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.
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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.

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

1.2 Part names and functions

**HPB unit**

- **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 display here.

- **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.

**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.

---

**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 than the ERCD.

### 9-25pin conversion adapter

This adapter is required when connecting the HPB to controller types other than the ERCD.

#### HPB side

<table>
<thead>
<tr>
<th>Signal name</th>
<th>Pin No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>HSTCHK</td>
<td>1</td>
</tr>
<tr>
<td>RXD</td>
<td>2</td>
</tr>
<tr>
<td>TXD</td>
<td>3</td>
</tr>
<tr>
<td>+12V</td>
<td>4</td>
</tr>
<tr>
<td>GND</td>
<td>5</td>
</tr>
<tr>
<td>HSESC2</td>
<td>6</td>
</tr>
<tr>
<td>RTS</td>
<td>7</td>
</tr>
<tr>
<td>CTS</td>
<td>8</td>
</tr>
<tr>
<td>HSESC1(+24V)</td>
<td>9</td>
</tr>
<tr>
<td>SHELL</td>
<td></td>
</tr>
</tbody>
</table>

#### Controller side

<table>
<thead>
<tr>
<th>Signal name</th>
<th>Pin No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>HSTCHK</td>
<td>12</td>
</tr>
<tr>
<td>RXD</td>
<td>3</td>
</tr>
<tr>
<td>TXD</td>
<td>2</td>
</tr>
<tr>
<td>+12V</td>
<td>10</td>
</tr>
<tr>
<td>D.G</td>
<td>7</td>
</tr>
<tr>
<td>HSESC2</td>
<td>21</td>
</tr>
<tr>
<td>RTS</td>
<td>4</td>
</tr>
<tr>
<td>CTS</td>
<td>5</td>
</tr>
<tr>
<td>HSESC1(+24V)</td>
<td>18</td>
</tr>
<tr>
<td>F.G.</td>
<td>1</td>
</tr>
<tr>
<td>SHELL</td>
<td></td>
</tr>
</tbody>
</table>

**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.)

- Do not attempt to extend the shorting wire between pins 14 and 15.
● 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)**

<table>
<thead>
<tr>
<th>Pin No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
</tr>
<tr>
<td>2</td>
</tr>
<tr>
<td>...</td>
</tr>
<tr>
<td>14</td>
</tr>
<tr>
<td>15</td>
</tr>
</tbody>
</table>

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

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

<table>
<thead>
<tr>
<th>Pin No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
</tr>
<tr>
<td>2</td>
</tr>
<tr>
<td>3</td>
</tr>
<tr>
<td>4</td>
</tr>
<tr>
<td>...</td>
</tr>
<tr>
<td>15</td>
</tr>
</tbody>
</table>

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.

---

**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

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.
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**

**Step 1** 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**

![Diagram showing HPB connection to ERCD]

**Step 2** Turn the ERCD controller power ON.

A buzzer sounds for approximately 1 second, then the initial menu screen displays.
2 Connecting and Disconnecting the HPB

Step 3 Verify that the initial menu screen displays.

Initial menu screen

![Initial menu screen](image)

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

Step 1 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

![HPB connection to ERCD](image)

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

Initial menu screen

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.

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

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

HPB connection to ERCX
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.

Step 2: Verify that the initial menu screen displays.

Initial menu screen

```
[MENU]
select menu
```

Fig. HPB-E004-003
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.
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**

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**

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 a 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.

**Step 2** Turn the controller power ON.
A buzzer sounds for approximately 1 second, then the initial menu screen displays.
Step 3 Verify that the initial menu screen displays.

Initial menu screen

![Initial menu screen](image)

When controller power is ON

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

Step 1 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

![HPB connection to SRCX](image)
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

![Initial menu screen](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.

**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.
### Basic Operations

#### 3.1 HPB control keys

The HPB control keys are divided into 2 main groups, as shown below.

The key functions are described below.

**1. Function keys**

<table>
<thead>
<tr>
<th>HPB Keys</th>
<th>Description</th>
<th>TPB Keys</th>
</tr>
</thead>
<tbody>
<tr>
<td>F1 ~ F4</td>
<td>Selects modes displayed at the bottom line of the display, and executes commands. The key numbers correspond to the mode and command numbers.</td>
<td>F1 ~ F4</td>
</tr>
</tbody>
</table>

**2. Data entry / operation keys**

<table>
<thead>
<tr>
<th>HPB Keys</th>
<th>Description</th>
<th>TPB Keys</th>
</tr>
</thead>
<tbody>
<tr>
<td>RUN</td>
<td>Starts robot operation in accordance with the selected program and parameters.</td>
<td>RUN</td>
</tr>
<tr>
<td>STOP</td>
<td>Stops the robot operation which is in progress. Operation can be resumed by pressing STOP again.</td>
<td>STOP</td>
</tr>
<tr>
<td>CHG</td>
<td>Selects the axis when controlling 3 or more axes. There is no CHG key on the HPB. Instead, the following keys are provided.</td>
<td>CHG</td>
</tr>
</tbody>
</table>

- Not available on HPB

<table>
<thead>
<tr>
<th>Operation Description</th>
<th>HPB</th>
</tr>
</thead>
<tbody>
<tr>
<td>Switches the axis during point data editing operations.</td>
<td>CHG</td>
</tr>
<tr>
<td>DIO monitor switching.</td>
<td>DIO</td>
</tr>
</tbody>
</table>

| DIO | Displays the DIO monitor. | DIO |
### Basic Operations

<table>
<thead>
<tr>
<th>Key</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>0 ~ 9</td>
<td>Numerical input keys.</td>
</tr>
<tr>
<td>.</td>
<td>Symbol input keys.</td>
</tr>
<tr>
<td>TIMR</td>
<td>Robot language input keys (used the robot language editing screen in the</td>
</tr>
<tr>
<td>MOVF</td>
<td>program editing mode).</td>
</tr>
<tr>
<td></td>
<td>Moves the robot in the plus and minus directions within an X, Y, Z, R</td>
</tr>
<tr>
<td></td>
<td>coordinate system.</td>
</tr>
<tr>
<td></td>
<td>For screen left/right scrolling, and cursor left/right movement.</td>
</tr>
<tr>
<td></td>
<td>For scrolling through displayed parameter and point numbers.</td>
</tr>
<tr>
<td>ESC</td>
<td>Returns to the previous mode or screen.</td>
</tr>
<tr>
<td>BS</td>
<td>(BackSpace) Moves the editing cursor one space back at numerical input</td>
</tr>
<tr>
<td></td>
<td>operations, and erases that entry.</td>
</tr>
<tr>
<td>PRINT</td>
<td>Registers an entered value.</td>
</tr>
</tbody>
</table>
3.2 HPB and TPB key layout differences

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

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 $\phi$ 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.

**Step 1** 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.

```
1 EDIT (Editing)  2 OPRT (Operation)  3 SYS (System)  4 MON (Monitor)
```

![Fig. HPB-E010-001](image)

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

**Step 2** 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 $F_2$ (OPRT) key was pressed to select the OPRT (operation) mode. The following 3 sub-modes can be selected from the OPRT mode.

```
1 ORG (Return-to-origin)  2 STEP (Step operation)  3 AUTO (Automatic operation)
```

![Fig. HPB-E010-002](image)

**Step 3** 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 $F_2$ (STEP) key was pressed to select the STEP mode.

![Fig. HPB-E010-003](image)

NOTE
The [4 next] item displays at the right end of the bottom line when there are 5 or more selectable menu items. The $F_4$ key can then be pressed to display the next set of menu items. Press $F_4$ to return to the previous set of menu items.
Step 4 Use the same procedure to select the next mode.

In the example shown at right, the STEP mode screen’s \( F_3 \) (CHG) key was pressed to select the program changing mode. The desired value can then be entered at the cursor ( _) position.

Step 5 Enter the desired program No.

Use the number keys to enter the desired program No., then press the \( F \) key to select that program.

NOTE

Press the \( \text{ESC} \) key to return to the previous screen, or to return to the next higher hierarchy level.
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.

* 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

**Step 1** Insert the SD memory card into the SD memory card slot (connector).

Inserting the SD memory card (1)

**Step 2** Push the SD memory card in until a clicking sound is heard, then release it.

Inserting the SD memory card (2)

---

**CAUTION**

- Use care to avoid inserting the SD memory card in a reversed posture.
■ Ejecting the card

**Step 1** Push the SD memory card in until a clicking sound is heard, then release it.

**SD memory card ejection (1)**

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

**SD memory card ejection (2)**
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**

![File's 1st line](image)

**Controller type & version**

(this example indicates "SRC[13.60]."

**Data compatibility table (1)**

<table>
<thead>
<tr>
<th>File's 1st line</th>
<th>Controller type</th>
</tr>
</thead>
<tbody>
<tr>
<td>SRC[1.nn]</td>
<td>○</td>
</tr>
<tr>
<td>SRC[2.nn]</td>
<td></td>
</tr>
<tr>
<td>SRC[4.nn]</td>
<td></td>
</tr>
<tr>
<td>SRC[3.nn]</td>
<td></td>
</tr>
<tr>
<td>DRC[5.nn]</td>
<td>▲</td>
</tr>
<tr>
<td>DRC[6.nn]</td>
<td></td>
</tr>
<tr>
<td>DRC[7.nn]</td>
<td></td>
</tr>
<tr>
<td>DRC[8.nn]</td>
<td>▲</td>
</tr>
<tr>
<td>TRC3[9.nn]</td>
<td></td>
</tr>
<tr>
<td>TRC4[9.nn]</td>
<td></td>
</tr>
<tr>
<td>SRC[13.nn]</td>
<td>▲</td>
</tr>
<tr>
<td>DRC[18.nn]</td>
<td>▲</td>
</tr>
<tr>
<td>TRC2[19.nn]</td>
<td></td>
</tr>
<tr>
<td>TRC3[19.nn]</td>
<td></td>
</tr>
<tr>
<td>TRC4[19.nn]</td>
<td></td>
</tr>
<tr>
<td>SRC[24.nn]</td>
<td></td>
</tr>
<tr>
<td>SRC[24.nnB]</td>
<td></td>
</tr>
<tr>
<td>SRC[33.nn]</td>
<td></td>
</tr>
<tr>
<td>SRC[53.nn]</td>
<td>▲</td>
</tr>
<tr>
<td>SRC[54.nn]</td>
<td>▲</td>
</tr>
</tbody>
</table>

*“○” 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)

<table>
<thead>
<tr>
<th>File's 1st line</th>
<th>Controller type</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>SRC</td>
</tr>
<tr>
<td>SRC</td>
<td>Δ</td>
</tr>
<tr>
<td>DRC</td>
<td></td>
</tr>
<tr>
<td>TRC2</td>
<td></td>
</tr>
<tr>
<td>TRC3</td>
<td></td>
</tr>
<tr>
<td>TRC4</td>
<td></td>
</tr>
<tr>
<td>Other</td>
<td></td>
</tr>
</tbody>
</table>

"Δ" 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.
4.2 Saving controller data to an SD memory card

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

**Step 2** Press (SYS) on the initial menu screen.

The SYS (system) mode screen appears.

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

The screen changes to the data backup mode.

**Step 4** Press (CARD).

The screen changes to the memory card mode.

**Step 5** Press (SAVE).

**Step 6** Specify the data to be saved.
- Press (ALL) to save all data (program, point and parameter data).
- Press (ALM) to save the alarm history.
- Press (ERR) to save the error history.
Step 7 Specify the save destination.

Press \# (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.

- **Saving in a directory other than the root directory (sub-directory):**
  Use the cursor keys (\upa, \dow, \right, \left) to specify the hierarchy level where the data is to be saved.

![Diagram](image1)

![Diagram](image2)

- **Directory names are enclosed in angle-brackets (< >).**
- **File names are enclosed in quotation marks (" ").**
**Step 8** Assign the file name.

Enter a file name of up to 8 characters (alphanumeric chars, underscore marks ( _ ), and hyphens ( - ) are permitted), then press \[\text{OK}\].

(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.

To select characters from the screen’s 3rd line character string, use the left/right ((\(\text{\textdownarrow}\)\(\text{\textuparrow}\))) cursor keys to move the cursor in 1-character units, or use the up/down ((\(\text{\textrightarrow}\)\(\text{\textleftarrow}\))) cursor keys to move the cursor in 10-character units.

When the cursor is positioned at the desired character, press \[\text{F1} \] (keyin).

**Step 9** Assign a date to the saved file.

Use the number keys and the left/right ((\(\text{\textdownarrow}\)\(\text{\textuparrow}\))) 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 \[\text{OK}\] key.

**Step 10** Press \[\text{F5} \] (yes) to save the data.

To abort the data save operation, press \[\text{F2} \] (no).

A "saving..." message displays during the save operation, and "save complete" displays when the operation is completed without error.
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.
4.3 Loading SD memory card data to the controller

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

**Step 2** Press \[ F_3 \] (SYS) on the initial menu screen.

The SYS (system) mode screen appears.

**Step 3** Press \[ F_2 \] (B.UP).

The screen changes to the data backup mode.

**Step 4** Press \[ F_1 \] (CARD).

The screen changes to the memory card mode.

**Step 5** Press \[ F_2 \] (LOAD).

**Step 6** Specify the file to be loaded.

- Specifying a file in the root directory:
  Use the up/down (\[ \text{\textarrowup} \text{\textarrowdown} \]) cursor keys to display the file to be loaded, then press \[ F_1 \] (SEL) or \[ \text{DEL} \].

(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).
### Using SD Memory Cards

#### 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 **Del**.

1. Directory names are enclosed in angle-brackets (`< >`).
2. Indicate the date and time (no "secs." display).

<table>
<thead>
<tr>
<th>Root directory</th>
<th>Sub-directory (level 2)</th>
<th>Sub-directory (level 3)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>LV1</strong></td>
<td><strong>LV2</strong></td>
<td><strong>LV3</strong></td>
</tr>
<tr>
<td><code>&lt;050601.BAK&gt;</code></td>
<td><code>...</code></td>
<td><code>...</code></td>
</tr>
<tr>
<td><code>&lt;Directory name&gt;</code></td>
<td><code>&lt;Directory name&gt;</code></td>
<td><code>&lt;Directory name&gt;</code></td>
</tr>
<tr>
<td><code>&lt;Directory name&gt;</code></td>
<td><code>...</code></td>
<td><code>&lt;Directory name&gt;</code></td>
</tr>
<tr>
<td><code>&quot;File name&quot;</code></td>
<td><code>&lt;Directory name&gt;</code></td>
<td><code>&quot;File name&quot;</code></td>
</tr>
<tr>
<td><code>&quot;File name&quot;</code></td>
<td><code>&lt;Directory name&gt;</code></td>
<td><code>&quot;File name&quot;</code></td>
</tr>
<tr>
<td><code>&quot;File name&quot;</code></td>
<td><code>&lt;Directory name&gt;</code></td>
<td><code>&quot;File name&quot;</code></td>
</tr>
</tbody>
</table>

- Directory names are enclosed in angle-brackets (`< >`).
- File names are enclosed in quotation marks (`" "`).

In the above example, this file is specified for loading.
Step 7 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).

Step 8 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.

Step 9 Press F1 (yes) to load the data.
Press F2 (no) to abort the data loading operation.

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

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 \( \text{F3} \) (SYS) on the initial menu screen.

The SYS (system) mode screen appears.

**Step 3** Press \( \text{F2} \) (B.UP).

The screen changes to the data backup mode.

**Step 4** Press \( \text{F1} \) (CARD).

The screen changes to the memory card mode.

**Step 5** Press \( \text{F3} \) (LIST).

**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 \( \text{F1} \) (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.
• **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.

---

**Using SD Memory Cards**

---

**Root directory**

<table>
<thead>
<tr>
<th>LV1</th>
<th>LV2</th>
<th>LV3</th>
</tr>
</thead>
<tbody>
<tr>
<td><code>&lt;050601.BAK&gt;</code></td>
<td><code>&lt;Directory name&gt;</code></td>
<td><code>&lt;Directory name&gt;</code></td>
</tr>
<tr>
<td><code>&lt;Directory name&gt;</code></td>
<td><code>&lt;Directory name&gt;</code></td>
<td><code>&lt;Directory name&gt;</code></td>
</tr>
<tr>
<td><code>&lt;File name&gt;</code></td>
<td><code>&lt;Directory name&gt;</code></td>
<td><code>&lt;Directory name&gt;</code></td>
</tr>
</tbody>
</table>

In the above example, a directory is being created here.

- Directory names are enclosed in angle-brackets (`<>`).
- File names are enclosed in quotation marks (`""`).

---

Fig. HPB-E016-008
Step 7 Assign a name to the directory.

Enter a directory name (alphanumeric chars, underscore marks ( _ ), and hyphens ( - ), and period ( . ) are permitted), then press \( \text{keyin} \).

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.

To select characters from the screen’s 3rd line character string, use the left/right ( \( \text{cursor keys} \) ) cursor keys to move the cursor in 1-character units, or use the up/down ( \( \text{cursor keys} \) ) cursor keys to move the cursor in 10-character units.

When the cursor is positioned at the desired character, press \( \text{keyin} \).

Step 8 Assign a date to the directory being created.

Use the number keys and the left/right ( \( \text{cursor keys} \) ) 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 \( \text{key} \).

Step 9 Press \( \text{keyin} \) (yes) to create the directory.

To abort the data save operation, press \( \text{keyin} \) (no).

If the directory creation is completed without error, the system returns to the Step 6 screen.

---

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

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

**Step 2** Press \( F_3 \) (SYS) on the initial menu screen.

The SYS (system) mode screen appears.

**Step 3** Press \( F_2 \) (B.UP).

The screen changes to the data backup mode.

**Step 4** Press \( F_1 \) (CARD).

The screen changes to the memory card mode.

**Step 5** Press \( F_8 \) (LIST).

**Step 6** Select the file or directory to be deleted.

Use the cursor keys (↑↓→←) to display the file or directory to be deleted, then press \( F_2 \) (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.)

**Step 7** Press \( F_1 \) (yes) to delete the file or directory.

Press \( F_2 \) (no) to abort the deletion operation.

If the deletion is completed without error, the system returns to the Step 6 screen.
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.
4.6 Displaying SD memory card file content

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

**Step 2** Press \( \text{F3} \) (SYS) on the initial menu screen.

The SYS (system) mode screen appears.

**Step 3** Press \( \text{F2} \) (B.UP).

The screen changes to the data backup mode.

**Step 4** Press \( \text{F1} \) (CARD).

The screen changes to the memory card mode.

**Step 5** Press \( \text{F3} \) (LIST).

**Step 6** Specify the file with the content to be displayed.

Use the cursor keys (\( \text{A} \), \( \text{V} \), \( \text{<} \), \( \text{>} \)) to display the file name, then press \( \text{F3} \) (VIEW) to display its content.

(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).
**Step 7 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).

---

**NOTE**

An ASCII code display comprises 0x20 to 0x7E and 0xA1 to 0xDF, with all others displaying as asterisks (*).
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 message example](Fig. HPB-E019-001)

### Alarm message example

![Alarm message example](Fig. HPB-E019-002)

### Example of HPB related error message

![Example of HPB related error message](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.

<table>
<thead>
<tr>
<th>Message</th>
<th>Meaning</th>
<th>Corrective Action</th>
</tr>
</thead>
<tbody>
<tr>
<td>SIO error</td>
<td>(1) HPB was connected while a dedicated command input was ON.</td>
<td>(1) Turn all dedicated command inputs OFF before connecting the HPB.</td>
</tr>
<tr>
<td></td>
<td>(2) No response from controller.</td>
<td>(2) Reconnect the HPB, or restart the controller.</td>
</tr>
<tr>
<td></td>
<td>(3) HPB is connected to an incompatible controller.</td>
<td>(3) Upgrade the HPB version.</td>
</tr>
<tr>
<td>card not exist</td>
<td>No SD memory card.</td>
<td>Insert an SD memory card into the SD memory card slot (connector).</td>
</tr>
<tr>
<td>card failed</td>
<td>Detection of SD memory card failed.</td>
<td>* Eject the SD memory card, re-insert it, then try the operation again.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>* Perform a &quot;chkdsk&quot; operation from the command prompt of a Windows personal computer.</td>
</tr>
<tr>
<td>card failed (FAT)</td>
<td>The SD memory card format is other than FAT (12 or 16).</td>
<td>Perform FAT formatting of the SD memory card on a Windows personal computer.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>* Formats other than FAT (12 or 16) cannot be used.</td>
</tr>
<tr>
<td>card full</td>
<td>No space available for file creation on the SD memory card.</td>
<td>Delete unnecessary files; use a new SD memory card; use sub-directories.</td>
</tr>
<tr>
<td>card empty</td>
<td>There are no files or sub-directories on the SD memory card.</td>
<td>Use a Windows personal computer to check the card for the presence of files and sub-directories.</td>
</tr>
<tr>
<td>card write protected</td>
<td>The SD memory card's &quot;write protect&quot; switch is set to &quot;write prohibit&quot;.</td>
<td>Set the SD memory card's &quot;write protect&quot; switch to &quot;write enable&quot;.</td>
</tr>
<tr>
<td>card read error</td>
<td>SD memory card reading failed.</td>
<td>* If the SD memory card was ejected during loading (LOAD) or content display (VIEW), repeat the operation.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>* 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 &quot;chkdsk/f&quot; operation without delay from the command prompt of a Windows personal computer.</td>
</tr>
<tr>
<td>Message</td>
<td>Meaning</td>
<td></td>
</tr>
<tr>
<td>--------------------</td>
<td>-------------------------------------------------------------------------</td>
<td></td>
</tr>
<tr>
<td>card write error</td>
<td>SD memory card writing failed.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• 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.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• 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.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• 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 &quot;chkdsk/f&quot; operation without delay from the command prompt of a Windows personal computer.</td>
<td></td>
</tr>
<tr>
<td>access denied</td>
<td>The following items cannot be deleted: the sub-directories themselves (&lt;.. &gt;), directories which contain data, system files/directories, hidden files/directories, read-only files/directories.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Delete all the files in a sub-directory before deleting (DEL) that sub-directory.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Use a Windows personal computer to check the memory card for the presence of files and directories, then change the &quot;system&quot;, &quot;hidden&quot;, or &quot;read-only&quot; attribute.</td>
<td></td>
</tr>
<tr>
<td>name already exist</td>
<td>An existing file or sub-directory name was specified.</td>
<td></td>
</tr>
<tr>
<td>file empty</td>
<td>The file is empty.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Use another file.</td>
<td></td>
</tr>
<tr>
<td>no data loaded</td>
<td>The specified data type does not exist in the file.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Specify another file at the loading (LOAD) operation.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Specify another data type at the loading (LOAD) operation.</td>
<td></td>
</tr>
<tr>
<td>cannot access</td>
<td>An access level prohibited operation occurred.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Change the access level.</td>
<td></td>
</tr>
</tbody>
</table>
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.

<table>
<thead>
<tr>
<th>No.</th>
<th>Problem</th>
<th>Probable Cause</th>
<th>Corrective Action</th>
</tr>
</thead>
</table>
| 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. |
## Specifications

### 7.1 HPB specifications

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

Dimensional outlines

Units: mm

[Diagram showing dimensional outlines of a device with various measurements labeled in millimeters]
Revision record

<table>
<thead>
<tr>
<th>Manual version</th>
<th>Issue date</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ver. 1.00</td>
<td>Jun. 2005</td>
<td>English manual Ver. 1.00 is based on Japanese manual Ver. 1.00.</td>
</tr>
<tr>
<td>Ver. 1.01</td>
<td>Oct. 2005</td>
<td>English manual Ver. 1.01 is based on Japanese manual Ver. 1.01.</td>
</tr>
<tr>
<td>Ver. 1.02</td>
<td>Feb. 2006</td>
<td>English manual Ver. 1.02 is based on Japanese manual Ver. 1.02.</td>
</tr>
<tr>
<td>Ver. 1.03</td>
<td>Jul. 2007</td>
<td>English manual Ver. 1.03 is based on Japanese manual Ver. 1.03.</td>
</tr>
</tbody>
</table>