY2+ unit

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

RCXiVY2+ unit accessories

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

Support software for PC RCXiVY2+ Studio

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

Download from website (member site)

Environment

OS	Microsoft Windows XP / Vista (32 bit / 64 bit) / 7 (32 bit / 64 bit) / 8, 8.1 (32 bit / 64 bit) /10 (32 bit / 64 bit) / 11 (Supported version: V.3.06.03.00 or later)
CPU	Processor that meets or exceeds the suggested requirements for the OS being used.
Memory	Suggested amount of memory or more for the OS being used.
Hard disk capacity	30MB of available space required on installation drive. * Additional vacant space is required for saving images and data.
Display	800 x 600 dot, or higher, 32768 colors (16bit High Color) or higher (recommended)
Communication Port	Ethernet Port of TCP/IP

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

Options

CMOS camera

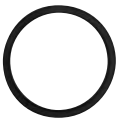
Model	400,000 pixel	720(H) × 540(V)	KFR-M6541-01
	1,600,000 pixel	1440(H) × 1080(V)	KFR-M6541-11
	3,200,000 pixel	2048(H) × 1536(V)	KFR-M6541-21
	5,000,000 pixel	2592(H) × 1944(V)	KFR-M6541-32

Lens

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

* Common to iVY2.

Close-up ring



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

Lighting control board

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

Lighting control board

Name	Model
Lighting control board	KCX-M4403-L0

Lighting control board accessories

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

Tracking board

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

Tracking board

Name	Model
Tracking board	KCX-M4400-T0

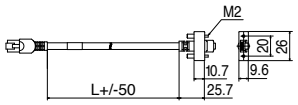
Tracking board accessories

Name	Model
Tracking encoder connector	KX0-M657K-20

Camera cable

Cable for connecting the camera to the RCXiVY2+ board.

External diagram of camera cable



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

* Common to iVY2.

LAN cable with shield cloth (5 m)

Model	KX0-M55G0-00

Tracking encoder cable (10 m)

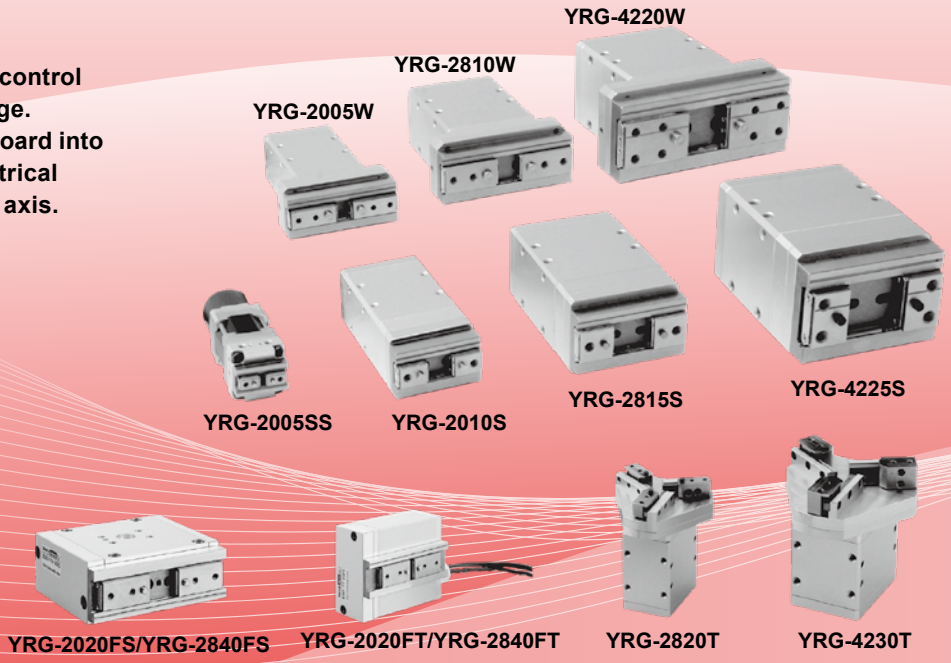
Model	KX0-M66AF-00

Calibration jig (Large and small attachments are provided.)

Model	KCX-M7200-00

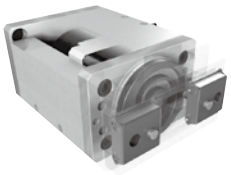
YRG Series

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.



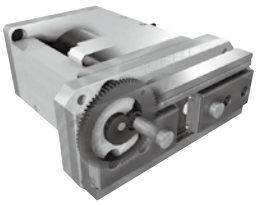
Structure

Single cam structure



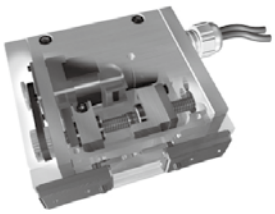
Unique cam structure is simple and compact. The fingers work due to external force since no self-locking is used.

Double cam structure



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

Ball screw structure

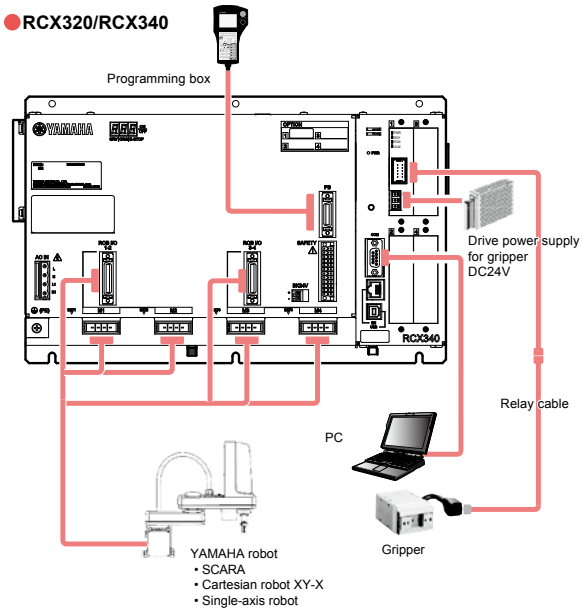


Belt-driven ground ball screw delivers a long stroke with high efficiency and high precision.

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



Compact single cam type

YRG-2005SS

Basic specifications

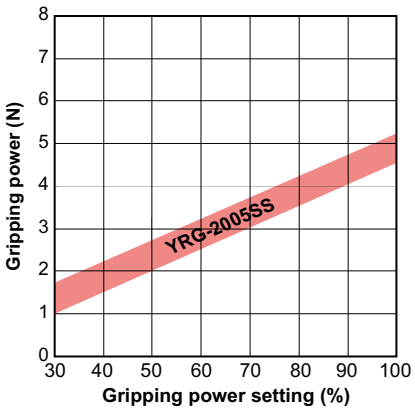
Model name		YRG-2005SS
Model number		KCF-M2010-A0
Holding power	Max. continuous rating (N)	5
	Min. setting (% (N))	30 (1.5)
	Resolution (% (N))	1 (0.05)
Open/close stroke (mm)		3.2
Speed	Max. rating (mm/sec)	100
	Min. setting (% (mm/sec))	20 (20)
	Resolution (% (mm/sec))	1 (1)
	Holding speed (Max.) (%)	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) • 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. The maximum gripping weight is the upper limit weight when the workpiece is gripped with maximum continuous rated gripping force.
Determine the weight of the workpiece to be gripped by considering the upper limit weight and the inertia force due to acceleration/deceleration and rotary operation in the gripped state.

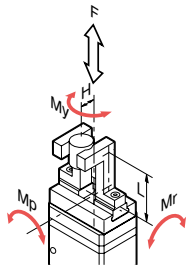
Gripping power vs. gripping power setting (%)



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

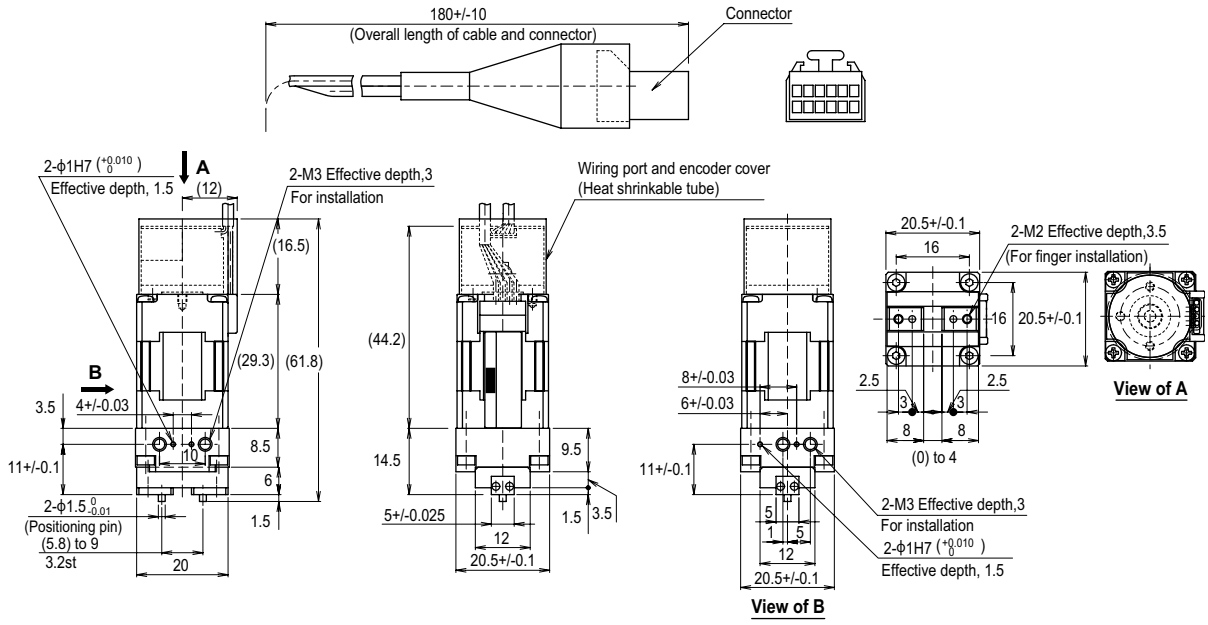
Allowable load and load moment

				YRG-2005SS
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

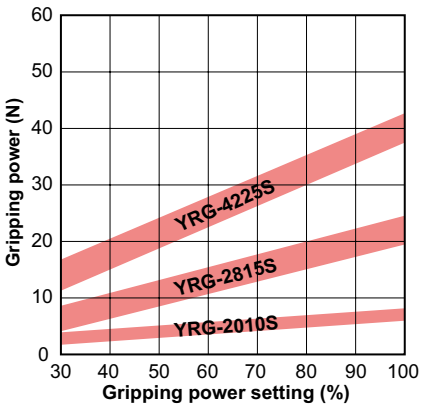
Model name		YRG-2010S	YRG-2815S	YRG-4225S
Model number		KCF-M2011-A0	KCF-M2011-B0	KCF-M2011-C0
Holding power	Max. continuous rating (N)	6	22	40
	Min. setting (% (N))	30 (1.8)	30 (6.6)	30 (12)
	Resolution (% (N))	1 (0.06)	1 (0.22)	1 (0.4)
Open/close stroke (mm)		7.6	14.3	23.5
Speed	Max. rating (mm/sec)	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	0.4
Weight (g)		160	300	580

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

Note. Design the finger as short and lightweight as possible.
Note. Set the parameters and holding power (%) of the holding movement command so that any excessive shock is not applied to the finger during operation.
Note. When installing or uninstalling the finger, tighten the bolts while the finger is being held securely so that any excessive force or shock is not applied to the guide block.
Note. Workpiece weight that is able to be held may greatly vary depending on the material, shape, and/or holding surface conditions of the finger.

Note 1. The maximum gripping weight is the upper limit weight when the workpiece is gripped with maximum continuous rated gripping force.
Determine the weight of the workpiece to be gripped by considering the upper limit weight and the inertia force due to acceleration/deceleration and rotary operation in the gripped state.

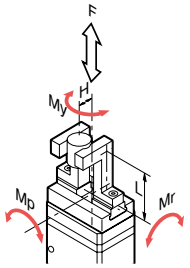
Gripping power vs. gripping power setting (%)



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

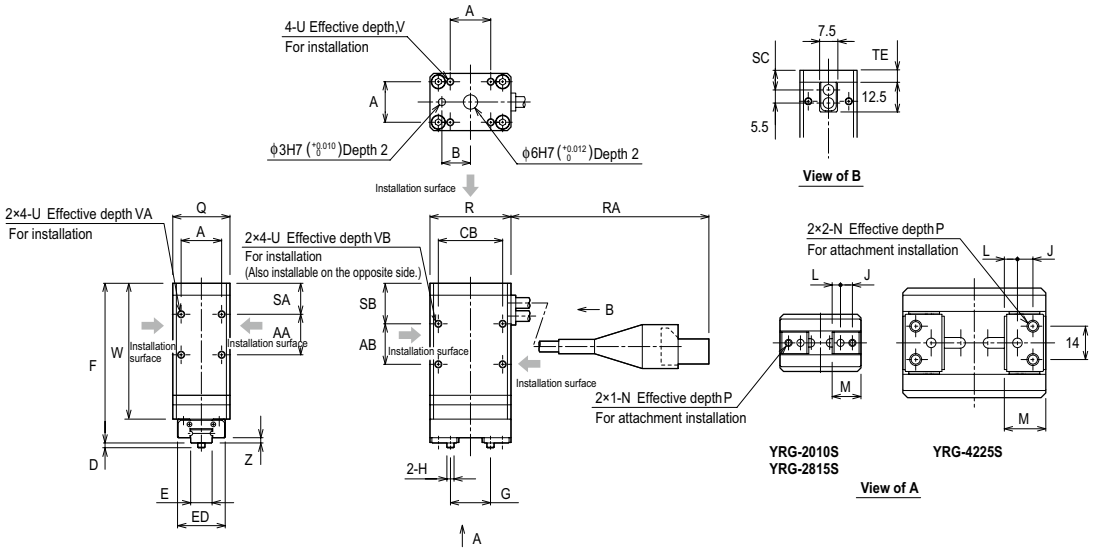
Allowable load and load moment

				YRG-2010S	YRG-2815S	YRG-4225S
Guide	Allowable load	F	N	450	350	600
	Allowable pitching moment	Mp	N•m	0.7	0.5	1.1
	Allowable yawing moment	My	N•m	0.8	0.6	1.3
	Allowable rolling moment	Mr	N•m	2.3	2.8	8.6
Finger	Max. weight (1 pair)		g	15	30	50
	Max. holding position	L	mm	20	20	25
	Max. overhang	H	mm	20	25	30



• 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

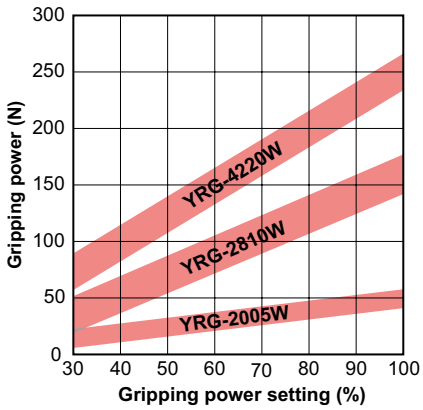
Basic specifications

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	250
	Min. setting (% (N))	30 (15)	30 (45)	30 (75)
	Resolution (% (N))	1 (0.5)	1 (1.5)	1 (2.5)
Open/close stroke (mm)		5	10	19.3
Speed	Max. rating (mm/sec)	60	60	45
	Min. setting (% (mm/sec))	20 (12)	20 (12)	20 (9)
	Resolution (% (mm/sec))	1 (0.6)	1 (0.7)	1 (0.45)
	Holding speed (Max.) (%)	50		
Repetitive positioning accuracy (mm)		+/-0.03		
Guide mechanism		Linear guide		
Max. holding weight Note 1 (kg)		0.5	1.5	2.5
Weight (g)		200	350	800

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

Note. Design the finger as short and lightweight as possible.
Note. Set the parameters and holding power (%) of the holding movement command so that any excessive shock is not applied to the finger during operation.
Note. When installing or uninstalling the finger, tighten the bolts while the finger is being held securely so that any excessive force or shock is not applied to the guide block.
Note. Workpiece weight that is able to be held may greatly vary depending on the material, shape, and/or holding surface conditions of the finger.
Note 1. The maximum gripping weight is the upper limit weight when the workpiece is gripped with maximum continuous rated gripping force.
Determine the weight of the workpiece to be gripped by considering the upper limit weight and the inertia force due to acceleration/deceleration and rotary operation in the gripped state.

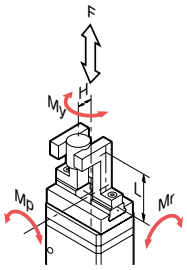
Gripping power vs. gripping power setting (%)



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

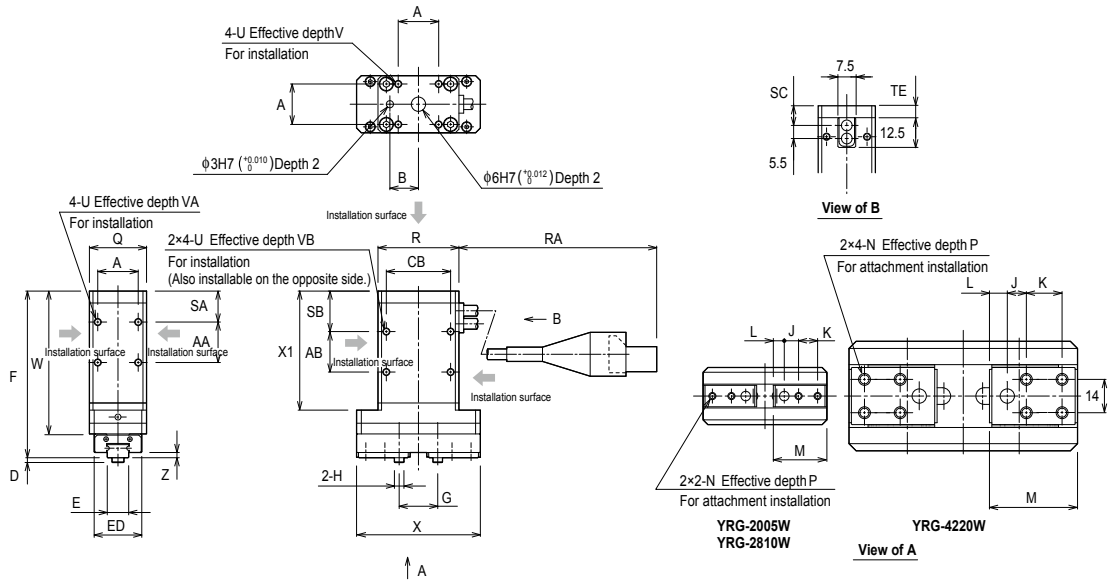
Allowable load and load moment

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



- 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-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 Series

Screw type strait style

YRG-2020FS/2840FS

Basic specifications

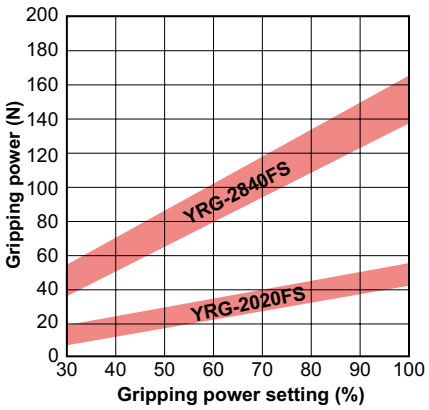
Model name		YRG-2020FS	YRG-2840FS
Model number		KCF-M2013-A0	KCF-M2013-B0
Holding power	Max. continuous rating (N)	50	150
	Min. setting (% (N))	30 (15)	30 (45)
	Resolution (% (N))	1 (0.5)	1 (1.5)
Open/close stroke (mm)		19	38
Speed	Max. rating (mm/sec)	50	50
	Min. setting (% (mm/sec))	20 (10)	20 (10)
	Resolution (% (mm/sec))	1 (0.5)	1 (0.5)
	Holding speed (Max.) (%)	50	50
Repetitive positioning accuracy (mm)		+/-0.01	+/-0.01
Guide mechanism		Linear guide	
Max. holding weight Note 1 (kg)		0.5	1.5
Weight (g)		420	880

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

Note. Design the finger as short and lightweight as possible.
Note. Set the parameters and holding power (%) of the holding movement command so that any excessive shock is not applied to the finger during operation.
Note. When installing or uninstalling the finger, tighten the bolts while the finger is being held securely so that any excessive force or shock is not applied to the guide block.
Note. Workpiece weight that is able to be held may greatly vary depending on the material, shape, and/or holding surface conditions of the finger.

Note 1. The maximum gripping weight is the upper limit weight when the workpiece is gripped with maximum continuous rated gripping force.
Determine the weight of the workpiece to be gripped by considering the upper limit weight and the inertia force due to acceleration/deceleration and rotary operation in the gripped state.

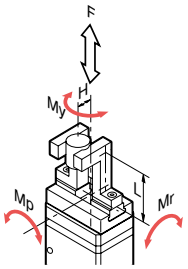
Gripping power vs. gripping power setting (%)



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

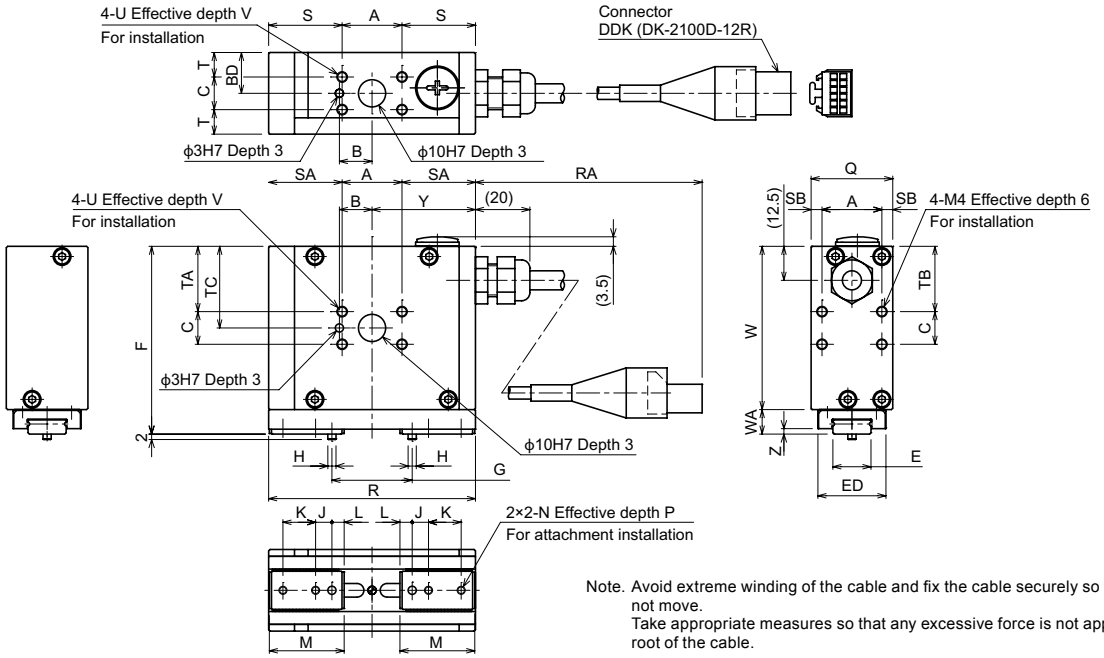
Allowable load and load moment

				YRG-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

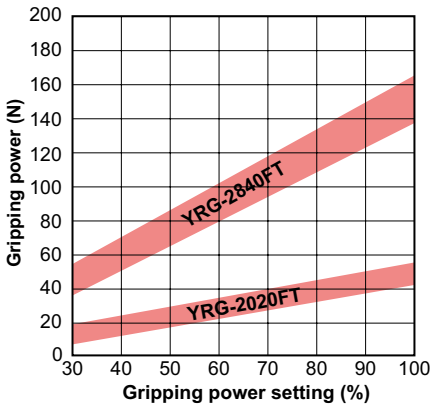
Model name		YRG-2020FT	YRG-2840FT
Model number		KCF-M2014-A0	KCF-M2014-B0
Holding power	Max. continuous rating (N)	50	150
	Min. setting (% (N))	30 (15)	30 (45)
	Resolution (% (N))	1 (0.5)	1 (1.5)
Open/close stroke (mm)		19	38
Speed	Max. rating (mm/sec)	50	50
	Min. setting (% (mm/sec))	20 (10)	20 (10)
	Resolution (% (mm/sec))	1 (0.5)	1 (0.5)
	Holding speed (Max.) (%)	50	50
Repetitive positioning accuracy (mm)		+/-0.01	+/-0.01
Guide mechanism		Linear guide	
Max. holding weight Note 1 (kg)		0.5	1.5
Weight (g)		420	890

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

Note. Design the finger as short and lightweight as possible.
Note. Set the parameters and holding power (%) of the holding movement command so that any excessive shock is not applied to the finger during operation.
Note. When installing or uninstalling the finger, tighten the bolts while the finger is being held securely so that any excessive force or shock is not applied to the guide block.
Note. Workpiece weight that is able to be held may greatly vary depending on the material, shape, and/or holding surface conditions of the finger.

Note 1. The maximum gripping weight is the upper limit weight when the workpiece is gripped with maximum continuous rated gripping force.
Determine the weight of the workpiece to be gripped by considering the upper limit weight and the inertia force due to acceleration/deceleration and rotary operation in the gripped state.

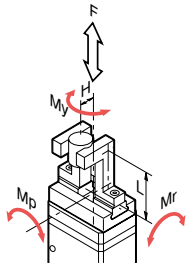
Gripping power vs. gripping power setting (%)



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

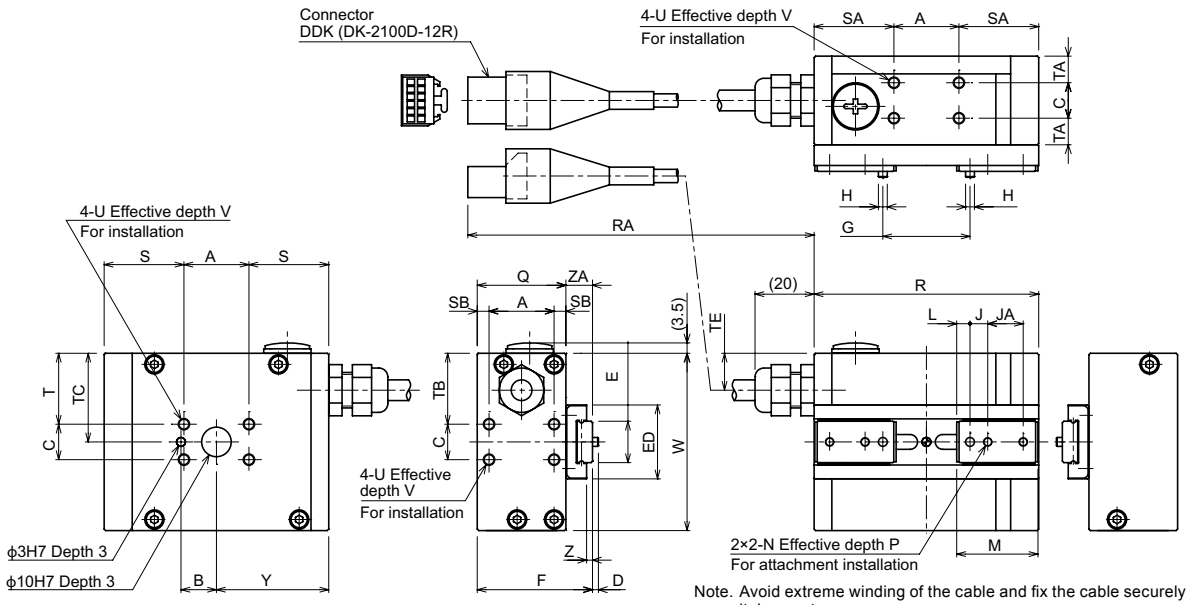
Allowable load and load moment

				YRG-2020FT	YRG-2840FT
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-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 $^{0}_{-0.05}$	25	39	10.5 to 29.5	ϕ3 $^{0}_{-0.01}$	6	12	12	4.5	27.5	M3	5
YRG-2840FT	30	15	16	2	18 $^{0}_{-0.05}$	30	52	13 to 51	ϕ4 $^{0}_{-0.012}$	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

YRG Series

Three fingers type

YRG-2820T/4230T

Basic specifications

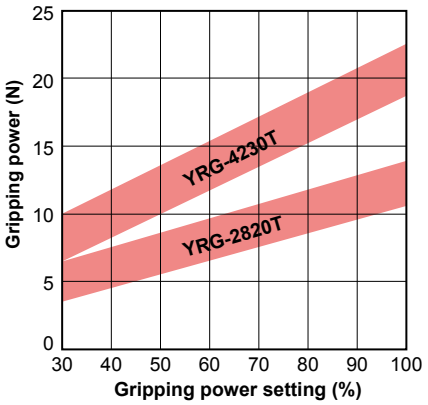
Model name		YRG-2820T	YRG-4230T
Model number		KCF-M2015-C0	KCF-M2015-D0
Holding power	Max. continuous rating (N)	10	20
	Min. setting (% (N))	30 (3)	30 (6)
	Resolution (% (N))	1 (0.1)	1 (0.2)
Open/close stroke (mm)		20	30
Speed	Max. rating (mm/sec)	100	
	Min. setting (% (mm/sec))	20 (20)	
	Resolution (% (mm/sec))	1 (1)	1 (1)
	Holding speed (Max.) (%)	50	50
Repetitive positioning accuracy (mm)		+/-0.03	
Guide mechanism		Linear guide	
Max. holding weight Note 1 (kg)		0.1	0.2
Weight (g)		340	640

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

Note. Design the finger as short and lightweight as possible.
Note. Set the parameters and holding power (%) of the holding movement command so that any excessive shock is not applied to the finger during operation.
Note. When installing or uninstalling the finger, tighten the bolts while the finger is being held securely so that any excessive force or shock is not applied to the guide block.
Note. Workpiece weight that is able to be held may greatly vary depending on the material, shape, and/or holding surface conditions of the finger.

Note 1. The maximum gripping weight is the upper limit weight when the workpiece is gripped with maximum continuous rated gripping force.
Determine the weight of the workpiece to be gripped by considering the upper limit weight and the inertia force due to acceleration/deceleration and rotary operation in the gripped state.

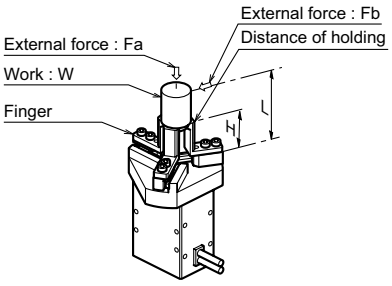
Gripping power vs. gripping power setting (%)



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

Allowable load and load moment

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



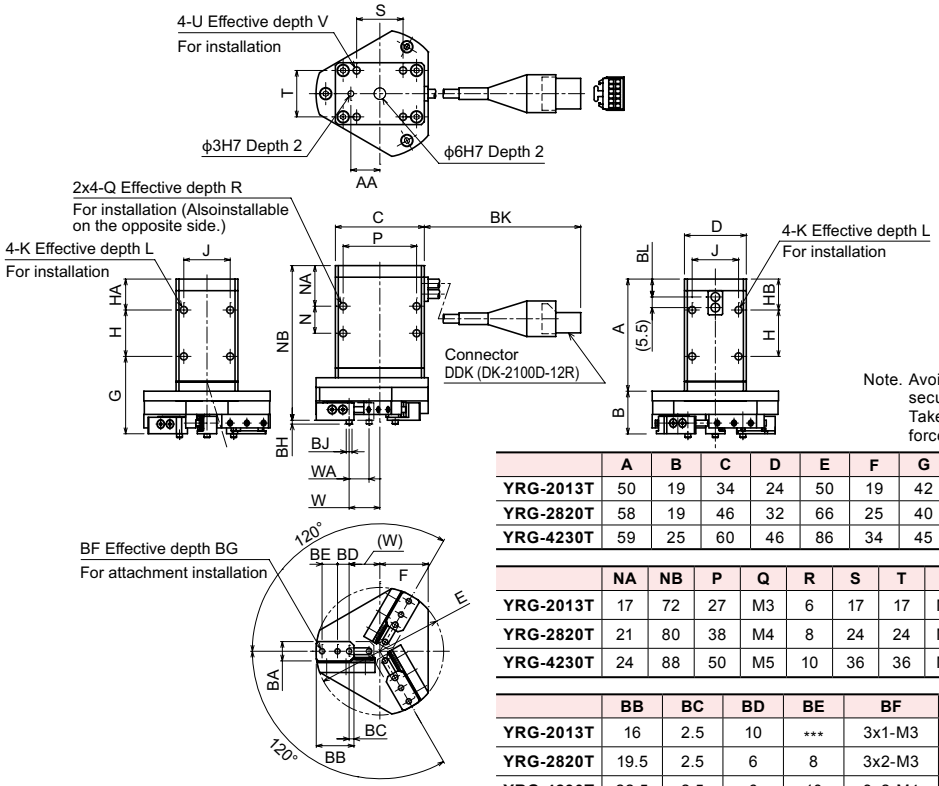
- When the external forces Fa and Fb are applied to a potion the distance (L) apart from the finger installation surface, the load (F) and moment (M) are calculated from the formulas shown below.

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

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]

YRG-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	RCX320 / RCX340
	Number of connection grippers	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.)
	Acceleration setting	1 to 100% (in 1% steps, Setting by the acceleration parameter)
Programming	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

RCX320 / RCX340

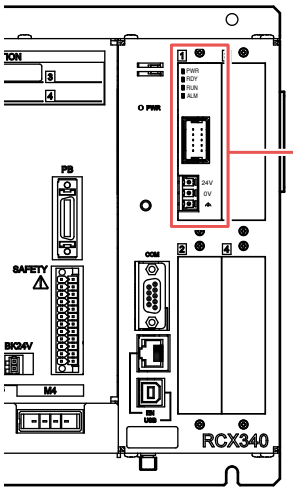
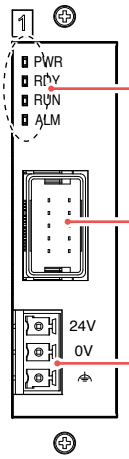


Figure when viewed from the front of the controller



Status LEDs

Four LEDs show the status of the gripper control board.

ACT

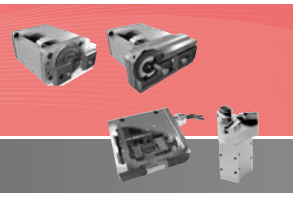
Connector to be connected to the gripper main body.

POWER

Board drive power input connector.

Accessories and part options

YRG Series



Standard accessories

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

Gripper control board

Model	KCX-M4400-G0

Note. This board includes a 24V supply connector.

RCX320 RCX340/341

Robot (for gripper) cable

Model	3.5m	KCF-M4751-31
	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.

RCX320 RCX340/341

Relay cable

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

RCX320 RCX340/341

Connector for 24V power supply

Model	KCF-M5382-00

RCX320 RCX340/341