

YRC1000 SUPPLEMENTARY INSTRUCTIONS

FOR HEAT EXCHANGER MAINTENANCE MANUAL

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)



DANGER

- This manual describes the maintenance for the YRC1000 heat exchanger. Read this manual carefully and be sure to understand its contents before handling the YRC1000. Any matter, including operation, usage, measures, and an item to use, 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.
- 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.



To ensure safe and efficient operation at all times, be sure to follow all instructions, even if not designated as “DANGER”, “WARNING” and “CAUTION”.



DANGER

- 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 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 result in personal injury caused by unintended manipulator movement.

Fig. : Release of Emergency Stop



- Observe the following precautions when performing a teaching operation within the P-point maximum envelope of the manipulator:
 - 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 result in personal injury caused by improper or unintended manipulator movement.

- Confirm that no person is present in the P-point maximum envelope of the manipulator 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.



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.

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 manipulator cables.

In this manual, the equipment is designated as follows.

Equipment	Manual Designation
YRC1000 controller	YRC1000
YRC1000 programming pendant	Programming pendant
Cable between the manipulator and the controller	Manipulator cable

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

Equipment	Manual Designation
Programming Pendant	Character Keys /Symbol Keys The keys which have characters or its symbols printed on them are denoted with []. ex. [ENTER]
	Axis Keys /Numeric Keys [Axis Key] and [Numeric Key] are generic names for the keys for axis operation and number input.
	Keys pressed simultaneously When two keys are to be pressed simultaneously, the keys are shown with a "+" sign between them, ex. [SHIFT]+[COORD]
	Displays The menu displayed in the programming pendant is denoted with { }. ex. {JOB}



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.

1	Introduction	1-1
1.1	About this Instruction	1-1
2	Replacing Parts.....	2-1
2.1	Replacing YRC1000 Parts.....	2-1
2.1.1	Replacing the Filter and the Filter Kit of the Heat Exchanger.....	2-4
2.1.1.1	TCMSY-312DC.....	2-4
2.1.1.2	TCMSY-320DC, TCMSY-322DC.....	2-6
2.1.2	Replacing the Fan of the Heat Exchanger.....	2-7
2.1.2.1	Replacing the Interior Fan *Common to each heat exchanger.....	2-7
2.1.2.2	Replacing the Exterior Fan (TCMSY-312DC).....	2-9
2.1.2.3	Replacing the Exterior Fan (TCMSY-320DC, TCMSY-322DC).....	2-12
2.2	Parts List.....	2-14

1 Introduction

1.1 About this Instruction

This manual is the YRC1000 supplementary instructions for maintenance of the heat exchanger.

The target heat exchanger types are as follows. (Refer to *fig. 1-1 "Heat Exchanger Type"*.)

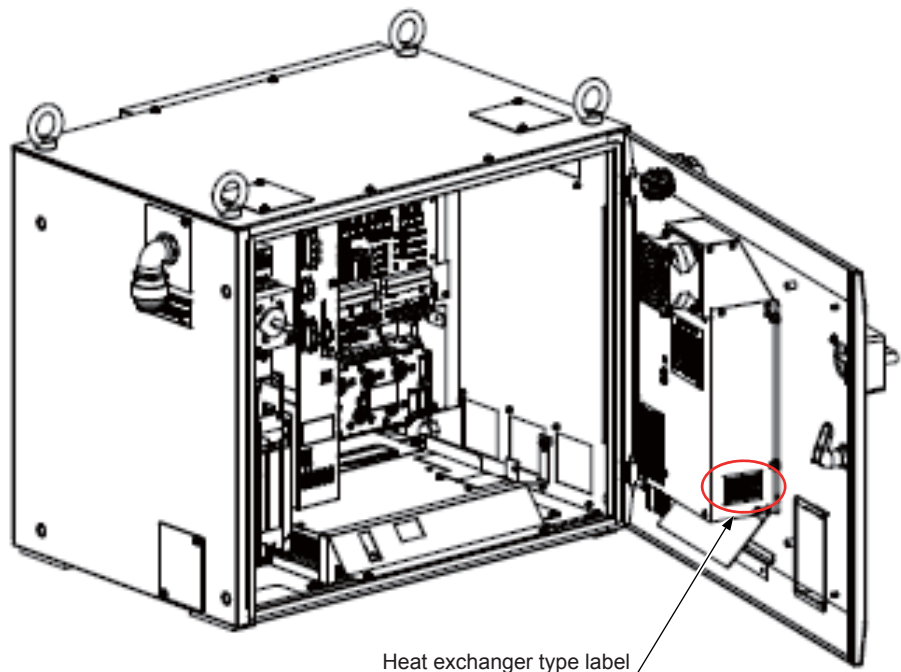
- TCMSY-312DC
- TCMSY-320DC
- TCMSY-322DC

Differences from YRC1000 INSTRUCTIONS (RE-CTO-A221) and YRC1000 MAINTENANCE MANUAL (RE-CHO-A114) are described in this manual.

- YRC1000 INSTRUCTIONS (RE-CTO-A221)
- YRC1000 MAINTENANCE MANUAL (RE-CHO-A114)

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

Fig. 1-1: Heat Exchanger Type



2	Replacing Parts
2.1	Replacing YRC1000 Parts

2 Replacing Parts

2.1 Replacing YRC1000 Parts

Prepare the following recommended tools for maintenance:

- Phillips screwdriver: large, medium, small size
(recommended length of the medium-size Phillips screwdriver:
500 mm)
- Flathead screwdriver: large, medium, small size
- Nipper, combination pliers, needle nose pliers

2 Replacing Parts

2.1 Replacing YRC1000 Parts



WARNING

- To prevent anyone from inadvertently turning ON the power supply during maintenance and inspection, display a warning sign such as “DO NOT TURN ON THE POWER” at the primary power supply (at the knife switch, or at the circuit breaker, etc.) and at the YRC1000 and related controllers, and use proper lockout/tagout.

Failure to observe this instruction may result in electric shock and/or personal injury.

- After completing the replacement of parts, confirm that no problem is found in the manipulator and peripheral devices and no person is present in the manipulator's operating range. After that, start operating the manipulator.
- After installing the manipulator, replacing parts, modifying the taught job, or modifying the robot system by changing the tool or a peripheral device, etc., make sure to perform the first operation of the manipulator at low speed, and confirm that there is no abnormal noise, abnormal vibration, or abnormal operation. If an error occurs, immediately inform the safety manager of the error.
- When entering the area enclosed by the safety fences, confirm that there is no source of danger around. If it is necessary to enter the area enclosed by the safety fences while any source of danger exists, pay careful attention to the surroundings and enter the area with due care.
- If it is necessary to perform a maintenance operation or to enter the manipulator's operating range while the power is ON, make sure that another operator stays near the YRC1000 and is able to immediately press the emergency stop button in case of emergency.



CAUTION

- Do not touch the regeneration resistors. They are very hot.

Failure to observe this instruction may result in burn injuries.

- After completing the maintenance, make sure to confirm that no industrial tool, etc. is left inside the YRC1000 and that the door of the YRC1000 is securely closed.

Failure to observe this instruction may result in electric shock and/or personal injury.

- Make sure to use recommended spare parts only. If parts not recommended by YASKAWA are used, product performance cannot be guaranteed and mechanical failure and/or fire may result.
- If the light in the operator's working space is not bright enough, provide the space with appropriate lighting.

2 Replacing Parts

2.1 Replacing YRC1000 Parts

NOTICE

- It is required to remove the screws or disconnect the cables for replacing parts. Be careful not to lose the screws. Please take a note of the connection position before disconnecting the cables to connect the cables correctly.

2 Replacing Parts
2.1 Replacing YRC1000 Parts

2.1.1 Replacing the Filter and the Filter Kit of the Heat Exchanger

2.1.1.1 TCMSY-312DC

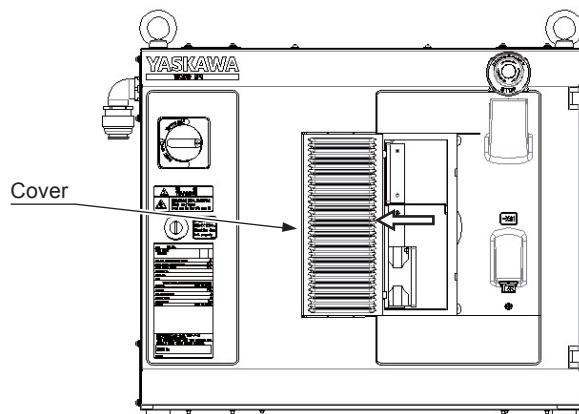


Turn OFF the power before replacing the filter and/or the filter kit.

■ Replacement Procedure

1. Slide the front cover of the YRC1000 to the left to open it.
(Refer to *fig. 2-1 "Front Cover"*.)

Fig. 2-1: Front Cover



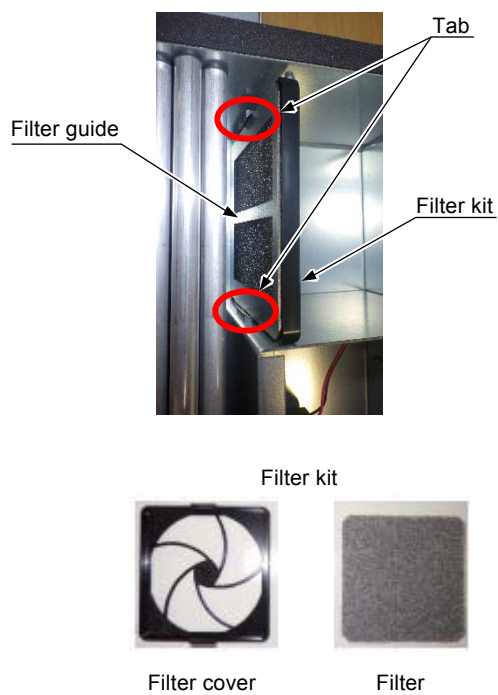
2. Slide and remove the filter kit which is attached to the top and bottom of the filter guide with tabs.
(Refer to *fig. 2-2 "Filter and Filter Kit"*.)
3. To replace only the filter, remove the filter from the filter kit, and replace it with a new filter.

2 Replacing Parts

2.1 Replacing YRC1000 Parts

4. Hook the tabs of the new filter kit on the top and bottom of the filter guide, then slide and insert the filter kit.

Fig. 2-2: Filter and Filter Kit



5. By reversing the procedure in the step 1, slide the cover to the right to close it.

2 Replacing Parts

2.1 Replacing YRC1000 Parts

2.1.1.2 TCMSY-320DC, TCMSY-322DC

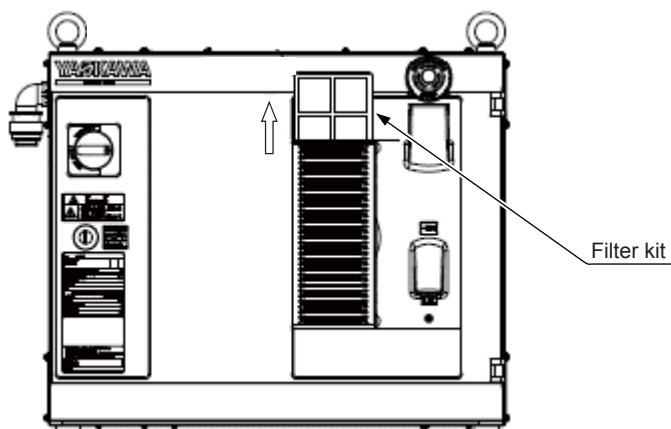


Turn OFF the power before replacing the filter and/or the filter kit.

■ Replacement Procedure

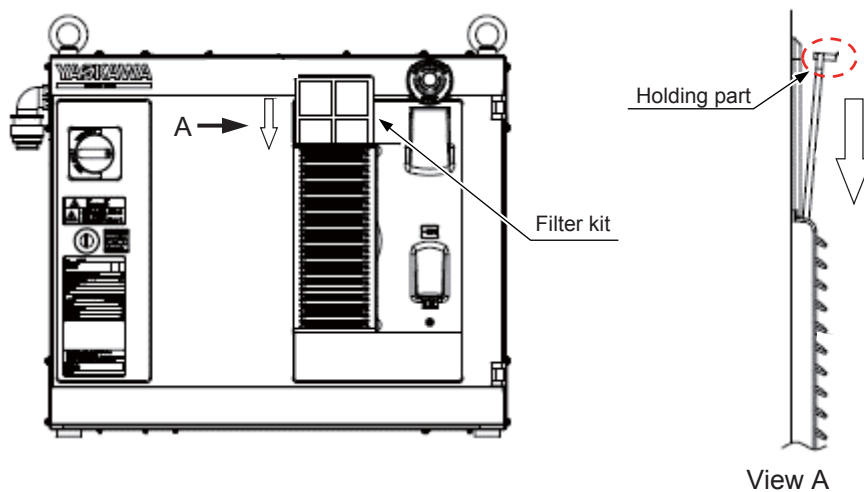
1. Remove the filter kit which is inserted into the upper part of the front cover of the YRC1000.
(Refer to fig. 2-3 "Removing a Filter Kit")

Fig. 2-3: Removing a Filter Kit



2. By reversing the procedure in the step 1, insert the new filter kit into the upper part of the front cover of the YRC1000.
Be sure to insert the filter with the longer protruding piece facing outward.
(Refer to fig. 2-4 "Inserting a Filter Kit")

Fig. 2-4: Inserting a Filter Kit



2 Replacing Parts

2.1 Replacing YRC1000 Parts

2.1.2 Replacing the Fan of the Heat Exchanger



WARNING

- Turn OFF the power before replacing the fan.
- After turning OFF the power supply, wait at least 5 minutes before the replacement operation. In addition, confirm that the charge lamps (orange LED) on the converter and the inverter unit are turned OFF.

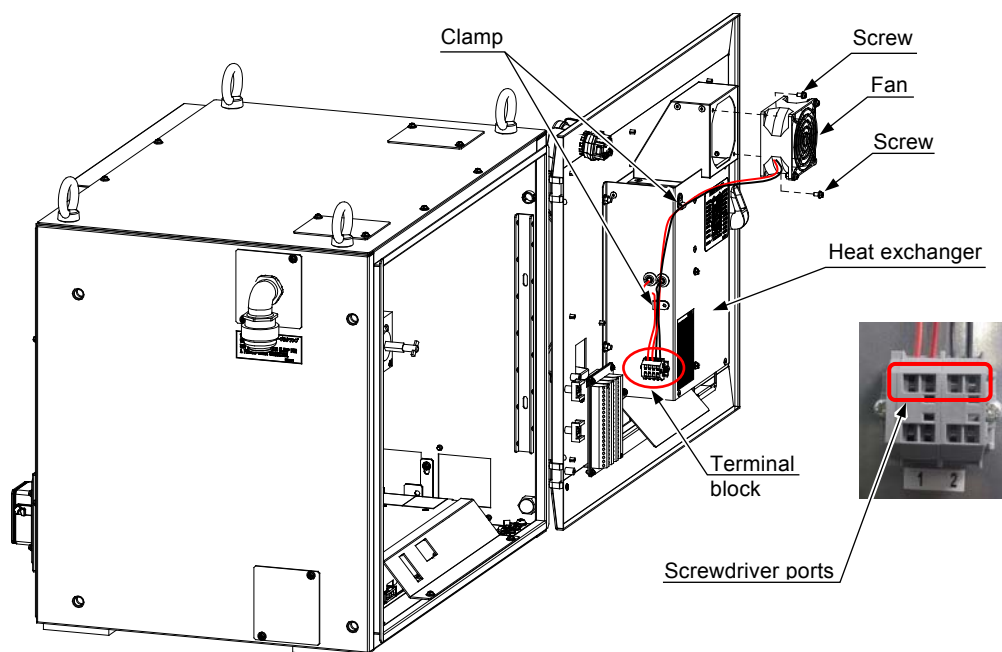
Failure to observe this instruction may result in electric shock and/or personal injury due to residual voltage in the capacitor.

2.1.2.1 Replacing the Interior Fan *Common to each heat exchanger

■ Replacement Procedure

1. Open the front door of the YRC1000.
By using a flathead screwdriver (small), press the levers of the terminal block (No.1 and 2) on the heat exchanger, and remove each power cable (red and black) for the inner fan which is connected to the terminal block.
Remove the screws (2 places) securing the fan, and then remove the fan together with the fan guard. (Refer to *fig. 2-5 "Heat Exchanger"* .)

Fig. 2-5: Heat Exchanger



2 Replacing Parts

2.1 Replacing YRC1000 Parts

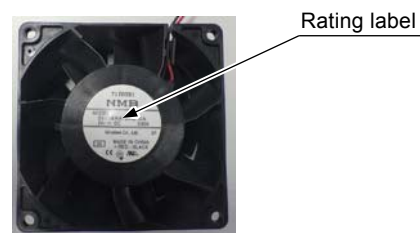
2. From the removed fan, remove the screws and nuts (2 places) securing the fan guard, and remove the fan guard.
(Refer to *fig. 2-6 "Fan Guard"*.)
Be careful not to lose the nuts when removing the screws.

Fig. 2-6: Fan Guard



3. Mount the fan guard removed in the step 2 onto a new fan.
Pay attention to the direction of the fan rotation when mounting the fan guard. Make sure to mount the fan equipped with the fan guard in the way that the rating label on the fan faces to the heat exchanger side.
(Make sure that the fan rotates in the direction in which the air blown by the fan goes from the fan into the heat exchanger.)
(Refer to *fig. 2-7 "Fan Body"*.)

Fig. 2-7: Fan Body



4. By reversing the procedure in the step 1, mount the fan to the heat exchanger.
Pass the power cables for the fan through the clamps. By using a flathead screwdriver (small), press the levers of the terminal block, and connect the power cables (red and black) to the terminal block (No. 1 and 2).

2 Replacing Parts

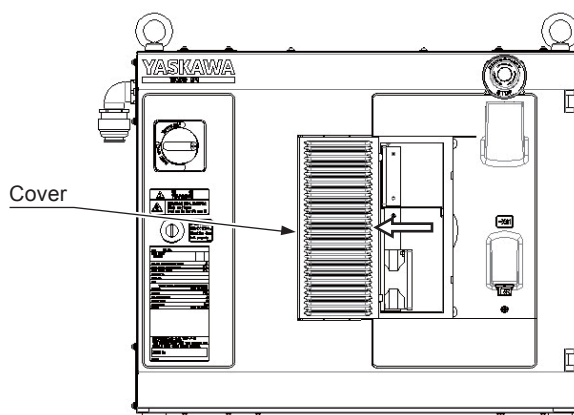
2.1 Replacing YRC1000 Parts

2.1.2.2 Replacing the Exterior Fan (TCMSY-312DC)

■ Replacement Procedure

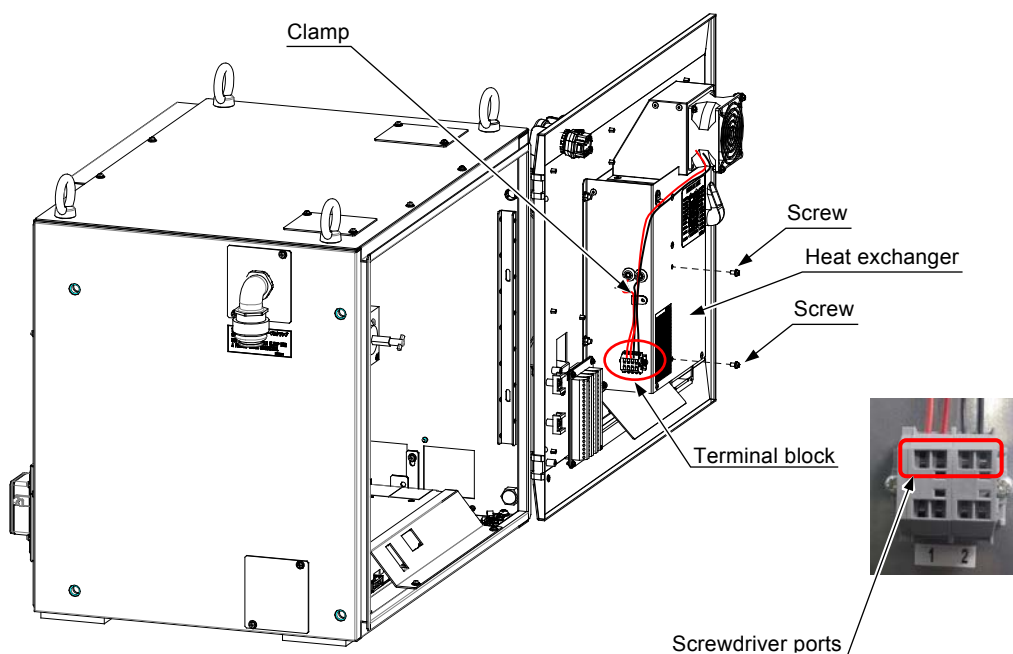
1. Slide the front cover of the YRC1000 to the left to open it.
(Refer to *fig. 2-8 "Front Cover"*.)

Fig. 2-8: Front Cover



2. Open the front door of the YRC1000.
By using a flathead screwdriver (small), press the levers of the terminal block (No.1 and 2) on the heat exchanger, and remove each power cable (red and black) for the exterior fan which is connected to the terminal block.
3. Remove the screws (2 places) securing the fan kit, and then remove the fan kit including the fan base. (Refer to *fig. 2-9 "Heat Exchanger"* and *fig. 2-10 "Exterior Fan"*.)

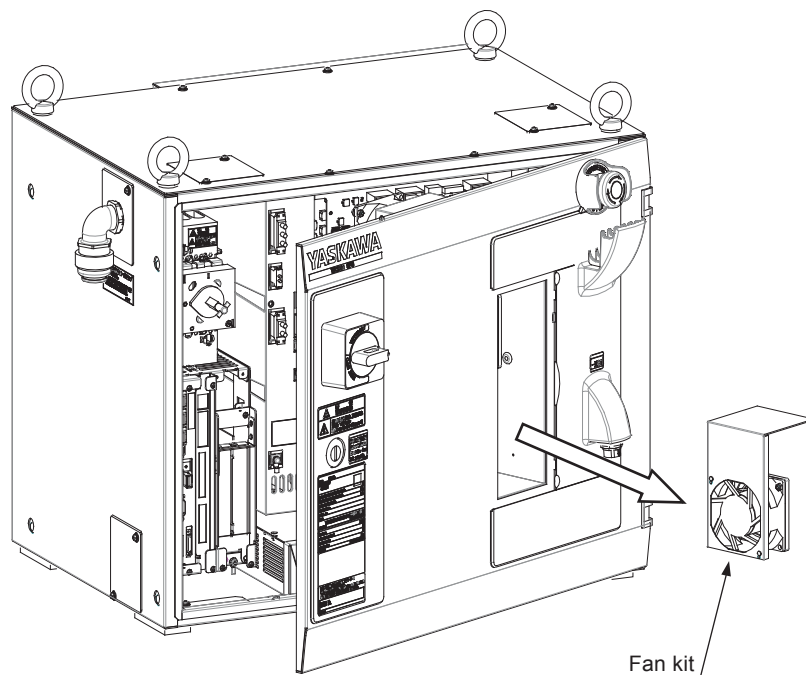
Fig. 2-9: Heat Exchanger



2 Replacing Parts

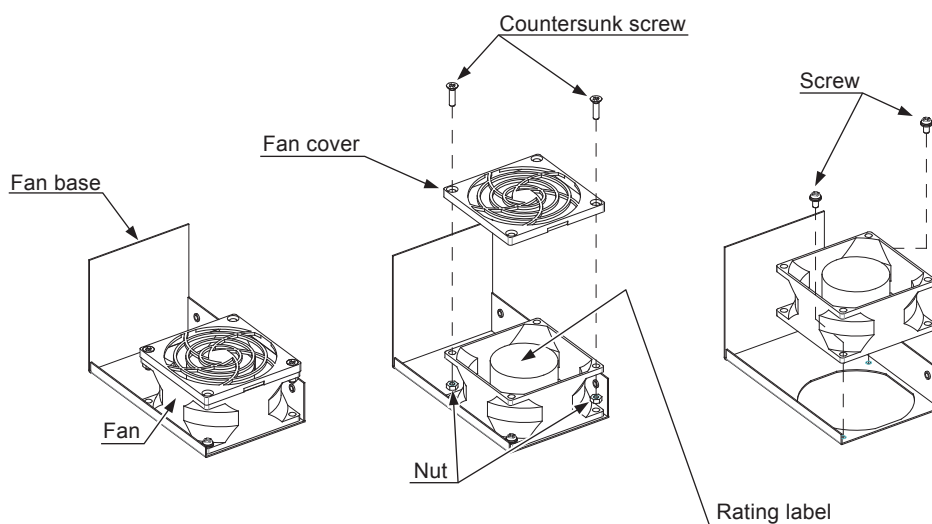
2.1 Replacing YRC1000 Parts

Fig. 2-10: Exterior Fan



4. Remove the fan cover from the removed fan kit.
(Refer to *fig. 2-11 "Fan Kit"*.)
5. From the fan body, remove the fan cover secured with the countersunk screws and nuts (2 places).
Be careful not to lose the nuts when removing the screws.
(Refer to *fig. 2-11.*)
6. Remove the screws (2 places) securing the fan, and then remove the fan from the fan base. (Refer to *fig. 2-11.*)

Fig. 2-11: Fan Kit

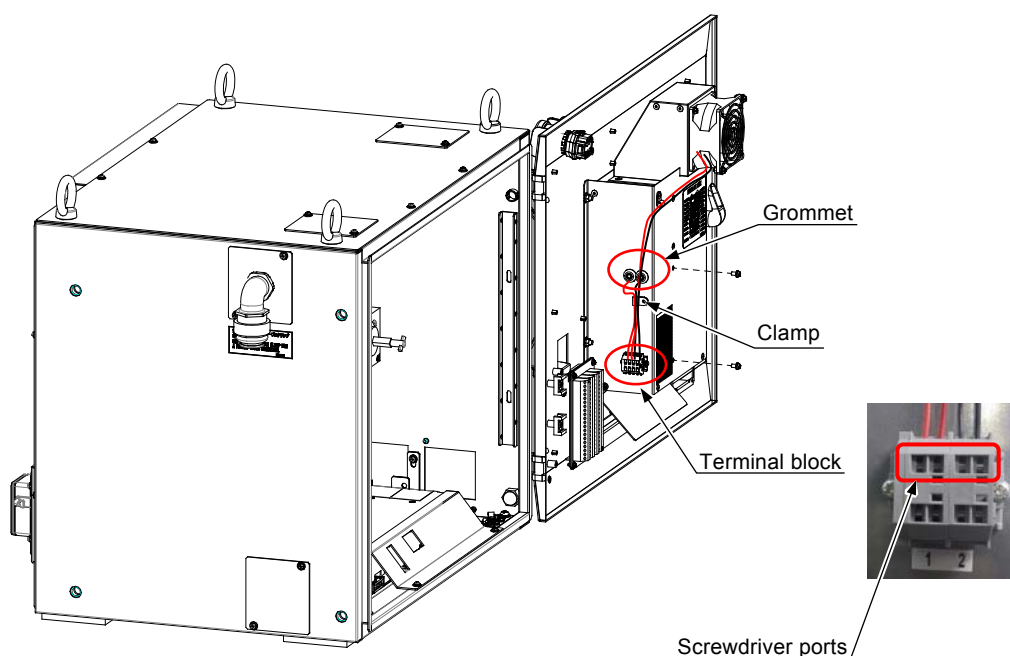


2 Replacing Parts

2.1 Replacing YRC1000 Parts

7. Mount a new fan by reversing the above-mentioned steps, in the order of 6, 5, 4, and 3. Pay attention to the direction of the fan rotation when mounting the fan. Make sure to mount the fan in the way that the rating label on the fan faces to the fan cover side.
(Refer to *fig. 2-7 "Fan Body"* and *fig. 2-11 "Fan Kit"*.)
(Make sure that the fan rotates in the direction in which the air from the fan blows toward the fan cover.)
When mounting the fan kit, make sure to prevent the power cables for the fan from getting caught in the fan kit. (Failure to observe this instruction may result in a ground fault.)
8. Pass the power cables for the fan through the grommets into the YRC1000. And then, pass the power cables through the clamps. By using a flathead screwdriver (small), press the levers of the terminal block, and connect the power cables (red and black) to the terminal block (No. 1 and 2). (Refer to *fig. 2-12 "Heat Exchanger"*.)

Fig. 2-12: Heat Exchanger



2 Replacing Parts

2.1 Replacing YRC1000 Parts

2.1.2.3 Replacing the Exterior Fan (TCMSY-320DC, TCMSY-322DC)

■ Replacement Procedure

1. Slide the front cover of the YRC1000 to the left to open it.
(Refer to *fig. 2-8 "Front Cover"*.)
2. Open the front door of the YRC1000.
By using a flathead screwdriver (small), press the levers of the terminal block (No.1 and 2) on the heat exchanger, and remove each power cable (red and black) for the exterior fan which is connected to the terminal block.
3. Remove the screws (2 places) securing the fan kit, and then remove the fan kit including the fan base. (Refer to *fig. 2-9 "Heat Exchanger"* and *fig. 2-10 "Exterior Fan"*.)
4. Remove the fan guard from the removed fan kit.
(Refer to *fig. 2-13 "Fan Kit (TCMSY-320DC)"* and *fig. 2-14 "Fan Kit (TCMSY-322DC)"*.)

Fig. 2-13: Fan Kit (TCMSY-320DC)

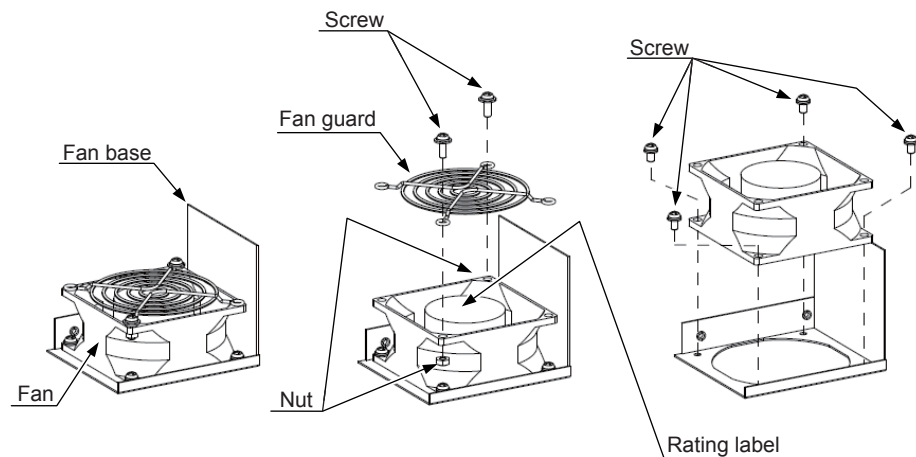
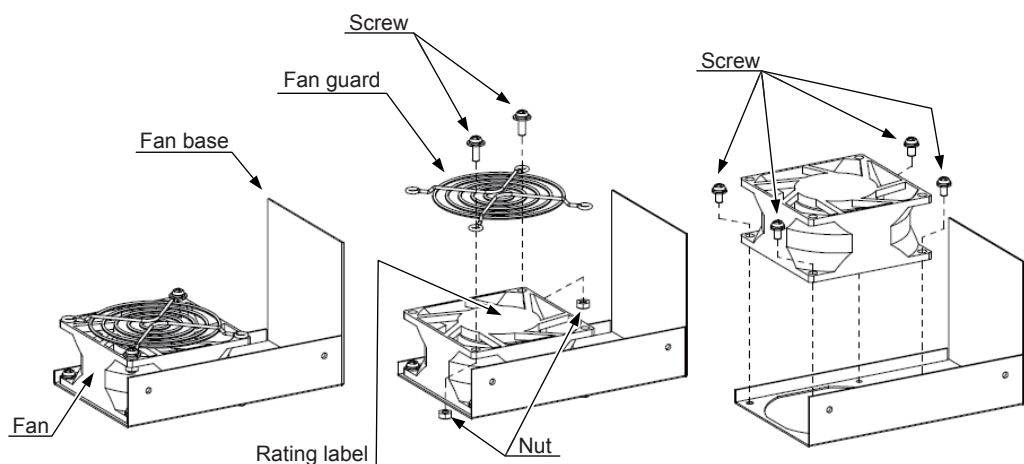


Fig. 2-14: Fan Kit (TCMSY-322DC)



2 Replacing Parts

2.1 Replacing YRC1000 Parts

5. From the fan body, remove the fan guard secured with screws and nuts (2 places).
Be careful not to lose the nuts when removing the screws.
(Refer to *fig. 2-13 "Fan Kit (TCMSY-320DC)"* and *fig. 2-14 "Fan Kit (TCMSY-322DC)"*.)
6. Remove the screws (4 places) securing the fan, and then remove the fan from the fan base. (Refer to *fig. 2-13* and *fig. 2-14*.)
7. Mount a new fan by reversing the above-mentioned steps, in the order of 6, 5, 4, and 3. Pay attention to the direction of the fan rotation when mounting the fan. Make sure to mount the fan in the way that the rating label on the fan faces to the fan guard side.
(Refer to *fig. 2-7 "Fan Body"* and *fig. 2-13* and *fig. 2-14*.)
(Make sure that the fan rotates in the direction in which the air from the fan blows toward the fan guard.)
When mounting the fan kit, make sure to prevent the power cables for the fan from getting caught in the fan kit. (Failure to observe this instruction may result in a ground fault.)
8. Pass the power cables for the fan through the grommets into the YRC1000. And then, pass the power cables through the clamps. By using a flathead screwdriver (small), press the levers of the terminal block, and connect the power cables (red and black) to the terminal block (No. 1 and 2). (Refer to *fig. 2-12 "Heat Exchanger"*.)

2.2 Parts List

For the models not described in this manual, refer to the YRC1000 instructions supplement.

Table 2-1: Parts List

No.	Name	Model	Comment
1	Heat exchanger	TCMSY-312DC	
	Exterior fan	08038RA-24Q-GA-04	
	Interior fan	08038RA-24Q-EA-02	
	Filter kit	GRM80-30	

Table 2-2: Parts List

No.	Name	Model	Comment
1	Heat exchanger	TCMSY-320DC TCMSY-322DC	
	Exterior fan	08038RA-24Q-GA-04	
	Interior fan	08038RA-24Q-EA-02	
	Filter kit	MM850-0811A	

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