Programming box

HPB/HPB-D

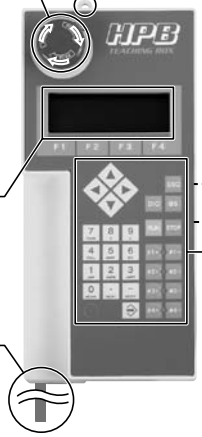
Applicable controllers ▶ ERCD ERCX SR1-X SR1-P DRCX

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.

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)
	Using with ERCX, SRCP30, DRCX	KBB-M5110-0A (with a conversion adaptor)	KBB-M5110-2A (with a conversion adaptor)
Display		LCD (20characters × 4 lines)	
Emergency stop button		Normally closed contact point (with lock function)	
Enable switch		–	3-position
CE marking		Not supported	Applicable
Memory back-up device		SD Memory card	
Operating temperature		0°C to 40°C	
Operating humidity		35% to 85%RH (non-condensing)	
Dimensions		W107 × H230 × D53mm (Strap holder, emergency stop button not included.)	
Weight		650g	
Cable length		3.5m	

Part names and function



Emergency stop button

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

Liquid crystal display

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

Connector cable

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

Strap hole

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

SD memory card connector

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

Operation keys

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

HPB-D rear side

Safety connector (HPB-D only)

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

3-position enable switch (HPB-D only)

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

A conversion adapter for HPB

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

Model	KBB-M657E-01

Note. It is unnecessary when using ERCD or SR1-X, SR1-P, SRCP30.

Field network system with minimal wiring

NETWORK

Applicable controllers ▶ ERCX SR1-X SR1-P DRCX

CC-Link

- Option unit with networking functions that can be incorporated in YAMAHA robot controllers, ERCX / SR1-P / SR1-X / 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.
- Available I/Os are 32 general inputs / outputs and 16 dedicated inputs / outputs (2 nodes occupied).
- It is possible to perform position specification movement and data reading / writing directly by using the remote commands.

Basic specifications for network modules CC-Link

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

Note 1. Controller I/Os are updated every 10ms.
Note 2. These values apply when a cable that supports CC-Link Ver 1.10 is used.

DeviceNet

- Option unit with networking functions that can be incorporated in YAMAHA robot controllers, ERCX / SR1-P / SR1-X / DRCX.
- As connection of the robot system and the sequencer requires only one (5-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.
- Available I/Os are 16 general inputs / outputs and 16 dedicated inputs / outputs.
- It is possible to perform position specification movement and data reading / writing directly by using the remote commands.(SR1-X only)

Basic specifications for network modules DeviceNet

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

- Option unit used to connect a YAMAHA robot controllers ERCX / SR1-P / SR1-X / DRCX to Profibus.
- Optimum for high speed data communication and complicated communication processing.
- Communication is made available among devices of multiple number of manufacturers.
- It is possible to perform position specification movement and data reading / writing directly by using the remote commands.

Basic specifications for network modules Profibus

Item	Network modules Profibus
Applicable controllers	ERCX / SR1-P / S R1-X / SRCP30 / DRCX
Communication profile	Profibus-DP slave
Number of occupied nodes	1 node
Setting of station address	0 to 126
Communication speed setting	9.6Kbps, 19.2Kbps, 93.75Kbps, 187.5Kbps, 500Kbps, 1.5Mbps, 3Mbps, 6Mbps, 12Mbps (automatic recognition)
Profibus I/O Note	General input 32 points, General output 32 points, Dedicated input 16 points, Dedicated Output 16 points
Parallel external I/O (ERCX / DRCX only)	All points usable as parallel external I/O for controller. Each point controllable from master station sequencer (PLC) by emulated serialization, regardless of robot program.
Overall length	100m/12Mbps, 200m/1.5Mbps, 400m/500Kbps, 1000m/187.5Kbps, 1200m/9.6K · 19.2K · 93.75Kbps

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

Ethernet

- Option unit used to connect a YAMAHA robot controller to Ethernet, which can be incorporated in YAMAHA robot controllers, ERCX / 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.

Basic specifications for network modules Ethernet

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