YRC1000
SUPPLEMENTARY
INSTRUCTIONS
FOR CONTROLLER WITH COOLING UNIT

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

MOTOMAN INSTRUCTIONS

MOTOMAN-□□□ INSTRUCTIONS
YRC1000 INSTRUCTIONS
YRC1000 OPERATOR’S MANUAL (GENERAL) (SUBJECT SPECIFIC)
YRC1000 MAINTENANCE MANUAL
YRC1000 ALARM CODES (MAJOR ALARMS) (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: 188455-1CD
Revision: 0
DANGER

• This manual explains the YRC1000 controller with cooling unit. Read this manual carefully and be sure to understand its contents before handling the YRC1000. 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 “YRC1000 INSTRUCTIONS”. To ensure correct and safe operation, carefully read “Chapter 1. Safety” of the YRC1000 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. The drawings and photos in this manual are representative examples and differences may exist between them and the delivered 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 YRC1000

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 buttons on the front door of the YRC1000, on the programming pendant, on the external control device, etc.
- Disconnect the safety plug of the safety fence. (when in the automatic (play) mode or in the remote mode)

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 YRC1000 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 buttons are located on the front panel of the YRC1000 and on the right of the programming pendant.

Read and understand the Explanation of the Warning Labels before operating the manipulator.
Definition of Terms Used Often in This Manual

The MOTOMAN is the YASKAWA industrial robot product.
The MOTOMAN usually consists of the manipulator, the controller, the programming pendant, and supply cables.

In this manual, the equipment is designated as follows:

<table>
<thead>
<tr>
<th>Equipment</th>
<th>Manual Designation</th>
</tr>
</thead>
<tbody>
<tr>
<td>YRC1000 controller</td>
<td>YRC1000</td>
</tr>
<tr>
<td>YRC1000 programming pendant</td>
<td>programming pendant</td>
</tr>
<tr>
<td>Cable between the manipulator and the controller</td>
<td>Manipulator cable</td>
</tr>
</tbody>
</table>

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.
• Always return the programming pendant to the hook on the YRC1000 cabinet 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.
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 [ ]. e.g. [ENTER]</td>
</tr>
<tr>
<td>Axis Keys /Numeric 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, e.g. [SHIFT]+[COORD].</td>
</tr>
<tr>
<td>Mode Switch</td>
<td>Mode Switch can select three kinds of modes that are denoted as follows: REMOTE, PLAY or TEACH. (The switch names are denoted as symbols)</td>
</tr>
<tr>
<td>Button</td>
<td>The three buttons on the upper side of the programming pendant are denoted as follows: START, HOLD, or EMERGENCY STOP. (The button names are denoted as symbols)</td>
</tr>
<tr>
<td>Displays</td>
<td>The menu displayed in the programming pendant is denoted with { }. e.g. {JOB}</td>
</tr>
</tbody>
</table>

![Diagram of the programming pendant with labels for keys and buttons.](image)

*The button/switch names are denoted as symbols.*
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 the [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 ™ are omitted.
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1 Introduction

1.1 About this instruction

This manual is YRC1000 supplementary instructions for the controller with cooling unit. Differences from YRC1000 INSTRUCTIONS (RE-CTO-A221) and YRC1000 MAINTENANCE MANUAL (RE-CHO-A114) are described in this manual.

For information on the operation and maintenance of the standard YRC1000, refer to other manuals, as well as this supplementary instruction manual.

- YRC1000 INSTRUCTIONS(RE-CTO-A221)
- YRC1000 MAINTENANCE MANUAL(RE-CHO-A114)
- YRC1000 OPERATOR’S MANUAL(RE-CSO-A051)
- YRC1000 ALARM CODES (MAJOR ALARMS) (MINOR ALARMS) (RE-CER-A600)
2 Controller Cooling Unit Specifications

2.1 Controller Cooling Unit Models

This manual provides explanations for the following controller cooling units.

The controller cooling unit model depends on the specifications of the controller.

Refer to the cooling unit instruction manual included with the controller for more information about the cooling unit, such as inspection procedures, maintenance, and usage precautions.

### Table 2-1: Controller Cooling Unit Models

<table>
<thead>
<tr>
<th>Manufacturer</th>
<th>Model</th>
<th>Controller Mounting Location</th>
<th>Power Supply Specifications</th>
</tr>
</thead>
<tbody>
<tr>
<td>Apiste</td>
<td>ENC-GR500EX</td>
<td>Top-mounted</td>
<td>Three-phase 200 to 240 VAC (±10%) 50/60 Hz</td>
</tr>
<tr>
<td></td>
<td>ENC-GR1100EX</td>
<td></td>
<td>(The cooling unit uses a single-phase 200 to 240 VAC (±10%) 50/60 Hz power supply.)</td>
</tr>
<tr>
<td></td>
<td>ENC-GR1100LE</td>
<td>Side-mounted</td>
<td></td>
</tr>
<tr>
<td>Topre</td>
<td>TCC-05H-S</td>
<td>Top-mounted</td>
<td>Three-phase 200 VAC (±10%) 50/60 Hz</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>(The cooling unit uses a single-phase 200 VAC (±10%) 50/60 Hz power supply.)</td>
</tr>
<tr>
<td></td>
<td>TCC-05H-Y</td>
<td></td>
<td>Three-phase 400 VAC (±10%) 50/60 Hz</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>(The cooling unit uses a single-phase 400 VAC (±10%) 50/60 Hz power supply.)</td>
</tr>
</tbody>
</table>

WARNING

- Do not use a voltage other than the power supply specifications of the cooling unit as the input power supply for the controller.

There is a risk of cooling unit failure, damage, and injury.
3 Installation

3.1 Handling Procedure

WARNING

- Operation of the crane, sling, or forklift must be performed only by authorized personnel.

Failure to observe this instruction may result in personal injury and/or equipment damage.

NOTICE

- Avoid excessive vibration or shock while transporting or moving the YRC1000.

Failure to observe this instruction may adversely affect the performance of the YRC1000 because it consists of precision components.
3.2 Using a Crane to Move the Controller

Use a crane, in principle, to transport the YRC1000.

Check the followings before transporting:

- Confirm the weight of the controller described in rating NP before transporting, and use a wire rope with a rating that is greater than the weight of the controller.

- A lifting jig is attached to the top of the controller with a cooling unit. Before transporting the controller with cooling unit, confirm that the fixing bolts of the lifting jig have been tightened. After confirming that the fixing bolts have been tightened, transport the controller with cooling unit by using the lifting jig and lifting it with a crane.

Fig. 3-1: Lifting Jig Diagram for Small and Medium/Large Capacity Models

Fig. 3-2: Lifting Jig Diagram for Extra Large Capacity Model
3.3 Place of Installation

Install the YRC1000 in accordance with chapter 3.2 "Place of Installation" in “YRC1000 INSTRUCTIONS”.

3.4 Location

Install the controller by ensuring a space of 400 mm or more between the exterior of the cooling unit and any obstructions, such as a wall, so that the air flow for the air inlet and outlet on the exterior of the cooling unit are not blocked and so that the air from the air outlet does not blow into the air inlet.

For the other installation location conditions, refer to the instruction manual and supplemental instructions for each controller.

Fig. 3-3: Installation of the Controller with Cooling Unit

3.5 Mounting the Controller

Fix the YRC1000 controller in accordance with chapter 3.4 “Mounting the Controller” in “YRC1000 INSTRUCTIONS”.
4 Cooling Unit Handling Procedures

4.1 Drain Water Piping

Follow the cooling unit instruction manual and connect the appropriate piping to the cooling unit by using the cooling unit parts provided with the controller, such as drain hoses and L-shaped pipes.

CAUTION

- Correctly connect the appropriate drain water piping according to the included cooling unit instruction manual. If the drain water piping is not connected correctly, water may leak inside the controller and cause damage or electric shock.
4.2 Operation Check

Turn ON the power supply to the controller according to chapter 5.1 Turning ON the Main Power Supply in "YRC1000 INSTRUCTIONS".

Before turning ON the power supply to the controller, confirm that the protection device for the cooling unit (-FS23) is ON.

**WARNING**

- When turning ON the YRC1000 power, confirm that no person is present in the manipulator's operating range and that the operator is in a safe location. 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 buttons are located on the front panel of the YRC1000 and on the right of the programming pendant.

*Fig. 4-1: Location of the Protection Device for the Cooling Unit*

After the power supply to the controller is turned ON, the detected temperature inside the controller will appear on the LED indicator located on the front of the cooling unit.

The cooling unit will start operating and cool the inside of the controller when the temperature inside the controller reaches the cooling unit operation temperature set point.

Then the cooling unit will stop when the temperature inside the controller drops below the cooling unit operation temperature set point.
5 Cooling Unit Operation Temperature Set Point

5.1 Cooling Unit Operation Temperature Set Point

The cooling unit operation temperature set point is set to 45°C when the controller is shipped from the factory.

Refer to the included cooling unit instruction manual for how to change the operation temperature set point to the desired temperature.

**CAUTION**

- When the cooling unit operation temperature set point is changed, a large amount of water may drain from the cooling unit and dew condensation may form inside and outside the controller due to the temperature set point, the temperature inside the controller, and the ambient temperature and humidity.
6 Alarms and Messages

6.1 Alarms and Messages

Perform troubleshooting according to the included cooling unit instruction manual in the following situations:

If an error code (a value other than the temperature inside the controller) appears on the LED indicators or temperature display.

If nothing appears on the indicators and display, the power supply to the cooling unit is off, and "Alarm 4153 Cooling Unit Error" appears on the programming pendant screen.

**CAUTION**

- The robot will not stop during operation (playback) even if "Alarm 4153 Cooling Unit Error" occurs and appears on the programming pendant screen.

After the alarm occurs, promptly check the cooling unit according to the included cooling unit instruction manual.

Troubleshoot the problem.

Reset the alarm if the cooling unit recovers normally.