YAMAHA PROGRAMMING BOX

HPB

Supplement User's Manual

ENGLISH **E**

Introduction

Thank you for your purchase of the YAMAHA HPB Programming Box (hereafter referred to as "HPB"). Please read this manual supplement carefully before using the HPB, in order to ensure correct operation.

About This Document

This document is primarily a guide to functions which have been added to the HPB. For information concerning functions not included in this document, please refer to the TPB operation explanations provided in the controller user's manual.

After reading this document, please store it in a secure location where it can be easily referenced by the HPB operator when necessary.

Although the content of this document has been carefully checked, please contact YAMAHA MOTOR CO., LTD. if an error, etc., is found.
For information concerning the robot unit, the controller, and other optional products, please refer to the respective user's manuals for those items.

* Product names which appear in this document are the trademark or registered trademark names used by the respective companies.

MEMO

Contents

MEMO

1 About the HPB

The HPB is a hand-held, pendant-type programming box which connects to the robot controller in order to edit robot operation data and execute programs. The HPB is compatible with all controllers where the TPB was used.
Featuring an interactive user operation by hierarchical menus, the HPB operating procedures are identical to those of the TPB, and can be easily mastered even by first-time users.

1.1   What the HPB does

The HPB can be used to perform the following operations and checks. Some of the functions shown below, however, may not be available when using some controller models and versions. For details, refer to the controller user's manual.

Function		Description	TPB	HPB
Programming and data editing	Parameter setting	Sets the parameters for robot operation.		●
	Programming	Creates & edits the programs used to operate the robot.		●
	Point data entry	Edits the point data used for robot motion.		
	• Manual data input	For direct point data inputs using the HPB number keys.		●
	• Teaching playback	Manually moves the robot to any desired position, and registers that position as the point data setting.		●
	• Direct teaching	Basically identical to the "teaching playback" function, but permits the robot to be moved by hand during an emergency stop status.		●
	Trace	Moves the robot in accordance with the registered position data (point data).		●
Robot operation	Return-to-origin	Returns the robot to its origin position.		●
	Step operation	Performs program operation one step at a time.		●
	Automatic operation	Performs automatic operation in accordance with the program.		●
Safety functions	Emergency stop button	This HPB button is used to perform robot emergency stops.		●
	SERVICE mode	Used to enhance safety when working in the robot's range of motion.		●
Data backup functions	Data backup	Saves the controller data.		
	• Save to IC memory card	Saves the controller data to an IC memory card.	●	×
	• Save to flash ROM	Saves the parameter data to a flash ROM.		●
	• Save to SD memory card	Saves controller data to an SD memory card.	×	●
	Data load	Loads data to the controller.		
	• Load from IC memory card	Loads IC memory card data to the controller.	●	×
	• Load from flash ROM	Loads flash ROM parameter data to the controller.		●
	• Load from SD memory card	Loads SD memory card data to the controller.	×	●
Display functions	Error and alarm display	Displays the content of an error or malfunction. Also displays a history of past errors and alarms.		●
	Others	Duty monitor DIO monitor System information display		●

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1.2   Part names and functions

HPB unit

Strap hole

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

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.

SD memory card connector

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

Liquid crystal display

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

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".)
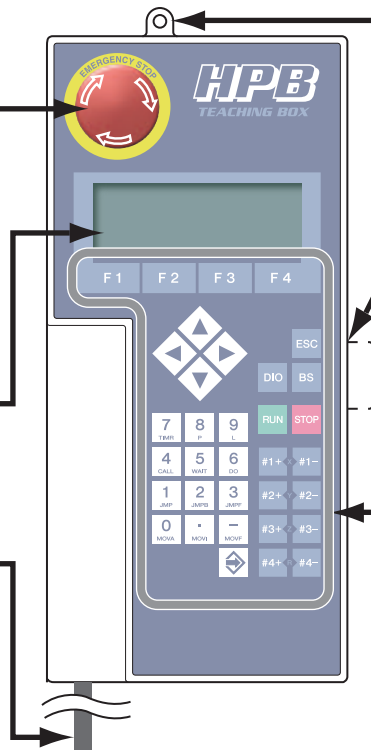
Connection cable

Connects the HPB to the controller. A D-Sub 9-pin connector (male) is provided at one end of the cable.
To connect to controller types other than the ERCD, use the accessory connector adapter.

Fig. HPB-E001-001

Rear view

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.
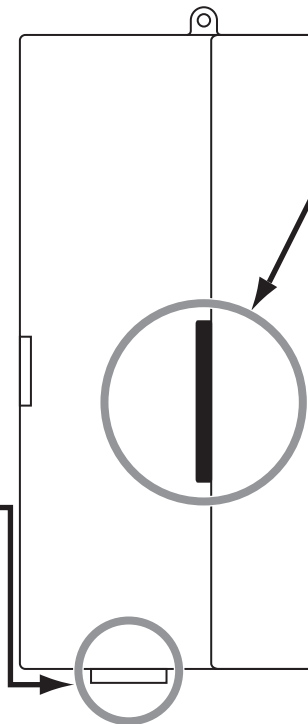
Safety connector (HPB-D only)

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.

Fig. HPB-E021-001

⚠ **WARNING**
- **THE FLUID (LIQUID CRYSTAL) IN THE LCD DISPLAY MODULE IS A HAZARDOUS SUBSTANCE. IF THIS FLUID LEAKS FROM THE DISPLAY DUE TO DAMAGE AND ADHERES TO SKIN OR CLOTHES, WASH IT OFF WITH SOAP AND WATER.**
- **DO NOT WIND THE CONNECTION CABLE AROUND THE HPB BODY WHEN STORING OR BEND IT SHARPLY SINCE THIS MIGHT BREAK THE WIRES IN THE CONNECTION CABLE.**
- **DO NOT USE AN EXTENSION CORD WITH THE CONNECTION CABLE.**

● **9-25pin conversion adapter (Accessory Item)**

This adapter is required when connecting the HPB to controller types other the ERCD.
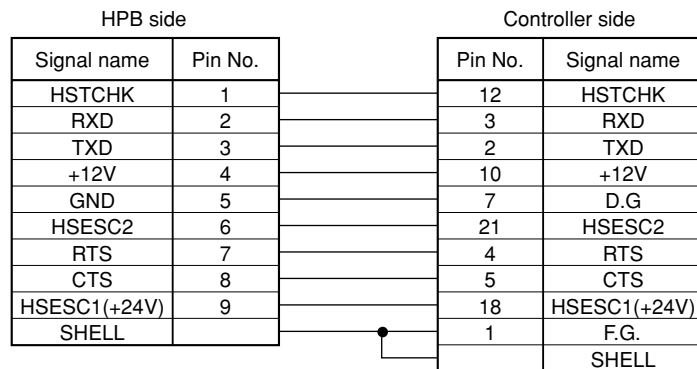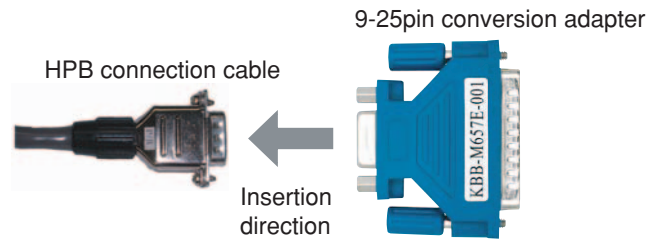
9-25pin conversion adapter

9-25pin conversion adapter

HPB connection cable

Insertion direction

HPB side

Signal name	Pin No.
HSTCHK	1
RXD	2
TXD	3
+12V	4
GND	5
HSESC2	6
RTS	7
CTS	8
HSESC1(+24V)	9
SHELL	

Controller side

Pin No.	Signal name
12	HSTCHK
3	RXD
2	TXD
10	+12V
7	D.G
21	HSESC2
4	RTS
5	CTS
18	HSESC1(+24V)
1	F.G.
	SHELL

Fig. HPB-E002-001

⚠ **WARNING**
• **DO NOT USE COMMERCIAL POWER SUPPLY ADAPTERS WITH THE HPB.**

HPB-D wiring diagram

15-pin D-sub connector (female)
(If not using the HPB-D
then connect the supplied
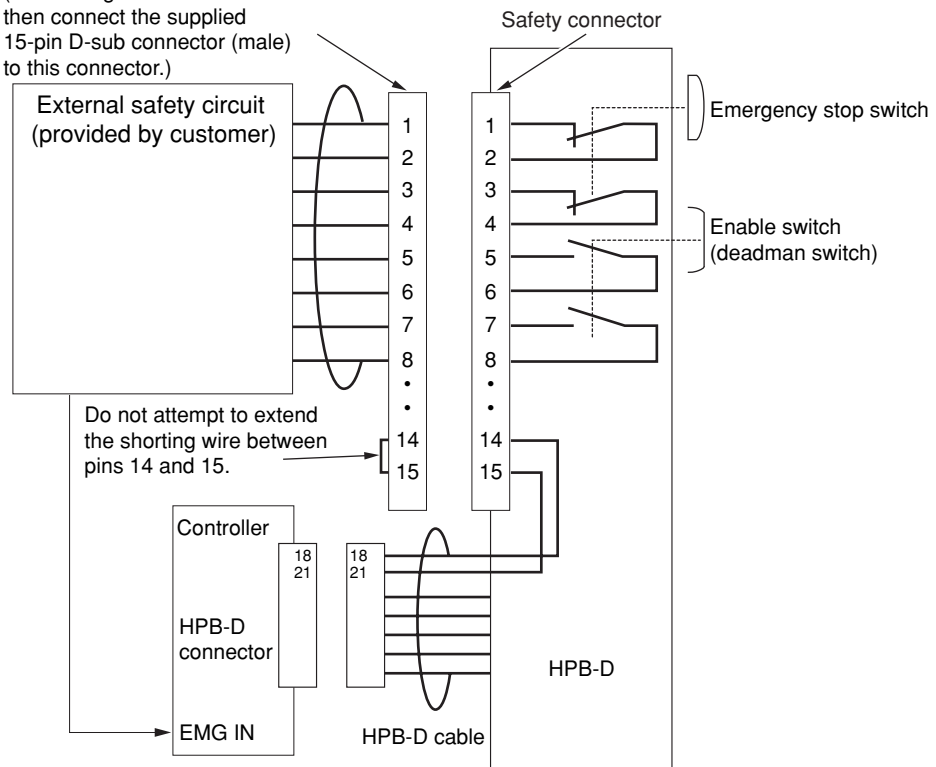15-pin D-sub connector (male)
to this connector.)

Safety connector

External safety circuit
(provided by customer)

Emergency stop switch

Enable switch
(deadman switch)

Do not attempt to extend
the shorting wire between
pins 14 and 15.

Controller
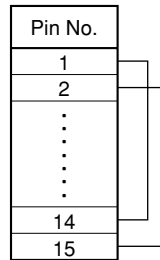
HPB-D
connector

EMG IN

HPB-D cable

HPB-D

Fig. HPB-E022-001

1

● **15-pin D-sub connectors (supplied only with HPB-D)**

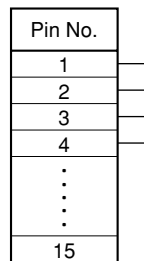Use these connectors with the emergency stop or enable switch to configure an external safety circuit.

15-pin D-sub connector (female: KS9-M532A-000)

Pin No.
1
2
:
:
:
14
15

Attaching this connector directly to the safety connector on the HPB-D enables the emergency stop button only.

Fig. HPB-E023-001

15-pin D-sub connector (male: KS9-M532E-001)

Pin No.
1
2
3
4
:
:
:
15

If not using the HPB-D then attach this connector directly to the 15-pin D-sub connector on the external safety circuit so that the emergency stop circuit is shorted.

Fig. HPB-E024-001

⚠ **CAUTION**

Set so the voltage and current ratings on the circuit connected to pins 1 to 8 on the supplied 15-pin D-sub connector are no higher than 30V DC and 1A.
Pins 1 and 14, and pins 2 and 15 on the supplied 15-pin D-sub connector are shorted prior to shipment. When connecting the HPB-D contacts to the external emergency stop circuit, change the wiring as shown in the above diagram to short pins 14 and 15 together.
Never attempt to extend the shorting wire between pins 14 and 15. Doing so might cause noise in the wiring that interferes with HPB-D or controller operation and causes faulty operation. This wiring should be kept short.

● SD memory card

SD memory cards (required format: FAT12/16) are not available as accessory or optional items, and must be provided by the customer.
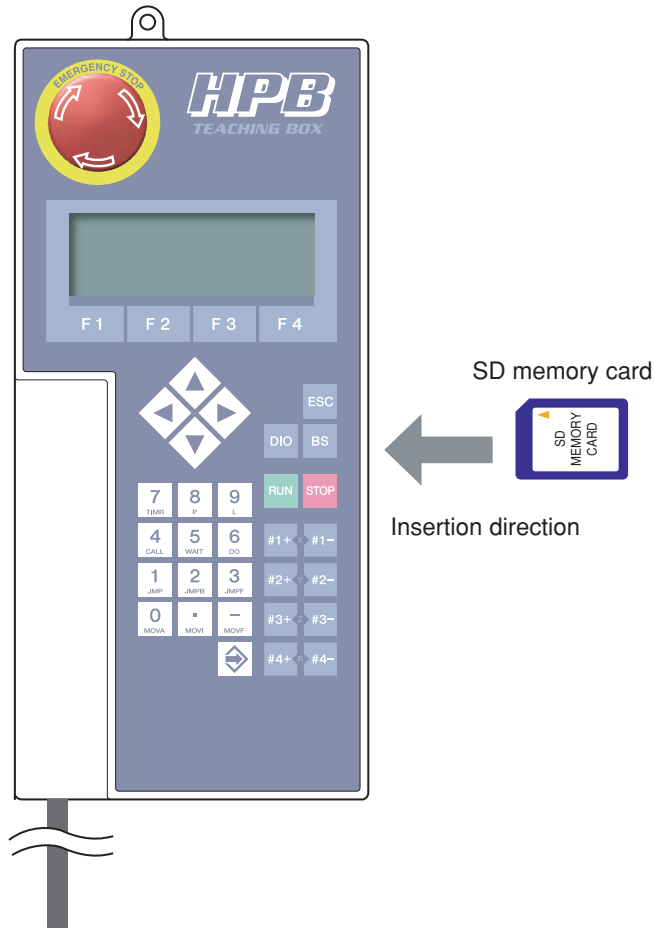(For SD memory card handling information, see Chapter 4 "Using SD Memory Cards".)

SD memory card

SD memory card

Insertion direction

Fig. HPB-E003-001

⚠️ **CAUTION**
- **The recommended SD memory card size is "up to 32MB". Using a card size of 64MB or more during format on Windows sometimes causes "FAT32" to appear as the preset value. However, the HPB cannot use FAT32, so always select "FAT" at this time.**
- **The maximum size of the controller data file backed up on the SD memory card is "328KB". The data file size is generally about "64KB" so up to 512 files can be stored on a 32MB memory card.**

MEMO

2 Connecting and Disconnecting the HPB

2.1 Connecting to, disconnecting from, the ERCD controller

The HPB can be connected to, or disconnected from, an ERCD controller regardless of whether the controller's power is ON or OFF.

2.1.1 Connecting to the ERCD controller

⚠ **CAUTION**
- **Do not use a modified HPB connection cable to connect the HPB to an ERCD controller, as this can result in communication errors and equipment failure.**
- **An poor connection or an incorrect connector insertion can result in equipment failure and malfunctions. Be sure that the cable is properly connected.**
- **An RS-232C adapter is provided as an accessory with ERCD controllers. However, this adapter is used only for connecting a TPB to an ERCD controller, and it cannot be used to connect the HPB.**
- **When connecting or disconnecting the HPB connection cable from the ERCD controller, always grip the connector body itself. When removing the connector from the ERCD controller, pull it straight out so as not to bend the connector pins. When attaching the HPB connection cable to the ERCD controller, make sure that both connectors are aligned with each other.**

■ **When ERCD controller power is OFF**

Step1 *Connect the HPB to the ERCD controller.*

Plug the HPB connection cable into the PB connector on the front panel of the ERCD controller, then tighten the screws on both sides of the connector.
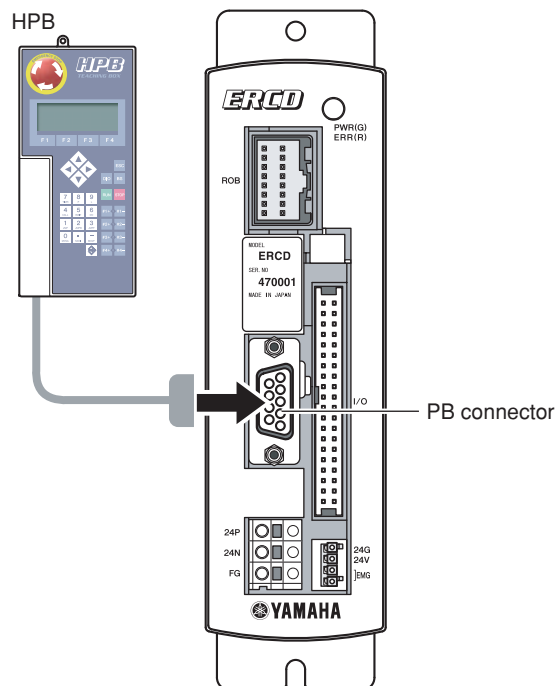
HPB connection to ERCD

Fig. HPB-E004-001

Step2 *Turn the ERCD controller power ON.*

A buzzer sounds for approximately 1 second, then the initial menu screen displays.

2

Step3 *Verify that the initial menu screen displays.*

Initial menu screen

```
[MENU]
select menu

1EDIT2OPRT3SYS 4MON
```
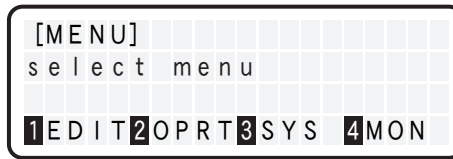
Fig. HPB-E004-003

■ When ERCD controller power is ON

The HPB can be connected to the ERCD controller even when the controller power is ON.

Step1 *Connect the HPB to the ERCD controller.*

Plug the HPB connection cable into the PB connector on the front panel of the ERCD controller, then tighten the screws on both sides of the connector. A buzzer sounds for approximately 1 second, then the initial menu screen displays.
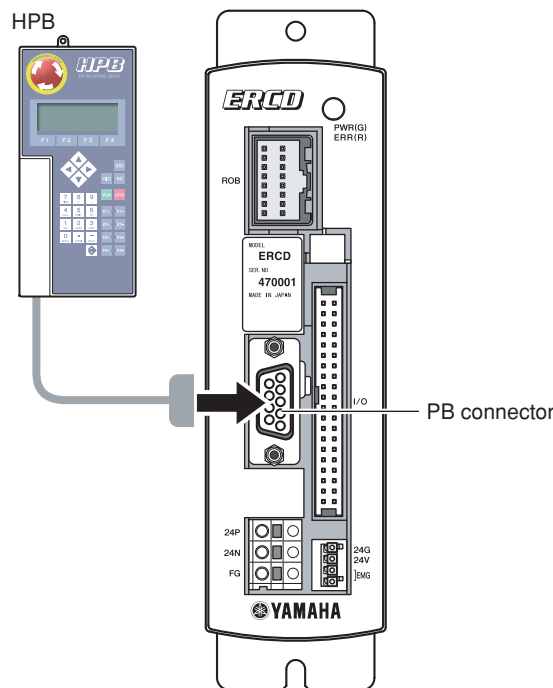
HPB connection to ERCD

Fig. HPB-E004-001

⚠ **CAUTION**
- **If the HPB is connected to the ERCD controller when the controller power is ON, an emergency stop and a robot servo OFF status occur.**
- **If the HPB is connected to the ERCD controller while a program or I/O dedicated command is being executed, the command execution is aborted, and robot operation is stopped.**

Step2 *Verify that the initial menu screen displays.*

Initial menu screen
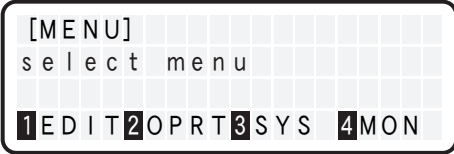
```
[MENU]
select menu

1EDIT2OPRT3SYS 4MON
```

Fig. HPB-E004-003

2.1.2 Disconnecting from the ERCD controller

The HPB can be disconnected regardless of whether the ERCD controller power is ON or OFF.
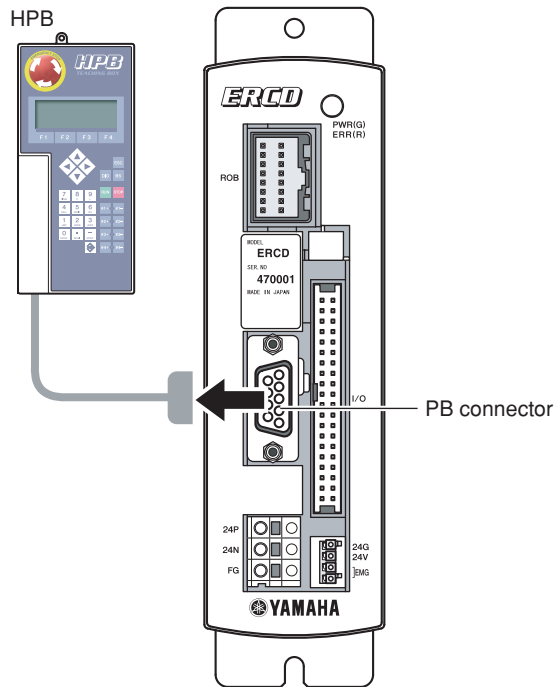Disconnect the HPB from the ERCD controller.

HPB disconnection from ERCD

HPB

PB connector

Fig. HPB-E004-002

⚠ **CAUTION**

• **If the HPB is disconnected from the ERCD controller when the controller power is ON, an emergency stop and a robot servo OFF status occurs.**
• **If the HPB is disconnected from the ERCD controller while a program or I/O dedicated command is being executed, the command execution is aborted, and robot operation is stopped.**

2.2   Connecting to, disconnecting from, the ERCX controller

The HPB can be connected to, or disconnected from, an ERCX controller regardless of whether the controller's power is ON or OFF.

2.2.1   Connecting to the ERCX controller

⚠ CAUTION

• **Do not use a modified HPB connection cable, or any relay device other than the accessory 9-25pin conversion adapter to connect the HPB to an ERCX controller, as this can result in communication errors and equipment failure.**
• **An poor connection or an incorrect connector insertion can result in equipment failure and malfunctions. Be sure that the cable is properly connected.**
• **When connecting or disconnecting the HPB connection cable from the ERCX controller, always grip the connector body itself. When removing the connector from the ERCX controller, pull it straight out so as not to bend the connector pins. When attaching the HPB connection cable to the ERCX controller, make sure that both connectors are aligned with each other.**

■ When ERCX controller power is OFF

Step 1 *Connect the HPB to the ERCX controller.*

Attach the 9-25pin conversion adapter to the HPB connection cable, then plug the cable into the TPB connector at the front panel of the ERCX controller. Secure by tightening the two screws on both sides of the adapter.
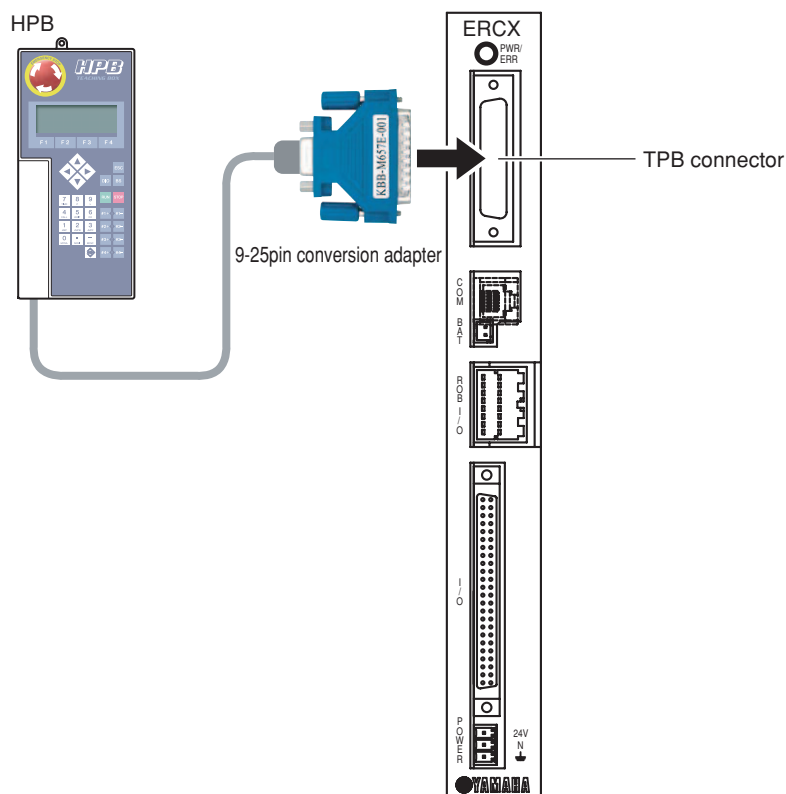
HPB connection to ERCX

Fig. HPB-E005-001

Step 2 *Turn the ERCX controller power ON.*

A buzzer sounds for approximately 1 second, then the initial menu screen displays.

Step3 *Verify that the initial menu screen displays.*

Initial menu screen
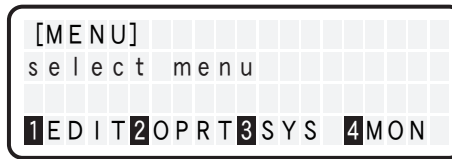
```
[MENU]
select  menu

1EDIT2OPRT3SYS  4MON
```

Fig. HPB-E004-003

■ **When ERCX controller power is ON**

The HPB can be connected to the ERCX controller even when the controller power is ON.

Step1 *Connect the HPB to the ERCX controller.*

Attach the 9-25pin conversion adapter to the HPB connection cable, then plug the cable into the TPB connector at the front panel of the ERCX controller. Secure by tightening the two screws on both sides of the adapter. A buzzer sounds for approximately 1 second, then the initial menu screen displays.
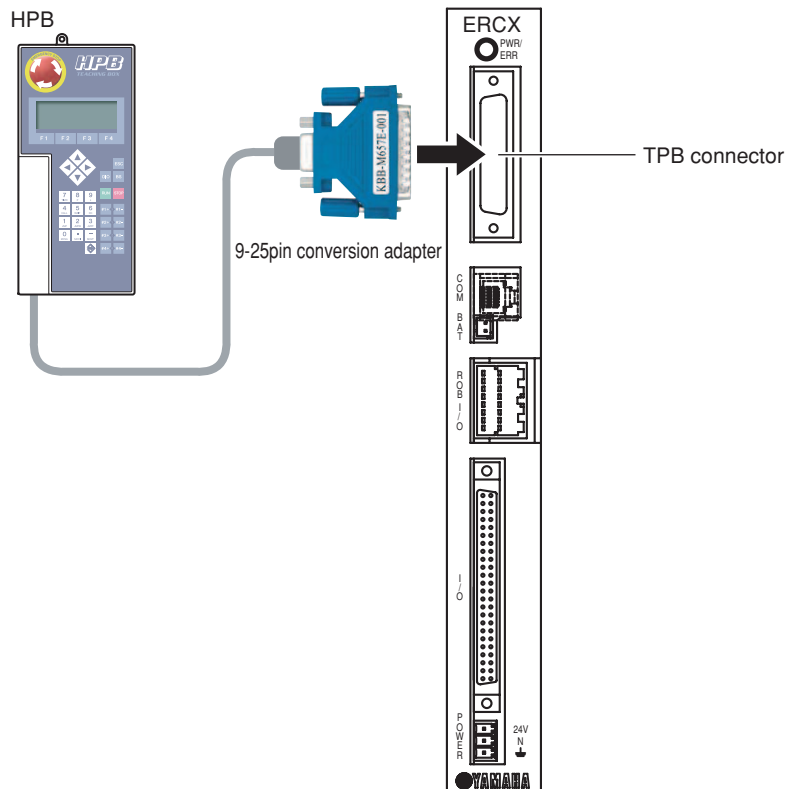
HPB connection to ERCX

Fig. HPB-E005-001

⚠ CAUTION
• **The robot servo status may change from ON to OFF if the HPB is connected to the ERCX controller when the controller power is ON.**
• **If the HPB is connected to the ERCD controller while a program or I/O dedicated command is being executed, the command execution is aborted, and robot operation is stopped.**

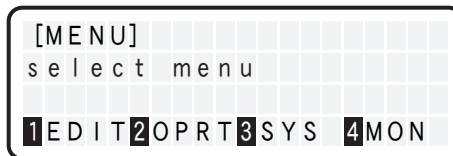**Step2** *Verify that the initial menu screen displays.*

Initial menu screen

```
[MENU]
select menu

1EDIT2OPRT3SYS 4MON
```

Fig. HPB-E004-003

2

Connecting and Disconnecting the HPB

2.2.2 Disconnecting from the ERCX controller

The HPB can be disconnected regardless of whether the ERCX controller power is ON or OFF. Robot operation is also unaffected by disconnecting the HPB. After loosening the 9-25pin conversion adapter screws, disconnect the 9-25pin conversion adapter and HPB from the ERCX controller.

When leaving the HPB disconnected from the ERCX controller for extended periods, the accessory RS-232C dust cover should be attached to the ERCX connector area.

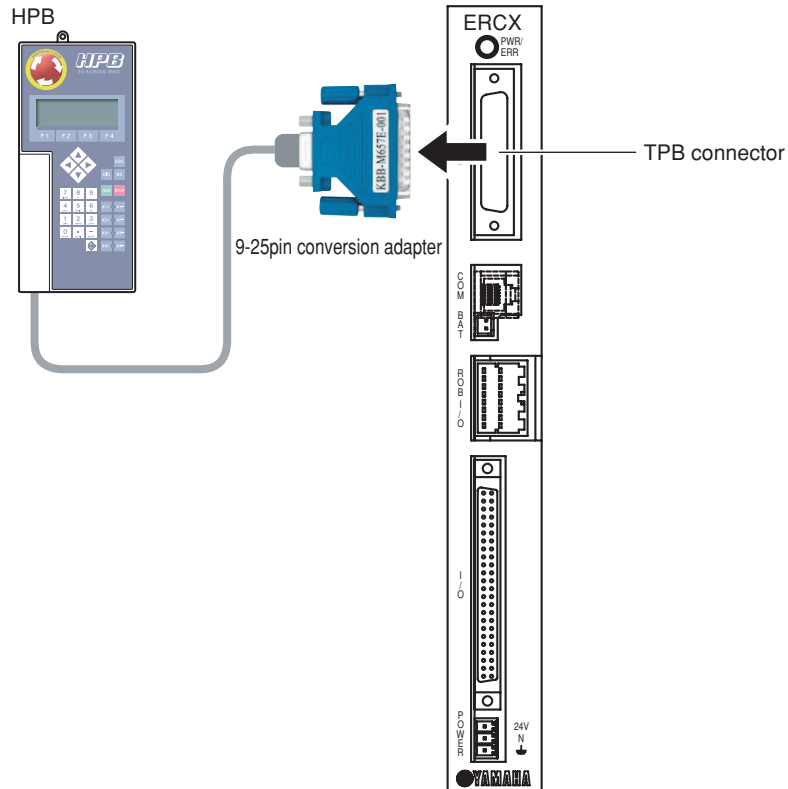**HPB disconnection from ERCX**

Fig. HPB-E005-002

2.2.3   Servo OFF when connecting and disconnecting the HPB

The SRCX, DRCX, etc. controllers have an ESC switch (used to connect and disconnect the HPB to and from the controller) on their front panels. The ERCD and ERCX do not have this switch. Because of this, the robot servo may turn OFF when the HPB is connected to or disconnected from the controller. (The status LED that is lit in green changes to green/red blinking.) If this happens, perform the servo recovery (according to the menu that automatically appears in running automatic operation) or execute the servo recovery command (SERVO) through the I/O port. This allows the robot to restart the normal operation.

If a problem occurs in the system when the servo is turned off, try connecting and disconnecting the HPB as illustrated below. This will prevent the robot servo being turned OFF. Pay attention not to deform the connector pins when connecting and disconnecting the HPB.

Connecting the HPB

Fig. HPB-E006-001
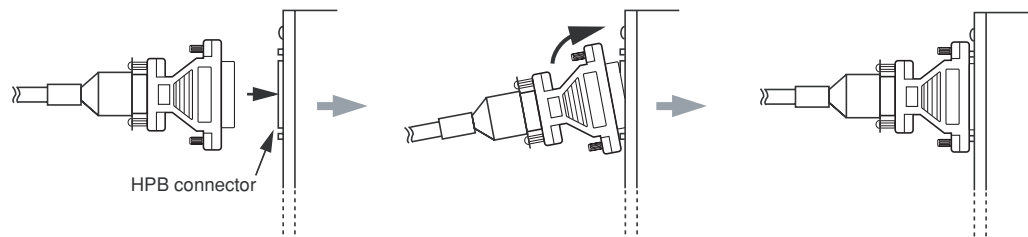
With the 9-25pin conversion adapter attached to the HPB connection cable, plug the adapter in at an angle as shown above, so that it is plugged into connector's bottom side first.

Disconnecting the HPB

Fig. HPB-E006-002
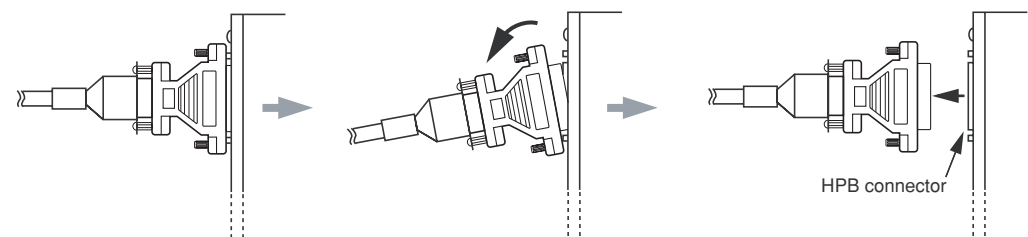
With the 9-25pin conversion adapter attached to the HPB connection cable, unplug the adapter at an angle as shown above, so that it is unplugged from the connector's top side first.

⚠ **CAUTION**
Connect/disconnect the HPB carefully to avoid deforming the connector pins of the 9-25pin conversion adapter.

2.3 Connecting to, disconnecting from, other controllers

The HPB can be connected to, or disconnected from, a controller (SRCX, DRCX, etc.) other than an ERCD or ERCX controller regardless of whether the controller's power is ON or OFF.
An example of the HPB connection/disconnection method versus an SRCX controller is explained below.

2.3.1 Connecting to the SRCX controller

⚠️ **CAUTION**
- **Do not use a modified HPB connection cable, or any relay device other than the accessory 9-25pin conversion adapter to connect the HPB to an controller, as this can result in communication errors and equipment failure.**
- **An poor connection or an incorrect connector insertion can result in equipment failure and malfunctions. Be sure that the cable is properly connected.**
- **When connecting or disconnecting the HPB connection cable from the robot controller, always grip the connector body itself. When removing the connector from the robot controller, pull it straight out so as not to bend the connector pins. When attaching the HPB connection cable to the robot controller, make sure that both connectors are aligned with each other.**

■ When controller power is OFF

Step 1 Connect the HPB to the SRCX controller.

Attach the 9-25pin conversion adapter to the HPB connection cable, then plug the cable into the TPB connector at the front panel of the controller. Secure by tightening the two screws on both sides of the adapter.

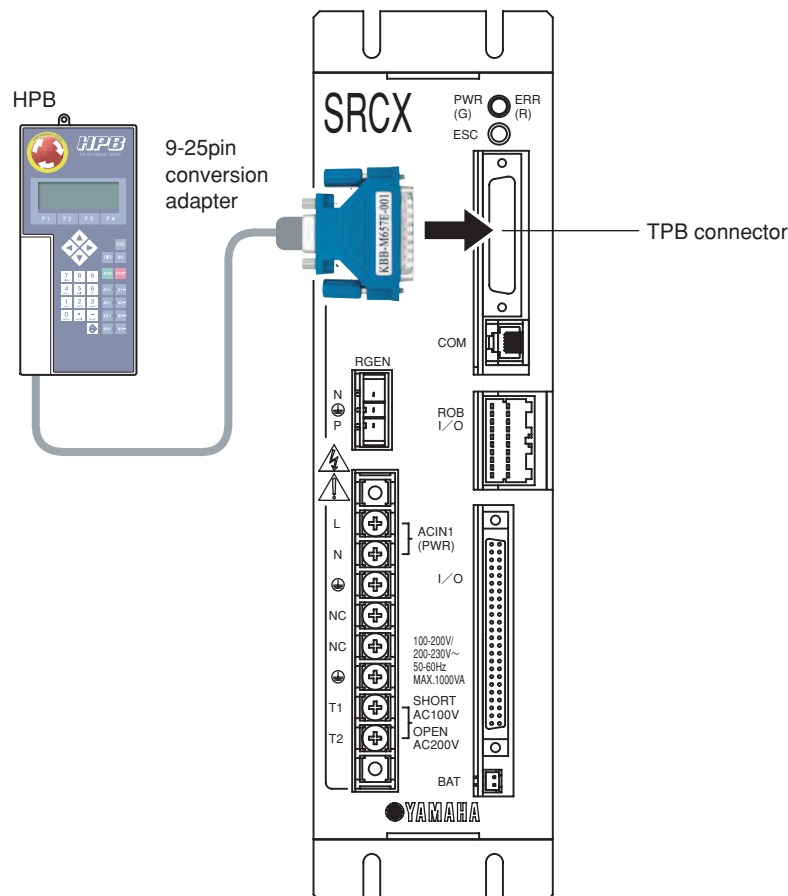**HPB connection to SRCX**

Fig. HPB-E007-001

Step 2 Turn the controller power ON.

A buzzer sounds for approximately 1 second, then the initial menu screen displays.

Step3 *Verify that the initial menu screen displays.*

| Initial menu screen
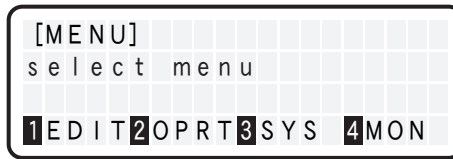
```
[MENU]
select menu

1EDIT2OPRT3SYS 4MON
```

Fig. HPB-E004-003

■ **When controller power is ON**

The HPB can be connected even while the controller power is ON.

Step1 *Connect the HPB to the SRCX controller.*

Attach the 9-25pin conversion adapter to the HPB connection cable, then plug the adapter into the controller's TPB connector while pressing the ESC switch on the controller's front panel. Secure by tightening the two screws on both sides of the adapter. A buzzer sounds for approximately 1 second, then the initial menu screen displays.
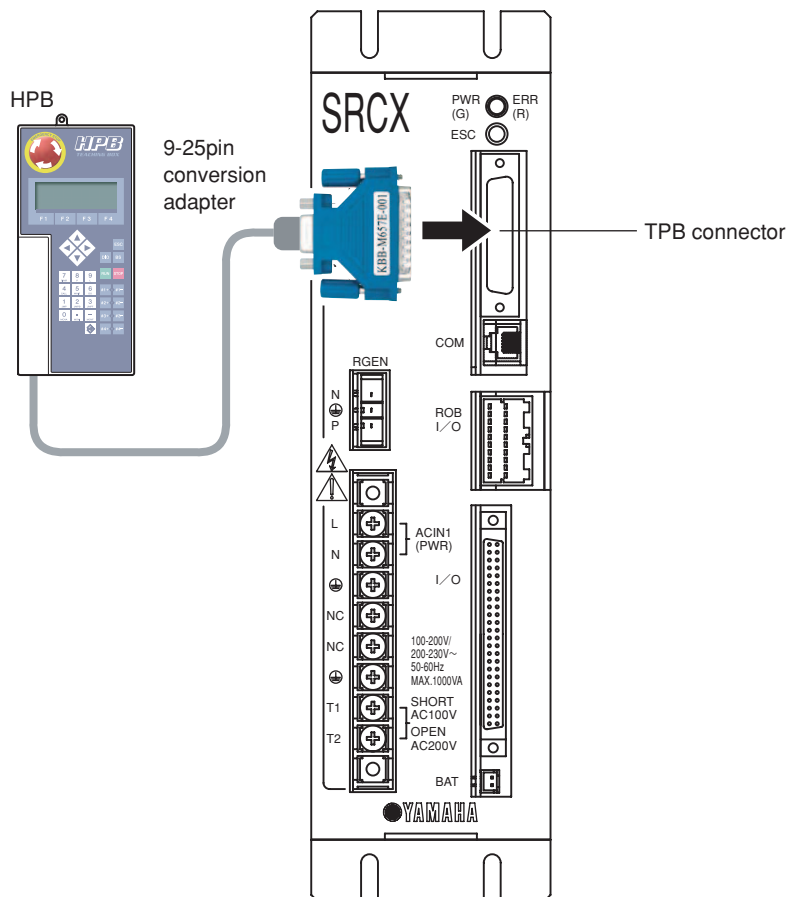
| HPB connection to SRCX

Fig. HPB-E007-001

⚠ **CAUTION**
- **Connecting the HPB to a "power ON" status controller without pressing the ESC switch will result in an emergency stop, and the robot servo may switch OFF.**
- **If the HPB is connected while a program or an I/O dedicated command is being executed, the operation being executed will be aborted regardless of whether or not the controller's front panel ESC switch is pressed.**

*Step*2 *Verify that the initial menu screen displays.*

Initial menu screen
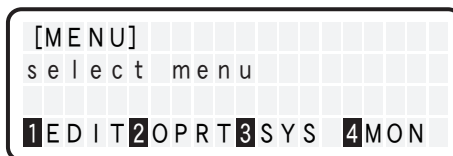
```
[MENU]
select  menu

1EDIT2OPRT3SYS 4MON
```

Fig. HPB-E004-003

2.3.2 Disconnecting from the SRCX controller

The HPB can be disconnected regardless of whether the SRCX controller power is ON or OFF.
After loosening the 9-25pin conversion adapter screws, disconnect the 9-25pin conversion adapter and HPB from the SRCX controller. To disconnect the HPB while a program or an I/O dedicated command is being executed, press the ESC switch on the controller's front panel while disconnecting the 9-25pin conversion adapter and the HPB.
When leaving the HPB disconnected from the SRCX controller for extended periods, the accessory RS-232C dust cover should be attached to the SRCX connector area.
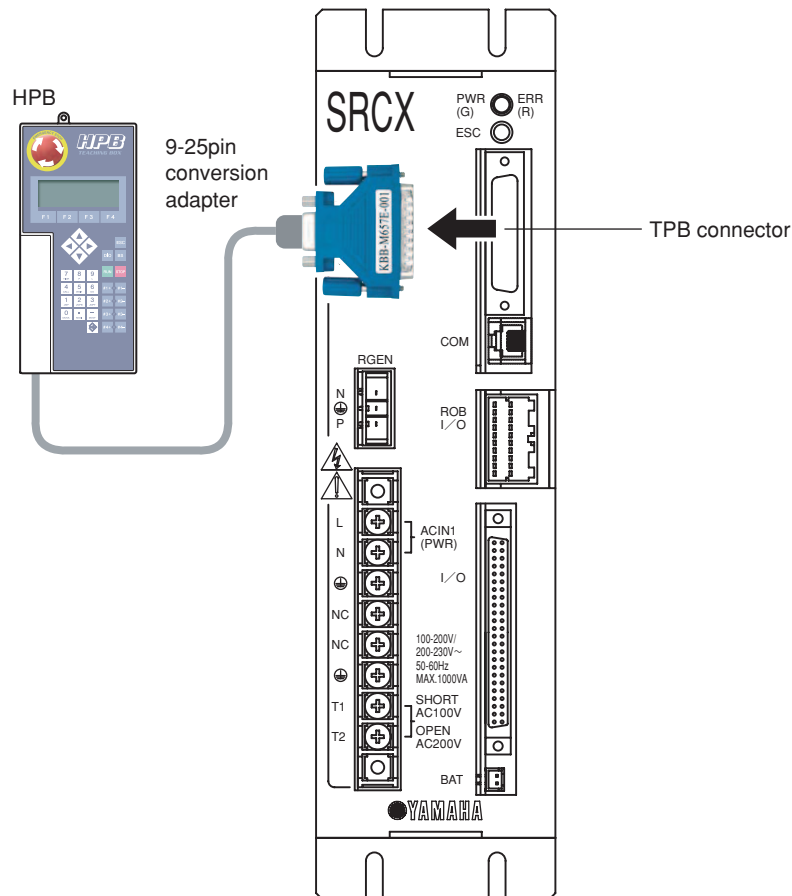
Disconnecting the HPB from the SRCX

HPB

9-25pin
conversion
adapter

TPB connector

Fig. HPB-E007-002

⚠ **CAUTION**
If a program or I/O dedicated command is in progress, disconnecting the HPB without pressing the ESC switch at the controller's front panel will result in an emergency stop, and the robot servo may switch OFF.

MEMO

3 Basic Operations

3.1 HPB control keys

The HPB control keys are divided into 2 main groups, as shown below.
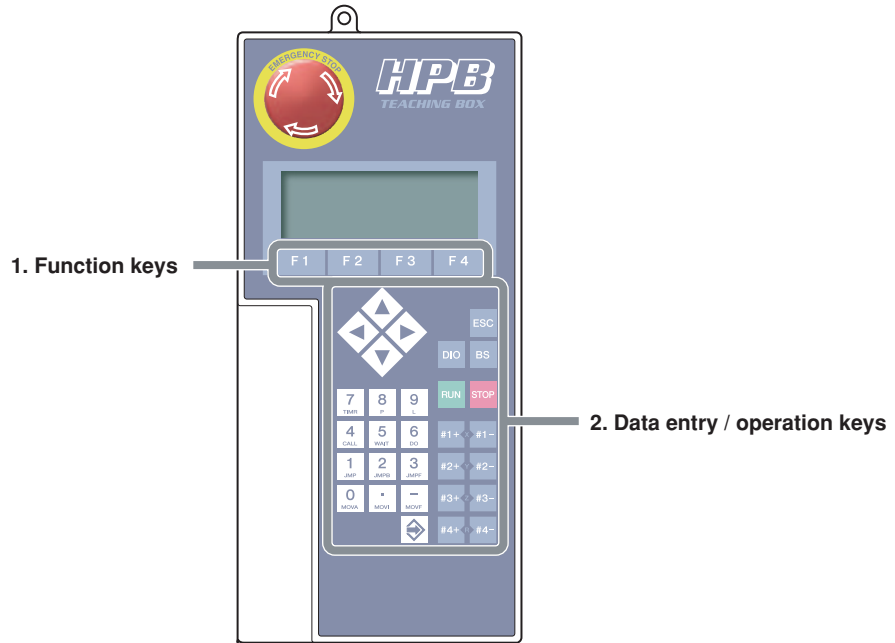
| **HPB control key layout**

Fig. HPB-E008-001

The key functions are described below.

1. Function keys

HPB Keys	Description	TPB Keys
F1 ～ F4	Selects modes displayed at the bottom line of the display, and executes commands. The key numbers correspond to the mode and command numbers.	F1 ～ F4

2. Data entry / operation keys

HPB Keys	Description	TPB Keys
RUN	Starts robot operation in accordance with the selected program and parameters.	RUN
STOP	Stops the robot operation which is in progress. Operation can be resumed by pressing RUN again.	STOP
Not available on HPB	Selects the axis when controlling 3 or more axes. There is no CHG key on the HPB. Instead, the following keys are provided. <table><tr><td>Operation Description</td><td>HPB</td></tr><tr><td>Switches the axis during point data editing operations.</td><td>◄ ►</td></tr><tr><td>DIO monitor switching.</td><td>DIO</td></tr></table>	CHG
DIO	Displays the DIO monitor.	DIO

0 ～ 9	Numerical input keys.	0 ～ 9
. —	Symbol input keys.	• —
TIMR ～ MOVF	Robot language input keys (used the robot language editing screen in the program editing mode).	TIMR ～ MOVF
#1+◇#1− #2+◇#2− #3+◇#3− #4+◇#4−	Moves the robot in the plus and minus directions within an X, Y, Z, R coordinate system.	X−/Z ⇐ X+/Z ⇒ Y−/R Y+/R
◀ ▶	For screen left/right scrolling, and cursor left/right movement.	X−/Z ⇐ X+/Z ⇒
▲ ▼	For scrolling through displayed parameter and point numbers.	STEP UP STEP DOWN
ESC	Returns to the previous mode or screen.	ESC
BS	(BackSpace) Moves the editing cursor one space back at numerical input operations, and erases that entry.	BS
⇨	Registers an entered value.	⇨

3.2 HPB and TPB key layout differences

The main differences between the HPB and TPB key layout and key functions are shown below.
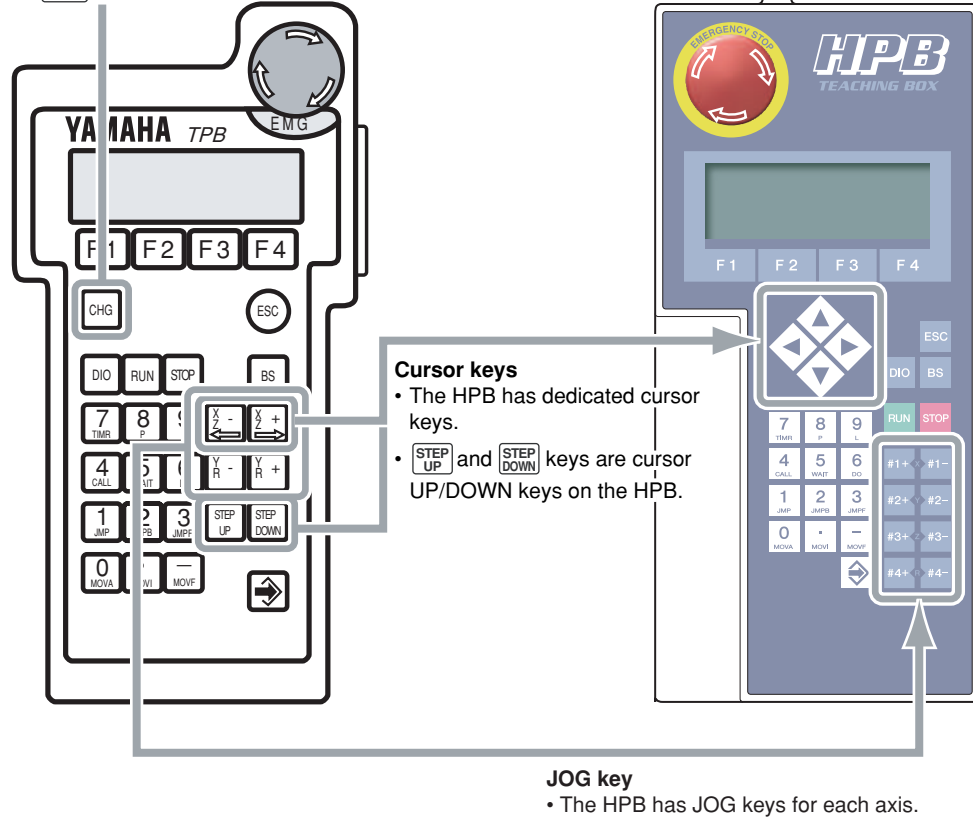
HPB and TPB key layout differences

No CHG key on HPB

Cursor keys
• The HPB has dedicated cursor keys.
• STEP UP and STEP DOWN keys are cursor UP/DOWN keys on the HPB.

JOG key
• The HPB has JOG keys for each axis.

Fig. HPB-E009-001

⚠ **CAUTION**
The JOG key plus/minus direction layout on the HPB is the reverse of that on the TPB. Use care to avoid specifying the wrong direction.
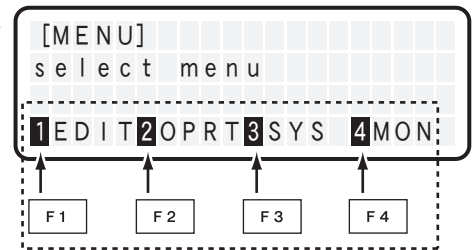
3.3   Basic key operation

HPB operations are selected from a hierarchical menu system. To display a menu item, press the corresponding function key. The number keys and the ◈ key are used to enter numerical values. The following steps describe a basic HPB operation, showing how to select a robot operation program from the initial menu.

Step1 *Verify that the initial menu screen displays.*

The initial menu screen has a [MENU] title at the top line, with the 4 modes displayed for selection on the bottom line.

```
[MENU]
select  menu

1EDIT2OPRT3SYS  4MON
```
```
 F 1      F 2      F 3      F 4
```
Selectable menus (modes) and corresponding function keys

Fig. HPB-E010-001

1 E D I T (Editing)
2 O P R T (Operation)
3 S Y S   (System)
4 M O N   (Monitor)

NOTE
The numbers to the left of each mode correspond to the function key numbers.

Step2 *Press the function key for the desired mode.*

The screen then changes to that of the selected mode. In the example shown at right, the initial menu screen's ⟨F2⟩ (OPRT) key was pressed to select the OPRT (operation) mode. The following 3 sub-modes can be selected from the OPRT mode.

Current mode
```
[OPRT]
select  menu

1ORG  2STEP3AUTO
```
Fig. HPB-E010-002

1 O R G   (Return-to-origin)
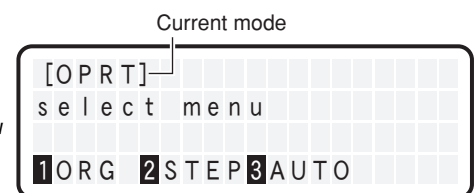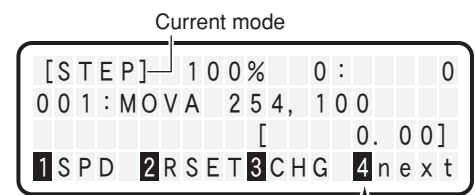2 S T E P (Step operation)
3 A U T O (Automatic operation)

Step3 *Press a function key to select the desired sub-mode.*

Each time a function key is pressed to select a menu, processing moves further down into the hierarchical menu system.

In the example shown at right, the OPRT mode screen's ⟨F2⟩ (STEP) key was pressed to select the STEP mode.

Current mode
```
[STEP] 100%  0:      0
001:MOVA 254, 100
           [    0. 00]
1SPD  2RSET3CHG  4next
```
The ⟨F4⟩ key can then be pressed to display the next set of menu items.

Fig. HPB-E010-003

NOTE
The [4 next] item displays at the right end of the bottom line when there are 5 or more selectable menu items. The ⟨F4⟩ key can then be pressed to display the next set of menu items. Press ⟨bs⟩ to return to the previous set of menu items.

Step4 *Use the same procedure to select the next mode.*

In the example shown at right, the STEP mode screen's `F3` *(CHG) key was pressed to select the program changing mode. The desired value can then be entered at the cursor (_) position.*

Input enabled at cursor position

```
[STEP]  100%   0:        0
PGM  No  =
(program No)   0~99
```

Indicates the input range.

Fig. HPB-E010-004

Step5 *Enter the desired program No.*

Use the number keys to enter the desired program No., then press the ⬦ key to select that program.

NOTE

Press the `ESC` key to return to the previous screen, or to return to the next higher hierarchy level.

3

Basic Operations

3-5

3.4 Hierarchical menu structure

HPB operations are performed by making selections from a hierarchical menu system. The HPB menu hierarchy structure is shown below.
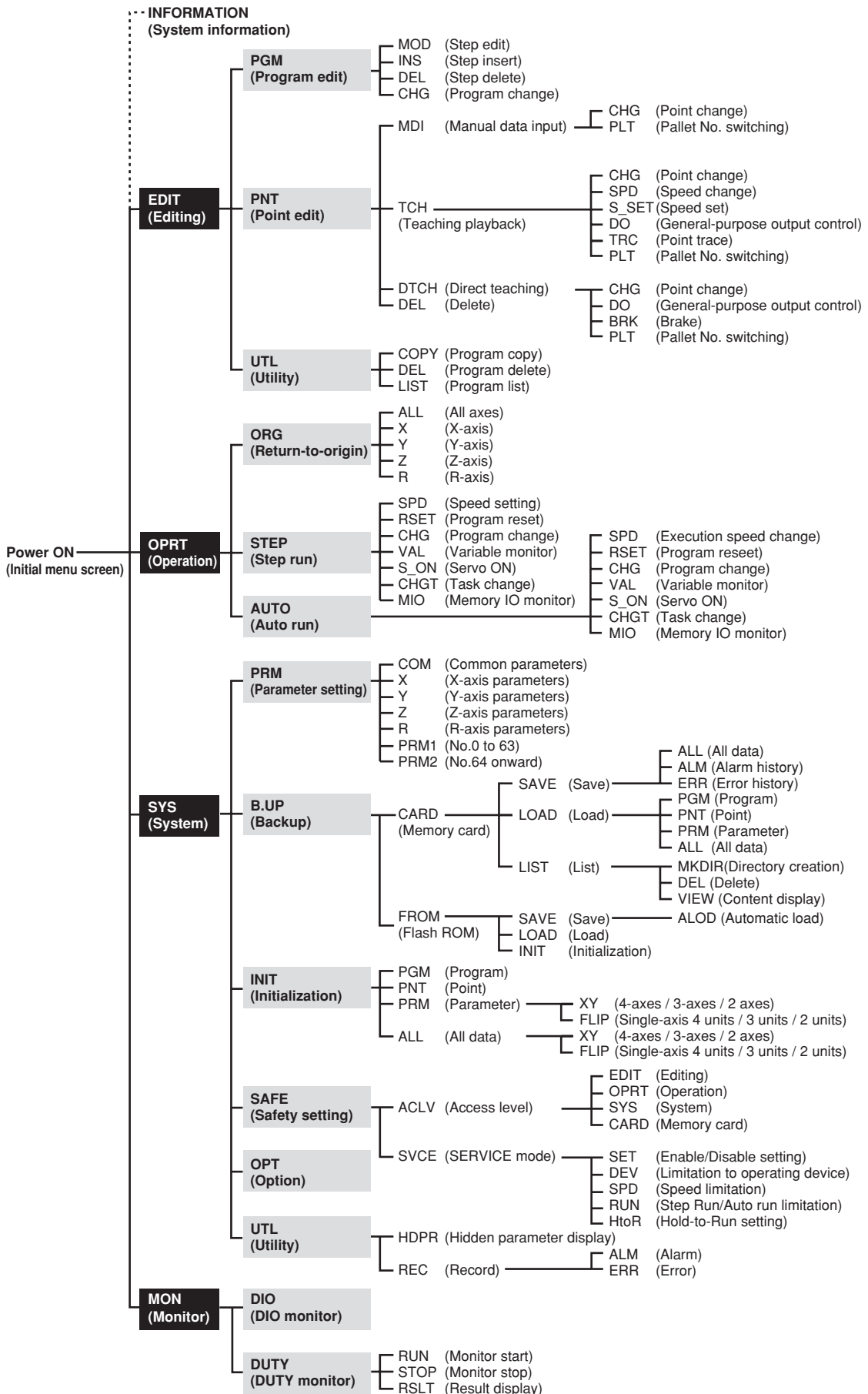

Fig. HPB-E011-001

* The menu hierarchy structure varies according to the controller model and version being used.

4 Using SD Memory Cards

SD memory cards can be used at the HPB to back up controller data.

4.1 Before using an SD memory card

4.1.1 Supported SD memory card type

Only SD memory cards with a "FAT12/16" format can be used. These cards are provided by the customer.

The HPB does not offer the following functions with regard SD memory cards:
- Volume label display & setting function
- Attribute change function
- Format function

A personal computer must be used to format an SD memory card, and for changing attributes.

⚠ **CAUTION**
- **The recommended SD memory card size is "up to 32MB". Using a card size of 64MB or more during format on Windows sometimes causes "FAT32" to appear as the preset value. However, the HPB cannot use FAT32, so always select "FAT" at this time.**
- **The maximum size of the controller data file backed up on the SD memory card is "328KB". The data file size is generally about "64KB" so up to 512 files can be stored on a 32MB memory card.**

4.1.2 Inserting and ejecting an SD memory card

A PUSH-PUSH type (with breakage prevention mechanism for excessive-force ejection) is used for SD memory card insertion and ejection.

■ Inserting the card

Step1 *Insert the SD memory card into the SD memory card slot (connector).*

Inserting the SD memory card (1)
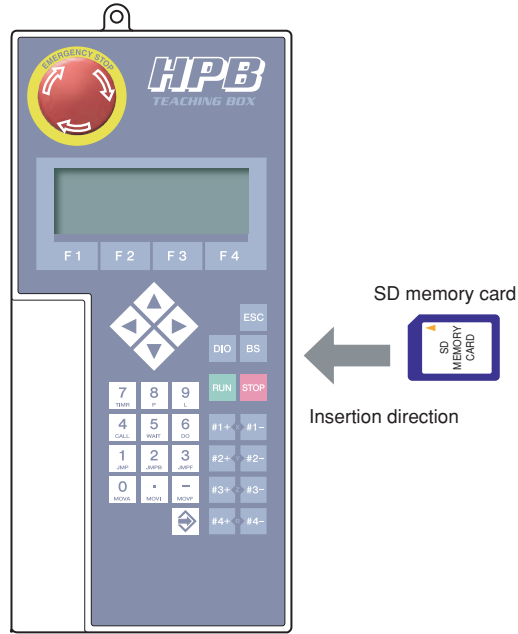

SD memory card

Insertion direction

Fig. HPB-E012-001

Step2 *Push the SD memory card in until a clicking sound is heard, then release it.*

Inserting the SD memory card (2)

Fig. HPB-E012-002
Fig. HPB-E012-003

⚠ **CAUTION**
• **Use care to avoid inserting the SD memory card in a reversed posture.**

■ **Ejecting the card**

Step1 *Push the SD memory card in until a clicking sound is heard, then release it.*

SD memory card ejection (1)

Fig. HPB-E012-003
Fig. HPB-E012-002

Step2 *Remove the SD memory card from the SD memory card slot (connector).*
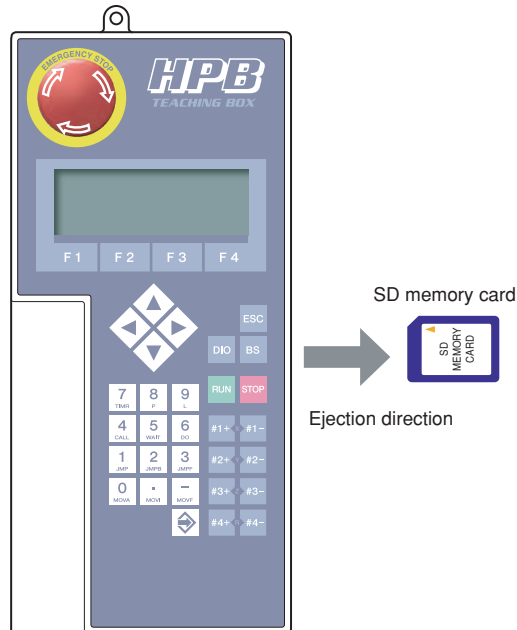
SD memory card ejection (2)

SD memory card

Ejection direction

Fig. HPB-E012-004

4

Using SD Memory Cards

4.1.3 Loading backup data

Backed up data can be loaded to other compatible controller types. Compatibility is indicated by the controller type and version information on the file's first line.

For details concerning the controller type and version checking procedure, see section 4.6 "Displaying SD memory card file content". This controller type and version can also be checked by using the text editor on a personal computer.

VIEW screen

```
[VIEW]                    0
000:S R C [ 1 3 .   6 ]
008:0 1   * *  P  R  M  0
 1 H E X 2 A S C I I
```
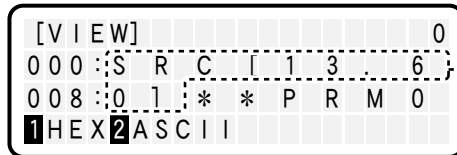
Controller type & version
(this example indicates "SRC[13.60]".

Fig. HPB-E013-001

Data compatibility table (1)

File's 1st line	Controller type															
	SRCA / SRC / ERC	SRCH	DRCA / DRC-R / DRC	DRCH	TRCH 3 axes	TRCH 4 axes	SRCX / ERCX	DRCX	TRCX 2 axes	TRCX 3 axes	TRCX 4 axes	SRCP	SRCD	ERCD	SR1-X	SR1-P
SRC[1.nn] SRC[2.nn] SRC[4.nn]	○	▲					▲					▲	▲	▲	▲	▲
SRC[3.nn]	▲	○					▲					▲	▲	▲	▲	▲
DRC[5.nn] DRC[6.nn] DRC[7.nn]			○	▲				▲								
DRC[8.nn]			▲	○				▲								
TRC3[9.nn]					○					▲						
TRC4[9.nn]						○					▲					
SRC[13.nn]	▲	▲					○					▲	▲	▲	▲	▲
DRC[18.nn]			▲	▲				○								
TRC2[19.nn]									○							
TRC3[19.nn]					▲					○						
TRC4[19.nn]						▲					○					
SRC[24.nn]	▲	▲					▲					○	▲	▲	▲	▲
SRC[24.nnB]	▲	▲					▲					▲	○	▲	▲	▲
SRC[33.nn]	▲	▲					▲					▲	▲	○	▲	▲
SRC[53.nn]	▲	▲					▲					▲	▲	▲	○	▲
SRC[54.nn]	▲	▲					▲					▲	▲	▲	▲	○
Other																

"○" marks indicate that PGM (program data), PNT (point data), PRM (parameter data), ALL (program, point, and parameter data) can all be loaded.

"▲" marks indicate that only PGM (program data) and PNT (point data) can be loaded. PRM (parameter data) and ALL (program, point, and parameter data) cannot be loaded.

[Ex] When "SRC[24.60]" is indicated at the file's 1st line:

↓

PGM (program data), PNT (point data), PRM (parameter data), ALL (program, point, and parameter data) can all be loaded to the SRCP controller.
Only PGM (program data) and PNT (point data) can be loaded to SRC, SRCH, SRCX, SRCD, ERCD, SR1-X, and SR1-P controllers.

[Supplemental Information]

The controller version is not indicated in newly created data (created by using the POPCOM support software) which is loaded to a controller by way of an SD memory card, and the file types are as shown in the table below.

Data compatibility table (2)

File's 1st line	Controller type															
	SRCA / SRC / ERC	SRCH	DRCA / DRC-R / DRC	DRCH	TRCH 3 axes	TRCH 4 axes	SRCX / ERCX	DRCX	TRCX 2 axes	TRCX 3 axes	TRCX 4 axes	SRCP	SRCD	ERCD	SR1-X	SR1-P
SRC	△	△					△					△	△	△	△	△
DRC			△	△				△								
TRC2									△							
TRC3					△					△						
TRC4						△					△					
Other																

"△" marks indicate that PGM (program data) and PNT (point data) can be loaded. When attempting to load PRM (parameter data) and ALL (program, point and parameter data), a warning displays with a message requesting loading confirmation.

[Ex] When "SRC" is indicated at the file's 1st line:

↓

PGM (program data) and PNT (point data) can be loaded to SRC, SRCH, SRCX, SRCP, SRCD, ERCD, SR1-X, and SR1-P controllers. When attempting to load PRM (parameter data) and ALL (program, point, and parameter data), a warning displays with a message requesting loading confirmation.

⚠ **CAUTION**
If incorrect robot data is loaded to the robot controller, this may impair robot controller performance and may also cause failures or malfunctions or errors, so use caution.

4

Using SD Memory Cards

4.2 Saving controller data to an SD memory card

Step1 *Insert an SD memory card in the HPB.*

Step2 *Press* `F3` *(SYS) on the initial menu screen.*
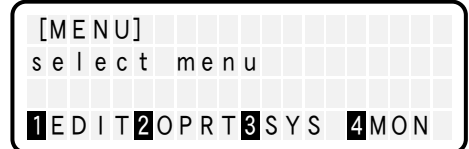*The SYS (system) mode screen appears.*

```
[MENU]
select menu

1EDIT2OPRT3SYS 4MON
```
Fig. HPB-E014-001

Step3 *Press* `F2` *(B.UP).*
The screen changes to the data backup mode.
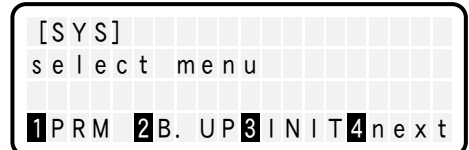
```
[SYS]
select menu

1PRM  2B.UP3INIT4next
```
Fig. HPB-E014-002

Step4 *Press* `F1` *(CARD).*
The screen changes to the memory card mode.
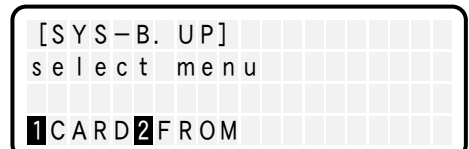
```
[SYS-B.UP]
select menu

1CARD2FROM
```
Fig. HPB-E014-003

Step5 *Press* `F1` *(SAVE).*
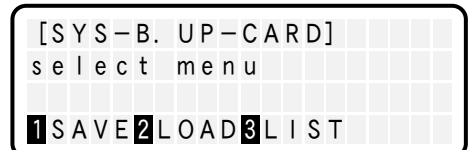
```
[SYS-B.UP-CARD]
select menu

1SAVE2LOAD3LIST
```
Fig HPB-E014-004

Step6 *Specify the data to be saved.*
- *Press* `F1` *(ALL) to save all data (program, point and parameter data).*
- *Press* `F2` *(ALM) to save the alarm history.*
- *Press* `F3` *(ERR) to save the error history.*

```
[CARD-SAVE]
select menu

1ALL  2ALM  3ERR
```
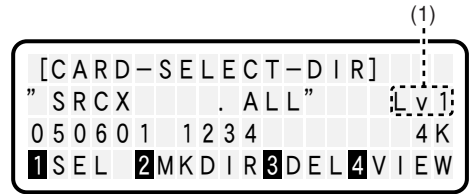Fig. HPB-E014-005

Step7 *Specify the save destination.*

Press [F1] *(SEL) or ◈ to display the data save destination. Data save destinations can be displayed by the following 2 methods.*

• *Saving in the root directory:*

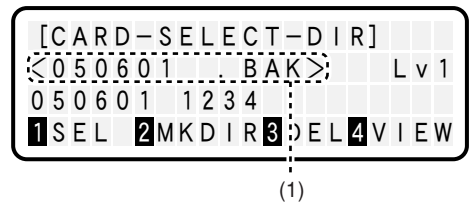* *A "root directory" is the highest level directory in the hierarchy.*

```
[CARD-SELECT-DIR]
" SRCX    . ALL"    Lv1
050601  1234         4K
1SEL 2MKDIR3DEL4VIEW
```

(1) "Lv" indicates the directory level.
   ("Lv1" denotes the root directory.)

Fig. HPB-E014-006

• *Saving in a directory other than the root directory (sub-directory):*

Use the cursor keys (◇▲◇ ◇▼◇ ◇◀◇ ◇▶◇) to specify the hierarchy level where the data is to be saved.

```
[CARD-SELECT-DIR]
<050601 . BAK>    Lv1
050601  1234
1SEL  2MKDIR3DEL4VIEW
```

(1) Directory names are enclosed in angle-brackets (< >).

Fig. HPB-E014-007

```
[CARD-SELECT-DIR]
<..          >    Lv2

1SEL  2MKDIR3DEL4VIEW
```

Fig. HPB-E014-008

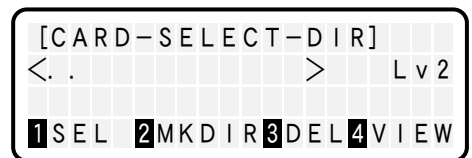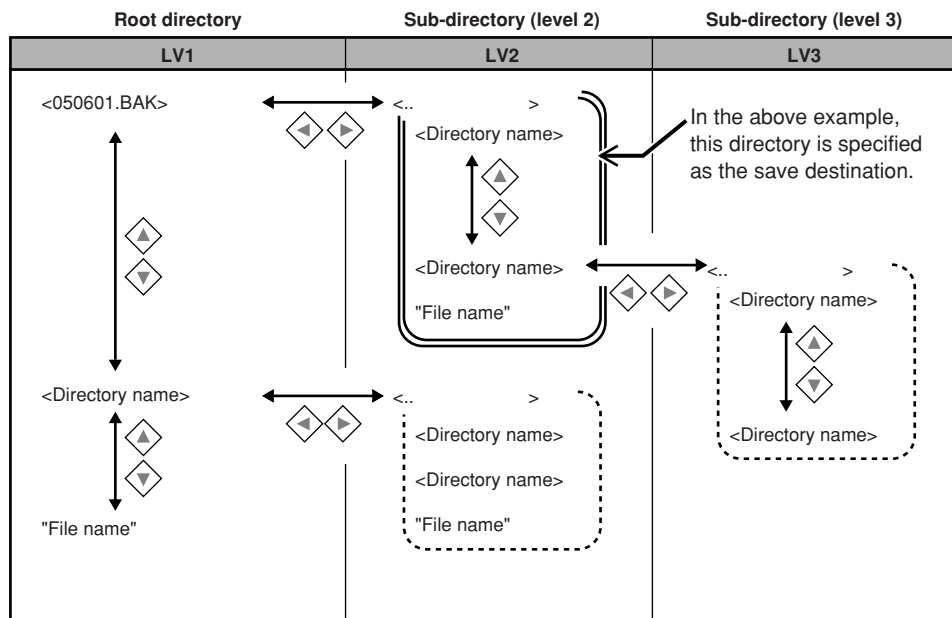| Root directory	Sub-directory (level 2)	Sub-directory (level 3)
LV1	LV2	LV3

• Directory names are enclosed in angle-brackets (< >).

• File names are enclosed in quotation marks (" ").

Fig. HPB-E014-009

Step8 *Assign the file name.*

Enter a file name of up to 8 characters (alphanumeric chars, underscore marks (_), and hyphens (-) are permitted), then press ⬧.
(file extension names are automatically assigned, and need not be entered.)
The character input procedure is described below.

[Character input procedure]
Select the desired alphabetic input characters from the character string displayed on the screen's 3rd line. Key in numerical values and hyphens directly from the number keys.

```
[CARD-SAVE]
  =             . ALL
ABCDEFGHIJKLMNOPQRST
1keyin
```
Fig. HPB-E014-010

To select characters from the screen's 3rd line character string, use the left/right (◀ ▶) cursor keys to move the cursor in 1-character units, or use the up/down (▲ ▼) cursor keys to move the cursor in 10-character units.
When the cursor is positioned at the desired character, press F1 *(keyin).*

```
[CARD-SAVE]
  = SRCX-1  . ALL
FGHIJKLMNOPQRSTUVWXY
1keyin
```
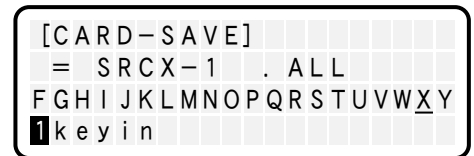Fig. HPB-E014-011i

Step9 *Assign a date to the saved file.*

Use the number keys and the left/right (◀ ▶) cursor keys to enter the date (Western calendar year/month/day) and the time (hour:minutes:seconds).
(The date and time are not entered automatically.)
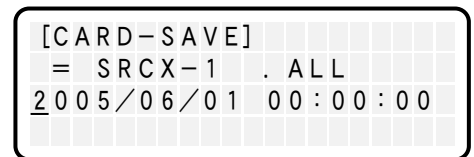*After entering the date and time, press the ⬧ key.*

```
[CARD-SAVE]
  = SRCX-1  . ALL
2005/06/01 00:00:00
```
Fig. HPB-E014-012

Step10 *Press* F1 *(yes) to save the data.*

To abort the data save operation, press F2 *(no).*

```
[CARD-SAVE]
save OK ?

1yes 2no
```
Fig. HPB-E014-013

A "saving…" message displays during the save operation, and "save complete" displays when the operation is completed without error.
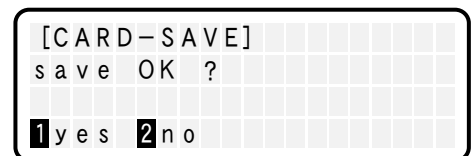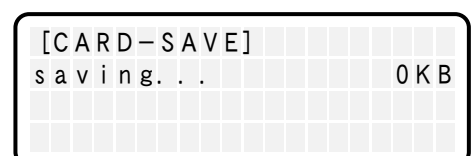
```
[CARD-SAVE]
saving...          0KB

```
Fig. HPB-E014-014

```
[CARD-SAVE]

save complete

```
Fig. HPB-E014-015

⚠ **CAUTION** ───

• **If an alarm occurs during the save operation, the file being written is deleted without being destroyed.**
• **If connection with the controller is severed during the save operation, or if the SD memory card is ejected at that time, the file will be destroyed.**
• **HPB performs file management by the FAT format used on Windows personal computers. Therefore non-contiguous file conditions occur after repeated saves and deletions, possibly reducing the file access speed. If this occurs, back up all files to a Windows personal computer, then copy only the required files.**

💡 NOTE ──

Data is saved in an ASCII format, and it can therefore be used in the POPCOM support software.

4

Using SD Memory Cards

4.3   Loading SD memory card data to the controller

Step1 *Insert an SD memory card in the HPB.*

Step2 *Press* <u>F3</u> *(SYS) on the initial menu screen.*
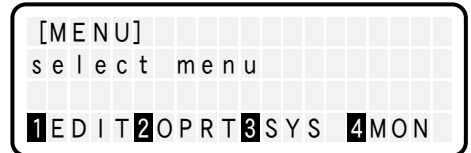*The SYS (system) mode screen appears.*

```
[MENU]
select menu

1EDIT2OPRT3SYS 4MON
```
Fig. HPB-E015-001

Step3 *Press* <u>F2</u> *(B.UP).*
The screen changes to the data backup mode.
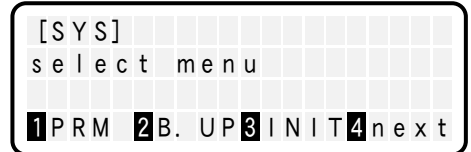
```
[SYS]
select menu

1PRM 2B.UP3INIT4next
```
Fig. HPB-E015-002

Step4 *Press* <u>F1</u> *(CARD).*
The screen changes to the memory card mode.
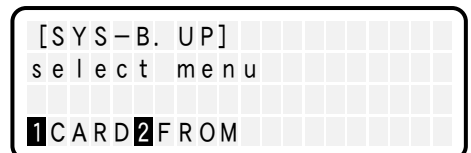
```
[SYS-B.UP]
select menu

1CARD2FROM
```
Fig. HPB-E015-003

Step5 *Press* <u>F2</u> *(LOAD).*
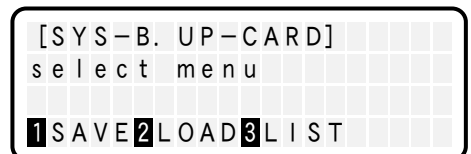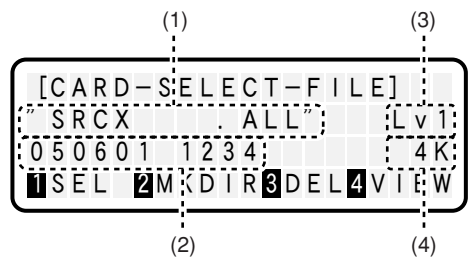
```
[SYS-B.UP-CARD]
select menu

1SAVE2LOAD3LIST
```
Fig. HPB-E015-004

Step6 *Specify the file to be loaded.*
  • *Specifying a file in the root directory:*
   Use the up/down (▲▼) cursor keys to display
   the file to be loaded, then press <u>F1</u> *(SEL) or* ◈*.*

(1)   (3)
```
[CARD-SELECT-FILE]
" SRCX    .ALL"     Lv1
050601  1234          4K
1SEL 2MKDIR3DEL4VIEW
```
(2)   (4)

(1) File names are enclosed in quotation marks (" ").

(2) Indicates the date and time (no "secs." display).
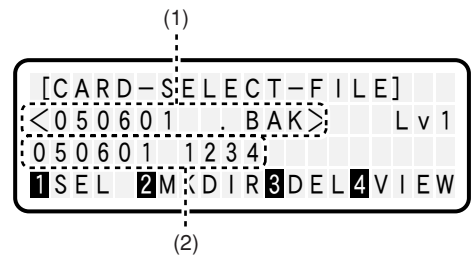
(3) "Lv" denotes the directory hierarchy level.
   ("Lv1" denotes the root directory.)

(4) Indicates the file size (in Kbyte units).

Fig. HPB-E015-005

- ***Specifying a directory (sub-directory) other than the root directory:***

  Use the cursor keys (▲ ▼ ◄ ►) to display the file to be loaded, then press F1 *(SEL) or* ◈*.*

```
[CARD-SELECT-FILE]
<050601   .BAK>    Lv1
050601 1234
1SEL 2MKDIR3DEL4VIEW
```

(1) Directory names are enclosed in angle-brackets (< >).

(2) Indicates the date and time (no "secs." display).

Fig. HPB-E015-006

```
[CARD-SELECT-FILE]
<..            >    Lv2

1SEL 2MKDIR3DEL4VIEW
```
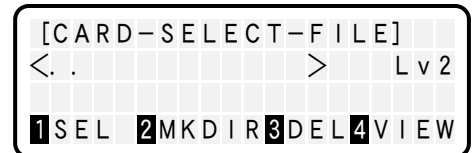
Fig. HPB-E015-007

```
[CARD-SELECT-FILE]
"SRCX-1  .ALL"     Lv2
050601 1300        4K
1SEL 2MKDIR3DEL4VIEW
```

Fig. HPB-E015-008i

Root directory	Sub-directory (level 2)	Sub-directory (level 3)
LV1	**LV2**	**LV3**

In the above example, this file is specified for loading.
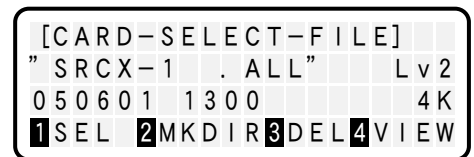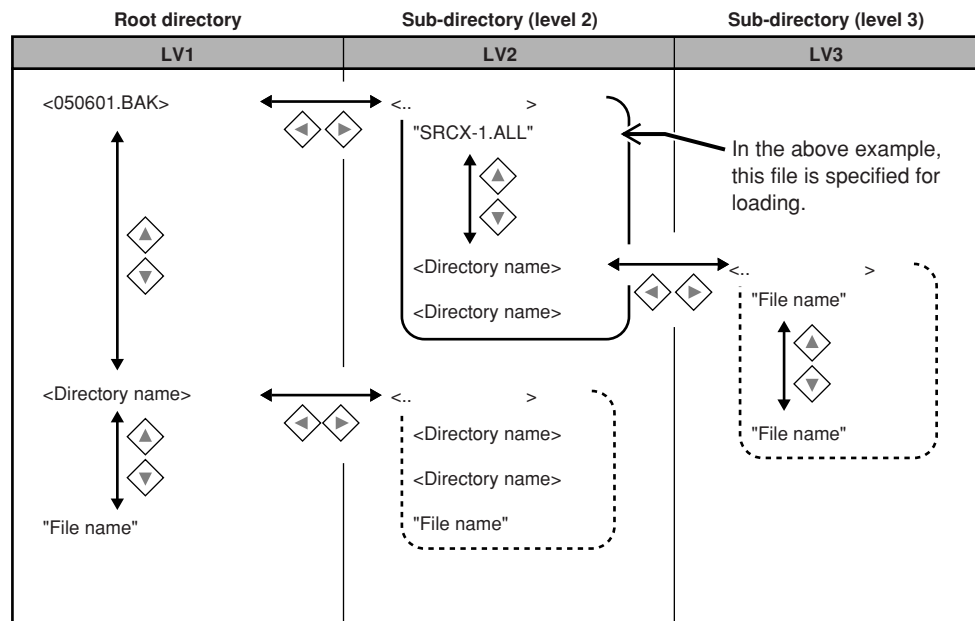
- Directory names are enclosed in angle-brackets (< >).
- File names are enclosed in quotation marks (" ").

Fig. HPB-E015-009

Step7 *Specify the data to be loaded.*

- *To load program data, press* [F1] *(PGM).*
- *To load point data, press* [F2] *(PNT).*
- *To load parameter data, press* [F3] *(PRM).*
- *To load all data (program, point, parameter), press* [F4] *(ALL).*

```
[CARD-LOAD]
select menu

1PGM  2PNT  3PRM  4ALL
```
Fig. HPB-E015-010

Step8 *Check the onscreen message.*

- *An overwrite confirmation message displays only if* [F1] *(PGM) or* [F2] *(PNT) was selected at Step 7.*
- *Press* [F1] *(yes) to retain program and point data which is not redundant.*
- *Press* [F2] *(no) to initialize all controller data, and then load the new data.*
- *If* [F4] *(ALL) was selected at Step 7, the controller's program and point data is initialized, and a load confirmation message displays.*

```
[CARD-LOAD]
program data
over write ?
1yes  2no
```
Fig. HPB-E015-011

Step9 *Press* [F1] *(yes) to load the data.*

Press [F2] *(no) to abort the data loading operation.*

```
[CARD-LOAD]
program data
load OK ?
1yes  2no
```
Fig. HPB-E015-012

A "loading…" message displays while the data is being loaded, and a "load complete" message displays when loading is completed.

```
[CARD-LOAD]
loading...        78%
```
Fig. HPB-E015-013

```
[CARD-LOAD]

load complete
```
Fig. HPB-E015-014

⚠ **CAUTION**
- **Data loading does not occur if the initializing processing fails at Step 8. Moreover, if an error occurs during the data loading operation, the loaded data up to the error occurrence point remains in the controller because initializing occurs before the data loading operation.**
- **Do not eject the SD memory card during a data loading operation.**
- **HPB performs file management by the FAT format used on Windows personal computers. Therefore non-contiguous file conditions occur after repeated saves and deletions, possibly reducing the file access speed. If this occurs, back up all files to a Windows personal computer, then copy only the required files.**
- **If incorrect robot data is loaded to the robot controller, this may impair robot controller performance and may also cause failures or malfunctions or errors, so use caution.**

4.4   Creating directories on the SD memory card

Step 1 *Insert an SD memory card in the HPB.*

Step 2 *Press* F3 *(SYS) on the initial menu screen.*
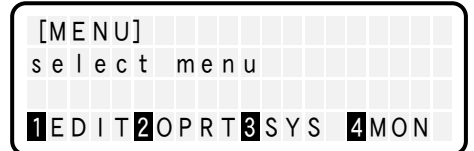
The SYS (system) mode screen appears.

```
[MENU]
select menu

1EDIT2OPRT3SYS 4MON
```
Fig. HPB-E016-001

Step 3 *Press* F2 *(B.UP).*

The screen changes to the data backup mode.
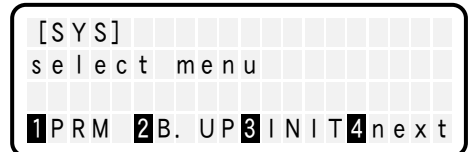
```
[SYS]
select menu

1PRM 2B.UP3INIT4next
```
Fig. HPB-E016-002

Step 4 *Press* F1 *(CARD).*

The screen changes to the memory card mode.
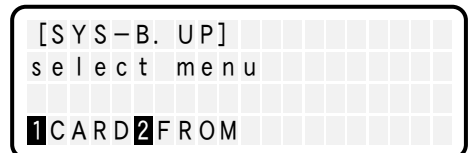
```
[SYS-B.UP]
select menu

1CARD2FROM
```
Fig. HPB-E016-003

Step 5 *Press* F3 *(LIST).*
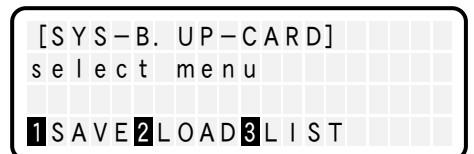
```
[SYS-B.UP-CARD]
select menu

1SAVE2LOAD3LIST
```
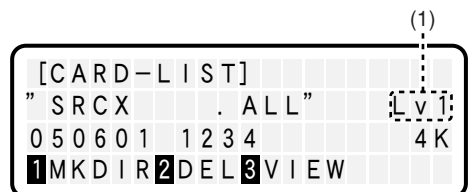Fig. HPB-E016-004

Step 6 *Specify the location where the directory is to be created.*

Display the hierarchy level where the directory is to be created, then press F1 *(MKDIR). The procedure for displaying the hierarchy level where the directory is to be created, is given below.*

- *For creation in the root directory:*

  * *A "root directory" is the highest level directory in the hierarchy.*
  * *An "empty" message displays if there are no files in the SD memory card.*

(1)
```
[CARD-LIST]
"SRCX    .ALL"    Lv1
050601 1234       4K
1MKDIR2DEL3VIEW
```
(1) "Lv" denotes the directory hierarchy level.
    ("Lv1" denotes the root directory.)

Fig. HPB-E016-005

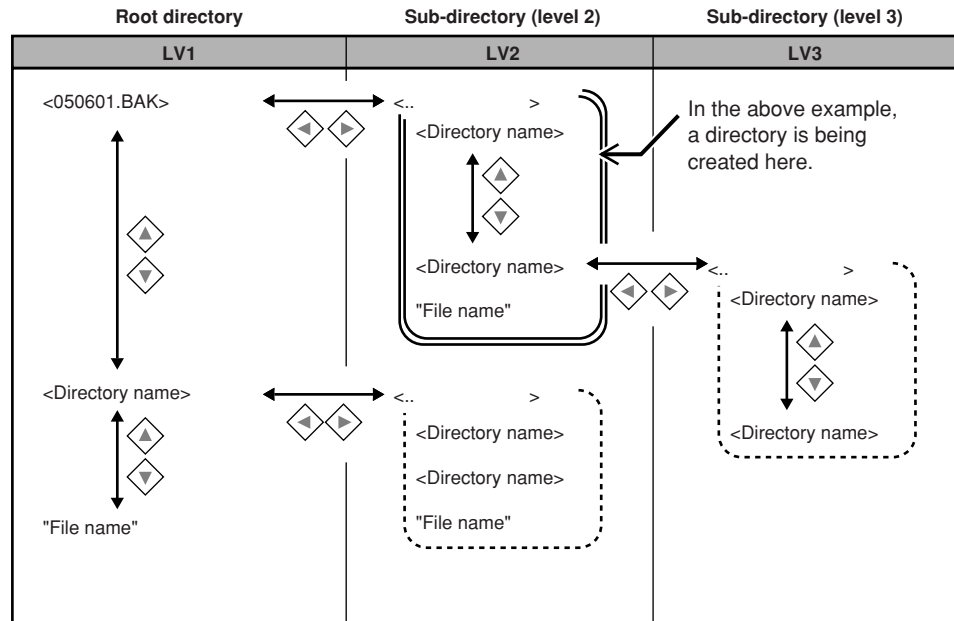• **For creation in a directory other than the root directory (sub-directory):**

Use the cursor keys (▲ ▼ ◄ ►) to specify the hierarchy level where the directory is to be created.

```
[CARD-LIST]
<050601  .BAK>    Lv1
050601  1234
1MKDIR2DEL3VIEW
```

Fig. HPB-E016-006

```
[CARD-LIST]
<..            >    Lv2

1MKDIR2DEL3VIEW
```

Fig. HPB-E016-007

Root directory	Sub-directory (level 2)	Sub-directory (level 3)
LV1	**LV2**	**LV3**

• Directory names are enclosed in angle-brackets (< >).

• File names are enclosed in quotation marks (" ").

Fig. HPB-E016-008

Step7 *Assign a name to the directory.*

Enter a directory name (alphanumeric chars, under-score marks (_), and hyphens (-), and period (.) are permitted), then press ◈.
An 8.3 input format is used (max. 8-character directory name, and 3-character extension name). The character input procedure is described below.

[Character input procedure]
Select the desired alphabetic input characters from the character string displayed on the screen's 3rd line. Key in numerical values, hyphens, and period, directly from the number keys.
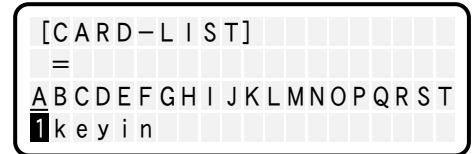
```
[CARD-LIST]
 =
ABCDEFGHIJKLMNOPQRST
1keyin
```
Fig. HPB-E016-009

To select characters from the screen's 3rd line character string, use the left/right (◀ ▶) cursor keys to move the cursor in 1-character units, or use the up/down (▲ ▼) cursor keys to move the cursor in 10-character units.
When the cursor is positioned at the desired charac-ter, press F1 *(keyin).*
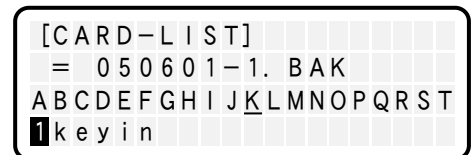
```
[CARD-LIST]
 = 050601-1.BAK
ABCDEFGHIJKLMNOPQRST
1keyin
```
Fig. HPB-E016-010

Step8 *Assign a date to the directory being created.*

Use the number keys and the left/right (◀ ▶) cursor keys to enter the date (Western calendar year/month/day) and the time (hour:minutes:seconds). (The date and time are not entered automatically.) After entering the date and time, press the ◈ key.
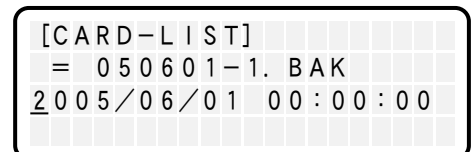
```
[CARD-LIST]
 = 050601-1.BAK
2005/06/01 00:00:00
```
Fig. HPB-E016-011

Step9 *Press* F1 *(yes) to create the directory.*

To abort the data save operation, press F2 *(no). If the directory creation is completed without error, the system returns to the Step 6 screen.*

```
[CARD-LIST]
create ?

1yes 2no
```
Fig. HPB-E016-012

⚠ **CAUTION**
A directory name which already exists in the same directory cannot be assigned as the name of the directory being created.

💡 NOTE
A directory hierarchy level down to level 8 (Lv1 to Lv8) can be selected as the directory creation level.

4.5   Deleting files and directories from the SD memory card

Step1 *Insert an SD memory card in the HPB.*

Step2 *Press* `F3` *(SYS) on the initial menu screen.*
The SYS (system) mode screen appears.

```
[MENU]
s e l e c t   m e n u

1 E D I T 2 O P R T 3 S Y S  4 M O N
```
Fig. HPB-E017-001

Step3 *Press* `F2` *(B.UP).*
The screen changes to the data backup mode.

```
[SYS]
s e l e c t   m e n u

1 P R M  2 B .  U P 3 I N I T 4 n e x t
```
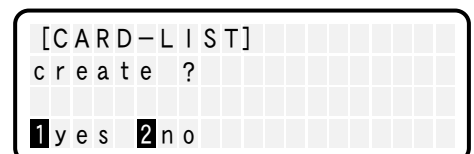Fig. HPB-E017-002

Step4 *Press* `F1` *(CARD).*
The screen changes to the memory card mode.

```
[SYS-B. UP]
s e l e c t   m e n u

1 C A R D 2 F R O M
```
Fig. HPB-E017-003

Step5 *Press* `F3` *(LIST).*

```
[SYS-B. UP-CARD]
s e l e c t   m e n u

1 S A V E 2 L O A D 3 L I S T
```
Fig. HPB-E017-004

Step6 *Select the file or directory to be deleted.*
Use the cursor keys (▲ ▼ ◀ ▶) to display the file or directory to be deleted, then press `F2` *(DEL).*
(A directory cannot be deleted if it contains sub-directories and files. Therefore, deletions should always be performed in ascending order, beginning from the lower hierarchy levels.)

```
[CARD-LIST]
" S R C X - 1   . A L L "       L v 2
0 5 0 6 0 1   1 3 0 0           4 K
1 M K D I R 2 D E L 3 V I E W
```
Fig. HPB-E017-005

Step7 *Press* `F1` *(yes) to delete the file or directory.*
Press `F2` *(no) to abort the deletion operation.*
If the deletion is completed without error, the system returns to the Step 6 screen.

```
[CARD-LIST]
d e l e t e  ?

1 y e s   2 n o
```
Fig. HPB-E017-006

⚠ **CAUTION**

- **A directory cannot be deleted if it contains sub-directories and files. Therefore, deletions should always be performed in ascending order, beginning from the lower hierarchy levels.**
- **Although system files and hidden files can be displayed, they cannot be deleted. This applies to read-only files, as well.**
- **HPB performs file management by the FAT format used on Windows personal computers. Therefore non-contiguous file conditions occur after repeated saves and deletions, possibly reducing the file access speed. If this occurs, back up all files to a Windows personal computer, then copy only the required files.**

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Using SD Memory Cards

4.6   Displaying SD memory card file content

Step1 *Insert an SD memory card in the HPB.*

Step2 *Press* [F3] *(SYS) on the initial menu screen.*
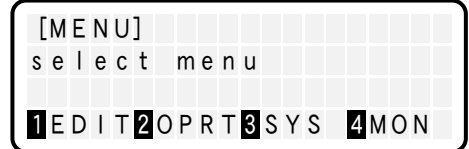*The SYS (system) mode screen appears.*

```
[MENU]
select menu

1EDIT2OPRT3SYS 4MON
```
Fig. HPB-E018-001

Step3 *Press* [F2] *(B.UP).*
The screen changes to the data backup mode.
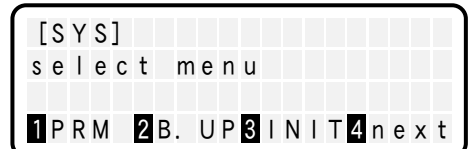
```
[SYS]
select menu

1PRM 2B.UP3INIT4next
```
Fig. HPB-E018-002

Step4 *Press* [F1] *(CARD).*
The screen changes to the memory card mode.
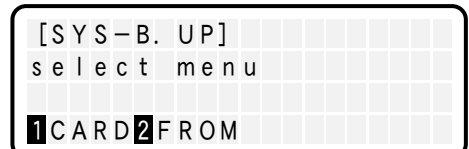
```
[SYS-B.UP]
select menu

1CARD2FROM
```
Fig. HPB-E018-003

Step5 *Press* [F3] *(LIST).*
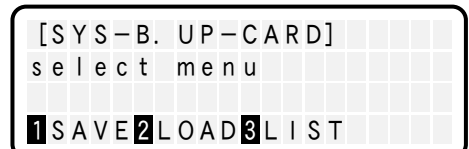
```
[SYS-B.UP-CARD]
select menu

1SAVE2LOAD3LIST
```
Fig. HPB-E018-004

Step6 *Specify the file with the content to be displayed.*
Use the cursor keys (△ ▽ ◁ ▷) to display the file name, then press [F3] *(VIEW) to display its content.*

(1)

```
[CARD-LIST]
"SRCX-1  .ALL"      Lv2
050601 1300          4K
1MKDIR2DEL3VIEW
```
(2)   (3)
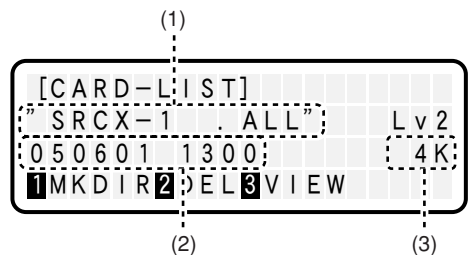
(1) File names are enclosed in quotation marks (" ").
(2) Indicates the date and time (no "secs." display).
(3) Indicates the file size (in Kbyte units).

Fig. HPB-E018-005

Step7 *Display the file content.*

The file content displays in ASCII code.

For a hexadecimal display, press `F1` *(HEX).*

To switch from a hexadecimal display to an ASCII display, press `F2` *(ASCII).*

(1)   (2)

```
[VIEW]                    0
000:S  R  C  [  1  3  .  6
008:0  ]  *  *  P  R  M  0
1HEX 2ASCII
```

```
[VIEW]                    0
000:53 52 43 5B 31 33 2E 36
008:30 5D 0D 0A 50 52 4D 30
1HEX 2ASCII
```
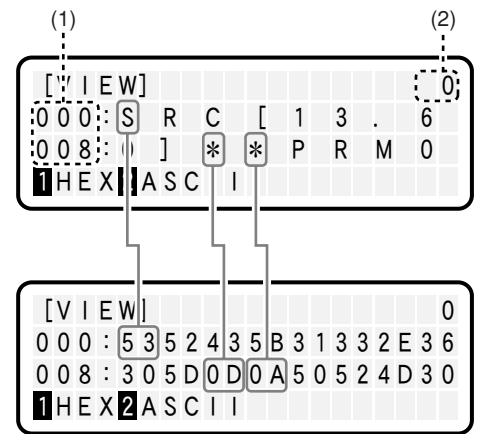
(1) The first character position of the displayed character string displays in hexadecimal code.

(2) First character position of the displayed character string (in the above example, "S" is the 0 character position.)

Fig. HPB-E018-006

NOTE

An ASCII code display comprises 0x20 to 0x7E and 0xA1 to 0xDF, with all others displaying as asterisks (*).

4

Using SD Memory Cards

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5 Error and Alarm

An error No. and message display on the HPB screen if an error occurs due to inappropriate operation (operator error). An alarm No. and alarm message display in the event of a system problem. For details concerning the content of error and alarm messages, refer to the user's manual for the controller in question.

Only error messages display (no error No.) for HPB related errors. (See section 5.1 "HPB error message list".)

Examples of error and alarm messages which display on the HPB screen are given below.

Error message example

Error number   Error message

```
[EDIT]
select menu
43:cannot find PGM
1PGM 2PNT 3UTL
```
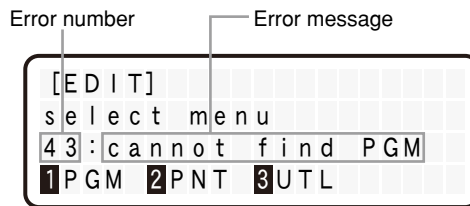
Fig. HPB-E019-001

Alarm message example

Alarm number   Alarm message

```
[STEP]

32:origin incomplete
```
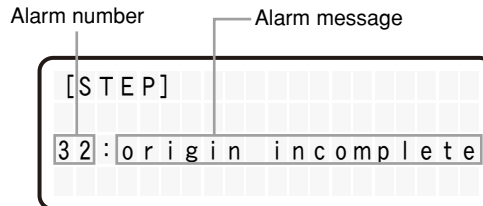
Fig. HPB-E019-002

Example of HPB related error message

Error message

```
[CARD]
card detect...
card write protected
1SAVE2LOAD3LIST
```

Fig. HPB-E019-003

5.1   HPB error message list

Only error messages display (no error No.) for HPB related errors. The HPB related error messages are listed below, together with the corrective actions.

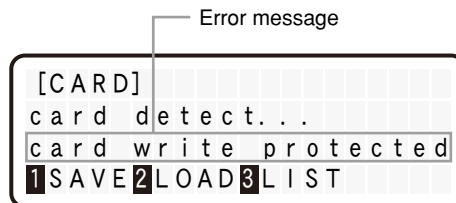| Message	SIO error
Meaning	(1) HPB was connected while a dedicated command input was ON.
	(2) No response from controller.
	(3) HPB is connected to an incompatible controller.
Corrective Action	(1) Turn all dedicated command inputs OFF before connecting the HPB.
	(2) Reconnect the HPB, or restart the controller.
	(3) Upgrade the HPB version.
Message	card not exist
Meaning	No SD memory card.
Corrective Action	Insert an SD memory card into the SD memory card slot (connector).
Message	card failed
Meaning	Detection of SD memory card failed.
Corrective Action	• Eject the SD memory card, re-insert it, then try the operation again.
	• Perform a "chkdsk" operation from the command prompt of a Windows personal computer.
Message	card failed (FAT)
Meaning	The SD memory card format is other than FAT (12 or 16).
Corrective Action	Perform FAT formatting of the SD memory card on a Windows personal computer.
	* Formats other than FAT (12 or 16) cannot be used.
Message	card full
Meaning	No space available for file creation on the SD memory card.
Corrective Action	Delete unnecessary files; use a new SD memory card; use sub-directories.
Message	card empty
Meaning	There are no files or sub-directories on the SD memory card.
Corrective Action	Use a Windows personal computer to check the card for the presence of files and sub-directories.
Message	card write protected
Meaning	The SD memory card's "write protect" switch is set to "write prohibit".
Corrective Action	Set the SD memory card's "write protect" switch to "write enable".
Message	card read error
Meaning	SD memory card reading failed.
Corrective Action	• If the SD memory card was ejected during loading (LOAD) or content display (VIEW), repeat the operation.
	• If the SD memory card was ejected during a save (SAVE), directory creation (MKDIR), or file/sub-directory deletion (DEL) operation, the file system will be destroyed. Therefore, perform a "chkdsk/f" operation without delay from the command prompt of a Windows personal computer.

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Error and Alarm

Message	card write error
Meaning	SD memory card writing failed.
Corrective Action	• If the memory card became full during a save (SAVE) operation, the most recently saved file will be incomplete. Delete this file and other unnecessary files, or insert a new SD memory card, then repeat the save operation. • If the memory card became full during a directory creation (MKDIR) operation, either delete unnecessary files or insert a new SD memory card, then repeat the directory creation operation. • If the SD memory card was ejected during a save (SAVE), directory creation (MKDIR), or file/sub-directory deletion (DEL) operation, the file system will be destroyed. Therefore, perform a "chkdsk/f" operation without delay from the command prompt of a Windows personal computer.
Message	access denied
Meaning	The following items cannot be deleted: the sub-directories themselves (<.. >), directories which contain data, system files/directories, hidden files/directories, read-only files/directories.
Corrective Action	• Delete all the files in a sub-directory before deleting (DEL) that sub-directory. • Use a Windows personal computer to check the memory card for the presence of files and directories, then change the "system", "hidden", or "read-only" attribute.
Message	name already exist
Meaning	An existing file or sub-directory name was specified.
Corrective Action	Specify a different name.
Message	file empty
Meaning	The file is empty.
Corrective Action	Use another file.
Message	no data loaded
Meaning	The specified data type does not exist in the file.
Corrective Action	• Specify another file at the loading (LOAD) operation. • Specify another data type at the loading (LOAD) operation.
Message	cannot access
Meaning	An access level prohibited operation occurred.
Corrective Action	Change the access level.

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Error and Alarm

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6 Troubleshooting

The corrective actions for HPB problems are explained in this chapter.

6.1 Problems and corrective actions

When an HPB problem occurs, take the appropriate corrective action with reference to the table below. If the problem persists after the corrective action has been taken, contact (without delay) our sales office or sales representative.

| No.	Problem	Probable Cause	Corrective Action
1	A beeping sound fails to occur when HPB is connected, and nothing displays on the LCD screen.	1) The 9-25pin conversion adapter is not being used. 2) The HPB connection cable has been extended using a commercially available communication cable. 3) The HPB connection cable is defective.	• Use the 9-25pin conversion adapter. • Connect the HPB directly to the controller (do not use a commercially available communication cable). • Replace the HPB. • If there is an open-circuit in the cable, contact our sales office or representative.
2	Robot fails to stop when Emergency Stop button is pressed.	1) The 9-25pin conversion adapter is not being used. 2) The HPB connection cable has been extended using a commercially available communication cable. 3) The HPB connection cable is defective.	• Use the 9-25pin conversion adapter. • Connect the HPB directly to the controller (do not use a commercially available communication cable). • Replace the HPB. • If there is an open-circuit in the cable, contact our sales office or representative.

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7   Specifications

7.1   HPB specifications

Item		Specification
Basic specifications	Outer dimensions	W107 × H230 × D53mm (not including strap holder and emergency stop button)
	Weight	650g
	Power consumption	5V, 200mA or less
	Power supply	DC 12V (supplied from controller)
	Cable length	3.5m
External inputs/outputs	Interface	RS-232C 1CH (dedicated for communication with controller)
	Display	Monochrome LCD, 20 chars. × 4 lines
	Operation keys	Membrane sheet keys
	Emergency Stop button	Normally closed contact (with lock function)
	Auxiliary memory device	SD memory card (FAT 12/16 format)
General specifications	Ambient operating temperature	0 to +40°C
	Ambient storage temperature	-10 to +65°C
	Ambient operating humidity	35 to 85% RH (no condensation)
	Noise immunity	Conforms to IEC61000-4-4 level 2
Others	Compatible controllers	Compatible with all controllers where TPB use is possible.

7.2 Dimensions

Dimensional outlines

Units: mm
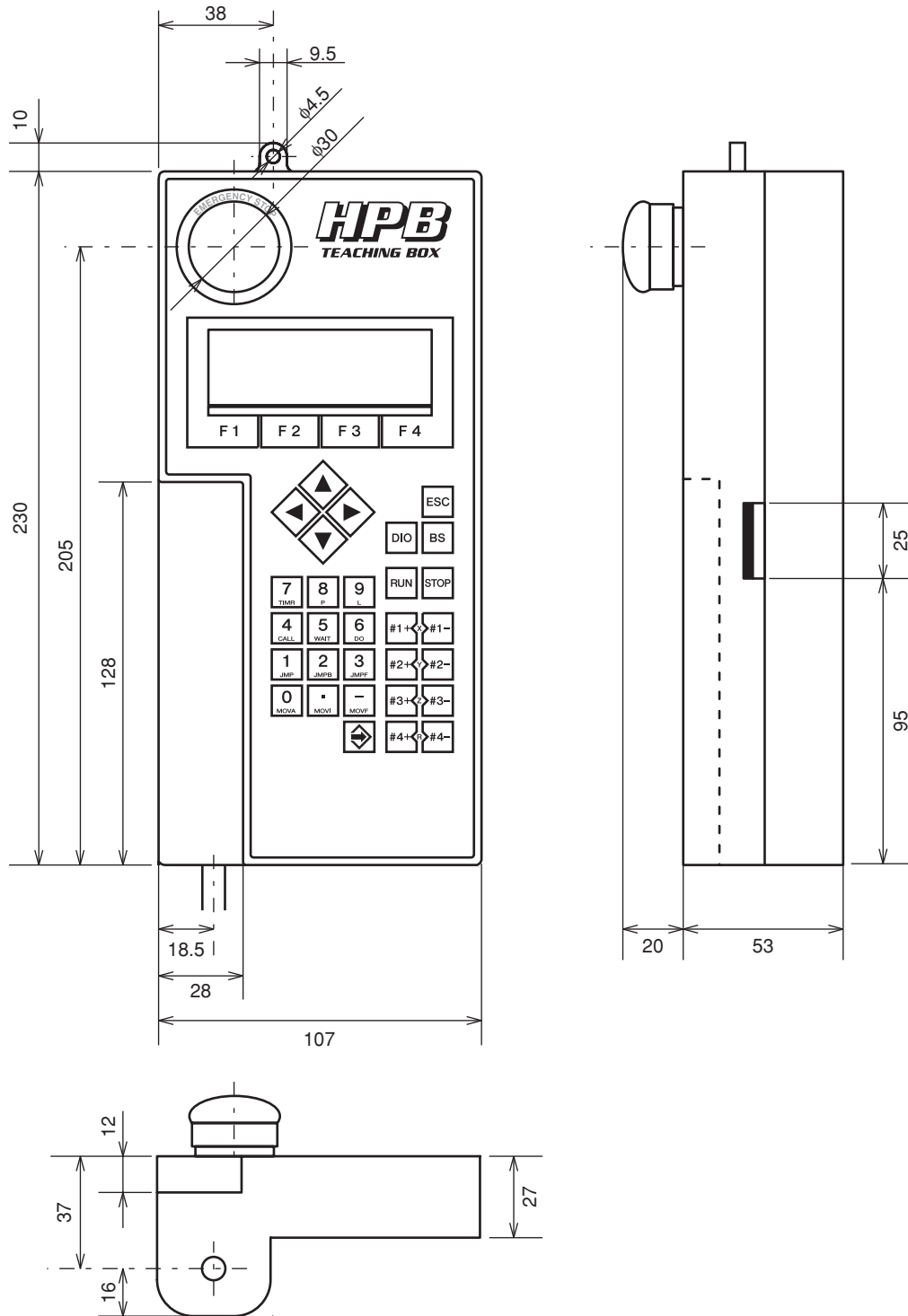
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Revision record

Manual version	Issue date	Description
Ver. 1.00	Jun. 2005	English manual Ver. 1.00 is based on Japanese manual Ver. 1.00.
Ver. 1.01	Oct. 2005	English manual Ver. 1.01 is based on Japanese manual Ver. 1.01.
Ver. 1.02	Feb. 2006	English manual Ver. 1.02 is based on Japanese manual Ver. 1.02.
Ver. 1.03	Jul. 2007	English manual Ver. 1.03 is based on Japanese manual Ver. 1.03.
Ver. 1.04	Oct. 2007	English manual Ver. 1.04 is based on Japanese manual Ver. 1.04.

Supplement User's Manual

YAMAHA **HPB**
Programming Box

Oct. 2007
Ver. 1.04
This manual is based on Ver. 1.04 of Japanese manual.

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IM Operations