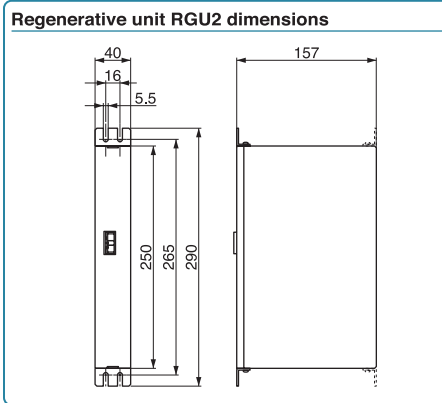


# OPTION

ERC/ERCX/SRCP/SRCD/SRCX/DRCX/TRCX

## Regenerative unit RGU2

<For SRCD/SRCX/DRCX/TRCX>



### Regenerative unit RGU2

This unit absorbs the regenerative current produced when the motor reduces the speed and emits it as heat. It is necessary when operating a model specified by Yamaha or a load with a large inertia.

### Selection criteria

RGU2 is required when the following models and use conditions are applicable.

- ① Those models whose motor output is 200W or more and used vertically.
- ② Those models whose motor output is 100W, used vertically and with 750mm or larger stroke.
- ③ B14H, used at the maximum speed of faster than 1200mm/sec. (MAX1875mm/sec.)
- ④ F17, F20 and F20N, used at the maximum speed of faster than 1000mm/sec. (MAX1200mm/sec.)
- ⑤ F17L, C17L

### Regenerative unit RGU2 basic specifications

Item	RGU2
Dimensions	W40 x H250 x D157mm
Weight	0.9kg
Regenerative voltage	Approximately 380V or more
Regenerative stop voltage	Approximately 360V or less
Connectable controller	SRCD/SRCX/DRCX/TRCX
Accessory	Special cable for connection with controller (300mm)

Note : When installing RGU2, be sure to leave a clearance (approx. 20mm) between the controller in use and RGU2 and use the special cable supplied with RGU2 to connect with the controller.

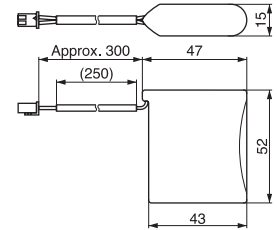
## B1 / B2 absolute batteries

<For ERCX/SRCX/DRCX/TRCX>

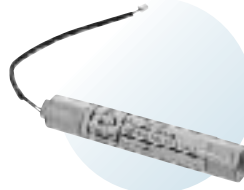
### B1 battery



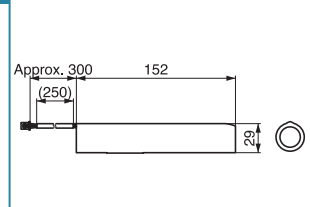
### B1 battery dimensions



### B2 battery



### B2 battery dimensions



### B1 / B2 batteries

These batteries are for backing up the absolute data. B1 and B2 differ in the capacity. Select either one to be suitable for equipment stop time.

### B1 / B2 batteries basic specifications

Item	B1	B2
Battery type	Ni-Cd battery	
Battery capacity	3.6V/700mAh	3.6V/2,000mAh
Data holding time (Note 1)	120 hours	340 hours
Dimensions	W52 x D47 x H15mm	φ 29 x L152mm
Weight	80g	280g
Cable length	300mm	300mm

Note 1 : When power is turned OFF with fully charged battery mounted.

## I/O checker

<For ERCX/SRCX/DRCX/TRCX>

With this checker, not only input and output status can be checked by LEDs but also the input signal can be simulated with the toggle switch.



## I/O flat cable (CN1)

<For ERC/ERCX/SRCP/SRCD>

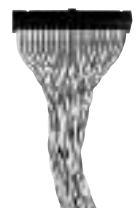
Connector and flat cable used to connect the standard parallel I/O of the ERC/ERCX, SRCP, SRCD controllers and an external equipment (sequencer). The cable is 1m long with its end cut and left as it is.



## Twisted-pair cable (CN2)

<For ERC/ERCX/SRCP/SRCD>

Connector and twisted pair cable used to connect parallel I/O of ERC/ERCX, SRCP, SRCD controllers and an external equipment. The cable is 2m long with its end cut and left as it is. Select CN2 when using the pulse train input equipment.



## Common options

### HPB / HPB-E

20 characters x 4 lines LCD. SD memory card for wide range of general purpose use is usable.



Note : HPB-E is a programming unit usable for CE.

### Programming box HPB / HPB-E basic specifications

Item	HPB / HPB-E
Display	LCD(20characters 4 lines)
Emergency stop switch	Normally closed contact point (with lock function)
Memory back-up device	SD Memory card (FAT12/16 format)
Serial interface	RS-232C : 1CH, dedicated to communication with controllers
Operating temperature	0°C to 40°C
Operating humidity	35 to 85%RH (non-condensing)
Dimensions / Weight / Cable length	W107 x H230 x D53mm (Note 1) / 650g / 3.5m
Applicable robot controller	ERC/ERCX/SRCP/SRCD/SRCX/DRCX/TRCX

Note 1 : Strap holder, emergency stop button not included.

### PC supporting software POPCOM

Application software to create and edit programs and to carry out on-line operation of robots.



### Communication cable for PC supporting software

Available for DOS/ personal computers. The cable is 3.5m long.

## Units supporting CC-Link

- Option unit with networking functions that can be incorporated in YAMAHA robot controllers, ERCX, SRCP, SRCD, SRCX, DRCX.
- As connection of the robot system and the sequencer requires only one (4-wire) dedicated cable, it is possible to save wiring of the entire system, which contributes to efficient wiring work, reduction of installation and maintenance costs, etc.
- 32 general use inputs/outputs, 16 dedicated inputs/outputs (2 nodes occupied) are available for use as well as the parallel I/O interface as it is.
- Capable of simulating serial operation of parallel I/O. With this function set properly, it is possible to control various I/O units connected to the parallel I/O of the robot controller, such as sensor and relay from the sequencer side without using the robot program, as if they are I/Os of the CC-Link system.

Note : CC-Link is a registered trademark of CC-Link Association.

### Basic specifications for units supporting CC-Link

Specification item	Units supporting CC-Link
Applicable controllers	ERCX, SRCP, SRCD, SRCX, DRCX
Version supporting CC-Link	Ver 1,10
Remote node type	Remote device node
Number of occupied nodes	Two nodes fixed
Node number setting	1 to 63 (set from HPB/HPB-E)
Communication speed setting	10Mbps, 5Mbps, 2.5Mbps, 625Kbps, 156Kbps (set from HPB/HPB-E)
No. of CC-Link inputs/outputs (Note 1)	32 general inputs, 32 general outputs, 16 dedicated inputs (10 currently in use), 16 dedicated outputs (5 currently in use)
Parallel external inputs/outputs	All controller parallel external inputs/outputs are available for use. 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 (Note 2)	0.2m min.
Overall extension distance (Note 2)	100m/10Mbps, 160m/5Mbps, 400m/2.5Mbps, 900m/625Kbps, 1200m/156Kbps
Monitor LED (Note 3)	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.  
 Note 3 : The top cover must be removed from the controller in order to use LED monitoring.

## Units supporting DeviceNet

- Option unit with networking functions that can be incorporated in YAMAHA robot controllers, ERCX, SRCP, SRCD, SRCX, DRCX.
- As connection of the robot system and the sequencer requires only one (4-wire) dedicated cable, it is possible to reduce wiring of the entire system, which contributes to efficient wiring work, reduction of installation and maintenance costs, etc.
- 16 general use inputs/outputs, 16 dedicated inputs/outputs are available for use as well as the parallel I/O interface as it is.
- Capable of simulating serial operation of parallel I/O. With this function set properly, it is possible to control various I/O units connected to the parallel I/O of the robot controller, such as sensor and relay from the sequencer side without using the robot program, as if they are I/Os of the DeviceNet system.

Note : DeviceNet is a registered trademark of Open Device/Net Vendor Association, Inc. (ODVA)

### Basic specifications for units supporting DeviceNet

Specification item	Units supporting DeviceNet
Applicable controllers	ERCX, SRCP, SRCD, SRCX, DRCX
Applicable DeviceNet specifications	Volume 1 Release 2.0 / Volume 2 Release 2.0
Device type	Generic Device (device number 0)
Number of occupied nodes	1 node
MAC ID setting	0 to 63 (set using DIP switch on board)
Communication speed settings	500Kbps, 250Kbps, 125Kbps (set using DIP switch on board)
DeviceNet inputs/outputs (Note 1)	16 general inputs, 16 general outputs, 16 dedicated inputs (10 currently in use), 16 dedicated outputs (5 currently in use)
Parallel external inputs/outputs	All controller parallel external inputs/outputs are available for use. A function that simulates serial communication enables individual control of the various points from a master sequencer, regardless of the robot program.
Network length	Overall extension distance (Note 2) Branch length / Overall branch length
Monitor LED (Note 3)	100m/500Kbps, 250m/250Kbps, 500m/125Kbps Module, Network

Note 1 : Controller I/Os are updated every 10ms.  
 Note 2 : 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.  
 Note 3 : The top cover must be removed from the controller in order to use LED monitoring.

## Units supporting Profibus

- Option unit used to connect a YAMAHA robot controllers ERCX, SRCP, SRCD, SRCX, DRCX to Profibus.
- Optimum for high speed data communication and complicated communication processing.
- Communication is made available among devices of multiple number of manufacturers.
- Capable of simulating serial operation of parallel I/O. With this function set properly, it is possible to control various I/O units connected to the parallel I/O of the robot controller, such as sensor and relay from the sequencer side without using the robot program, as if they are I/Os of the Profibus system.

Note : Profibus is a registered trademark of SIEMENS Corp. Germany.

### Basic specifications for units supporting Profibus

Specification item	Units supporting Profibus
Applicable controllers	ERCX, SRCP, SRCD, SRCX, DRCX
Communication profile	Profibus-DP slave
Number of occupied nodes	1 node
Setting of station address	0 to 126 (set from HPB/HPB-E)
Setting of communication speed	9.6Kbps, 19.2Kbps, 93.75Kbps, 187.5Kbps, 500Kbps, 1.5Mbps, 3Mbps, 6Mbps, 12Mbps (automatic recognition)
Profibus inputs/outputs (Note 1)	32 general inputs, 32 general outputs, 16 dedicated inputs (10 currently in use), 16 dedicated outputs (5 currently in use)
Parallel external inputs/outputs	All controller parallel external inputs/outputs are available for use. A function that simulates serial communication enables individual control of the various points from a master sequencer, regardless of the robot program.
Overall extension distance	100m/12Mbps, 200m/1.5Mbps, 400m/500Kbps, 1000m/187.5Kbps, 1200m/9.6K+19.2K+93.75Kbps

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

## Units supporting Ethernet

- Option unit used to connect a YAMAHA robot controller to Ethernet, which can be incorporated in YAMAHA robot controllers, ERCX, SRCP, SRCD, SRCX, DRCX. Connection of this unit to the network operation by the TCP/IP protocol with a 10BASE-T cable makes data exchange with a robots easy.
- Capable of making an easy access from the TELNET terminal to the robot controller. As the command system is the same as that by the RS-232C communication, even first-time users can use it easily. (Windows PCs have a built-in TELNET terminal called TELNET.EXE as a standard equipment.)
- With a number of controllers connected in the network, it is possible to perform integrated information control over robots even at a distance from the work site.

Note : Ethernet is a registered trademark of XEROX Corp. U.S.A.

### Basic specifications for units supporting Ethernet

Specification item	Units supporting Ethernet
Applicable controllers	ERCX, SRCP, SRCD, SRCX, DRCX
Network specification	As specified for Ethernet (IEEE802.3)
Connector specification	RJ-45 connector (8-pole modular connector) 1 port
Communication speed	10Mbps (10BASE-T)
Communication mode	Half Duplex
Network protocol	Application layer : TELNET / Transport layer : TCP / Network layer : IP, ICMP, ARP / Data link layer : CSMA/CD / Physical layer : 10BASE-T
Number of simultaneous log inputs	1
Setting of IP address, etc.	Set from HPB/HPB-E
Monitor LED (Note 1)	Run, Collision, Link, Transmit, Receive

Note 1 : The top cover must be removed from the controller in order to use LED monitoring.

# SOFTWARE

ERCD/ERCX/SRCP/SRCD/SRCX/DRCX/TRCX

## POPCOM Windows

PC Offline Programming & Communication

POPCOM Windows is an application software which provides visualized guidance for simplified operation of robots, and creation and editing of programs, point teaching and others using a computer which can run the Windows. Japanese-English version POPCOM/VIP (see page 34) is included in the YAMAHA support software CD-ROM as a package. Using this CD-ROM only with the personal computer, it is possible to control all the YAMAHA robots easily.

### 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-E (programming box).

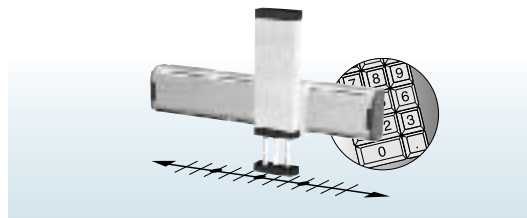


#### 6 Creating point data

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.



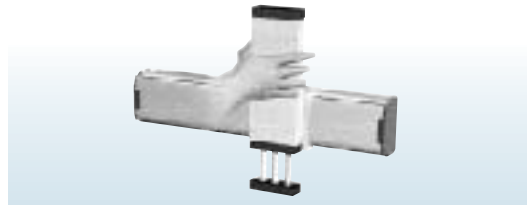
##### Remote teaching

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.



### POPCOM ordering method

**POPCOM - SSC - 1 - 3L**

POPCOM

Cable

Number of pin

Cable length

3L: 3.5m

5L: 5m

1: IBMtype 9-25Pin

2: NEType 25-25Pin

### POPCOM environment

Operating software	MS-Windows version 3.1 or later
Computer	PC using 80386 or higher processor
Memory	4MB or more
Hard disk	Open capacity 2MB or more
CD-ROM drive	More than four times speed
Serial communication port	1 port (necessary when connecting with robot controller)
Adaptable controllers	ERCD, ERCX, SRCP, SRCD, SRCX, DRCX, TRCX controller

Note: Windows is a registered trademark of Microsoft Corporation (USA).