YRC1000micro OPTIONS
INSTRUCTIONS

FOR TEACHING POINT ADJUSTMENT FUNCTION
WITH PROGRAMMING PENDANT

Upon receipt of the product and prior to initial operation, read these instructions thoroughly, and retain for future reference.

MOTOMAN INSTRUCTIONS

The YRC1000micro alarm codes above consist of "MAJOR ALARMS" and "MINOR ALARMS".

Please have the following information available when contacting Yaskawa Customer Support:
• System
• Primary Application
• Software Version (Located on Programming Pendant by selecting: (Main Menu) - (System Info) - (Version))
Robot Serial Number (Located on robot data plate)
Robot Sales Order Number (Located on controller data plate)

Part Number: 181295-1CD
Revision: 0
DANGER

• This manual explains the teaching point adjustment function of the YRC1000micro system. Read this manual carefully and be sure to understand its contents before handling the YRC1000micro. Any matter not described in this manual must be regarded as “prohibited” or “improper”.

• General information related to safety are described in “Chapter 1. Safety” of the YRC1000micro INSTRUCTIONS. To ensure correct and safe operation, carefully read “Chapter 1. Safety” of the YRC1000micro INSTRUCTIONS.

CAUTION

• In some drawings in this manual, protective covers or shields are removed to show details. Make sure that all the covers or shields are installed in place before operating this product.

• YASKAWA is not responsible for incidents arising from unauthorized modification of its products. Unauthorized modification voids the product warranty.

NOTICE

• The drawings and photos in this manual are representative examples and differences may exist between them and the delivered product.

• YASKAWA may modify this model without notice when necessary due to product improvements, modifications, or changes in specifications. If such modification is made, the manual number will also be revised.

• If your copy of the manual is damaged or lost, contact a YASKAWA representative to order a new copy. The representatives are listed on the back cover. Be sure to tell the representative the manual number listed on the front cover.
Notes for Safe Operation

Read this manual carefully before installation, operation, maintenance, or inspection of the YRC1000micro.

In this manual, the Notes for Safe Operation are classified as “DANGER”, “WARNING”, “CAUTION”, or “NOTICE”.

**DANGER**
Indicates an imminently hazardous situation which, if not avoided, will result in death or serious injury. Safety Signs identified by the signal word DANGER should be used sparingly and only for those situations presenting the most serious hazards.

**WARNING**
Indicates a potentially hazardous situation which, if not avoided, will result in death or serious injury. Hazards identified by the signal word WARNING present a lesser degree of risk of injury or death than those identified by the signal word DANGER.

**CAUTION**
Indicates a hazardous situation, which if not avoided, could result in minor or moderate injury. It may also be used without the safety alert symbol as an alternative to “NOTICE”.

**NOTICE**
NOTICE is the preferred signal word to address practices not related to personal injury. The safety alert symbol should not be used with this signal word. As an alternative to “NOTICE”, the word “CAUTION” without the safety alert symbol may be used to indicate a message not related to personal injury.

Even items described as “CAUTION” may result in a serious accident in some situations.
At any rate, be sure to follow these important items.

**NOTE**
To ensure safe and efficient operation at all times, be sure to follow all instructions, even if not designated as “DANGER”, “WARNING” and “CAUTION”.
Before operating the manipulator, make sure the servo power is turned OFF by performing the following operations. When the servo power is turned OFF, the SERVO ON LED on the programming pendant is turned OFF.

- Press the emergency stop button on the programming pendant or on the external control device, etc.
- Disconnect the safety plug of the safety fence.

If operation of the manipulator cannot be stopped in an emergency, personal injury and/or equipment damage may result.

Fig. : Emergency Stop Button

Before releasing the emergency stop, make sure to remove the obstacle or error caused the emergency stop, if any, and then turn the servo power ON.

Failure to observe this instruction may cause unintended movement of the manipulator, which may result in personal injury.

Fig. : Release of Emergency Stop

Observe the following precautions when performing a teaching operation within the manipulator's operating range:

- Be sure to perform lockout by putting a lockout device on the safety fence when going into the area enclosed by the safety fence. In addition, the operator of the teaching operation must display the sign that the operation is being performed so that no other person closes the safety fence.
- View the manipulator from the front whenever possible.
- Always follow the predetermined operating procedure.
- Always keep in mind emergency response measures against the manipulator’s unexpected movement toward a person.
- Ensure a safe place to retreat in case of emergency.

Failure to observe this instruction may cause improper or unintended movement of the manipulator, which may result in personal injury.

- Confirm that no person is present in the manipulator's operating range and that the operator is in a safe location before:
  - Turning ON the YRC1000micro power
  - Moving the manipulator by using the programming pendant
  - Running the system in the check mode
  - Performing automatic operations

Personal injury may result if a person enters the manipulator’s operating range during operation. Immediately press an emergency stop button whenever there is a problem. The emergency stop button is located on the right of the programming pendant.

- Read and understand the Explanation of the Warning Labels before operating the manipulator.
DANGER

• In the case of not using the programming pendant, be sure to supply the emergency stop button on the equipment. Then before operating the manipulator, check to be sure that the servo power is turned OFF by pressing the emergency stop button. Connect the external emergency stop button to the 4-14 pin and 5-15 pin of the Safety connector (Safety).

• Upon shipment of the YRC1000micro, this signal is connected by a jumper cable in the dummy connector. To use the signal, make sure to supply a new connector, and then input it.

If the signal is input with the jumper cable connected, it does not function, which may result in personal injury or equipment damage.

WARNING

• Perform the following inspection procedures prior to conducting manipulator teaching. If there is any problem, immediately take necessary steps to solve it, such as maintenance and repair.
  – Check for a problem in manipulator movement.
  – Check for damage to insulation and sheathing of external wires.

• Return the programming pendant to a safe place after use.

If the programming pendant is left unattended on the manipulator, on a fixture, or on the floor, etc., the Enable Switch may be activated due to surface irregularities of where it is left, and the servo power may be turned ON. In addition, in case the operation of the manipulator starts, the manipulator or the tool may hit the programming pendant left unattended, which may result in personal injury and/or equipment damage.
Definition of Terms Used Often in This Manual

The MOTOMAN is the YASKAWA industrial robot product.

The MOTOMAN usually consists of the manipulator, the YRC1000micro controller, manipulator cables, the YRC1000micro programming pendant (optional), and the YRC1000micro programming pendant dummy connector (optional).

In this manual, the equipment is designated as follows:

<table>
<thead>
<tr>
<th>Equipment</th>
<th>Manual Designation</th>
</tr>
</thead>
<tbody>
<tr>
<td>YRC1000micro controller</td>
<td>YRC1000micro</td>
</tr>
<tr>
<td>YRC1000micro programming pendant</td>
<td>Programming pendant (optional)</td>
</tr>
<tr>
<td>Cable between the manipulator and the controller</td>
<td>Manipulator cable</td>
</tr>
<tr>
<td>YRC1000micro programming pendant dummy connector</td>
<td>Programming pendant dummy connector (optional)</td>
</tr>
</tbody>
</table>

Descriptions of the programming pendant keys, buttons, and displays are shown as follows:

<table>
<thead>
<tr>
<th>Equipment</th>
<th>Manual Designation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Programming Pendant</td>
<td></td>
</tr>
<tr>
<td>Character Keys /Symbol Keys</td>
<td>The keys which have characters or symbols printed on them are denoted with [ ]. ex. [ENTER]</td>
</tr>
<tr>
<td>Axis Keys /Number Keys</td>
<td>[Axis Key] and [Numeric Key] are generic names for the keys for axis operation and number input.</td>
</tr>
<tr>
<td>Keys pressed simultaneously</td>
<td>When two keys are to be pressed simultaneously, the keys are shown with a “+” sign between them, ex. [SHIFT]+[COORD]</td>
</tr>
<tr>
<td>Mode Key</td>
<td>Three kinds of modes that can be selected by the mode key are denoted as follows: REMOTE, PLAY, or TEACH</td>
</tr>
<tr>
<td>Button</td>
<td>Three buttons on the upper side of the programming pendant are denoted as follows: HOLD button START button EMERGENCY STOP button</td>
</tr>
<tr>
<td>Displays</td>
<td>The menu displayed in the programming pendant is denoted with {}. e.g. {}JOB}</td>
</tr>
<tr>
<td>PC Keyboard</td>
<td>The name of the key is denoted. e.g. Ctrl key on the keyboard }</td>
</tr>
</tbody>
</table>
Description of the Operation Procedure

In the explanation of the operation procedure, the expression "Select • • • " means that the cursor is moved to the object item and [SELECT] is pressed, or that the item is directly selected by touching the screen.

Registered Trademark

In this manual, names of companies, corporations, or products are trademarks, registered trademarks, or brand names for each company or corporation. The indications of (R) and TM are omitted.
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This manual describes how to modify the position data of the teaching point by entering numeric data with the Programming Pendant to adjust the teaching point without moving the manipulator.

This teaching point adjustment function with the Programming Pendant enables simplified offline teaching by using CAD data and fine adjustment of the position data in any coordinate system.
2 How to Adjust the Teaching Point

1. In the JOB CONTENT display, select {POS ADJUSTMENT} under {UTILITY}.

   – When {POS ADJUSTMENT} is selected from the pull-down menu, POSITION ADJUSTMENT display appears.

2. Move the cursor to the numeric value to be modified, and enter any position data. Then press [ENTER].

3. When [ENTER] is pressed again, an hourglass wait cursor is displayed and the entered position data can be reflected in the job.
2 How to Adjust the Teaching Point

4. Select {COMPLETE} or press [CANCEL] on the programming pendant to end the position adjustment function.

– The display returns to the JOB CONTENT display.

<table>
<thead>
<tr>
<th>JOB</th>
<th>EXIT</th>
<th>DISPLAY</th>
<th>UTILITY</th>
</tr>
</thead>
<tbody>
<tr>
<td>POSITION ADJUSTMENT</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>STEP CONTENT</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>EI</td>
<td>X:</td>
<td>100.450</td>
<td>mm</td>
</tr>
<tr>
<td>Y</td>
<td>10.036</td>
<td>mm</td>
<td></td>
</tr>
<tr>
<td>Z</td>
<td>0.141</td>
<td>mm</td>
<td></td>
</tr>
<tr>
<td>Rr</td>
<td>180.000</td>
<td>deg.</td>
<td></td>
</tr>
<tr>
<td>Rg</td>
<td>0.000</td>
<td>deg.</td>
<td></td>
</tr>
<tr>
<td>Rz</td>
<td>0.000</td>
<td>deg.</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>BI</td>
<td>X</td>
<td>0.000</td>
<td>mm</td>
</tr>
<tr>
<td>Y</td>
<td>0.000</td>
<td>mm</td>
<td></td>
</tr>
<tr>
<td>Z</td>
<td>0.000</td>
<td>mm</td>
<td></td>
</tr>
</tbody>
</table>

- After a numeric value is entered and [ENTER] is pressed, the YRC1000micro checks the soft limit, the axis interference, etc. for the new position data. If the entered value is out of the P-point maximum envelope of the manipulator, the message “Step exceeding operation range is made” appears. Also, “/OV” appears for the STEP of the JOB CONTENT display.

- While adjusting the teaching point, test runs and FWD/BWD key operations are disabled.

- After having modified the numeric value of the position data, always perform the FWD/BWD key operations to confirm that the teaching point is adjusted correctly.

- Unable to edit a edit-lock line or a line setting as a comment. The following errors occurs when attempt to edit.
  1011: This line is setting as edit-lock.
  1012: This line is setting as a comment.

(Refer to the "Chap.3.7.6 Commenting Out a Line" and "Chap.3.7.7 Prohibiting Editing Line-by-Line" in "YRC1000micro GENERAL OPERATOR’S MANUAL (RE-CSO-A058)" for more details.)
3 Position Adjustment Display

The contents of the POSITION ADJUSTMENT display depend on the control group and the coordinate system whose teaching point is to be adjusted.

3.1 For Robot Axes (including Base Axes)

Fig. : For a Cartesian Coordinate System

STEP
Indicates the step number whose teaching point is to be adjusted. The step number of the job for which “POS ADJUSTMENT” is selected is displayed as the initial value. Enter a step number by using the [Numeric Key] to view the position data of the step.

R1
Displays the teaching point of the manipulator. Modify the values in absolute values by using the [Numeric Key].

B1
Displays the teaching point of the existing base axes. Modify the values in absolute values by using the [Numeric Key].
3 Position Adjustment Display
3.1 For Robot Axes (including Base Axes)

COORD (Initial setting: BASE)
Displays the coordinates needed to adjust the teaching point.
A “BASE”, “ROBOT”, “USER# (*)”, “MASTER TOOL”, or “PULSE” coordinate can be selected. A “MASTER TOOL” coordinate can be selected only for a coordinated job.
For relative jobs, the teaching coordinate used to convert the standard job into the relative job is selected.

TOOL
Displays the taught tool.
The tool can be changed by selecting a tool number from 0 to 63 by using the [Numeric Key].

TYPE (Initial setting: OFF)
Sets the display of TYPE to “ON/OFF”.
Every time [SELECT] is pressed, the display switches between “OFF” and “ON”.

State of TYPE
Displays the state of TYPE when the TYPE is set to “ON” and allows modification of the state of TYPE.

Icon for the [PAGE] key
Appears when the job axis configuration includes more than one control group.
Press [PAGE] on the programming pendant to turn the pages for each control group in the following order:
“R1” → “R2” → “S1” → …
The contents of the position adjustment display for station axes are different from those for the robot axes. Refer to chapter 3.2 “For Station Axes”.

COMPLETE
Select {COMPLETE}, and the display returns to the JOB CONTENT display.
Pressing [CANCEL] on the programming pendant also ends the POSITION ADJUSTMENT function.

NOTE
• A parameter setting is required to select “PULSE” as the coordinate type. Contact your YASKAWA representative for more information.
• The parameter S3C1110 must be set to “1” to change the coordinates of the relative job.
• The parameter S2C431 must be set to “1” to change the taught tool.
• If the parameter S2C430 for specifying the relative job conversion method is set to “1” (TYPE REGARD), the TYPE cannot be changed.
• For the parameter settings, refer to chapter 4 “Parameters”.

Icon for the [PAGE] key
Appears when the job axis configuration includes more than one control group.
Press [PAGE] on the programming pendant to turn the pages for each control group in the following order:
“R1” → “R2” → “S1” → …
The contents of the position adjustment display for station axes are different from those for the robot axes. Refer to chapter 3.2 “For Station Axes”.

COMPLETE
Select {COMPLETE}, and the display returns to the JOB CONTENT display.
Pressing [CANCEL] on the programming pendant also ends the POSITION ADJUSTMENT function.

NOTE
• A parameter setting is required to select “PULSE” as the coordinate type. Contact your YASKAWA representative for more information.
• The parameter S3C1110 must be set to “1” to change the coordinates of the relative job.
• The parameter S2C431 must be set to “1” to change the taught tool.
• If the parameter S2C430 for specifying the relative job conversion method is set to “1” (TYPE REGARD), the TYPE cannot be changed.
• For the parameter settings, refer to chapter 4 “Parameters”.
3 Position Adjustment Display

3.2 For Station Axes

Fig. 3-1: For a Cartesian Coordinate System

STEP
Indicates the step number whose teaching point is to be adjusted.
The step number of the job for which “POS ADJUSTMENT” is selected
is displayed as the initial value.
Enter a step number by using the [Numeric Key] to view the position
data of the step.

S1
Displays the teaching point of the station.
Modify the values in absolute values by using the [Numeric Key].

NOTE
The position data of each station axis is displayed in the
units defined in the system configuration (“mm” or “degree”: Parameters S2C264 and S2C265 to S2C267).
For the parameter settings, refer to chapter 4 “Parameters”.

Fig. 3-1: For a Pulse Coordinate System

STEP
Indicates the step number whose teaching point is to be adjusted.
The step number of the job for which “POS ADJUSTMENT” is selected
is displayed as the initial value.
Enter a step number by using the [Numeric Key] to view the position
data of the step.

S1
Displays the teaching point of the station.
Modify the values in absolute values by using the [Numeric Key].
## 4 Parameters

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Setting</th>
<th>Setting Range/Units</th>
<th>Initial Setting</th>
</tr>
</thead>
<tbody>
<tr>
<td>S2C430</td>
<td>Relative job conversion method specification</td>
<td>0: STEP REGARD 1: TYPE REGARD 2: STEP REGARD (R-axis minimum)</td>
<td>0</td>
</tr>
<tr>
<td>S2C431</td>
<td>Tool number selection</td>
<td>0: Not possible, 1: Possible</td>
<td>0</td>
</tr>
<tr>
<td>S3C1110</td>
<td>Selection of coordinates for adjusting the teaching point of the relative job</td>
<td>0: Not possible, 1: Possible</td>
<td>0</td>
</tr>
<tr>
<td>S2C264</td>
<td>Station axis current value display</td>
<td>0: Disabled, 1: Enabled</td>
<td>0</td>
</tr>
<tr>
<td>S2C265</td>
<td>The units of the position data of Station axis 1 (S1)</td>
<td>Bit specification (0: angle, 1: distance)</td>
<td>0</td>
</tr>
<tr>
<td>S2C266</td>
<td>The units of the position data of Station axis 2 (S2)</td>
<td>Bit specification (0: angle, 1: distance)</td>
<td>0</td>
</tr>
<tr>
<td>S2C267</td>
<td>The units of the position data of Station axis 3 (S3)</td>
<td>Bit specification (0: angle, 1: distance)</td>
<td>0</td>
</tr>
</tbody>
</table>
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Specifications are subject to change without notice for ongoing product modifications and improvements.

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© Printed in Japan July 2017 17-07
MANUAL NO. HW1484514