Cat. No. I156E-EN-03

SCARA Robots
XG Series

R6Y - XG series

MAINTENANCE MANUAL

OMRON

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Safety Instructions

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1. Safety Information

Industrial robots are highly programmable, mechanical devices that provide a large degree of freedom when performing various manipulative tasks. To ensure safe and correct use of OMRON industrial robots and controllers, carefully read and comply with the safety instructions and precautions in this "Safety Instructions" guide. Failure to take necessary safety measures or incorrect handling may result in trouble or damage to the robot and controller, and also may cause personal injury (to installation personnel, robot operator or service personnel) including fatal accidents.

Before using this product, read this manual and related manuals and take safety precautions to ensure correct handling. The precautions listed in this manual relate to this product. To ensure safety of the user's final system that includes OMRON robots, please take appropriate safety measures as required by the user's individual system.

To use OMRON robots and controllers safely and correctly, always comply with the safety rules and instructions:

- For specific safety information and standards, refer to the applicable local regulations and comply with the instructions.
- Warning labels attached to the robots are written in English, Japanese, Chinese and Korean. This manual is available in English or Japanese (or some parts in Chinese). Unless the robot operators or service personnel understand these languages, do not permit them to handle the robot.
- Cautions regarding the official language of EU countries:
  For equipment that will be installed in EU countries, the language used for the manuals, warning labels, operation screen characters, and CE declarations is English only.
  Warning labels only have pictograms or else include warning messages in English. In the latter case, messages in Japanese or other languages might be added.

It is not possible to list all safety items in detail within the limited space of this manual. So please note that it is essential that the user have a full knowledge of safety and also make correct judgments on safety procedures.

2. Signal words used in this manual

This manual uses the following safety alert symbols and signal words to provide safety instructions that must be observed and to describe handling precautions, prohibited actions, and compulsory actions. Make sure you understand the meaning of each symbol and signal word and then read this manual.

DANGER

THIS INDICATES AN IMMEDIATELY HAZARDOUS SITUATION WHICH, IF NOT AVOIDED, WILL RESULT IN DEATH OR SERIOUS INJURY.

WARNING

THIS INDICATES A POTENTIALLY HAZARDOUS SITUATION WHICH, IF NOT AVOIDED, COULD RESULT IN DEATH OR SERIOUS INJURY.

CAUTION

This indicates a potentially hazardous situation which, if not avoided, could result in minor or moderate injury, or damage to the equipment.

NOTE

Explains the key point in the operation in a simple and clear manner.

3. Warning labels

Warning labels shown below are attached to the robot body and controller to alert the operator to potential hazards. To ensure correct use, read the warning labels and comply with the instructions.

3.1 Warning labels

WARNING

IF WARNING LABELS ARE REMOVED OR DIFFICULT TO SEE, THEN THE NECESSARY PRECAUTIONS MAY NOT BE TAKEN, RESULTING IN AN ACIDENT.

- DO NOT REMOVE, ALTER OR STAIN THE WARNING LABELS ON THE ROBOT BODY.
- DO NOT ALLOW WARNING LABELS TO BE HIDDEN BY DEVICES INSTALLED ON THE ROBOT BY THE USER.
- PROVIDE PROPER LIGHTING SO THAT THE SYMBOLS AND INSTRUCTIONS ON THE WARNING LABELS CAN BE CLEARLY SEEN FROM OUTSIDE THE SAFETY ENCLOSURE.

3.1.1 Warning label messages on robot and controller

Word messages on the danger, warning and caution labels are concise and brief instructions. For more specific instructions, read and follow the "Instructions on this label" described on the right of each label shown below.
See “7.1 Movement range” in “Safety instructions” for details on the robot’s movement range.

1. Warning label 1 (SCARA robots)

DANGER

SERIOUS INJURY MAY RESULT FROM CONTACT WITH A MOVING ROBOT.

- KEEP OUTSIDE OF THE ROBOT SAFETY ENCLOSURE DURING OPERATION.
- PRESS THE EMERGENCY STOP BUTTON BEFORE ENTERING THE SAFETY ENCLOSURE.

Instructions on this label
• Always install a safety enclosure to keep all persons away from the robot movement range and prevent injury from contacting the moving part of the robot. • Install an interlock that triggers emergency stop when the door or gate of the safety enclosure is opened. • The safety enclosure should be designed so that no one can enter inside except from the door or gate equipped with an interlock device. • Warning label 1 that comes supplied with a robot should be affixed to an easy-to-see location on the door or gate of the safety enclosure.

Potential hazard to human body	Serious injury may result from contact with a moving robot.
To avoid hazard	• Keep outside of the robot safety enclosure during operation. • Press the emergency stop button before entering the safety enclosure.

2. Warning label 2 (SCARA robots)

WARNING

MOVING PARTS CAN PINCH OR CRUSH HANDS.
KEEP HANDS AWAY FROM THE MOVABLE PARTS OF THE ROBOT.

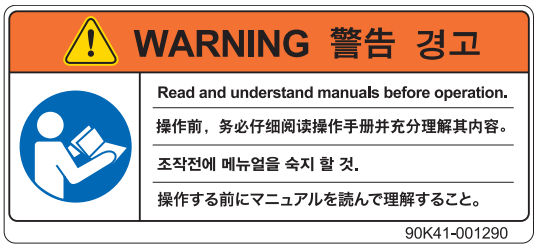
Instructions on this label
Use caution to prevent hands and fingers from being pinched or crushed by the movable parts of the robot when transporting or moving the robot or during teaching.

Potential hazard to human body	Moving parts can pinch or crush hands.
To avoid hazard	Keep hands away from the movable parts of the robot.

3. Warning label 3 (SCARA robots)

WARNING

IMPROPER INSTALLATION OR OPERATION MAY CAUSE SERIOUS INJURY.
BEFORE INSTALLING OR OPERATING THE ROBOT, READ THE MANUAL AND INSTRUCTIONS ON THE WARNING LABELS AND UNDERSTAND THE CONTENTS.

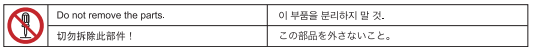


Instructions on this label	
• Be sure to read the warning label and this manual carefully to make you completely understand the contents before attempting installation and operation of the robot. • Before starting the robot operation, even after you have read through this manual, read again the corresponding procedures and "Safety instructions" in this manual. • Never install, adjust, inspect or service the robot in any manner that does not comply with the instructions in this manual.	
Potential hazard to human body	Improper installation or operation may cause serious injury.
To avoid hazard	Before installing or operating the robot, read the manual and instructions on the warning labels and understand the contents.

4. Warning label 4 (SCARA robots)

CAUTION

Do not remove the parts on which Warning label 4 is attached.
Doing so may damage the ball screw.

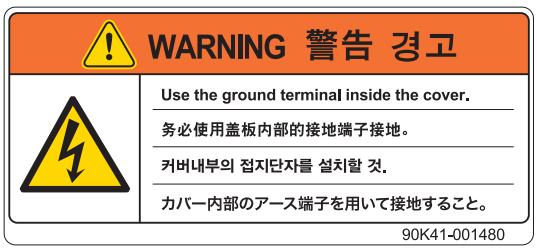


Instructions on this label
The Z-axis ball screw will be damaged if the upper end mechanical stopper on the Z-axis spline is removed or moved. Never attempt to remove or move it.

5. Warning label 5 (Controller)

WARNING

GROUND THE CONTROLLER TO PREVENT ELECTRICAL SHOCK.
GROUND TERMINAL IS LOCATED INSIDE THIS COVER.
READ THE MANUAL FOR DETAILS.



Instructions on this label	
• High voltage section inside • To prevent electrical shock, always ground the robot using the ground terminal located inside the cover.	
Potential hazard to human body	Electrical shock
To avoid hazard	Ground the controller.

6. "Read instruction manual" label (Controller)*

* This label is attached to the front panel.

CAUTION

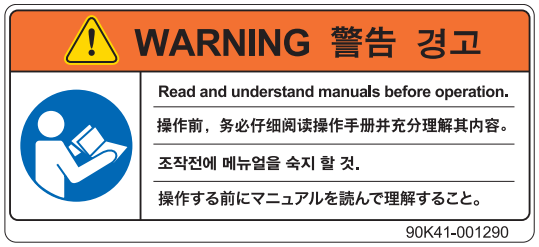
Refer to the manual.

	Instructions on this label
	This indicates important information that you must know and is described in the manual. Before using the controller, be sure to read the manual thoroughly. When adding external safety circuits or connecting a power supply to the controller, read the manual carefully and make checks before beginning the work. Connectors have an orientation. Insert each connector in the correct direction.

3.1.2 Supplied warning labels

Some warning labels are not affixed to robots but included in the packing box. **These warning labels should be affixed to an easy-to-see location.**

● Warning label is attached to the robot body.
○ Warning label comes supplied with the robot and should be affixed to an easy-to-see location on the door or gate of the safety enclosure.
◎ Warning label comes supplied with the robot and should be affixed to an easy-to-see location.

		SCARA robots
Warning label 1		●*1 ○
Warning label 2		●*1
Warning label 3		●*1

*1: See "Part names" in each SCARA robot manual for label positions.

3.2 Warning symbols

Warning symbols shown below are indicated on the robots and controllers to alert the operator to potential hazards. To use the OMRON robot safely and correctly always follow the instructions and cautions indicated by the symbols.

1. Electrical shock hazard symbol

WARNING

TOUCHING THE TERMINAL BLOCK OR CONNECTOR MAY CAUSE ELECTRICAL SHOCK, SO USE CAUTION.

	Instructions by this symbol
	This indicates a high voltage is present. Touching the terminal block or connector may cause electrical shock.

2. High temperature hazard symbol

WARNING

MOTORS, HEATSINKS, AND REGENERATIVE UNITS BECOME HOT, SO DO NOT TOUCH THEM.

	Instructions by this symbol
	This indicates the area around this symbol may become very hot. Motors, heatsinks, and regenerative units become hot during and shortly after operation. To avoid burns be careful not to touch those sections.

3. Caution symbol

CAUTION

Always read the manual carefully before using the controller.

	Instructions by this symbol
	This indicates important information that you must know and is described in the manual. Before using the controller, be sure to read the manual thoroughly. When adding external safety circuits or connecting a power supply to the controller, read the manual carefully and make checks before beginning the work. Connectors must be attached while facing a certain direction, so insert each connector in the correct direction.

4. Major precautions for each stage of use

This section describes major precautions that must be observed when using robots and controllers. Be sure to carefully read and comply with all of these precautions even if there is no alert symbol shown.

4.1 Precautions for using robots and controllers

General precautions for using robots and controllers are described below.

1. Applications where robots cannot be used

OMRON robots and robot controllers are designed as general-purpose industrial equipment and cannot be used for the following applications.

DANGER

OMRON ROBOT CONTROLLERS AND ROBOTS ARE DESIGNED AS GENERAL-PURPOSE INDUSTRIAL EQUIPMENT AND CANNOT BE USED FOR THE FOLLOWING APPLICATIONS.

- IN MEDICAL EQUIPMENT SYSTEMS WHICH ARE CRITICAL TO HUMAN LIFE
- IN SYSTEMS THAT SIGNIFICANTLY AFFECT SOCIETY AND THE GENERAL PUBLIC
- IN EQUIPMENT INTENDED TO CARRY OR TRANSPORT PEOPLE
- IN ENVIRONMENTS WHICH ARE SUBJECT TO VIBRATION SUCH AS ONBOARD SHIPS AND VEHICLES.

2. Qualification of operators/workers

Operators or persons who handle the robot such as for teaching, programming, movement check, inspection, adjustment, and repair must receive appropriate training and also have the skills needed to perform the job correctly and safely. They must read the manual carefully to understand its contents before attempting the robot operation or maintenance.

Tasks related to industrial robots (teaching, programming, movement check, inspection, adjustment, repair, etc.) must be performed by qualified persons who meet requirements established by local regulations and standards for industrial robots.

WARNING

- THE ROBOT MUST BE OPERATED ONLY BY PERSONS WHO HAVE RECEIVED SAFETY AND OPERATION TRAINING. OPERATION BY AN UNTRAINED PERSON IS EXTREMELY HAZARDOUS.
- ADJUSTMENT AND MAINTENANCE BY REMOVING A COVER REQUIRE SPECIALIZED TECHNICAL KNOWLEDGE AND SKILLS, AND MAY ALSO INVOLVE HAZARDS IF ATTEMPTED BY AN UNSKILLED PERSON. THESE TASKS MUST BE PERFORMED ONLY BY PERSONS WHO HAVE ENOUGH ABILITY AND QUALIFICATIONS IN ACCORDANCE WITH LOCAL LAWS AND REGULATIONS. FOR DETAILED INFORMATION, PLEASE CONTACT YOUR DISTRIBUTOR WHERE YOU PURCHASED THE PRODUCT.

4.2 Design

4.2.1 Precautions for robots

1. Restricting the robot moving speed

WARNING

RESTRICTION ON THE ROBOT MOVING SPEED IS NOT A SAFETY-RELATED FUNCTION.
TO REDUCE THE RISK OF COLLISION BETWEEN THE ROBOT AND WORKERS, THE USER MUST TAKE THE NECESSARY PROTECTIVE MEASURES SUCH AS ENABLE DEVICES ACCORDING TO RISK ASSESSMENT BY THE USER.

2. Restricting the movement range

See “7.1 Movement range” in “Safety instructions” for details on the robot’s movement range.

WARNING

SOFT LIMIT FUNCTION IS NOT A SAFETY-RELATED FUNCTION INTENDED TO PROTECT THE HUMAN BODY.
TO RESTRICT THE ROBOT MOVEMENT RANGE TO PROTECT THE HUMAN BODY, USE THE MECHANICAL STOPPERS INSTALLED IN THE ROBOT (OR AVAILABLE AS OPTIONS).

CAUTION

If the robot moving at high speed collides with a mechanical stopper installed in the robot (or available as option), the robot may be damaged.

3. Provide safety measures for end effector (gripper, etc.)

WARNING

- END EFFECTORS MUST BE DESIGNED AND MANUFACTURED SO THAT THEY CAUSE NO HAZARDS (SUCH AS A LOOSE WORKPIECE OR LOAD) EVEN IF POWER (ELECTRICITY, AIR PRESSURE, ETC.) IS SHUT OFF OR POWER FLUCTUATIONS OCCUR.
- IF THE OBJECT GRIPPED BY THE END EFFECTOR MIGHT POSSIBLY FLY OFF OR DROP, THEN PROVIDE APPROPRIATE SAFETY PROTECTION TAKING INTO ACCOUNT THE OBJECT SIZE, WEIGHT, TEMPERATURE, AND CHEMICAL PROPERTIES.

4. Provide adequate lighting

Provide enough lighting to ensure safety during work.

5. Install an operation status light

WARNING

INSTALL A SIGNAL LIGHT (SIGNAL TOWER) AT AN EASY-TO-SEE POSITION SO THAT THE OPERATOR WILL BE AWARE OF THE ROBOT STOP STATUS (TEMPORARILY STOPPED, EMERGENCY STOP, ERROR STOP, ETC.).

4.2.2 Precautions for robot controllers

1. Emergency stop input terminal

DANGER

EACH ROBOT CONTROLLER HAS AN EMERGENCY STOP INPUT TERMINAL TO TRIGGER EMERGENCY STOP. USING THIS TERMINAL, INSTALL A SAFETY CIRCUIT SO THAT THE SYSTEM INCLUDING THE ROBOT CONTROLLER WILL WORK SAFELY.

2. Maintain clearance

CAUTION

Do not bundle control lines or communication cables together or in close to the main power supply or power lines. Usually separate these by at least 100mm. Failure to follow this instruction may cause malfunction due to noise.

4.3 Moving and installation

4.3.1 Precautions for robots

■ Installation environment

1. Do not use in strong magnetic fields

WARNING

DO NOT USE THE ROBOT NEAR EQUIPMENT OR IN LOCATIONS THAT GENERATE STRONG MAGNETIC FIELDS. THE ROBOT MAY BREAK DOWN OR MALFUNCTION IF USED IN SUCH LOCATIONS.

2. Do not use in locations subject to possible electromagnetic interference, etc.

WARNING

DO NOT USE THE ROBOT IN LOCATIONS SUBJECT TO ELECTROMAGNETIC INTERFERENCE, ELECTROSTATIC DISCHARGE OR RADIO FREQUENCY INTERFERENCE. THE ROBOT MAY MALFUNCTION IF USED IN SUCH LOCATIONS CREATING HAZARDOUS SITUATIONS.

3. Do not use in locations exposed to flammable gases

WARNING

- OMRON ROBOTS ARE NOT DESIGNED TO BE EXPLOSION-PROOF.
- DO NOT USE THE ROBOTS IN LOCATIONS EXPOSED TO EXPLOSIVE OR INFLAMMABLE GASES, DUST PARTICLES OR LIQUID. FAILURE TO FOLLOW THIS INSTRUCTION MAY CAUSE SERIOUS ACCIDENTS INVOLVING INJURY OR DEATH, OR LEAD TO FIRE.

■ Moving

1. Use caution to prevent pinching or crushing of hands or fingers

WARNING

MOVING PARTS CAN PINCH OR CRUSH HANDS OR FINGERS.
KEEP HANDS AWAY FROM THE MOVABLE PARTS OF THE ROBOT.

As instructed in Warning label 2, use caution to prevent hands or fingers from being pinched or crushed by movable parts when transporting or moving the robot. For details on warning labels, see "3. Warning labels" in "Safety instructions."

2. Take safety measures when moving the robot

To ensure safety when moving a SCARA robot with an arm length of 500mm or more, use the eyebolts that come supplied with the robot.
Refer to the Robot Manual for details.

■ Installation

1. Protect electrical wiring and hydraulic/pneumatic hoses

Install a cover or similar item to protect the electrical wiring and hydraulic/pneumatic hoses from possible damage.

■ Wiring

1. Protective measures against electrical shock

WARNING

ALWAYS GROUND THE ROBOT TO PREVENT ELECTRICAL SHOCK.

■ Adjustment

1. Adjustment that requires removing a cover

WARNING

ADJUSTMENT BY REMOVING A COVER REQUIRE SPECIALIZED TECHNICAL KNOWLEDGE AND SKILLS, AND MAY ALSO INVOLVE HAZARDS IF ATEMPTED BY AN UNSKILLED PERSON. THESE TASKS MUST BE PERFORMED ONLY BY PERSONS WHO HAVE ENOUGH ABILITY AND QUALIFICATIONS IN ACORDANCE WITH LOCAL LAWS AND REGULATIONS. FOR DETAILED INFORMATION, PLEASE CONTACT YOUR DISTRIBUTOR WHERE YOU PURCHASED THE PRODUCT.

4.3.2 Precautions for robot controllers

■ Installation environment

1. Installation environment

WARNING

OMRON ROBOTS ARE NOT DESIGNED TO BE EXPLOSION-PROOF. DO NOT USE THE ROBOTS AND CONTROLLERS IN LOCATIONS EXPOSED TO EXPLOSIVE OR INFLAMMABLE GASES, DUST PARTICLES OR LIQUID SUCH AS GASOLINE AND SOLVENTS. FAILURE TO FOLLOW THIS INSTRUCTION MAY CAUSE SERIOUS ACCIDENTS INVOLVING INJURY OR DEATH, AND LEAD TO FIRE.

WARNING

- USE THE ROBOT CONTROLLER IN LOCATIONS THAT SUPPORT THE ENVIRONMENTAL CONDITIONS SPECIFIED IN THIS MANUAL. OPERATION OUTSIDE THE SPECIFIED ENVIRONMENTAL RANGE MAY CAUSE ELECTRICAL SHOCK, FIRE, MALFUNCTION OR PRODUCT DAMAGE OR DETERIORATION.
- THE ROBOT CONTROLLER AND PROGRAMMING BOX MUST BE INSTALLED AT A LOCATION THAT IS OUTSIDE THE ROBOT SAFETY ENCLOSURE YET WHERE IT IS EASY TO OPERATE AND VIEW ROBOT MOVEMENT.
- INSTALL THE ROBOT CONTROLLER IN LOCATIONS WITH ENOUGH SPACE TO PERFORM WORK (TEACHING, INSPECTION, ETC.) SAFELY. LIMITED SPACE NOT ONLY MAKES IT DIFFICULT TO PERFORM WORK BUT CAN ALSO CAUSE INJURY.
- INSTALL THE ROBOT CONTROLLER IN A STABLE, LEVEL LOCATION AND SECURE IT FIRMLY. AVOID INSTALLING THE CONTROLLER UPSIDE DOWN OR IN A TILTED POSITION.
- PROVIDE SUFFICIENT CLEARANCE AROUND THE ROBOT CONTROLLER FOR GOOD VENTILATION. INSUFFICIENT CLEARANCE MAY CAUSE MALFUNCTION, BREAKDOWN OR FIRE.

■ Installation

To install the robot controller, observe the installation conditions and method described in the manual.

1. Installation

WARNING

SECURELY TIGHTEN THE SCREWS FOR THE L-SHAPED BRACKETS USED TO INSTALL THE ROBOT CONTROLLER. IF NOT SECURELY TIGHTENED, THE SCREWS MAY COME LOOSE CAUSING THE CONTROLLER TO DROP.

2. Connections

WARNING

- ALWAYS SHUT OFF ALL PHASES OF THE POWER SUPPLY EXTERNALLY BEFORE STARTING INSTALLATION OR WIRING WORK. FAILURE TO DO THIS MAY CAUSE ELECTRICAL SHOCK OR PRODUCT DAMAGE.
- NEVER DIRECTLY TOUCH CONDUCTIVE SECTIONS AND ELECTRONIC PARTS OTHER THAN THE CONNECTORS, ROTARY SWITCHES, AND DIP SWITCHES ON THE OUTSIDE PANEL OF THE ROBOT CONTROLLER. TOUCHING THEM MAY CAUSE ELECTRICAL SHOCK OR BREAKDOWN.
- SECURELY INSTALL EACH CABLE CONNECTOR INTO THE RECEPTACLES OR SOCKETS. POOR CONNECTIONS MAY CAUSE THE CONTROLLER OR ROBOT TO MALFUNCTION.

■ Wiring

1. Connection to robot controller

The controller parameters are preset at the factory before shipping to match the robot model. Check the specified robot and controller combination, and connect them in the correct combination.
Since the software detects abnormal operation such as motor overloads, the controller parameters must be set correctly to match the motor type used in the robot connected to the controller.

2. Wiring safety points

WARNING

ALWAYS SHUT OFF ALL PHASES OF THE POWER SUPPLY EXTERNALLY BEFORE STARTING INSTALLATION OR WIRING WORK. FAILURE TO DO THIS MAY CAUSE ELECTRICAL SHOCK OR PRODUCT DAMAGE.

CAUTION

- Make sure that no foreign matter such as cutting chips or wire scraps get into the robot controller. Malfunction, breakdown or fire may result if these penetrate inside.
- Do not apply excessive impacts or loads to the connectors when making cable connections. This might bend the connector pins or damage the internal PC board.
- When using ferrite cores for noise elimination, be sure to fit them onto the power cable as close to the robot controller and/or the robot as possible, to prevent malfunction caused by noise.

3. Wiring method

WARNING

SECURELY INSTALL THE CONNECTORS INTO THE ROBOT CONTROLLER AND, WHEN WIRING THE CONNECTORS, MAKE THE CRIMP, PRESS-CONTACT OR SOLDER CONNECTIONS CORRECTLY USING THE TOOL SPECIFIED BY THE CONNECTOR MANUFACTURER.

CAUTION

When disconnecting the cable from the robot controller, detach by gripping the connector itself and not by tugging on the cable. Loosen the screws on the connector (if fastened with the screws), and then disconnect the cable. Trying to detach by pulling on the cable itself may damage the connector or cables, and poor cable contact will cause the controller or robot to malfunction.

4. Precautions for cable routing and installation

CAUTION

- Always store the cables connected to the robot controller in a conduit or clamp them securely in place. If the cables are not stored in a conduit or properly clamped, excessive play or movement or mistakenly pulling on the cable may damage the connector or cables, and poor cable contact will cause the controller or robot to malfunction.
- Do not modify the cables and do not place any heavy objects on them. Handle them carefully to avoid damage. Damaged cables may cause malfunction or electrical shock.
- If the cables connected to the robot controller may possibly become damaged, then protect them with a cover, etc.
- Check that the control lines and communication cables are routed at a gap sufficiently away from main power supply circuits and power lines, etc. Bundling them together with power lines or close to power lines may cause faulty operation due to noise.

5. Protective measures against electrical shock

WARNING

BE SURE TO GROUND THE CONTROLLER USING THE GROUND TERMINAL ON THE POWER TERMINAL BLOCK. POOR GROUNDING MAY CAUSE ELECTRICAL SHOCK.

4.4 Safety measures

4.4.1 Safety measures

1. Referring to warning labels and manual

WARNING

- BEFORE STARTING INSTALLATION OR OPERATION OF THE ROBOT, BE SURE TO READ THE WARNING LABELS AND THIS MANUAL, AND COMPLY WITH THE INSTRUCTIONS.
- NEVER ATTEMPT ANY REPAIR, PARTS REPLACEMENT AND MODIFICATION UNLESS DESCRIBED IN THIS MANUAL. THESE TASKS REQUIRE SPECIALIZED TECHNICAL KNOWLEDGE AND SKILLS AND MAY ALSO INVOLVE HAZARDS. PLEASE CONTACT YOUR DISTRIBUTOR FOR ADVICE.

NOTE

For details on warning labels, see "3. Warning labels" in "Safety instructions."

2. Draw up "work instructions" and make the operators/workers understand them

WARNING

DECIDE ON "WORK INSTRUCTIONS" IN CASES WHERE PERSONNEL MUST WORK WITHIN THE ROBOT SAFETY ENCLOSURE TO PERFORM STARTUP OR MAINTENANCE WORK. MAKE SURE THE WORKERS COMPLETELY UNDERSTAND THESE "WORK INSTRUCTIONS".

Decide on "work instructions" for the following items in cases where personnel must work within the robot safety enclosure to perform teaching, maintenance or inspection tasks. Make sure the workers completely understand these "work instructions".

1. Robot operating procedures needed for tasks such as startup procedures and handling switches
2. Robot speeds used during tasks such as teaching
3. Methods for workers to signal each other when two or more workers perform tasks
4. Steps that the worker should take when a problem or emergency occurs
5. Steps to take after the robot has come to a stop when the emergency stop device was triggered, including checks for cancelling the problem or error state and safety checks in order to restart the robot.
6. In cases other than above, the following actions should be taken as needed to prevent hazardous situations due to sudden or unexpected robot operation or faulty robot operation as listed below.
   - Place a display sign on the operator panel
   - Ensure the safety of workers performing tasks within the robot safety enclosure
   - Clearly specify position and posture during work
     Specify a position and posture where worker can constantly check robot movements and immediately move to avoid trouble if an error/problem occurs
   - Take noise prevention measures
   - Use methods for signaling operators of related equipment
   - Use methods to decide that an error has occurred and identify the type of error

Implement the "work instructions" according to the type of robot, installation location, and type of work task.
When drawing up the "work instructions", make an effort to include opinions from the workers involved, equipment manufacturer technicians, and workplace safety consultants, etc.

3. Take safety measures

DANGER

- NEVER ENTER THE ROBOT MOVEMENT RANGE WHILE THE ROBOT IS OPERATING OR THE MAIN POWER IS TURNED ON. FAILURE TO FOLLOW THIS WARNING MAY CAUSE SERIOUS ACCIDENTS INVOLVING INJURY OR DEATH. INSTALL A SAFETY ENCLOSURE OR A GATE INTERLOCK WITH AN AREA SENSOR TO KEEP ALL PERSONS AWAY FROM THE ROBOT MOVEMENT RANGE.
- WHEN IT IS NECESSARY TO OPERATE THE ROBOT WHILE YOU ARE WITHIN THE ROBOT MOVEMENT RANGE SUCH AS FOR TEACHING OR MAINTENANCE/INSPECTION TASKS, ALWAYS CARRY THE PROGRAMMING BOX WITH YOU SO THAT YOU CAN IMMEDIATELY STOP THE ROBOT OPERATION IN CASE OF AN ABNORMAL OR HAZARDOUS CONDITION. INSTALL AN ENABLE DEVICE IN THE EXTERNAL SAFETY CIRCUIT AS NEEDED. ALSO SET THE ROBOT MOVING SPEED TO 3% OR LESS. FAILURE TO FOLLOW THESE INSTRUCTIONS MAY CAUSE SERIOUS ACCIDENTS INVOLVING INJURY OR DEATH.

See “7.1 Movement range” in “Safety instructions” for details on the robot’s movement range.

WARNING

- DURING STARTUP OR MAINTENANCE TASKS, DISPLAY A SIGN "WORK IN PROGRESS" ON THE PROGRAMMING BOX AND OPERATION PANEL IN ORDER TO PREVENT ANYONE OTHER THAN THE PERSON FOR THAT TASK FROM MISTAKENLY OPERATING THE START OR SELECTOR SWITCH. IF NEEDED, TAKE OTHER MEASURES SUCH AS LOCKING THE COVER ON THE OPERATION PANEL.
- ALWAYS CONNECT THE ROBOT AND ROBOT CONTROLLER IN THE CORRECT COMBINATION. USING THEM IN AN INCORRECT COMBINATION MAY CAUSE FIRE OR BREAKDOWN.

4. Install system

When configuring an automated system using a robot, hazardous situations are more likely to occur from the automated system than the robot itself. So the system manufacturer should install the necessary safety measures required for the individual system. The system manufacturer should provide a proper manual for safe, correct operation and servicing of the system.

WARNING

TO CHECK THE ROBOT CONTROLLER OPERATING STATUS, REFER TO THIS MANUAL AND TO RELATED MANUALS. DESIGN AND INSTALL THE SYSTEM INCLUDING THE ROBOT CONTROLLER SO THAT IT WILL ALWAYS WORK SAFELY.

5. Precautions for operation

WARNING

- DO NOT TOUCH ANY ELECTRICAL TERMINAL. DIRECTLY TOUCHING THESE TERMINALS MAY CAUSE ELECTRICAL SHOCK, EQUIPMENT DAMAGE, AND MALFUNCTION.
- DO NOT TOUCH OR OPERATE THE ROBOT CONTROLLER OR PROGRAMMING BOX WITH WET HANDS. TOUCHING OR OPERATING THEM WITH WET HANDS MAY RESULT IN ELECTRICAL SHOCK OR BREAKDOWN.

6. Do not disassemble and modify

WARNING

NEVER DISASSEMBLE AND MODIFY ANY PART IN THE ROBOT, CONTROLLER, AND PROGRAMMING BOX. DO NOT OPEN ANY COVER. DOING SO MAY CAUSE ELECTRICAL SHOCK, BREAKDOWN, MALFUNCTION, INJURY, OR FIRE.

4.4.2 Installing a safety enclosure

Be sure to install a safety enclosure to keep anyone from entering within the movement range of the robot. The safety enclosure will prevent the operator and other persons from coming in contact with moving parts of the robot and suffering injury.
See “7.1 Movement range” in “Safety instructions” for details on the robot’s movement range.

DANGER

SERIOUS INJURY MAY RESULT FROM CONTACT WITH A MOVING ROBOT.

- KEEP OUTSIDE OF THE ROBOT SAFETY ENCLOSURE DURING OPERATION.
- PRESS THE EMERGENCY STOP BUTTON BEFORE ENTERING THE SAFETY ENCLOSURE.

WARNING

- INSTALL AN INTERLOCK THAT TRIGGERS EMERGENCY STOP WHEN THE DOOR OR GATE OF THE SAFETY ENCLOSURE IS OPENED.
- THE SAFETY ENCLOSURE SHOULD BE DESIGNED SO THAT NO ONE CAN ENTER INSIDE EXCEPT FROM THE DOOR OR GATE EQUIPPED WITH AN INTERLOCK DEVICE.
- WARNING LABEL 1 (SEE "3. WARNING LABELS" IN "SAFETY INSTRUCTIONS") THAT COMES SUPPLIED WITH A ROBOT SHOULD BE AFFIXED TO AN EASY-TO-SEE LOCATION ON THE DOOR OR GATE OF THE SAFETY ENCLOSURE.

4.5 Operation

When operating a robot, ignoring safety measures and checks may lead to serious accidents. Always take the following safety measures and checks to ensure safe operation.

DANGER

CHECK THE FOLLOWING POINTS BEFORE STARTING ROBOT OPERATION.

- NO ONE IS WITHIN THE ROBOT SAFETY ENCLOSURE.
- THE PROGRAMMING UNIT IS IN THE SPECIFIED LOCATION.
- THE ROBOT AND PERIPHERAL EQUIPMENT ARE IN GOOD CONDITION.

4.5.1 Trial operation

After installing, adjusting, inspecting, maintaining or repairing the robot, perform trial operation using the following procedures.

1. If a safety enclosure has not yet been provided right after installing the robot:

Then rope off or chain off the movement range around the robot in place of the safety enclosure and observe the following points. See “7.1 Movement range” in “Safety instructions” for details on the robot’s movement range.

DANGER

PLACE A "ROBOT IS MOVING - KEEP AWAY!" SIGN TO KEEP THE OPERATOR OR OTHER PERSONNEL FROM ENTERING WITHIN THE MOVEMENT RANGE OF THE ROBOT.

WARNING

- USE STURDY, STABLE POSTS WHICH WILL NOT FALL OVER EASILY.
- THE ROPE OR CHAIN SHOULD BE EASILY VISIBLE TO EVERYONE AROUND THE ROBOT.

2. Check the following points before turning on the controller.

- Is the robot securely and correctly installed?
- Are the electrical connections to the robot wired correctly?
- Are items such as air pressure correctly supplied?
- Is the robot correctly connected to peripheral equipment?
- Have safety measures (safety enclosure, etc.) been taken?
- Does the installation environment meet the specified standards?

3. After the controller is turned on, check the following points from outside the safety enclosure.

- Does the robot start, stop and enter the selected operation mode as intended?
- Does each axis move as intended within the soft limits?
- Does the end effector move as intended?
- Are the correct signals being sent to the end effector and peripheral equipment?
- Does emergency stop function?
- Are teaching and playback functions normal?
- Are the safety enclosure and interlocks functioning as intended?

4. Working inside safety enclosures

Before starting work within the safety enclosure, **always confirm from outside the enclosure that each protective function is operating correctly (see the previous section 2.3).**

DANGER

NEVER ENTER WITHIN THE MOVEMENT RANGE WHILE WITHIN THE SAFETY ENCLOSURE.

See “7.1 Movement range” in “Safety instructions” for details on the robot’s movement range.

WARNING

WHEN WORK IS REQUIRED WITHIN THE SAFETY ENCLOSURE, PLACE A SIGN "WORK IN PROGRESS" IN ORDER TO KEEP OTHER PERSONS FROM OPERATING THE CONTROLLER SWITCH OR OPERATION PANEL.

WARNING

WHEN WORK WITHIN THE SAFETY ENCLOSURE IS REQUIRED, ALWAYS TURN OFF THE CONTROLLER POWER EXCEPT FOR THE FOLLOWING CASES:

Exception

Work with power turned on, but robot in emergency stop

Origin position setting	**SCARA robots**	Follow the precautions and procedure described in "2. Adjusting the origin" in Chapter 3.
Standard coordinate setting	**SCARA robots**	Follow the precautions and procedure described in "4. Setting the standard coordinates" in Chapter 3.
Soft limit settings	**SCARA robots**	Follow the precautions and procedure described in "3. Setting the soft limits" in Chapter 3.

Work with power turned on

Teaching	**SCARA robots**	Refer to "5. Teaching within safety enclosure" described below.

5. Teaching within the safety enclosure

When performing teaching within the safety enclosure, check or perform the following points **from outside the safety enclosure**.

DANGER

NEVER ENTER WITHIN THE MOVEMENT RANGE WHILE WITHIN THE SAFETY ENCLOSURE.

See “7.1 Movement range” in “Safety instructions” for details on the robot’s movement range.

WARNING

- MAKE A VISUAL CHECK TO ENSURE THAT NO HAZARDS ARE PRESENT WITHIN THE SAFETY ENCLOSURE.
- CHECK THAT THE PROGRAMMING BOX OR HANDY TERMINAL OPERATES CORRECTLY.
- CHECK THAT NO FAILURES ARE FOUND IN THE ROBOT.
- CHECK THAT EMERGENCY STOP WORKS CORRECTLY.
- SELECT TEACHING MODE AND DISABLE AUTOMATIC OPERATION.

4.5.2 Automatic operation

Check the following points when operating the robot in AUTO mode. Observe the instructions below in cases where an error occurs during automatic operation. Automatic operation described here includes all operations in AUTO mode.

1. Checkpoints before starting automatic operation

Check the following points before starting automatic operation

DANGER

- CHECK THAT NO ONE IS WITHIN THE SAFETY ENCLOSURE.
- CHECK THE SAFETY ENCLOSURE IS SECURELY INSTALLED WITH INTERLOCKS FUNCTIONAL.

WARNING

- CHECK THAT THE PROGRAMMING BOX / HANDY TERMINAL AND TOOLS ARE IN THEIR SPECIFIED LOCATIONS.
- CHECK THAT THE SIGNAL TOWER LAMPS OR OTHER ALARM DISPLAYS INSTALLED FOR THE SYSTEM ARE NOT LIT OR FLASHING, INDICATING NO ERROR IS OCCURRING ON THE ROBOT AND PERIPHERAL DEVICES.

2. During automatic operation and when errors occur

After automatic operation starts, check the operation status and the signal tower to ensure that the robot is in automatic operation.

DANGER

NEVER ENTER THE SAFETY ENCLOSURE DURING AUTOMATIC OPERATION.

WARNING

IF AN ERROR OCCURS IN THE ROBOT OR PERIPHERAL EQUIPMENT, OBSERVE THE FOLLOWING PROCEDURE BEFORE ENTERING THE SAFETY ENCLOSURE.

1) PRESS THE EMERGENCY STOP BUTTON TO SET THE ROBOT TO EMERGENCY STOP.
2) PLACE A SIGN ON THE START SWITCH, INDICATING THAT THE ROBOT IS BEING INSPECTED IN ORDER TO KEEP OTHER PERSONS FROM RESTARTING THE ROBOT.

4.5.3 Precautions during operation

1. When the robot is damaged or an abnormal condition occurs

WARNING

- IF UNUSUAL ODORS, NOISE OR SMOKE OCCUR DURING OPERATION, IMMEDIATELY TURN OFF POWER TO PREVENT POSSIBLE ELECTRICAL SHOCK, FIRE OR BREAKDOWN. STOP USING THE ROBOT AND CONTACT YOUR DISTRIBUTOR.
- IF ANY OF THE FOLLOWING DAMAGE OR ABNORMAL CONDITIONS OCCURS THE ROBOT, THEN CONTINUING TO OPERATE THE ROBOT IS DANGEROUS. IMMEDIATELY STOP USING THE ROBOT AND CONTACT YOUR DISTRIBUTOR.

Damage or abnormal condition	Type of danger
Damage to machine harness or robot cable	Electrical shock, robot malfunction
Damage to robot exterior	Damaged parts fly off during robot operation
Abnormal robot operation (position deviation, vibration, etc.)	Robot malfunction
Z-axis (vertical axis) or brake malfunction	Loads fall off

2. High temperature hazard

WARNING

- DO NOT TOUCH THE ROBOT CONTROLLER AND ROBOT DURING OPERATION. THE ROBOT CONTROLLER AND ROBOT BODY ARE VERY HOT DURING OPERATION, SO BURNS MAY OCCUR IF THESE SECTIONS ARE TOUCHED.
- THE MOTOR AND SPEED REDUCTION GEAR CASING ARE VERY HOT SHORTLY AFTER OPERATION, SO BURNS MAY OCCUR IF THESE ARE TOUCHED. BEFORE TOUCHING THOSE PARTS FOR INSPECTIONS OR SERVICING, TURN OFF THE CONTROLLER, WAIT FOR A WHILE AND CHECK THAT THEIR TEMPERATURE HAS COOLED.

3. Use caution when releasing the Z-axis (vertical axis) brake

WARNING

THE VERTICAL AXIS WILL SLIDE DOWNWARD WHEN THE BRAKE IS RELEASED, CAUSING A HAZARDOUS SITUATION. TAKE ADEQUATE SAFETY MEASURES IN CONSIDERATION BY TAKING THE WEIGHT AND SHAPE INTO ACCOUNT.

- BEFORE RELEASING THE BRAKE AFTER PRESSING THE EMERGENCY STOP BUTTON, PLACE A SUPPORT UNDER THE VERTICAL AXIS SO THAT IT WILL NOT SLIDE DOWN.
- BE CAREFUL NOT TO LET YOUR BODY GET CAUGHT BETWEEN THE VERTICAL AXIS AND THE INSTALLATION BASE WHEN PERFORMING TASKS (DIRECT TEACHING, ETC.) WITH THE BRAKE RELEASED.

4. Be careful of Z-axis movement when the controller is turned off or emergency stop is triggered (air-driven Z-axis)

WARNING

THE Z-AXIS STARTS MOVING UPWARD WHEN POWER TO THE CONTROLLER OR PLC IS TURNED OFF, THE PROGRAM IS RESET, EMERGENCY STOP IS TRIGGERED, OR AIR IS SUPPLIED TO THE SOLENOID VALVE FOR THE Z-AXIS AIR CYLINDER.

- DO NOT LET HANDS OR FINGERS GET CAUGHT AND SQUEEZED BY ROBOT PARTS MOVING ALONG THE Z-AXIS.
- KEEP THE USUAL ROBOT POSITION IN MIND SO AS TO PREVENT THE Z-AXIS FROM HANGING UP OR BINDING ON OBSTACLES DURING RAISING OF THE Z-AXIS EXCEPT IN CASE OF EMERGENCY STOP.

5. Take protective measures when the Z-axis interferes with peripheral equipment (air-driven Z-axis)

WARNING

WHEN THE Z-AXIS COMES TO A STOP DUE TO OBSTRUCTION FROM PERIPHERAL EQUIPMENT, THE Z-AXIS MAY MOVE SUDDENLY AFTER THE OBSTRUCTION IS REMOVED, CAUSING INJURY SUCH AS PINCHED OR CRUSHED HANDS.

- TURN OFF THE CONTROLLER AND REDUCE THE AIR PRESSURE BEFORE ATTEMPTING TO REMOVE THE OBSTRUCTION.
- BEFORE REDUCING THE AIR PRESSURE, PLACE A SUPPORT UNDER THE Z-AXIS BECAUSE THE Z-AXIS WILL DROP UNDER ITS OWN WEIGHT.

6. Be careful of Z-axis movement when air supply is stopped (air-driven Z-axis)

WARNING

THE Z-AXIS WILL SLIDE DOWNWARD WHEN THE AIR PRESSURE TO THE Z-AXIS AIR CYLINDER SOLENOID VALVE IS REDUCED, CREATING A HAZARDOUS SITUATION.
TURN OFF THE CONTROLLER AND PLACE A SUPPORT UNDER THE Z-AXIS BEFORE CUTTING OFF THE AIR SUPPLY.

7. Make correct parameter settings

CAUTION

The robot must be operated with the correct tolerable moment of inertia and acceleration coefficients that match the manipulator tip mass and moment of inertia. Failure to follow this instruction will lead to a premature end to the drive unit service life, damage to robot parts, or cause residual vibration during positioning.

8. If the X-axis, Y-axis or R-axis rotation angle is small

CAUTION

If the X-axis, Y-axis or R-axis rotation angle is set smaller than 5 degrees, then it will always move within the same position. This restricted position makes it difficult for an oil film to form on the joint support bearing, and so may possibly damage the bearing. In this type of operation, add a range of motion so that the joint moves through 90 degrees or more, about 5 times a day.

4.6 Inspection and maintenance

Always perform daily and periodic inspections and make a pre-operation check to ensure there are no problems with the robot and related equipment. If a problem or abnormality is found, then promptly repair it or take other measures as necessary.
Keep a record of periodic inspections or repairs and store this record for at least 3 years.

4.6.1 Before inspection and maintenance work

1. Do not attempt any work or operation unless described in this manual.

Never attempt any work or operation unless described in this manual.
If an abnormal condition occurs, please be sure to contact your distributor. Our service personnel will take appropriate action.

WARNING

NEVER ATTEMPT INSPECTION, MAINTENANCE, REPAIR, AND PART REPLACEMENT UNLESS DESCRIBED IN THIS MANUAL. THESE TASKS REQUIRE SPECIALIZED TECHNICAL KNOWLEDGE AND SKILLS AND MAY ALSO INVOLVE HAZARDS. PLEASE BE SURE TO CONTACT YOUR DISTRIBUTOR FOR ADVICE.

2. Precautions during repair and parts replacement

WARNING

WHEN IT IS NECESSARY TO REPAIR OR REPLACE PARTS OF THE ROBOT OR CONTROLLER, PLEASE BE SURE TO CONTACT YOUR DISTRIBUTOR AND FOLLOW THE INSTRUCTIONS THEY PROVIDE. INSPECTION AND MAINTENANCE OF THE ROBOT OR CONTROLLER BY AN UNSKILLED, UNTRAINED PERSON IS EXTREMELY HAZARDOUS.

Adjustment, maintenance and parts replacement require specialized technical knowledge and skills, and also may involve hazards. These tasks must be performed only by persons who have enough ability and qualifications required by local laws and regulations.

WARNING

ADJUSTMENT AND MAINTENANCE BY REMOVING A COVER REQUIRE SPECIALIZED TECHNICAL KNOWLEDGE AND SKILLS, AND MAY ALSO INVOLVE HAZARDS IF ATTEMPTED BY AN UNSKILLED PERSON. FOR DETAILED INFORMATION, PLEASE CONTACT YOUR DISTRIBUTOR WHERE YOU PURCHASED THE PRODUCT.

3. Shut off all phases of power supply

WARNING

ALWAYS SHUT OFF ALL PHASES OF THE POWER SUPPLY EXTERNALLY BEFORE CLEANING THE ROBOT AND CONTROLLER OR SECURELY TIGHTENING THE TERMINAL SCREWS ETC. FAILURE TO DO THIS MAY CAUSE ELECTRICAL SHOCK OR PRODUCT DAMAGE OR MALFUNCTION.

4. Allow a waiting time after power is shut off (Allow time for temperature and voltage to drop)

WARNING

- WHEN PERFORMING MAINTENANCE OR INSPECTION OF THE ROBOT CONTROLLER UNDER YOUR DISTRIBUTOR'S INSTRUCTIONS, WAIT AT LEAST THE TIME SPECIFIED FOR EACH CONTROLLER AFTER TURNING THE POWER OFF. SOME COMPONENTS IN THE ROBOT CONTROLLER ARE VERY HOT OR STILL RETAIN A HIGH VOLTAGE SHORTLY AFTER OPERATION, SO BURNS OR ELECTRICAL SHOCK MAY OCCUR IF THOSE PARTS ARE TOUCHED.
- THE MOTOR AND SPEED REDUCTION GEAR CASING ARE VERY HOT SHORTLY AFTER OPERATION, SO BURNS MAY OCCUR IF THEY ARE TOUCHED. BEFORE TOUCHING THOSE PARTS FOR INSPECTIONS OR SERVICING, TURN OFF THE CONTROLLER, WAIT FOR A WHILE AND CHECK THAT THE TEMPERATURE HAS COOLED.

5. Precautions during inspection of controller

WARNING

- WHEN YOU NEED TO TOUCH THE TERMINALS OR CONNECTORS ON THE OUTSIDE OF THE CONTROLLER DURING INSPECTION, ALWAYS FIRST TURN OFF THE CONTROLLER POWER SWITCH AND ALSO THE POWER SOURCE IN ORDER TO PREVENT POSSIBLE ELECTRICAL SHOCK.
- DO NOT DISASSEMBLE THE CONTROLLER. NEVER TOUCH ANY INTERNAL PARTS OF THE CONTROLLER. DOING SO MAY CAUSE BREAKDOWN, MALFUNCTION, INJURY, OR FIRE.

4.6.2 Precautions during service work

1. Be careful when removing the Z-axis motor (SCARA robots)

WARNING

THE Z-AXIS WILL SLIDE DOWNWARD WHEN THE Z-AXIS MOTOR IS REMOVED, CAUSING A HAZARDOUS SITUATION.

- TURN OFF THE CONTROLLER AND PLACE A SUPPORT UNDER THE Z-AXIS BEFORE REMOVING THE Z-AXIS MOTOR.
- BE CAREFUL NOT TO LET YOUR BODY GET CAUGHT BY THE DRIVING UNIT OF THE Z-AXIS OR BETWEEN THE Z-AXIS DRIVE UNIT AND THE INSTALLATION BASE.

2. Do not remove the Z-axis upper limit mechanical stopper

CAUTION

Warning label 4 is attached to each SCARA robot. (For details on warning labels, see "3. Warning labels" in "Safety instructions.") Removing the upper limit mechanical stopper installed to the Z-axis spline or shifting its position will damage the Z-axis ball screw. Never attempt to remove it.

3. Use caution when handling a robot that contains powerful magnets

WARNING

POWERFUL MAGNETS ARE INSTALLED INSIDE THE ROBOT. DO NOT DISASSEMBLE THE ROBOT SINCE THIS MAY CAUSE INJURY. DEVICES THAT MAY MALFUNCTION DUE TO MAGNETIC FIELDS MUST BE KEPT AWAY FROM THIS ROBOT.

See "6. Cautions regarding strong magnetic fields" in "Safety instructions" for detailed information on strong magnetic fields.

4. Use the following caution items when disassembling or replacing the pneumatic equipment.

WARNING

AIR OR PARTS MAY FLY OUTWARD IF PNEUMATIC EQUIPMENT IS DISASSEMBLED OR PARTS REPLACED WHILE AIR IS STILL SUPPLIED.

- DO SERVICE WORK AFTER TURNING OFF THE CONTROLLER, REDUCING THE AIR PRESSURE, AND EXHAUSTING THE RESIDUAL AIR FROM THE PNEUMATIC EQUIPMENT.
- BEFORE REDUCING THE AIR PRESSURE, PLACE A SUPPORT STAND UNDER THE Z-AXIS SINCE IT WILL DROP UNDER ITS OWN WEIGHT.

5. Use caution to avoid contact with the controller cooling fan

WARNING

- TOUCHING THE ROTATING FAN MAY CAUSE INJURY.
- IF REMOVING THE FAN COVER, FIRST TURN OFF THE CONTROLLER AND MAKE SURE THE FAN HAS STOPPED.

6. Precautions for robot controllers

CAUTION

- Back up the robot controller internal data on an external storage device. The robot controller internal data (programs, point data, etc.) may be lost or deleted for unexpected reasons. Always make a backup of this data.
- Do not use thinner, benzene, or alcohol to wipe off the surface of the programming box. The surface sheet may be damaged or printed letters or marks erased. Use a soft, dry cloth and gently wipe the surface.
- Do not use a hard or pointed object to press the keys on the programming box. Malfunction or breakdown may result if the keys are damaged. Use your fingers to operate the keys.
- Do not insert any SD memory card other than specified into the SD memory card slot in the programming box. Malfunction or breakdown may result if the wrong memory card is inserted.

4.7 Disposal

When disposing of robots and related items, handle them carefully as industrial wastes. Use the correct disposal method in compliance with your local regulations, or entrust disposal to a licensed industrial waste disposal company.

1. Disposal of lithium batteries

When disposing of lithium batteries, use the correct disposal method in compliance with your local regulations, or entrust disposal to a licensed industrial waste disposal company. We do not collect and dispose of the used batteries.

2. Disposal of packing boxes and materials

When disposing of packing boxes and materials, use the correct disposal method in compliance with your local regulations. We do not collect and dispose of the used packing boxes and materials.

3. Strong magnet

WARNING

STRONG MAGNETS ARE INSTALLED IN THE ROBOT. BE CAREFUL WHEN DISPOSING OF THE ROBOT.

See "6. Cautions regarding strong magnetic fields" in "Safety instructions" for detailed information on strong magnetic fields.

5. Emergency action when a person is caught by robot

If a person should get caught between the robot and a mechanical part such as the installation base, then release the axis.

■ Emergency action

Release the axis while referring to the following section in the manual for the robot controller.

Controller	Refer to:
YRC	Section 1, "Freeing a person caught by the robot" in Chapter 1
YRCX	Section 1, "Emergency action when a person is caught by robot" in Chapter 1

NOTE

Make a printout of the relevant page in the manual and post it a conspicuous location near the controller.

6. Cautions regarding strong magnetic fields

Some OMRON robots contain parts generating strong magnetic fields which may cause bodily injury, death, or device malfunction. Always comply with the following instructions.

- Persons wearing ID cards, purses, or wristwatches must keep away from the robot.
- Do not bring tools close to the magnet inside the robot.

7. Using the robot safely

7.1 Movement range

When a tool or workpiece is attached to the robot manipulator tip, the actual movement range enlarges from the movement range of the robot itself (Figure A) to include the areas taken up by movement of the tool and workpiece attached to the manipulator tip (Figure B).
The actual movement range expands even further if the tool or workpiece is offset from the manipulator tip.
The movement range here is defined as the range of robot motion including all areas through which the robot arms, the tool and workpiece attached to the manipulator tip, and the solenoid valves attached to the robot arms move.
To make the robot motion easier to understand, the figures below only show the movement ranges of the tool attachment section, tool, and workpiece.
Please note that during actual operation, the movement range includes all areas where the robot arms and any other parts move along with the robot.

Movement range

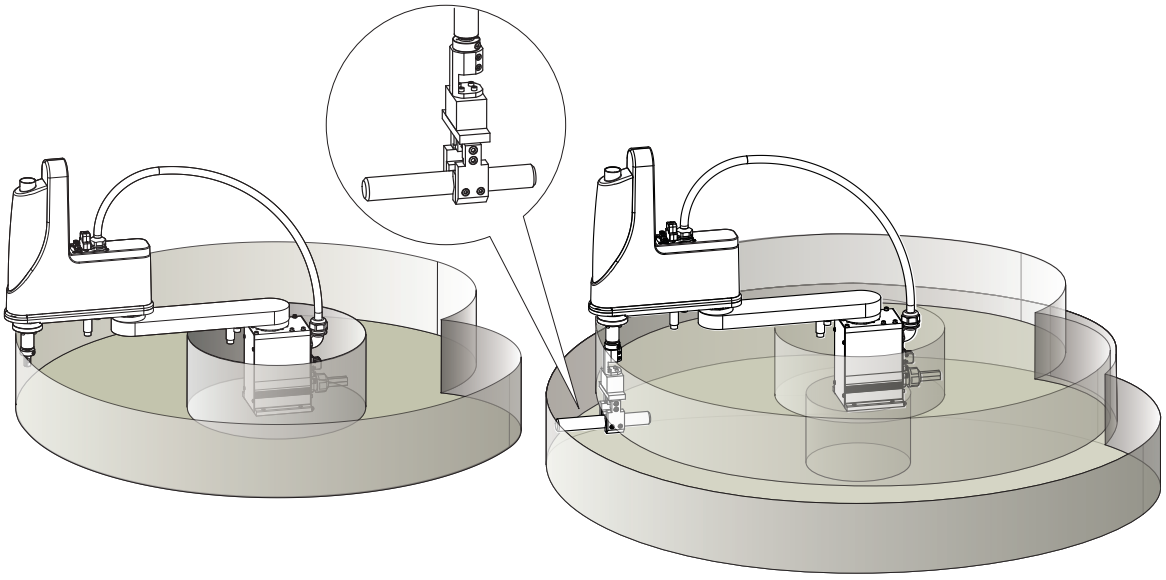


Figure A: Movement range of robot itself

Figure B: Movement range when tool and workpiece are attached to manipulator tip

CAUTION

To make the robot motion easier to understand, the above figures only show the movement ranges of the tool attachment section, tool, and workpiece. In actual operation, the movement range includes all areas where the robot arms and any other parts move along with the robot.

7.2 Robot protective functions

Protective functions for OMRON robots are described below.

1. Overload detection

This function detects an overload applied to the motor and turns off the servo.
If an overload error occurs, take the following measures to avoid such errors:

1. Insert a timer in the program.
2. Reduce the acceleration.

2. Overheat detection

This function detects an abnormal temperature rise in the driver inside the controller and turns off the servo.
If an overheat error occurs, take the following measures to avoid the error:

1. Insert a timer in the program.
2. Reduce the acceleration.

3. Soft limits

Soft limits can be set on each axis to limit the working envelope in manual operation after return-to-origin and during automatic operation. The working envelope is the area limited by soft limits.

WARNING

SOFT LIMIT FUNCTION IS NOT A SAFETY-RELATED FUNCTION INTENDED TO PROTECT THE HUMAN BODY.
TO RESTRICT THE ROBOT MOVEMENT RANGE TO PROTECT THE HUMAN BODY, USE THE MECHANICAL STOPPERS INSTALLED IN THE ROBOT (OR AVAILABLE AS OPTIONS).

4. Mechanical stoppers

If the servo is turned off by emergency stop operation or protective function while the robot is moving, then these mechanical stoppers prevent the axis from exceeding the movement range. The movement range is the area limited by the mechanical stoppers.

SCARA robots	• The X and Y axes have mechanical stoppers that are installed at both ends of the maximum movement range. Some robot models have a standard feature that allows changing the mechanical stopper positions. On some other models, the mechanical stopper positions can also be changed by using option parts. • The Z-axis has a mechanical stopper at the upper end and lower end. The stopper positions can be changed by using option parts. • No mechanical stopper is provided on the R-axis.

WARNING

AXIS MOVEMENT DOES NOT STOP IMMEDIATELY AFTER THE SERVO IS TURNED OFF BY EMERGENCY STOP OR OTHER PROTECTIVE FUNCTIONS, SO USE CAUTION.

CAUTION

If the robot moving at high speed collides with a mechanical stopper installed in the robot (or available as option), the robot may be damaged.

5. Z-axis (vertical axis) brake

An electromagnetic brake is installed on the Z-axis to prevent the Z-axis from sliding downward when the servo is OFF. This brake is working when the controller is OFF or the Z-axis servo power is OFF even when the controller is ON. The Z-axis brake can be released by the programming unit / handy terminal or by a command in the program when the controller is ON.

WARNING

THE VERTICAL AXIS WILL SLIDE DOWNWARD WHEN THE BRAKE IS RELEASED, CAUSING A HAZARDOUS SITUATION. TAKE ADEQUATE SAFETY MEASURES IN CONSIDERATION BY TAKING THE WEIGHT AND SHAPE INTO ACCOUNT.

- BEFORE RELEASING THE BRAKE AFTER PRESSING THE EMERGENCY STOP BUTTON, PLACE A SUPPORT UNDER THE VERTICAL AXIS SO THAT IT WILL NOT SLIDE DOWN.
- BE CAREFUL NOT TO LET YOUR BODY GET CAUGHT BETWEEN THE VERTICAL AXIS AND THE INSTALLATION BASE WHEN PERFORMING TASKS (DIRECT TEACHING, ETC.) WITH THE BRAKE RELEASED.

7.3 Residual risk

To ensure safe and correct use of OMRON robots and controllers, System integrators and/or end users implement machinery safety design that conforms to ISO12100.
Residual risks for OMRON robots and controllers are described in the DANGER or WARNING instructions provided in each chapter and section. Read them carefully.

7.4 Special training for industrial robot operation

Operators or persons who handle the robot for tasks such as for teaching, programming, movement checks, inspections, adjustments, and repairs must receive appropriate training and also have the skills needed to perform the job correctly and safely. They must also read the manual carefully to understand its contents before attempting the robot operation or maintenance.

Tasks related to industrial robots (teaching, programming, movement check, inspection, adjustment, repair, etc.) must be performed by qualified persons who meet requirements established by local regulations and safety standards for industrial robots.

Comparison of terms used in this manual with ISO

This manual	ISO 10218-1	Note
Maximum movement range	maximum space	Area limited by mechanical stoppers.
Movement range	restricted space	Area limited by movable mechanical stoppers.
Working envelope	operational space	Area limited by software limits.
Within safety enclosure	safeguarded space	

See “7.1 Movement range” in “Safety instructions” for details on the robot’s movement range.

Warranty

The OMRON robot and/or related product you have purchased are warranted against the defects or malfunctions as described below.

Warranty description

If a failure or breakdown occurs due to defects in materials or workmanship in the genuine parts constituting this OMRON robot and/or related product within the warranty period, then OMRON shall supply free of charge the necessary replacement/ repair parts.

Warranty period

The warranty period ends 24 months after the date of manufacturing as shown on the products.

Exceptions to the warranty

This warranty will not apply in the following cases:

1. Fatigue arising due to the passage of time, natural wear and tear occurring during operation (natural fading of painted or planted surfaces, deterioration of parts subject to wear, etc.)
2. Minor natural phenomena that do not affect the capabilities of the robot and/or related product (noise from computers, motors, etc.)
3. Programs, point data and other internal data were changed or created by the user.

Failures resulting from the following causes are not covered by warranty.

1. Damage due to earthquakes, storms, floods, thunderbolt, fire or any other natural or man-made disaster.
2. Troubles caused by procedures prohibited in this manual.
3. Modifications to the robot and/or related product not approved by OMRON or OMRON sales representative.
4. Use of any other than genuine parts and specified grease and lubricant.
5. Incorrect or inadequate maintenance and inspection.
6. Repairs by other than authorized dealers.

WARRANTY

OMRON's exclusive warranty is that the products are free from defects in materials and workmanship for a period of one year (or other period if specified) from date of sale by OMRON.

OMRON MAKES NO WARRANTY OR REPRESENTATION, EXPRESS OR IMPLIED, REGARDING NONINFRINGEMENT, MERCHANTABILITY, OR FITNESS FOR PARTICULAR PURPOSE OF THE PRODUCTS. ANY BUYER OR USER ACKNOWLEDGES THAT THE BUYER OR USER ALONE HAS DETERMINED THAT THE PRODUCTS WILL SUITABLY MEET THE REQUERIMENTS OF THEIR INTENDED USE. OMRON DISCLAIMS ALL OTHER WARRANTIES, EXPRESS OR IMPLIED.

LIMITATIONS OF LIABILITY

OMRON SHALL NOT BE RESPONSIBLE FOR SPECIAL, INDIRECT OR CONSEQUENTIAL DAMAGES, LOSS OF PROFITS OR COMERCIAL LOSS IN ANY WAY CONNECTED WITH THE PRODUCTS, WETHER SUCH CLAIM IS BASED ON CONTRACT, WARRANTY, NEGLIGENCE OR STRICT LIABILITY.

In no event shall the responsibility of OMRON for any act exceed the individual price of the product on which liability is asserted.

IN NO EVENT SHALL OMRON BE RESPONSIBLE FOR WARRANTY, REPAIR OR OTHER CLAIMS REGARDING THE PRODUCTS UNLESS OMRON'S ANALYSIS CONFIRMS THAT THE PRODUCTS WERE PROPERLY HANDLED, STORED, INSTALLED AND MAINTAINED AND NOT SUBJECT TO CONTAMINATION, ABUSE, MISUSE OR INAPPROPIATE MODIFICATION OR REPAIR.

Chapter 1 Overview

Contents

1. Overview

WARNING

- THE ADJUSTMENT AND MAINTENANCE WORK WITH THE COVER REMOVED NEEDS THE SPECIAL KNOWLEDGE AND SKILL. IF UNSKILLED WORK PERSON PERFORMS SUCH WORK, THIS MAY INVOLVE RISK. ONLY QUALIFIED ENGINEERS WHO HAVE THE SKILL AND LICENSE IN ACCORDANCE WITH THE LAWS AND REGULATIONS IN EACH COUNTRY ARE ALLOWED TO CARRY OUT THE ADJUSTMENT AND MAINTENANCE WORK WHILE REFERRING TO THIS MANUAL.
- PLACE A CONSPICUOUS SIGN INDICATING THE ROBOT IS BEING ADJUSTED, TO PREVENT OTHERS FROM TOUCHING THE CONTROLLER SWITCH, PROGRAMMING BOX OR OPERATION PANEL.
- IF A SAFETY ENCLOSURE HAS NOT YET BEEN PROVIDED RIGHT AFTER INSTALLATION OF THE ROBOT, ROPE OFF OR CHAIN OFF THE MOVEMENT AREA AROUND THE MANIPULATOR IN PLACE OF A SAFETY ENCLOSURE, AND OBSERVE THE FOLLOWING POINTS.

  1. USE STABLE POSTS WHICH WILL NOT FALL OVER EASILY.
  2. THE ROPE OR CHAIN SHOULD BE EASILY VISIBLE BY EVERYONE AROUND THE ROBOT.
  3. PLACE A CONSPICUOUS SIGN PROHIBITING THE OPERATOR OR OTHER PERSONNEL FROM ENTERING THE MOVEMENT AREA OF THE MANIPULATOR.

- TO CHECK THE OPERATION AFTER THE ADJUSTMENT HAS BEEN MADE, SEE "4.5.1 TRIAL OPERATION" IN THE SAFETY INSTRUCTIONS.

CAUTION

Use only the lubricants specified by your distributors.

Chapter 2 Attaching, detaching, and replacing the cover

Contents

1. Attaching, detaching, and replacing the cover

To detach the covers, remove the bolts and screws shown in the Fig. below.

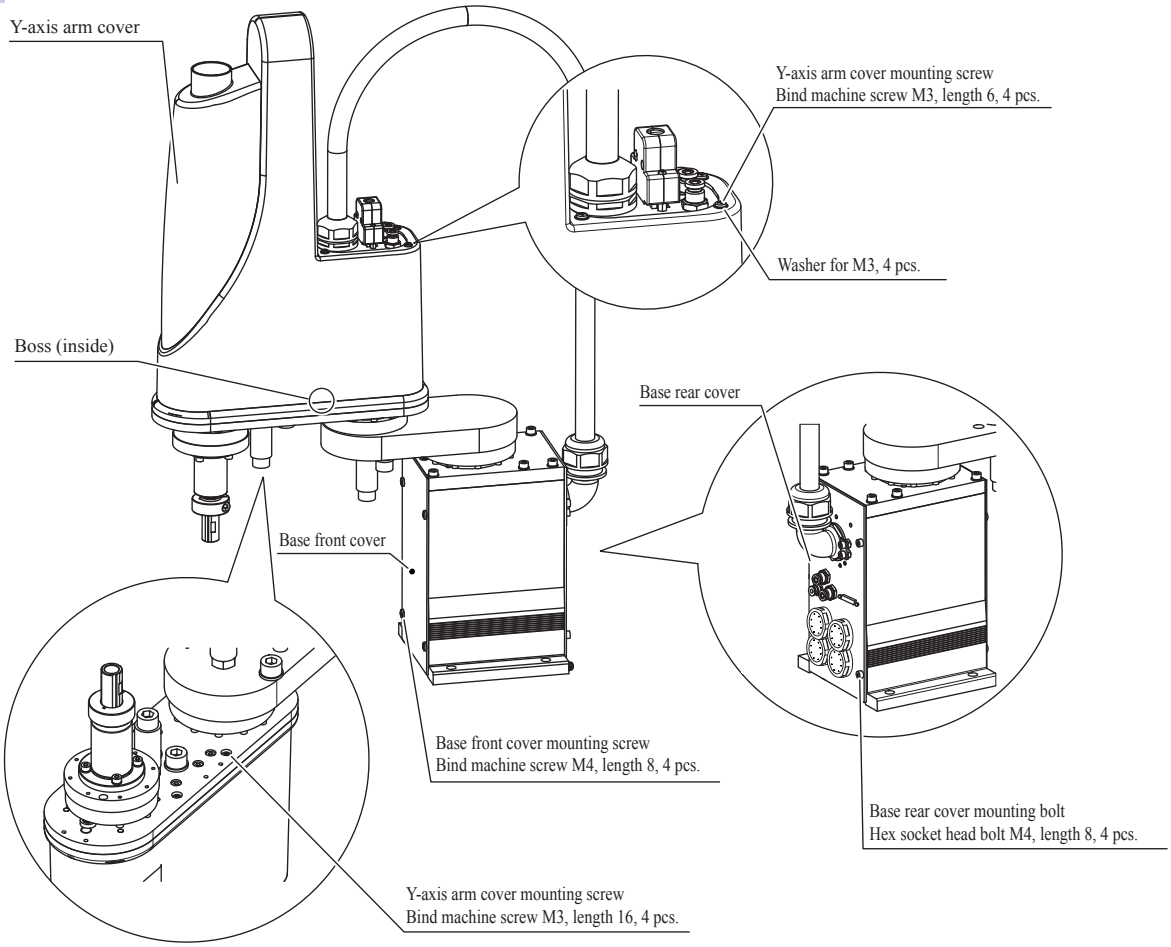
WARNING

WHEN THE COVERS HAVE BEEN REMOVED FOR THE MAINTENANCE WORK, BE SURE TO RETURN THE COVERS TO THEIR ORIGINAL POSITIONS USING THE SCREWS AND BOLTS THAT HAVE SECURED THEM.
IF ANY SCREW IS LOST, USE THE SPECIFIED SCREWS AND QUANTITIES TO SECURE THE COVERS WHILE REFERRING TO THE FIG. BELOW.
IF THE COVERS ARE NOT SECURED FIRMLY, NOISE MAY OCCUR, THE COVER MAY DROP AND FLY OUT, YOUR HAND MAY BE ENTANGLED IN THE DRIVE UNIT DURING TEACHING, OR YOUR HAND MAY BE IN CONTACT THE HOT DRIVE UNIT, CAUSING BURN. TO PREVENT SUCH TROUBLES, STRICTLY OBSERVE THIS CAUTION.

CAUTION

In the user wiring/tubing through spline type, the cover cannot be detached unless the Z-axis is moved down to the lower end.

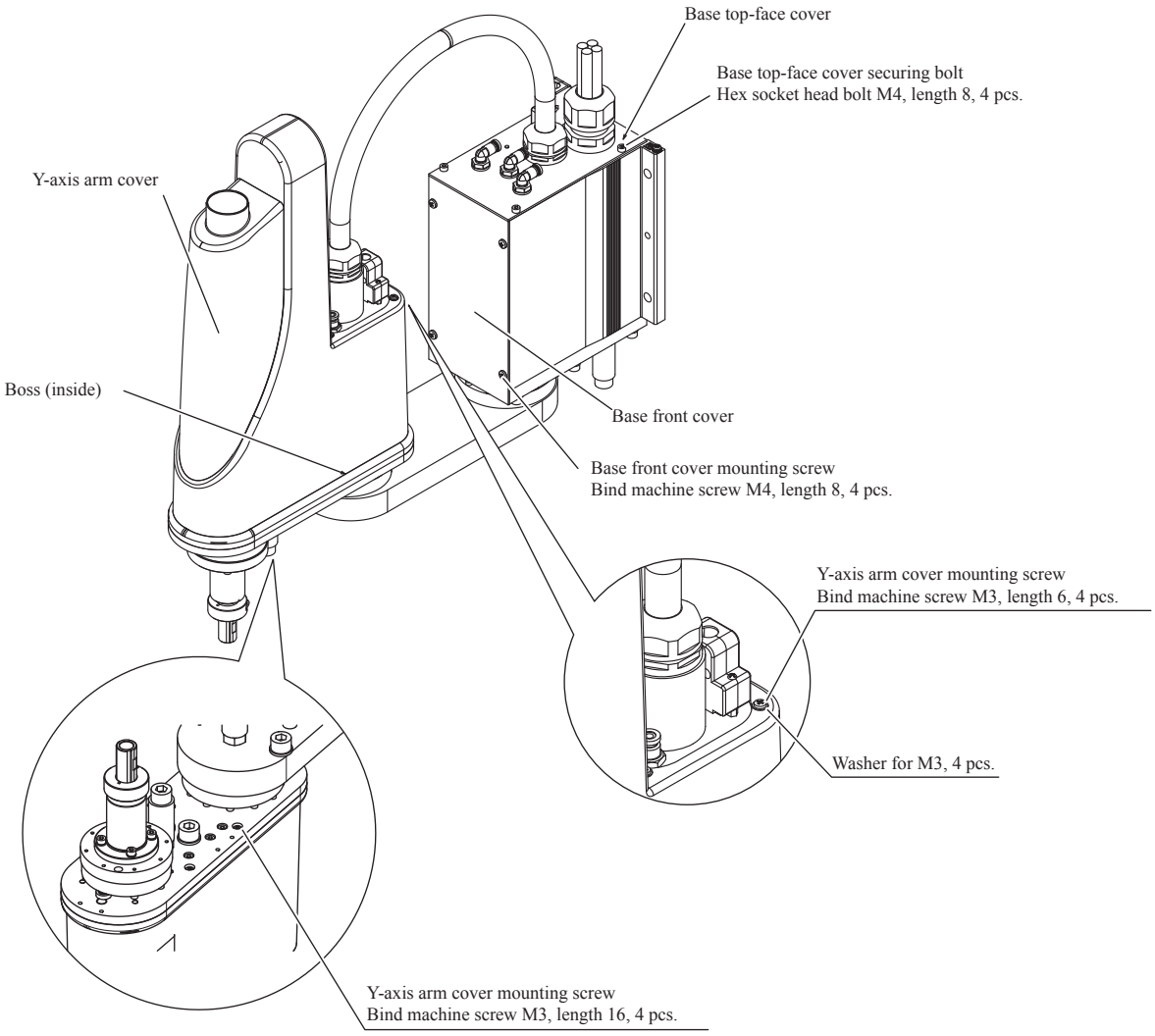
R6YXGL250, R6YXGL350, R6YXGL400, R6YXGL500, R6YXGL600



CAUTION

When detaching or attaching the cover, the boss inside the cover may be in contact with the internal stay. In this case, attach the cover while widening or moving it slightly.

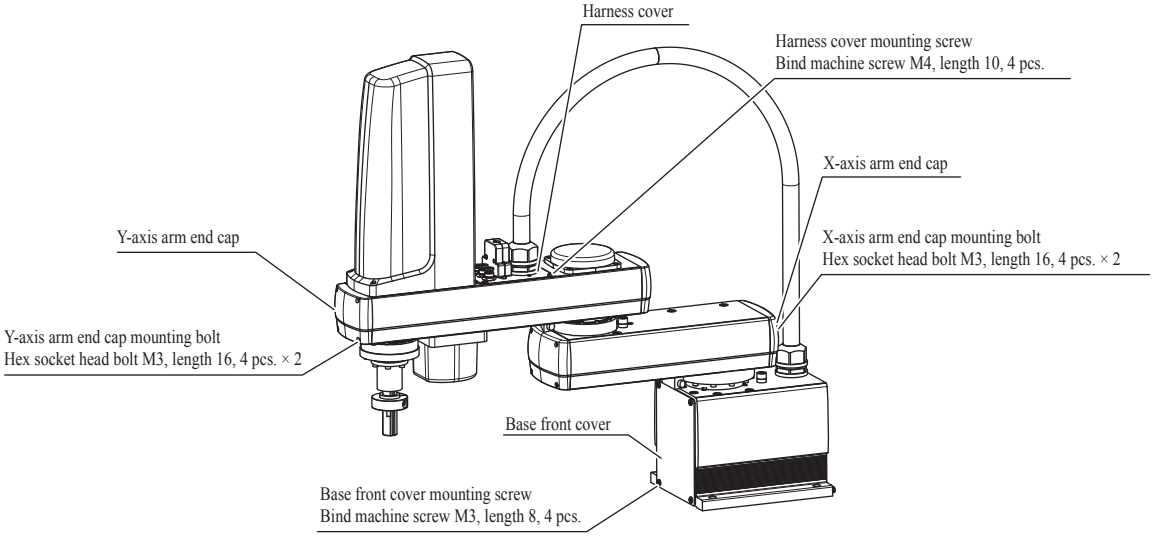
R6YXGS300, R6YXGS400

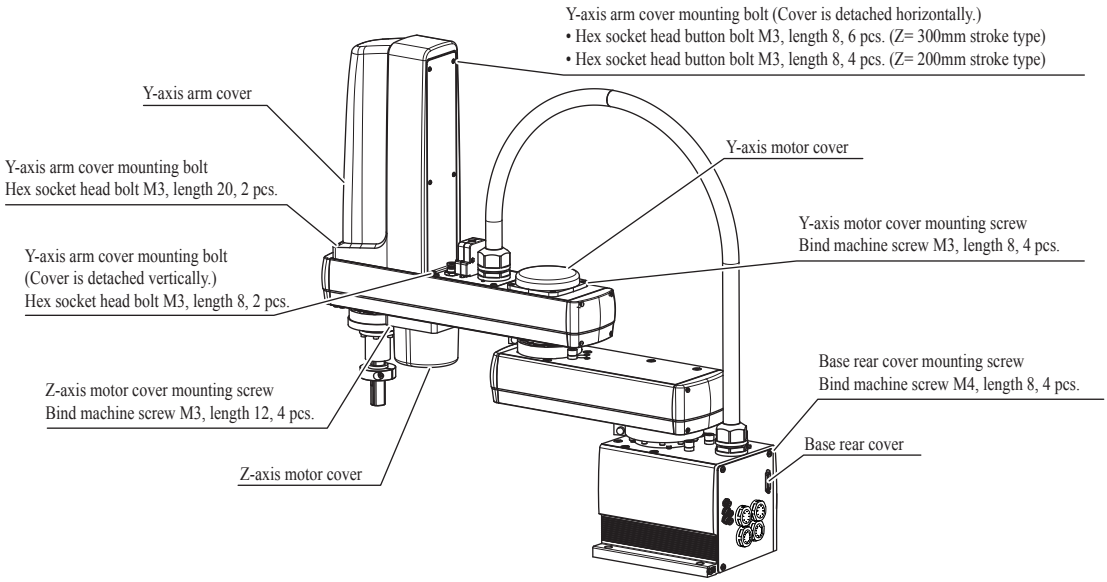


CAUTION

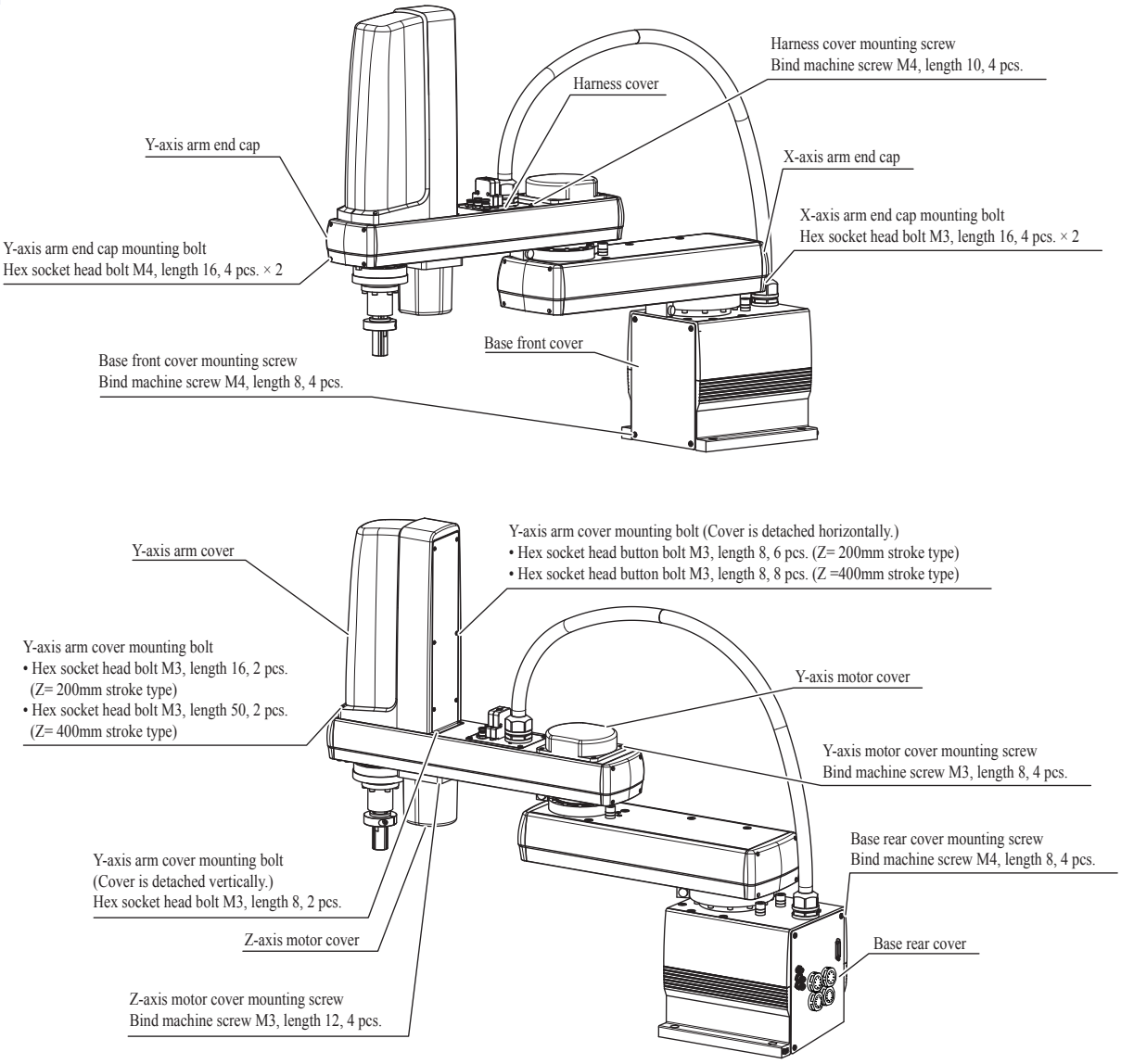
When detaching or attaching the cover, the boss inside the cover may be in contact with the internal stay. In this case, attach the cover while widening or moving it slightly.

R6YXG500, R6YXG600

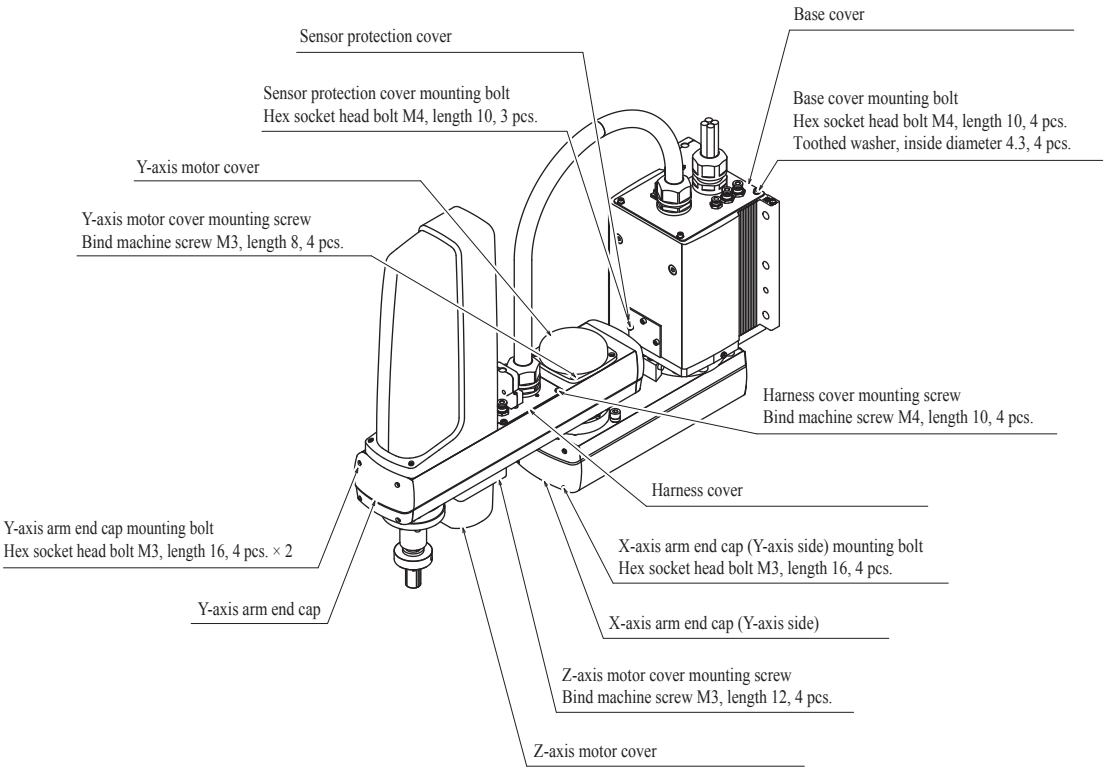


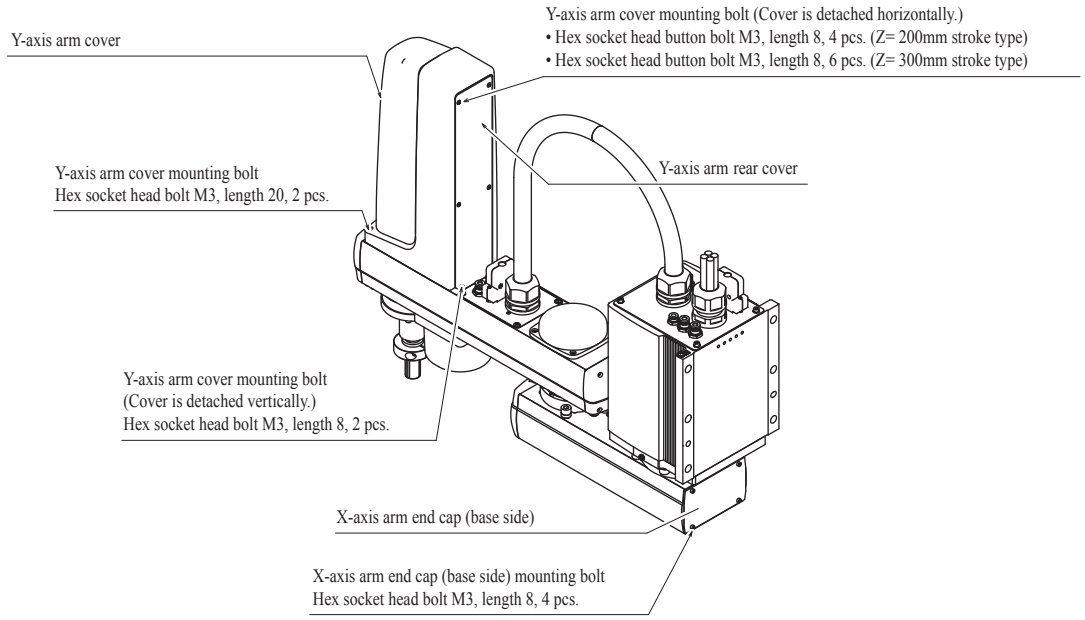


R6YXGH600, R6YXG700, R6YXG800, R6YXG900, R6YXG1000

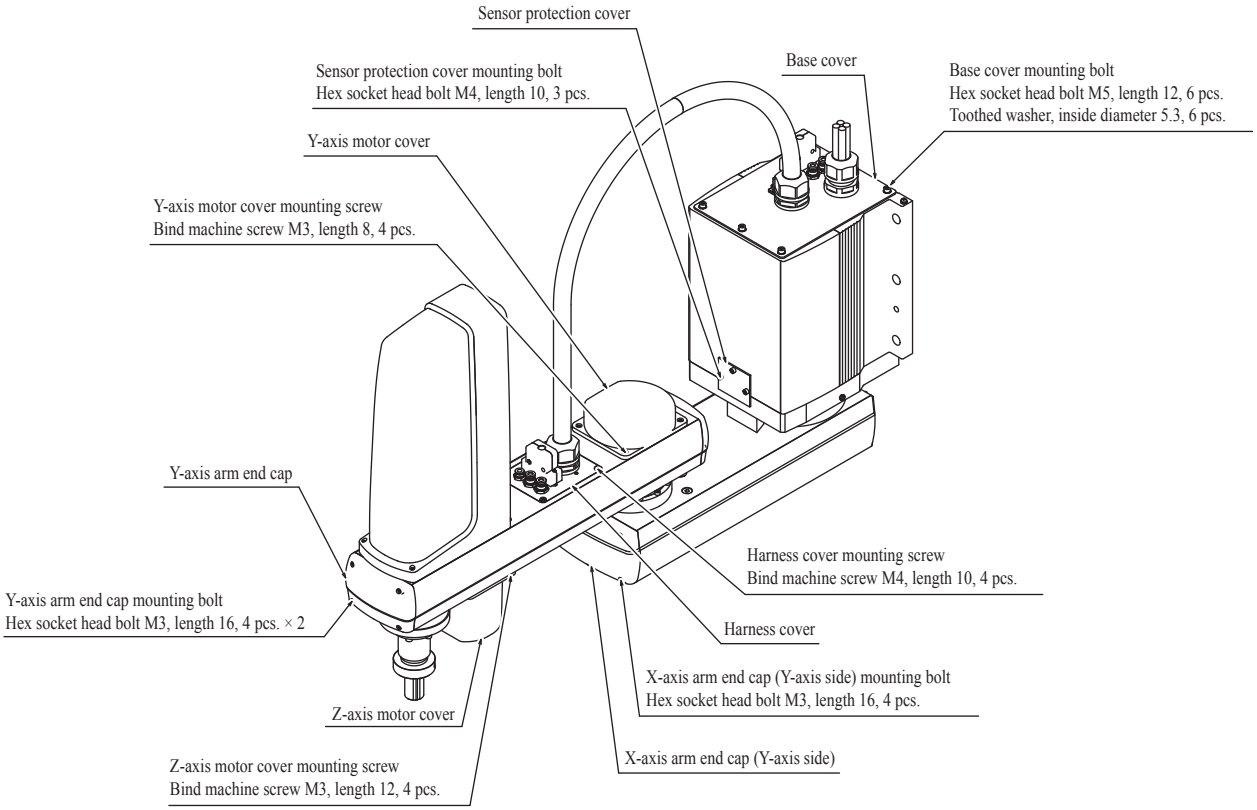


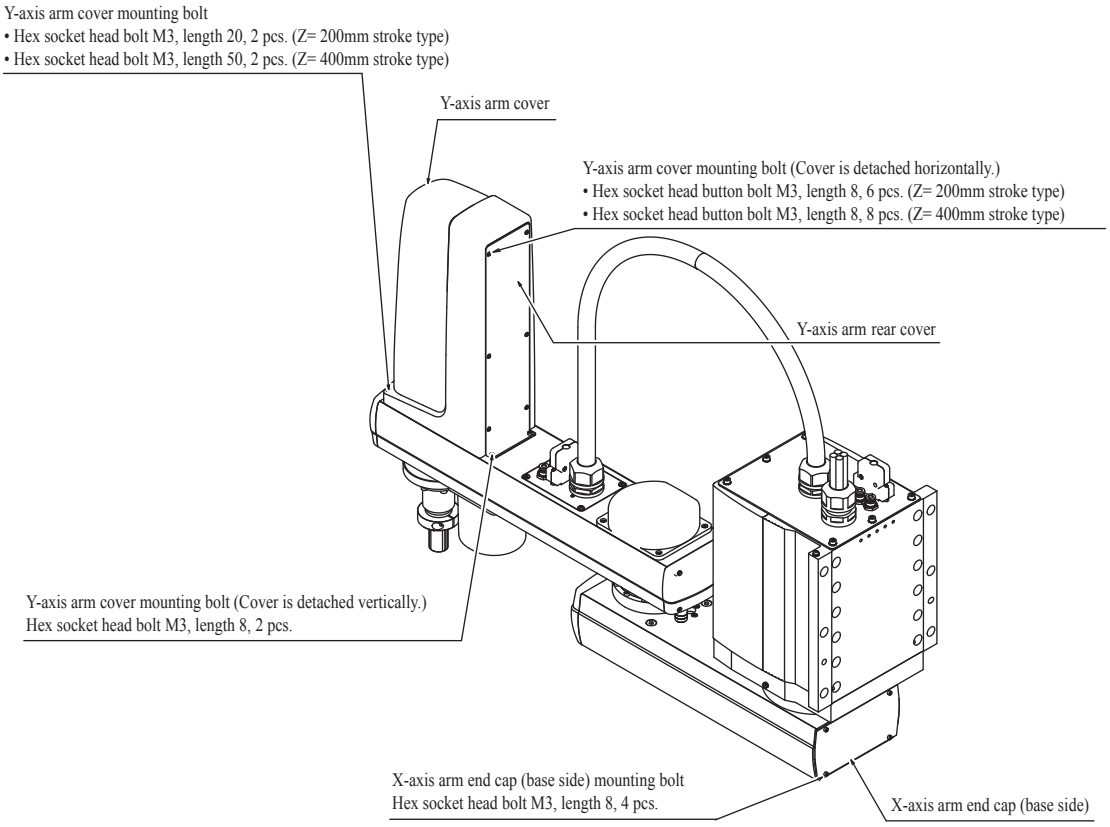
R6YXGS500, R6YXGS600





R6YXGS700, R6YXGS800, R6YXGS900, R6YXGS1000





Chapter 3 Periodic inspection

Contents

1. Overview

Daily and periodic inspection of the OMRON robot is essential in order to ensure safe and efficient operation. This chapter describes the periodic inspection items and procedures for the OMRON XG series robots.

Periodic inspection includes:

• Daily inspection • 6-month inspection

Make sure that you thoroughly understand details of the inspection and follow the procedures and precautions explained in this chapter.

WARNING

THE ADJUSTMENT AND MAINTENANCE WORK WITH THE COVER REMOVED NEEDS THE SPECIAL KNOWLEDGE AND SKILL. IF UNSKILLED WORK PERSON PERFORMS SUCH WORK, THIS MAY INVOLVE RISK. ONLY QUALIFIED ENGINEERS WHO HAVE THE SKILL AND LICENSE IN ACCORDANCE WITH THE LAWS AND REGULATIONS IN EACH COUNTRY ARE ALLOWED TO CARRY OUT THE ADJUSTMENT AND MAINTENANCE WORK WHILE REFERRING TO THIS MANUAL.

WARNING

- WHEN YOU NEED TO TOUCH THE TERMINALS OR CONNECTORS ON THE OUTSIDE OF THE CONTROLLER DURING INSPECTION, ALWAYS FIRST TURN OFF THE CONTROLLER POWER SWITCH AND ALSO THE POWER SOURCE IN ORDER TO PREVENT POSSIBLE ELECTRICAL SHOCK.
- NEVER TOUCH ANY INTERNAL PARTS OF THE CONTROLLER.

WARNING

- WHEN INSPECTION IS REQUIRED INSIDE THE SAFETY ENCLOSURE, ALWAYS TURN OFF THE CONTROLLER AND ALSO THE EXTERNAL SWITCH BOARD.
- IF THE INSPECTION OR MAINTENANCE PROCEDURE CALLS FOR OPERATION OF THE ROBOT, STAY OUTSIDE THE SAFETY ENCLOSURE.
- PLACE A SIGN INDICATING THE ROBOT IS BEING INSPECTED, TO KEEP OTHERS FROM OPERATING THE CONTROLLER SWITCH, PROGRAMMING BOX OR OPERATION PANEL.
- FOR DETAILS REGARDING THE OPERATION CHECK WHICH IS PERFORMED AFTER THE INSPECTION, REFER TO SECTION "4.5.1 TEST OPERATION" OF THESE SAFETY GUIDELINES.

CAUTION

Use only the lubricants specified by your distributors.

NOTE

For precautions on handling the controller, refer to the "OMRON Robot Controller User's Manual".

2. Daily inspection

The following is an inspection list that must be performed every day before and after operating the robot.

■ Inspection to be performed with the controller turned off

1 ***Turn off the controller.***

2 ***Place a sign indicating the robot is being adjusted.***
Place a sign indicating the robot is being inspected, to keep others from operating the controller switch.

3 ***Perform the daily inspection.***
Enter the safety enclosure and check the following points.

Checkpoint	Procedure
Machine harness Robot cable User cable and wiring	Check for scratches, dents and excessive bend and kinks. (If the machine harness or robot cable is damaged, contact your distributor.)
Regulator, joints, air tube, solenoid valve, air cylinder	Check air pressure. Check for air leaks. Check drain. Check air filter for clogging or damage.
Robot exterior	Check for damage. (If a damage is found, contact your distributor.)

■ Inspection to be performed with the controller turned on

1 ***Turn on the controller.***
Check that no one is inside the safety enclosure, and then turn on the controller.

2 ***Place a sign indicating the robot is being adjusted.***
Place a sign indicating the robot is being inspected, to keep others from operating the controller, programming box or operation panel.

3 ***Perform the daily inspection.***
Check the following points from outside the safety enclosure.

Checkpoint	Procedure
Safety enclosure	Check if the safety enclosure is in place. Check if emergency stop is triggered when the door is opened. Check if warning labels are affixed at the entrance and clearly visible.
Emergency stop device	Press the emergency stop button to check if it works.
Robot movement	Check for abnormal movement and excessive vibration and noise. (If any abnormal symptom is found, contact your distributor.)
Z-axis brake operation *	Check if the brake works to stop the Z-axis from dropping more than 3mm from the stationary point. (If any abnormal operation is found, contact your distributor.)

* Visually check the Z-axis movement when you press the emergency stop button from outside the safety enclosure and also when you turn off the controller.

■ Adjustment and parts replacement

CAUTION

- After inspection, if you notice any adjustment or parts replacement is needed, first turn off the controller and then enter the safety enclosure to perform the necessary work. To perform the inspection after the adjustment and parts replacement work, follow the steps stated in n Inspection to be performed with the controller turned off and n Inspection to be performed with the controller turned on described above.
- If repair or parts replacement is required for the robot or controller, please contact your distributor. This work requires specialized technical knowledge and skill, so do not attempt it by yourself.

3. Six-month inspection

Take the following precautions when performing 6-month inspection.

WARNING

THE Z-AXIS WILL SLIDE DOWN WHEN THE Z-AXIS BRAKE IS RELEASED, CAUSING A HAZARDOUS SITUATION. DO NOT RELEASE THE BRAKE WHEN LUBRICATING THE Z-AXIS PARTS.

When lubricating the ball screw and spline shaft, observe the following precautions.

WARNING

PRECAUTIONS WHEN HANDLING GREASE:

- INFLAMMATION MAY OCCUR IF THIS GETS IN THE EYES.
  BEFORE HANDLING THE GREASE, WEAR YOUR SAFETY GOGGLES TO ENSURE THE GREASE WILL NOT COME IN CONTACT WITH THE EYES.
- INFLAMMATION MAY OCCUR IF THE GREASE COMES INTO CONTACT WITH SKIN. BE SURE TO WEAR PROTECTIVE GLOVES TO PREVENT CONTACT WITH SKIN.
- DO NOT TAKE ORALLY OR EAT. (EATING WILL CAUSE DIARRHEA AND VOMITING.)
- HANDS AND FINGERS MIGHT BE CUT WHEN OPENING THE CONTAINER, SO USE PROTECTIVE GLOVES.
- KEEP OUT OF THE REACH OF CHILDREN.
- DO NOT HEAT THE GREASE OR PLACE NEAR AN OPEN FLAME SINCE THIS COULD LEAD TO SPARKS AND FIRES.

EMERGENCY TREATMENT:

- IF THIS GREASE GETS IN THE EYES, WASH LIBERALLY WITH PURE WATER FOR ABOUT 15 MINUTES AND CONSULT A PHYSICIAN FOR TREATMENT.
- IF THIS GREASE COMES IN CONTACT WITH THE SKIN, WASH AWAY COMPLETELY WITH SOAP AND WATER.
- IF TAKEN INTERNALLY, DO NOT INDUCE VOMITING BUT PROMPTLY CONSULT A PHYSICIAN FOR TREATMENT.

DISPOSING OF GREASE AND THE CONTAINER:

- PROPER DISPOSAL IS COMPULSORY UNDER FEDERAL, STATE AND LOCAL REGULATIONS. TAKE APPROPRIATE MEASURES IN COMPLIANCE WITH LEGAL REGULATIONS.
- DO NOT PRESSURIZE THE EMPTY CONTAINER. PRESSURIZING MAY CAUSE THE CONTAINER TO RUPTURE.
- DO NOT ATTEMPT TO WELD, HEAT UP, DRILL HOLES OR CUT THIS CONTAINER. THIS MIGHT CAUSE THE CONTAINER TO EXPLODE AND THE REMAINING MATERIALS INSIDE IT TO IGNITE.

CAUTION

Unless grease specified by OMRON is used, the service life of the ball screw and ball spline will shorten.

■ Inspection to be performed with the controller turned off

1 ***Turn off the controller.***

2 ***Place a sign indicating the robot is being adjusted.***
Place a sign showing that the robot is being inspected, to keep others from operating the controller switch.

3 ***Perform the daily inspection.***
Enter the safety enclosure and check the following points.

Checkpoint	Procedure
Manipulator bolts and screws (Only for major bolts and screws exposed externally)	Check for looseness and tighten if necessary. (See the Table below.)
Detection areas of the origin sensors of the X-axis, Y-axis, and R-axis	Clean if it is dirty.
Controller	Check for looseness at each terminal and connector on the panel. (See “4. Robot cable connection” in Chapter 2 of the Installation Manual.)
Application of grease to Z-axis ball screw and spline	See “4. Applying the grease” in this Chapter.
Z-axis ball spline, ball screw	Check for backlash. (If any abnormality is found, contact your distributor.)

Bolt tightening torque

Bolt size	Tightening torque (kgfcm)	Tightening torque (Nm)
M3 button head bolt	14	1.4
M4 set screw	20	2.0
M3	20	2.0
M4	46	4.5
M5	92	9.0
M6	156	15.3
M8	380	37
M10	459	45.0
M12	1310	128
M14	2090	205

■ Inspection to be performed with the controller turned on

WARNING

- THE ROBOT CONTROLLER MUST BE INSTALLED OUTSIDE THE SAFETY ENCLOSURE, TO PREVENT A HAZARDOUS SITUATION IN WHICH YOU OR ANYONE ENTER THE SAFETY ENCLOSURE TO INSPECT THE CONTROLLER WHILE IT IS TURNED ON.
- BODILY INJURY MAY OCCUR FROM COMING INTO CONTACT WITH THE FAN WHILE IT IS ROTATING.
- WHEN REMOVING THE FAN COVER FOR INSPECTION, FIRST TURN OFF THE CONTROLLER AND MAKE SURE THE FAN HAS STOPPED.

1 ***Turn on the controller.***

Check that no one is inside the safety enclosure, and then turn on the controller.

2 ***Place a sign indicating the robot is being adjusted.***

Place a sign indicating the robot is being inspected, to keep others from operating the controller, programming box or operation panel.

3 ***Perform the daily inspection.***

Check the following points from outside the safety enclosure.

Checkpoint	Procedure
Cooling fan at rear of controller	• Check if the fan rotates normally. • Check if objects blocking the fan are located and remove if any are found. • Check for abnormal noise from the rotating fan. If abnormal noise is heard, visually check and remove the cause. If no cause is found, contact your distributor . • Check for dust on the fan cover. Remove and clean if necessary.

■ Adjustment and parts replacement

CAUTION

- After inspection, if you notice any adjustment or parts replacement is needed, first turn off the controller and then enter the safety enclosure to perform the necessary work. o perform the inspection after the adjustment and parts replacement work, follow the steps stated in “n Inspection to be performed with the controller turned off” and “n Inspection to be performed with the controller turned on” described above.
- If repair or parts replacement is required for the robot or controller, please contact your distributor. This work requires specialized technical knowledge and skill, so do not attempt it by yourself.

4. Applying the grease

4.1 Applying the grease to the spline shaft

Follow the steps below to apply the grease to the spline shaft.

1 ***Turn off the controller power.***

2 ***Place a sign indicating the robot is being adjusted.***
Place a sign indicating the robot is being adjusted, to keep others from operating the controller or operation panel.

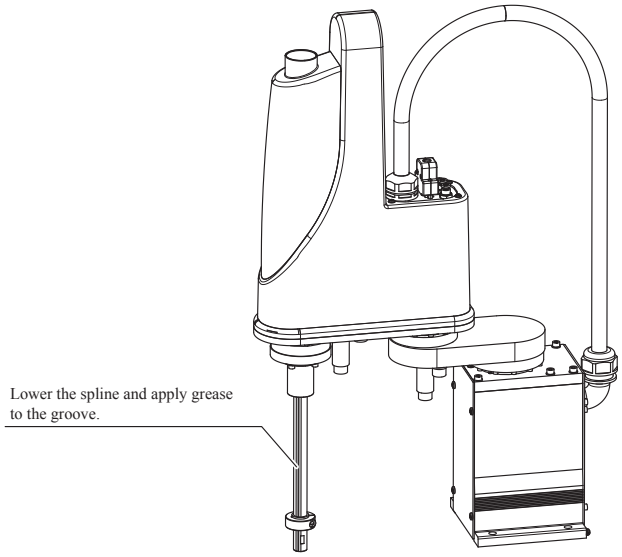
3 ***Enter the safety enclosure.***

4 ***Remove the old grease with a cloth rag.***

5 ***Apply the grease.***
Apply the grease (Alvania S2 (Showa Shell)) to the spline shaft of the Z-axis. (See also the Fig. below.)

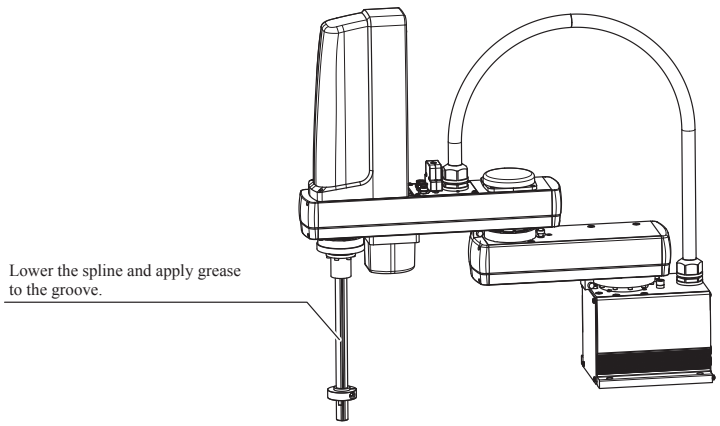
Applying the grease

R6YXGL250, R6YXGL350, R6YXGL400, R6YXGL500, R6YXGL600, R6YXGS300, R6YXGS400



Applying the grease

R6YXG500, R6YXG600, R6YXGH600, R6YXG700, R6YXG800, R6YXG900, R6YXG1000
R6YXGS500, R6YXGS600, R6YXGS700, R6YXGS800, R6YXGS900, R6YXGS1000



4.2 Applying the grease to the ball screw

Follow the steps below to apply the grease to the ball screw.

WARNING

BEFORE STARTING THE WORK, THOROUGHLY READ "1. ATTACHING, DETACHING, AND REPLACING THE COVER" IN CHAPTER 2.

1 ***Turn off the controller power.***

2 ***Place a sign indicating the robot is being adjusted.***
Place a sign indicating the robot is being adjusted, to keep others from operating the controller or operation panel.

3 ***Enter the safety enclosure.***

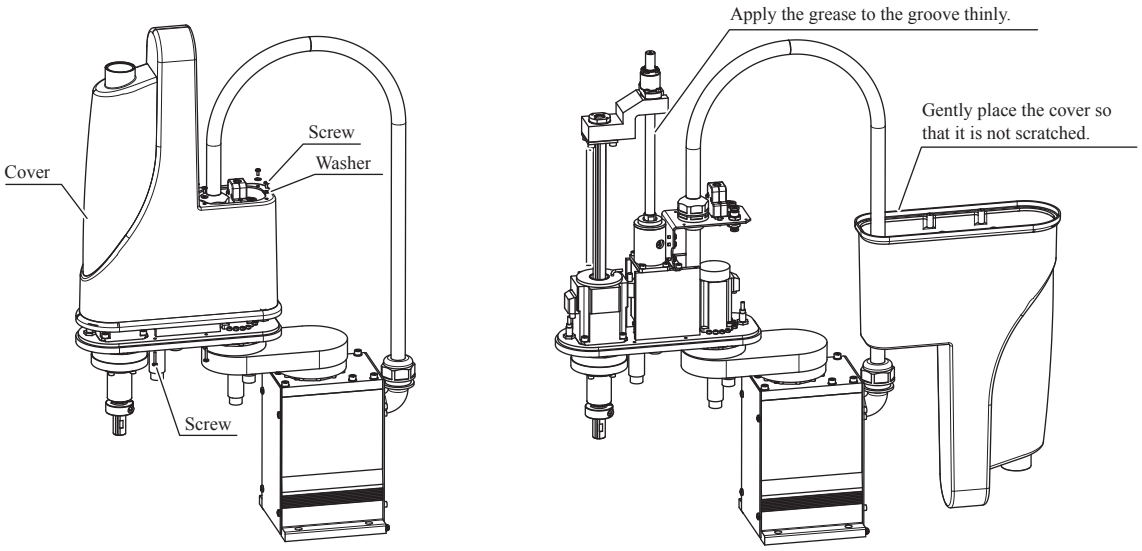
4 ***Remove the Y-axis arm cover.***
Remove the cover while referring to "1. Detaching or attaching the covers" in Chapter 2.

5 ***Remove the old grease with a cloth rag.***

6 ***Apply the grease.***
Apply the grease (Alvania S2 (Showa Shell)) to the ball screw. (See the Fig. below.)

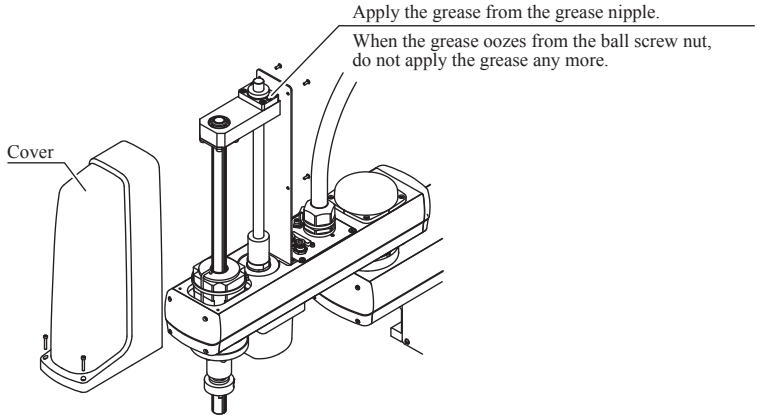
Applying the grease

R6YXGL250, R6YXGL350, R6YXGL400, R6YXGL500, R6YXGL600, R6YXGS300, R6YXGS400



Applying the grease

R6YXG500, R6YXG600, R6YXGH600, R6YXG700, R6YXG800, R6YXG900, R6YXG1000
R6YXGS500, R6YXGS600, R6YXGS700, R6YXGS800, R6YXGS900, R6YXGS1000



Chapter 4 Adjusting the origin

Contents

1. Changing the origin position and adjusting the machine reference

This section describes how to change the origin position and adjust the machine reference.

CAUTION

- If the origin position has been changed, then the absolute reset must be performed, the machine reference must be adjusted, and the standard coordinate and point data must be reset.
- If any machine reference is adjusted, the origin position may change. Before the adjustment, mark off the reference mark at the current origin position on the main body of the robot. After the machine reference is adjusted, be sure to check that the origin position has not deviated. If the origin position changes after the machine reference has been adjusted, then the standard coordinate and point data must be reset.

1.1 Sensor method (R6YXGL250, R6YXGL350, R6YXGL400, R6YXGL500, R6YXGL600, R6YXGS300, R6YXGS400)

WARNING

BEFORE STARTING THE WORK, THOROUGHLY READ "1. ATTACHING, DETACHING, AND REPLACING THE COVER" IN CHAPTER 2.

■ Adjusting the X-axis machine reference

CAUTION

- The origin position may change due to machine reference adjustment. If it occurs, you must set point data again.
- When the return-to-origin direction is reversed, the origin position may not be the base front. When using the standard soft limit, the axis may collide with the mechanical stopper. Be sure that the soft limit is set at 2° or more to the inside of the mechanical stopper as instructed in the separate Installation Manual, Chapter 3 "3. Setting the soft limits".

Follow the steps below to adjust the X-axis machine reference value.
Prepare a wrench for a width across flat of 13 mm.

1 ***Turn on the controller.***
Check that no one is inside the safety enclosure, and then turn on the controller.

2 ***Perform the absolute reset.***
Perform the absolute reset from outside the safety enclosure.
For details about how to perform the absolute reset, see "2.3 Absolute reset procedures" in Chapter 3 of the Installation Manual.

3 ***Check the machine reference value.***
If the machine reference value displayed on the PBEX/PB is not in the range between 30 and 70 (recommended range) after the absolute reset has been completed, follow the steps below to adjust the machine reference value.

4 ***Place a sign indicating the robot is being adjusted.***
Place a sign indicating the robot is being adjusted, to keep others from operating the controller or operation panel.

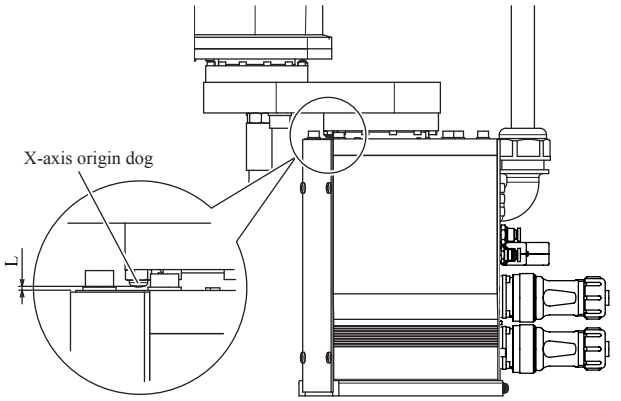
5 ***Turn off the controller.***

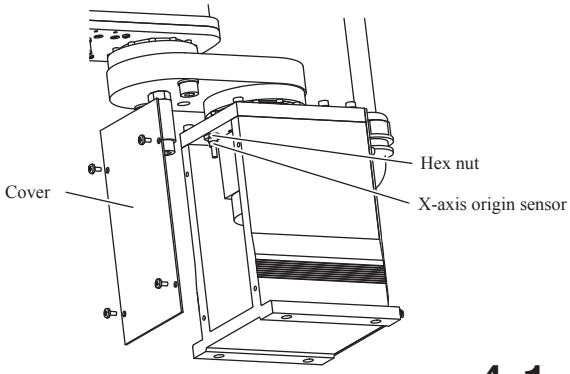
6 ***Enter the safety enclosure.***

7 ***Put a mark at the origin position.***
Scribe a mark at the current origin position on the X-axis joint area of the robot.
At this time, be careful to prevent the origin position from deviating since the X-axis arm is touched.

8 ***Remove the cover.***
Remove the cover while referring to "1. Attaching, detaching, and replacing the cover" in Chapter 2.

▶ **Step 8-15** **Adjusting the X-axis machine reference value (R6YXGL250 to R6YXGL600)**





9 ***Loosen the hex nut.***

Using the wrench, loosen the hex nut that secures the X-axis origin sensor.

CAUTION

It is enough to loosen the nut. Do not remove the nut completely.

10 ***Move the X-axis origin sensor.***

Move the X-axis origin sensor as follows.

Determine the distance between the sensor and dog (L) to 0.2 to 0.8 mm so that the sensor does not collide with the dog.

- To decrease the X-axis machine reference value, move the sensor away from the dog.
- To increase the X-axis machine reference value, put the sensor close the dog.

11 ***Secure the sensor with the hex nut.***

Secure the X-axis origin sensor with the hex nut.

• Tightening torque: 7 Nm (71 kgfcm)

12 ***Turn on the controller.***

Check that no one is inside the safety enclosure, and then turn on the controller.

13 ***Perform the absolute reset.***

Perform the absolute reset from outside the safety enclosure.

14 ***Check the machine reference value.***

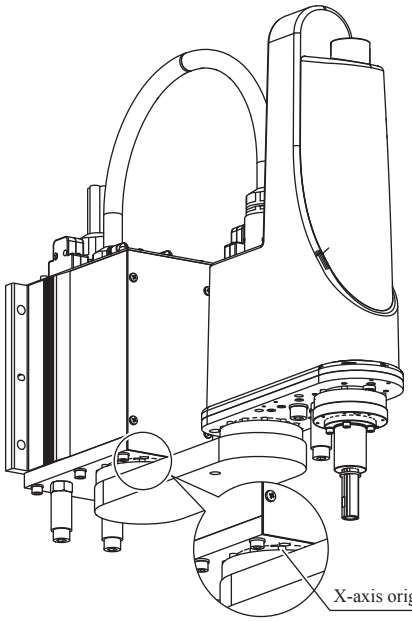
1. After the absolute reset has been completed, read the machine reference value displayed on the PBEX/PB.
2. When the machine reference value is in the range between 30 and 70 (recommended range) and the X-axis arm position is within ± 1° or less from the front of the base, then the machine reference has been completely adjusted.
3. If it is outside the recommended range, then repeat the procedure from step 4 again to readjust it.

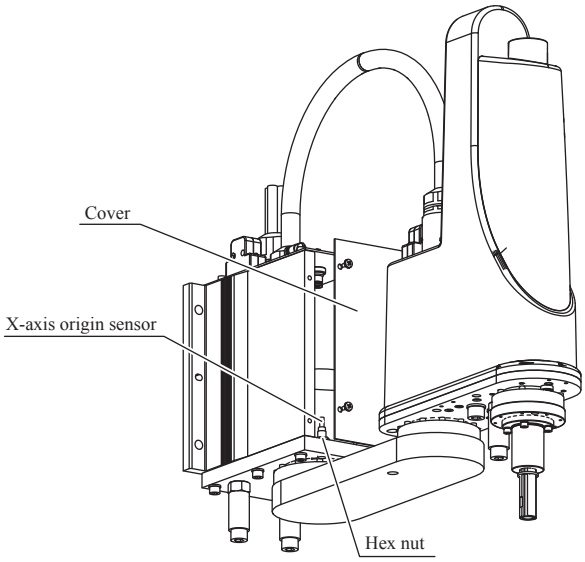
15 ***Turn off the controller.***

16 ***Enter the safety enclosure.***

17 ***Reattach the cover.***

Step 8-15 Adjusting the X-axis machine reference value (R6YXGS300 to R6YXGS400)





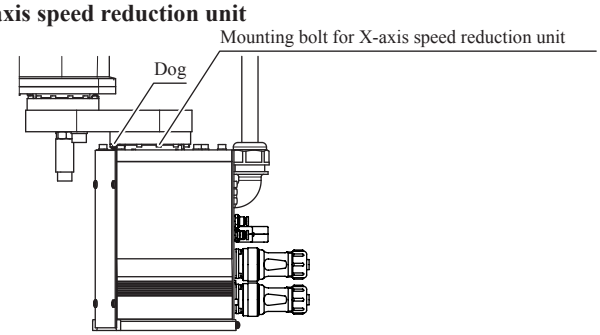
■ Changing the X-axis origin position

The X-axis origin position can be changed to any position in the range from the front position of the X-axis arm base to a maximum of 120° clockwise and counterclockwise at 30° intervals, by changing the positions of the dog and the mounting bolt for the X-axis speed reduction unit as shown below.

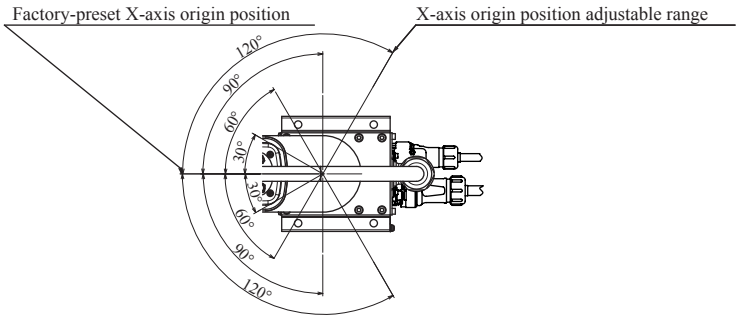
CAUTION

If the origin position has been changed, then the absolute reset must be performed, the machine reference must be adjusted, and the standard coordinate and point data must be reset.

Dog and mounting bolt for X-axis speed reduction unit



X-axis origin position adjustable range



The following describes how to change the X-axis origin position, for example, to a position 90° counterclockwise.
Prepare the tools listed below.

• Hex wrench set • Torque wrench • Phillips screwdriver • Hex bit • Phillips screwdriver bit

1 ***Turn on the controller.***

Check that no one is inside the safety enclosure, and then turn on the controller.

2 ***Perform the absolute reset.***

Perform the absolute reset from outside the safety enclosure.
For details about how to perform the absolute reset, see "2.3 Absolute reset procedures" in Chapter 3 of the Installation Manual.

3 ***Place a sign indicating that the robot is being adjusted.***

Place a sign indicating that the robot is being adjusted, to keep others from operating the controller or operation panel.

4 ***Turn off the controller.***

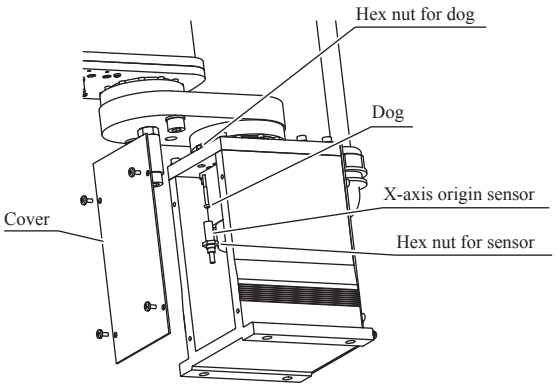
5 ***Enter the safety enclosure.***

6 ***Remove the cover.***

Remove the cover while referring to "1. Attaching, detaching, and replacing the cover" in Chapter 2.

▶ Step 6-9

Removing the cover, connector, X-axis origin sensor, and dog.



7 ***Disconnect the connector of the X-axis origin sensor wire XORG.***

8 ***Remove the sensor.***
Loosen the hex nut of the X-axis origin sensor to remove the sensor.

9 ***Remove the dog.***
Remove the dog through the tapped hole for the sensor. Leave the hex nut on the base.

10 ***Turn the X-axis arm 90° counterclockwise.***

11 ***Remove the bolt located opposite to the tapped hole for the sensor.***

12 ***Secure the hex nut and dog.***
Secure the hex nut and dog to the tapped hole, and then tighten to the specified torque.

13 ***Return the X-axis arm to its original origin position.***

14 ***Tighten the bolt.***
Insert the bolt into the tapped hole where the dog was attached, and tighten to the specified torque.

15 ***Secure the X-axis origin sensor with the hex nut.***
Secure the X-axis origin sensor with the hex nut so that the distance between the sensor and dog is 0.2 to 0.8 mm while referring to the "nAdjusting the X-axis machine reference value" described previously.

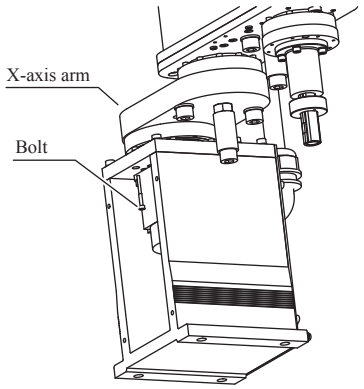
CAUTION
Pay special attention so that the sensor does not collide with the dog.

16 ***Turn on the controller.***
Check that no one is inside the safety enclosure, and then turn on the controller.

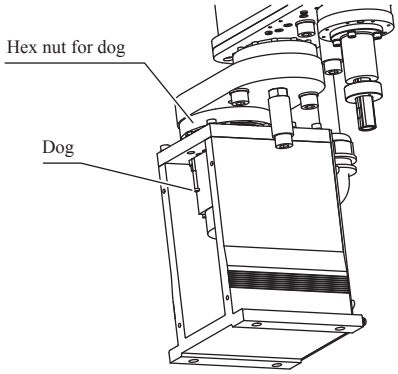
17 ***Perform the absolute reset.***
Perform the absolute reset from outside the safety enclosure.

18 ***Check the machine reference value.***
1. After the absolute reset has been completed, read the machine reference value displayed on the PBEX/PB.
2. If the machine reference value is in the range between 30 and 70 (recommended range), then the machine reference value has been completely adjusted.

Step 10-11 Removing the bolt

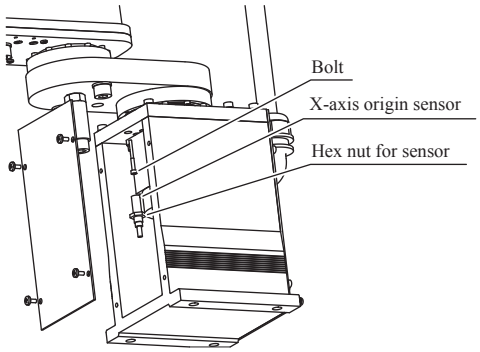


Step 12 Securing the hex nut and dog



Dog	Tightening torque (kgfcm)	Tightening torque (Nm)
M3×30	9	90

Step 13-14 Tightening the bolt



Bolt	Tightening torque (kgfcm)	Tightening torque (Nm)
M3×30	20	2.0

Use only OMRON genuine bolts or JIS B 1176 hex socket head bolts (strength class: JIS B 1051 12.9).

NOTE

If it is outside the recommended range, adjust the machine reference value while referring to "nAdjusting the Y-axis machine reference value" described previously.

19 ***Tighten the X-axis origin sensor mounting bolt.***
• Tightening torque: 7Nm (71kgfcm)

20 ***Turn off the controller.***

21 ***Enter the safety enclosure.***

22 ***Reattach the cover.***

■ Adjusting the Y-axis machine reference

CAUTION

The origin position may change due to machine reference adjustment. If it occurs, you must set point data again.

Follow the steps below to adjust the Y-axis machine reference value.
Prepare a wrench for a width across flat of 13 mm.

1 ***Turn on the controller.***
Check that no one is inside the safety enclosure, and then turn on the controller.

2 ***Perform the absolute reset.***
Perform the absolute reset from outside the safety enclosure.
For details about how to perform the absolute reset, see "2.3 Absolute reset procedures" in Chapter 3 of the Installation Manual.

3 ***Check the machine reference value.***
If the machine reference value displayed on the PBEX/PB is not in the range between 30 and 70 (recommended range) after the absolute reset has been completed, follow the steps below to adjust the machine reference value.

4 ***Place a sign indicating the robot is being adjusted.***
Place a sign indicating the robot is being adjusted, to keep others from operating the controller or operation panel.

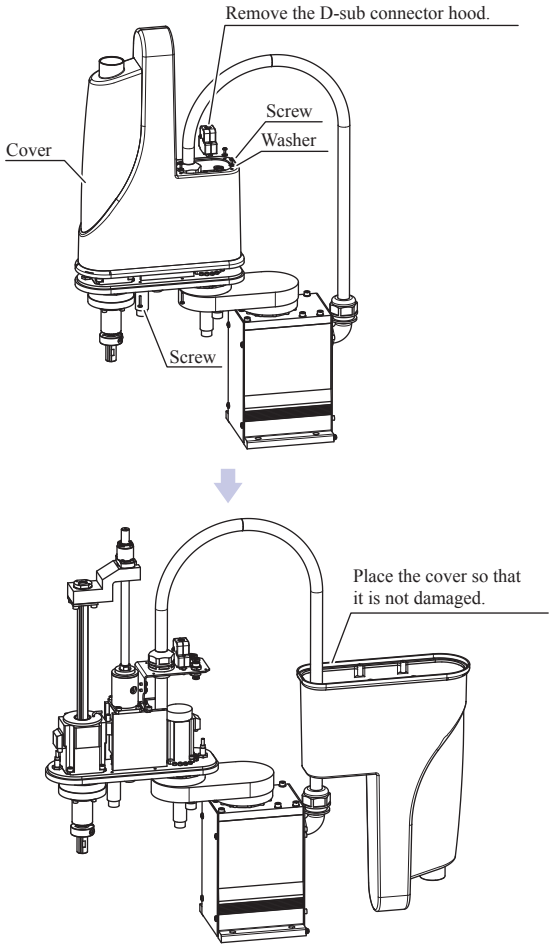
5 ***Turn off the controller.***

6 ***Enter the safety enclosure.***

7 ***Put a mark at the origin position.***
Scribe a mark at the current origin position on the Y-axis joint area of the robot.
At this time, be careful to prevent the origin position from deviating since the Y-axis arm is touched.

8 ***Remove the cover.***
Remove the cover while referring to "1. Attaching, detaching, and replacing the cover" in Chapter 2.

▶ **Step 8** **Removing the cover**



9 ***Loosen the hex nut.***

Using the wrench, loosen the hex nut that secures the Y-axis origin sensor.

CAUTION

It is enough to loosen the nut. Do not remove the nut completely.

10 ***Move the Y-axis origin sensor.***

Move the Y-axis origin sensor as follows. Determine the distance between the sensor and dog (L) to 0.2 to 0.8 mm.

- To decrease the Y-axis machine reference value, move the sensor away from the dog.
- To increase the Y-axis machine reference value, put the sensor close the dog.

CAUTION

Pay special attention so that the sensor does not collide with the dog.

11 ***Secure the sensor with the hex nut.***

Secure the Y-axis origin sensor with the hex nut.

• Tightening torque: 7 Nm (71 kgfcm)

12 ***Turn on the controller.***

Check that no one is inside the safety enclosure, and then turn on the controller.

13 ***Perform the absolute reset.***

Perform the absolute reset from outside the safety enclosure.

14 ***Check the machine reference value.***

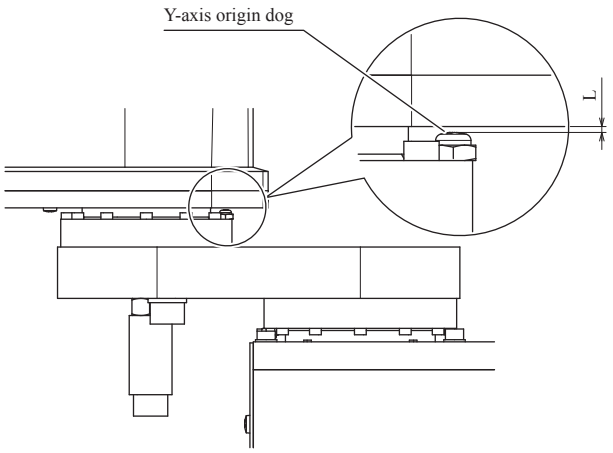
1. After the absolute reset has been completed, read the machine reference value displayed on the PBEX/PB.
2. When the machine reference value is in the range between 30 and 70 (recommended range) and the Y-axis arm position is in parallel with the X-axis arm position within ± 1° or less, then the machine reference value has been completely adjusted.
3. If it is outside the recommended range, then repeat the procedure from step 4 again to readjust it.

15 ***Turn off the controller.***

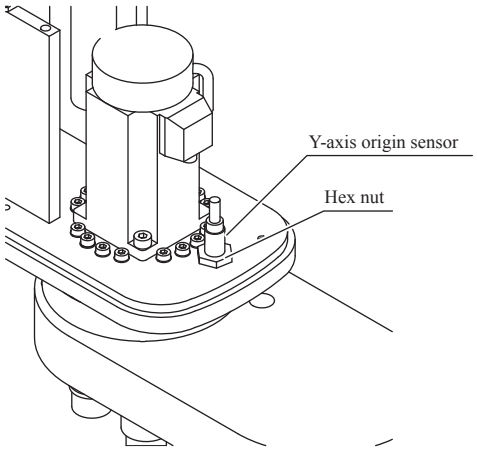
16 ***Enter the safety enclosure.***

17 ***Reattach the cover.***

Step 9-11 Moving the Y-axis origin sensor



Step 9-11 Moving the Y-axis origin sensor



■ Adjusting the R-axis machine reference

CAUTION

As the machine reference value is adjusted, the origin position may change. In this case, it is necessary to set the point data again after the machine reference value has been adjusted.

Follow the steps below to adjust the R-axis machine reference value.
Prepare a wrench for a width across flat of 13 mm.

1 ***Turn on the controller.***
Check that no one is inside the safety enclosure, and then turn on the controller.

2 ***Perform the absolute reset.***
Perform the absolute reset from outside the safety enclosure.
For details about how to perform the absolute reset, see "2.3 Absolute reset procedures" in Chapter 3 of the Installation Manual.

3 ***Check the machine reference value.***
If the machine reference value displayed on the PBEX/PB is not in the range between 30 and 70 (recommended range) after the absolute reset has been completed, follow the steps below to adjust the machine reference value.

4 ***Place a sign indicating the robot is being adjusted.***
Place a sign indicating the robot is being adjusted, to keep others from operating the controller or operation panel.

5 ***Turn off the controller.***

6 ***Enter the safety enclosure.***

7 ***Put a mark at the origin position.***
Scribe a mark at the current origin position on the R-axis of the robot.
At this time, be careful to prevent the origin position from deviating since the tip tool is touched.

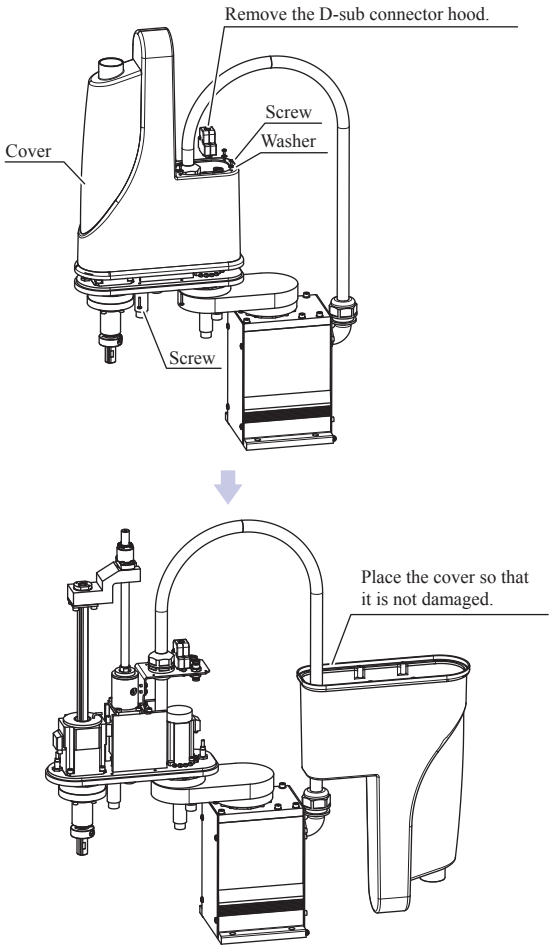
8 ***Remove the cover.***
Remove the cover while referring to "1. Attaching, detaching, and replacing the cover" in Chapter 2.

9 ***Loosen the hex nut.***
Using the wrench, loosen the hex nut that secures the R-axis origin sensor.

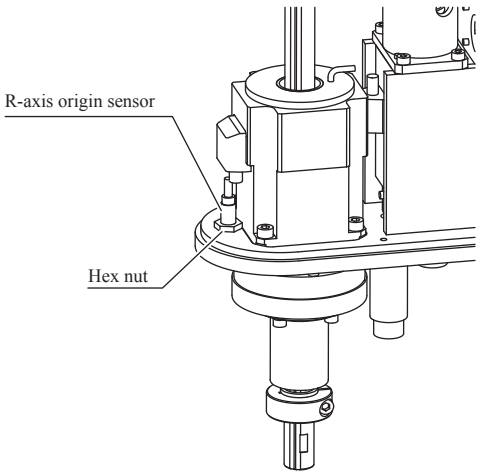
CAUTION

It is enough to loosen the nut. Do not remove the nut completely.

Step 8 **Removing the cover**



Step 9-11 **Moving the R-axis origin sensor**



10 ***Move the R-axis origin sensor.***

Move the R-axis origin sensor as follows. Determine the distance between the sensor and dog (L) to 0.2 to 0.8 mm.

- To decrease the R-axis machine reference value, move the sensor away from the dog.
- To increase the R-axis machine reference value, put the sensor close the dog.

CAUTION

Pay special attention so that the sensor does not collide with the dog.

11 ***Secure the sensor with the hex nut.***

Secure the R-axis origin sensor with the hex nut.

• Tightening torque: 7 Nm (71 kgfcm)

12 ***Turn on the controller.***

Check that no one is inside the safety enclosure, and then turn on the controller.

13 ***Perform the absolute reset.***

Perform the absolute reset from outside the safety enclosure.

14 ***Check the machine reference value.***

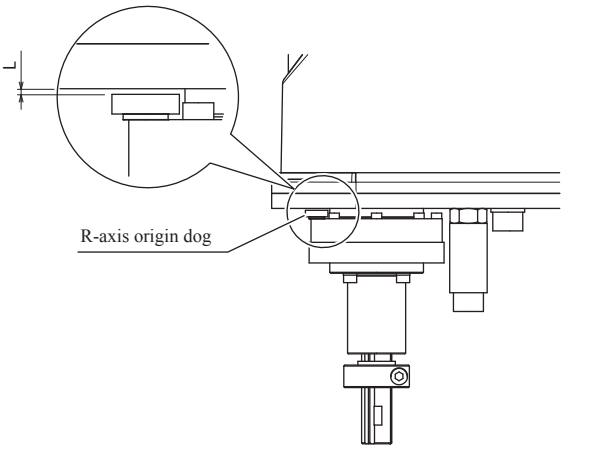
1. After the absolute reset has been completed, read the machine reference value displayed on the PBEX/PB.
2. When the machine reference value is in the range between 30 and 70 (recommended range), then the machine reference value has been completely adjusted.
3. If it is outside the recommended range, then repeat the procedure from step 4 again to readjust it.

15 ***Turn off the controller.***

16 ***Enter the safety enclosure.***

17 ***Reattach the cover.***

Step 10 **R-axis origin dog**



1.2 Sensor method
(R6YXG500, R6YXG600, R6YXGH600, R6YXG700, R6YXG800, R6YXG900, R6YXG1000)
(R6YXGS500, R6YXGS600, R6YXGS700, R6YXGS800, R6YXGS900, R6YXGS1000)

WARNING

BEFORE STARTING THE WORK, THOROUGHLY READ "1. ATTACHING, DETACHING, AND REPLACING THE COVER" IN CHAPTER 2.

■ Adjusting the X-axis machine reference

CAUTION

The origin position may change due to machine reference adjustment. If it occurs, you must set point data again.

Follow the steps below to adjust the X-axis machine reference value.
Prepare a hex wrench set.

1 ***Turn on the controller.***
Check that no one is inside the safety enclosure, and then turn on the controller.

2 ***Perform the absolute reset.***
Perform the absolute reset from outside the safety enclosure.
For details regarding the absolute reset procedure, refer to the separate Installation Manual, Chapter 3 "2.3 Absolute reset procedures".

3 ***Check the machine reference value.***
If the machine reference value displayed on the PBEX/PB is not in the range between 40 and 60 (recommended range) after the absolute reset has been completed, follow the steps below to adjust the machine reference value.

4 ***Place a sign indicating the robot is being adjusted.***
Place a sign indicating the robot is being adjusted, to keep others from operating the controller or operation panel.

5 ***Turn off the controller.***

6 ***Enter the safety enclosure.***

7 ***Put a mark at the origin position.***
Scribe a mark at the current origin position on the X-axis joint area of the robot.
At this time, be careful to prevent the origin position from deviating since the X-axis arm is touched.

8 ***Remove the cover.***
Remove the cover while referring to "1. Attaching, detaching, and replacing the cover" in Chapter 2.

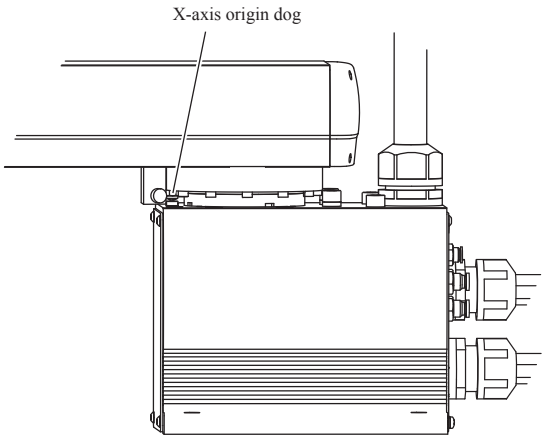
9 ***Scribe a mark at the X-axis origin sensor stay position.***

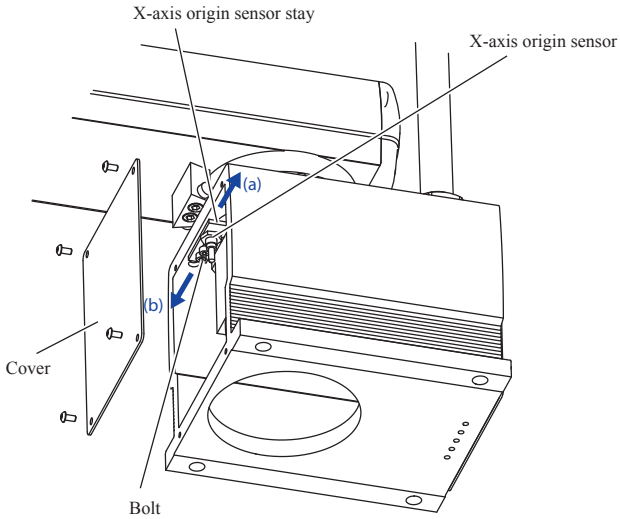
10 ***Loosen the bolts.***
Using the hex wrench, loosen the bolts (2 pcs.) that secure the X-axis origin sensor stay.

CAUTION

It is enough to loosen the bolt. Do not remove the nut completely.

▶ **Step 8-16** **Adjusting the X-axis machine reference (R6YXG500 to R6YXG1000)**





11 ***Move the X-axis origin sensor stay.***

Move the X-axis origin sensor stay as follows.
As an approximate guide, a 1mm-movement equals 100%.

X-axis machine reference value < 40%: Move the X-axis origin sensor stay toward (a) shown in the Fig.

X-axis machine reference value > 60%: Move the X-axis origin sensor stay toward (b) shown in the Fig.

12 ***Secure the stay with the bolts.***

Secure the X-axis origin sensor stay with the bolts.

13 ***Turn on the controller.***

Check that no one is inside the safety enclosure, and then turn on the controller.

14 ***Perform the absolute reset.***

Perform the absolute reset from outside the safety enclosure.

15 ***Check the machine reference value.***

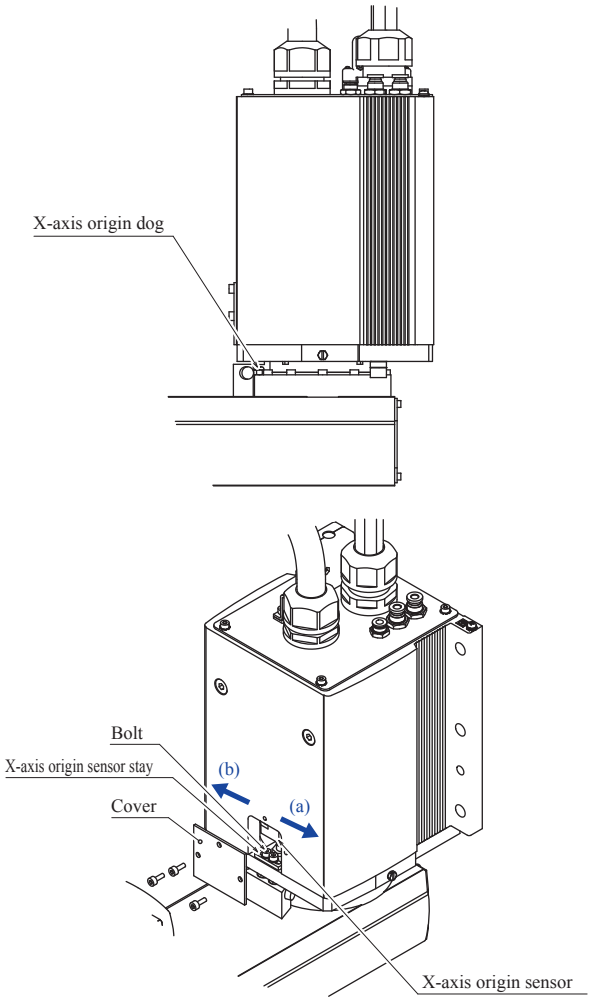
1. After the absolute reset has been completed, read the machine reference value displayed on the PBEX/PB.
2. If the machine reference value is in the range between 40 and 60 (recommended range), then the machine reference value has been completely adjusted.
3. If it is outside the recommended range, then repeat the procedure from step 4 again to readjust it.

16 ***Turn off the controller.***

17 ***Enter the safety enclosure.***

18 ***Reattach the cover.***

Step 8-16 Adjusting the X-axis machine reference (R6YXGS500 to R6YXGS1000)



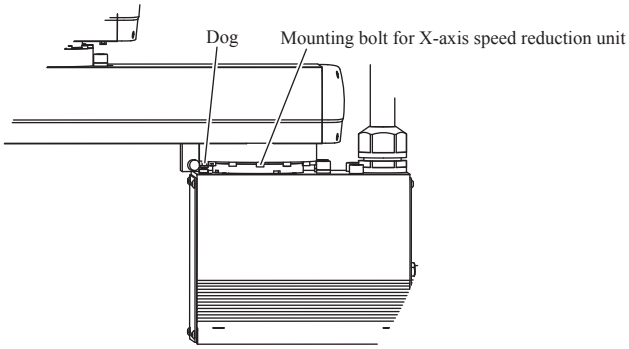
■ Changing the X-axis origin position

The X-axis origin position can be changed to any position in the range from the front position of the X-axis arm base to a maximum of 120° clockwise and counterclockwise at 30° intervals, by changing the positions of the dog and the mounting bolt for the X-axis speed reduction unit as shown below.

CAUTION

If the origin position has been changed, then the absolute reset must be performed, the machine reference must be adjusted, and the standard coordinate and point data must be reset.

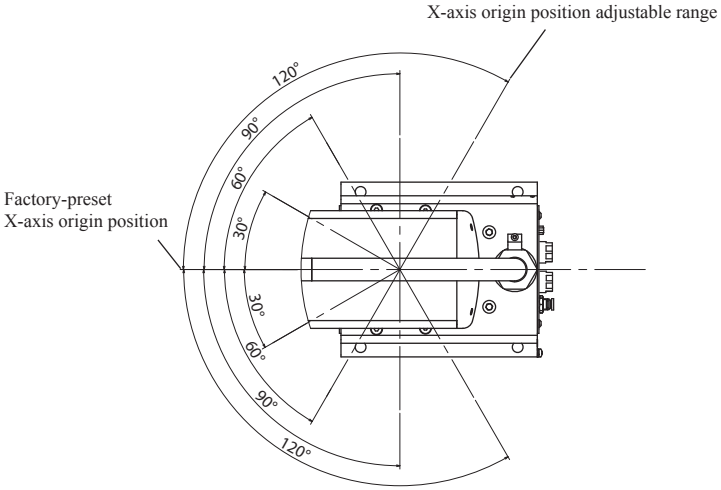
Dog and mounting bolt for X-axis speed reduction unit



CAUTION

For the wall-mount and inverse wall-mount models (R6YXGS500, R6YXGS600, R6YXGS700, R6YXGS800, R6YXGS900 and R6YXGS1000), the X-axis origin position can be changed in the same manner as the standard model. However, the cover removal work may involve risk. So, contact your distributor before changing the X-axis origin position.

X-axis origin position adjustable range



The following describes how to change the X-axis origin position, for example, to a position 90° counterclockwise.
Prepare the tools listed below.
• Hex wrench set • Torque wrench • Phillips screwdriver • Hex bit • Phillips screwdriver bit

1 ***Turn on the controller.***

Check that no one is inside the safety enclosure, and then turn on the controller.

2 ***Perform the absolute reset.***

Perform the absolute reset from outside the safety enclosure.
For details regarding the absolute reset procedure, refer to the separate Installation Manual, Chapter 3 "2.3 Absolute reset procedures".

3 ***Place a sign indicating that the robot is being adjusted.***
Place a sign indicating that the robot is being adjusted, to keep others from operating the controller or operation panel.

4 ***Turn off the controller.***

5 ***Enter the safety enclosure.***

6 ***Remove the cover.***
Remove the cover while referring to "1. Attaching, detaching, and replacing the cover" in Chapter 2.

7 ***Remove the bolts.***
Using the hex wrench, remove the bolts (2 pcs.) that secure the X-axis origin stay.

8 ***Remove the X-axis origin stay.***

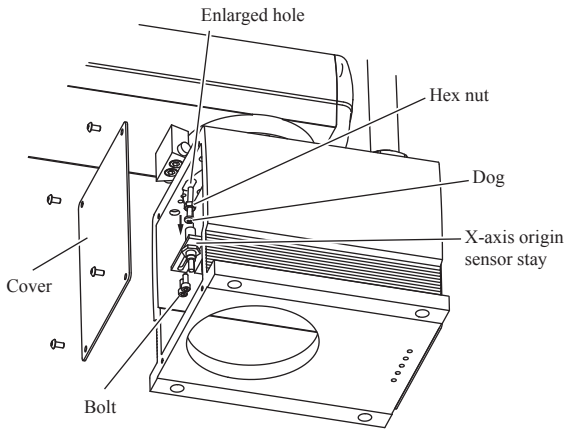
9 ***Remove the dog and hex nut.***
Remove the dog through the enlarged hole. At this time, remove the dog using the hex bit and wrench.

10 ***Turn the X-axis arm 90° counterclockwise.***

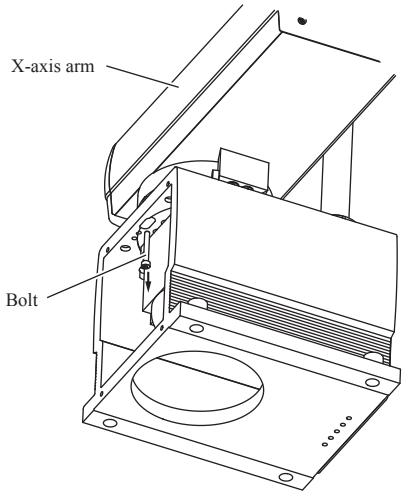
11 ***Remove the bolt located opposite to the enlarged hole hole.***

12 ***Secure the hex nut and dog.***
Secure the hex nut and dog to the tapped hole, and then tighten to the specified torque.

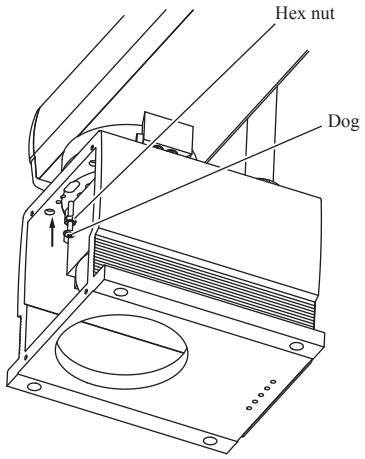
Step 6-9 **Removing the cover, bolt, and X-axis origin sensor stay**



Step 10-11 **Removing the bolt**



Step 12 **Securing the hex nut and dog**



Robot model	Dog	Tightening torque (kgfcm)	Tightening torque (Nm)
R6YXG500, R6YXG600 R6YXGS500, R6YXGS600	M4×30	16	160
R6YXGH600, R6YXG700, R6YXG800, R6YXG900, R6YXG1000 R6YXGS700, R6YXGS800, R6YXGS900, R6YXGS1000	M5×40	32	320

13 ***Return the X-axis arm to its original origin position.***

14 ***Tighten the bolt.***

Insert the bolt into the tapped hole where the dog was attached, and tighten to the specified torque.

15 ***Secure the X-axis origin sensor stay temporarily with the bolt.***

At this time, turn the X-axis arm manually to check that the sensor does not interfere with other parts.

16 ***Turn on the controller.***

Check that no one is inside the safety enclosure, and then turn on the controller.

17 ***Perform the absolute reset.***

Perform the absolute reset from outside the safety enclosure.

18 ***Check the machine reference value.***

1. After the absolute reset has been completed, read the machine reference value displayed on the PBEX/PB.
2. If the machine reference value is in the range between 40 and 60 (recommended range), then the machine reference value has been completely adjusted.

NOTE

If it is outside the recommended range, adjust the machine reference value while referring to "n Adjusting the X-axis machine reference value" described previously.

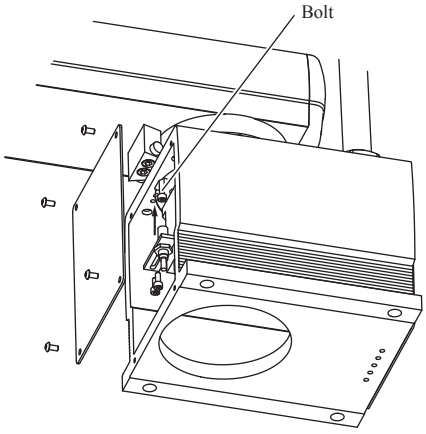
19 ***Tighten the X-axis origin sensor mounting bolt.***

20 ***Turn off the controller.***

21 ***Enter the safety enclosure.***

22 ***Reattach the cover.***

Step 13-14 Tightening the bolt



Robot model	Bolt	Tightening torque (kgfcm)	Tightening torque (Nm)
R6YXG500, R6YXG600 R6YXGS500, R6YXGS600	M4×30	46	4.5
R6YXGH600, R6YXG700, R6YXG800, R6YXG900, R6YXG1000 R6YXGS700, R6YXGS800, R6YXGS900, R6YXGS1000	M5×40	92	9.0

Use only OMRON genuine bolts or JIS B 1176 hex socket head bolts (strength class: JIS B 1051 12.9).

■ Adjusting the Y-axis machine reference

CAUTION

The origin position may change due to machine reference adjustment. If it occurs, you must set point data again.

Follow the steps below to adjust the X-axis machine reference value.
Prepare a hex wrench set.

1 ***Turn on the controller.***
Check that no one is inside the safety enclosure, and then turn on the controller.

2 ***Perform the absolute reset.***
Perform the absolute reset from outside the safety enclosure.
For details regarding the absolute reset procedure, refer to the separate Installation Manual, Chapter 3 "2.3 Absolute reset procedures".

3 ***Check the machine reference value.***
If the machine reference value displayed on the PBEX/PB is not in the range between 40 and 60 (recommended range) after the absolute reset has been completed, follow the steps below to adjust the machine reference value.

4 ***Place a sign indicating the robot is being adjusted.***
Place a sign indicating the robot is being adjusted, to keep others from operating the controller or operation panel.

5 ***Turn off the controller.***

6 ***Enter the safety enclosure.***

7 ***Put a mark at the origin position.***
Scribe a mark at the current origin position on the Y-axis joint area of the robot.
At this time, be careful to prevent the origin position from deviating since the Y-axis arm is touched.

8 ***Remove the cover.***
Remove the cover while referring to "1. Attaching, detaching, and replacing the cover" in Chapter 2.

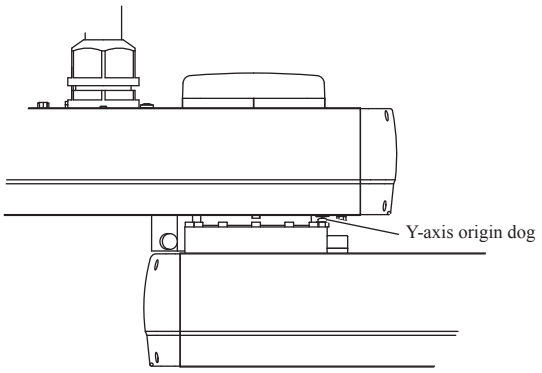
9 ***Scribe a mark at the Y-axis origin sensor stay position.***

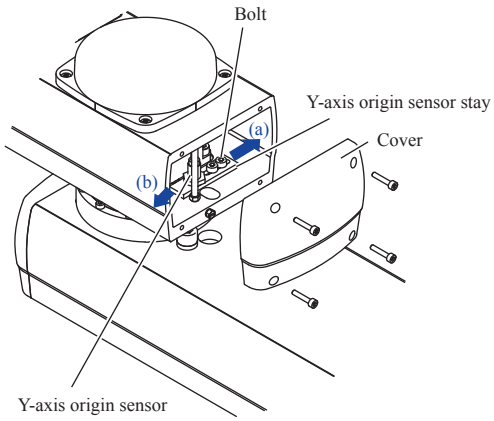
10 ***Loosen the bolts.***
Using the hex wrench, loosen the bolts (2 pcs.) that secure the Y-axis origin sensor stay.

CAUTION

It is enough to loosen the bolt. Do not remove the nut completely.

▶ **Step 8-11 Adjusting the Y-axis machine reference**





11 ***Move the Y-axis origin sensor stay.***

Move the Y-axis origin sensor stay as follows.
As an approximate guide, a 0.8mm-movement equals 100%.

Y-axis machine reference value < 40%: Move the Y-axis origin sensor stay toward (a) shown in the Fig.

Y-axis machine reference value > 60%: Move the Y-axis origin sensor stay toward (b) shown in the Fig.

12 ***Secure the stay with the bolts.***

Secure the X-axis origin sensor stay with the bolts.

13 ***Turn on the controller.***

Check that no one is inside the safety enclosure, and then turn on the controller.

14 ***Perform the absolute reset.***

Perform the absolute reset from outside the safety enclosure.

15 ***Check the machine reference value.***

1. After the absolute reset has been completed, read the machine reference value displayed on the PBEX/PB.
2. If the machine reference value is in the range between 40 and 60 (recommended range), then the machine reference value has been completely adjusted.
3. If it is outside the recommended range, then repeat the procedure from step 4 again to readjust it.

16 ***Turn off the controller.***

17 ***Enter the safety enclosure.***

18 ***Reattach the cover.***

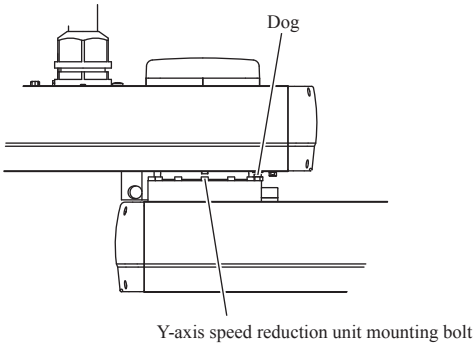
■ Changing the Y-axis origin position

The Y-axis origin position can be changed to any position in the range from the front position of the Y-axis arm and X-axis arm to a maximum of 120° clockwise and counterclockwise at 30° intervals, by changing the positions of the dog and the Y-axis speed reduction unit mounting bolt as shown below.

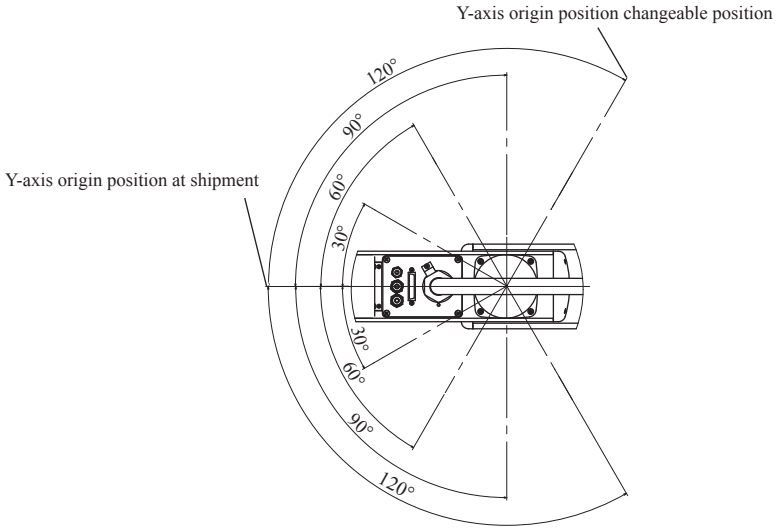
CAUTION

When the origin position has been changed, it is necessary to perform the absolute reset, adjust the machine reference value, and set the standard coordinate and point data again.

Dog and Y-axis speed reduction unit mounting bolt



Y-axis origin position changeable position



The following describes how to change the Y-axis origin position, for example, to a position 90° counterclockwise.
Prepare the tools listed below.
• Hex wrench set • Torque wrench • Phillips screwdriver • Hex bit • Phillips screwdriver bit

1 ***Turn on the controller.***
Check that no one is inside the safety enclosure, and then turn on the controller.

2 ***Perform the absolute reset.***
Perform the absolute reset from outside the safety enclosure.
For details regarding the absolute reset procedure, refer to the separate Installation Manual, Chapter 3 "2.3 Absolute reset procedures".

3 ***Place a sign indicating that the robot is being adjusted.***
Place a sign indicating that the robot is being adjusted, to keep others from operating the controller or operation panel.

4 ***Turn off the controller.***

5 ***Enter the safety enclosure.***

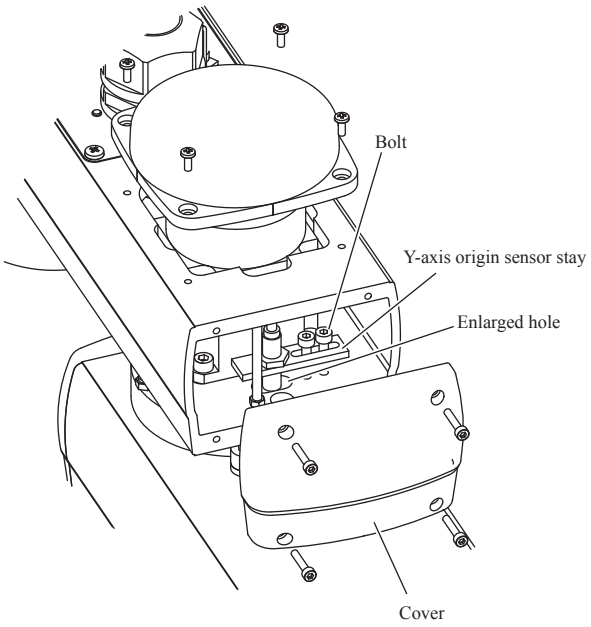
6 ***Remove the cover.***
Remove the cover while referring to "1. Attaching, detaching, and replacing the cover" in Chapter 2.

7 ***Remove the bolts.***
Using the hex wrench, remove the bolts (2 pcs.) that secure the Y-axis origin stay.

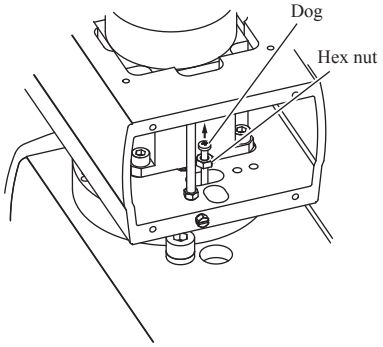
8 ***Remove the Y-axis origin stay.***

9 ***Remove the dog and hex nut.***
Remove the dog through the enlarged hole. At this time, remove the dog using the hex bit and wrench.

▶ **Step 6-8** **Removing the cover, bolt, and Y-axis origin sensor stay**



▶ **Step 9** **Removing the dog and hex nut.**



10 ***Turn the Y-axis arm 90° counterclockwise.***

11 ***Remove the bolt located opposite to the enlarged hole hole.***

12 ***Secure the hex nut and dog.***
Secure the hex nut and dog into the tapped hole where the bolt was attached, and then tighten to the specified torque.

13 ***Return the Y-axis arm to its original origin position.***

14 ***Tighten the bolt.***
Insert the bolt into the tapped hole where the dog was attached, and tighten to the specified torque.

15 ***Secure the Y-axis origin sensor stay temporarily with the bolt.***
At this time, turn the Y-axis arm manually to check that the sensor does not interfere with other parts.

16 ***Turn on the controller.***
Check that no one is inside the safety enclosure, and then turn on the controller.

17 ***Perform the absolute reset.***
Perform the absolute reset from outside the safety enclosure.

18 ***Check the machine reference value.***
1. After the absolute reset has been completed, read the machine reference value displayed on the PBEX/PB.
2. When the machine reference value is in the range between 40 and 60 (recommended range), then the machine reference value has been completely adjusted.

NOTE
If it is outside the recommended range, adjust the machine reference value while referring to "nAdjusting the Y-axis machine reference value" described previously.

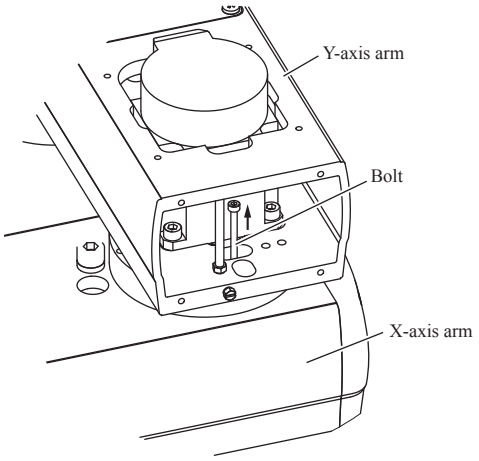
19 ***Tighten the Y-axis origin sensor mounting bolt.***

20 ***Turn off the controller.***

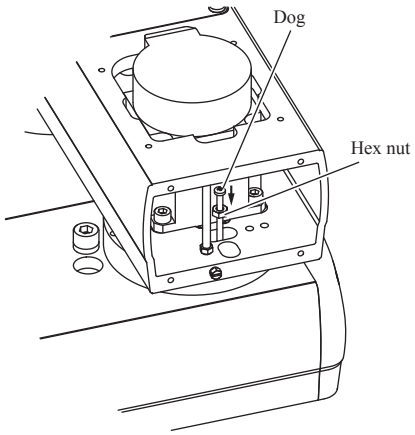
21 ***Enter the safety enclosure.***

22 ***Reattach the cover.***

Step 10-11 Removing the bolt

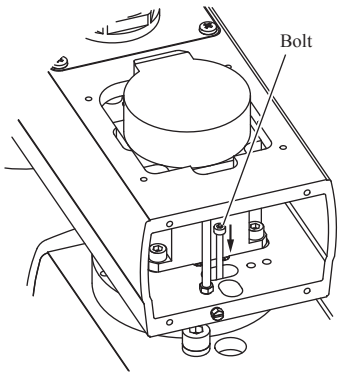


Step 12 Securing the hex nut and bolt



Robot model	Dog	Tightening torque (kgfcm)	Tightening torque (Nm)
R6YXG500, R6YXG600 R6YXGS500, R6YXGS600	M3×30	9	90
R6YXGH600, R6YXG700, R6YXG800, R6YXG900, R6YXG1000 R6YXGS700, R6YXGS800, R6YXGS900, R6YXGS1000	M4×40	16	160

Step 13-14 Tightening the bolt



Robot model	Bolt	Tightening torque (kgfcm)	Tightening torque (Nm)
R6YXG500, R6YXG600 R6YXGS500, R6YXGS600	M3×30	20	2.0
R6YXGH600, R6YXG700, R6YXG800, R6YXG900, R6YXG1000 R6YXGS700, R6YXGS800, R6YXGS900, R6YXGS1000	M4×40	46	4.5

Use only OMRON genuine bolts or JIS B 1176 hex socket head bolts (strength class: JIS B 1051 12.9).

■ Adjusting the R-axis machine reference

CAUTION

The origin position may change due to machine reference adjustment. If it occurs, you must set point data again.

Follow the steps below to adjust the R-axis machine reference value.
Prepare a hex wrench set.

1 ***Turn on the controller.***
Check that no one is inside the safety enclosure, and then turn on the controller.

2 ***Perform the absolute reset.***
Perform the absolute reset from outside the safety enclosure.
For details regarding the absolute reset procedure, refer to the separate Installation Manual, Chapter 3 "2.3 Absolute reset procedures".

3 ***Check the machine reference value.***
If the machine reference value displayed on the PBEX/PB is not in the range between 40 and 60 (recommended range) after the absolute reset has been completed, follow the steps below to adjust the machine reference value.

4 ***Place a sign indicating the robot is being adjusted.***
Place a sign indicating the robot is being adjusted, to keep others from operating the controller or operation panel.

5 ***Turn off the controller.***

6 ***Enter the safety enclosure.***

7 ***Put a mark at the origin position.***
Scribe a mark at the current origin position on the R-axis of the robot.
At this time, be careful to prevent the origin position from deviating since the tip tool is touched.

8 ***Remove the cover.***
Remove the cover while referring to "1. Attaching, detaching, and replacing the cover" in Chapter 2.

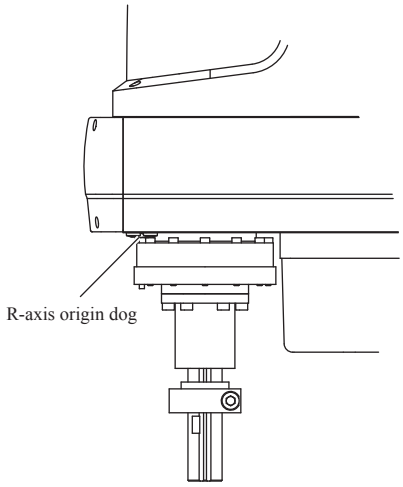
9 ***Scribe a mark at the R-axis origin sensor stay position.***

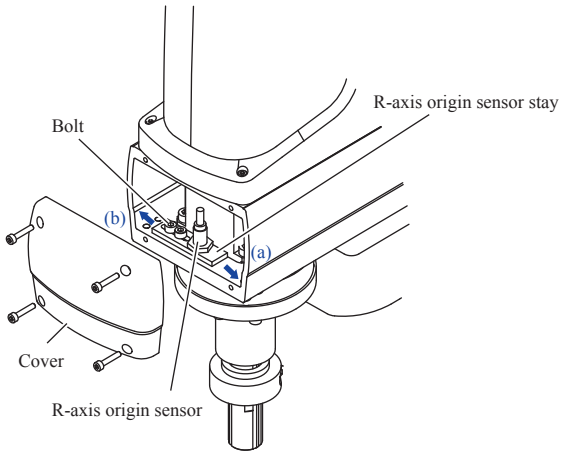
10 ***Loosen the bolts.***
Using the hex wrench, loosen the bolts (2 pcs.) that secure the R-axis origin sensor stay.

CAUTION

It is enough to loosen the bolt. Do not remove the nut completely.

▶ **Step 8-16** **Adjusting the R-axis machine reference**





11 ***Move the R-axis origin sensor stay.***

Move the R-axis origin sensor stay as follows.
As an approximate guide, a 1.9mm-movement equals 100%.

R-axis machine reference value < 40%: Move the R-axis origin sensor stay toward (a) shown in the Fig.

R-axis machine reference value > 60%: Move the R-axis origin sensor stay toward (b) shown in the Fig.

12 ***Secure the stay with the bolts.***

Secure the X-axis origin sensor stay with the bolts.

13 ***Turn on the controller.***

Check that no one is inside the safety enclosure, and then turn on the controller.

14 ***Perform the absolute reset.***

Perform the absolute reset from outside the safety enclosure.

15 ***Check the machine reference value.***

1. After the absolute reset has been completed, read the machine reference value displayed on the PBEX/PB.
2. If the machine reference value is in the range between 40 and 60 (recommended range), then the machine reference value has been completely adjusted.
3. If it is outside the recommended range, then repeat the procedure from step 4 again to readjust it.

16 ***Turn off the controller.***

17 ***Enter the safety enclosure.***

18 ***Reattach the cover.***

2. Adjusting the machine reference value of the stroke end method (Z-axis)

The stroke end method is employed on the XG series robots for the absolute reset of the Z-axis. The origin position of the Z-axis is fixed at the upper end of the Z-axis stroke, and it cannot be changed. The machine reference is factoryadjusted at shipment, and readjustment is not necessary for normal use. The readjustment in the following procedure is required, however, if the machine reference exceeds the tolerance range (25 to 75) of the absolute reset for any reason.

WARNING

BEFORE STARTING THE WORK, THOROUGHLY READ "1. ATTACHING, DETACHING, AND REPLACING THE COVER" IN CHAPTER 2.

CAUTION

The origin position may change due to machine reference adjustment. If it occurs, you must set point data again.

2.1 Stroke end method (R6YXGL250, R6YXGL350, R6YXGL400, R6YXGL500, R6YXGL600, R6YXGS300, R6YXGS400)

1 ***Turn on the controller.***
Check that no one is inside the safety enclosure, and then turn on the controller.

2 ***Place a sign indicating the robot is being adjusted.***
Place a sign indicating the robot is being adjusted, to keep others from operating the controller or operation panel.

3 ***Perform the absolute reset of the Z-axis.***

NOTE

For details about how to perform the absolute reset of the Z-axis, see "2.3 Absolute reset procedures" in Chapter 3 of the Installation Manual.

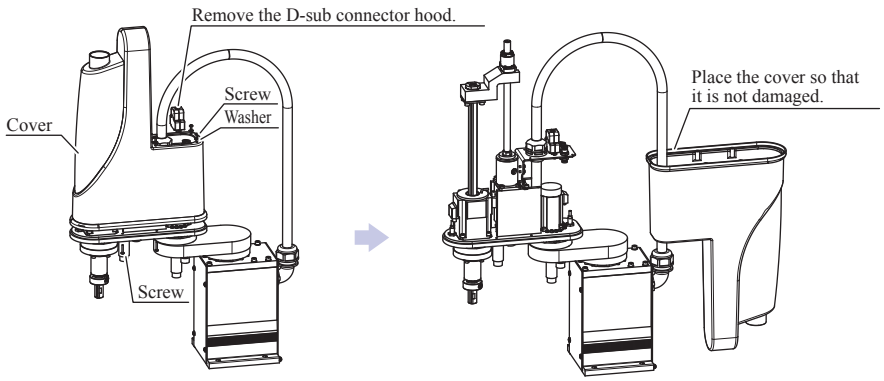
4 ***Record the machine reference value.***

5 ***Turn off the controller.***
The Z-axis motor brake is now working at the origin position.

6 ***Enter the safety enclosure.***

7 ***Remove the cover.***
Remove the cover while referring to "1. Attaching, detaching, and replacing the cover" in Chapter 2.

Step 7 Removing the cover



WARNING

IF THE Z-AXIS BRAKE IS RELEASED OR THE BOLT SHOWN BELOW IS LOOSENED, THE Z-AXIS MAY DROP, CAUSING A HAZARDOUS SITUATION. ALWAYS PROP UP THE Z-AXIS WITH A SUPPORT STAND, ETC.

8 ***Prop the spline or end effector with a support stand to prevent the Z-axis from dropping.***

9 ***Release the Z-axis brake.***
After checking that appropriate measures are taken to prevent the Z-axis from dropping, release the Z-axis brake.

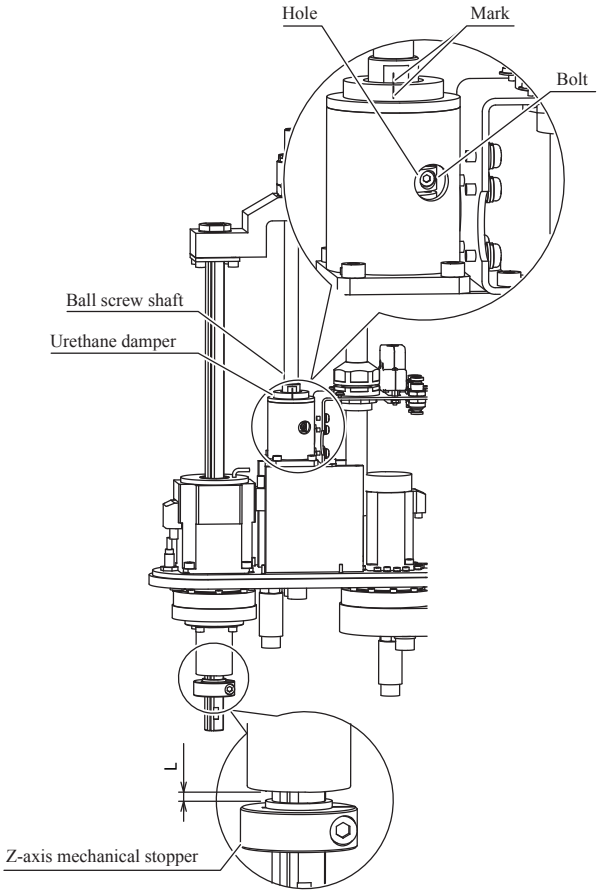
NOTE

For details about how to release the Z-axis brake, see the "OMRON Robot Controller User's Manual".

10 ***Put on the Z-axis brake.***

Move the Z-axis up or down so that the bolt is located at the center of the hole, and then put on the brake.

Step 10-13 Adjusting the Z-axis machine reference value



11 ***Put a mark on the ball screw and urethane damper.***

12 ***Loosen the bolt.***

13 ***Rotate the ball screw in response to the motor shaft.***

Rotating the ball screw 30° will change the machine reference value 33%.

The machine reference value decreases by rotating the ball screw clockwise as viewed from the top, while it increases by rotating the ball screw counterclockwise.

Determine the ball screw position based on the Z-axis machine reference value you have made a note of in step 4, so that the machine reference value is in the range between 30 and 70.

14 ***Tighten the bolt.***

• Tightening torque: 1.1 Nm (11 kgfcm)

Carefully tighten the bolt since the hex socket cap of the bolt is crushed easily.

15 ***Go out of the safety enclosure.***

16 ***Turn on the controller.***

Check that no one is inside the safety enclosure, and then turn on the controller.

17 ***Perform the absolute reset of the Z-axis.***

NOTE

For details about how to perform the absolute reset of the Z-axis, see "2.3 Absolute reset procedures" in Chapter 3 of the Installation Manual.

18 ***Check the Z-axis machine reference value.***

After the absolute reset has been completed, check that the adjustment machine reference value is within the absolute reset tolerance range (30 to 70).

If the adjustment machine reference value is outside the tolerance range (30 to 70), then repeat the procedure from step 5 again to readjust it.

19 ***Turn off the controller.***

20 ***Enter the safety enclosure.***

21 ***Reattach the cover.***

When the machine reference value is within the tolerance range, reattach the cover.

2.2 Stroke end method
(R6YXG500, R6YXG600, R6YXGH600, R6YXG700, R6YXG800, R6YXG900, R6YXG1000)
(R6YXGS500, R6YXGS600, R6YXGS700, R6YXGS800, R6YXGS900, R6YXGS1000)

WARNING

BEFORE STARTING THE WORK, THOROUGHLY READ "1. ATTACHING, DETACHING, AND REPLACING THE COVER" IN CHAPTER 2.

1 ***Turn on the controller.***

Check that no one is inside the safety enclosure, and then turn on the controller.

2 ***Place a sign indicating the robot is being adjusted.***

Place a sign indicating the robot is being adjusted, to keep others from operating the controller or operation panel.

3 ***Perform the absolute reset of the Z-axis.***

NOTE

For details about how to perform the absolute reset of the Z-axis, see "2.3 Absolute reset procedures" in Chapter 3 of the Installation Manual.

4 ***Record the machine reference value.***

5 ***Turn off the controller.***

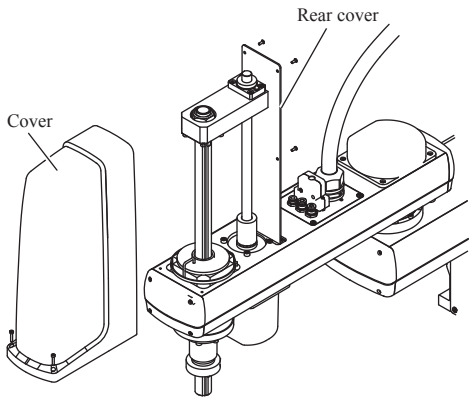
The Z-axis motor brake is now working at the origin position.

6 ***Enter the safety enclosure.***

7 ***Remove the cover.***

Remove the cover while referring to "1. Attaching, detaching, and replacing the cover" in Chapter 2.

Step 7 Removing the cover



WARNING

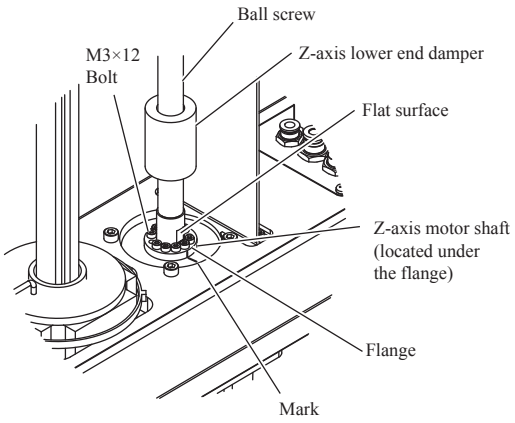
IF THE BALL SCREW COMES OFF THE Z-AXIS MOTOR, THE Z-AXIS DROPS, CAUSING A HAZARDOUS SITUATION.
ALWAYS PROP UP THE Z-AXIS WITH A SUPPORT STAND, ETC.

8 ***Prop the spline or end effector with a support stand to prevent the Z-axis from dropping.***

9 ***Shift the Z-axis lower end damper upward.***

If it is difficult to shift the Z-axis lower end damper, insert a flat blade screwdriver into the portion between the damper and holder and raise the damper by leverage from.

Step 9-11 Adjusting the Z-axis machine reference



*Use only OMRON genuine bolts or JIS B 1176 hex socket head bolts (strength class: JIS B 1051 12.9).

10 ***Put a mark.***

Put a mark so that the current flange position corresponding to the Z-axis motor shaft can be understood.

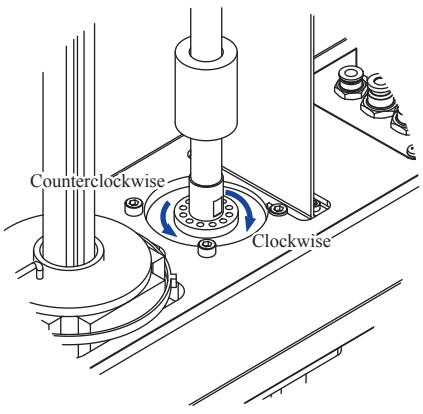
11 ***Remove the bolts.***

Put the wrench on the width across flat part of the flange and loosen the bolts to remove them.
The rotation of the ball screw then becomes free from the Z-axis motor.

12 ***Turn the flange with respect to the motor shaft.***

As the flange is turned 30°, the reference value changes 33%.
Turning the flange clockwise as viewed from the top will decrease the reference value while turning it counterclockwise will increase the reference value.
Determine the flange position based on the Z-axis machine reference value you have made a note of in step 4, so that the machine reference value is in the range between 25 and 75.

Step 12 Adjusting the flange position



13 ***Tighten the bolt.***

Gradually tighten the bolts located at diagonal positions.

• Tightening torque: 2.0Nm (20kgfcm)

The number of bolt installation positions is 10 with respect to 12 through holes.

14 ***Go out of the safety enclosure.***

15 ***Turn on the controller.***

Check that no one is inside the safety enclosure, and then turn on the controller.

16 ***Perform the absolute reset of the Z-axis.***

NOTE

For details about how to perform the absolute reset of the Z-axis, see "2.3 Absolute reset procedures" in Chapter 3 of the Installation Manual.

17 ***Check the Z-axis machine reference value.***

After the absolute reset has been completed, check that the adjustment machine reference value is within the absolute reset tolerance range (25 to 75).

If the adjustment machine reference value is outside the tolerance range (25 to 75), then repeat the procedure from step 5 again to readjust it.

18 ***Turn off the controller.***

19 ***Enter the safety enclosure.***

20 ***Reattach the cover.***

When the machine reference value enters the absolute reset tolerance range, bring the Z-axis lower end damper tightly in contact the holder and reattach the cover. At this time, be sure to tighten all the screws securely.

Chapter 5 Replacing the harmonic drive

Contents

1. Cautions on replacement of the harmonic drive

The following describes the cautions on replacement of the harmonic drive. Before beginning the replacement work, always be sure to read these replacement procedures and caution.

■ Cautions on replacement of the harmonic drive

WARNING

- THE MOTOR AND SPEED REDUCTION GEAR CASING ARE EXTREMELY HOT AFTER AUTOMATIC OPERATION, SO BURNS MAY OCCUR IF THESE ARE TOUCHED. BEFORE TOUCHING THESE PARTS, TURN OFF THE CONTROLLER, WAIT FOR A WHILE AND CHECK THAT THE TEMPERATURE HAS COOLED.
- WHEN REMOVING THE WAVE GENERATOR FROM THE MOTOR SHAFT OR REINSTALLING IT BACK ONTO THE MOTOR SHAFT, USE CAUTION TO AVOID AS MUCH AS POSSIBLE, APPLYING A THRUST LOAD TO THE MOTOR SHAFT. IF A LOAD IS APPLIED, THE RESOLVER MAY BE DAMAGED RESULTING IN A HAZARDOUS SITUATION OF THE ROBOT TROUBLE.

PRECAUTIONS WHEN HANDLING HARMONIC GREASE, CLEANING OIL:

- INFLAMMATION MAY OCCUR IF THEY GET IN THE EYES.
  BEFORE HANDLING THEM, WEAR YOUR SAFETY GOGGLES TO ENSURE THEY WILL NOT COME IN CONTACT WITH THE EYES.
- INFLAMMATION MAY OCCUR IF THEY COME INTO CONTACT WITH SKIN. BE SURE TO WEAR PROTECTIVE GLOVES TO PREVENT CONTACT WITH SKIN.
- DO NOT TAKE ORALLY OR EAT. (EATING WILL CAUSE DIARRHEA AND VOMITING.)
- HANDS AND FINGERS MIGHT BE CUT WHEN OPENING THE CONTAINER, SO USE PROTECTIVE GLOVES.
- KEEP OUT OF THE REACH OF CHILDREN.
- DO NOT HEAT THEM OR PLACE NEAR AN OPEN FLAME SINCE THIS COULD LEAD TO SPARKS AND FIRES.

EMERGENCY TREATMENT:

- IF THEY GET IN THE EYES, WASH LIBERALLY WITH PURE WATER FOR ABOUT 15 MINUTES AND CONSULT A PHYSICIAN FOR TREATMENT.
- IF THEY COME IN CONTACT WITH THE SKIN, WASH AWAY COMPLETELY WITH SOAP AND WATER.
- IF TAKEN INTERNALLY, DO NOT INDUCE VOMITING BUT PROMPTLY CONSULT A PHYSICIAN FOR TREATMENT.

DISPOSING OF HARMONIC GREASE, CLEANING OIL AND THE CONTAINER:

- PROPER DISPOSAL IS COMPULSORY UNDER FEDERAL, STATE AND LOCAL REGULATIONS. TAKE APPROPRIATE MEASURES IN COMPLIANCE WITH LEGAL REGULATIONS.
- DO NOT PRESSURIZE THE EMPTY CONTAINER. PRESSURIZING MAY CAUSE THE CONTAINER TO RUPTURE.
- DO NOT ATTEMPT TO WELD, HEAT UP, DRILL HOLES OR CUT THIS CONTAINER. THIS MIGHT CAUSE THE CONTAINER TO EXPLODE AND THE REMAINING MATERIALS INSIDE IT TO IGNITE.

CAUTION

The harmonic drive service life may shorten if the grease recommended by OMRON is not used.

■ Recommended grease

Use the following harmonic drive grease.

4B No.2 (made by Harmonic Drive Systems Inc.)

CAUTION

Harmonic drive

- Do not apply strong shocks or impacts to these parts such as with a hammer. Also, do not scratch, scar or dent these parts by dropping, etc. Such actions will damage the harmonic drive.
- The specified performance cannot be maintained if any part of the harmonic drive is used in a damaged state. This damage or wear may also lead to trouble with the harmonic drive.
- Since a positional shift occurs after replacing the harmonic drive, it is necessary to make absolute reset, standard coordinate setting and point data setting again.

2. Replacement procedure for harmonic drive

The following describes the procedures and precautions for replacing the harmonic drive.
For the bolt tightening torque in the harmonic drive replacement work, see the Table below. However, when tightening the mounting bolts for the harmonic drive, observe the tightening torque specified in each replacement procedure. Use only OMRON genuine bolts.

■ Bolt tightening torque

Bolt size	Tightening torque (kgfcm)	Tightening torque (Nm)
M3 button head bolt	14	1.4
M4 set screw	20	2.0
M3	20	2.0
M4	46	4.5
M5	92	9.0
M6	156	15.3
M8	380	37
M10	720	71

Recommended "Screw Lock": LOCTITE 262 (made by Henkel Corporation)

2.1 R6YXGL250, R6YXGL350, R6YXGL400, R6YXGL500, R6YXGL600, R6YXGS300, R6YXGS400

2.1.1 Replacing the X-axis harmonic drive

WARNING
BEFORE STARTING THE WORK, THOROUGHLY READ “1. ATTACHING, DETACHING, AND REPLACING THE COVER” IN CHAPTER 2.

The following shows the parts and tools necessary for the X-axis harmonic drive replacement work.

1. Replacement parts

	Part Name	OMRON Part No.	Part No. / Specs	Q'ty	Remarks
1	Harmonic drive	KCY-M2110-001		1	
2	O-ring	KN4-M257K-000	Cross section diameter: 1.78mm Inner diameter: 72.75mm	1	Becomes worn and must be replaced
3	O-ring	KN3-M2143-000	Cross section diameter: 1.5mm Inner diameter: 49.0mm	1	Becomes worn and must be replaced
4	O-ring	KN3-M2144-000	Cross section diameter: 0.99mm Inner diameter: 53.28mm	1	Supplied with harmonic drive
5	Motor mounting bolt	91312-05014	M5, length: 14	4	Spare parts
6	Harmonic drive mounting bolt	91312-03018	M3, length: 18	16	Must be replaced
7	Harmonic drive mounting bolt	91312-03030	M3, length: 30	11	Must be replaced
8	Panhead bolt for dog	98502-03030	M3, length: 30	1	Spare parts
9	Nut for dog	95302-04600	M4	1	Spare parts
10	Washer	92903-03600	M3	16	Must be replaced
11	Plate mounting bolt	91312-05025	M5, length: 25	6	Spare parts
12	Washer for plate mounting bolt	92902-05600	For M5	6	Spare parts

2. Torque wrench, etc.

CAUTION

Use accurately calibrated torque screwdrivers and torque wrenches.

	Name	Part No.	Manufacturer	Remarks
A	Torque wrench	N120SPCK	KANON (Nakamura Mfg. Co., Ltd.)	For M5 hex socket head bolt Tightening torque: 7.4Nm (76kgfcm)
	Changeable head	230HCK4	KANON (Nakamura Mfg. Co., Ltd.)	Wrench (without ball end) for M5 hex socket head bolt; insert 110mm
B	Torque screwdriver	N30LTDK	KANON (Nakamura Mfg. Co., Ltd.)	For M3 hex socket head bolt Tightening torque: 1.8Nm (18kgfcm)
	Drive bit	B35, opposite side 2.5×75	Vessel Co., Inc.	Attachment hexagonal width across flat: 6.35mm Overall length: 75mm Hexagonal width across flat at tip: 2.5mm
C	Torque screwdriver	N12LTDK	KANON (Nakamura Mfg. Co., Ltd.)	For M3 set screw Tightening torque: 0.7Nm (7kgfcm)
	Drive bit	3C1507	NAC (Nagahori Industry Co., Ltd.)	Attachment hexagonal width across flat: 6.35mm Overall length: 70mm Hexagonal width across flat at tip: 1.5mm
D	Torque screwdriver	N12LTDK	KANON (Nakamura Mfg. Co., Ltd.)	For M3 Phillips-head screw Tightening torque: 0.9Nm (9kgfcm)
	Drive bit	B35+2×50	Vessel Co., Inc.	Attachment hexagonal width across flat: 6.35mm Overall length: 50mm Bit number: #2

* Use a commercially available torque wrench to tighten bolts other than those shown above.

3. Other tools

Name	Part No.	Manufacturer	Remarks
Harmonic grease	4B No.2 (*1)	Harmonic Drive Systems	Do not use grease if it was purchased 4 or more years ago. The grease has probably deteriorated.
Cleaning wipe			
Phillips screwdriver			
Hex wrench set			
Screw thread locking agent	Loctite 262	Henkel	High strength type (red)

*1: 25g

■ Removal

Follow the steps below to remove the X-axis parts.

1 ***Turn off the controller.***

2 ***Place a sign indicating the robot is being adjusted.***

Place a sign indicating the robot is being adjusted, to keep others from operating the controller or operation panel.

3 ***Enter the safety enclosure.***

CAUTION

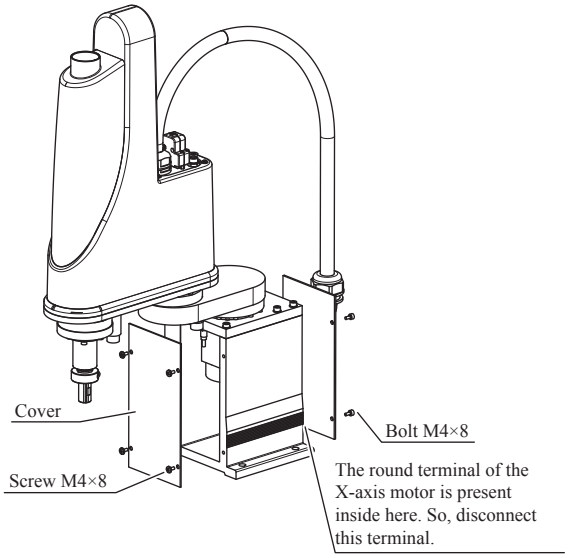
In the following steps, when the work is performed without removing the Y-axis arm from the X-axis arm, perform the work with great care since the X-arm without removing the Y-axis arm is very heavy.

4 ***Remove the base front and rear covers.***

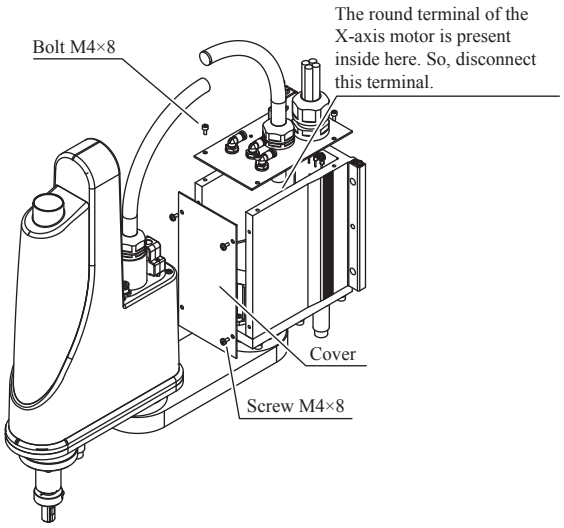
Remove the cover while referring to "1. Attaching, detaching, and replacing the cover" in Chapter 2.

5 ***Disconnect the connectors of the X-axis motor power wire XM and resolver wire XP in the base, and the round terminal of the X-axis motor.***

Step 4-5 Removing the base front and rear covers



R6YXGL250, R6YXGL350, R6YXGL400, R6YXGL500, R6YXGL600



R6YXGS300, R6YXGS400

6 ***Remove the bolts from the top surface of the plate, and then remove the plate from the base.***

Lay down the plate for each of the X-axis and Y-axis arms to place it on a cloth rag.

7 ***Remove the X-axis motor.***

1. Using the tool A, remove the bolts that secure the motor.
2. Pull out the motor from the plate while turning the X-axis arm.

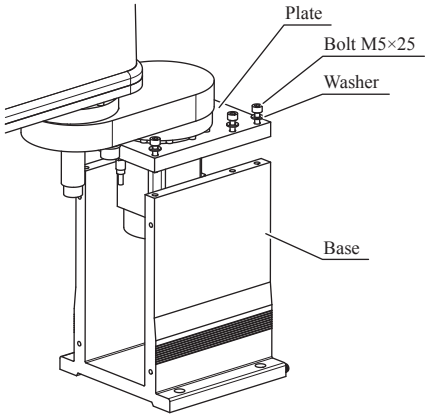
NOTE

An O-ring is placed between the motor mating and the plate. Replace this O-ring with a new one.

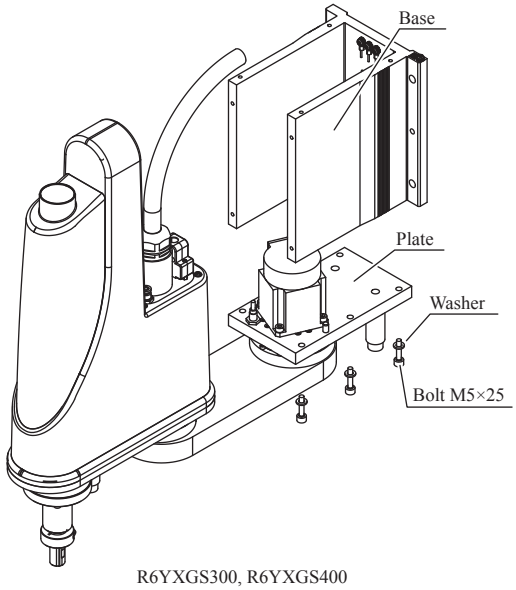
8 ***Remove the wave generator.***

Remove the set screw (1 pc.) that secure the wave generator.

Step 6 **Removing the plate**

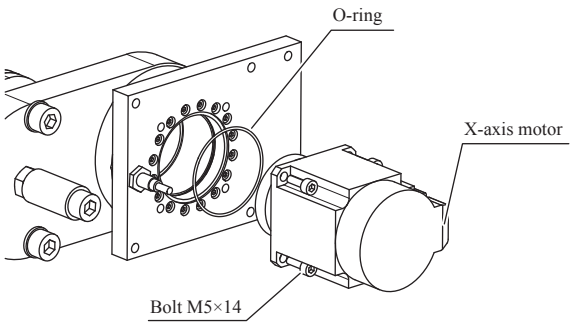


R6YXGL250, R6YXGL350, R6YXGL400, R6YXGL500, R6YXGL600

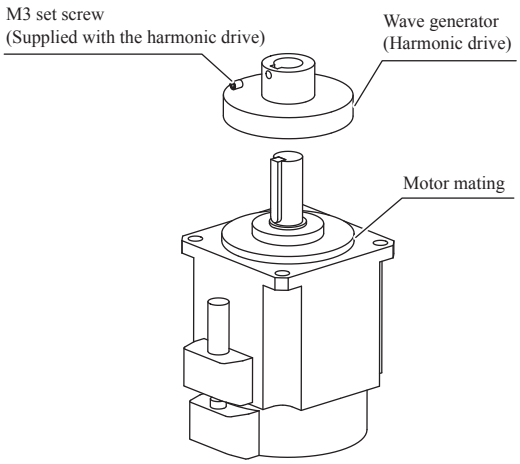


R6YXGS300, R6YXGS400

Step 7 **Removing the motor**



Step 8 **Removing the wave generator**



9 ***Remove the X-axis arm.***

Remove the bolts that secure the X-axis arm.
Place the X-axis arm that has been removed in a place where it does not hinder the work.

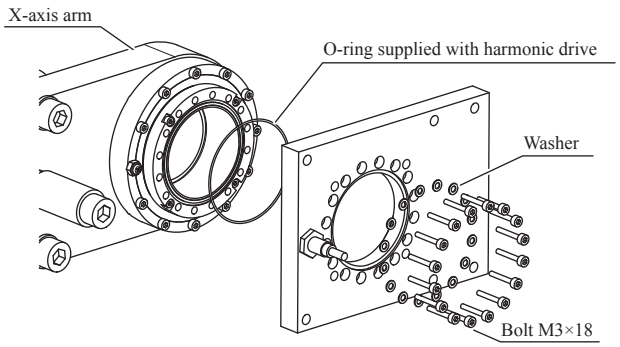
10 ***Remove the X-axis harmonic drive from the X-axis arm.***

Remove the bolts, panhead bolts, and nuts that secure the X-axis harmonic drive.

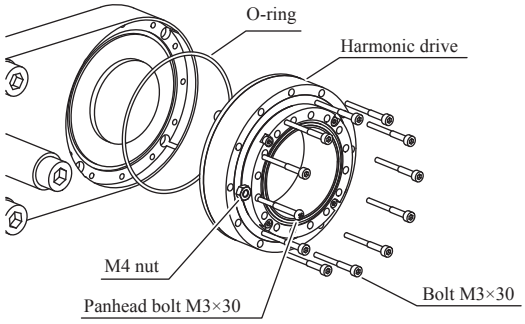
NOTE

An O-ring is fitted to the X-axis arm. Replace this O-ring with a new one.

Step 9 Removing the X-axis arm



Step 10 Removing the harmonic drive



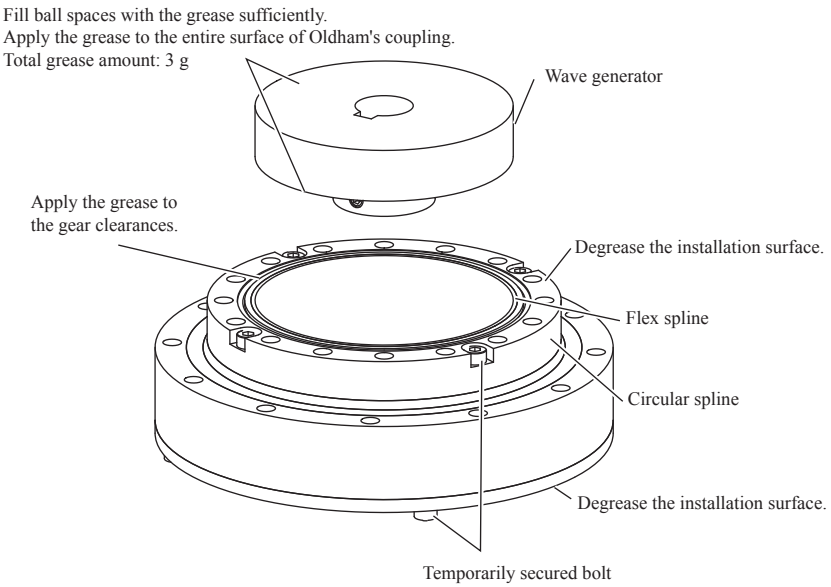
■ Replacement and reassembly

Follow the steps below to replace the harmonic drive with a new one and reassemble it.

1 ***Perform the work shown below before reassembling the harmonic drive.***

1. Apply the harmonic grease to a new wave generator. For details about how to apply the grease, see the Fig. below. Before applying the grease, degrease the top and bottom surfaces of the harmonic drive.

Step 1 Applying the harmonic grease



2. Remove the old grease and worn-out particles from the motor, plate, and X-axis arm completely.

CAUTION

- If foreign matter is caught in during reassembly work, this may cause the noise from the harmonic drive or the harmonic drive to break.
- Never remove the temporarily secured bolts. Doing so may cause a misalignment.

2 *Secure a new harmonic drive (1) to the X-axis arm.*

1. Degrease the harmonic drive installation surface of the X-axis arm.
   Do not apply the grease to the seating part.
2. Fit the O-ring (2) coated with the new harmonic grease into the O-ring groove of the X-axis arm.
   Since the grease application to the O-ring is intended to prevent the O-ring from coming off, it is accepted to apply a small amount of the grease.

CAUTION

Do not allow the O-ring to get caught out of the groove during reassembly. If the robot is operated with the O-ring left caught out of the groove, this may cause a malfunction.

3. Secure the new harmonic drive to the X-axis arm with new bolts.
   Apply harmonic grease 4B No.2 to the tip of each bolt so that the roots of at least the first four threads are filled with grease.
   Grease applied to the bolt tip is intended to stabilize the bolt axial force.
4. Secure the panhead bolts and nuts at their original positions.

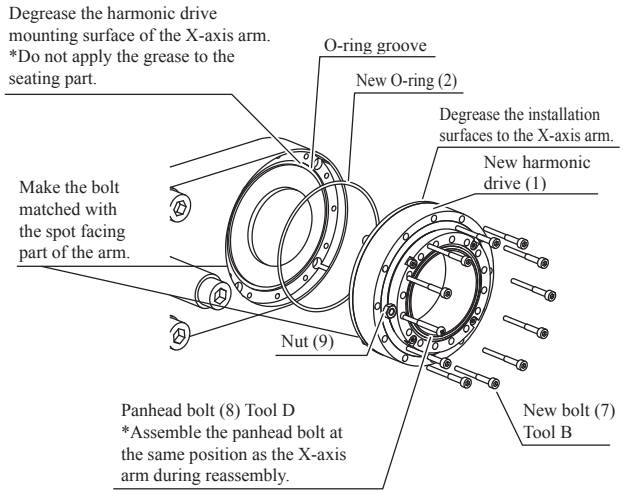
CAUTION

Do not apply the grease to the panhead bolt. Doing so may cause the bolt to loosen.

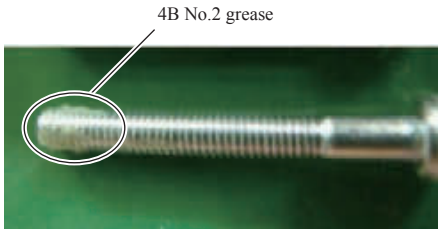
3 *Tighten the bolts and panhead bolts in the order shown below.*

1. Using the wrench, tighten the bolts and panhead bolts manually in the order indicated by circled numbers.
2. Using the torque wrench, tighten the bolts and panhead bolts to approximately 50% of the specified torque in the order indicated by circled numbers.
3. Tighten the bolts and panhead bolts to the specified torque in the order indicated by circled numbers.
4. Finally, check that the bolts and panhead bolts are tightened to the specified torque.

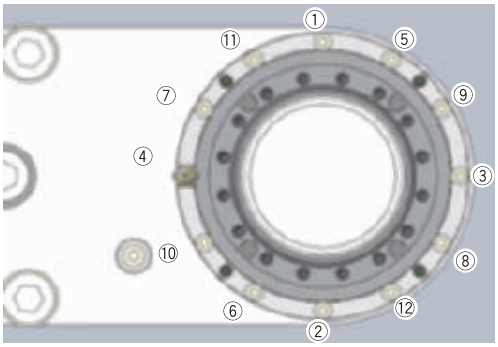
Step 2 **Mounting the harmonic drive**



Step 2, 5 **Applying the grease to the mounting bolt**



Step 3 **Bolt and panhead bolt tightening order**



4 *Install the new O-ring (4).*

1. Degrease the top surface of the plate where the harmonic drive is to be installed.

CAUTION

Do not allow the O-ring to get caught out of the groove during reassembly. If the robot is operated with the O-ring left caught out of the groove, this may cause a malfunction.

2. Fit the new O-ring (4) coated with the harmonic grease into the O-ring groove of the harmonic drive.
   Since the grease application to the O-ring is intended to prevent the O-ring from coming off, it is accepted to apply a small amount of the grease.

5 *Secure the harmonic drive to the plate.*

Secure the harmonic drive to the plate with the new bolts.
The harmonic drive's phase with respect to the plate should be as shown in the Fig. on the right.
Apply harmonic grease 4B No.2 to the tip of each bolt so that the roots of at least the first four threads are filled with grease.

6 *Tighten the bolts in the order shown below.*

1. Using the wrench, tighten the bolts manually in the order indicated by circled numbers.
2. Using the torque wrench, tighten the bolts to approximately 50% of the specified torque in the order indicated by circled numbers.
3. Tighten the bolts to the specified torque in the order indicated by circled numbers.
4. Finally, check that the bolts are tightened to the specified torque.

7 *Fit the new O-ring (3) into the motor mating.*

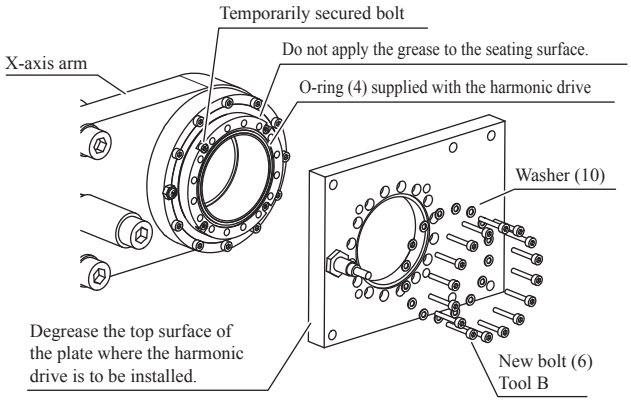
CAUTION

Do not allow the O-ring to get caught out of the groove during reassembly. If the robot is operated with the O-ring left caught out of the groove, this may cause a malfunction.

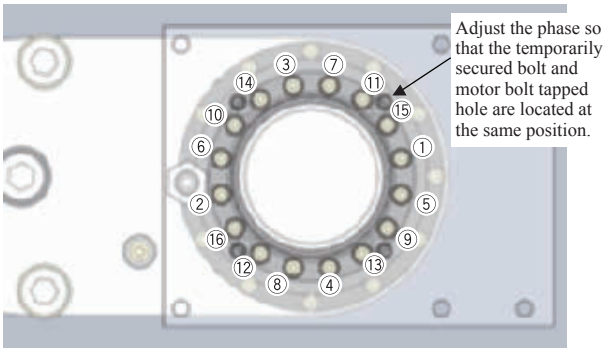
8 *Secure the spacer and wave generator.*

1. Pass the spacer and wave generator through the motor shaft.
   Push in the spacer and wave generator until they are in contact with the motor.
2. Secure the wave generator with the set screw (1 pc.).
   At this time, apply a small amount of the screw lock to the set screw.

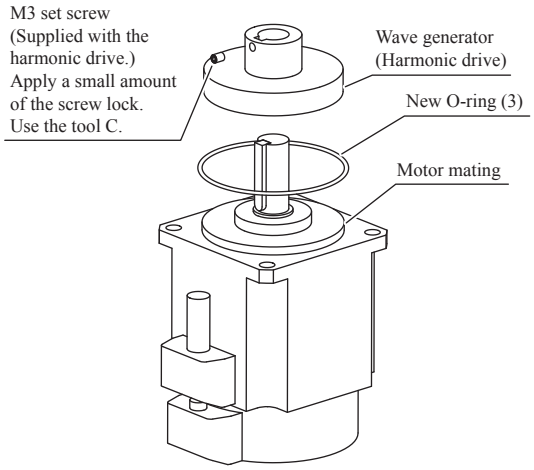
Step 4 Installing the harmonic drive



Step 5-6 Phase with respect to the plate



Step 7-8 Securing the spacer and wave generator



3. Apply the harmonic grease to the portion between the wave generator and motor and the top surface of the wave generator.

CAUTION

- If it is difficult to fit the wave generator onto the motor shaft by pushing by hand, do not forcefully push in. Grind the key or motor shaft with sandpaper or similar tool to make it easier to fit the wave generator onto the motor shaft.
- Apply the specified amount of harmonic grease (total specified amount, 25g) to each part of the harmonic drive. An insufficient amount of grease may shorten the service life of the drive parts, and an excessive amount may cause the grease to leak.

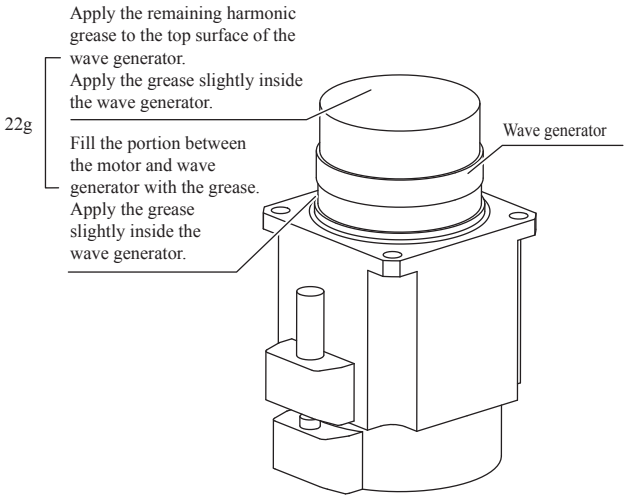
9 *Install the X-axis motor.*

1. Push the X-axis motor into the plate while moving the X-axis arm manually. At this time, pay special attention so that any grease does not stick to the plate.
2. Using the tool A, uniformly tighten the four bolts while moving the X-axis arm by hand slowly left and right at intervals of 45°. At this time, if any jamming or catching is felt, reassemble from the beginning.

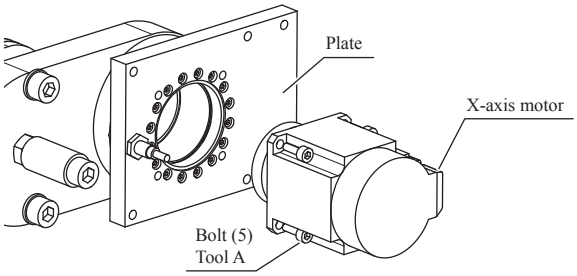
10 *Secure the plate.*

Secure the plate to the base with bolt (11). Reassemble the plate so that there is no clearance between the plate and base end face.

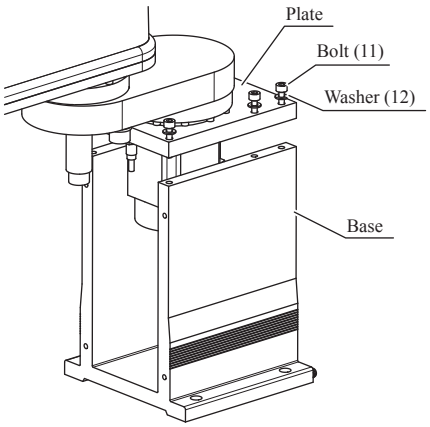
Step 8 **Applying the harmonic grease**



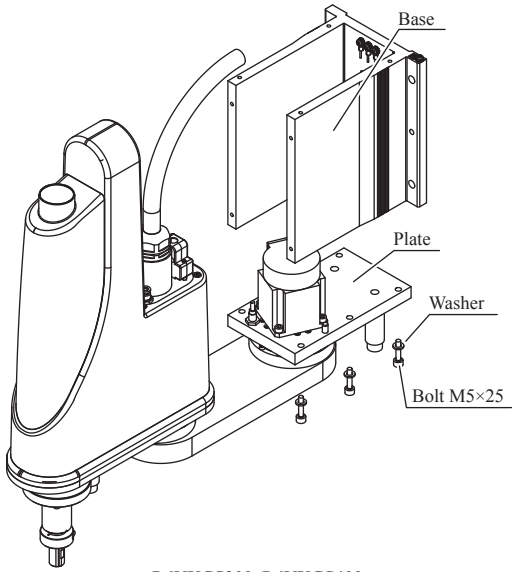
Step 9 **Installing the X-axis motor**



Step 10 **Securing the plate**



R6YXGL250, R6YXGL350, R6YXGL400, R6YXGL500, R6YXGL600

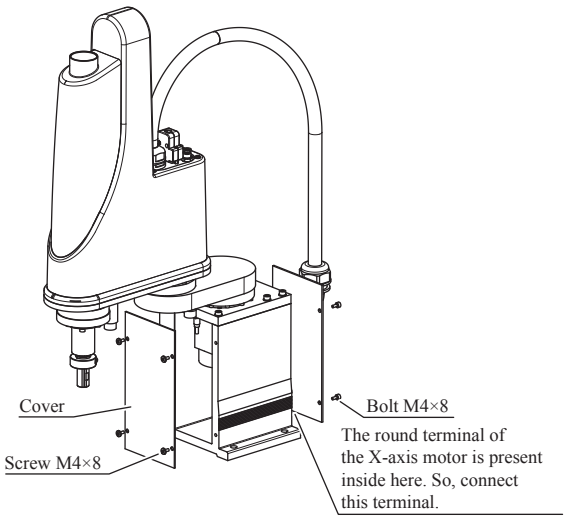


R6YXGS300, R6YXGS400

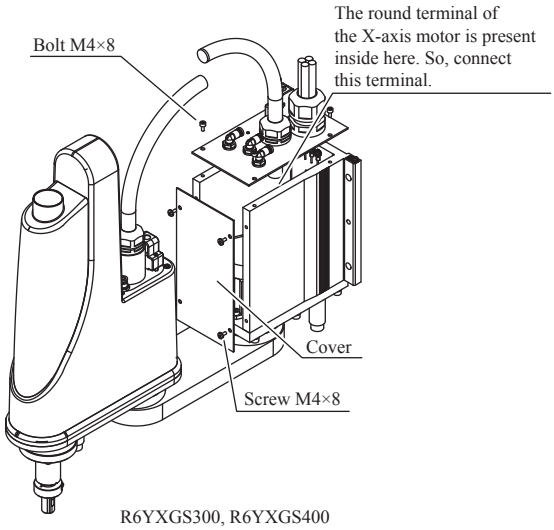
11 ***Connect the connectors of the X-axis motor power wire XM and resolver wire XP, and the round terminal of the X-axis motor.***

12 ***Reattach the base font and rear covers.***

▶ Step 11-12 **Reattaching the base front and rear covers**



R6YXGL250, R6YXGL350, R6YXGL400, R6YXGL500, R6YXGL600



R6YXGS300, R6YXGS400

■ Aging

1 ***Go out of the safety enclosure.***

2 ***Turn on the controller.***
Check that no one is inside the safety enclosure, and then turn on the controller.

CAUTION

After the harmonic drive has been replaced, it is necessary to perform the absolute reset and set the standard coordinates and point data again. Make the adjustments while referring to Chapter 3 “Adjusting the robot” in the Installation Manual.

3 ***Perform the aging.***
Perform the aging for 30 minutes at 5% speed and for another 30 minutes at 20% speed by rotating the X-axis arm as much as possible (at least 10°).

2.1.2 Replacing the Y-axis harmonic drive

WARNING

BEFORE STARTING THE WORK, THOROUGHLY READ "1. ATTACHING, DETACHING, AND REPLACING THE COVER" IN CHAPTER 2.

The following shows the parts and tools necessary for the Y-axis harmonic drive replacement work.

1. Replacement parts

	Part Name	OMRON Part No.	Part No. / Specs	Q'ty	Remarks
1	Harmonic drive	KCY-M2510-000		1	
2	O-ring	KN4-M1896-000	Cross section diameter: 1.78mm Inner diameter: 63.22mm	1	Becomes worn and must be replaced
3	Nut for dog	95302-04700	M4	1	Spare parts
4	O-ring	90990-17J016	Cross section diameter: 0.8mm Inner diameter: 45.40mm	1	Supplied with harmonic drive
5	Washer	92903-03600	M3	16	Must be replaced
6	Harmonic drive mounting bolt	91312-03022	M3, length: 22	16	Must be replaced
7	Harmonic drive mounting bolt	91312-03025	M3, length: 25	11	Must be replaced
8	Panhead bolt for dog	98502-03030	M3, length: 30	1	Spare parts

2. Torque wrench, etc.

CAUTION

Use accurately calibrated torque screwdrivers and torque wrenches.

	Name	Part No.	Manufacturer	Remarks
A	Torque wrench	N60CPCK	KANON (Nakamura Mfg. Co., Ltd.)	For M4 hex socket head bolt Tightening torque: 3.8Nm (39kgfcm)
	Changeable head	230HCK3	KANON (Nakamura Mfg. Co., Ltd.)	Wrench (without ball end) for M4 hex socket head bolt; insert 93mm
B	Torque screwdriver	N30LTDK	KANON (Nakamura Mfg. Co., Ltd.)	For M3 hex socket head bolt Tightening torque: 1.8Nm (18kgfcm)
	Drive bit	B35, opposite side 2.5×75	Vessel Co., Inc.	Attachment hexagonal width across flat: 6.35mm Overall length: 75mm Hexagonal width across flat at tip: 2.5mm
C	Torque screwdriver	N12LTDK	KANON (Nakamura Mfg. Co., Ltd.)	For M3 set screw Tightening torque: 0.7Nm (7kgfcm)
	Drive bit	3C1507	NAC (Nakamura Mfg. Co., Ltd.)	Attachment hexagonal width across flat: 6.35mm Overall length: 70mm Hexagonal width across flat at tip: 1.5mm
D	Torque screwdriver	N12LTDK	KANON (Nakamura Mfg. Co., Ltd.)	For M3 Phillips-head screw Tightening torque: 0.9Nm (9kgfcm)
	Drive bit	B35+2×50	Vessel Co., Inc.	Attachment hexagonal width across flat: 6.35mm Overall length: 50mm Bit number: #2

* Use a commercially available torque wrench to tighten bolts other than those shown above.

3. Other tools

Name	Part No.	Manufacturer	Remarks
Harmonic grease	4B No.2 (*1)	Harmonic Drive Systems	Do not use grease if it was purchased 4 or more years ago. The grease has probably deteriorated.
Cleaning wipe			
Phillips screwdriver			
Hex wrench set			
Screw thread locking agent	Loctite 262	Henkel	High strength type (red)

*1: 12g

■ Removal

Follow the steps below to remove the Y-axis parts.

1 ***Turn off the controller.***

2 ***Place a sign indicating the robot is being adjusted.***

Place a sign indicating the robot is being adjusted, to keep others from operating the controller or operation panel.

3 ***Enter the safety enclosure.***

4 ***Remove the cover.***

As the Y-axis motor wiring is clamped at several locations, the connectors are difficult to disconnect. So, perform the replacement work without disconnection of the connectors.
Remove the cover while referring to "1. Attaching, detaching, and replacing the cover" in Chapter 2.

WARNING

IF THE Y-AXIS ARM MOUNTING BOLTS ARE REMOVED IN STEP 5, THE Y-AXIS ARM COMES OFF, CAUSING HAZARDOUS SITUATION.
IF A HEAVY TOOL IS ATTACHED TO THE ARM TIP, THE ARM MAY DROP. TAKE GREAT CARE WHEN REMOVING THE Y-AXIS ARM MOUNTING BOLTS.

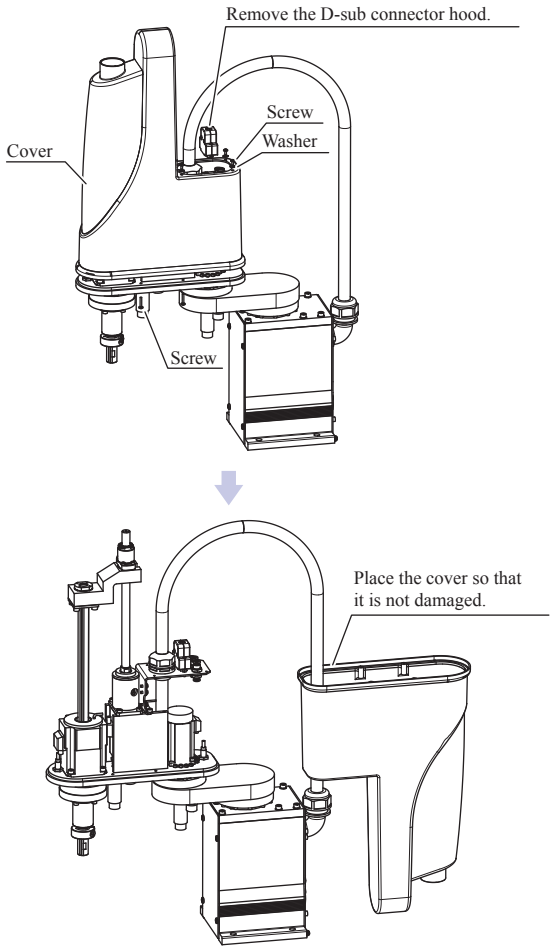
5 ***Remove the Y-axis arm.***

1. Remove the harness support plate.
2. Remove the Y-axis arm mounting bolts.
3. Remove the Y-axis arm.
   Place the Y-axis arm that has been removed in a place where it is not in contact with the harness and it does not hinder the work.
4. Remove the O-ring.

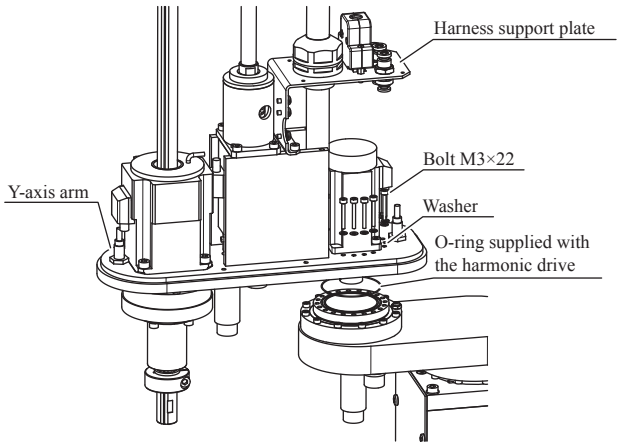
NOTE

The O-ring in the harmonic drive must be replaced with a new one later on.
The O-ring may adhere to the bottom surface of the Y-axis arm, so be sure to remove it.

Step 4 **Removing the cover**



Step 5 **Removing the Y-axis arm**



6 ***Remove the wave generator from the motor shaft.***

Remove the set screws (2 pcs.) that secure the wave generator.

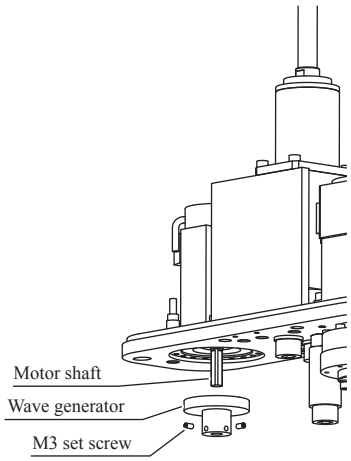
7 ***Remove the Y-axis harmonic drive from the top surface of the X-axis arm.***

1. Remove the bolts, panhead bolts, and nuts that secure the Y-axis harmonic drive.
2. Remove the O-ring.

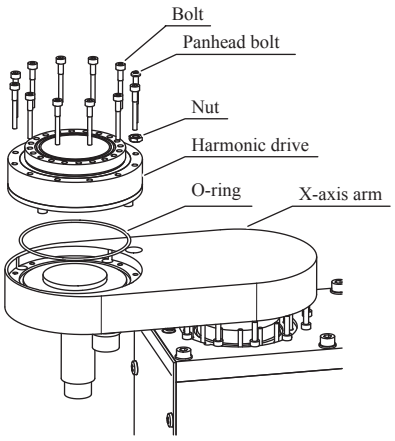
NOTE

The O-ring in the Y-axis harmonic drive must be replaced with a new one later on.

▶ **Step 6** **Removing the wave generator**



▶ **Step 7** **Removing the Y-axis harmonic drive**



■ Replacement and reassembly

Follow the steps below to replace the harmonic drive with a new one and reassemble it.

1 ***Perform the work shown below before reassembling the harmonic drive.***

1. Apply the harmonic grease 4B No.2 to a new wave generator.
2. Remove the old grease and worn-out particles from the motor, X-axis arm, and Y-axis arm completely.

CAUTION

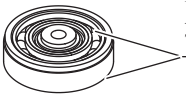
If foreign matter is caught in during reassembly work, this may cause the noise from the harmonic drive or the harmonic drive to break.

3. Apply the specified amount of harmonic grease to each part of the harmonic drive.

CAUTION

An insufficient amount of grease may shorten the service life of the drive parts, and an excessive amount may cause the grease to leak.

▶ **Step 1** **Applying the harmonic grease (wave generator)**



Fill ball spaces with the grease sufficiently.
Apply the grease.
Total grease amount: 2g

2 *Secure a new harmonic drive (1) to the X-axis arm.*

1. Degrease the harmonic drive installation surface of the X-axis arm.
   Do not apply the grease to the seating surface.
2. Fit a new O-ring (2) into the O-ring groove in the X-axis arm.

CAUTION

- Do not allow the O-ring to get caught out of the groove during reassembly. If the robot is operated with the O-ring left caught out of the groove, this may cause a malfunction.
- Never remove the temporarily secured bolt. Doing so may cause a misalignment.

3. Place the new harmonic drive on the X-axis arm and secure it with the bolts.
   Apply harmonic grease 4B No.2 to the tip of each bolt so that the roots of at least the first four threads are filled with grease.
   Grease applied to the bolt tip is intended to stabilize the bolt axial force.
4. Secure the panhead bolts and nuts at their original positions.

CAUTION

Do not apply the grease to the panhead bolt. Doing so may cause the bolt to loosen.

3 *Tighten the bolts and panhead bolts in the order shown below.*

1. Using the wrench, tighten the bolts and panhead bolts manually in the order indicated by circled numbers.
2. Using the torque driver, tighten the bolts and panhead bolts to approximately 50% of the specified torque in the order indicated by circled numbers.
3. Tighten the bolts and panhead bolts to the specified torque in the order indicated by circled numbers.
4. Finally, check that the bolts and panhead bolts are tightened to the specified torque.

4 *Apply the grease to the inside of the harmonic drive main body.*

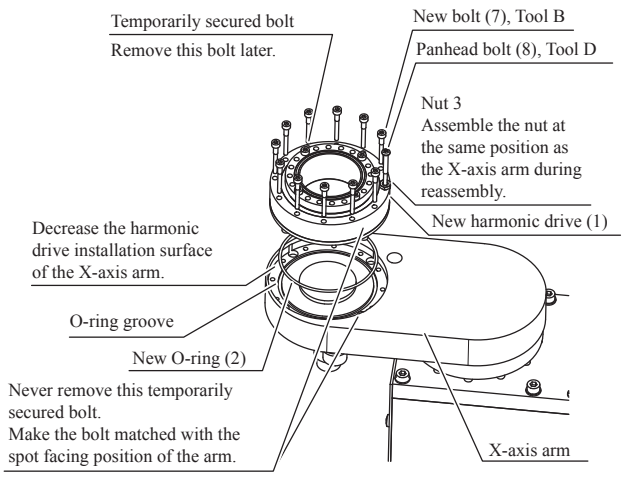
For the Y-axis, apply the grease so that it becomes flat.

5 *Remove the temporarily secured bolts (4 pcs.).*

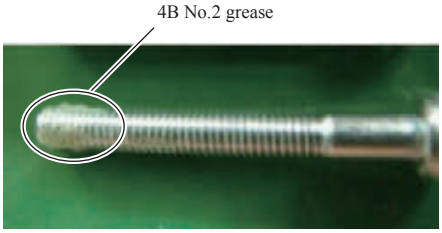
6 *Install the new O-ring (4) provided with the new harmonic drive.*

1. Degrease the installation surface on the top surface of the harmonic drive.
2. Fit the O-ring supplied with the new harmonic drive into the O-ring groove of the harmonic drive.
   If it is difficult to fit the O-ring into the groove, slightly stretch the O-ring.
   It is accepted to apply a small amount of the harmonic drive grease to the O-ring in order to prevent the O-ring from coming off the groove.

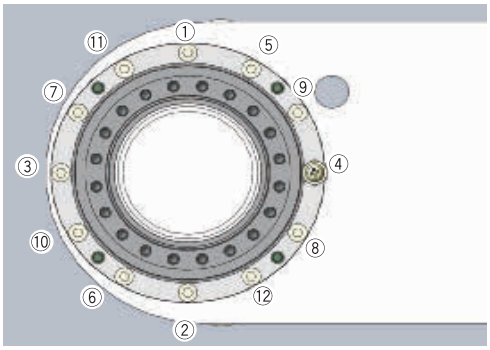
Step 2 **Securing the harmonic drive**



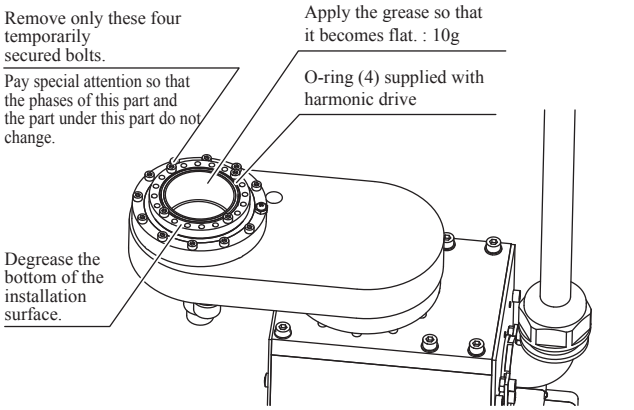
Step 2, 7 **Applying the grease to the mounting bolt**



Step 3 **Bolt and panhead bolt tightening order**



Step 4-6 **Applying the grease to the inside of the harmonic main body.**



CAUTION

Do not allow the O-ring to get caught out of the groove during reassembly. If the robot is operated with the O-ring left caught out of the groove, this may cause a malfunction.

7 *Secure the wave generator.*

1. Pass the wave generator through the motor shaft while carefully checking its orientation.
   Push in the wave generator until it is in contact with the stepped part of the motor shaft.
2. Secure the wave generator with the set screws (2 pcs.).
   At this time, apply a small amount of the screw lock to the set screws.

CAUTION

- If it is difficult to fit the wave generator onto the motor shaft by pushing by hand, do not forcefully push in. Grind the key or motor shaft with sandpaper or similar tool to make it easier to fit the wave generator onto the motor shaft.
- Apply the specified amount of the harmonic grease to each part of the harmonic drive. An insufficient amount of grease may shorten the service life of the drive parts, and an excessive amount may cause the grease to leak.

8 *Secure the Y-axis arm to the harmonic drive.*

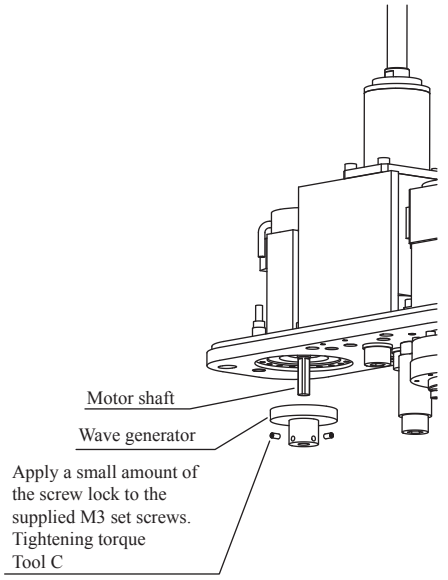
1. Degrease the Y-axis arm side where the harmonic drive is to be installed.
2. Apply harmonic grease 4B No.2 to the tip of each bolt so that the roots of at least the first four threads are filled with grease.

CAUTION

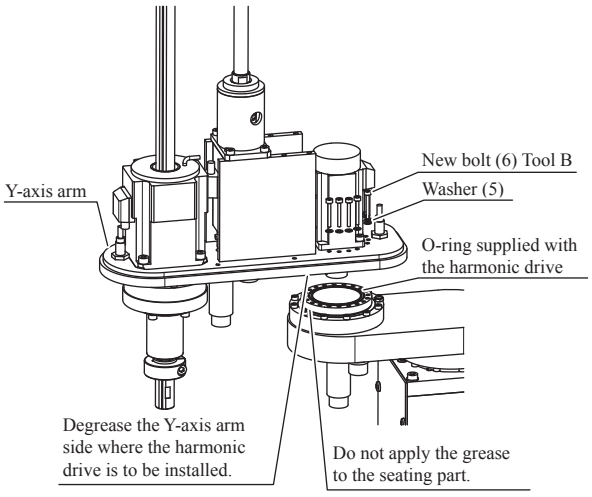
When tightening the bolts with the moment load applied to the harmonic drive, this may cause breakage. Perform the work not to apply the moment load to the harmonic drive.

3. Secure the Y-axis arm to the harmonic drive with new mounting bolts (6).
   In order to prevent abnormal sounds from the harmonic, only the 4 bolts <13>, <14>, <15>, <16> shown in the Step 9 illustration should be seated first, and tightened only to the point where a torque is not yet applied. The remaining bolts should then be seated.
   At this time, two work personnel perform the work with the Y-axis arm kept horizontally so that no moment load is applied to the Y-axis harmonic drive. One person supports the end of the Y-axis arm and the other person secures the Y-axis arm in place.

Step 7 **Securing the wave generator**



Step 8 **Securing the Y-axis arm**



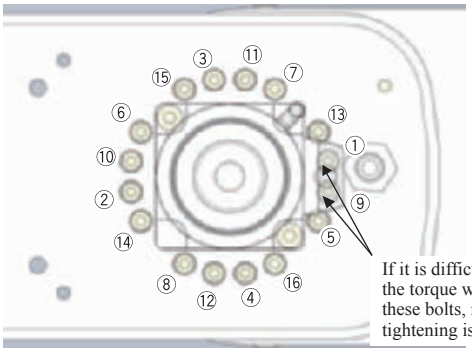
9 ***Tighten the bolts in the order shown below.***

1. While rotating the Y-axis arm, gradually tighten bolts <13> <14> <15> <16> in an alternating manner, and in the order indicated below (rotate the arm at ultra-low-speed mode (1/10 of turn per second)). Tighten these bolts until they can no longer be turned by hand.
   The bolts should be gradually tightened in the following alternating sequence 3 times: <13> → <14> → <15> → <16> → <13> → <14>, etc.
2. Use tool B to tighten bolts <13> → <14> → <15> → <16> (4 bolts) while rotating the Y-axis arm.
3. Use tool B to tighten the remaining 12 bolts in diagonal pattern sequence.
4. Finally, check that the bolts are tightened to the specified torque.

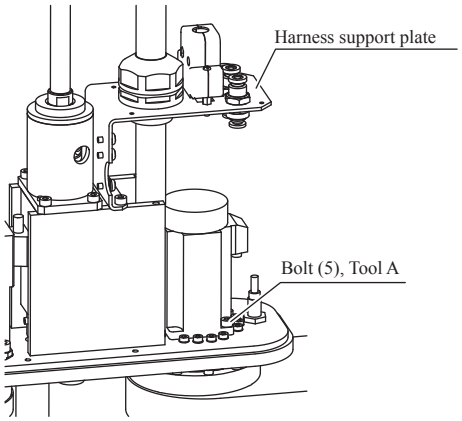
10 ***Install the harness support plate.***

11 ***Reattach the cover.***

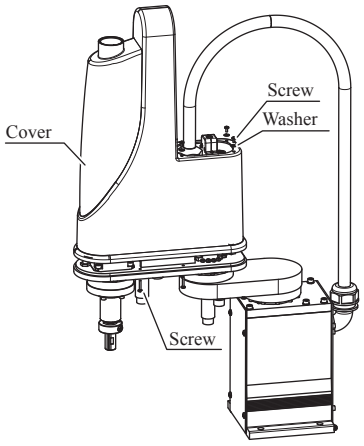
Step 9 **Bolt tightening order**



Step 10 **Retightening the bolts**



Step 11 **Reattaching the cover**



■ Aging

1 ***Go out of the safety enclosure.***

2 ***Turn on the controller.***
Check that no one is inside the safety enclosure, and then turn on the controller.

CAUTION
After the harmonic drive has been replaced, it is necessary to perform the absolute reset and set the standard coordinates and point data again.

3 ***Perform the aging.***
Perform the aging for 30 minutes at 5% speed and for another 30 minutes at 20% speed by rotating the Y-axis arm as much as possible (at least 10°).

2.1.3 Replacing the R-axis harmonic drive

WARNING

BEFORE STARTING THE WORK, THOROUGHLY READ “1. ATTACHING, DETACHING, AND REPLACING THE COVER” IN CHAPTER 2.

The following shows the parts and tools necessary for the R-axis harmonic drive replacement work.

CAUTION

At Step 2 of the "■ Replacement and reassembly" procedure, a motor-securing vise and a dial gauge are required in order to check the deflection of the harmonic drive's wave generator.
If a vise and dial gauge are not available, the wave generator can be installed at OMRON, with the assembly then being shipped to the customer.
In that case, the customer should order an "additional new KCY-M4883-000 motor" replacement part and request that the wave generator be installed in the motor.

1. Replacement parts

	Part Name	OMRON Part No.	Part No. / Specs	Q'ty	Remarks
1	Harmonic drive	KCY-M1821-000		1	
2	O-ring	KN3-M1895-000	S53 (JIS)	1	Becomes worn and must be replaced
3	O-ring	90990-17J001	Cross section diameter: 0.90mm Inner diameter: 35.40mm	1	Supplied with harmonic drive
4	O-ring	KN5-M181H-000	Cross section diameter: 0.80mm Inner diameter: 33.7mm	1	Becomes worn and must be replaced
5	O-ring	KN3-M2144-000	Cross section diameter: 0.99mm Inner diameter: 53.28mm	1	Becomes worn and must be replaced
6	O-ring	90990-17J034	Cross section diameter: 0.60mm Inner diameter: 22.20mm	1	Becomes worn and must be replaced
7	Motor mounting bolt	91312-05016	M5, length: 16	4	Spare parts
8	Harmonic drive mounting bolt	91312-03014	M3, length: 14	12	Must be replaced
9	Harmonic drive mounting bolt	91312-03022	M3, length: 22	8	Must be replaced
10	O-ring	90990-17J032	Cross section diameter: 1.00mm Inner diameter: 46.00mm	1	Becomes worn and must be replaced
11	Washer for dog	90990-28J064		1	Spare parts
12	Seal washer	90990-36J002	SW4×7.2 (Musashi Oil Seal Mfg. Co. Ltd.)	4	Becomes worn and must be replaced
13	Washer	92903-03600	M3	12	Must be replaced
14	Dog	KCY-M1888-000		1	Spare parts
15	Spline nut securing bolts	91312-04012	M4, length: 12	4	Spare parts
16	Bearing	90933-01J002	6002ZZ	2	Spare parts
17	Bearing nut	KCY-M1874-000		1	Spare parts
18	Bearing plate securing bolts	91312-05014	M5, length: 14	4	Spare parts
19	End face seal (*1)	KCY-M1886-000		1	Replace with spare when damaged or missing.

*1: A new end face seal will be subjected to a high level of friction if sufficient R-axis aging has not occurred. Therefore, be sure to perform R-axis aging, and do not replace this seal unless it is damaged.

2. Torque wrench, etc.

CAUTION

Use accurately calibrated torque screwdrivers and torque wrenches.

	Name	Part No.	Manufacturer	Remarks
A	Torque wrench	N120SPCK	KANON (Nakamura Mfg. Co., Ltd.)	For M5 hex socket head bolt Tightening torque: 7.4Nm (76kgfcm)
	Changeable head	230HCK4	KANON (Nakamura Mfg. Co., Ltd.)	Wrench (without ball end) for M5 hex socket head bolt; insert 110mm
B	Torque screwdriver	N30LTDK	KANON (Nakamura Mfg. Co., Ltd.)	For M3 hex socket head bolt Tightening torque: 1.8Nm (18kgfcm)
	Drive bit	B35, opposite side 2.5×75	Vessel Co., Inc.	Attachment hexagonal width across flat: 6.35mm Overall length: 75mm Hexagonal width across flat at tip: 2.5mm
C	Torque screwdriver	N12LTDK	KANON (Nakamura Mfg. Co., Ltd.)	For M3 set screw Tightening torque: 0.55Nm (5.6kgfcm)
	Drive bit	3C1507	NAC (Nagahori Industry Co., Ltd.)	Attachment hexagonal width across flat: 6.35mm Overall length: 100mm Hexagonal width across flat at tip: 1.5mm
D	Torque wrench	N380SPK24	KANON (Nakamura Mfg. Co., Ltd.)	Torque wrench for 24mm-wide wrench, Set the tightening torque to 20Nm (200kgfcm).

* Use a commercially available torque wrench to tighten bolts other than those shown above.

3. Other tools

Name	Part No.	Manufacturer	Remarks
Harmonic grease	4B No.2 (*1)	Harmonic Drive Systems	Do not use grease if it was purchased 4 or more years ago. The grease has probably deteriorated.
Cleaning wipe			
Phillips screwdriver			
Hex wrench set			
15mm spanner	6M-13-15	BAHCO	
24mm spanner			
Screw thread locking agent	Loctite 262	Henkel	High strength type (red)

*1: 4.2g

■ Removal

Follow the steps below to remove the R-axis parts.

1 ***Turn off the controller.***

2 ***Place a sign indicating the robot is being adjusted.***

Place a sign indicating the robot is being adjusted, to keep others from operating the controller or operation panel.

3 ***Enter the safety enclosure.***

4 ***Remove the cover.***

As the R-axis motor wiring is clamped at several locations, the connectors are difficult to disconnect. So, perform the replacement work without disconnection of the connectors.
Remove the cover while referring to "1. Attaching, detaching, and replacing the cover" in Chapter 2.

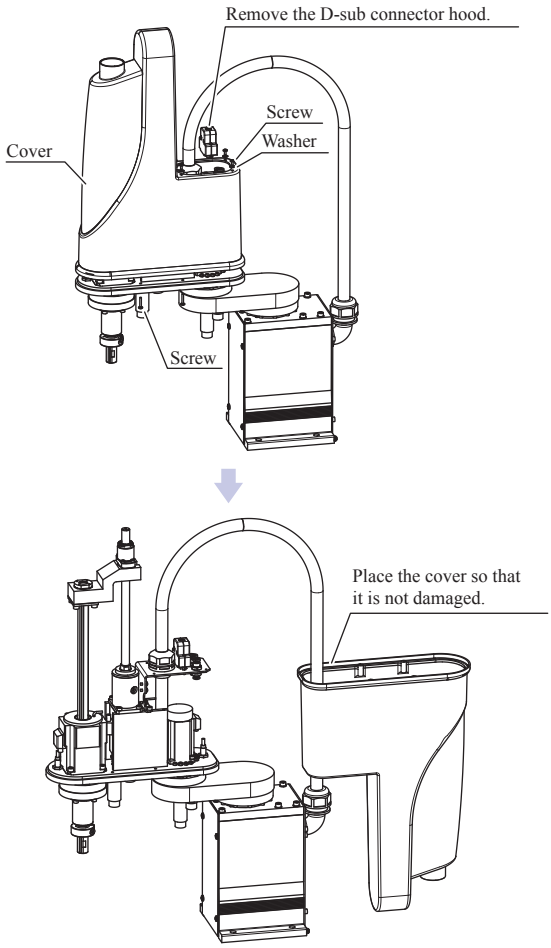
WARNING

IF THE BEARING MOUNTING BOLTS ARE REMOVED IN STEP 5, THE Y-AXIS MAY DROP, CAUSING HAZARDOUS SITUATION. BEFORE REMOVING THE BEARING MOUNTING BOLTS, SUPPORT THE Z-AXIS USING A BASE, ETC.

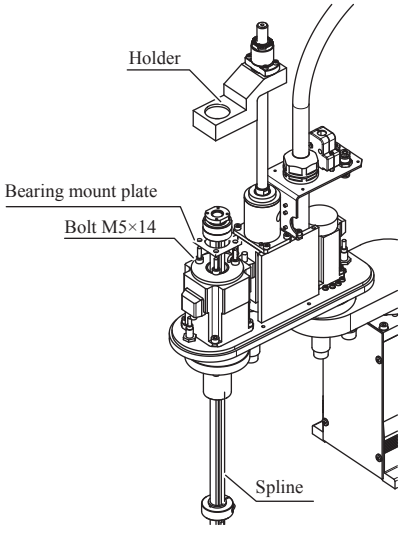
5 ***Pull out the spline and bearing from the holder.***

Remove the bolt at the top end of the spline that secures the bearing. Pull out the spline and bearing from the holder.

Step 4-5 **Removing the cover**



Step 5 **Removing the spline**



6 ***Remove the bearing and bearing mount plate.***

Fit the wrenches to the width across flat surfaces of the bearings at the bottom and top of the spline and remove the bearing nut from the top of the spline. Then, remove the bearing and bearing mount plate. At this time, be careful to keep the spline shaft so that it does not come off the spline nut.

7 ***Remove the bolt of the spline nut, and then remove the spline nut.***

NOTE

An O-ring is fitted to the shaft. Replace this O-ring with a new one. Additionally, replace also the seal washer with a new one.

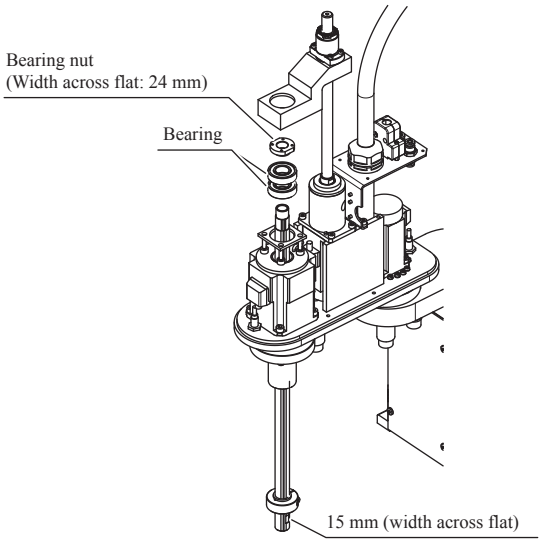
8 ***Pull out the R-axis motor.***

Remove the bolts that secure the R-axis motor, and then pull out the R-axis motor while turning the outer periphery of the R-axis harmonic drive.

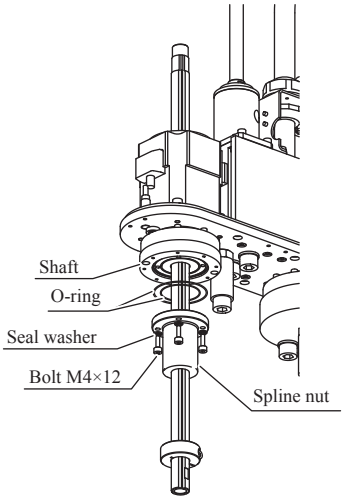
NOTE

An O-ring is placed between the R-axis motor flange and the Y-axis arm. Replace this O-ring with a new one.

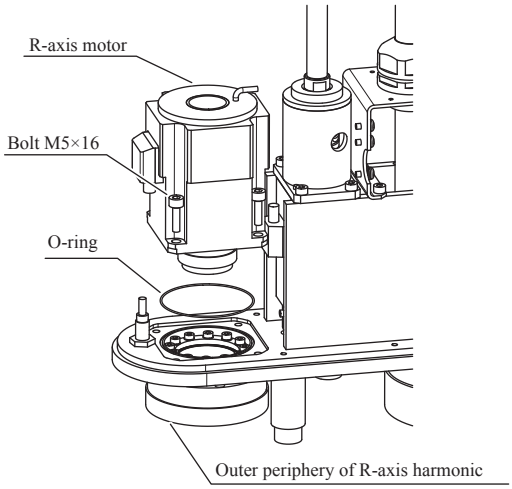
Step 6 **Removing the bearing and bearing mount plate**



Step 7 **Removing the spline nut**



Step 8 **Removing the R-axis motor**



9 ***Pull out the wave generator from the R-axis motor.***

Loosen two set screws of the wave generator, and then pull out the wave generator from the R-axis motor shaft.

NOTE

An O-ring is placed between the R-axis motor shaft and the wave generator. Replace this O-ring with a new one.

10 ***Remove the harmonic drive.***

Remove the bolts that secure the harmonic drive, and then remove the harmonic drive.

NOTE

An O-ring is fitted to the harmonic drive. Replace this O-ring with a new one.

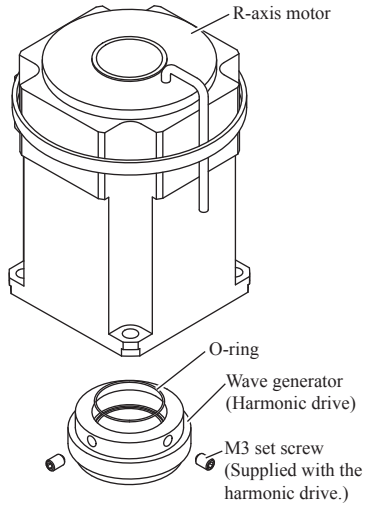
11 ***Remove the shaft from the harmonic drive.***

Remove the shaft mounting bolts and dog from the harmonic drive, and then remove the shaft.

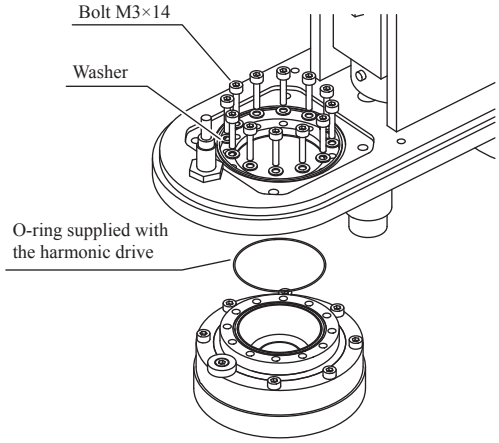
NOTE

An O-ring is placed between the harmonic drive and the shaft. Replace this O-ring with a new one.

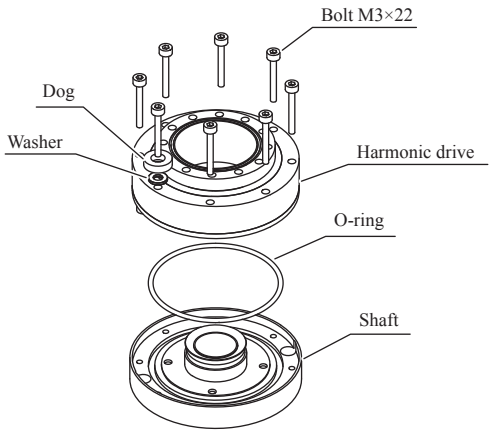
Step 9 **Removing the wave generator**



Step 10 **Removing the harmonic drive**



Step 11 **Removing the shaft**



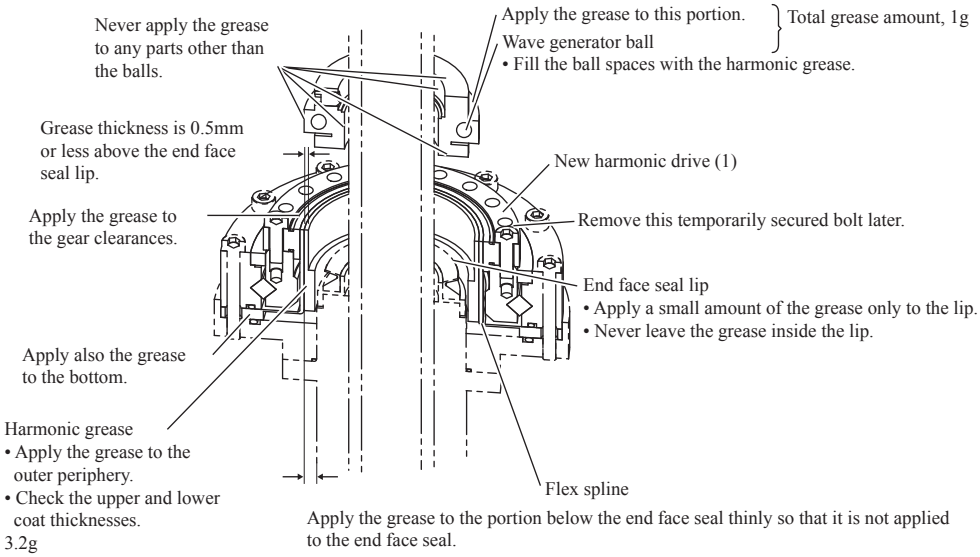
■ Replacement and reassembly

Follow the steps below to replace the harmonic drive with a new one and reassemble it.

1 *Apply the harmonic grease to a new wave generator.*

For details about how to apply the grease, see the Fig. below.

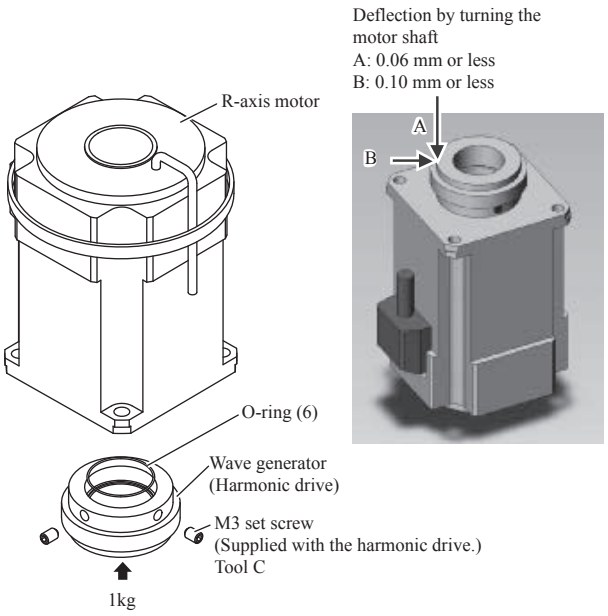
Step 1 Applying the harmonic grease



2 *Secure the new wave generator to the R-axis motor.*

1. Fit the O-ring (6) to the inside of the new wave generator.
2. Insert the wave generator into the inner end of the R-axis motor shaft and secure it with two set screws while pressing the wave generator with a load of about 1 kg.
3. The wave generator deflection must satisfy the values shown in the Fig. on the right. Also make sure that the O-ring does not drop.

Step 2 Securing the wave generator



3 ***Apply the harmonic grease to the flex spline.***

For details about how to apply the harmonic grease, see the Fig. stated in step 1.

CAUTION

Perform the assembly work so that the flat face is in parallel to the side surface of the Y-axis arm at the R-axis origin position while observing the phases at the locations indicated by "Check phase" as shown in the Fig. on the right.

4 ***Secure the harmonic drive to the shaft.***

1. Degrease the upper and lower installation surfaces of the harmonic drive.
2. Degrease the harmonic drive installation surface of the shaft.
3. Fit the new O-ring (2) coated with the harmonic grease into the groove in the shaft.

CAUTION

Do not allow the O-ring to get caught out of the groove during reassembly. If the robot is operated with the O-ring left caught out of the groove, this may cause a malfunction.

4. Install the washer, dog, and new mounting bolts, and then secure the harmonic drive to the shaft.

CAUTION

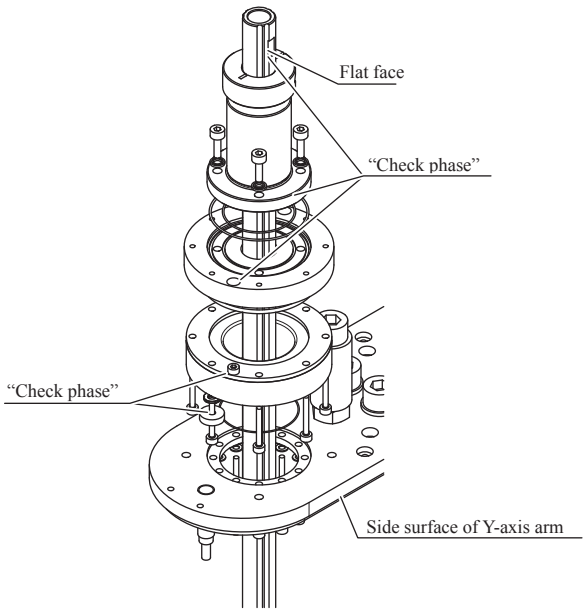
Never remove the temporarily secured bolt. Doing so may cause a misalignment.

For details about the temporarily secured bolt and dog position, see the Fig. on the right.
Apply harmonic grease 4B No.2 to the tip of each bolt so that the roots of at least the first four threads are filled with grease.
Grease applied to the bolt tip is intended to stabilize the bolt axial force.

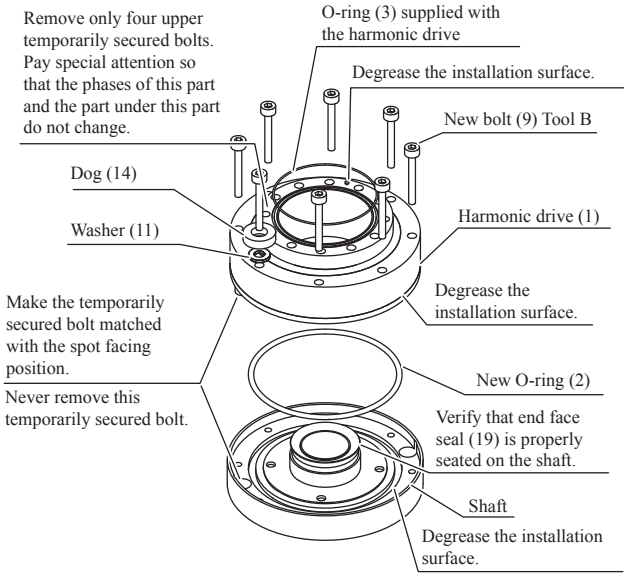
5 ***Tighten the bolts in the order shown below.***

1. Using the wrench, tighten the bolts manually in the order indicated by circled numbers.
2. Using the torque driver, tighten the bolts to approximately 50% of the specified torque in the order indicated by circled numbers.
3. Tighten the bolts to the specified torque in the order indicated by circled numbers.

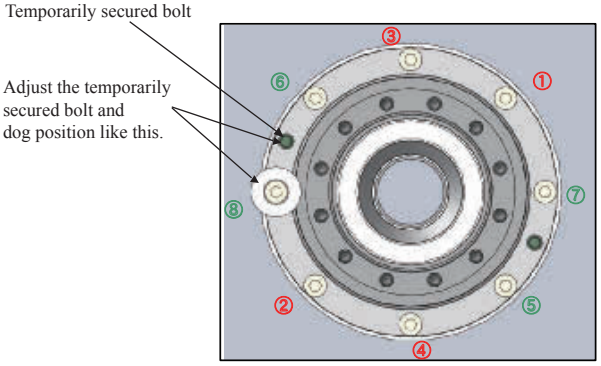
Step 3 **Checking the phases**



Step 4 **Securing the harmonic drive**



Step 4, 5 **Temporarily secured bolt and dog positions**



4. Finally, check that the bolts are tightened to the specified torque.

6 *Install the O-ring (3).*

1. Degrease the installation surface of the Y-axis arm where the harmonic drive is to be installed.
2. Fit the O-ring (3) coated with a small amount of the harmonic grease into the O-ring groove of the new harmonic drive. If it is difficult to fit the O-ring into the groove, slightly stretch the O-ring.

CAUTION

Do not allow the O-ring to get caught out of the groove during reassembly. If the robot is operated with the O-ring left caught out of the groove, this may cause a malfunction.

7 *Secure the harmonic drive to the Y-axis arm.*

From the upper portion of the Y-axis arm, secure the harmonic drive to the Y-axis arm.
Apply harmonic grease 4B No.2 to the tip of each bolt so that the roots of at least the first four threads are filled with grease.
Grease applied to the bolt tip is intended to stabilize the bolt axial force.

8 *Tighten the bolts in the order shown below.*

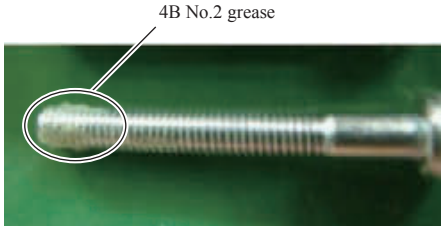
1. Using the wrench, tighten the bolts manually in the order indicated by circled numbers.
2. Using the torque driver, tighten the bolts to approximately 50% of the specified torque in the order indicated by circled numbers.
3. Tighten the bolts to the specified torque in the order indicated by circled numbers.
4. Finally, check that the bolts are tightened to the specified torque.

9 *Fit the new O-ring (5) coated with the harmonic grease into the O-ring groove of the Y-axis arm.*

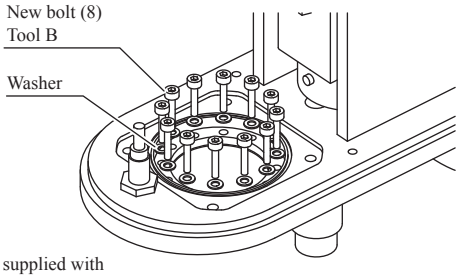
CAUTION

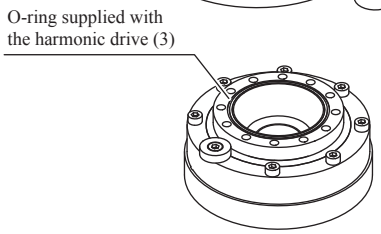
Do not allow the O-ring to get caught out of the groove during reassembly. If the robot is operated with the O-ring left caught out of the groove, this may cause a malfunction.

Step 4, 7 Applying the grease to the mounting bolt

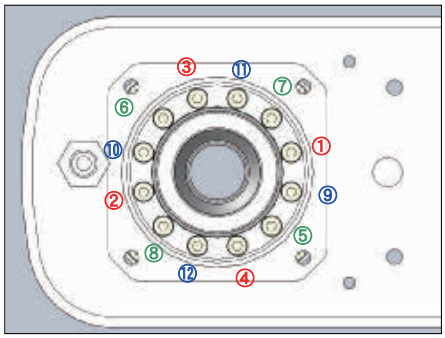


Step 6 Installing the harmonic drive

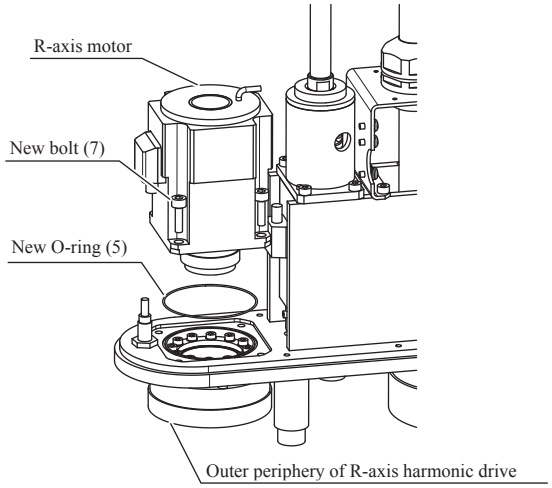




Step 8 Mounting bolt tightening order



Step 9-10 Inserting the R-axis motor



10 ***Insert the R-axis motor into the Y-axis arm.***

Insert the R-axis motor into the Y-axis arm while turning the R-axis. Tighten the bolts while turning the R-axis.

11 ***Fit the new O-rings (4) and (10) coated with the harmonic grease into the groove at the lower portion of the shaft.***

CAUTION

Do not allow the O-ring to get caught out of the groove during reassembly. If the robot is operated with the O-ring left caught out of the groove, this may cause a malfunction.

12 ***Use seal washer (12) and bolt (15) to secure the spline nut to the shaft.***

13 ***Secure the bearing.***

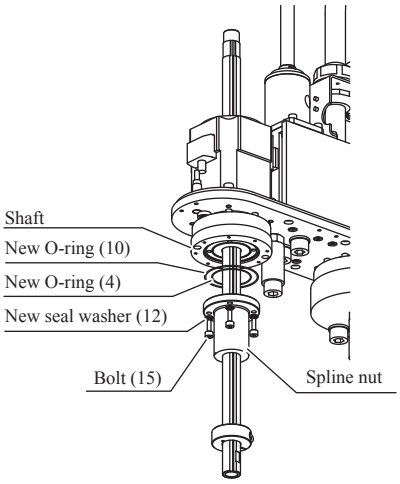
Fit the bearing mount plate and bearing (16) over the top of the spline, then secure the bearing with bearing nut (17). (Utilize the width across flat part of the spline in the same manner as described for removing of the bearing nut.)

14 ***Insert the spline and bearing into the holder.***

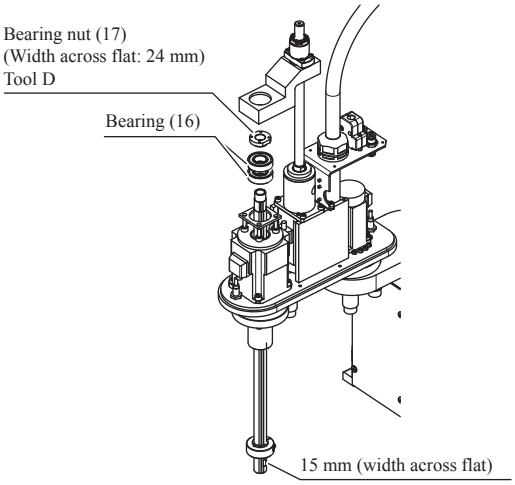
Insert the spline and bearing into the holder, then secure them with bolt (18).

15 ***Reattach the cover.***

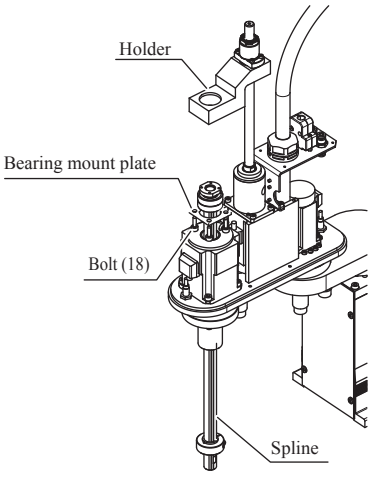
▶ Step 11-12 **Securing the spline nut**



▶ Step 13 **Securing the bearing**



▶ Step 14 **Inserting the spline and bearing**



■ Aging

1 ***Go out of the safety enclosure.***

2 ***Turn on the controller.***

Check that no one is inside the safety enclosure, and then turn on the controller.

CAUTION

After the harmonic drive has been replaced, it is necessary to perform the absolute reset and set the standard coordinates and point data again. Make the adjustments while referring to Chapter 3 “Adjusting the robot” in the Installation Manual.

3 ***Perform the aging.***

Perform the aging for 30 minutes at 5% speed and for another 30 minutes at 20% speed by rotating the R-axis arm as much as possible (at least 10°).

2.2 R6YXG500, R6YXG600, R6YXGH600, R6YXG700, R6YXG800, R6YXG900, R6YXG1000 R6YXGS500, R6YXGS600, R6YXGS700, R6YXGS800, R6YXGS900, R6YXGS1000

2.2.1 Replacing the X-axis harmonic drive

WARNING

BEFORE STARTING THE WORK, THOROUGHLY READ "1. ATTACHING, DETACHING, AND REPLACING THE COVER" IN CHAPTER 2.

The following shows the parts and tools necessary for the X-axis harmonic drive replacement work.

1. Replacement parts

- **R6YXG500, R6YXG600**
  R6YXGS500, R6YXGS600

	Part Name	OMRON Part No.	Part No. / Specs	Q'ty	Remarks
1	Harmonic drive	KBF-M2110-000		1	
2	O-ring	KN4-M2143-000	S90 (JIS)	1	Becomes worn and must be replaced
3	O-ring	90990-17J030	Cross section diameter: 1.78mm Inner diameter: 66.4mm	1	Becomes worn and must be replaced
4	O-ring	KN5-M257L-000	Cross section diameter: 1.30mm Inner diameter: 66.5mm	1	Supplied with harmonic drive
5	Motor mounting bolt	KBP-M259A-000	M6, length: 16	4	Must be replaced when robot reference number is prior to KC346
		91312-06016	M6, length: 16	4	Spare parts for robots with a reference number of KC346 or later
6	Harmonic drive mounting bolt	91312-04020	M4, length: 20	16	Must be replaced
7	Harmonic drive mounting bolt	91312-04030	M4, length: 30	11	Must be replaced
8	Panhead bolt for dog	98502-04030	M4, length: 30	1	Spare parts
9	Nut for dog	95302-05600	M4	1	Spare parts
10	Washer	92903-04600	M4	16	Must be replaced

- **R6YXGH600, R6YXG700, R6YXG800, R6YXG900, R6YXG1000**
  R6YXGS700, R6YXGS800, R6YXGS900, R6YXGS1000

	Part Name	OMRON Part No.	Part No. / Specs	Q'ty	Remarks
1	Harmonic drive	KBP-M2110-000		1	For standard model
	Harmonic drive (*1)	KBB-M2110-000		1	For wall-mount model/wall-mount inverse model
2	O-ring	KN5-M2159-000	S115 (JIS)	1	Becomes worn and must be replaced
3	O-ring	90990-17J035	Cross section diameter: 1.50mm Inner diameter: 82.0mm	1	Becomes worn and must be replaced
4	O-ring	KN5-M2199-000	Cross section diameter: 1.50mm Inner diameter: 87.5mm	1	Supplied with harmonic drive
5	Motor mounting bolt	91312-5016	M5, length: 16	4	Spare parts
6	Harmonic drive mounting bolt	91312-05040	M5, length: 40	16	Must be replaced
7	Harmonic drive mounting bolt	91312-05040	M5, length: 40	11	Must be replaced
8	Panhead bolt for dog	98502-05040	M5, length: 40	1	Spare parts
9	Nut for dog	95302-06600	M6	1	Spare parts
10	Washer	KBF-M2146-001		1	Spare parts

*1: For the R6YXGS700, R6YXGS800, R6YXGS900 and R6YXGS1000, only the harmonic drive is different from that of the standard model.

2. Torque wrench, etc.

CAUTION

Use accurately calibrated torque screwdrivers and torque wrenches.

- **R6YXG500, R6YXG600**
  R6YXGS500, R6YXGS600

	Name	Part No.	Manufacturer	Remarks
A	Torque wrench	N230QLK	KANON (Nakamura Mfg. Co., Ltd.)	For M6 hex socket head bolt Tightening torque: 15.2Nm (156kgfcm)
	Drive bit	3KH5L	TONE (Maeda Kinzoku Kogyo)	Attachment hexagonal width across flat: 9.53mm Overall length: 100mm Hexagonal width across flat at tip: 5mm
B	Torque wrench	N120QLK	KANON (Nakamura Mfg. Co., Ltd.)	For M4 hex socket head bolt Tightening torque: 4.0Nm (41kgfcm)
	Drive bit	2H3	TONE (Maeda Kinzoku Kogyo)	Attachment hexagonal width across flat: 6.35mm Hexagonal width across flat at tip: 3mm
C	Torque screwdriver	N20LTDK	KANON (Nakamura Mfg. Co., Ltd.)	For M4 set screw Tightening torque: 1.7Nm (17kgfcm)
	Drive bit	3C2010	NAC (Nagahori Industry Co., Ltd.)	Attachment hexagonal width across flat: 6.35mm Overall length: 100mm Hexagonal width across flat at tip: 2mm
D	Torque screwdriver	N20LTDK	KANON (Nakamura Mfg. Co., Ltd.)	For M4 Phillips-head screw Tightening torque: 1.6Nm (16kgfcm)
	Drive bit	+2×50	Vessel Co., Inc.	Attachment hexagonal width across flat: 6.35mm Overall length: 50mm Bit number: #2

- **R6YXGH600, R6YXG700, R6YXG800, R6YXG900, R6YXG1000**
  R6YXGS700, R6YXGS800, R6YXGS900, R6YXGS1000

	Name	Part No.	Manufacturer	Remarks
A	Torque wrench	N230QLK	KANON (Nakamura Mfg. Co., Ltd.)	For M5 hex socket head bolt Tightening torque: 9Nm (92kgfcm)
	Drive bit	BT3-04L	KTC (Kyoto Tool)	Attachment hexagonal width across flat: 9.53mm Overall length: 128mm Hexagonal width across flat at tip: 4mm
B	Torque wrench	N230QSPK	KANON (Nakamura Mfg. Co., Ltd.)	For M5 hex socket head bolt Tightening torque: 8.4Nm (86kgfcm)
	Drive bit	3010M-100	Koken (Yamashita Kogyo Kenkyusho)	Attachment hexagonal width across flat: 9.53mm Overall length: 100mm Hexagonal width across flat at tip: 4mm
C	Torque screwdriver	N20LTDK	KANON (Nakamura Mfg. Co., Ltd.)	For M4 set screw Tightening torque: 1.7Nm (17kgfcm)
	Drive bit	3C2010	NAC (Nagahori Industry Co., Ltd.)	Attachment hexagonal width across flat: 6.35mm Overall length: 100mm Hexagonal width across flat at tip: 2mm
D	Torque screwdriver	N50LTDK	KANON (Nakamura Mfg. Co., Ltd.)	For M5 Phillips-head screw Tightening torque: 3.2Nm (32kgfcm)
	Drive bit	B35+2×50	Vessel Co., Inc.	Attachment hexagonal width across flat: 6.35mm Overall length: 50mm Bit number: #2

3. Other tools

Name	Part No.	Manufacturer	Remarks
Harmonic grease	4B No.2 (*1)	Harmonic Drive Systems	Do not use grease if it was purchased 4 or more years ago. The grease has probably deteriorated.
Cleaning wipe			
Phillips screwdriver			
Hex wrench set			
Screw thread locking agent	Loctite 262	Henkel	High strength type (red)

*1: R6YXG500, R6YXG600, R6YXGS500, R6YXGS600: 20g
R6YXGH600, R6YXG700, R6YXG800, R6YXG900, R6YXG1000, R6YXGS700, R6YXGS800, R6YXGS900, R6YXGS1000: 60g

■ Removal

Follow the steps below to remove the X-axis parts.

1 ***Turn off the controller.***

2 ***Place a sign indicating the robot is being adjusted.***

Place a sign indicating the robot is being adjusted, to keep others from operating the controller or operation panel.

3 ***Enter the safety enclosure.***

CAUTION

In the following steps, if the Y-axis arm is not removed from the X-axis arm, the integrated unit is very heavy. So, it is recommended to perform the work after the Y-axis arm has been removed from the X-axis arm beforehand while referring to "2.2.2. Replacing the Y-axis harmonic drive".

4 ***Remove the cover from the base.***

Remove the cover while referring to "1. Attaching, detaching, and replacing the cover" in Chapter 2.

5 ***Disconnect the connectors of the X-axis motor power wire XM and resolver wire XP in the base, and the round terminal of the X-axis motor.***

CAUTION

When removing the motor, pay special attention so that your hand is not caught in the potion between the motor and base.

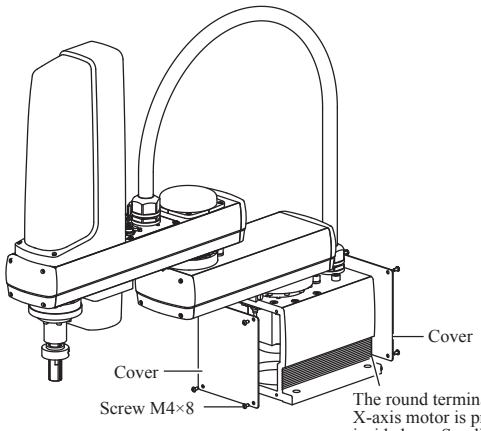
NOTE

- In the R6YXG500, R6YXG600, R6YXGS500 and R6YXGS600, an O-ring is fitted intothe portion between the motor mating end face and the base. Be sure to replace this O-ring with a new one.
- In the R6YXGH600, R6YXG700, R6YXG800, R6YXG900, R6YXG1000, R6YXGS700, R6YXGS800, R6YXGS900 and R6YXGS1000, an O-ring is fitted into the portion between the end face of the motor flange and the base. Be sure to replace this O-ring with a new one.

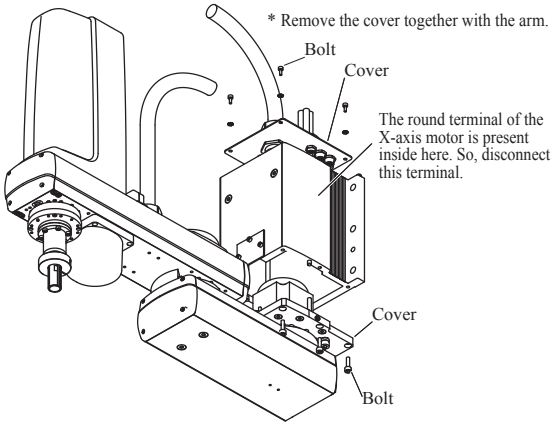
6 ***Remove the X-axis motor.***

1. Using the tool A, remove the bolts that secure the motor. The bolts are replaced with new ones later on.
2. Support the motor so that it does not drop.
3. Pull out the motor from the plate while turning the X-axis arm.

▶ Step 4-5 Removing the cover

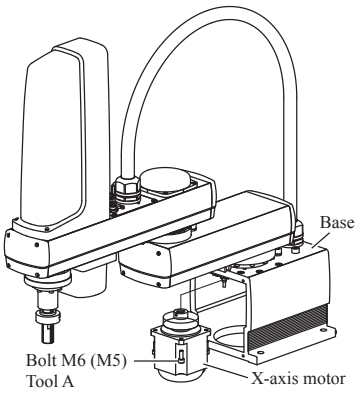


R6YXG500, R6YXG600, R6YXGH600, R6YXG700, R6YXG800, R6YXG900, R6YXG1000

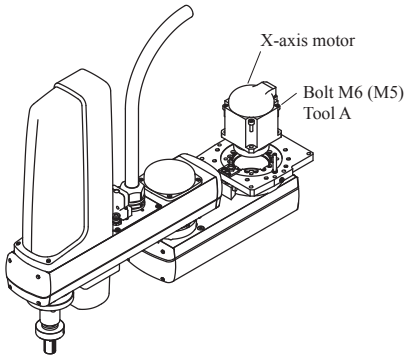


R6YXGS500, R6YXGS600, R6YXGS700, R6YXGS800, R6YXGS900, R6YXGS1000

▶ Step 6 Removing the X-axis motor



R6YXG500, R6YXG600, R6YXGH600, R6YXG700, R6YXG800, R6YXG900, R6YXG1000
* Values in parentheses apply to the R6YXGH600, R6YXG700, R6YXG800, R6YXG900 and R6YXG1000.



R6YXGS500, R6YXGS600, R6YXGS700, R6YXGS800, R6YXGS900, R6YXGS1000

7 *Remove the wave generator from the motor shaft.*

Remove the set screw (1 pc.) that secure the wave generator.
For the R6YXGH600, R6YXG700, R6YXG800, R6YXG900, R6YXG1000 , R6YXGS700, R6YXGS800, R6YXGS900 and R6YXGS1000, further remove the spacer and bolt.

CAUTION

A spacer is fitted into the portion between the wave generator and motor. Carefully handle it so that it is not lost. In the R6YXGH600, R6YXG700, R6YXG800, R6YXG900, R6YXG1000 , R6YXGS700, R6YXGS800, R6YXGS900 and R6YXGS1000, this spacer is not fitted.

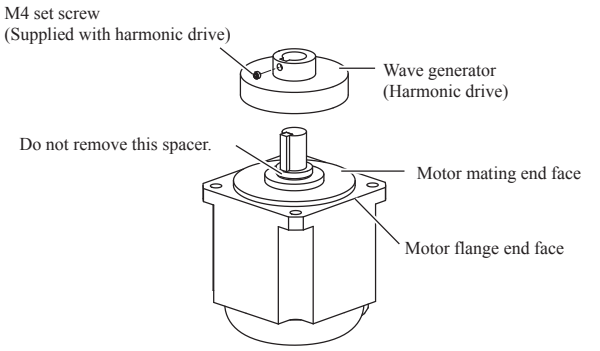
WARNING

- IF THE X-AXIS ARM MOUNTING BOLTS ARE REMOVED IN STEP 8, THE X-AXIS ARM COMES OFF, CAUSING HAZARDOUS SITUATION.
  IF A HEAVY TOOL IS ATTACHED TO THE ARM TIP, THE ARM MAY DROP. SO, TAKE GREAT CARE WHEN REMOVING THE X-AXIS ARM MOUNTING BOLTS. (SEE THE FIG. IN STEP 8.)
- IF THE X-AXIS ARM REMOVAL WORK IS PERFORMED ALONE, THIS IS DANGEROUS. REMOVE THE X-AXIS ARM BY TWO OR MORE PERSONNEL OR REMOVE THE Y-AXIS ARM BEFOREHAND. FOR DETAILS ABOUT HOW TO REMOVE THE Y-AXIS ARM, SEE "2.2.2. REPLACING THE Y-AXIS HARMONIC DRIVE".

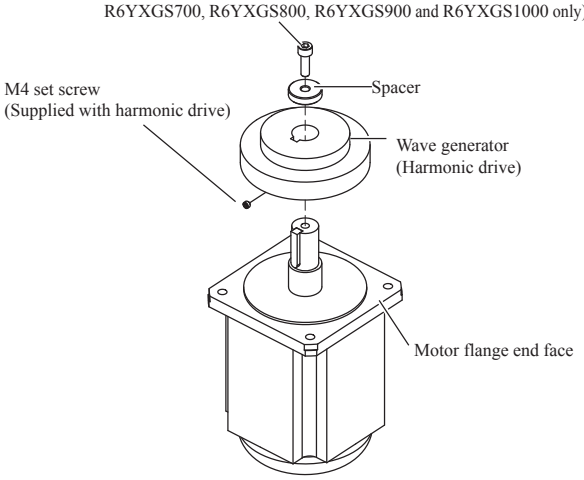
8 *Remove the X-axis arm.*

Using the tool B, remove the bolts that secure the X-axis arm.
Place the X-axis arm that has been removed in a place where it does not hinder the work.

Step 7 Removing the wave generator

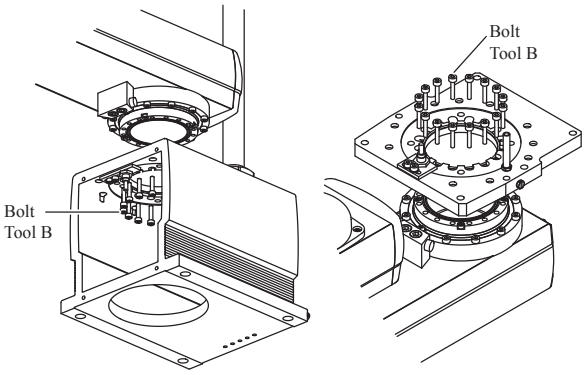


R6YXG500, R6YXG600, R6YXGS500, R6YXGS600



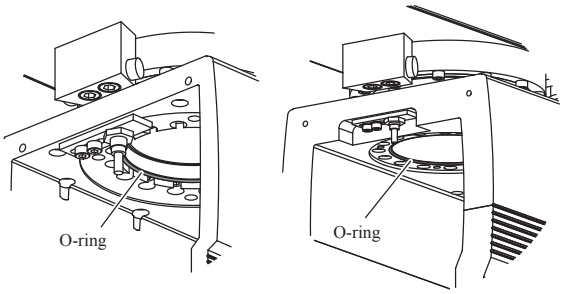
R6YXGH600, R6YXG700, R6YXG800, R6YXG900, R6YXG1000, R6YXGS700, R6YXGS800, R6YXGS900, R6YXGS1000

Step 8 Removing the X-axis arm



R6YXG500, R6YXG600, R6YXGH600, R6YXG700, R6YXG800, R6YXG900, R6YXG1000

R6YXGS500, R6YXGS600, R6YXGS700, R6YXGS800, R6YXGS900, R6YXGS1000



R6YXG500, R6YXG600, R6YXGS500, R6YXGS600

R6YXGH600, R6YXG700, R6YXG800, R6YXG900, R6YXG1000, R6YXGS700, R6YXGS800, R6YXGS900, R6YXGS1000

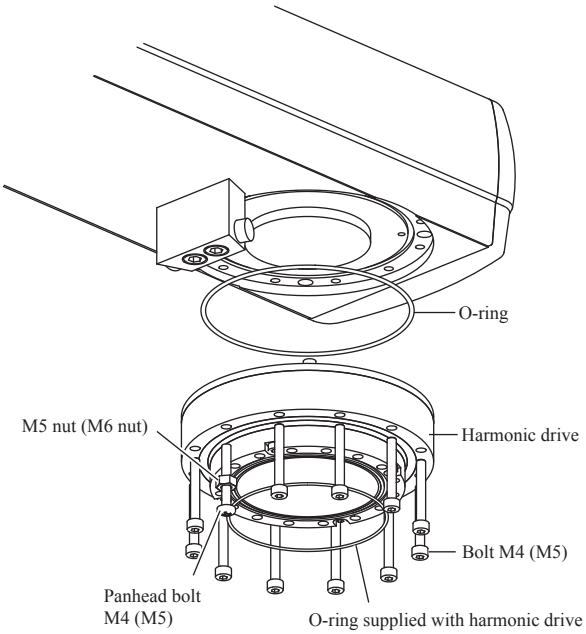
9 ***Remove the X-axis harmonic drive from the X-axis arm.***

Remove the bolts, panhead bolts, and nuts that secure the X-axis harmonic drive.

NOTE

An O-ring is fitted to the X-axis arm. Replace this O-ring with a new one.

Step 9 Removing the harmonic drive



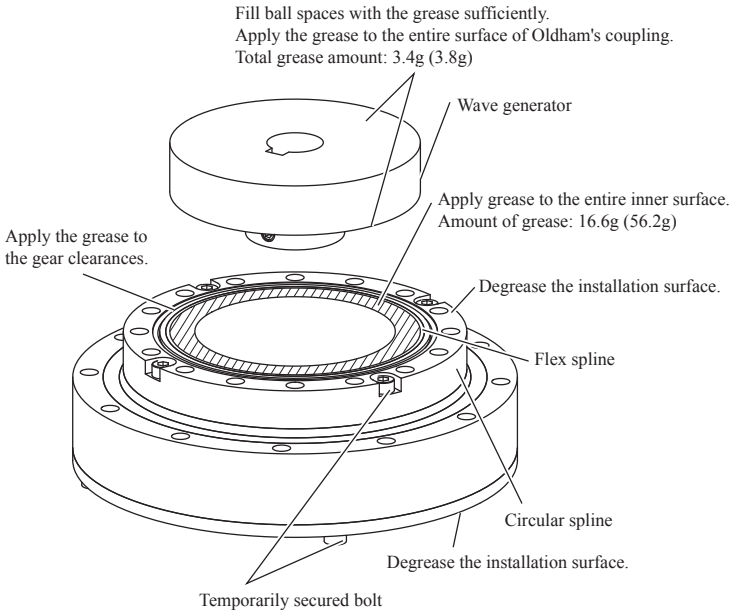
■ Replacement and reassembly

Follow the steps below to replace the harmonic drive with a new one and reassemble it.

1 ***Perform the work shown below before reassembling the harmonic drive.***

1. Apply the harmonic grease to new wave generator and flex spline. For details about how to apply the harmonic grease, see the Fig. below.
   Before applying the grease, degrease the top and bottom surfaces of the harmonic drive.

Step 1 Applying the harmonic grease



* Values in parentheses apply to the R6YXGH600, R6YXG700, R6YXG800, R6YXG900, R6YXG1000, R6YXGS700, R6YXGS800, R6YXGS900 and R6YXGS1000.

2. Remove the old grease and worn-out particles from the motor, base, and X-axis arm completely.

CAUTION

- If foreign matter is caught in during reassembly work, this may cause the noise from the harmonic drive or the harmonic drive to break.
- Never remove the temporarily secured bolts. Doing so may cause a misalignment.

2 *Secure a new harmonic drive (1) to the X-axis arm.*

1. Degrease the harmonic drive installation surface of the X-axis arm.
   Do not apply the grease to the seating part.
2. Fit the O-ring (2) coated with the new harmonic grease into the O-ring groove of the X-axis arm.
   Since the grease application to the O-ring is intended to prevent the O-ring from coming off, it is accepted to apply a small amount of the grease.

CAUTION

Do not allow the O-ring to get caught out of the groove during reassembly. If the robot is operated with the O-ring left caught out of the groove, this may cause a malfunction.

3. Secure the new harmonic drive to the X-axis arm with new bolts.
   Apply harmonic grease 4B No.2 to the tip of each bolt so that the roots of at least the first four threads are filled with grease.
   Grease applied to the bolt tip is intended to stabilize the bolt axial force.
4. Secure the panhead bolts and nuts at their original positions.

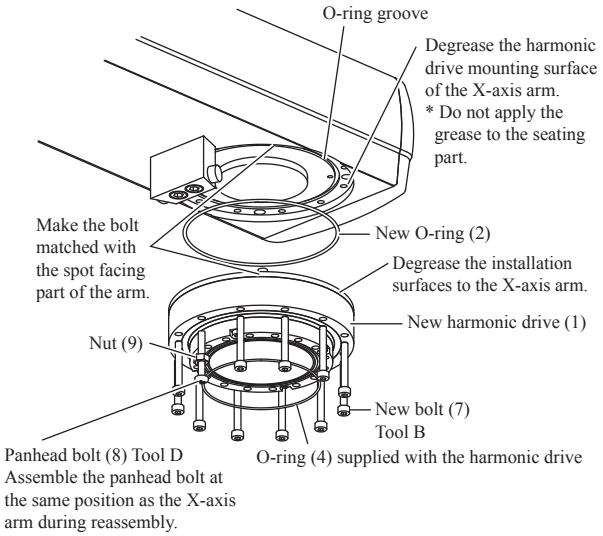
CAUTION

Do not apply the grease to the panhead bolt. Doing so may cause the bolt to loosen.

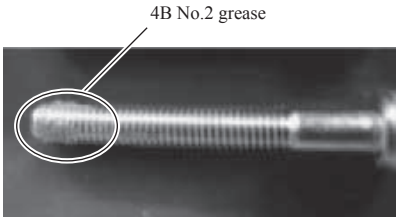
3 *Tighten the bolts and panhead bolts in the order shown below.*

1. Using the wrench, tighten the bolts and panhead bolts manually in the order indicated by circled numbers.
2. Using the torque wrench, tighten the bolts and panhead bolts to approximately 50% of the specified torque in the order indicated by circled numbers.
3. Tighten the bolts and panhead bolts to the specified torque in the order indicated by circled numbers. Then, loosen the bolts and panhead bolts 1 to 2 rotations once (do not remove any bolt at this time). After that, tighten the first bolt to the specified torque again, and then tighten the next and subsequent bolts to the specified torque in order.
   This work is intended to stabilize the bolt axial force.
4. Finally, check that the bolts and panhead bolts are tightened to the specified torque.

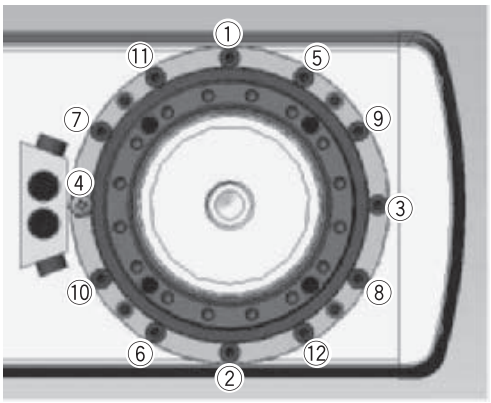
Step 2, 4 **Mounting the harmonic drive**



Step 2, 5 **Applying the grease to the mounting bolt**



Step 3, 6 **Bolt and panhead bolt tightening order**



4 ***Install the new O-ring (4).***

1. Degrease the top surface of the plate where the harmonic drive is to be installed.

CAUTION

Do not allow the O-ring to get caught out of the groove during reassembly. If the robot is operated with the O-ring left caught out of the groove, this may cause a malfunction.

2. Fit the new O-ring (4) coated with the harmonic grease into the O-ring groove of the harmonic drive.
   Since the grease application to the O-ring is intended to prevent the O-ring from coming off, it is accepted to apply a small amount of the grease.

5 ***Secure the harmonic drive to the base.***

Secure the harmonic drive to the base with new bolts. The harmonic drive's phase with respect to the base should be aligned as shown in the Fig. on the right.

CAUTION

At this time, two personnel should make the X-axis arm and Y-axis arm horizontal so that any moment load is not applied to the harmonic drive during work. One person should support the X-axis arm and Y-axis arm while another person installs the X-axis arm.

Apply harmonic grease 4B No.2 to the tip of each bolt so that the roots of at least the first four threads are filled with grease.

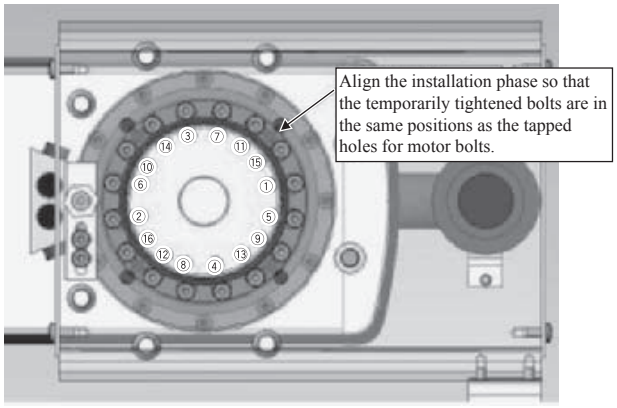
CAUTION

When tightening the bolts with the moment load applied to the harmonic drive, this may cause breakage. So, carefully perform the work so that any moment load is not applied to the harmonic drive.

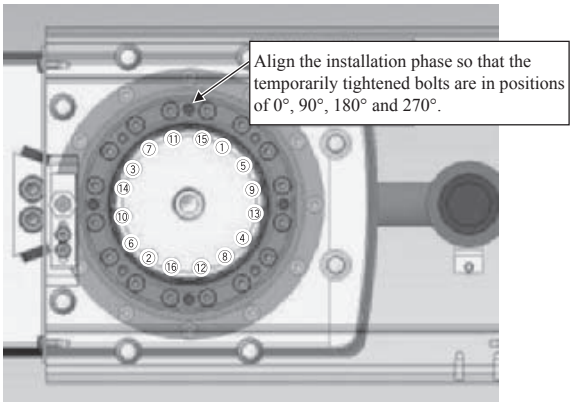
6 ***Tighten the bolts in the order shown below.***

1. Using the wrench, tighten the bolts manually in the order indicated by circled numbers.
2. Using the torque wrench, tighten the bolts to approximately 50% of the specified torque in the order indicated by circled numbers.

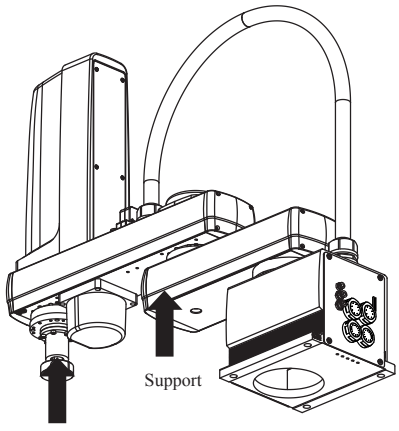
Step 5 **Phase with respect to the base**



R6YXG500, R6YXG600, R6YXGS500, R6YXGS600



R6YXGH600, R6YXG700, R6YXG800, R6YXG900, R6YXG1000, R6YXGS700, R6YXGS800, R6YXGS900, R6YXGS1000



3. Tighten the bolts to the specified torque in the order indicated by circled numbers. Then, loosen the bolts 1 to 2 rotations once (do not remove any bolt at this time). After that, tighten the first bolt to the specified torque again, and then tighten the next and subsequent bolts to the specified torque in order.
4. Finally, check that the bolts are tightened to the specified torque.

7 *Secure the spacer and wave generator.*

1. For the R6YXGH600, R6YXG700, R6YXG800, R6YXG900, R6YXG1000, R6YXGS700, R6YXGS800, R6YXGS900 and R6YXGS1000, secure the wave generator with the spacer and M5 bolt.
2. Pass the spacer and wave generator through the motor shaft.
   Push in the spacer and wave generator until they are in contact with the motor.
3. Secure the wave generator with the set screw (1 pc.).
   At this time, apply a small amount of the screw lock to the set screw.

CAUTION

- If it is difficult to fit the wave generator onto the motor shaft by pushing by hand, do not forcefully push in. Grind the key or motor shaft with sandpaper or similar tool to make it easier to fit the wave generator onto the motor shaft.
- Apply the specified amount of harmonic grease to each part of the harmonic drive. An insufficient amount of grease may shorten the service life of the drive parts, and an excessive amount may cause the grease to leak.

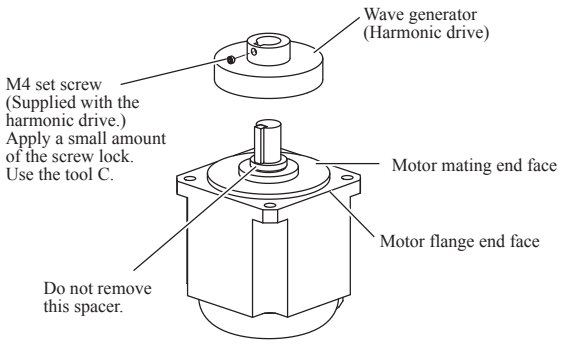
8 *Fit a new O-ring (3) into the base cylindrical surface and push it into the upper end face.*

For the R6YXGH600, R6YXG700, R6YXG800, R6YXG900, R6YXG1000, R6YXGS700, R6YXGS800, R6YXGS900 and R6YXGS1000, it is accepted to fit a new O-ring into one groove.

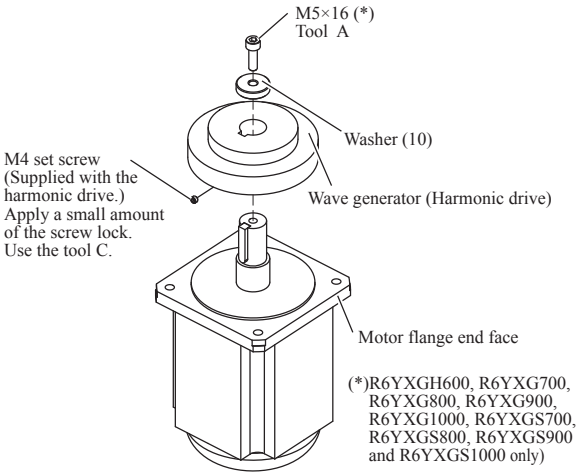
CAUTION

Do not allow the O-ring to get caught out of the groove during reassembly. If the robot is operated with the O-ring left caught out of the groove, this may cause a malfunction.

Step 7 Securing the spacer and wave generator

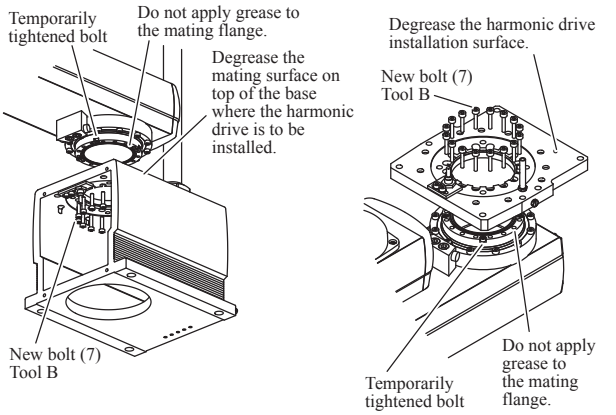


R6YXG500, R6YXG600, R6YXGS500, R6YXGS600



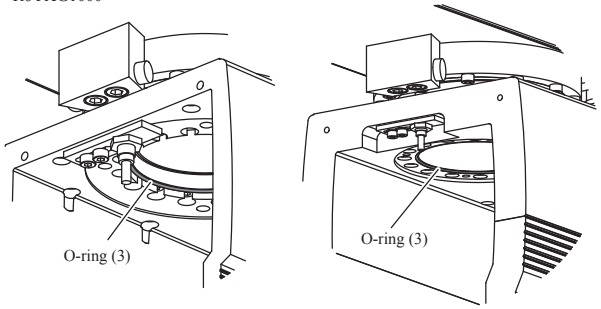
R6YXGH600, R6YXG700, R6YXG800, R6YXG900, R6YXG1000, R6YXGS700, R6YXGS800, R6YXGS900, R6YXGS1000

Step 6, 8 Installing the base



R6YXG500, R6YXG600, R6YXGH600, R6YXG700, R6YXG800, R6YXG900, R6YXG1000

R6YXGS500, R6YXGS600, R6YXGS700, R6YXGS800, R6YXGS900, R6YXGS1000



R6YXG500, R6YXG600, R6YXGS500, R6YXGS600

R6YXGH600, R6YXG700, R6YXG800, R6YXG900, R6YXG1000, R6YXGS700, R6YXGS800, R6YXGS900, R6YXGS1000

9 ***Secure the X-axis motor to the base.***

1. Push the X-axis motor into the plate while moving the X-axis arm manually.
2. Using the tool A, uniformly tighten the four bolts while moving the X-axis arm by hand slowly left and right at intervals of 45°. At this time, if any jamming or catching is felt, reassemble from the beginning.

10 ***Connect the connectors of the X-axis motor power wire XM and resolver wire XP, and the round terminal of the X-axis motor.***

11 ***Reattach the base font and rear covers.***

■ Aging

1 ***Go out of the safety enclosure.***

2 ***Turn on the controller.***

Check that no one is inside the safety enclosure, and then turn on the controller.

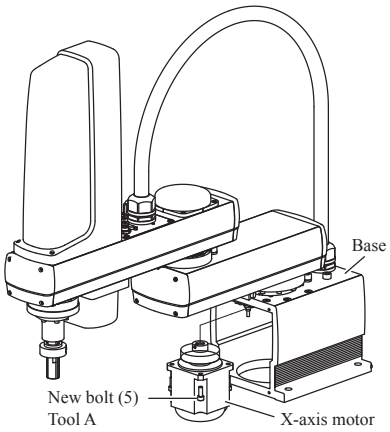
CAUTION

After the harmonic drive has been replaced, it is necessary to perform the absolute reset and set the standard coordinates and point data again. Make the adjustments while referring to Chapter 3 “Adjusting the robot” in the Installation Manual.

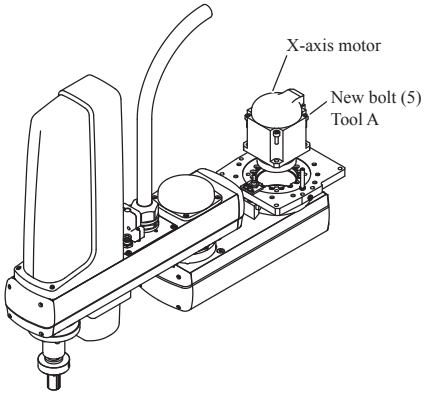
3 ***Perform the aging.***

Perform the aging for 30 minutes at 5% speed and for another 30 minutes at 20% speed by rotating the X-axis arm as much as possible (at least 10°).

▶ Step 9 Installing the X-axis motor

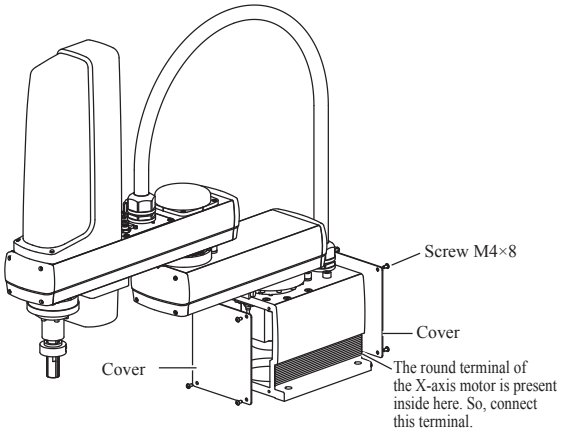


R6YXG500, R6YXG600, R6YXGH600, R6YXG700, R6YXG800, R6YXG900, R6YXG1000

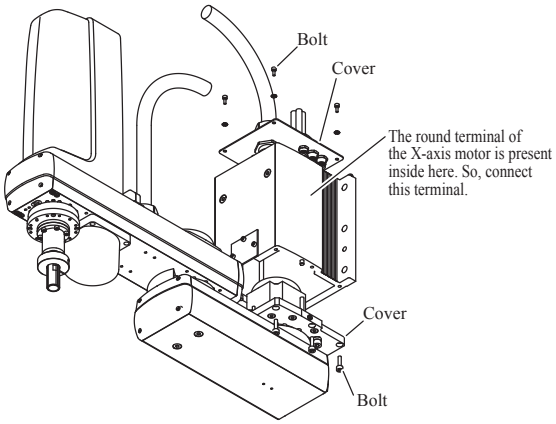


R6YXGS500, R6YXGS600, R6YXGS700, R6YXGS800, R6YXGS900, R6YXGS1000

▶ Step 10-11 Reattaching the cover



R6YXG500, R6YXG600, R6YXGH600, R6YXG700, R6YXG800, R6YXG900, R6YXG1000



R6YXGS500, R6YXGS600, R6YXGS700, R6YXGS800, R6YXGS900, R6YXGS1000

2.2.2 Replacing the Y-axis harmonic drive

WARNING

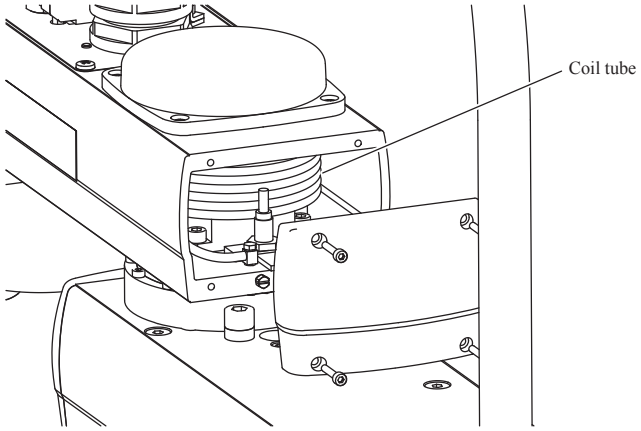
BEFORE STARTING THE WORK, THOROUGHLY READ "1. ATTACHING, DETACHING, AND REPLACING THE COVER" IN CHAPTER 2.

The coil tube shown below is absolutely required for the Y-axis reduction unit replacement work. If the coil tube has not been connected, prepare a new coil tube. Even when the coil tube has been connected, prepare a new coil tube since it needs to be replaced.
If the coil tube is not connected, this may cause the grease to leak.

NOTE

For the wall-mount inverse models of the R6YXGS500, R6YXGS600, R6YXGS700, R6YXGS800, R6YXGS900 and R6YXGS1000, the coil tube is not connected. So, the replacement work is not needed.

Coil tube



The following shows the parts and tools necessary for the Y-axis harmonic drive replacement work.

1. Replacement parts

- **R6YXG500, R6YXG600**
  R6YXGS500, R6YXGS600

	Part Name	OMRON Part No.	Part No. / Specs	Q'ty	Remarks
1	Harmonic drive	KBF-M2510-000		1	
2	O-ring	KN4-M257K-000	Cross section diameter: 1.78mm Inner diameter: 72.75mm	1	Becomes worn and must be replaced
3	O-ring	KN3-M2143-000	Cross section diameter: 1.50mm Inner diameter: 49.00mm	1	Becomes worn and must be replaced
4	O-ring	KN3-M2144-000	Cross section diameter: 0.99mm Inner diameter: 53.28mm	1	Supplied with harmonic drive
5	Motor mounting bolt	KBF-M259A-000	M5, length: 12	4	Must be replaced when robot reference number is prior to KC394
		91312-05012	M5, length: 12	4	Spare parts for robots with a reference number of KC394 or later
6	Harmonic drive mounting bolt	91312-03016	M3, length: 16	16	Must be replaced
7	Harmonic drive mounting bolt	91312-03030	M3, length: 30	11	Must be replaced
8	Panhead bolt for dog	98502-03030	M3, length: 30	1	Spare parts
9	Nut for dog	95302-04600	M4	1	Spare parts
10	Coil tube	KBF-M2511-000		1	Not needed for the wall-mount inverse models of the R6YXGS500 and R6YXGS600.
11	Joint	$UEF4-M3	UEF4-M3 (KOGANEI)	1	No need to be replaced if coil tube is originally equipped

- **R6YXGH600, R6YXG700, R6YXG800, R6YXG900, R6YXG1000**
  R6YXGS700, R6YXGS800, R6YXGS900, R6YXGS1000

	Part Name	OMRON Part No.	Part No. / Specs	Q'ty	Remarks
1	Harmonic drive	KBP-M2510-000		1	
2	O-ring	KN4-M2143-000	S90 (JIS)	1	Becomes worn and must be replaced
3	O-ring	90990-17J030	Cross section diameter: 1.78mm Inner diameter: 66.4mm	1	Becomes worn and must be replaced
4	O-ring	KN5-M257L-000	Cross section diameter: 1.30mm Inner diameter: 66.5mm	1	Supplied with harmonic drive
5	Motor mounting bolt	KBP-M259A-000	M6, length: 16	4	Must be replaced when robot reference number is prior to KC346
		91312-06016	M6, length: 16	4	Spare parts for robots with a reference number of KC346 or later
6	Harmonic drive mounting bolt	91312-04020	M4, length: 20	16	Must be replaced
7	Harmonic drive mounting bolt	91312-04030	M4, length: 30	11	Must be replaced
8	Panhead bolt for dog	98502-04030	M4, length: 30	1	Spare parts
9	Nut for dog	95302-05600	M4	1	Spare parts
10	Washer	92903-04600	M4	16	Must be replaced
11	Coil tube	KBP-M2511-000		1	Not needed for the wall-mount inverse models of the R6YXGS700, R6YXGS800, R6YXGS900 and R6YXGS1000.
12	Joint	$UEF4-M3	UEF4-M3 (KOGANEI)	1	No need to be replaced if coil tube is originally equipped
13	Washer	KBF-M2146-001		1	Spare parts

2. Torque wrench, etc.

CAUTION

Use accurately calibrated torque screwdrivers and torque wrenches.

- **R6YXG500, R6YXG600**
  R6YXGS500, R6YXGS600

	Name	Part No.	Manufacturer	Remarks
A	Torque wrench	N120SPCK	KANON (Nakamura Mfg. Co., Ltd.)	For M5 hex socket head bolt Tightening torque: 7.4Nm (76kgfcm)
	Changeable head	230HCK4	KANON (Nakamura Mfg. Co., Ltd.)	Wrench (without ball end) for M5 hex socket head bolt; insert 110mm
B	Torque screwdriver	N30LTDK	KANON (Nakamura Mfg. Co., Ltd.)	For M3 hex socket head bolt Tightening torque: 1.8Nm (18kgfcm)
	Drive bit	B35, opposite side 2.5×75	Vessel Co., Inc.	Attachment hexagonal width across flat: 6.35mm Overall length: 75mm Hexagonal width across flat at tip: 2.5mm
C	Torque screwdriver	N12LTDK	KANON (Nakamura Mfg. Co., Ltd.)	For M3 set screw Tightening torque: 0.7Nm (7kgfcm)
	Drive bit	3C1507	NAC (Nagahori Industry Co., Ltd.)	Attachment hexagonal width across flat: 6.35mm Overall length: 70mm Hexagonal width across flat at tip: 1.5mm
D	Torque screwdriver	N12LTDK	KANON (Nakamura Mfg. Co., Ltd.)	For M3 Phillips-head screw Tightening torque: 0.9Nm (9kgfcm)
	Drive bit	B35+2×50	Vessel Co., Inc.	Attachment hexagonal width across flat: 6.35mm Overall length: 50mm Bit number: #2

- **R6YXGH600, R6YXG700, R6YXG800, R6YXG900, R6YXG1000**
  R6YXGS700, R6YXGS800, R6YXGS900, R6YXGS1000

	Name	Part No.	Manufacturer	Remarks
A	Torque wrench	N230SPCK	KANON (Nakamura Mfg. Co., Ltd.)	For M6 hex socket head bolt Tightening torque: 15.2Nm (156kgfcm)
	Changeable head	230HCK5	KANON (Nakamura Mfg. Co., Ltd.)	Wrench (without ball end) for M6 hex socket head bolt; insert 100mm
B	Torque screwdriver	N50LTDK	KANON (Nakamura Mfg. Co., Ltd.)	For M4 hex socket head bolt Tightening torque: 4.0Nm (41kgfcm)
	Drive bit	3C3007	NAC (Nagahori Industry Co., Ltd.)	Attachment hexagonal width across flat: 6.35mm Overall length: 70mm Hexagonal width across flat at tip: 3mm
C	Torque screwdriver	N20LTDK	KANON (Nakamura Mfg. Co., Ltd.)	For M4 set screw Tightening torque: 1.7Nm (17kgfcm)
	Drive bit	3C2010	NAC (Nagahori Industry Co., Ltd.)	Attachment hexagonal width across flat: 6.35mm Overall length: 100mm Hexagonal width across flat at tip: 2mm
D	Torque screwdriver	N20LTDK	KANON (Nakamura Mfg. Co., Ltd.)	For M4 Phillips-head screw Tightening torque: 1.6Nm (16kgfcm)
	Drive bit	+2×50	Vessel Co., Inc.	Attachment hexagonal width across flat: 6.35mm Overall length: 50mm Bit number: #2

3. Other tools

Name	Part No.	Manufacturer	Remarks
Harmonic grease	4B No.2 (*1)	Harmonic Drive Systems	Do not use grease if it was purchased 4 or more years ago. The grease has probably deteriorated.
Cleaning wipe			
Phillips screwdriver			
Hex wrench set			
Screw thread locking agent	Loctite 262	Henkel	High strength type (red)
Spanner (wrench)	width across flat: 5mm		
Tie band			

*1: R6YXG500, R6YXG600, R6YXGS500, R6YXGS600: 27g
R6YXGH600, R6YXG700, R6YXG800, R6YXG900, R6YXG1000, R6YXGS700, R6YXGS800, R6YXGS900, R6YXGS1000: 48g
Make sure to install a coil tube for applying the specified amount of grease. If a coil tube is not used, grease may leak.

■ Removal

Follow the steps below to remove the Y-axis parts.

1 ***Turn off the controller.***

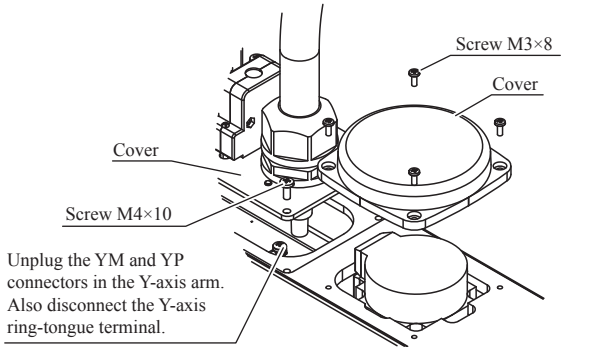
2 ***Place a sign indicating the robot is being adjusted.***
Place a sign indicating the robot is being adjusted, to keep others from operating the controller or operation panel.

3 ***Enter the safety enclosure.***

4 ***Remove the cover.***
Remove the cover while referring to "1. Attaching, detaching, and replacing the cover" in Chapter 2.

5 ***Disconnect the connectors of the Y-axis motor power wire YM and resolver wire YP in the Y-axis arm, and the round terminal of the Y-axis motor.***

▶ **Step 4-5** **Removing the cover**



6 ***Remove the cover.***

Remove the cover while referring to "1. Attaching, detaching, and replacing the cover" in Chapter 2.

7 ***Disconnect the coil tube or air tube.***

When the coil tube is connected, disconnect it from the joint. Cut the tie bands and take out the coil tube from the Y-axis arm window.
If the coil tube is not connected, disconnect the air tube together with the joint.
At this time, pay special attention so that no grease leaks from the tube and joint.
For the wall-mount inverse model not needing the coil tube, move to Step 8.
The work stated in Step 7 is not needed.

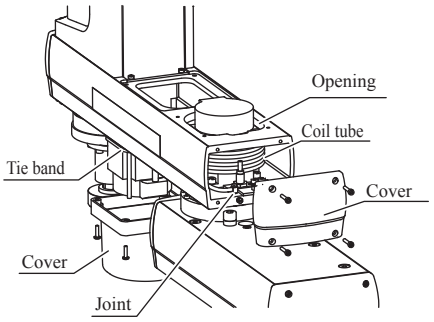
8 ***Remove the Y-axis motor.***

1. Remove the bolts that secure the Y-axis motor. The bolts are replaced with new ones later on.
2. Gradually pull out the Y-axis motor while turning the Y-axis joint area.
3. Remove the O-ring.

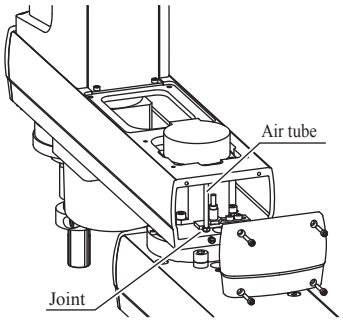
NOTE

The O-ring of the Y-axis arm is replaced with a new one later on.

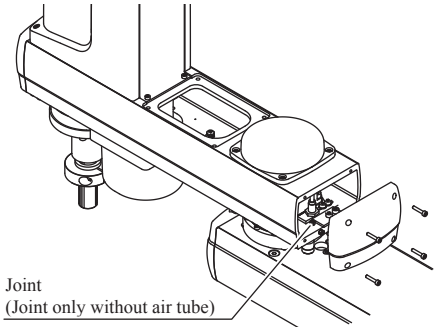
Step 6-7 Disconnecting the joint



For Y-axis originally equipped with a coil tube

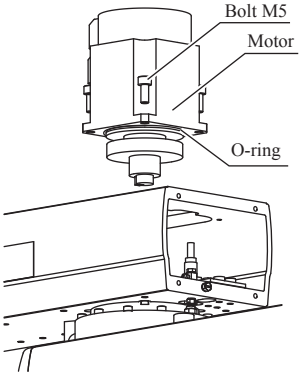


For Y-axis not originally equipped with a coil tube

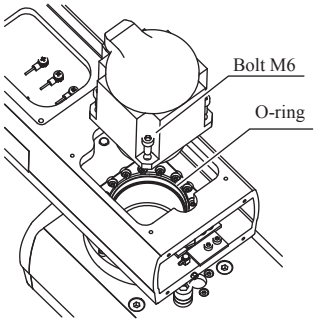


For wall-mount inverse model

Step 8 Removing the Y-axis motor



R6YXG500, R6YXG600, R6YXGS500, R6YXGS600



R6YXGH600, R6YXG700, R6YXG800, R6YXG900, R6YXG1000, R6YXGS700, R6YXGS800, R6YXGS900, R6YXGS1000

9 ***Remove the wave generator from the motor shaft.***

Remove the set screws (1 pcs.) that secure the wave generator.

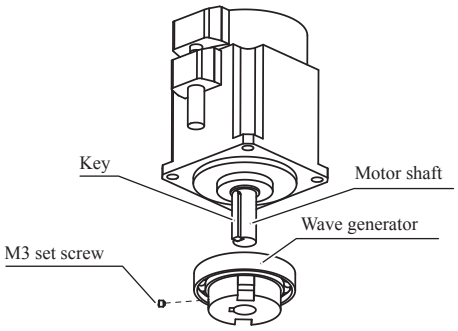
WARNING

IF THE Y-AXIS MOUNTING BOLTS ARE REMOVED IN STEP 10, THE Y-AXIS ARM COMES OFF, CAUSING HAZARDOUS SITUATION.
IF A HEAVY TOOL IS ATTACHED TO THE ARM TIP, THE ARM MAY DROP. SO, TAKE GREAT CARE WHEN REMOVING THE X-AXIS ARM MOUNTING BOLTS. (SEE THE FIG. IN STEP 10.)

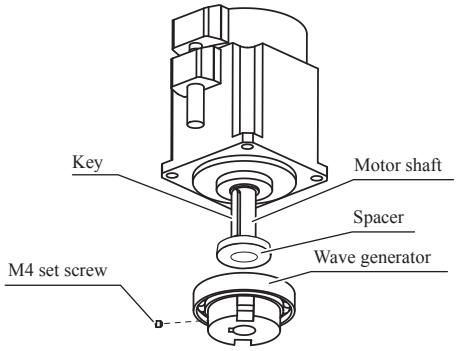
10 ***Remove the Y-axis arm.***

1. Before removing the Y-axis arm, reattach the cover so that the wiring is not stretched.
2. Remove the Y-axis arm mounting bolts.
3. Remove the Y-axis arm.
   Place the Y-axis arm that has been removed in a place where it is not in contact with the harness and it does not hinder the work.
4. Remove the O-ring.
   The O-ring of the harmonic drive is replaced with a new one later on.
   The O-ring may adhere to the bottom surface of the Y-axis arm. So, be sure to remove it completely.

Step 9 **Removing the wave generator**

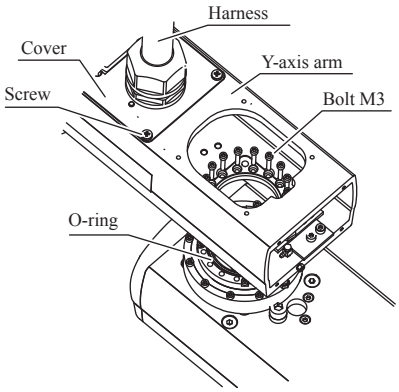


R6YXG500, R6YXG600, R6YXGS500, R6YXGS600

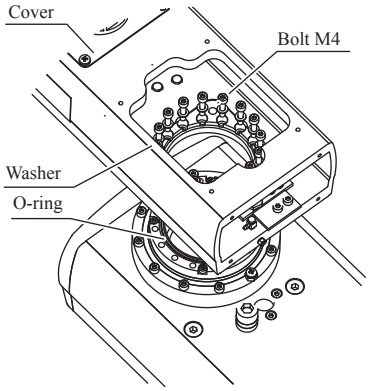


R6YXGH600, R6YXG700, R6YXG800, R6YXG900, R6YXG1000, R6YXGS700, R6YXGS800, R6YXGS900, R6YXGS1000

Step 10 **Removing the Y-axis arm**



R6YXG500, R6YXG600, R6YXGS500, R6YXGS600



R6YXGH600, R6YXG700, R6YXG800, R6YXG900, R6YXG1000, R6YXGS700, R6YXGS800, R6YXGS900, R6YXGS1000

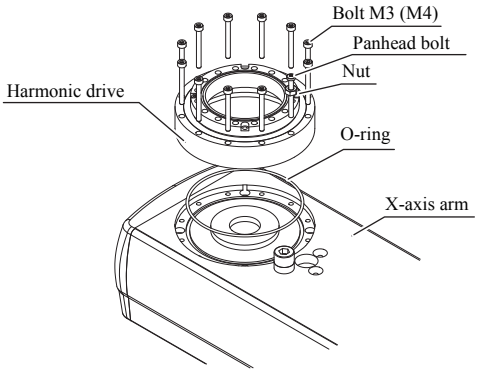
11 ***Remove the Y-axis harmonic drive from the top surface of the X-axis arm.***

1. Remove the bolts, panhead bolts, and nuts that secure the Y-axis harmonic drive.
2. Remove the O-ring.

NOTE

The O-ring in the harmonic drive must be replaced with a new one later on.

Step 11 Removing the Y-axis harmonic drive



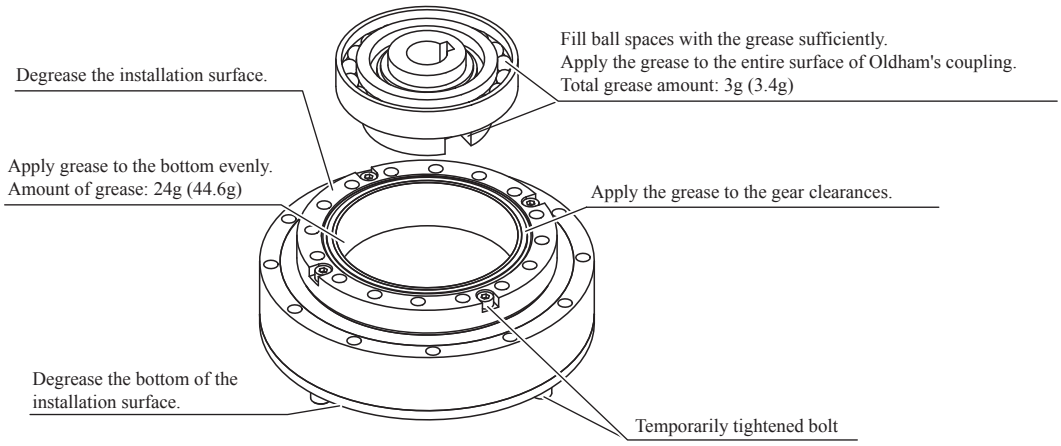
■ Replacement and reassembly

Follow the steps below to replace the harmonic drive with a new one and reassemble it.

1 ***Perform the work shown below before reassembling the harmonic drive.***

1. Apply harmonic grease 4B No.2 to the wave generator and main body bottom of a new harmonic drive. For details about how to apply the grease, see the Fig. below.

Step 1 Applying the harmonic grease



* Values in parentheses apply to the R6YXGH600, R6YXG700, R6YXG800, R6YXG900, R6YXG1000, R6YXGS700, R6YXGS800, R6YXGS900 and R6YXGS1000.

2. Remove the old grease and worn-out particles from the motor, X-axis arm, and Y-axis arm completely.

CAUTION

- If foreign matter is caught in during reassembly work, this may cause the noise from the harmonic drive or the harmonic drive to break.
- Never remove the temporarily secured bolts. Doing so may cause a misalignment.

3. Apply the specified amount of harmonic grease to each part of the harmonic drive.

CAUTION

An insufficient amount of grease may shorten the service life of the drive parts, and an excessive amount may cause the grease to leak.

2 *Secure a new harmonic drive (1) to the X-axis arm.*

1. Degrease the harmonic drive installation surface of the X-axis arm.
   Do not apply the grease to the seating surface.
2. Fit a new O-ring (2) into the O-ring groove in the X-axis arm.

CAUTION

Do not allow the O-ring to get caught out of the groove during reassembly. If the robot is operated with the O-ring left caught out of the groove, this may cause a malfunction.

3. Place the new harmonic drive on the X-axis arm and secure it with the bolts.
   Apply harmonic grease 4B No.2 to the tip of each bolt so that the roots of at least the first four threads are filled with grease.
   Grease applied to the bolt tip is intended to stabilize the bolt axial force.
4. Secure the panhead bolts and nuts at their original positions.

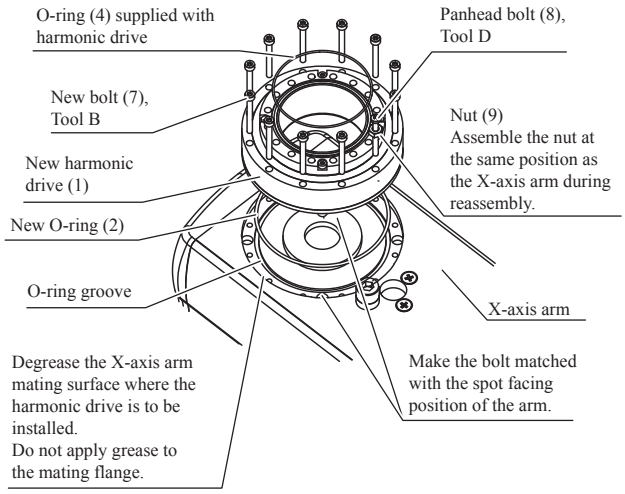
CAUTION

Do not apply the grease to the panhead bolt. Doing so may cause the bolt to loosen.

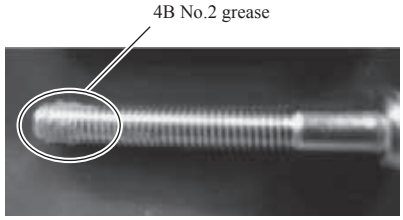
3 *Tighten the bolts and panhead bolts in the order shown below.*

1. Using the wrench, tighten the bolts and panhead bolts manually in the order indicated by circled numbers.
2. Using the torque driver, tighten the bolts and panhead bolts to approximately 50% of the specified torque in the order indicated by circled numbers.
3. Tighten the bolts and panhead bolts to the specified torque in the order indicated by circled numbers.
4. Finally, check that the bolts and panhead bolts are tightened to the specified torque.

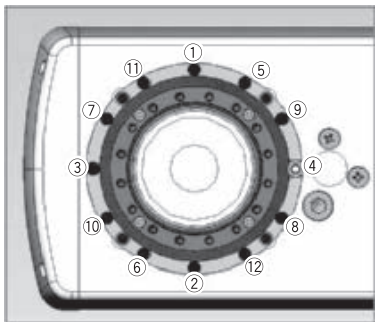
Step 2-4 Securing the harmonic drive



Step 2, 5 Applying the grease to the mounting bolt



Step 3 Bolt and panhead bolt tightening order



4 ***Install the new O-ring (4) provided with the new harmonic drive.***

1. Degrease the installation surface on the top surface of the harmonic drive.
2. Fit the O-ring supplied with the new harmonic drive into the O-ring groove of the harmonic drive.
   If it is difficult to fit the O-ring into the groove, slightly stretch the O-ring.
   It is accepted to apply a small amount of the harmonic drive grease to the O-ring in order to prevent the O-ring from coming off the groove.

CAUTION

Do not allow the O-ring to get caught out of the groove during reassembly. If the robot is operated with the O-ring left caught out of the groove, this may cause a malfunction.

5 ***Secure the Y-axis arm to the harmonic drive.***

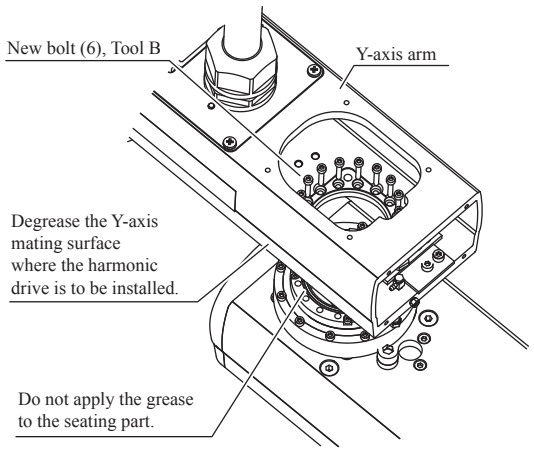
1. Degrease the Y-axis arm side where the harmonic drive is to be installed.
2. Apply harmonic grease 4B No.2 to the tip of each bolt so that the roots of at least the first four threads are filled with grease.

CAUTION

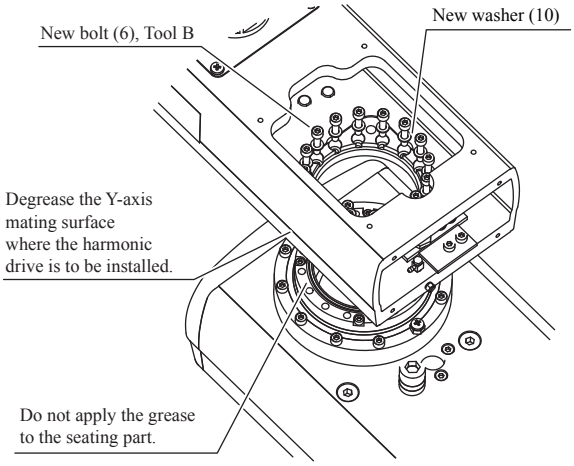
When tightening the bolts with the moment load applied to the harmonic drive, this may cause breakage. Perform the work not to apply the moment load to the harmonic drive.

3. Align the harmonic drive's phase with respect to the Y-axis arm and install the Y-axis arm so that the spot facing of the harmonic drive is matched with the tapped hole in the Y-axis arm.
   At this time, two work personnel perform the work with the Y-axis arm kept horizontally so that no moment load is applied to the Y-axis harmonic drive. One person supports the end of the Y-axis arm and the other person secures the Y-axis arm in place.

Step 5-6 Installing the Y-axis arm

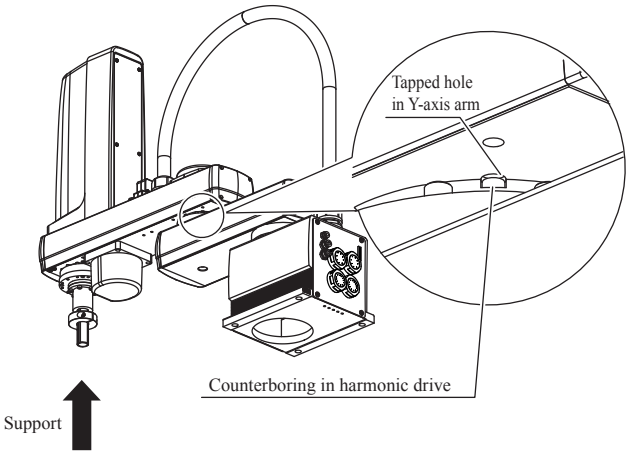


R6YXG500, R6YXG600, R6YXGS500, R6YXGS600



R6YXGH600, R6YXG700, R6YXG800, R6YXG900, R6YXG1000, R6YXGS700, R6YXGS800, R6YXGS900, R6YXGS1000

Step 5 Securing the Y-axis arm



6 ***Tighten the bolts in the order shown below.***

1. Using the wrench, tighten the bolts manually in the order indicated by circled numbers.
2. Using the torque driver, tighten the bolts to approximately 50% of the specified torque in the order indicated by circled numbers.
3. Tighten the bolts to the specified torque in the order indicated by circled numbers.
4. Finally, check that the bolts are tightened to the specified torque.

NOTE

For the R6YXG500, R6YXG600, R6YXGS500 and R6YXGS600, apply grease to fill in around the groove.

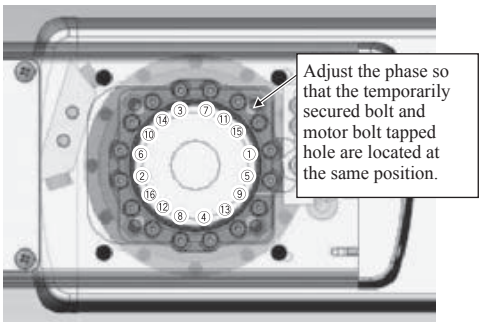
7 ***Secure the wave generator.***

1. For the R6YXGH600, R6YXG700, R6YXG800, R6YXG900, R6YXG1000, R6YXGS700, R6YXGS800, R6YXGS900 and R6YXGS1000, put a spacer and pass the wave generator through the motor shaft while carefully checking the orientation of the wave generator.
   At this time, push the wave generator until it is in contact with the stepped surface.
2. Secure the wave generator with the set screw (1 pc.).
   At this time, apply a small amount of the screw lock to the set screw.

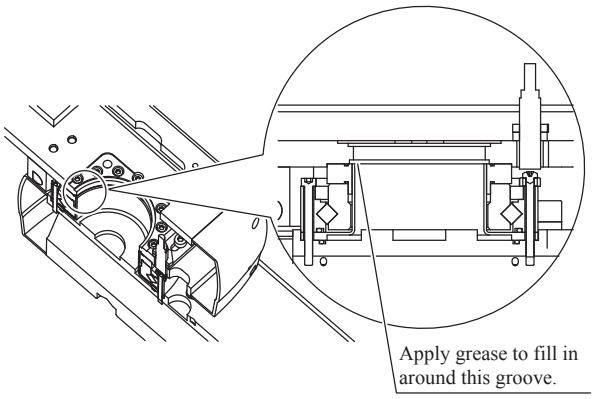
CAUTION

- If it is difficult to fit the wave generator onto the motor shaft by pushing by hand, do not forcefully push in. Grind the key or motor shaft with sandpaper or similar tool to make it easier to fit the wave generator onto the motor shaft.
- Apply the specified amount of harmonic grease to each part of the harmonic drive. An insufficient amount of grease may shorten the service life of the drive parts, and an excessive amount may cause the grease to leak.

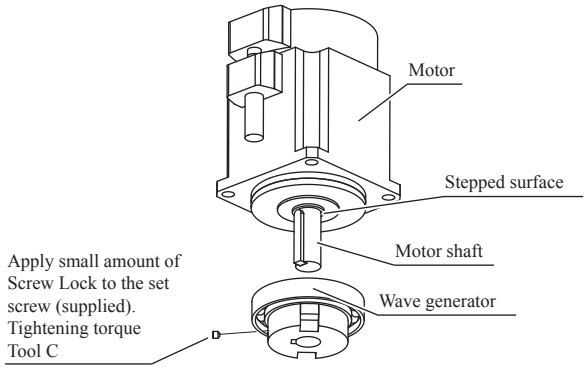
Step 6 **Bolt tightening order**



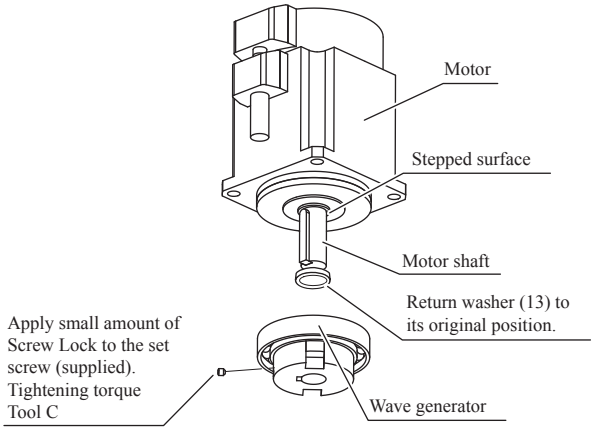
Step 6 **For the R6YXG500, R6YXG600, R6YXGS500 and R6YXGS600**



Step 7 **Securing the wave generator**



R6YXG500, R6YXG600, R6YXGS500, R6YXGS600



R6YXGH600, R6YXG700, R6YXG800, R6YXG900, R6YXG1000, R6YXGS700, R6YXGS800, R6YXGS900, R6YXGS1000

8 ***Subsequently, proceed the steps as follows.***

If the coil tube has already been connected, move to step 9.
If the coil tube has not been connected, move to step 13.
For the wall-mount inverse model not needing the coil tube, move to Step 9.

9 ***Secure the motor to the Y-axis arm temporarily.***

1. Open the cover. Pass the wiring through the Y-axis arm side.
2. Fit a new O-ring (3) into the motor mating (Y-axis arm mating for the R6YXGH600, R6YXG700, R6YXG800, R6YXG900, R6YXG1000, R6YXGS700, R6YXGS800, R6YXGS900 and R6YXGS1000).
3. Gradually put the motor into the Y-axis arm while turning the Y-axis joint area and secure the motor to the Y-axis arm temporarily with the mounting bolts.

CAUTION

Do not allow the O-ring to get caught out of the groove. If the robot is operated with the O-ring left caught out of the groove, this may cause a malfunction.

10 ***Retighten the temporarily secured bolts uniformly.***

Retighten the temporarily secured bolts (4 pcs.) uniformly while turning the Y-axis joint area.
At this time, if unusual feeling such as jamming is felt, reassemble from the beginning.

11 ***Insert the coil tube.***

Insert the coil tube through the clearance between the Y-axis arm window and Y-axis. Connect the coil tube with the short straight portion to the joint.
If the straight portion of the coil tube is too long, cut it to an appropriate level, and then connect it to the joint correctly. Connect the coil tube with the long straight portion to the Z-axis motor with tie bands. At this time, pay special attention so that the coil tube is not crushed or bent.
If the straight portion of the coil tube is longer than the Z-axis motor, cut the excess part.

For the wall-mount inverse model not needing the coil tube, move to Step 13.
The work stated in Step 11 is not needed.

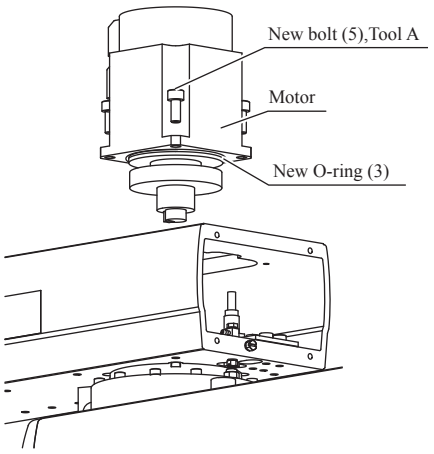
12 ***Install the cover.***

If the coil tube has already been connected, perform the work from Step 21.

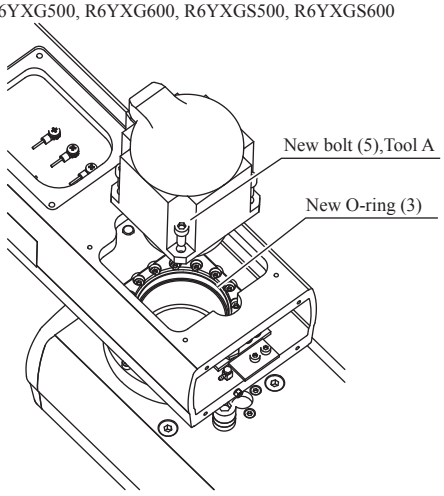
13 ***The following describes the work steps if the coil tube has not been connected.***

The following work steps are carried out since the Y-axis arm window is narrow.

Step 9-10 Securing the motor temporarily

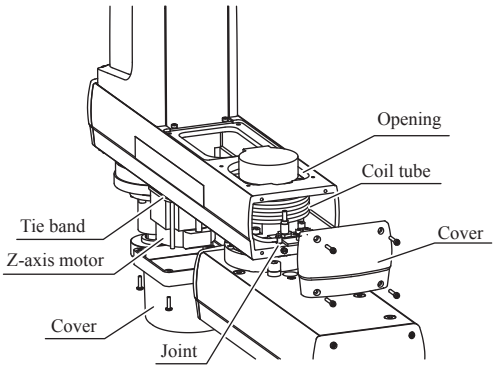


R6YXG500, R6YXG600, R6YXGS500, R6YXGS600



R6YXGH600, R6YXG700, R6YXG800, R6YXG900, R6YXG1000, R6YXGS700, R6YXGS800, R6YXGS900, R6YXGS1000

Step 11 Inserting the coil tube



For Y-axis originally equipped with a coil tube

14 ***Widen the inside diameter of the coil tube to D and secure the coil tube with the tie band.***

R6YXG500, R6YXG600, R6YXGS500,R6YXGS600	D=85mm
R6YXGH600, R6YXG700, R6YXG800, R6YXG900, R6YXG1000, R6YXGS700, R6YXGS800, R6YXGS900, R6YXGS1000	D=110mm

15 ***Insert the coil tube from the end face of the Y-axis arm.***

16 ***Secure the motor to the Y-axis arm temporarily.***

1. Open the cover. Pass the wiring through the Y-axis arm side.
2. Fit a new O-ring (3) into the motor mating (Y-axis arm mating for the R6YXGH600, R6YXG700, R6YXG800, R6YXG900, R6YXG1000, R6YXGS700, R6YXGS800, R6YXGS900 and R6YXGS1000).
3. Gradually put the motor into the Y-axis arm while turning the Y-axis joint area and secure the motor to the Y-axis arm temporarily with the mounting bolts.
   At this time, pay special attention so that the coil tube is not caught in the portion between the Y-axis motor and arm.

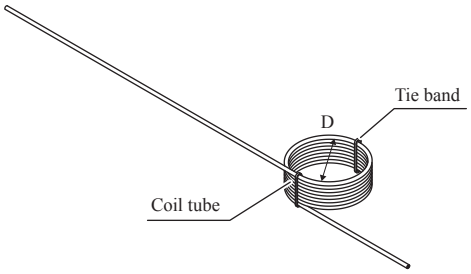
CAUTION

Do not allow the O-ring to get caught out of the groove. If the robot is operated with the O-ring left caught out of the groove, this may cause a malfunction.

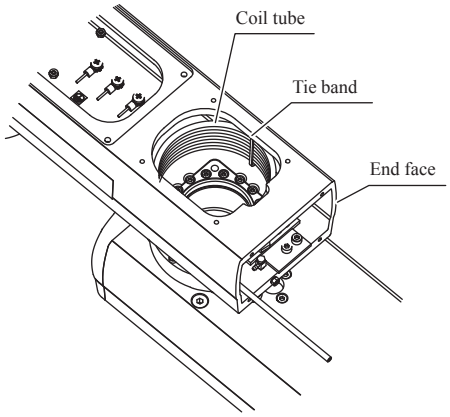
17 ***Retighten the temporarily secured bolts uniformly.***

Retighten the temporarily secured bolts (4 pcs.) uniformly while turning the Y-axis joint area.
At this time, if unusual feeling such as jamming is felt, reassemble from the beginning.

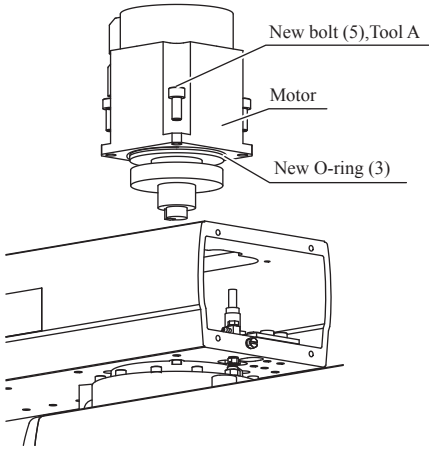
Step 14 For Y-axis not originally equipped with a coil tube



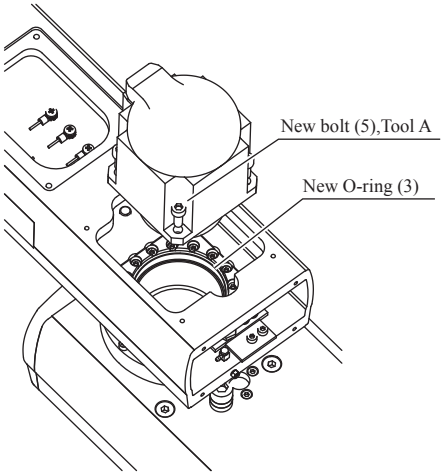
Step 15 Inserting the coil tube



Step 16-17 Securing the motor temporarily



R6YXG500, R6YXG600, R6YXGS500, R6YXGS600



R6YXGH600, R6YXG700, R6YXG800, R6YXG900, R6YXG1000, R6YXGS700, R6YXGS800, R6YXGS900, R6YXGS1000

18 ***Move the tie band to the end face of the Y-axis arm, and then cut it.***
At this time, be careful not to cut the coil tube.

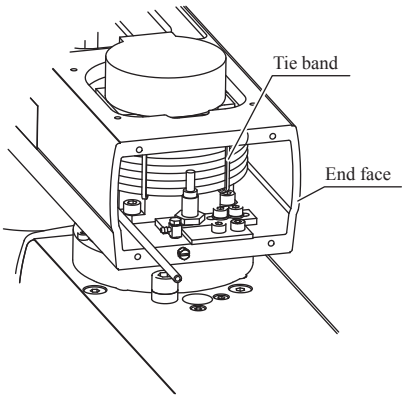
19 ***Connect the coil tube with the short straight portion to the joint.***
If the straight portion of the coil tube is too long, cut it to an appropriate level, and then connect it to the joint correctly. Connect the coil tube with the long straight portion to the Z-axis motor with tie bands. At this time, pay special attention so that the coil tube is not crushed or bent.
If the straight portion of the coil tube is longer than the Z-axis motor, cut the excess part.

20 ***Install the cover.***

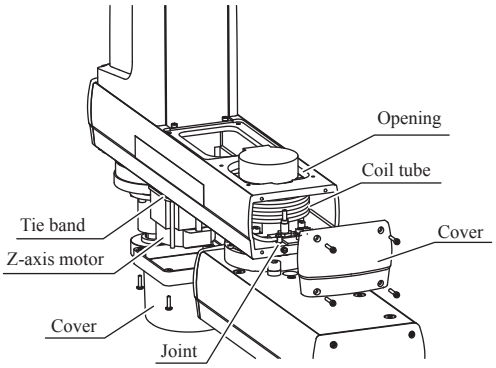
21 ***Connect the connectors of the Y-axis motor power wire YM and resolver wire YP, and the round terminal of the Y-axis motor.***

22 ***Reattach the cover.***

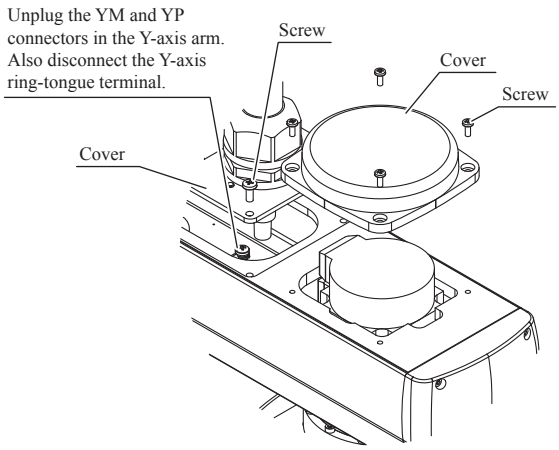
Step 18 **Cut the tie band.**



Step 19 **Inserting the coil tube**



Step 22 **Reattaching the cover**



■ Aging

1 ***Go out of the safety enclosure.***

2 ***Turn on the controller.***
Check that no one is inside the safety enclosure, and then turn on the controller.

CAUTION
After the harmonic drive has been replaced, it is necessary to perform the absolute reset and set the standard coordinates and point data again.

3 ***Perform the aging.***
Perform the aging for 30 minutes at 5% speed and for another 30 minutes at 20% speed by rotating the Y-axis arm as much as possible (at least 10°).

2.2.3 Replacing the R-axis harmonic drive

WARNING

BEFORE STARTING THE WORK, THOROUGHLY READ "1. ATTACHING, DETACHING, AND REPLACING THE COVER" IN CHAPTER 2.

The following shows the parts and tools necessary for the R-axis harmonic drive replacement work.

CAUTION

At Step 2 of the "■ Replacement and reassembly" procedure, a motor-securing vise and a dial gauge are required in order to check the deflection of the harmonic drive's wave generator.

If a vise and dial gauge are not available, the wave generator can be installed at OMRON, with the assembly then being shipped to the customer.

In that case, the customer should order one of the following "additional new motor" replacement parts and request that the wave generator be installed in the motor.

Additional motors:

KBF-M4883-002 (R6YXG500, R6YXG600, R6YXGS500, R6YXGS600)

KBP-M4883-001 (R6YXGH600, R6YXG700, R6YXG800, R6YXG900, R6YXG1000, R6YXGS700, R6YXGS800, R6YXGS900, R6YXGS1000)

1. Replacement parts

- **R6YXG500, R6YXG600**
  R6YXGS500, R6YXGS600

	Part Name	OMRON Part No.	Part No. / Specs	Q'ty	Remarks
1	Harmonic drive	KBF-M1821-100		1	
2	O-ring	KN4-M1896-000	Cross section diameter: 1.78mm Inner diameter: 63.22mm	1	Becomes worn and must be replaced
3	O-ring	90990-17J016	Cross section diameter: 0.80mm Inner diameter: 45.40mm	1	Supplied with harmonic drive
4	O-ring	90990-17J031	Cross section diameter: 1.00mm Inner diameter: 35.30mm	1	Becomes worn and must be replaced
5	O-ring	90990-17J032	Cross section diameter: 1.00mm Inner diameter: 46.00mm	1	Becomes worn and must be replaced
6	O-ring	90990-17J034	Cross section diameter: 0.60mm Inner diameter: 22.20mm	1	Becomes worn and must be replaced
7	Motor mounting bolt	KBF-M259A-000	M5, length: 12	4	Must be replaced when robot reference number is prior to KC368
		91312-05014	M5, length: 14	4	Spare parts for robots with a reference number of KC368 or later
8	Harmonic drive mounting bolt	91312-03014	M3, length: 14	16	Must be replaced
9	Harmonic drive mounting bolt	91312-03025	M3, length: 25	11	Must be replaced
10	Panhead bolt for dog	98502-03030	M3, length: 30	1	Spare parts
11	Nut for dog	95302-04600	M4	1	Spare parts
13	Spline nut securing bolts	91312-04010	M4, length: 10	6	Spare parts
14	End face seal (*1)	KBF-M1886-000		1	Replace with spare when damaged or missing.
15	Bearing nut	90185-03J00		1	Must be replaced
16	Bearing	90933-01J003	6003ZZ	2	Must be replaced
17	Bearing plate securing bolts	91312-05014	M5, length: 14	4	Spare parts

*1: A new end face seal will be subjected to a high level of friction if sufficient R-axis aging has not occurred. Therefore, be sure to perform R-axis aging, and do not replace this seal unless it is damaged.

- **R6YXGH600, R6YXG700, R6YXG800, R6YXG900, R6YXG1000**
  R6YXGS700, R6YXGS800, R6YXGS900, R6YXGS1000

	Part Name	OMRON Part No.	Part No. / Specs	Q'ty	Remarks
1	Harmonic drive	KBP-M1821-011	SHF-20-50	1	
2	O-ring	KN3-M2159-000	S71 (JIS)	1	Becomes worn and must be replaced
3	O-ring	KN3-M2144-000	Cross section diameter: 0.99mm Inner diameter: 53.28mm	1	Supplied with harmonic drive
4	O-ring	90990-17J036	Cross section diameter: 1.00mm Inner diameter: 43.00mm	1	Becomes worn and must be replaced

	Part Name	OMRON Part No.	Part No. / Specs	Q'ty	Remarks
5	O-ring	90990-17J038	Cross section diameter: 1.30mm Inner diameter: 53.00mm	1	Becomes worn and must be replaced
6	O-ring	90990-17J037	Cross section diameter: 0.50mm Inner diameter: 28.00mm	1	Becomes worn and must be replaced
7	End face seal	KBP-M1886-000	V-28A (N+C)	1	
8	Motor mounting bolt	KBP-M259A-000	M6, length: 16	4	Must be replaced when robot reference number is prior to KC172
		91312-06016	M6, length: 16	4	Spare parts for robots with a reference number of KC172 or later
9	Harmonic drive mounting bolt	91312-03016	M3, length: 16	16	Must be replaced
10	Harmonic drive mounting bolt	91312-03025	M3, length: 25	11	Must be replaced
11	Bolt for dog	91312-03030	M3, length: 30	1	Spare parts
12	Dog	KBP-M1888-000		1	Spare parts
13	Spline nut securing bolts	91312-05014	M5, length: 14	6	Spare parts
14	End face seal (*1)	KBP-M1886-000		1	Spare parts
15	Bearing nut	KBP-M1862-000		1	Must be replaced
16	Bearing	90933-01J022	6022ZZ	2	Must be replaced
17	Bearing plate securing bolts	91312-05014	M5, length: 14	4	Spare parts

*1: A new end face seal will be subjected to a high level of friction if sufficient R-axis aging has not occurred. Therefore, be sure to perform R-axis aging, and do not replace this seal unless it is damaged.

2. Torque wrench, etc.

CAUTION

Use accurately calibrated torque screwdrivers and torque wrenches.

- **R6YXG500, R6YXG600**
  R6YXGS500, R6YXGS600

	Name	Part No.	Manufacturer	Remarks
A	Torque wrench	N120CPCK	KANON (Nakamura Mfg. Co., Ltd.)	For M5 hex socket head bolt Tightening torque: 7.4Nm (76kgfcm)
	Changeable head	230HCK4	KANON (Nakamura Mfg. Co., Ltd.)	Wrench (without ball end) for M5 hex socket head bolt; insert 110mm
B	Torque screwdriver	N30LTDK	KANON (Nakamura Mfg. Co., Ltd.)	For M3 hex socket head bolt Tightening torque: 1.8Nm (18kgfcm)
	Drive bit	B35, opposite side 2.5×75	Vessel Co., Inc.	Attachment hexagonal width across flat: 6.35mm Overall length: 75mm Hexagonal width across flat at tip: 2.5mm
C	Torque screwdriver	N20LTDK	KANON (Nakamura Mfg. Co., Ltd.)	For M4 set screw Tightening torque: 0.7Nm (7.1kgfcm)
	Drive bit	3C2010	NAC (Nagahori Industry Co., Ltd.)	Attachment hexagonal width across flat: 6.35mm Overall length: 100mm Hexagonal width across flat at tip: 2mm
D	Torque screwdriver	N12LTDK	KANON (Nakamura Mfg. Co., Ltd.)	For M3 Phillips-head screw Tightening torque: 0.9Nm (9kgfcm)
	Drive bit	B35+2×50	Vessel Co., Inc.	Attachment hexagonal width across flat: 6.35mm Overall length: 50mm Bit number: #2
E	Ratchet handle	FUTR-3/8	Fuji Seimitsu	Insertion angle, 9.52 mm
	Socket	FUT#03	Fuji Seimitsu	Socket for fine U-nut, M17 x P1.0

- **R6YXGH600, R6YXG700, R6YXG800, R6YXG900, R6YXG1000**
  R6YXGS700, R6YXGS800, R6YXGS900, R6YXGS1000

	Name	Part No.	Manufacturer	Remarks
A	Torque wrench	N230SPCK	KANON (Nakamura Mfg. Co., Ltd.)	For M6 hex socket head bolt Tightening torque: 15.2Nm (156kgfcm)
	Changeable head	230HCK5	KANON (Nakamura Mfg. Co., Ltd.)	Wrench (without ball end) for M6 hex socket head bolt; insert 100mm
B	Torque screwdriver	N30LTDK	KANON (Nakamura Mfg. Co., Ltd.)	For M3 hex socket head bolt Tightening torque: 1.8Nm (18kgfcm)
	Drive bit	B35, opposite side 2.5×75	Vessel Co., Inc.	Attachment hexagonal width across flat: 6.35mm Overall length: 75mm Hexagonal width across flat at tip: 2.5mm

C	Torque screwdriver	N12LTDK	KANON (Nakamura Mfg. Co., Ltd.)	For M4 set screw Tightening torque: 0.8Nm (8.1kgfcm)
	Drive bit	3C2010	NAC (Nagahori Industry Co., Ltd.)	Attachment hexagonal width across flat: 6.35mm Overall length: 100mm Hexagonal width across flat at tip: 2mm

3. Other tools

Name	Part No.	Manufacturer	Remarks
Harmonic grease	4B No.2 (*1)	Harmonic Drive Systems	Do not use grease if it was purchased 4 or more years ago. The grease has probably deteriorated.
Harmonic grease (*2)	SK-1A	Harmonic Drive Systems	Use this SK-1A grease instead of the 4B No.2 grease only for the wall-mount inverse model.
Cleaning wipe			
Phillips screwdriver			
Hex wrench set			
19mm spanner			R6YXG500, R6YXG600, R6YXGS500, R6YXGS600
Hook spanner			Fine U-nut outer diameter: ∅28mm R6YXG500, R6YXG600, R6YXGS500, R6YXGS600
24mm spanner			R6YXGH600,R6YXG700, R6YXG800, R6YXG900, R6YXG1000, R6YXGS700, R6YXGS800, R6YXGS900, R6YXGS1000
32mm spanner			
Screw thread locking agent	Loctite 262	Henkel	High strength type (red)

*1: R6YXG500, R6YXG600, R6YXGS500, R6YXGS600: 8g
R6YXGH600, R6YXG700, R6YXG800, R6YXG900, R6YXG1000, R6YXGS700, R6YXGS800, R6YXGS900, R6YXGS1000: 10g

*2: If the 4B No.2 grease is used for the wall-mount inverse model, the grease may leak or the lubrication trouble may occur, causing damage to the harmonic drive.

■ Removal

Follow the steps below to remove the R-axis parts.

1 ***Turn off the controller.***

2 ***Place a sign indicating the robot is being adjusted.***
Place a sign indicating the robot is being adjusted, to keep others from operating the controller or operation panel.

3 ***Enter the safety enclosure.***

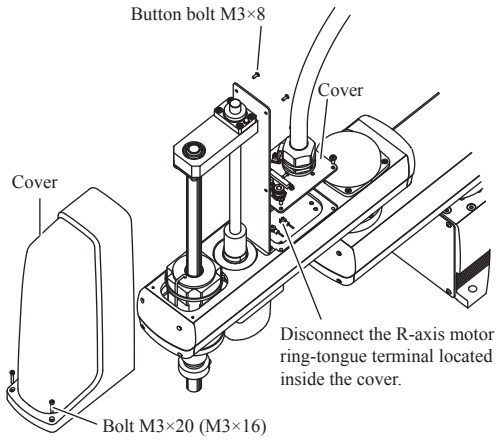
4 ***Remove the cover.***
Remove the cover while referring to "1. Attaching, detaching, and replacing the cover" in Chapter 2.

5 ***Disconnect the connectors of the R-axis motor power wire RM and resolver wire RP in the Y-axis arm, and the round terminal of the R-axis motor.***

WARNING
IF THE BEARING MOUNTING BOLTS ARE REMOVED IN STEP 6, THE Y-AXIS MAY DROP, CAUSING HAZARDOUS SITUATION. BEFORE REMOVING THE BEARING MOUNTING BOLTS, SUPPORT THE Z-AXIS USING A BASE, ETC.

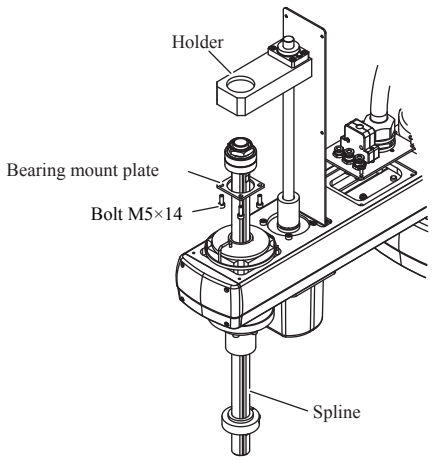
6 ***Pull out the spline and bearing from the holder.***
Remove the bolt at the top end of the spline that secures the bearing. Pull out the spline and bearing from the holder.

▶ Step 4-5 Removing the cover



* Values in parentheses apply to the R6YXGH600, R6YXG700, R6YXG800, R6YXG900, R6YXG1000, R6YXGS700, R6YXGS800, R6YXGS900 and R6YXGS1000.

▶ Step 6 Pulling out the spline and bearing



7 ***Remove the bearing and bearing mount plate.***

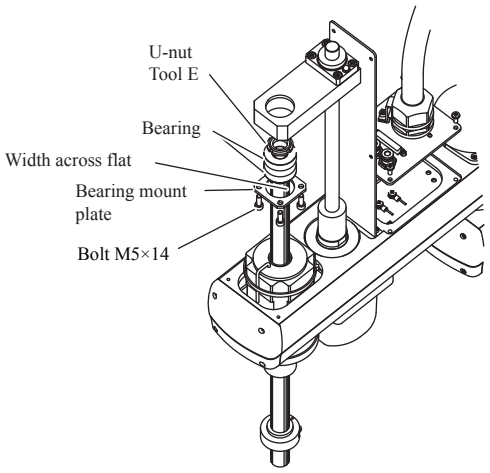
Fit the wrench to the width across flat surfaces at the lower portion of the bearing, remove the U-nut at the upper portion of the spline with the hook spanner, and then remove the bearing and bearing mount plate. At this time, be careful to keep the spline shaft so that it does not come off the spline nut.

8 ***Remove the bolt of the spline nut, and then remove the spline nut.***

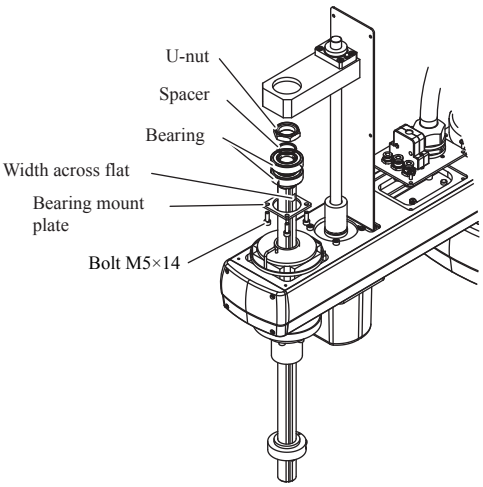
NOTE

An O-ring is fitted to the shaft. Replace this O-ring with a new one. At this time, do not remove the V-ring and sleeve.

Step 7 **Removing the bearing and bearing mount plate**

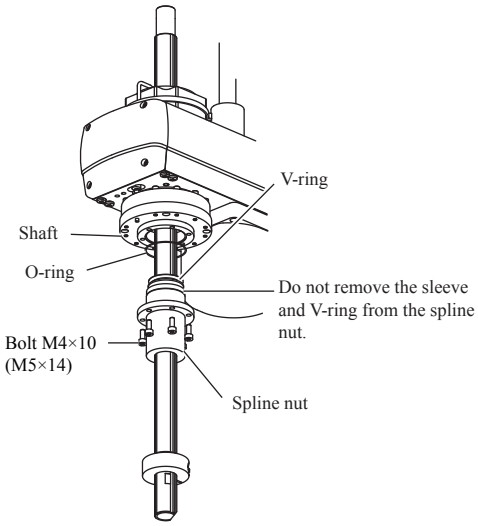


R6YXG500, R6YXG600, R6YXGS500, R6YXGS600



R6YXGH600, R6YXG700, R6YXG800, R6YXG900, R6YXG1000, R6YXGS700, R6YXGS800, R6YXGS900, R6YXGS1000

Step 8 **Removing the spline nut**



* Values in parentheses apply to the R6YXGH600, R6YXG700, R6YXG800, R6YXG900, R6YXG1000, R6YXGS700, R6YXGS800, R6YXGS900 and R6YXGS1000.

9 ***Pull out the R-axis motor.***

Remove the bolts that secure the R-axis motor and pull out the R-axis motor while turning the R-axis.

NOTE

An O-ring is placed between the R-axis motor flange and the Y-axis arm. Replace this O-ring with a new one.

10 ***Pull out the wave generator from the R-axis motor.***

Loosen two set screws of the wave generator, and then pull out the wave generator from the R-axis motor shaft.

NOTE

An O-ring is placed between the R-axis motor shaft and the wave generator. Replace this O-ring with a new one.

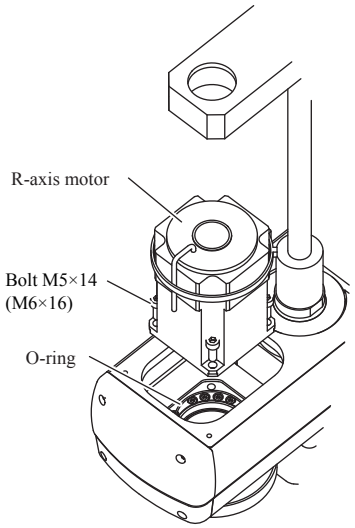
11 ***Remove the harmonic drive.***

Remove the bolts that secure the harmonic drive, and then remove the harmonic drive.

NOTE

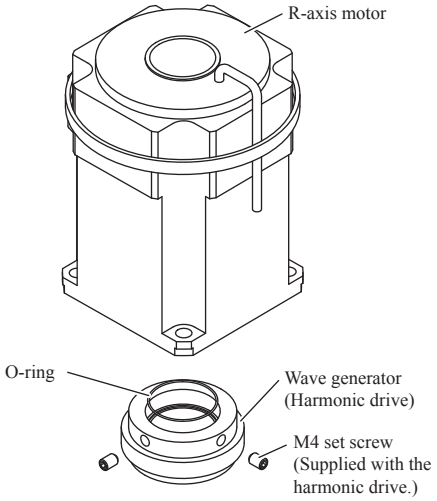
An O-ring is fitted to the harmonic drive. Replace this O-ring with a new one.

Step 9 **Removing the R-axis motor**

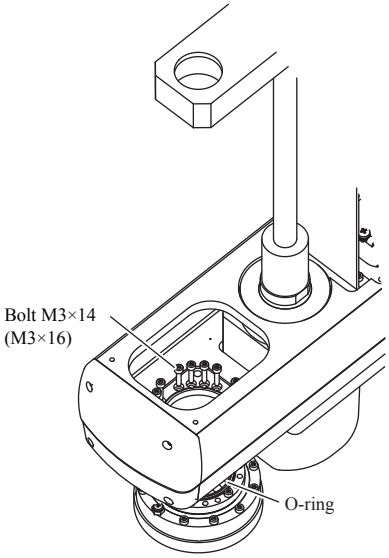


* Values in parentheses apply to the R6YXGH600, R6YXG700, R6YXG800, R6YXG900, R6YXG1000, R6YXGS700, R6YXGS800, R6YXGS900 and R6YXGS1000.

Step 10 **Removing the wave generator**



Step 11 **Removing the harmonic drive**



* Values in parentheses apply to the R6YXGH600, R6YXG700, R6YXG800, R6YXG900, R6YXG1000, R6YXGS700, R6YXGS800, R6YXGS900 and R6YXGS1000.

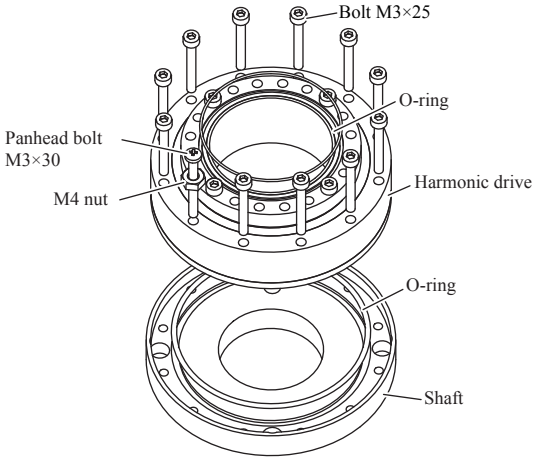
12 ***Remove the bolts that secure the shaft, and the panhead bolt and nut from the harmonic drive, and then remove the shaft.***

For the R6YXGH600, R6YXG700, R6YXG800, R6YXG900, R6YXG1000, R6YXGS700, R6YXGS800, R6YXGS900 and R6YXGS1000, remove the dog and bolt.

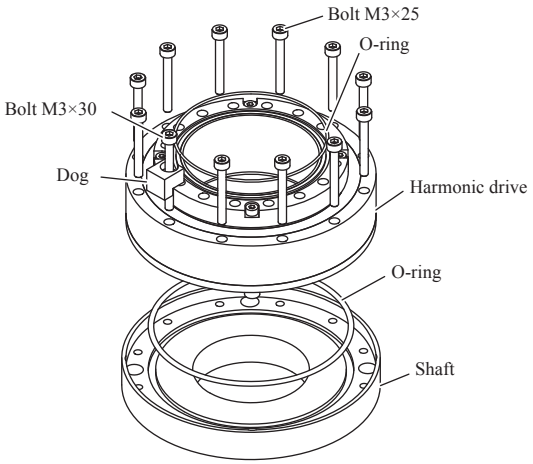
NOTE

An O-ring is placed between the harmonic drive and the shaft. Replace this O-ring with a new one.

Step 12 Removing the shaft



R6YXG500, R6YXG600, R6YXGS500, R6YXGS600



R6YXGH600, R6YXG700, R6YXG800, R6YXG900, R6YXG1000, R6YXGS700, R6YXGS800, R6YXGS900, R6YXGS1000

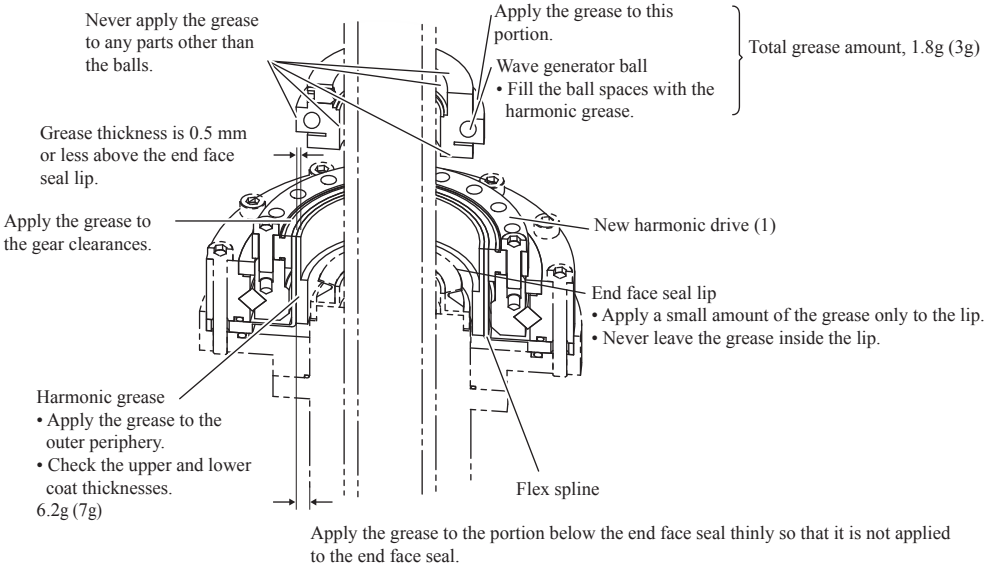
■ Replacement and reassembly

Follow the steps below to replace the harmonic drive with a new one and reassemble it.

1 ***Apply the harmonic grease to a new wave generator.***

For details about how to apply the grease, see the Fig. below.

Step 1 Applying the harmonic grease



* Values in parentheses apply to the R6YXGH600, R6YXG700, R6YXG800, R6YXG900, R6YXG1000, R6YXGS700, R6YXGS800, R6YXGS900 and R6YXGS1000.

2 *Secure the new wave generator to the R-axis motor.*

1. Fit the O-ring (6) to the inside of the new wave generator.
2. Insert the wave generator into the inner end of the R-axis motor shaft and secure it with two set screws while pressing the wave generator with a load of about 1 kg.
3. The wave generator deflection must satisfy the values shown in the Fig. on the right. Also make sure that the O-ring does not drop.

3 *Apply the harmonic grease to the flex spline.*

For details about how to apply the harmonic grease, see the Fig. stated in step 1.

4 *Secure the harmonic drive to the shaft.*

1. Degrease the upper and lower installation surfaces of the harmonic drive.
2. Degrease the harmonic drive installation surface of the shaft.
3. Fit the new O-ring (2) coated with the harmonic grease into the groove in the shaft.
4. Secure the harmonic drive to the shaft with new bolts (9).

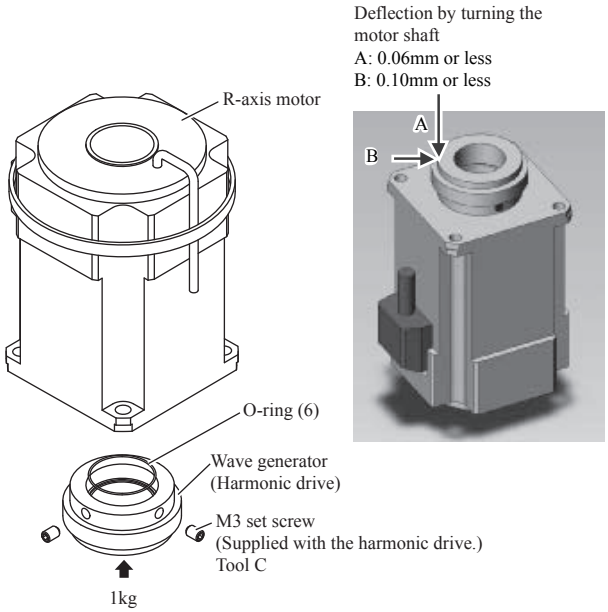
CAUTION

Never remove the temporarily secured bolt. Doing so may cause a misalignment.

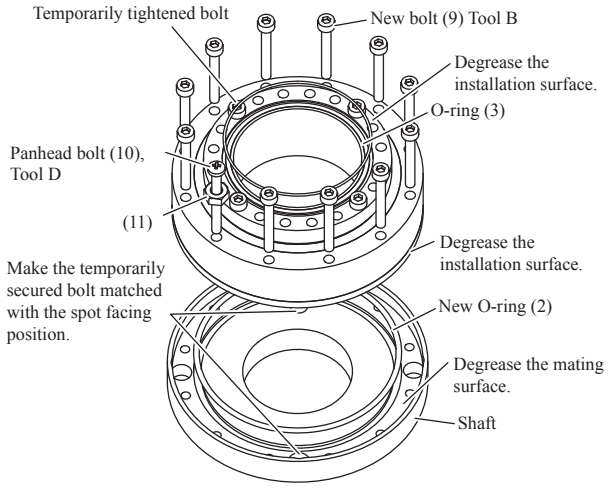
5 *Secure the panhead bolt and nut (bolt and dog (12) for the R6YXGH600, R6YXG700, R6YXG800, R6YXG900, R6YXG1000, R6YXGS700, R6YXGS800, R6YXGS900 and R6YXGS1000) to their original positions.*

It is not necessary to apply any grease to the panhead bolt (10) and bolt (11).

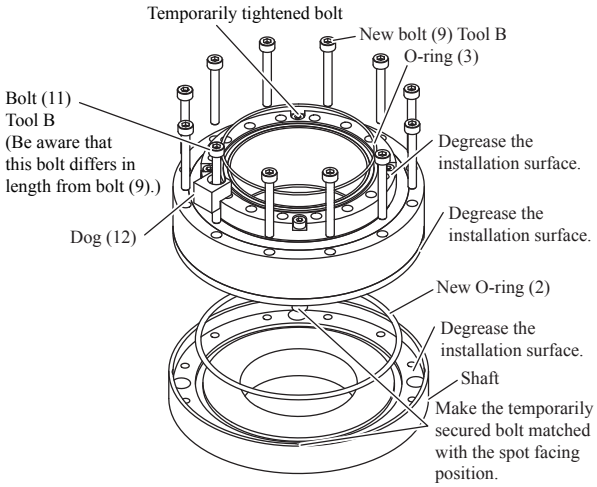
Step 2 Securing the wave generator



Step 4-5 Securing the harmonic drive



R6YXG500, R6YXG600, R6YXGS500, R6YXGS600



R6YXGH600, R6YXG700, R6YXG800, R6YXG900, R6YXG1000, R6YXGS700, R6YXGS800, R6YXGS900, R6YXGS1000

6 ***Tighten the bolts and panhead bolts in the order shown below.***

1. Using the wrench, tighten the bolts and panhead bolts manually in the order indicated by circled numbers.
2. Using the torque driver, tighten the bolts and panhead bolts to approximately 50% of the specified torque in the order indicated by circled numbers.
3. Tighten the bolts and panhead bolts to the specified torque in the order indicated by circled numbers.
4. Finally, check that the bolts and panhead bolts are tightened to the specified torque.

CAUTION

Do not allow the O-ring to get caught out of the groove during reassembly. If the robot is operated with the O-ring left caught out of the groove, this may cause a malfunction.

7 ***Install the O-ring (3).***

1. Degrease the installation surface of the Y-axis arm where the harmonic drive is to be installed.
2. Fit the O-ring (3) coated with a small amount of the harmonic grease into the O-ring groove of the new harmonic drive. If it is difficult to fit the O-ring into the groove, slightly stretch the O-ring.

CAUTION

Do not allow the O-ring to get caught out of the groove during reassembly. If the robot is operated with the O-ring left caught out of the groove, this may cause a malfunction.

8 ***Secure the harmonic drive to the Y-axis arm.***

From the upper portion of the Y-axis arm, secure the harmonic drive to the Y-axis arm.

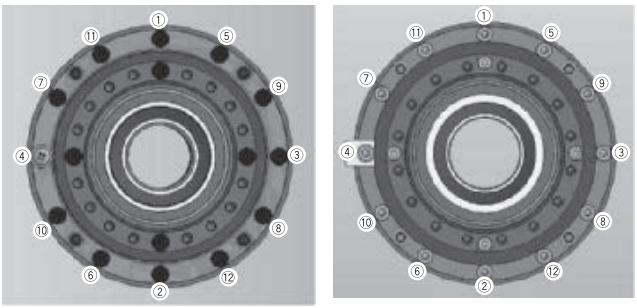
9 ***Tighten the bolts in the order shown below.***

1. Using the wrench, tighten the bolts manually in the order indicated by circled numbers.
2. Using the torque driver, tighten the bolts to approximately 50% of the specified torque in the order indicated by circled numbers.
3. Tighten the bolts to the specified torque in the order indicated by circled numbers.
4. Finally, check that the bolts are tightened to the specified torque.

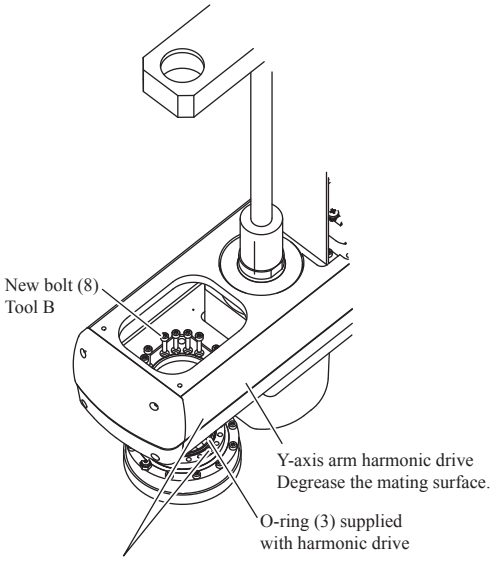
CAUTION

Do not allow the O-ring to get caught out of the groove during reassembly. If the robot is operated with the O-ring left caught out of the groove, this may cause a malfunction.

Step 6 **Bolt and panhead bolt tightening order**

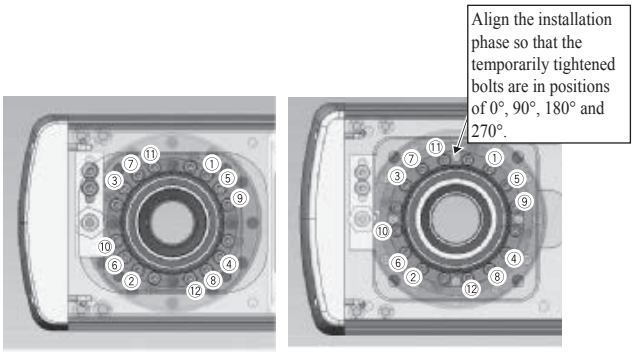


Step 7-8 **Installing the harmonic drive**



Reassemble while aligning the temporarily tightened bolts with the counterbored positions in the Y-axis arm.
(R6YXG500, R6YXG600, R6YXGS500 and R6YXGS600)
For the R6YXGH600, R6YXG700, R6YXG800, R6YXG900, R6YXG1000, R6YXGS700, R6YXGS800, R6YXGS900 and R6YXGS1000, align the phase as shown in the Fig. stated in step 9.

Step 9 **Mounting bolt tightening order**



R6YXG500, R6YXG600, R6YXGS500, R6YXGS600

R6YXGH600, R6YXG700, R6YXG800, R6YXG900, R6YXG1000, R6YXGS700, R6YXGS800, R6YXGS900, R6YXGS1000

10 ***Fit the new O-ring (5) coated with the harmonic grease into the O-ring groove of the Y-axis arm.***

CAUTION

Do not allow the O-ring to get caught out of the groove during reassembly. If the robot is operated with the O-ring left caught out of the groove, this may cause a malfunction.

11 ***Insert the R-axis motor into the Y-axis arm.***

Insert the R-axis motor into the Y-axis arm while turning the R-axis. Tighten the bolts while turning the R-axis.

12 ***Fit the new O-rings (4) coated with the harmonic grease into the groove at the lower portion of the shaft.***

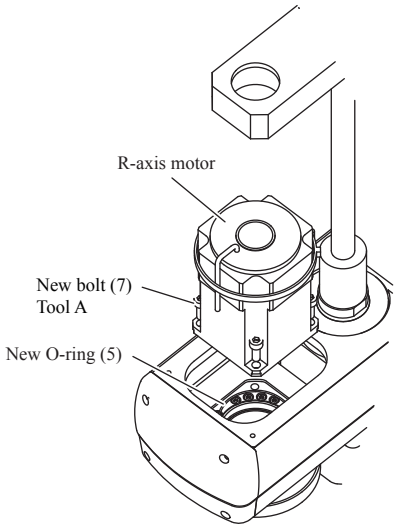
CAUTION

Do not allow the O-ring to get caught out of the groove during reassembly. If the robot is operated with the O-ring left caught out of the groove, this may cause a malfunction.

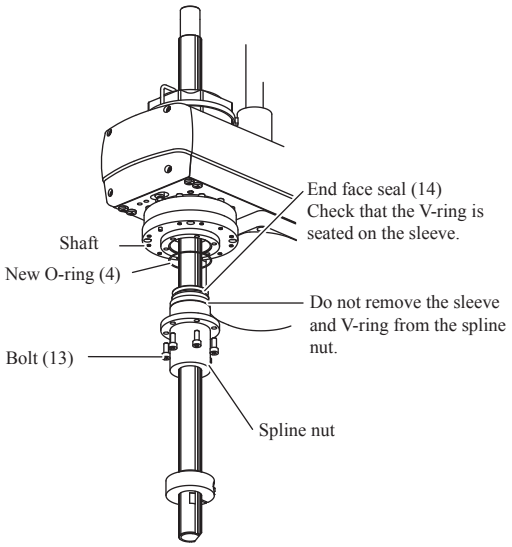
13 ***Secure the spline nut to the shaft with the bolt (13).***

Check that the sleeve and V-ring are installed correctly.

▶ Step 10-11 **Inserting the R-axis motor**



▶ Step 12-13 **Securing the spline nut**



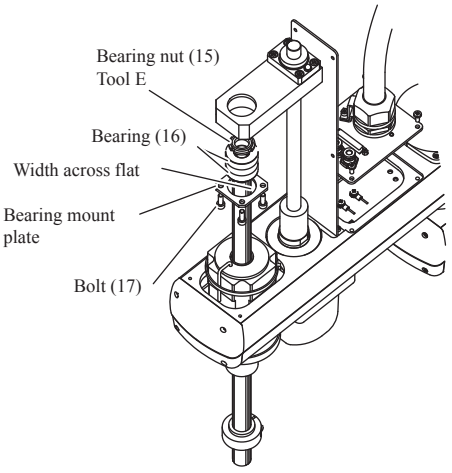
14 ***Secure the bearing.***

Fit the bearing plate and bearing (16) over the top of the spline, then secure the bearing with bearing nut (15). (At this time, utilize the width across flat surfaces of the spline in the same manner as the U-nut is loosened.)
For the R6YXGH600, R6YXG700, R6YXG800, R6YXG900, R6YXG1000, R6YXGS700, R6YXGS800, R6YXGS900 and R6YXGS1000, be careful not to forget the spacer.

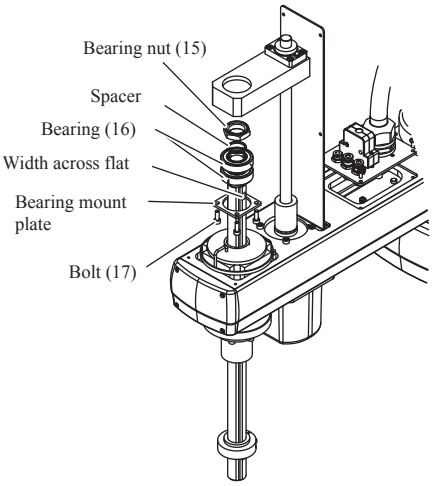
15 ***Insert the spline and bearing into the holder.***

Insert the spline and bearing into the holder and secure them with the bolt (17).

Step 14 **Securing the bearing**

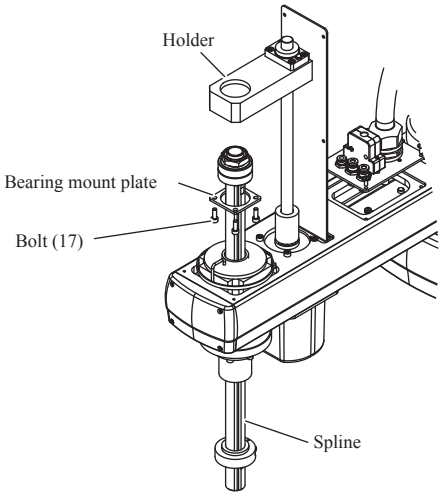


R6YXG500, R6YXG600, R6YXGS500, R6YXGS600



R6YXGH600, R6YXG700, R6YXG800, R6YXG900, R6YXG1000, R6YXGS700, R6YXGS800, R6YXGS900, R6YXGS1000

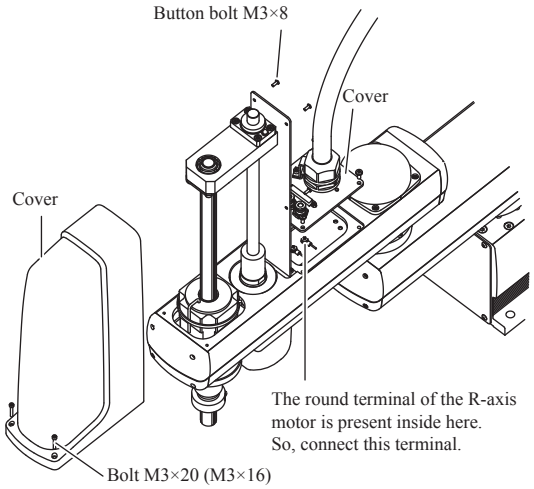
Step 15 **Inserting the spline and bearing**



16 ***Connect the connectors of the R-axis motor power wire RM and resolver wire RP, and the round terminal of the R-axis motor.***

17 ***Reattach the cover.***

▶ Step 16-17 **Reattaching the cover**



* Values in parentheses apply to the R6YXGH600, R6YXG700, R6YXG800, R6YXG900, R6YXG1000, R6YXGS700, R6YXGS800, R6YXGS900 and R6YXGS1000.

■ Aging

1 ***Go out of the safety enclosure.***

2 ***Turn on the controller.***
Check that no one is inside the safety enclosure, and then turn on the controller.

CAUTION
After the harmonic drive has been replaced, it is necessary to perform the absolute reset and set the standard coordinates and point data again. Make the adjustments while referring to Chapter 3 “Adjusting the robot” in the Installation Manual.

3 ***Perform the aging.***
Perform the aging for 30 minutes at 5% speed and for another 30 minutes at 20% speed by rotating the R-axis arm as much as possible (at least 10°).

Chapter 6 Replacing the machine harness

Contents

1. Replacing the machine harness

CAUTION

- If the bolt tightening torque is not instructed, see the tightening torque stated in "2. Replacement procedure for harmonic drive" in Chapter 5.
- An absolute reset is required after a machine harness replacement.

1.1 R6YXGL250, R6YXGL350, R6YXGL400, R6YXGL500, R6YXGL600, R6YXGS300, R6YXGS400

WARNING

BEFORE STARTING THE WORK, THOROUGHLY READ “1. ATTACHING, DETACHING, AND REPLACING THE COVER” IN CHAPTER 2.

1. Replacement parts

For details regarding models R6YXGS300 and R6YXGS400, please contact your distributor.

	Part Name	OMRON Part No.	Part No. / Specs	Q'ty	Remarks
1	Machine harness	KCY-M4843-002 (*1)		1	
2	Screw for round terminal	97602-04308	M4, length: 8	2	Spare parts
3	Lock washer for round terminal	90172-00J040	For M4	2	Spare parts
4	Bolt for D-sub	KN3-M2296-000	M3	4	Spare parts
5	Washer for D-sub	92903-03100	For M3	4	Spare parts
6	Nut for D-sub	95302-03600	For M3	4	Spare parts
7	Plate	KCY-M1368-010		6	Spare parts
8	Plate securing bolt	91312-03006	M3, length: 6	6	Spare parts

*1: KCY-M4843-002 cannot be used on the R6YXGS300 and R6YXGS400 models.

2. Other tools

Name	Part No.	Manufacturer	Remarks
Hex wrench set			
Tie band			
Phillips screwdriver			
Pliers			
Torque wrench			

■ Removal

Follow the steps below to disconnect the machine harness.

1 ***Turn the controller power and air supply OFF.***

2 ***Place a sign indicating the robot is being adjusted.***
Place a sign indicating the robot is being adjusted, to keep others from operating the controller or operation panel.

3 ***Enter the safety enclosure.***

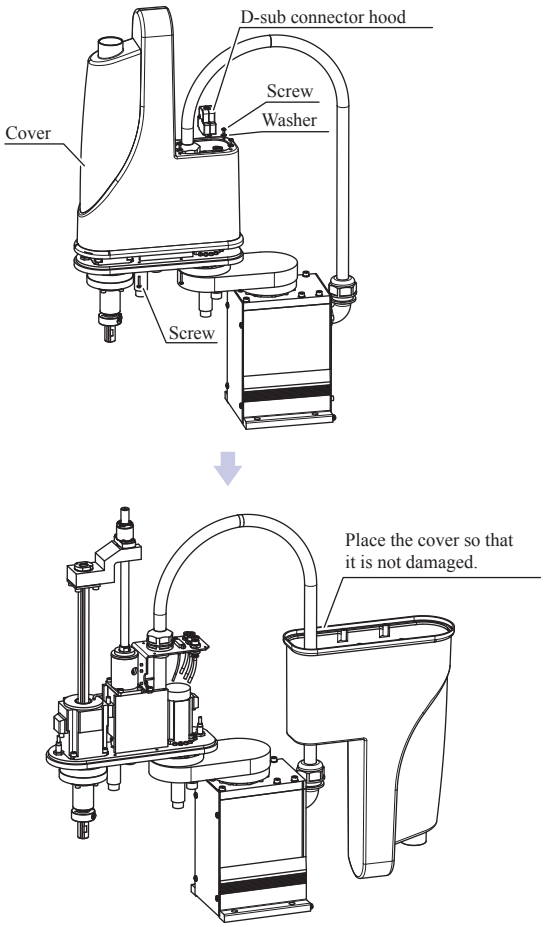
4 ***Remove the Y-axis arm cover.***
Remove the D-sub connector hood, screws, and washers.

5 ***Disconnect the D-sub connector.***
Remove the bolts and nuts to disconnect the D-sub connector.

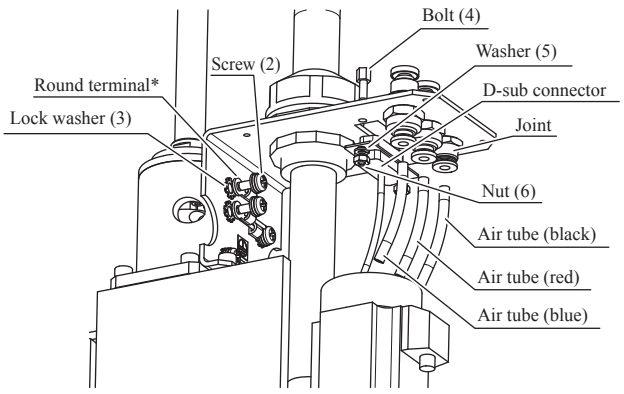
6 ***Remove the air tubes and round terminals.***
Remove the air tubes and round terminals (round terminals for the white and yellow/green wires).
Be careful not to drop any lock washer or screw.

7 ***Disconnect the wiring connector.***
Cut the tie bands to disconnect the wiring connector.

▶ Step 4 Removing the Y-axis arm cover



▶ Step 5-7 Removal



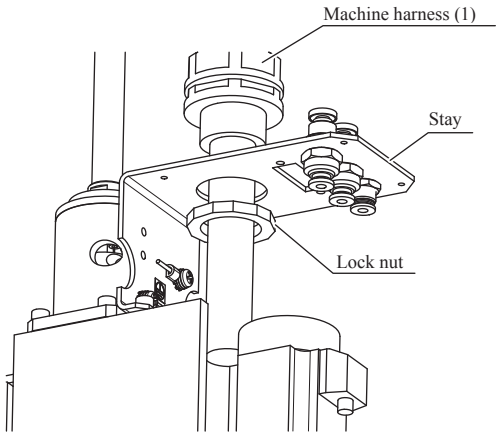
* The position of the round terminal may differ according to the model in question.

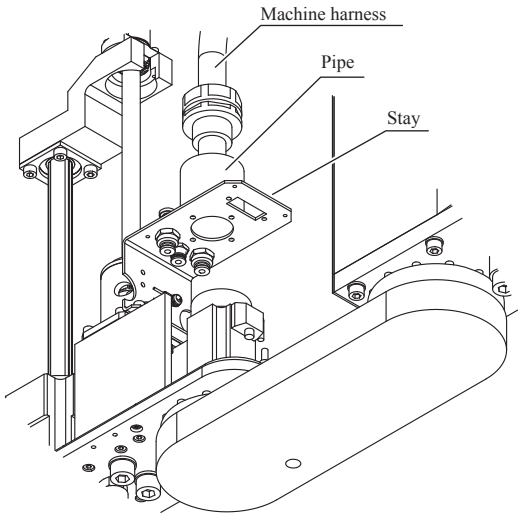
8 ***Disconnect the machine harness from the stay.***

Remove the lock nut to disconnect the machine harness.

9 ***Remove the cover.***

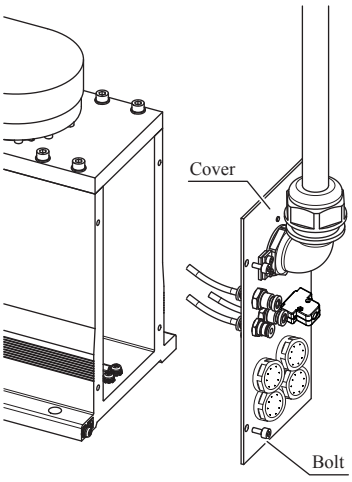
Step 8 **Disconnecting the machine harness**





There is no lock nut on wall-mounted / inverter specs. models. Remove the machine harness from the pipe by turning it in the counterclockwise direction.

Step 9 **Removing the cover**



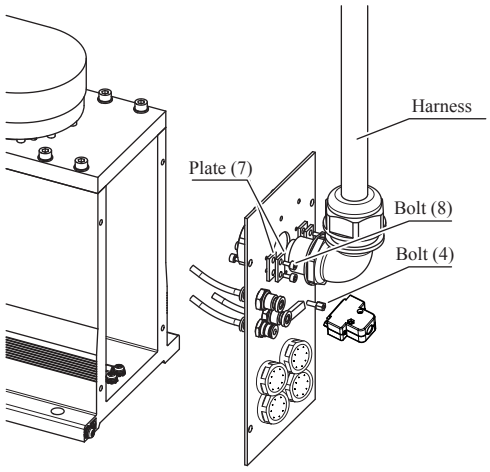
10 ***Remove the D-sub connector hood.***

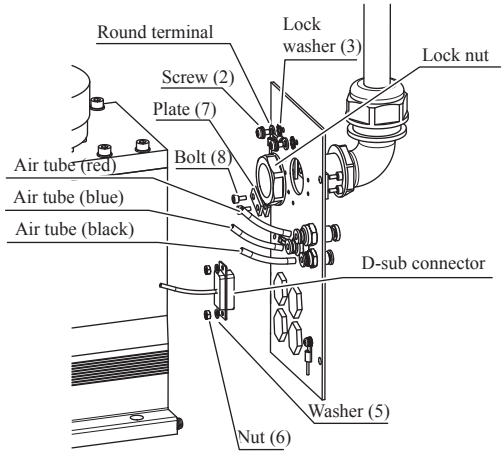
11 ***Remove the air tubes, D-sub connector, connectors, and round terminals.***

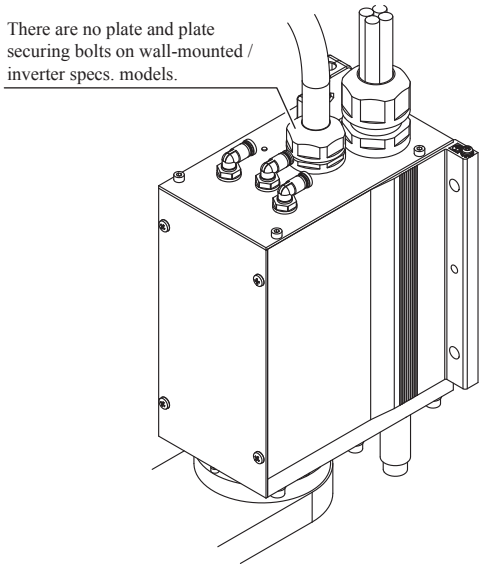
12 ***Disconnect the harness.***

Remove the bolt, plate, and lock nut to disconnect the harness.

Step 10-12 **Disconnecting the harness**







■ Assembly

Assemble a new machine harness in the reverse order of removal.

1 ***Secure the rotation-stop plate.***

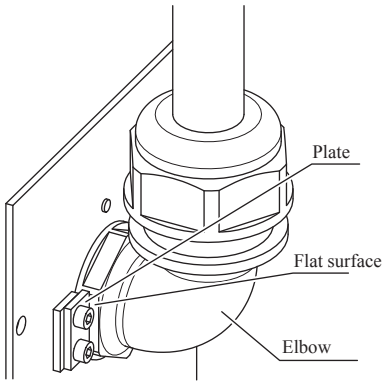
Secure the rotation-stop plate against the flat surface of the lock nut in order to prevent rotation of the machine harness elbow and lock nut.
The rotation-stop plate is not present on models R6YXGS300 and R6YXGS400.

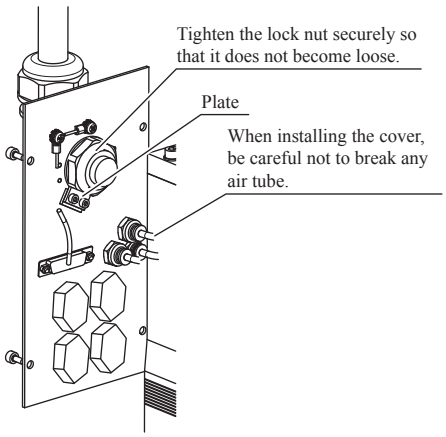
2 ***Reconnect the connector, round terminals, and air tubes.***

NOTE

See also “1.3 Robot inner wiring diagram” in Chapter 8 of the Installation Manual.

▶ **Step 1-2** **Assembly**





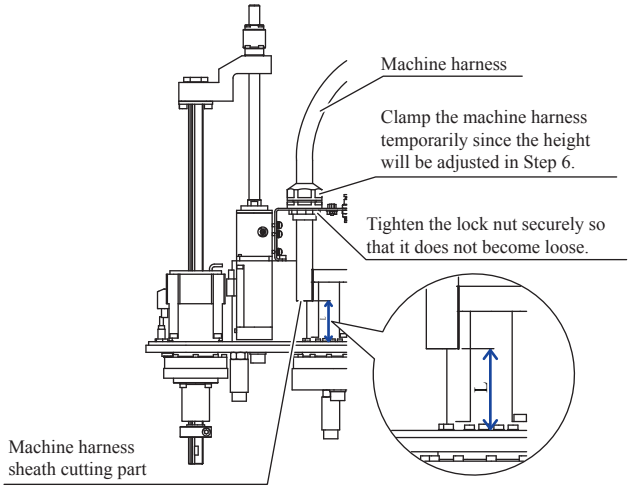
3 ***Clamp the machine harness on the Y-axis side.***

For details about the machine harness clamp position on the Y-axis side, see the Fig. below, and then clamp the machine harness at the specified position. Additionally, when the X- and Y-axis arms are made straight toward the front of the base, clamp the machine harness so that it is not twisted.

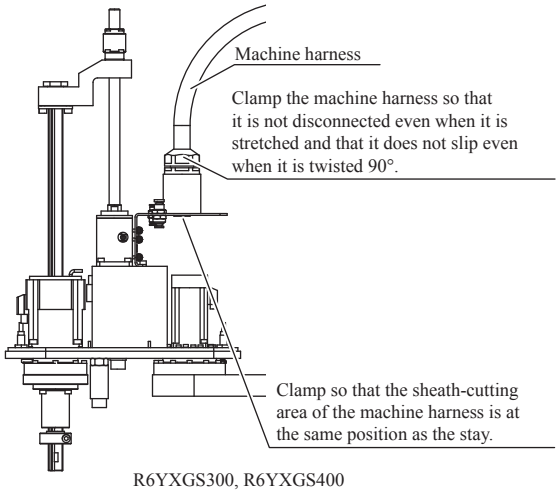
Model	L (mm)
R6YXGL250	45
R6YXGL350	100
R6YXGL400	130
R6YXGL500	74
R6YXGL600	131

4 ***Clamp the machine harness on the base side.***

Step 3 **Clamping the machine harness on the Y-axis side**

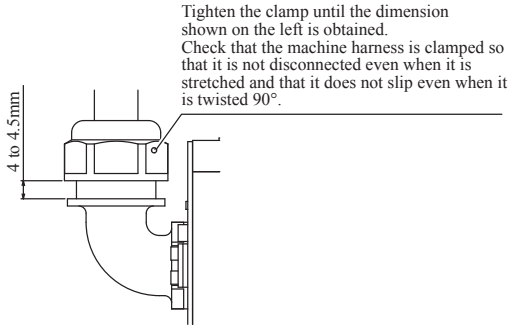


R6YXGL250, R6YXGL350, R6YXGL400, R6YXGL500, R6YXGL600

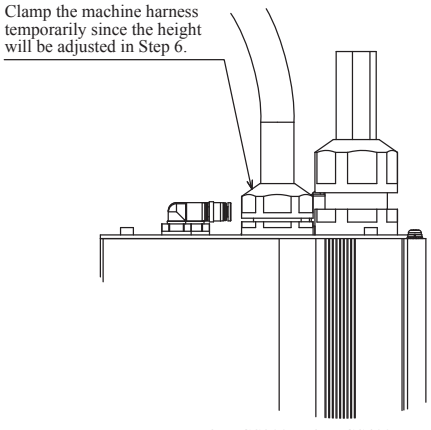


R6YXGS300, R6YXGS400

Step 4 **Clamping the machine harness on the base side**



R6YXGL250, R6YXGL350, R6YXGL400, R6YXGL500, R6YXGL600



R6YXGS300, R6YXGS400

5 *Clamp the cables with the tie bands as shown in the Fig. on the right.*

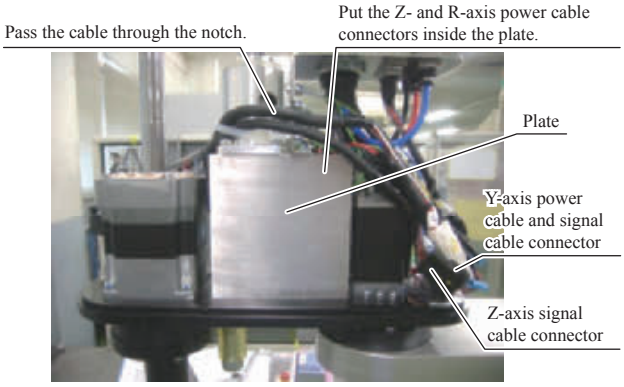
CAUTION

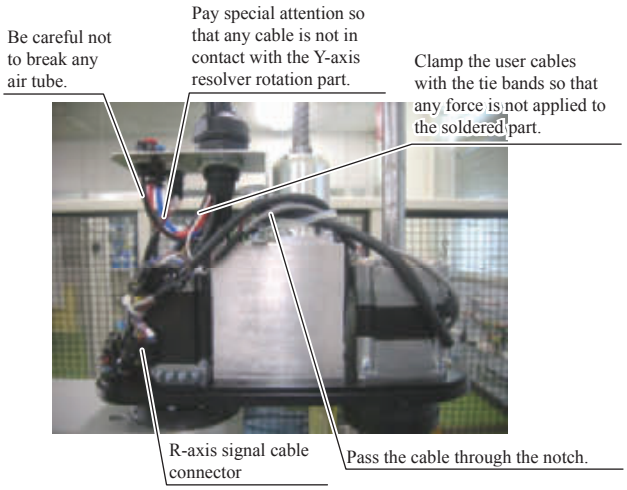
After the machine harness has been replaced, the absolute reset needs to be performed.

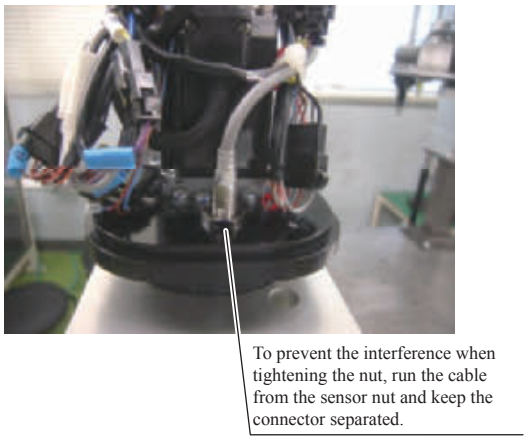
6 *Loosen the clamp of the machine harness. Adjust the height of the machine harness while referring to the Fig., and then clamp the machine harness.*

1. **[R6YXGL250, R6YXGL350, R6YXGL400, R6YXGL500, R6YXGL600]**
   Loosen the clamp of the machine harness on the Y-axis side and take the machine harness in or out to adjust the height of the machine harness.
   [R6YXGS300, R6YXGS400]
   Loosen the clamp of the machine harness on the base side and take the machine harness in or out to adjust the height of the machine harness.
2. Clamp the machine harness.
   Clamp the machine harness so that it is not disconnected even when it is stretched and that it does not slip even when it is twisted 90°.
   Additionally, clamp the machine harness so that it is not twisted when the X- and Y-axis arms are made straight to the base front.
3. Check that no excessive force is applied to the wiring portions.

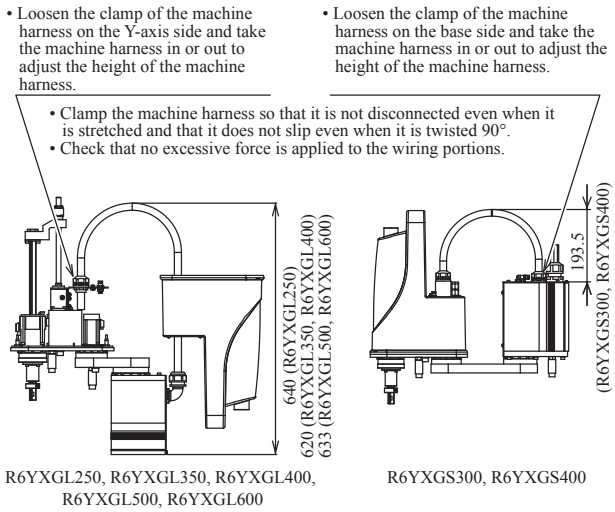
Step 5 Clamp with the tie band.







Step 6 Adjusting the height of the machine harness



R6YXGL250, R6YXGL350, R6YXGL400, R6YXGL500, R6YXGL600

R6YXGS300, R6YXGS400

1.2 R6YXG500, R6YXG600, R6YXGH600, R6YXG700, R6YXG800, R6YXG900, R6YXG1000 R6YXGS500, R6YXGS600, R6YXGS700, R6YXGS800, R6YXGS900, R6YXGS1000

WARNING

BEFORE STARTING THE WORK, THOROUGHLY READ "1. ATTACHING, DETACHING, AND REPLACING THE COVER" IN CHAPTER 2.

CAUTION

When replacing the machine harness, there are portions needing the taping process. When the user replaces the machine harness, OMRON will supply the necessary tapes. So, contact your distributor. (See the Fig. illustrating Step 4.)

1. Replacement parts

	Part Name	OMRON Part No.	Part No. / Specs	Q'ty	Remarks
1	Machine harness	KBF-M4843-004		1	R6YXG500, R6YXG600, R6YXGH600
		KBP-M4843-002		1	R6YXG700, R6YXG800
		KBP-M4843-102		1	R6YXG900, R6YXG1000
		KDA-M4843-001		1	R6YXGS500
		KDA-M4843-101		1	R6YXGS600
		KDB-M4843-001		1	R6YXGS700
		KDB-M4843-101		1	R6YXGS800
		KDB-M4843-201		1	R6YXGS900
		KDB-M4843-301		1	R6YXGS1000
2	Screw for round terminal	97602-04308	M4, length: 8	2	Spare parts
3	Lock washer for round terminal	90172-00J040	For M3	2	Spare parts
4	Bolt for D-sub	KN3-M2296-000	M3	4	Spare parts
5	Washer for D-sub	92903-03100	For M3	4	Spare parts
6	Nut for D-sub	95302-03600	For M3	4	Spare parts
7	Plate	KNO-M1368-001		1	Spare parts
8	Plate securing bolt	91312-04008	M4, length: 8	3	Spare parts
9	Plate	KNO-M1367-001		2	Spare parts
10	Plate	KNO-M1366-001		2	Spare parts
11	Joint	90990-42J048	KQ2L06-00A (SMC)	9	Spare parts

2. Other tools

Name	Part No.	Manufacturer	Remarks
Hex wrench set			
Phillips screwdriver			
Pliers			
Torque wrench			

■ Removal

Follow the steps below to disconnect the machine harness.

1 ***Turn the controller power and air supply OFF.***

2 ***Place a sign indicating the robot is being adjusted.***
Place a sign indicating the robot is being adjusted, to keep others from operating the controller or operation panel.

3 ***Enter the safety enclosure.***

4 ***Remove the D-sub connector hood.***

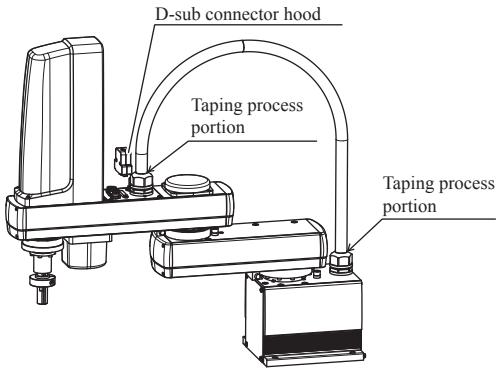
5 ***Remove the cover.***
Remove the screw, and then remove the cover.

6 ***Disconnect the D-sub connector.***
Remove the bolts and nuts to disconnect the D-sub connector.

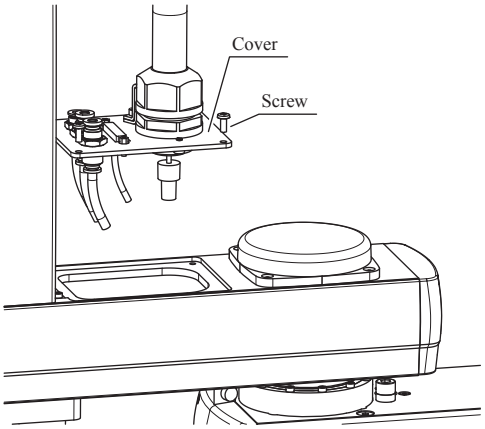
7 ***Remove the air tubes and round terminals.***
Remove the air tubes and round terminals (round terminals for black and yellow/green wires).
Be careful not to drop any lock washer or bolt.

8 ***Disconnect the wiring connector.***

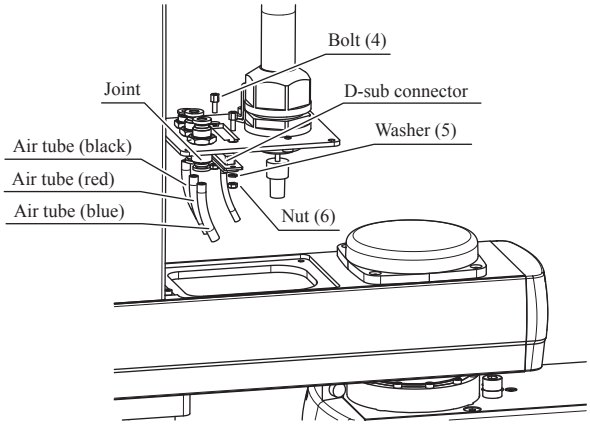
▶ **Step 4** **Removing the D-sub connector hood**

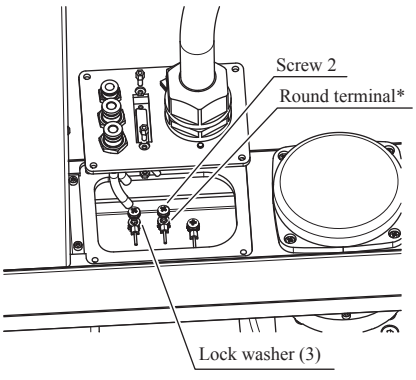


▶ **Step 5** **Removing the cover**



▶ **Step 6-8** **Removal and disconnection**



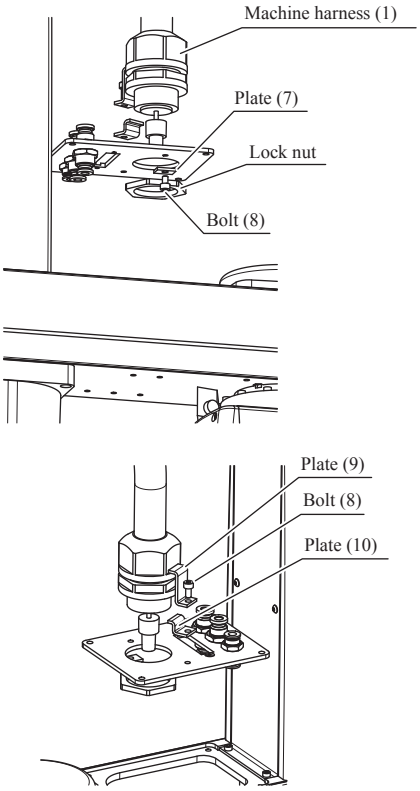


* The position of the round terminal may differ according to the model in question.

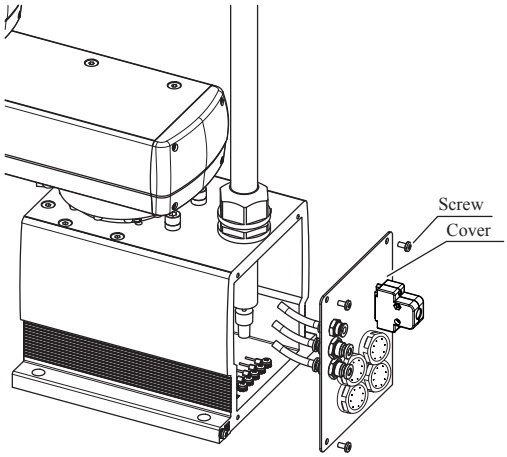
9 ***Disconnect the machine harness.***
Remove the lock nut and plate to disconnect the machine harness.

10 ***Remove the cover.***
Remove the cover while referring to "1. Attaching, detaching, and replacing the cover" in Chapter 2.

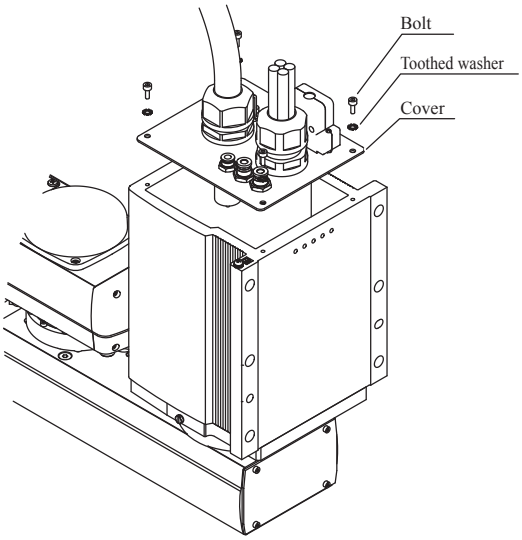
Step 9 **Disconnecting the machine harness**



Step 10 **Removing the cover**



R6YXG500, R6YXG600, R6YXGH600, R6YXG700, R6YXG800, R6YXG900, R6YXG1000



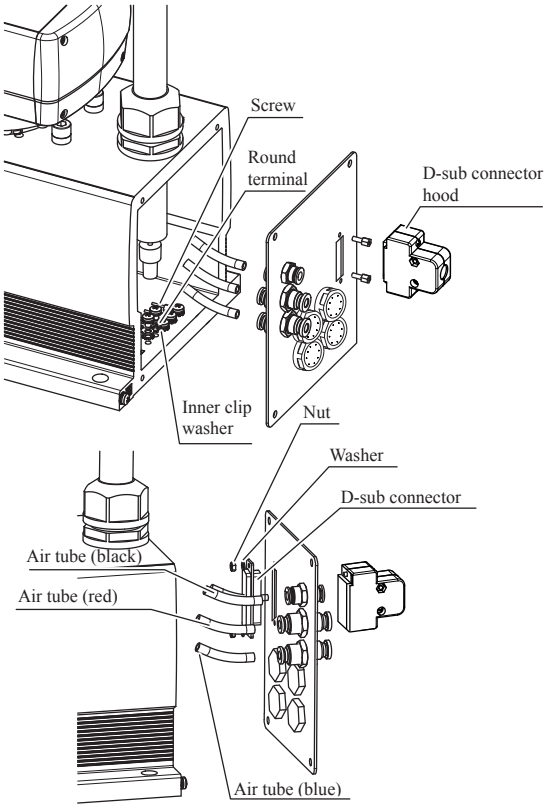
R6YXGS500, R6YXGS600, R6YXGS700, R6YXGS800, R6YXGS900, R6YXGS1000

11 ***Remove the D-sub connector hood.***

12 ***Remove the air tubes, D-sub connector, connector, and round terminals.***

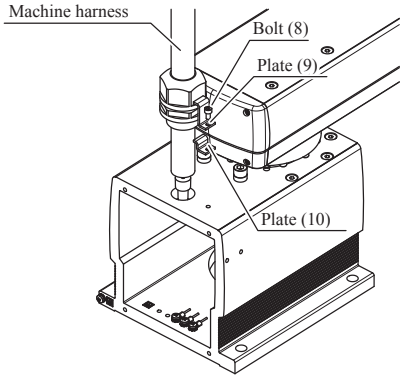
13 ***Disconnect the machine harness.***
Remove the plate to disconnect the machine harness.

▶ Step 11-12 **Removal**

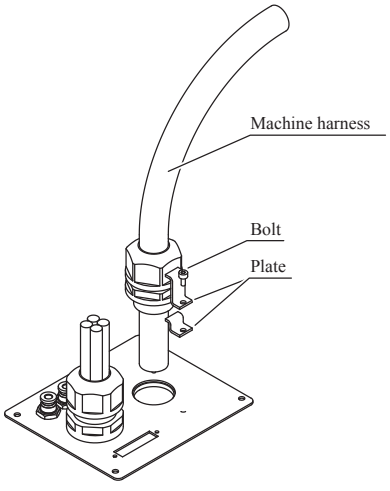


R6YXG500, R6YXG600, R6YXGH600, R6YXG700, R6YXG800, R6YXG900, R6YXG1000

▶ Step 13 **Disconnecting the machine harness**



R6YXG500, R6YXG600, R6YXGH600, R6YXG700, R6YXG800, R6YXG900, R6YXG1000



R6YXGS500, R6YXGS600, R6YXGS700, R6YXGS800, R6YXGS900, R6YXGS1000

■ Assembly

Reassemble a new machine harness in the reverse order of removal.

1 ***Arrest the rotation.***

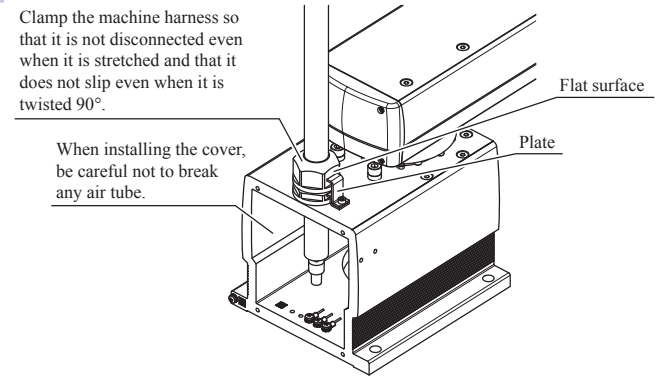
Bring the plate in contact with the flat surface to arrest the rotation of the machine harness clamp.

2 ***Reconnect the connector, round terminals, and air tubes.***

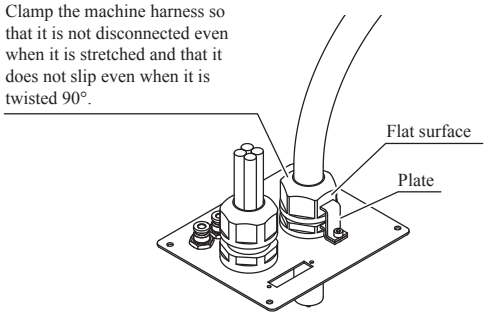
NOTE

See also “1.3 Robot inner wiring diagram” in Chapter 8 of the Installation Manual.

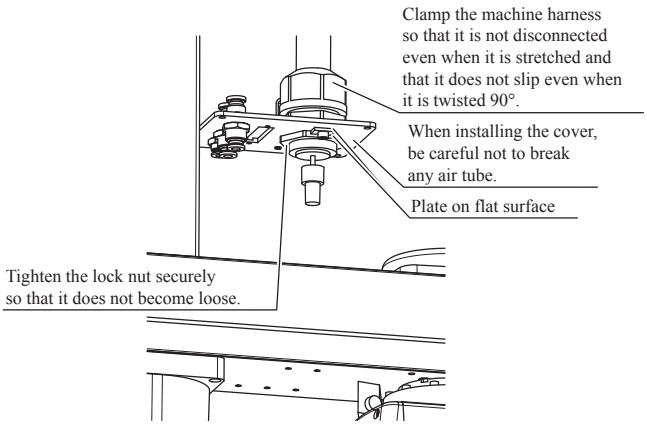
Step 1-2 Assembly

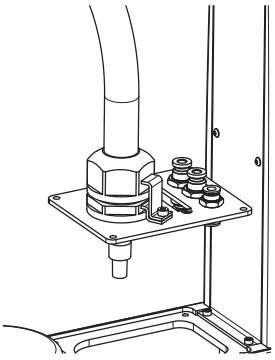


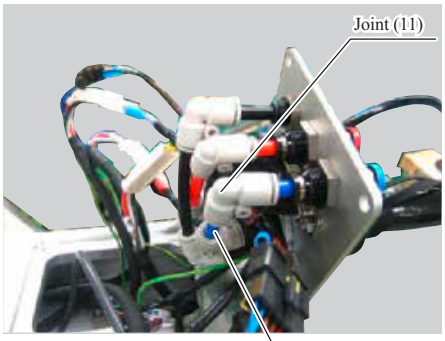
R6YXG500, R6YXG600, R6YXGH600, R6YXG700, R6YXG800, R6YXG900, R6YXG1000

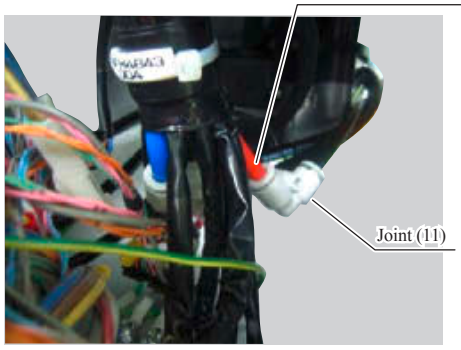


R6YXGS500, R6YXGS600, R6YXGS700, R6YXGS800, R6YXGS900, R6YXGS1000









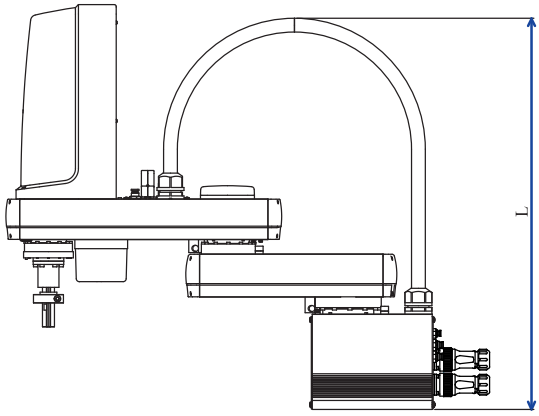
Base side

3 ***Clamp the machine harness on the Y-axis side.***

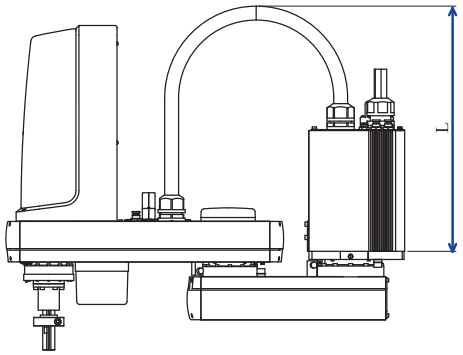
For details about the machine harness clamp position on the Y-axis side, see the Fig. below, and then clamp the machine harness at the specified position.

Model	L (mm)
R6YXG500, R6YXG600	652
R6YXGH600, R6YXG700, R6YXG800, R6YXG900, R6YXG1000	711
R6YXGS500	405
R6YXGS600	430
R6YXGS700, R6YXGS800, R6YXGS900, R6YXGS1000	520

▶ **Step 3** **Clamping the machine harness**



R6YXG500, R6YXG600, R6YXGH600, R6YXG700, R6YXG800, R6YXG900, R6YXG1000



R6YXGS500, R6YXGS600, R6YXGS700, R6YXGS800, R6YXGS900, R6YXGS1000

Chapter 7 Replacing the Z-axis ASSY

Contents

1. Replacing the Z-axis ASSY

To replace the Z-axis ball screw and Z-axis motor, follow the steps below to replace the Z-axis ASSY.

CAUTION

- If the bolt tightening torque is not instructed, see the tightening torque stated in "2. Replacement procedure for harmonic drive" in Chapter 5.
- Replacing the Z-axis causes a positional deviation. Therefore, following a Z-axis replacement, an absolute reset must be performed, and the point data must be re-specified.

1.1 R6YXGL250, R6YXGL350, R6YXGL400, R6YXGL500, R6YXGL600, R6YXGS300, R6YXGS400

WARNING

BEFORE STARTING THE REPLACEMENT WORK, THOROUGHLY READ "1. ATTACHING, DETACHING, AND REPLACING THE COVER" IN CHAPTER 2.

1. Replacement parts

	Part Name	OMRON Part No.	Part No. / Specs	Q'ty	Remarks
1	Motor	KCY-M4882-000		1	Assembly
	Motor securing bolt	91312-04012	M4, length: 12	2	
	Coupling	KCY-M1753-000		1	
	Ball screw	KCY-M1750-000		1	
	Bearing outer ring holder plate	KCY-M1744-000		1	
	Ball screw support bearing	KA1-M2273-000		1	
	Lower end damper	KCY-M1788-000		1	
	Bolt for outer ring holder plate	90112-2AJ010		8	
	Bearing inner ring holder plate	KCY-M1778-000		1	
	Bearing housing	KCY-M1712-000		1	
2	Ball screw securing bolt	91312-03014	M3, length: 14	4	Spare parts
3	Z-axis assembly securing bolt	91312-04014	M4, length: 14	4	Spare parts
4	Screw for round terminal	97602-04308	M4, length: 8	1	Spare parts
5	Lock washer for round terminal	90172-00J040	For M4	1	Spare parts

2. Other tools

Name	Part No.	Manufacturer	Remarks
Cleaning wipe			
Hex wrench set			
Tie band			
Phillips screwdriver			
Torque wrench			
Screw thread locking agent	Loctite 262	Henkel	High strength type (red)

Follow the steps below to perform the replacement work.

1 ***Turn off the controller power.***

2 ***Place a sign indicating the robot is being adjusted.***
Place a sign indicating the robot is being adjusted, to keep others from operating the controller or operation panel.

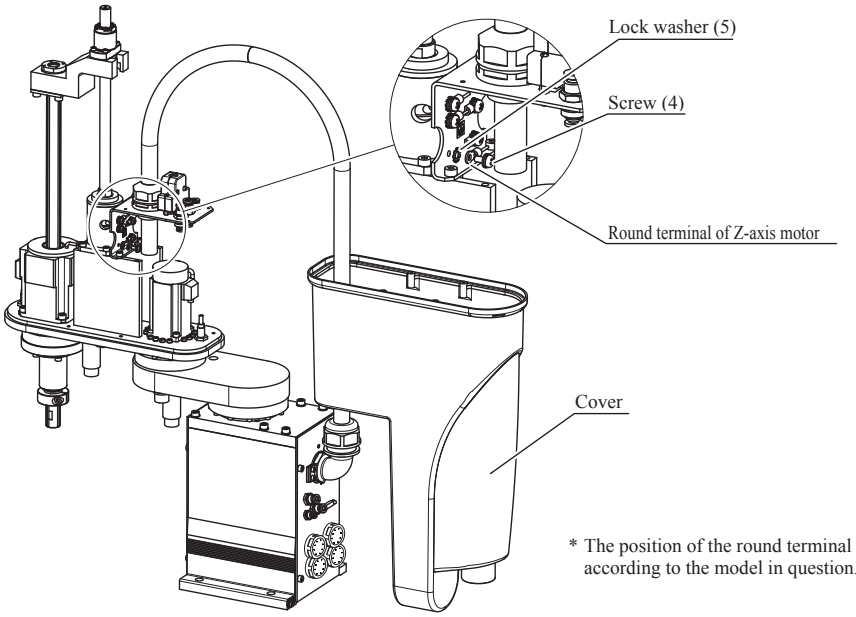
3 ***Enter the safety enclosure.***

4 ***Remove the Y-axis arm cover.***
Remove the D-sub connector hood, screws, and washers.

5 ***Disconnect the round terminal of the Z-axis motor and the Z-axis motor connectors ZM, ZP, and ZBK.***
Cut the tie bands and disconnect the wiring connectors.

NOTE
For details about how to handle the tie bands, see Chapter 6 "Replacing the machine harness".

Step 4-5 Disconnecting the round terminal and wiring connectors



* The position of the round terminal may differ according to the model in question.

6 ***Remove the Z-axis ASSY.***
Remove the bolts and remove the Z-axis ASSY.

7 ***Replace with a new Z-axis assembly (with Z-axis machine reference adjusted).***

8 ***Reconnect the wiring at the Y-axis arm side.***
Restore the Y-axis arm's wiring tie band, the connector, and the round terminal as described in Chapter 6 "Replacing the machine harness".

NOTE
Refer to the installation manual, Chapter 8 "1.3 Robot inner wiring diagram".

9 ***Move to a position outside the safety fence, then turn the controller power ON.***

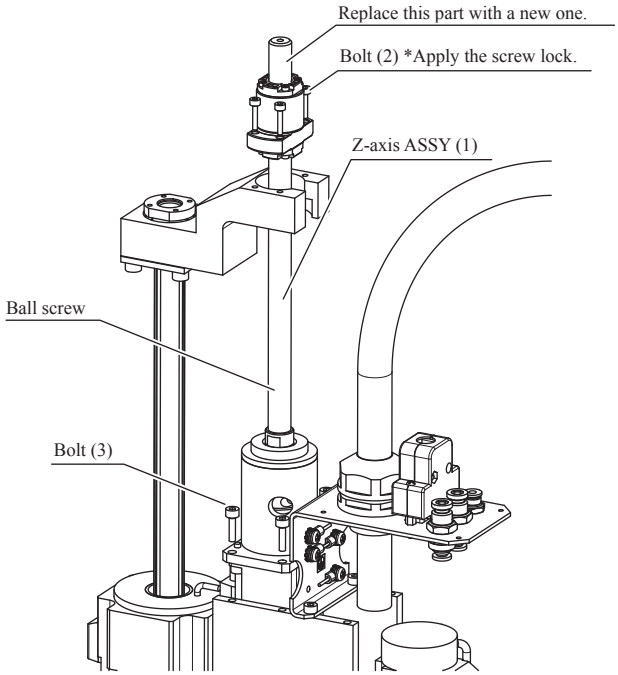
10 ***Establish an emergency stop status, then enter the safety fence area with the PBEX/PB in hand.***
After verifying that the Z-axis is prevented from falling, release the Z-axis brake.

NOTE
For the brake release procedure, refer to the "OMRON Robot Controller User's Manual".

11 ***While raising and lowering the Z-axis, tighten bolt (2).***

Apply grease to the ball screw in accordance with the instructions given in the Periodic Inspections section.

Step 6-11 Replacement and assembly



12 ***Turn off the controller power.***

13 ***Reattach the cover.***

Reattach the cover while referring to "1. Attaching, detaching, and replacing the cover" in Chapter 2.

1.2 R6YXG500, R6YXG600, R6YXGH600, R6YXG700, R6YXG800, R6YXG900, R6YXG1000, R6YXGS500, R6YXGS600, R6YXGS700, R6YXGS800, R6YXGS900, R6YXGS1000

WARNING

BEFORE STARTING THE REPLACEMENT WORK, THOROUGHLY READ "1. ATTACHING, DETACHING, AND REPLACING THE COVER" IN CHAPTER 2.

1. Replacement parts

- **R6YXG500, R6YXG600**
  R6YXGS500, R6YXGS600

	Part Name	OMRON Part No.	Part No. / Specs	Q'ty	Remarks
1	Motor	KBF-M4882-002		1	Must be replaced
2	Ball screw	KBP-M1750-001	Z-axis stroke 200mm	1	Assembly
		KBP-M1750-101	Z-axis stroke 300mm	1	
	Nylon nut	KBP-M1778-001		1	
	Motor and ball screw shaft coupling flange	KBP-M1753-003		1	
	Lower end damper	KBP-M1788-001		1	
3	Ball screw nut securing bolt	91312-05014	M5, length: 14	4	Must be replaced
4	Motor and ball screw shaft coupling flange securing bolt	91312-03020	M3, length: 20	10	Must be replaced
5	Motor securing bolt	91312-05012	M5, length: 12	2	Must be replaced
6	Motor securing bolt	91312-05016	M5, length: 16	2	Must be replaced
7	Screw for round terminal	97602-04308	M4, length: 8	1	Spare parts
8	Lock washer for round terminal	90172-00J040	For M4	1	Spare parts

- **R6YXGH600, R6YXG700, R6YXG800, R6YXG900, R6YXG1000**
  R6YXGS700, R6YXGS800, R6YXGS900, R6YXGS1000

	Part Name	OMRON Part No.	Part No. / Specs	Q'ty	Remarks
1	Motor	KBP-M4882-001		1	Must be replaced
2	Ball screw	KBP-M1750-001	Z-axis stroke 200mm	1	Assembly
		KBP-M1750-201	Z-axis stroke 400mm	1	
	Nylon nut	KBP-M1778-001		1	
	Motor and ball screw shaft coupling flange	KBP-M1753-003		1	
	Lower end damper	KBP-M1788-001		1	
3	Ball screw nut securing bolt	91312-05014	M5, length: 14	4	Must be replaced
4	Motor and ball screw shaft coupling flange securing bolt	91312-03020	M3, length: 20	10	Must be replaced
5	Motor securing bolt	91312-05016	M5, length: 16	2	Must be replaced
6	Motor securing bolt	91312-05020	M5, length: 20	2	Must be replaced
7	Screw for round terminal	97602-04308	M4, length: 8	1	Spare parts
8	Lock washer for round terminal	90172-00J040	For M4	1	Spare parts

2. Other tools

Name	Part No.	Manufacturer	Remarks
Cleaning wipe			
Hex wrench set			
Tie band			
Phillips screwdriver			
Torque wrench			
Screw thread locking agent	Loctite 262	Henkel	High strength type (red)

Follow the steps below to perform the replacement work.

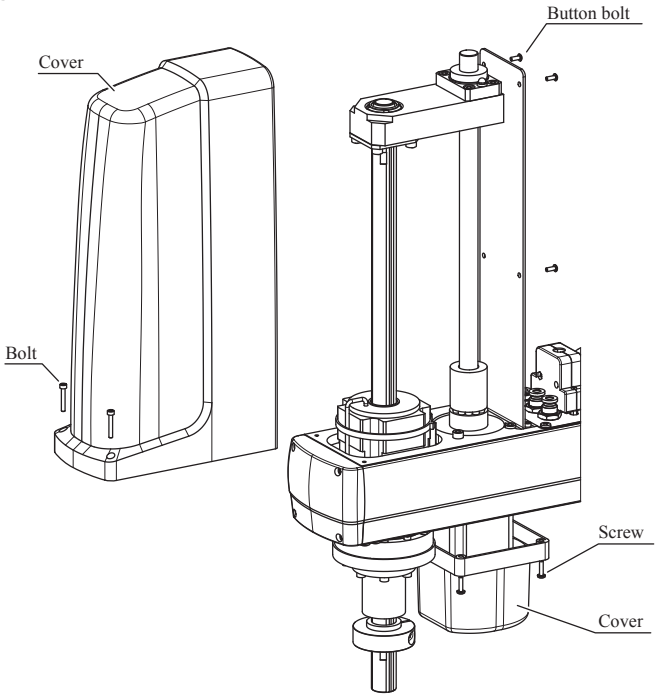
1 ***Turn off the controller power.***

2 ***Place a sign indicating the robot is being adjusted.***
Place a sign indicating the robot is being adjusted, to keep others from operating the controller or operation panel.

3 ***Enter the safety enclosure.***

4 ***Remove the covers 1 and 2.***
Remove the bolts, button bolts, and screws.

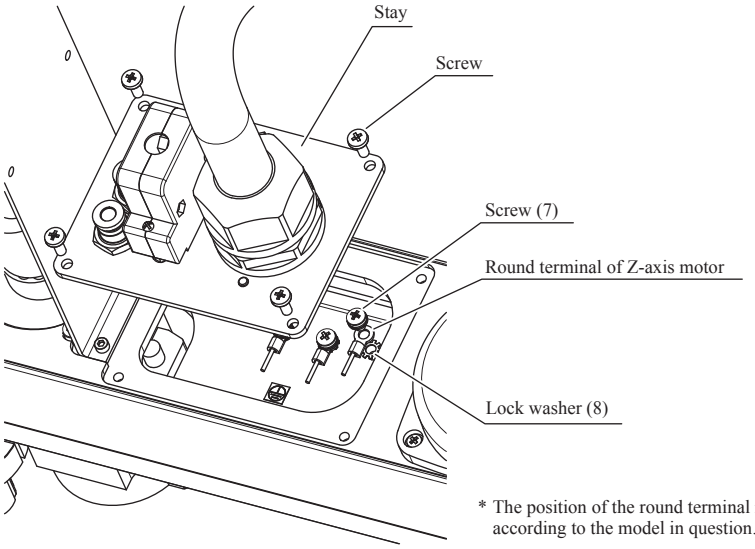
Step 4 Removing the covers 1 and 2



5 ***Disconnect the round terminal of the Z-axis motor and the connectors ZM and ZP and brake connector ZBK.***

Remove the stay, and then disconnect the round terminal and connectors.

Step 5 Disconnecting the round terminal and connectors

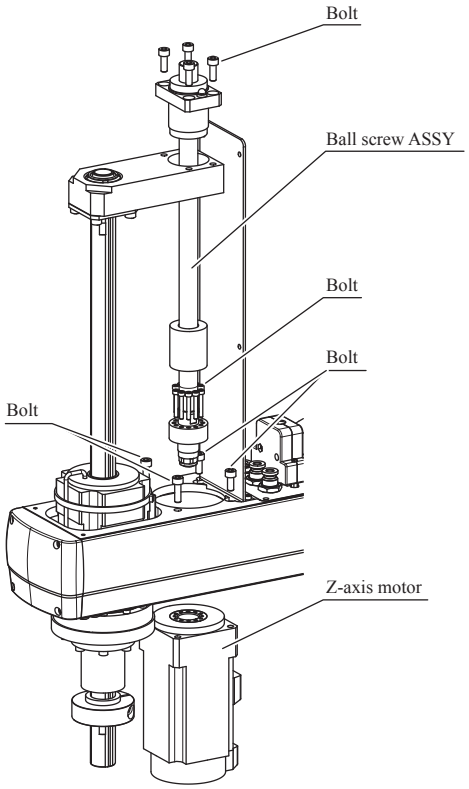


* The position of the round terminal may differ according to the model in question.

6 ***Remove the ball screw ASSY and Z-axis motor.***

Remove the bolts, and remove the ball screw ASSY and Z-axis motor.

Step 6 Removing the ball screw ASSY and Z-axis motor



7 ***Replace with a new Z-axis assembly (with Z-axis machine reference adjusted).***

8 ***Be sure to align the flange and motor shaft positioning marks when assembling them.***

9 ***Reconnect the wiring at the Y-axis arm side.***
Restore the Y-axis arm's wiring tie band, the connector, and the round terminal as described in Chapter 6 "Replacing the machine harness".

NOTE
Refer to the installation manual, Chapter 8 "1.3 Robot inner wiring diagram".

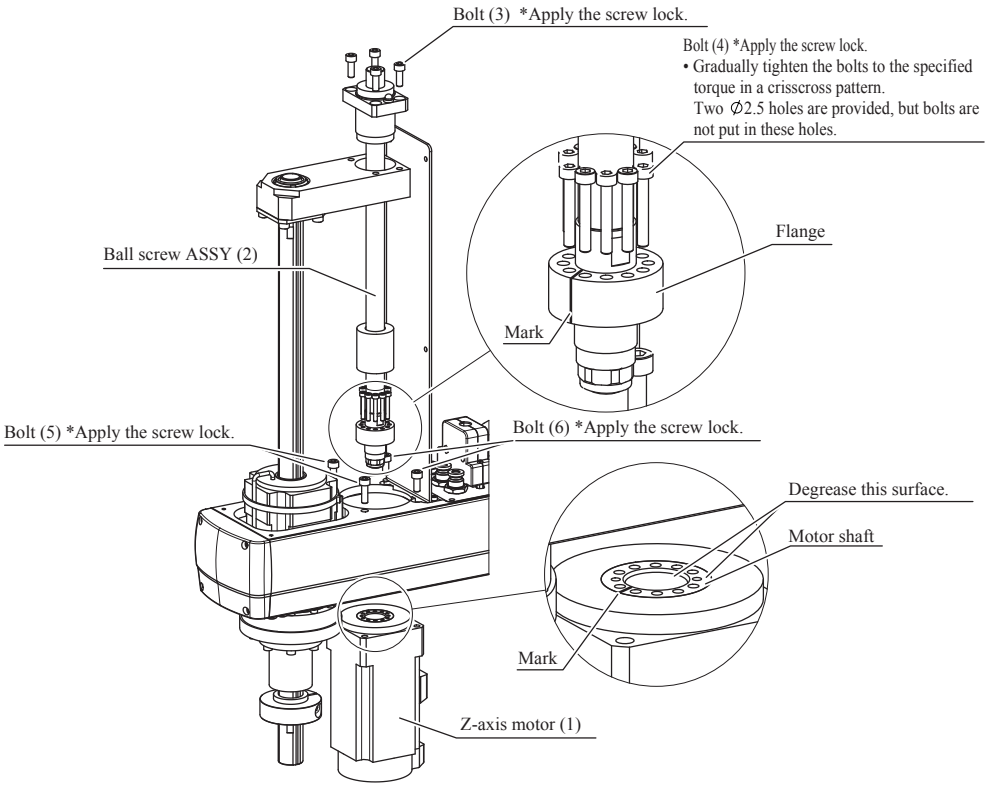
10 ***Move to a position outside the safety fence, then turn the controller power ON.***

11 ***Establish an emergency stop status, then enter the safety fence area with the PBEX/PB in hand.***
After verifying that the Z-axis is prevented from falling, release the Z-axis brake.

NOTE
For the brake release procedure, refer to the "OMRON Robot Controller User's Manual".

12 ***While raising and lowering the Z-axis, tighten bolt (3).***
Apply grease to the ball screw in accordance with the instructions given in the Periodic Inspections section.

Step 7-12 Replacement and assembly



13 ***Turn off the controller power.***

14 ***Reattach the covers.***
Reattach the covers while referring to "1. Attaching, detaching, and replacing the cover" in Chapter 2.

Chapter 8 Replacing the spline

Contents

1. Replacing the spline

Replace the spline as shown in the Fig. below while referring to "Replacing the R-axis harmonic drive". Additionally, apply the grease to the ball spline while referring to "Periodic inspection".

CAUTION

- If the bolt tightening torque is not instructed, see the tightening torque stated in "2. Replacement procedure for harmonic drive" in Chapter 5.
- Replacing the spline causes a positional deviation. Therefore, following a spline replacement, an absolute reset must be performed, and the point data and reference coordinates must be re-specified.

1.1 R6YXGL250, R6YXGL350, R6YXGL400, R6YXGL500, R6YXGL600, R6YXGS300, R6YXGS400

1. Replacement parts

	Part Name	OMRON Part No.	Part No. / Specs	Q'ty	Remarks
1	Ball spline	KCY-M1840-001		1	
2	Stopper securing bolt	91312-05016	M5, length: 16	1	Replace with spare when missing (Standard type)
3	Flange securing bolt	91312-05014	M5, length: 14	2	Replace with spare when missing (Tool flange mount type)
4	Set screw	92A08-05308	M5, length: 8	1	Replace with spare when missing (Tool flange mount type)
5	Spline nut upper O-ring (outer side)	90990-17J032	Cross section diameter: 1.00mm Inner diameter: 46.00mm	1	Becomes worn and must be replaced
6	Spline nut upper O-ring (inner side)	KN5-M181H-000	Cross section diameter: 0.80mm Inner diameter: 33.70mm	1	Becomes worn and must be replaced
7	Spline nut securing bolt seal washer	90990-36J002	For M4	4	Becomes worn and must be replaced
8	Spline nut securing bolt	91312-04012	M4, length: 12	4	Spare parts
9	Damper	KN3-M1788-100		1	Spare parts

2. Other tools

Name	Part No.	Manufacturer	Remarks
Cleaning wipe			
Hex wrench set			
Tie band			
15mm spanner			
24mm spanner			
Calipers, etc.			
Phillips screwdriver			
Screw thread locking agent	Loctite 262	Henkel	High strength type (red)
Harmonic grease	4B No.2 (*1)	Harmonic Drive Systems	Do not use grease if it was purchased 4 or more years ago. The grease has probably deteriorated.

*1: 4.2g

■ Removal

Follow the steps below to remove the R-axis parts.

1 ***Turn off the controller.***

2 ***Place a sign indicating the robot is being adjusted.***
Place a sign indicating the robot is being adjusted, to keep others from operating the controller or operation panel.

3 ***Enter the safety enclosure.***

4 ***Remove the spline.***
Remove the spline as described in Chapter 5 "2.1.3 Replacing the R-axis harmonic drive"

5 ***Remove the damper and stopper (flange) from the spline.***
Remove the bolt (,set screw), then remove the damper and stopper (flange) from the spline.

■ Replacement and reassembly

Follow the steps below to replace the spline with a new one and reassemble it.

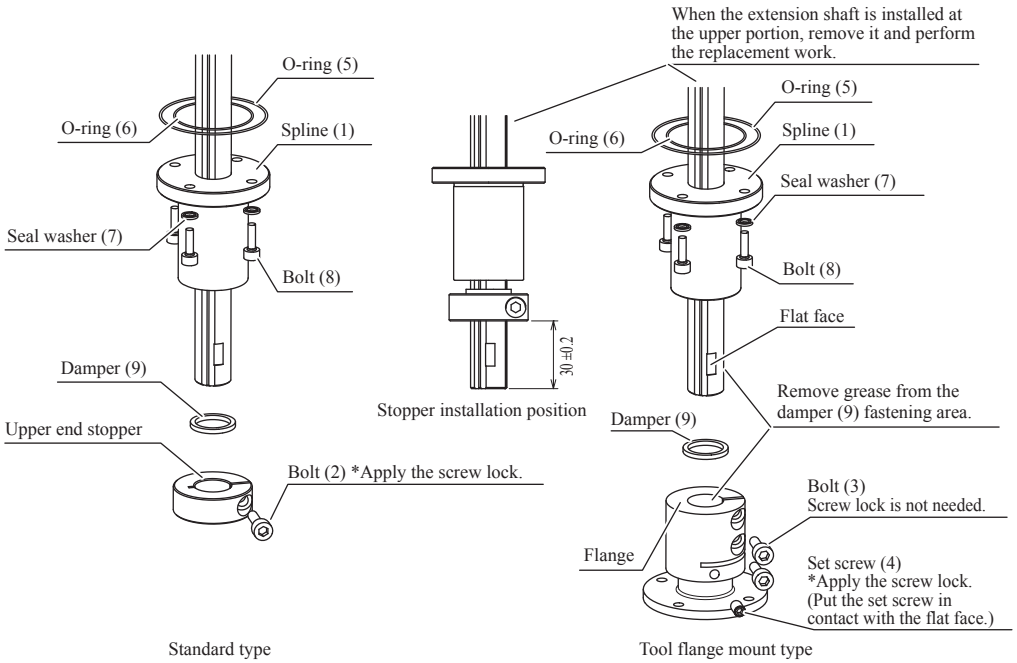
1 ***Install the damper and stopper (flange) on the spline.***
Secure the stopper (flange) at its prescribed position.

2 ***Disassemble to the point where the harmonic is removed from the Y-axis arm.***
1. Disassemble to the point where the harmonic is removed from the Y-axis arm, even if the harmonic is not being replaced. (Do not remove the wave generator.)
2. Wipe off the old grease from the harmonic, then apply new grease as described in Chapter 3 "4. Applying the grease".

3 ***Reassemble by reversing the disassembly procedure.***
Reassemble by reversing the disassembly procedure as described in Chapter 5 "2.1.3 Replacing the R-axis harmonic drive".

Replacing the spline

R6YXGL250, R6YXGL350, R6YXGL400, R6YXGL500, R6YXGL600, R6YXGS300, R6YXGS400



1.2 R6YXG500, R6YXG600, R6YXGH600, R6YXG700, R6YXG800, R6YXG900, R6YXG1000 R6YXGS500, R6YXGS600, R6YXGS700, R6YXGS800, R6YXGS900, R6YXGS1000

1. Replacement parts

- **R6YXG500, R6YXG600**
  R6YXGS500, R6YXGS600

	Part Name	OMRON Part No.	Part No. / Specs	Q'ty	Remarks
1	Ball spline	KBF-M1840-002	Z-axis stroke 200m	1	Assembly
		KBF-M1840-102	Z-axis stroke 300m	1	
	Ball spline nut upper collar	KBF-M1871-000		1	
	End face seal inside speed reduction unit	KBF-M1886-000		1	
2	Ball spline nut securing bolt	91312-04010	M4, length: 10	6	Must be replaced
3	Ball spline nut upper O-ring	90990-17J031	Cross section diameter: 1.00mm Inner diameter: 35.30mm	1	Becomes worn and must be replaced
4	Stopper securing bolt	91312-06018	M6, length: 18	1	Spare parts
5	Warning label	90K41-001520		1	
6	Damper	KBF-M1789-001		1	Spare parts
15	Bearing nut (*1)	90185-03J00		1	Must be replaced
16	Bearing (*1)	90933-01J003	6003ZZ	2	Must be replaced

*1: The indicated part Nos. are for an R-axis harmonic drive replacement. Refer to the R-axis harmonic drive replacement procedure for details.

- **R6YXGH600, R6YXG700, R6YXG800, R6YXG900, R6YXG1000**
  R6YXGS700, R6YXGS800, R6YXGS900, R6YXGS1000

	Part Name	OMRON Part No.	Part No. / Specs	Q'ty	Remarks
1	Ball spline	KBP-M1840-001	Z-axis stroke 200m	1	Assembly
		KBP-M1840-101	Z-axis stroke 400m	1	
	Ball spline nut upper collar	KBP-M1871-000		1	
	End face seal inside speed reduction unit	KBP-M1886-000	For M5	1	
2	Ball spline nut securing bolt	91312-05014	M5, length: 14	6	Must be replaced
3	Ball spline nut upper O-ring	90990-17J036	Cross section diameter: 1.00mm Inner diameter: 43.00mm	1	Becomes worn and must be replaced
4	Stopper securing bolt	91312-06020	M6, length: 20	1	Spare parts
5	Warning label	90K41-001520		1	
6	Damper	KBP-M1789-000		1	Spare parts
15	Bearing nut (*1)	KBP-M1862-000		1	Must be replaced
16	Bearing (*1)	90933-01J022	6022ZZ	2	Must be replaced

*1: The indicated part Nos. are for an R-axis harmonic drive replacement. Refer to the R-axis harmonic drive replacement procedure for details.

2. Other tools

Name	Part No.	Manufacturer	Remarks
Cleaning wipe			
Hex wrench set			
Tie band			
19mm spanner			R6YXG500, R6YXG600, R6YXGS500, R6YXGS600
Hook spanner			Fine U-nut outer diameter: ∅28mm R6YXG500, R6YXG600, R6YXGS500, R6YXGS600
24mm spanner			R6YXGH600, R6YXG700, R6YXG800, R6YXG900, R6YXG1000 R6YXGS700, R6YXGS800, R6YXGS900, R6YXGS1000
32mm spanner			
Calipers, etc.			
Phillips screwdriver			
Torque wrench			
Screw thread locking agent	Loctite 262	Henkel	High strength type (red)
Harmonic grease	4B No.2 (*1)	Harmonic Drive Systems	Do not use grease if it was purchased 4 or more years ago. The grease has probably deteriorated.
Harmonic grease (*2)	SK-1A (*1)	Harmonic Drive Systems	Use this SK-1A grease instead of the 4B No.2 grease only for the wall-mount inverse model.

*1: R6YXG500, R6YXG600, R6YXGS500, R6YXGS600:8g
R6YXGH600, R6YXG700, R6YXG800, R6YXG900, R6YXG1000, R6YXGS700, R6YXGS800, R6YXGS900, R6YXGS1000:10g
*2: If the 4B No.2 grease is used for the wall-mount inverse model, the grease may leak or the lubrication trouble may occur, causing damage to the harmonic drive.

■ Removal

Follow the steps below to remove the R-axis parts.

1 ***Turn off the controller.***

2 ***Place a sign indicating the robot is being adjusted.***
Place a sign indicating the robot is being adjusted, to keep others from operating the controller or operation panel.

3 ***Enter the safety enclosure.***

4 ***Remove the spline.***
Remove the spline as described in Chapter 5 "2.1.3 Replacing the R-axis harmonic drive"

5 ***Remove the damper and stopper (flange) from the spline.***
If the stopper bolt is covered by warning label, use a cutter to cut away the label so that the bolt head is exposed. Then remove the bolt, and remove the damper and stopper from the spline.

■ Replacement and reassembly

Follow the steps below to replace the spline with a new one and reassemble it.

1 ***Install the damper and stopper (flange) on the spline.***
Secure the stopper (flange) at its prescribed position.

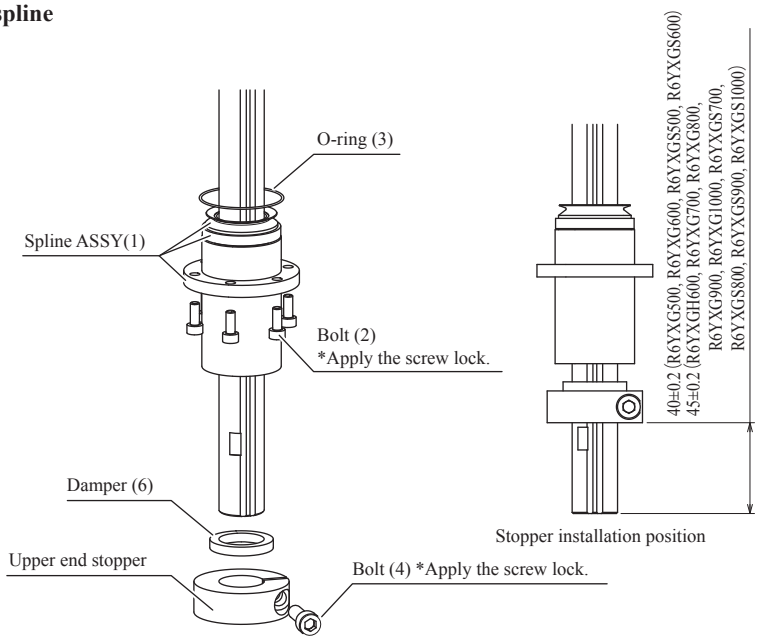
2 ***Disassemble to the point where the harmonic is removed from the Y-axis arm.***
1. Disassemble to the point where the harmonic is removed from the Y-axis arm, even if the harmonic is not being replaced. (Do not remove the wave generator.)
2. Wipe off the old grease from the harmonic, then apply new grease as described in Chapter 3 "4. Applying the grease".

3 ***Reassemble by reversing the disassembly procedure.***

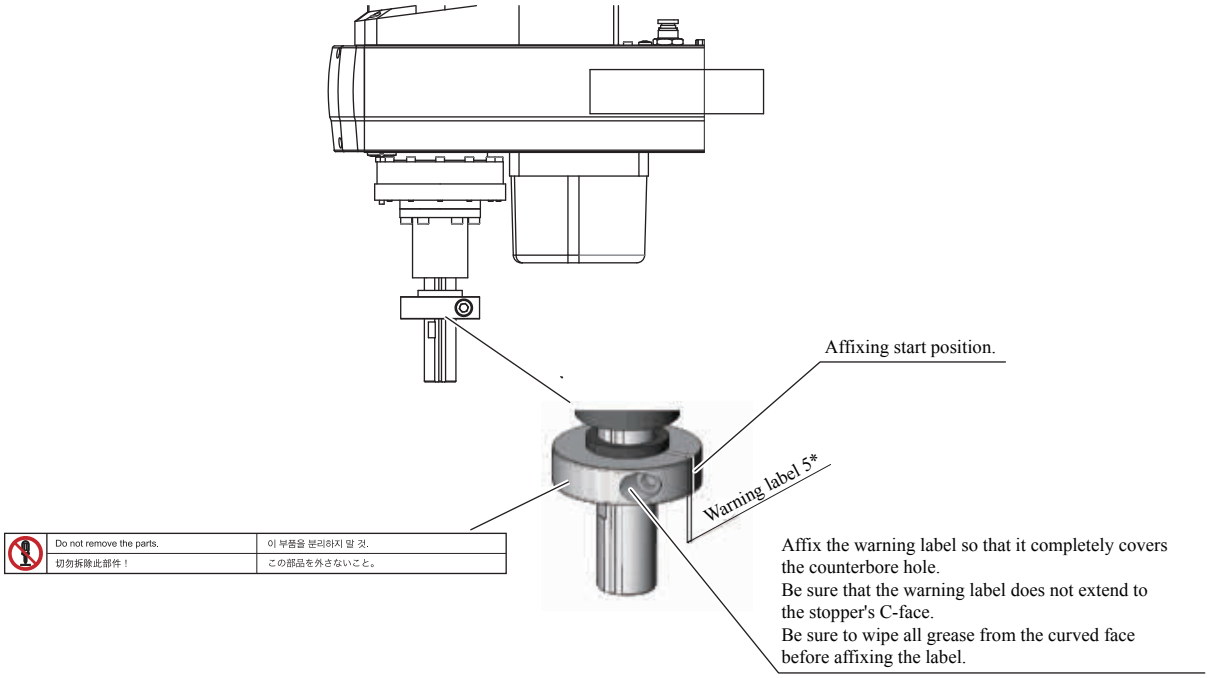
Reassemble by reversing the disassembly procedure as described in Chapter 5 "2.2.3 Replacing the R-axis harmonic drive".

4 ***Affix a warning label to the stopper.***

Replacing the spline



Affix a warning label



*Warning label 5

R6YXG500, R6YXG600, R6YXGS500, R6YXGS600	2mm
R6YXGH600, R6YXG700, R6YXG800, R6YXG900, R6YXG1000, R6YXGS700, R6YXGS800, R6YXGS900, R6YXGS1000	6mm

Chapter 9 Motor replacement

Contents

1. Motor replacement

CAUTION

- Replacing the motor causes a positional deviation. Therefore, following a motor replacement, an absolute reset must be performed, and the point data must be re-specified. After an X, Y, R axis motor replacement, the reference coordinates must also be re-specified.
- If the bolt tightening torque is not instructed, see the tightening torque stated in "2. Replacement procedure for harmonic drive" in Chapter 5.

1.1 R6YXGL250, R6YXGL350, R6YXGL400, R6YXGL500, R6YXGL600, R6YXGS300, R6YXGS400

1.1.1 X and R axis motor replacement

WARNING

BEFORE STARTING THE WORK, THOROUGHLY READ “1. ATTACHING, DETACHING, AND REPLACING THE COVER” IN CHAPTER 2.

For details regarding motor replacements, refer to the harmonic replacement procedure for each axis.
To replace the X-axis motor, disassemble to the point where the X-axis motor is removed, then wipe the old grease from the harmonic and apply new grease as described in the harmonic replacement procedure.
To replace the R-axis motor, disassemble to the step where the harmonic is removed from the Y-axis arm, then wipe the old grease from the harmonic and apply new grease as described in the harmonic replacement procedure.

CAUTION

When replacing the R-axis motor as described in the harmonic drive replacement procedure, a deflection check is required for the wave generator of the harmonic drive which was installed in the new motor at Step 2 of the "■ Replacement and reassembly" procedure. A motor-securing vise and a dial gauge are required in order to perform this check.
If a vise and dial gauge are not available, the wave generator can be installed at OMRON, with the assembly then being shipped to the customer. In that case, the customer should order an "additional new KCY-M1821-000 harmonic drive" replacement part and request that the wave generator be installed in the motor.

1. Replacement parts

	Part Name	OMRON Part No.	Part No. / Specs	Q'ty	Remarks
1	X-axis motor	KCY-M4880-001		1	
2	R-axis motor	KCY-M4883-000		1	

2. Other tools

Name	Part No.	Manufacturer	Remarks
Cleaning wipe			
Hex wrench set			
Phillips screwdriver			
Harmonic grease	4B No.2 (*1)	Harmonic Drive Systems	Do not use grease if it was purchased 4 or more years ago. The grease has probably deteriorated.

*1: X-axis 25g, R-axis 4.2g

1.1.2 Y-axis motor replacement

WARNING

BEFORE STARTING THE WORK, THOROUGHLY READ “1. ATTACHING, DETACHING, AND REPLACING THE COVER” IN CHAPTER 2.

1. Replacement parts

	Part Name	OMRON Part No.	Part No. / Specs	Q'ty	Remarks
1	Motor O-ring	KN3-M257K-000	Cross section diameter: 1.0mm Inner diameter: 29.5mm	1	Becomes worn and must be replaced
2	Motor	KCY-M4881-000		1	
3	Motor securing bolt	91312-04008	M4, length: 8	2	Spare parts

2. Torque wrench, etc.

CAUTION

Use accurately calibrated torque screwdrivers and torque wrenches.

	Name	Part No.	Manufacturer	Remarks
A	Torque screwdriver	N30LTDK	KANON (Nakamura Mfg. Co., Ltd.)	For M3 hex socket head bolt Tightening torque: 1.8Nm (18kgfcm)
	Drive bit	B35, opposite side 2.5×75	Vessel Co., Inc.	Attachment hexagonal width across flat: 6.35mm Overall length: 75mm Hexagonal width across flat at tip: 2.5mm

3. Other tools

Name	Part No.	Manufacturer	Remarks
Cleaning wipe			
Hex wrench set			
Harmonic grease	4B No.2 (*1)	Harmonic Drive Systems	Do not use grease if it was purchased 4 or more years ago. The grease has probably deteriorated.

*1 : 12g

Follow the steps below to perform the replacement work.

■ Removal

1 ***Turn off the controller.***

2 ***Place a sign indicating the robot is being adjusted.***
Place a sign indicating the robot is being adjusted, to keep others from operating the controller or operation panel.

3 ***Enter the safety enclosure.***

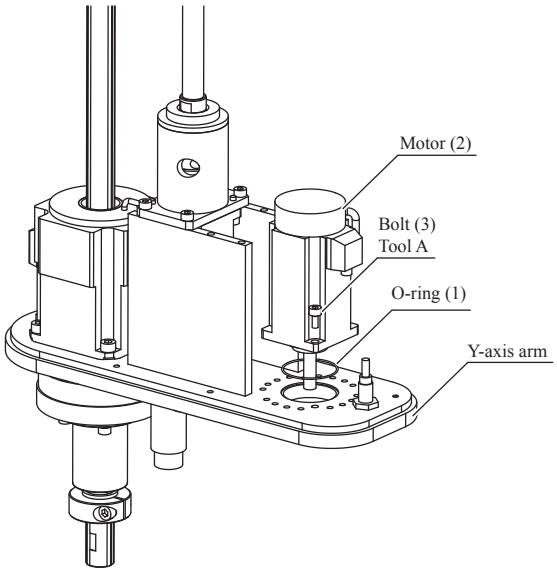
4 ***Remove the wave generator.***
Remove the wave generator as described in Chapter 5 "2.1.2 Replacing the Y-axis harmonic drive".

5 ***Remove the motor and O-ring.***
Remove the motor's round terminal and the connector. Remove the bolt, then remove the motor and O-ring.

NOTE

Replace the O-ring with a new one.

Y-axis motor replacement



■ Replacement and reassembly

Use the following procedure to replace the motor and reassemble the removed parts.

1 ***Apply new grease to the harmonic.***
Wipe off the old grease from the harmonic, then apply new grease as described in Chapter 5 "2.1.2 Replacing the Y-axis harmonic drive".

2 ***Install the motor and O-ring.***

CAUTION
- Do not allow the O-ring to get caught out of the groove during reassembly. If the robot is operated with the O-ring left caught out of the groove, this may cause a malfunction.
- If foreign matter is caught in during reassembly work, this may cause the noise from the harmonic drive or the harmonic drive to break.

3 ***Secure the round terminal.***

4 ***Connect the motor's connector.***
Connect the connector as described in Chapter 6 "Replacing the machine harness".

5 ***Install the wave generator and the remaining parts.***
Install the wave generator and the remaining parts as described in Chapter 5 "2.1.2 Replacing the Y-axis harmonic drive".

1.1.3 Z-axis motor replacement

For models R6YXGL250, R6YXGL350, R6YXGL400, R6YXGL500, R6YXGL600, R6YXGS300, R6YXGS400, replace the Z-axis motor and ball screw assembly as a set, using the procedure described in Chapter 7 "Replacing the Z-axis ASSY".

1.2 R6YXG500, R6YXG600, R6YXGH600, R6YXG700, R6YXG800, R6YXG900, R6YXG1000 R6YXGS500, R6YXGS600, R6YXGS700, R6YXGS800, R6YXGS900, R6YXGS1000

1.2.1 X, Y, R axis motor replacement

WARNING

BEFORE STARTING THE WORK, THOROUGHLY READ "1. ATTACHING, DETACHING, AND REPLACING THE COVER" IN CHAPTER 2.

For motor replacement details, refer to the harmonic replacement procedures for each axis.
When replacing the X and Y axis motors, wipe the old grease from the harmonic and apply new grease as described in the harmonic replacement procedure.
To replace the R-axis motor, disassemble to the step where the harmonic is removed from the Y-axis arm, then wipe the old grease from the harmonic and apply new grease as described in the harmonic replacement procedure.

CAUTION

When replacing the R-axis motor as described in the harmonic drive replacement procedure, a deflection check is required for the wave generator of the harmonic drive which was installed in the new motor at Step 2 of the "■ Replacement and reassembly" procedure. A motor-securing vise and a dial gauge are required in order to perform this check.
If a vise and dial gauge are not available, the wave generator can be installed at OMRON, with the assembly then being shipped to the customer.
In that case, the customer should order one of the following "additional new harmonic drive" replacement parts and request that the wave generator be installed in the motor.

Additional harmonic drives:

KBF-M1821-100 (R6YXG500, R6YXG600, R6YXGS500, R6YXGS600)

KBP-M1821-011 (R6YXGH600, R6YXG700, R6YXG800, R6YXG900, R6YXG1000, R6YXGS700, R6YXGS800, R6YXGS900, R6YXGS1000)

1. Replacement parts

- **R6YXG500, R6YXG600**
  R6YXGS500, R6YXGS600

	Part Name	OMRON Part No.	Part No. / Specs	Q'ty	Remarks
1	X-axis motor	90K94-8417FX		1	
2	Y-axis motor	90K94-6217FY		1	
3	R-axis motor	KBF-M4883-002		1	

- **R6YXGH600, R6YXG700, R6YXG800, R6YXG900, R6YXG1000**
  R6YXGS700, R6YXGS800, R6YXGS900, R6YXGS1000

	Part Name	OMRON Part No.	Part No. / Specs	Q'ty	Remarks
1	X-axis motor	90K94-8E173X		1	
2	Y-axis motor	90K94-8417FY		1	
3	R-axis motor	KBP-M4883-001		1	

2. Other tools

Name	Part No.	Manufacturer	Remarks
Cleaning wipe			
Hex wrench set			
Phillips screwdriver			
Harmonic grease	4B No.2 (*1)	Harmonic Drive Systems	Do not use grease if it was purchased 4 or more years ago. The grease has probably deteriorated.
Harmonic grease	SK-1A (*1)	Harmonic Drive Systems	Do not use grease if it was purchased 4 or more years ago. The grease has probably deteriorated. Used for wall-mount inverse model R-axis only.

*1: For grease amounts, refer to each of the harmonic replacement procedures.

1.2.2 Z-axis motor replacement

For the following models, replace the Z-axis motor and ball screw assembly as a set, using the procedure described in Chapter 7 "Replacing the Z-axis ASSY":
R6YXG500, R6YXG600, R6YXGS500, R6YXGS600, R6YXGH600, R6YXG700, R6YXG800, R6YXG900, R6YXG1000, R6YXGS700, R6YXGS800, R6YXGS900, R6YXGS1000.

Chapter 10 Sensor replacement

Contents

1. Sensor replacement

CAUTION

- Replacing the sensor could cause a positional deviation. Therefore, following a sensor replacement, it may be necessary to perform an absolute reset, and the point data and reference coordinates may have to be re-specified.
- If the bolt tightening torque is not instructed, see the tightening torque stated in "2. Replacement procedure for harmonic drive" in Chapter 5.

1.1 R6YXGL250, R6YXGL350, R6YXGL400, R6YXGL500, R6YXGL600, R6YXGS300, R6YXGS400

1.1.1 X, Y-axis sensor replacement

WARNING

BEFORE STARTING THE WORK, THOROUGHLY READ “1. ATTACHING, DETACHING, AND REPLACING THE COVER” IN CHAPTER 2.

1. Replacement parts

	Part Name	OMRON Part No.	Part No. / Specs	Q'ty	Remarks
1	X-axis sensor	KCY-M4850-400		1	
2	Y-axis sensor	KCY-M4850-100		1	

2. Torque wrench, etc.

CAUTION

Use accurately calibrated torque screwdrivers and torque wrenches.

	Name	Part No.	Manufacturer	Remarks
A	Torque wrench	N190SPK 13	KANON (Nakamura Mfg. Co., Ltd.)	Width across flat: 13mm Tightening torque: 5Nm (50kgfcm)

3. Other tools

Name	Part No.	Manufacturer	Remarks
Cleaning wipe			
Spanner (wrench)			
Phillips screwdriver			

Follow the steps below to perform the replacement work.

■ **Removal**

1 ***Turn off the controller.***

2 ***Place a sign indicating the robot is being adjusted.***
Place a sign indicating the robot is being adjusted, to keep others from operating the controller or operation panel.

3 ***Enter the safety enclosure.***

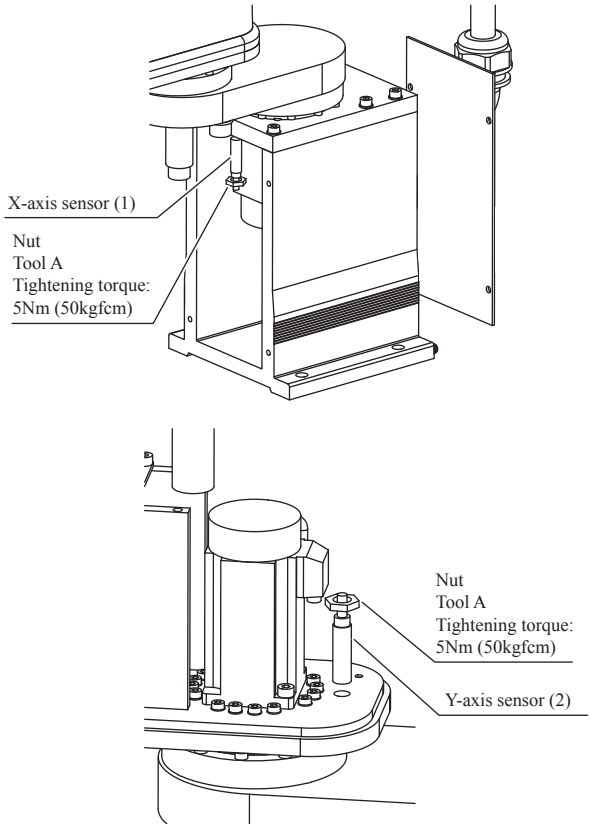
Although the procedure for replacing the X-axis sensor is given here, the same procedure also applies for the Y-axis sensor.

4 ***Remove the base cover.***
Remove the cover while referring to "1. Attaching, detaching, and replacing the cover" in Chapter 2.

5 ***Disconnect the XORG connector.***

6 ***Remove the sensor.***
Remove the nut, then turn the sensor to extract it. If the sensor is difficult to turn, use the width-across-flats at the sensor's end to turn it.

Step 4-6 **Removing the sensor**



■ Replacement and reassembly

Replace the sensor with a new one as described below, then reassemble by reversing the disassembly procedure.

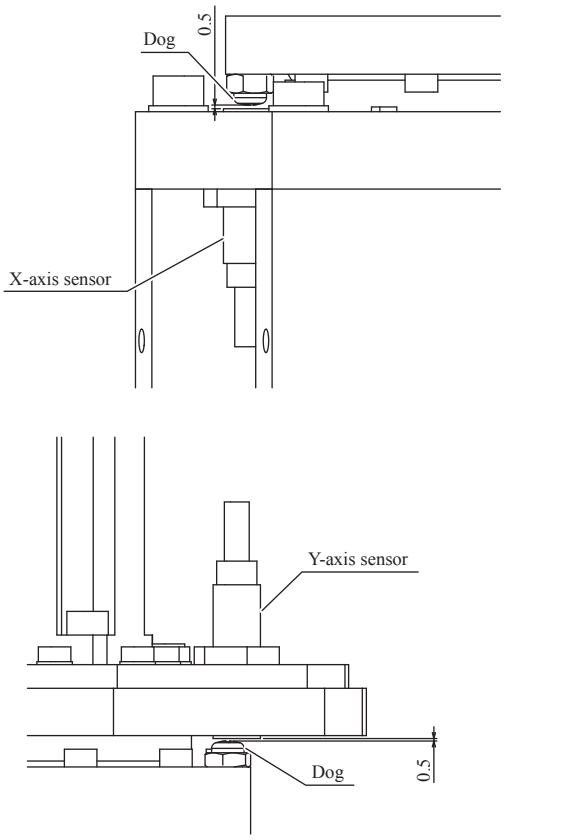
1 ***Fit the nut over the sensor, then screw the sensor in.***
If the sensor is difficult to screw in, use the width-across-flats at the sensor's end.
Use care to avoid damaging the sensor's screw threads. The sensor cannot be turned if the threads are damaged.
Use care to avoid twisting the sensor cable. Doing so could sever the cable.

2 ***Using the nut, partially secure the sensor at the position shown in the figure at right.***

3 ***Connect the XORG connector.***

4 ***Perform a machine reference adjustment.***
Perform a machine reference adjustment by using the X, Y axis machine reference adjustment procedure described in Chapter 4 "Adjusting the origin".

Step 2 **Replacing the sensor**



1.1.2 R-axis sensor replacement

WARNING

BEFORE STARTING THE WORK, THOROUGHLY READ "1. ATTACHING, DETACHING, AND REPLACING THE COVER" IN CHAPTER 2.

1. Replacement parts

	Part Name	OMRON Part No.	Part No. / Specs	Q'ty	Remarks
1	R-axis sensor	KCY-M4850-400		1	
2	R-axis motor securing bolt	91312-05016	M5, length: 16	4	Spare parts
3	R-axis motor O-ring	KN3-M2144-000	Cross section diameter: 0.99mm Inner diameter: 53.28mm	1	Replacement required when the wire is damaged or deteriorated.

2. Torque wrench, etc.

CAUTION

Use accurately calibrated torque screwdrivers and torque wrenches.

	Name	Part No.	Manufacturer	Remarks
A	Torque wrench	N190SPK 13	KANON (Nakamura Mfg. Co., Ltd.)	Width across flat: 13mm Tightening torque: 5Nm (50kgfcm)

* Use a commercially available torque wrench to tighten bolts other than those shown above.

3. Other tools

Name	Part No.	Manufacturer	Remarks
Cleaning wipe			
Hex wrench set			
Tie band			
Spanner (wrench)			
Phillips screwdriver			

Follow the steps below to perform the replacement work.

■ Removal

1 ***Turn off the controller.***

2 ***Place a sign indicating the robot is being adjusted.***
Place a sign indicating the robot is being adjusted, to keep others from operating the controller or operation panel.

3 ***Enter the safety enclosure.***

4 ***Remove the Y-axis arm cover.***
Remove the cover while referring to "1. Attaching, detaching, and replacing the cover" in Chapter 2.

5 ***Cut the tie band, then disconnect the RORG connector.***

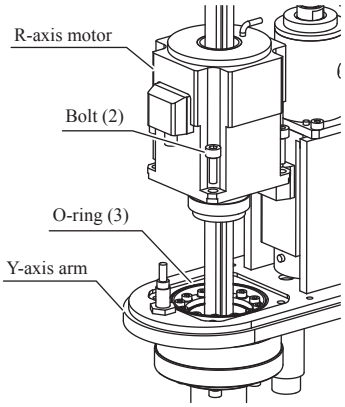
6 ***Remove the R-axis motor.***

Remove the bolts, then remove the R-axis motor.
Use care to prevent the O-ring from detaching. If it detaches, press it back into the O-ring groove. If the O-ring is damaged or in a deteriorated condition, replace it as described in the R-axis harmonic replacement procedure.
Place a support beneath the motor to prevent it from falling.

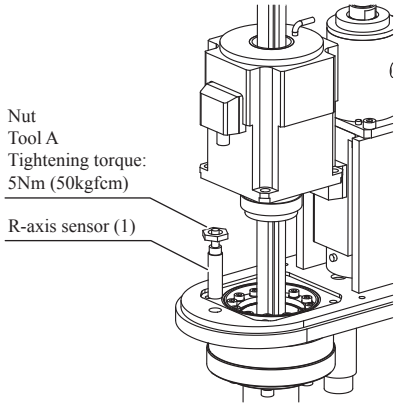
7 ***Remove the sensor.***

Remove the nut, then turn the sensor to extract it. If the sensor is difficult to turn, use the width-across-flats at the sensor's end to turn it.

Step 6 **Removing the R-axis motor**



Step 7 **Removing the R-axis sensor**



■ Replacement and reassembly

Replace the sensor with a new one as described below, then reassemble by reversing the disassembly procedure.

1 ***Fit the nut over the sensor, then screw the sensor in.***

If the sensor is difficult to screw in, use the width-across-flats at the sensor's end.
Use care to avoid damaging the sensor's screw threads. The sensor cannot be turned if the threads are damaged.
Use care to avoid twisting the sensor cable. Doing so could sever the cable.

2 ***Using the nut, partially secure the sensor at the position shown in the figure at right.***

3 ***Secure the motor with the bolts.***

Secure the motor with the bolts, using care to avoid pinching the O-ring.

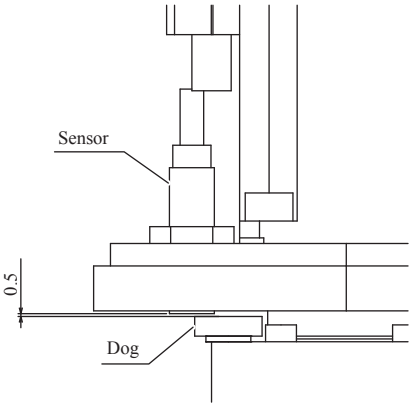
4 ***Connect the RORG connector.***

Secure the connector with a tie band as described in Chapter 6 "Replacing the machine harness".

5 ***Perform a machine reference adjustment.***

Perform a machine reference adjustment by using the R-axis machine reference adjustment procedure described in Chapter 4 "Adjusting the origin".

Step 2 **Replacing the R-axis sensor**



1.2 R6YXG500, R6YXG600, R6YXGH600, R6YXG700, R6YXG800, R6YXG900, R6YXG1000 R6YXGS500, R6YXGS600, R6YXGS700, R6YXGS800, R6YXGS900, R6YXGS1000

CAUTION

If the bolt tightening torque is not instructed, see the tightening torque stated in "2. Replacement procedure for harmonic drive" in Chapter 5.

1.2.1 X-axis sensor replacement

1.2.1.1 R6YXG500, R6YXG600, R6YXGH600, R6YXG700, R6YXG800, R6YXG900, R6YXG1000

WARNING

BEFORE STARTING THE WORK, THOROUGHLY READ “1. ATTACHING, DETACHING, AND REPLACING THE COVER” IN CHAPTER 2.

1. Replacement parts

	Part Name	OMRON Part No.	Part No. / Specs	Q'ty	Remarks
1	X-axis sensor	KCY-M4850-400		1	R6YXG500, R6YXG600
		KCY-M4850-500		1	R6YXGH600, R6YXG700, R6YXG800, R6YXG900, R6YXG1000

2. Torque wrench, etc.

CAUTION

Use accurately calibrated torque screwdrivers and torque wrenches.

	Name	Part No.	Manufacturer	Remarks
A	Torque wrench	N190SPK 13	KANON (Nakamura Mfg. Co., Ltd.)	Width across flat: 13mm Tightening torque: 5Nm (50kgfcm)

3. Other tools

Name	Part No.	Manufacturer	Remarks
Cleaning wipe			
Spanner (wrench)			
Phillips screwdriver			

Follow the steps below to perform the replacement work.

■ **Removal**

1 ***Turn off the controller.***

2 ***Place a sign indicating the robot is being adjusted.***
Place a sign indicating the robot is being adjusted, to keep others from operating the controller or operation panel.

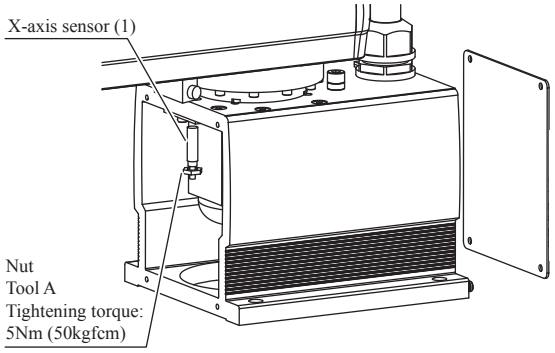
3 ***Enter the safety enclosure.***

4 ***Remove the base cover.***
Remove the cover while referring to "1. Attaching, detaching, and replacing the cover" in Chapter 2.

5 ***Disconnect the XORG connector.***

6 ***Remove the sensor.***
Remove the nut, then turn the sensor to extract it. If the sensor is difficult to turn, use the width-across-flats at the sensor's end to turn it.

▶ **Step 4-6** **Removing the X-axis sensor**



■ Replacement and reassembly

Replace the sensor with a new one as described below, then reassemble by reversing the disassembly procedure.

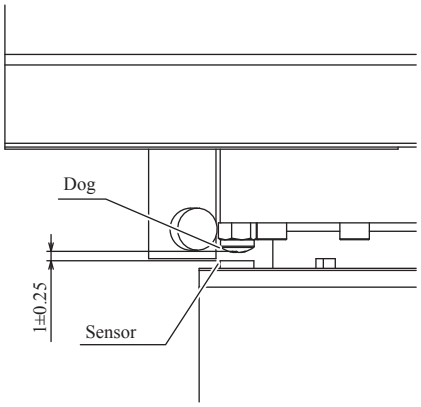
1 ***Fit the nut over the sensor, then screw the sensor in.***
If the sensor is difficult to screw in, use the width-across-flats at the sensor's end.
Use care to avoid damaging the sensor's screw threads. The sensor cannot be turned if the threads are damaged.
Use care to avoid twisting the sensor cable. Doing so could sever the cable.

2 ***Using the nut, secure the sensor at the position shown in the figure at right.***

3 ***Connect the XORG connector.***

4 ***Perform a machine reference adjustment.***
Perform a machine reference adjustment by using the X-axis machine reference adjustment procedure described in Chapter 4 "Adjusting the origin".

▶ **Step 2** **Replacing the X-axis sensor**



1.2.1.2 R6YXGS500, R6YXGS600, R6YXGS700, R6YXGS800, R6YXGS900, R6YXGS1000

WARNING
BEFORE STARTING THE WORK, THOROUGHLY READ "1. ATTACHING, DETACHING, AND REPLACING THE COVER" IN CHAPTER 2.

1. Replacement parts

	Part Name	OMRON Part No.	Part No. / Specs	Q'ty	Remarks
1	X-axis sensor	KCY-M4850-400		1	R6YXGS500, R6YXGS600
		KCY-M4850-500		1	R6YXGS700, R6YXGS800, R6YXGS900, R6YXGS1000

2. Torque wrench, etc.

CAUTION
Use accurately calibrated torque screwdrivers and torque wrenches.

	Name	Part No.	Manufacturer	Remarks
A	Torque wrench	N190SPK 13	KANON (Nakamura Mfg. Co., Ltd.)	Width across flat: 13mm Tightening torque: 5Nm (50kgfcm)

* Use a commercially available torque wrench to tighten bolts other than those shown above.

3. Other tools

Name	Part No.	Manufacturer	Remarks
Cleaning wipe			
Hex wrench set			
Spanner (wrench)			
Phillips screwdriver			

Follow the steps below to perform the replacement work.

■ Removal

1 ***Turn off the controller.***

2 ***Place a sign indicating the robot is being adjusted.***
Place a sign indicating the robot is being adjusted, to keep others from operating the controller or operation panel.

3 ***Enter the safety enclosure.***

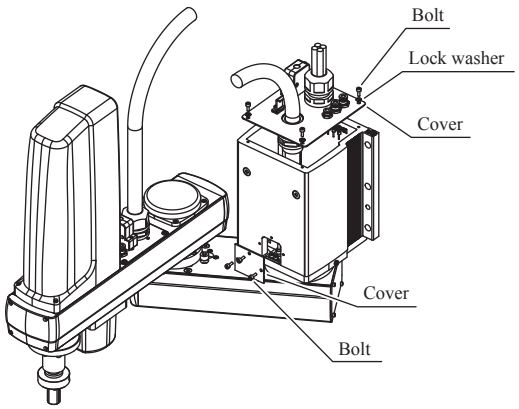
4 ***Remove the base cover.***
Remove the cover while referring to "1. Attaching, detaching, and replacing the cover" in Chapter 2.

5 ***Disconnect the XORG connector.***

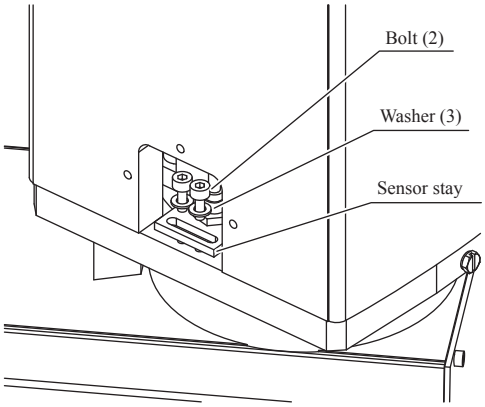
6 ***Remove the sensor stay.***
Remove the bolts, then remove the sensor together with its stay.

7 ***Remove the sensor.***
Remove the nut, then turn the sensor to extract it. If the sensor is difficult to turn, use the width-across-flats at the sensor's end to turn it.

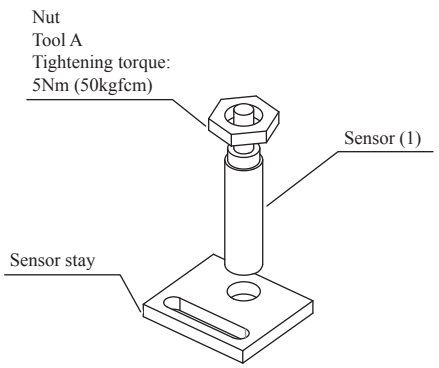
▶ **Step 4** **Removing the cover**



▶ **Step 5** **Disconnecting the XORG connector**



▶ **Step 6-7** **Removing the X-axis sensor**



■ Replacement and reassembly

Replace the sensor with a new one as described below, then reassemble by reversing the disassembly procedure.

1 ***Fit the nut over the sensor, then screw the sensor in.***
If the sensor is difficult to screw in, use the width-across-flats at the sensor's end.
Use care to avoid damaging the sensor's screw threads. The sensor cannot be turned if the threads are damaged.
Use care to avoid twisting the sensor cable. Doing so could sever the cable.

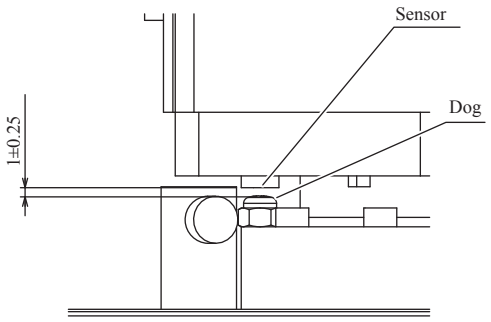
2 ***Use the bolts to partially secure the sensor stay to the base.***

3 ***Using the nut, partially secure the sensor at the position shown in the figure at right.***

4 ***Connect the XORG connector.***

5 ***Perform a machine reference adjustment.***
Perform a machine reference adjustment by using the X-axis machine reference adjustment procedure described in Chapter 4 "Adjusting the origin".

▶ **Step 3** **Replacing the X-axis sensor**



1.2.2 Y, R-axis sensor replacement

WARNING
BEFORE STARTING THE WORK, THOROUGHLY READ “1. ATTACHING, DETACHING, AND REPLACING THE COVER” IN CHAPTER 2.

1. Replacement parts

	Part Name	OMRON Part No.	Part No. / Specs	Q'ty	Remarks
1	Y-axis sensor	KCY-M4850-300		1	R6YXG500, R6YXG600, R6YXGS500, R6YXGS600
		KCY-M4850-500		1	R6YXGH600, R6YXG700, R6YXG800, R6YXG900, R6YXG1000, R6YXGS700, R6YXGS800, R6YXGS900, R6YXGS1000
2	R-axis sensor	KCY-M4850-500		1	R6YXG500, R6YXG600, R6YXGS500, R6YXGS600
		KCY-M4850-900		1	R6YXGH600, R6YXG700, R6YXG800, R6YXG900, R6YXG1000, R6YXGS700, R6YXGS800, R6YXGS900, R6YXGS1000
3	Sensor stay securing bolt	91312-04010	M4, Length: 10	4	Spare parts
4	Washer	92903-04600	For M4	4	Spare parts

2. Torque wrench, etc.

CAUTION

Use accurately calibrated torque screwdrivers and torque wrenches.

	Name	Part No.	Manufacturer	Remarks
A	Torque wrench	N190SPK 13	KANON (Nakamura Mfg. Co., Ltd.)	Width across flat: 13mm Tightening torque: 5Nm (50kgfcm)

* Use a commercially available torque wrench to tighten bolts other than those shown above.

3. Other tools

Name	Part No.	Manufacturer	Remarks
Cleaning wipe			
Hex wrench set			
Spanner (wrench)			
Phillips screwdriver			

Follow the steps below to perform the replacement work.

■ Removal

1 ***Turn off the controller.***

2 ***Place a sign indicating the robot is being adjusted.***
Place a sign indicating the robot is being adjusted, to keep others from operating the controller or operation panel.

3 ***Enter the safety enclosure.***

4 ***Remove the Y-axis arm end face and machine harness cover.***
Remove the cover while referring to "1. Attaching, detaching, and replacing the cover" in Chapter 2.

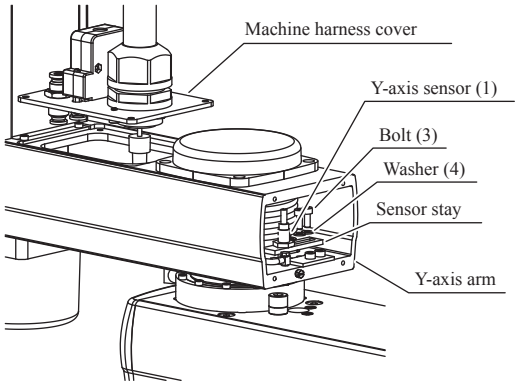
Although the procedure for replacing the Y-axis sensor is given here, the same procedure also applies for the R-axis sensor.

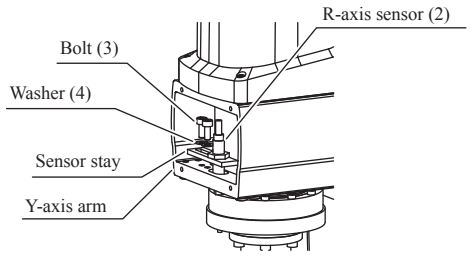
5 ***Disconnect the YORG connector.***

6 ***Remove the sensor stay.***
Remove the bolts, then remove the sensor together with its stay.

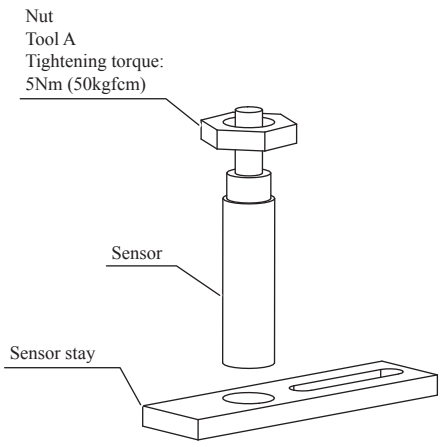
7 ***Remove the sensor.***
Remove the nut, then turn the sensor to extract it. If the sensor is difficult to turn, use the width-across-flats at the sensor's end to turn it.

▶ Step 4-6 Removal





▶ Step 7 Removing the sensor



■ Replacement and reassembly

Replace the sensor with a new one as described below, then reassemble by reversing the disassembly procedure.

1 ***Fit the nut over the sensor, then screw the sensor in.***

If the sensor is difficult to screw in, use the width-across-flats at the sensor's end.
Use care to avoid damaging the sensor's screw threads. The sensor cannot be turned if the threads are damaged.
Use care to avoid twisting the sensor cable. Doing so could sever the cable.

2 ***Use the bolts to partially secure the sensor stay to the Y-axis arm.***

3 ***Using the nut, partially secure the sensor at the position shown in the figure at right.***

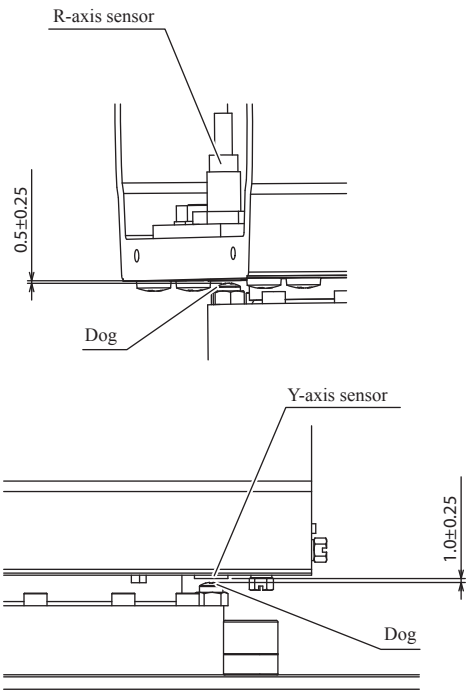
4 ***Connect the YORG connector.***

5 ***Attach the cover.***

6 ***Perform a machine reference adjustment.***

Perform a machine reference adjustment by using the Y-axis machine reference adjustment procedure described in Chapter 4 "Adjusting the origin".

▶ **Step 3** **Replacing the sensor**



Chapter 11 Robot cable replacement

Contents

1. Robot cable replacement

CAUTION

- An absolute reset is required after a robot cable replacement.
- If the bolt tightening torque is not instructed, see the tightening torque stated in "2. Replacement procedure for harmonic drive" in Chapter 5.

1.1 R6YXGL250, R6YXGL350, R6YXGL400, R6YXGL500, R6YXGL600, R6YXGS300, R6YXGS400

WARNING

BEFORE STARTING THE WORK, THOROUGHLY READ “1. ATTACHING, DETACHING, AND REPLACING THE COVER” IN CHAPTER 2.

1. Replacement parts

	Part Name	OMRON Part No.	Part No. / Specs	Q'ty	Remarks
1	Screw for round terminal	97602-04306	M4, Length: 6	2	Spare parts
2	Lock washer for round terminal	90172-00J040	For M4	2	Spare parts
3	Robot cable	KBF-M6211-005		1	3.5m
		KBF-M6211-105		1	5m
		KBF-M6211-205		1	10m

2. Other tools

Name	Part No.	Manufacturer	Remarks
Phillips screwdriver			
41mm spanner			

■ Removal

Disassemble using the following procedure.

1 ***Turn off the controller.***

2 ***Place a sign indicating the robot is being adjusted.***
Place a sign indicating the robot is being adjusted, to keep others from operating the controller or operation panel.

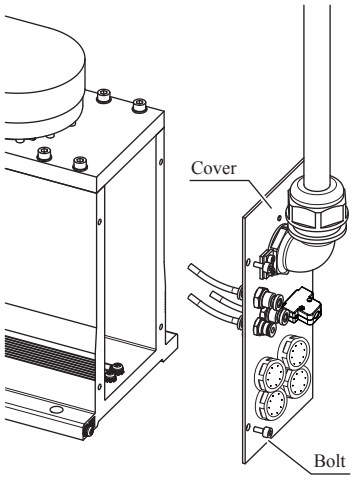
3 ***Enter the safety enclosure.***

4 ***Remove the base cover.***
Remove the cover while referring to "1. Attaching, detaching, and replacing the cover" in Chapter 2.

5 ***Disconnect the connector.***
Remove the robot cable's round terminal and the connector.

6 ***Disconnect the robot cable.***
Use a spanner to loosen the lock nut, then disconnect the robot cable.

▶ **Step 5** **Removing the connector**



■ Reassembly

Reassemble by reversing the disassembly procedure.

1 ***Tighten the lock nut and clamp.***

2 ***Secure the round terminal and connect the connector.***

NOTE

Refer to the installation manual, Chapter 8 "1.3 Robot inner wiring diagram".

3 ***Attach the cover.***

1.2 R6YXG500, R6YXG600, R6YXGH600, R6YXG700, R6YXG800, R6YXG900, R6YXG1000 R6YXGS500, R6YXGS600, R6YXGS700, R6YXGS800, R6YXGS900, R6YXGS1000

WARNING

BEFORE STARTING THE WORK, THOROUGHLY READ "1. ATTACHING, DETACHING, AND REPLACING THE COVER" IN CHAPTER 2.

1. Replacement parts

	Part Name	OMRON Part No.	Part No. / Specs	Q'ty	Remarks
1	Screw for round terminal	97602-04306	M4, Length: 6	2	Spare parts
2	Lock washer for round terminal	90172-00J040	For M4	2	Spare parts
3	Robot cable	KBF-M6211-005		1	3.5m
		KBF-M6211-105		1	5m
		KBF-M6211-205		1	10m

2. Other tools

Name	Part No.	Manufacturer	Remarks
Hex wrench set			
Phillips screwdriver			
41mm spanner			

■ Removal

Disassemble using the following procedure.

1 ***Turn off the controller.***

2 ***Place a sign indicating the robot is being adjusted.***

Place a sign indicating the robot is being adjusted, to keep others from operating the controller or operation panel.

3 ***Enter the safety enclosure.***

Although the replacement procedure for the R6YXG500 is given here, the same procedure also applies for the other models.

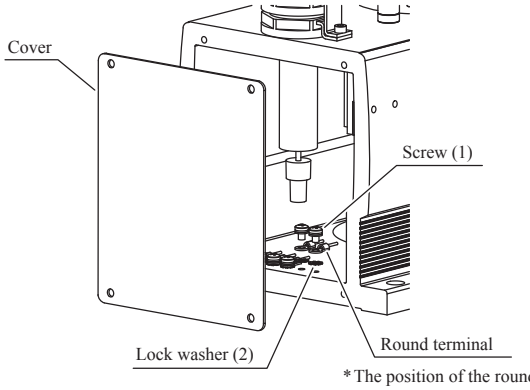
4 ***Remove the base cover.***

Remove the cover while referring to "1. Attaching, detaching, and replacing the cover" in Chapter 2.

5 ***Disconnect the connector.***

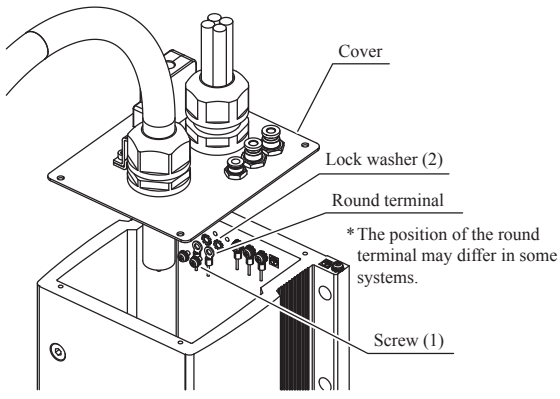
Remove the robot cable's round terminal and the connector.

▶ **Step 5 Removing the connector**



*The position of the round terminal may differ in some systems.

R6YXG500, R6YXG600, R6YXGH600, R6YXG700, R6YXG800, R6YXG900, R6YXG1000



*The position of the round terminal may differ in some systems.

R6YXGS500, R6YXGS600, R6YXGS700, R6YXGS800, R6YXGS900, R6YXGS1000

6 ***Disconnect the robot cable.***

Use a spanner to loosen the lock nut, then disconnect the robot cable.

■ Reassembly

Reassemble by reversing the disassembly procedure.

1 ***Tighten the lock nut and clamp.***

2 ***Secure the round terminal and connect the connector.***

NOTE

Refer to the installation manual, Chapter 8 "1.3 Robot inner wiring diagram".

3 ***Attach the cover.***

Chapter 12 Mechanical stopper replacement

Contents

1. Mechanical stopper replacement

To ensure safety, use the following procedure to replace the mechanical stopper when it becomes damaged, deformed, or when it can no longer be properly secured.
In the interest of safety, additional mechanical stoppers should also be replaced with new ones in accordance with the "additional mechanical stopper installation" procedure when they become damaged, deformed, or when they can no longer be properly secured.
If damage is found at the arm or base, etc., please contact your distributor.

CAUTION

If the bolt tightening torque is not instructed, see the tightening torque stated in "2. Replacement procedure for harmonic drive" in Chapter 5.

1.1 R6YXGL250, R6YXGL350, R6YXGL400, R6YXGL500, R6YXGL600, R6YXGS300, R6YXGS400

1.1.1 X, Y-axis mechanical stoppers

1. Replacement parts

• X-axis

	Part Name	OMRON Part No.	Part No. / Specs	Q'ty	Remarks
1	Stopper damper	KCY-M2197-000		1	
2	Bolt	90112-10J055	M10, Length: 55	1	
3	Nut	90189-02J106	M10	1	

• Y-axis

	Part Name	OMRON Part No.	Part No. / Specs	Q'ty	Remarks
1	Stopper damper	KCY-M2197-000		1	
2	Bolt	90112-10J055	M10, Length: 55	1	
3	Nut	90189-02J106	M10	1	

2. Torque wrench, etc.

CAUTION

Use accurately calibrated torque screwdrivers and torque wrenches.

	Name	Part No.	Manufacturer	Remarks
A	Torque wrench	N670SPK 17	KANON (Nakamura Mfg. Co., Ltd.)	Width across flat: 17mm Tightening torque: 42Nm (428kgfcm)

3. Other tools

Name	Part No.	Manufacturer	Remarks
Hex wrench set			
Spanner (wrench)			

Follow the steps below to perform the replacement work.

■ Removal

1 ***Turn off the controller.***

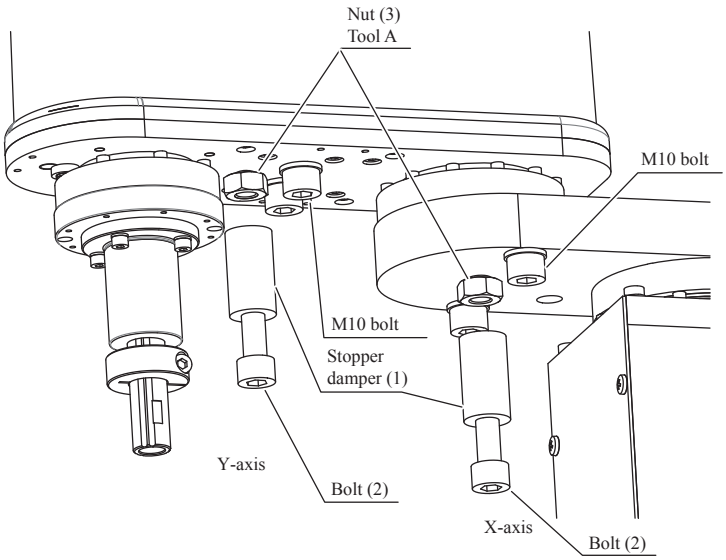
2 ***Place a sign indicating the robot is being adjusted.***
Place a sign indicating the robot is being adjusted, to keep others from operating the controller or operation panel.

3 ***Enter the safety enclosure.***

Although the procedure for the X-axis is given here, the same procedure also applies for the Y-axis.

4 ***Loosen the X-axis nut, then remove the stopper damper and the bolts.***

Mechanical stopper replacement



■ Reassembly

Install the new stopper and reassemble by reversing the disassembly procedure.

1 ***Secure the damper between the bolt and nut.***
1. Secure the damper (1) between bolt (2) and nut (3). Use the bolt and nut shown above.
2. Tighten the nut at the arm side to a torque of 42Nm (428kgf/cm). If the nut is difficult to tighten, remove the surrounding M10 bolts, then tighten the nut. Be sure to return the M10 bolts to their original positions (these are plug bolts). (For details, refer to Chapter 2 "Installing the X-axis/Y-axis additional mechanical stoppers" in the Installation Manual.)

2 ***Verify that the movement range is restricted.***

3 ***Go out of the safety enclosure.***

4 ***Turn on the controller.***
Check that no one is inside the safety enclosure, and then turn on the controller.

CAUTION
From a position outside the safety enclosure, verify that the soft limit stops the X-axis at a position before the stopper.

5 ***Verify that the X-axis is completely stopped.***
From a position outside the safety enclosure, verify that the maximum soft limit stops the X-axis at a position before the stopper.

1.1.2 Z-axis mechanical stopper

1.1.2.1 Upper end mechanical stopper

1. Standard specifications

1. Replacement parts

	Part Name	OMRON Part No.	Part No. / Specs	Q'ty	Remarks
1	Damper	KN3-M1788-100		1	
2	Stopper	KCY-M780-001		1	
3	Warning label	90K41-001490		1	Required when stopper is replaced.

2. Other tools

Name	Part No.	Manufacturer	Remarks
Cleaning wipe			
Calipers, etc.			
Hex wrench set			
Torque wrench			
Screw thread locking agent	Loctite 262	Henkel	High strength type (red)

■ Removal

Disassemble using the following procedure.

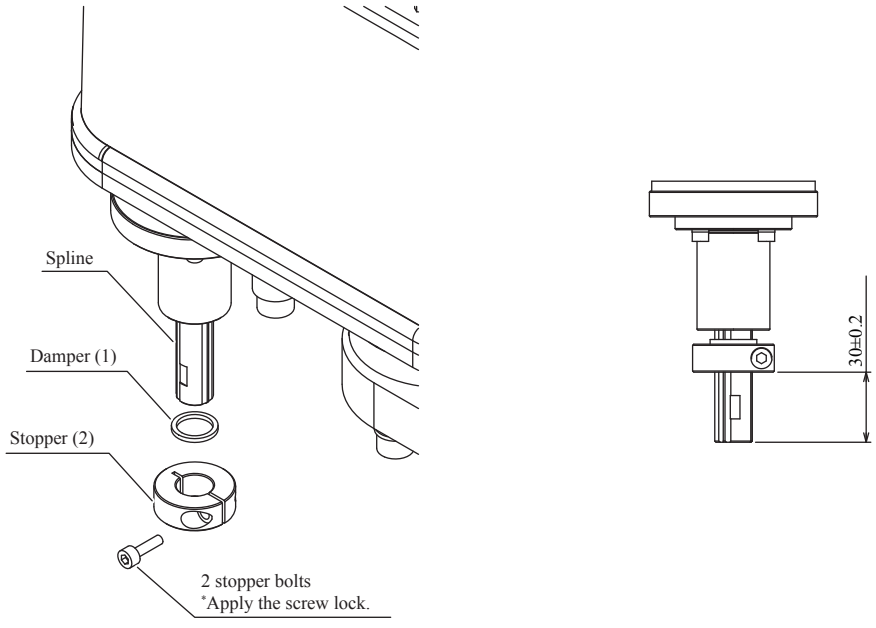
1 ***Turn off the controller.***

2 ***Place a sign indicating the robot is being adjusted.***
Place a sign indicating the robot is being adjusted, to keep others from operating the controller or operation panel.

3 ***Enter the safety enclosure.***

4 ***Remove the bolts, then remove the damper and stopper from the spline.***

Mechanical stopper replacement



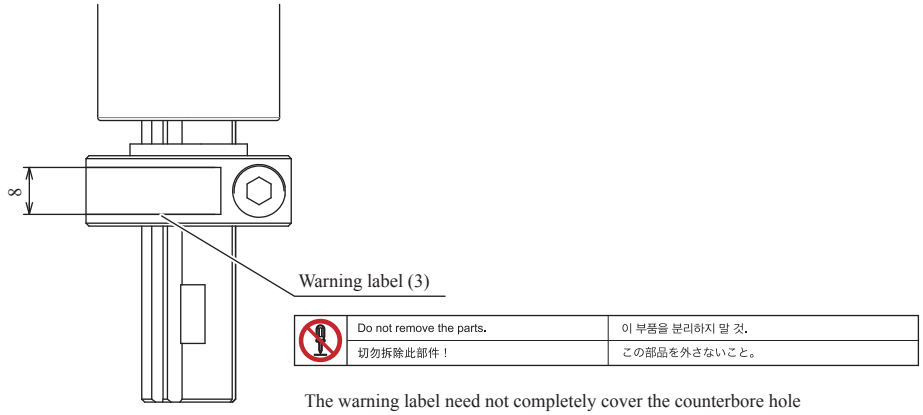
■ Replacement and reassembly

Replace the damaged damper or stopper with a new one as described below, then reassemble by reversing the disassembly procedure.

1 ***Install the damper and stopper on the spline.***
Secure the stopper at its prescribed position.

2 ***If the stopper was replaced, affix a warning label to the stopper.***

Warning label affixing position



The warning label need not completely cover the counterbore hole (because the bolt is protruding).
Be sure that the warning label does not extend to the stopper's C-face.
Be sure to wipe all grease from the curved face before affixing the label.

2. Tool flange specifications

CAUTION
Replacing the mechanical stopper causes a positional deviation.
Therefore, following the replacement, it may be necessary to perform an absolute reset, and re-specify the point data and reference coordinates.

1. Replacement parts

	Part Name	OMRON Part No.	Part No. / Specs	Q'ty	Remarks
1	Damper	KN3-M1788-100		1	
2	Flange	KCY-M1790-000		1	
3	Warning label	90K41-001490		1	Required when stopper is replaced.
4	Bolt	91312-05014	M5, length: 14	2	
5	Set screw	92A08-05308	M5, length: 8	1	

2. Other tools

Name	Part No.	Manufacturer	Remarks
Cleaning wipe			
Calipers, etc.			
Hex wrench set			
Screw thread locking agent	Loctite 262	Henkel	High strength type (red)

■ Removal

Disassemble using the following procedure.

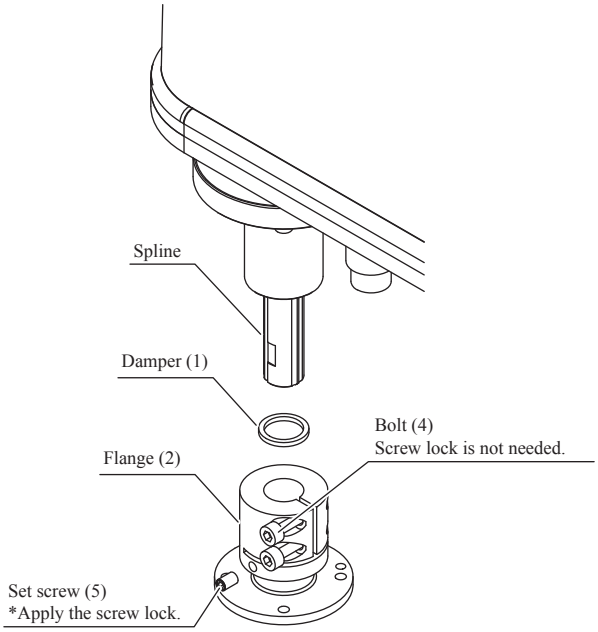
1 ***Turn off the controller.***

2 ***Place a sign indicating the robot is being adjusted.***
Place a sign indicating the robot is being adjusted, to keep others from operating the controller or operation panel.

3 ***Enter the safety enclosure.***

4 ***Remove the bolt and set screw, then remove the damper and flange from the spline.***

Mechanical stopper replacement



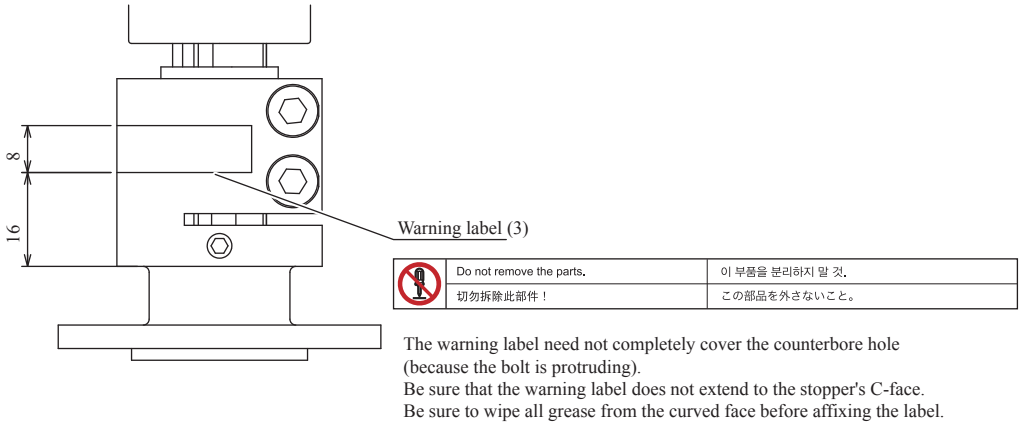
■ Replacement and reassembly

Replace the damaged damper or flange with a new one as described below, then reassemble by reversing the disassembly procedure.

1 ***Install the damper and flange on the spline.***
Secure the flange at its abutting position.
The set screw should be against the spline's flats at right angles.

2 ***If the flange was replaced, affix a warning label to the flange.***

Warning label affixing position



The warning label need not completely cover the counterbore hole (because the bolt is protruding).
Be sure that the warning label does not extend to the stopper's C-face.
Be sure to wipe all grease from the curved face before affixing the label.

1.1.2.2 Lower end mechanical stopper

CAUTION

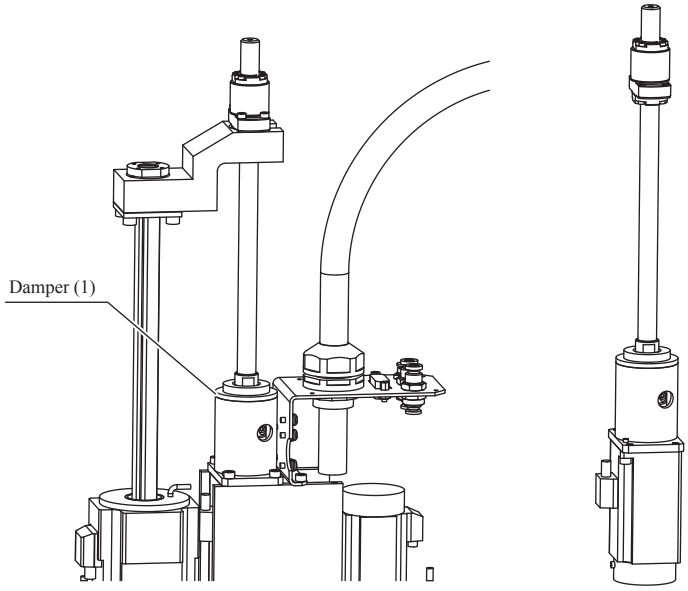
Replacing the mechanical stopper causes a positional deviation.
Therefore, following the replacement, it may be necessary to perform an absolute reset, and re-specify the point data and reference coordinates.

1. Replacement parts

	Part Name	OMRON Part No.	Part No. / Specs	Q'ty	Remarks
1	Damper	KCY-M1788-000		1	

In order to replace the damper, the ball screw must be detached from the motor, and this detachment causes a ball screw centerline deviation. Therefore, when a damper replacement is required, the ball screw, the motor assembly (removed as described in Chapter 7 "Replacing the Z-axis ASSY"), or the entire robot should be returned to your distributor where the procedure will then be performed. Alternatively, a service person can be dispatched from your distributor to perform the task onsite.

Mechanical stopper replacement



Ball screw and motor assembly

1.2 R6YXG500, R6YXG600, R6YXGH600, R6YXG700, R6YXG800, R6YXG900, R6YXG1000 R6YXGS500, R6YXGS600, R6YXGS700, R6YXGS800, R6YXGS900, R6YXGS1000

1.2.1 X-axis mechanical stopper

1.2.1.1 Moving side stopper

1. R6YXG500, R6YXG600, R6YXGS500, R6YXGS600, R6YXGS700, R6YXGS800, R6YXGS900, R6YXGS1000

CAUTION

Replacing the mechanical stopper causes a positional deviation.
Therefore, following the replacement, it may be necessary to perform an absolute reset, and re-specify the point data and reference coordinates.

1. Replacement parts

- **R6YXG500, R6YXG600**
  R6YXGS500, R6YXGS600

	Part Name	OMRON Part No.	Part No. / Specs	Q'ty	Remarks
1	Stopper	KBF-M2193-001		1	
2	Bolt	91312-06030	M6, length: 30	2	
3	Damper	KN3-M2596-002		2	

- **R6YXGS700, R6YXGS800, R6YXGS900, R6YXGS1000**

	Part Name	OMRON Part No.	Part No. / Specs	Q'ty	Remarks
1	Stopper	KBP-M2193-001		1	
2	Bolt	91312-08040	M8, length: 40	2	
3	Damper	KN5-M2596-001		2	

2. Other tools

Name	Part No.	Manufacturer	Remarks
Hex wrench set			
Instant adhesive	1739	ThreeBond Co., Ltd.	High peeling strength and impact shock resistant
Screw thread locking agent	Loctite 262	Henkel	High strength type (red)

■ Removal

Disassemble using the following procedure.

1 ***Turn off the controller.***

2 ***Place a sign indicating the robot is being adjusted.***
Place a sign indicating the robot is being adjusted, to keep others from operating the controller or operation panel.

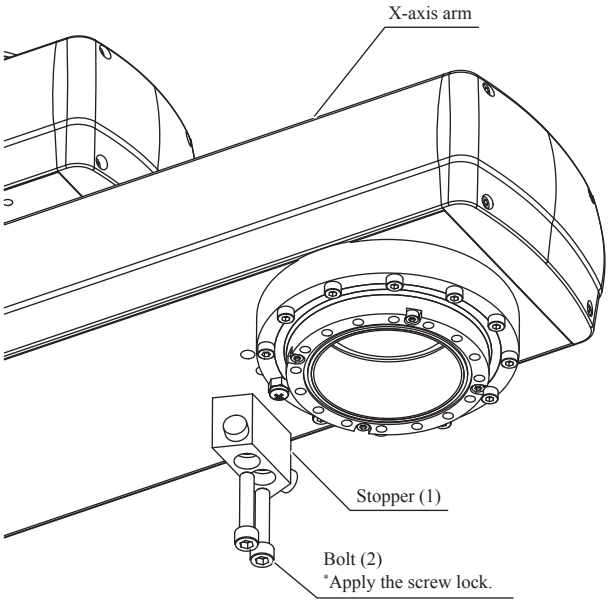
3 ***Enter the safety enclosure.***

Although the replacement procedure for the R6YXG500 is given here, the same procedure also applies for the other models.

4 ***Remove the X-axis arm is removed from the base or the base plate (depending on the model).***
Remove the X-axis arm by the procedure described in Chapter 5 "2. Replacement procedure for harmonic drive". On models R6YXG500 and R6YXG600, remove the X-axis arm from the base. On models R6YXGS500, R6YXGS600, R6YXGS700, R6YXGS800, R6YXGS900 and R6YXGS1000, remove the X-axis arm from the base plate.

5 ***Remove the bolts, then remove the stopper from the X-axis arm.***

Mechanical stopper replacement

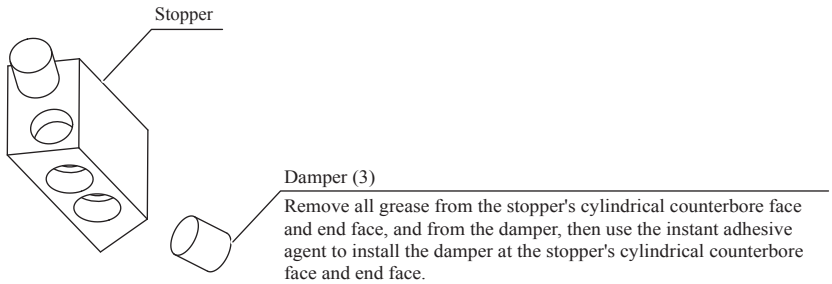


■ Reassembly

Install the new stopper, then reassemble by reversing the disassembly procedure.

1 ***Use the instant adhesive agent to Install the damper on the stopper.***

Installing the damper with the instant adhesive agent



2 ***Secure the stopper to the X-axis arm with the bolts.***

3 ***Reassemble as described in the harmonic replacement procedure (refer to Chapter 5 "2. Replacement procedure for harmonic drive").***

4 ***Verify that the movement range is restricted.***

5 ***Go out of the safety enclosure.***

6 ***Turn on the controller.***
Check that no one is inside the safety enclosure, and then turn on the controller.

CAUTION
From a position outside the safety enclosure, verify that the soft limit stops the X-axis at a position before the stopper.

7 ***Verify that the X-axis is completely stopped.***
From a position outside the safety enclosure, verify that the maximum soft limit stops the X-axis at a position before the stopper.

2. R6YXGH600, R6YXG700, R6YXG800, R6YXG900, R6YXG1000

1. Replacement parts

	Part Name	OMRON Part No.	Part No. / Specs	Q'ty	Remarks
1	Stopper	KBP-M2193-001		1	
2	Bolt	91312-08040	M8, length: 40	2	
3	Damper	KN5-M2596-001		2	

2. Other tools

Name	Part No.	Manufacturer	Remarks
Hex wrench set			
Instant adhesive	1739	ThreeBond Co., Ltd.	High peeling strength and impact shock resistant
Screw thread locking agent	Loctite 262	Henkel	High strength type (red)

■ Removal

Disassemble using the following procedure.

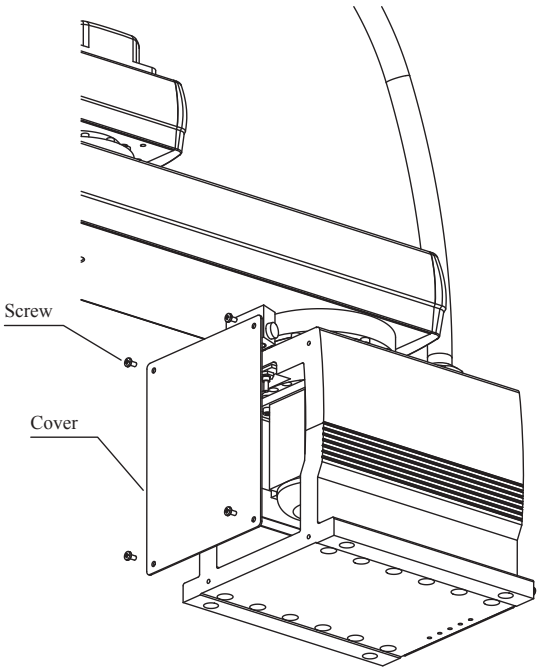
1 ***Turn off the controller.***

2 ***Place a sign indicating the robot is being adjusted.***
Place a sign indicating the robot is being adjusted, to keep others from operating the controller or operation panel.

3 ***Enter the safety enclosure.***

4 ***Remove the base cover.***
Remove the cover while referring to "1. Attaching, detaching, and replacing the cover" in Chapter 2.

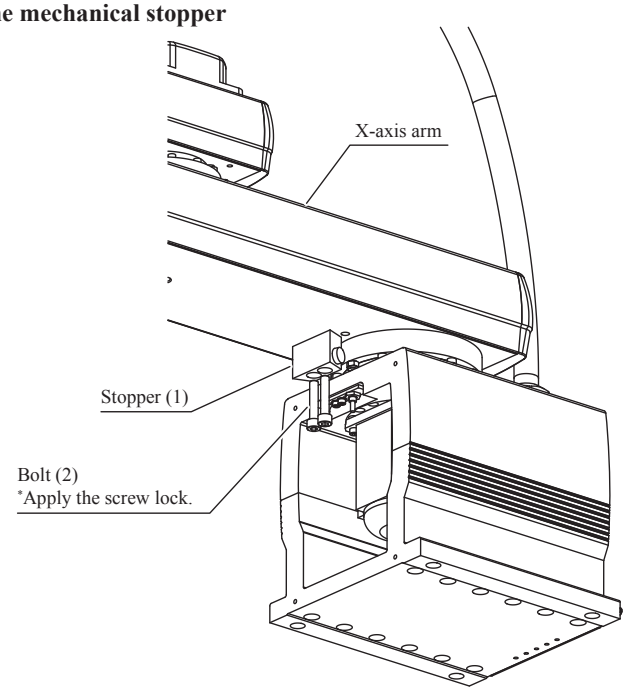
Removing the base cover



5 ***Remove the stopper from the X-axis arm.***

With the X-axis arm positioned at the front of the base, remove the bolts, then remove the stopper from the X-axis arm. If the X-axis arm cannot be positioned at the front of the base, perform this replacement in the same manner as on the R6YXG500 model.

Removing the mechanical stopper

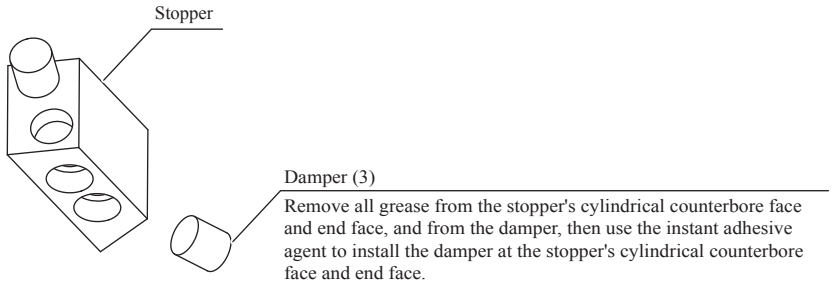


■ Reassembly

Install the new stopper, then reassemble by reversing the disassembly procedure.

1 ***Use the instant adhesive agent to Install the damper on the stopper.***

Installing the damper with the instant adhesive agent



2 ***Secure the stopper to the X-axis arm with the bolts.***

3 ***Attach the base cover.***

4 ***Verify that the movement range is restricted.***

5 ***Go out of the safety enclosure.***

6 ***Turn on the controller.***

Check that no one is inside the safety enclosure, and then turn on the controller.

CAUTION

From a position outside the safety enclosure, verify that the soft limit stops the X-axis at a position before the stopper.

7 ***Verify that the X-axis is completely stopped.***

From a position outside the safety enclosure, verify that the maximum soft limit stops the X-axis at a position before the stopper.

1.2.1.2 Fixed-side stopper

1. Replacement parts

- **R6YXG500, R6YXG600**
  R6YXGS500, R6YXGS600

	Part Name	OMRON Part No.	Part No. / Specs	Q'ty	Remarks
1	Stopper bolt	91312-08016	M8, length: 16	1	
2	Washer	90990-28J091		1	

- **R6YXGH600, R6YXG700, R6YXG800, R6YXG900, R6YXG1000**
  R6YXGS700, R6YXGS800, R6YXGS900, R6YXGS1000

	Part Name	OMRON Part No.	Part No. / Specs	Q'ty	Remarks
1	Stopper bolt	90112-10J030	M10, length: 30	1	
2	Washer	90990-28J093		2	

2. Other tools

Name	Part No.	Manufacturer	Remarks
Hex wrench set			
Screw thread locking agent	Loctite 262	Henkel	High strength type (red)

■ Removal

Disassemble using the following procedure.

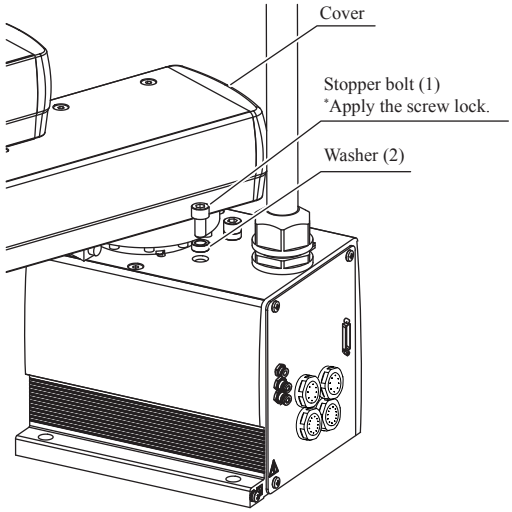
1 ***Turn off the controller.***

2 ***Place a sign indicating the robot is being adjusted.***
Place a sign indicating the robot is being adjusted, to keep others from operating the controller or operation panel.

3 ***Enter the safety enclosure.***

4 ***Remove the X-axis arm cover.***
On the R6YXGH600, R6YXG700, R6YXG800, R6YXG900, R6YXG1000, R6YXGS700, R6YXGS800, R6YXGS900, R6YXGS1000 models, remove the X-axis arm cover. The cover must be removed in order to remove the bolt.
Remove the cover while referring to "1. Attaching, detaching, and replacing the cover" in Chapter 2.

Mechanical stopper replacement



5 ***While in the posture shown in the above figure, remove the stopper bolt and washer from the base.***

■ Reassembly

Install the new stopper, then reassemble by reversing the disassembly procedure.

1 ***Secure the washer and stopper bolt to the base.***

2 ***Attach the X-axis arm cover.***
Attach the X-axis arm cover on the following models:
R6YXGH600, R6YXG700, R6YXG800, R6YXG900, R6YXG1000, R6YXGS700, R6YXGS800, R6YXGS900, R6YXGS1000.

3 ***Verify that the movement range is restricted.***

4 ***Go out of the safety enclosure.***

5 ***Turn on the controller.***
Check that no one is inside the safety enclosure, and then turn on the controller.

CAUTION
From a position outside the safety enclosure, verify that the soft limit stops the X-axis at a position before the stopper.

6 ***Verify that the X-axis is completely stopped.***
From a position outside the safety enclosure, verify that the maximum soft limit stops the X-axis at a position before the stopper.

1.2.2 Y-axis mechanical stopper

1.2.2.1 Moving side stopper

1. Replacement parts

- **R6YXG500, R6YXG600**
  R6YXGS500, R6YXGS600

	Part Name	OMRON Part No.	Part No. / Specs	Q'ty	Remarks
1	Stopper	KBF-M2587-001		1	R6YXG500, R6YXG600
		KDA-M2587-000		1	R6YXGS500, R6YXGS600
2	Bolt	91312-05025	M5, length: 25	2	
3	Damper	KN3-M2596-002		2	

- **R6YXGH600, R6YXG700, R6YXG800, R6YXG900, R6YXG1000**
  R6YXGS700, R6YXGS800, R6YXGS900, R6YXGS1000

	Part Name	OMRON Part No.	Part No. / Specs	Q'ty	Remarks
1	Stopper	KBP-M2587-000		1	
		KDB-M2587-000		1	
2	Bolt	91312-08035	M8, length: 35	2	
3	Damper	KN5-M2196-001		2	

2. Other tools

Name	Part No.	Manufacturer	Remarks
Hex wrench set			
Instant adhesive	1739	ThreeBond Co., Ltd.	High peeling strength and impact shock resistant
Screw thread locking agent	Loctite 262	Henkel	High strength type (red)

■ Removal

Disassemble using the following procedure.

1 ***Turn off the controller.***

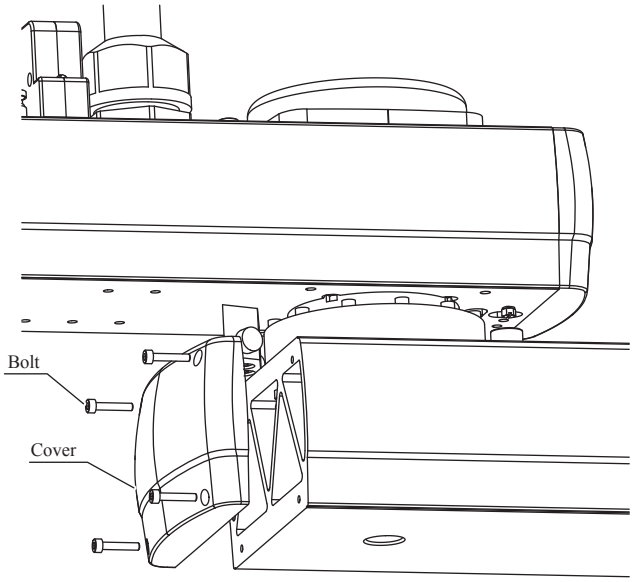
2 ***Place a sign indicating the robot is being adjusted.***
Place a sign indicating the robot is being adjusted, to keep others from operating the controller or operation panel.

3 ***Enter the safety enclosure.***

Although the replacement procedure for the R6YXG500 is given here, the same procedure also applies for the other models.

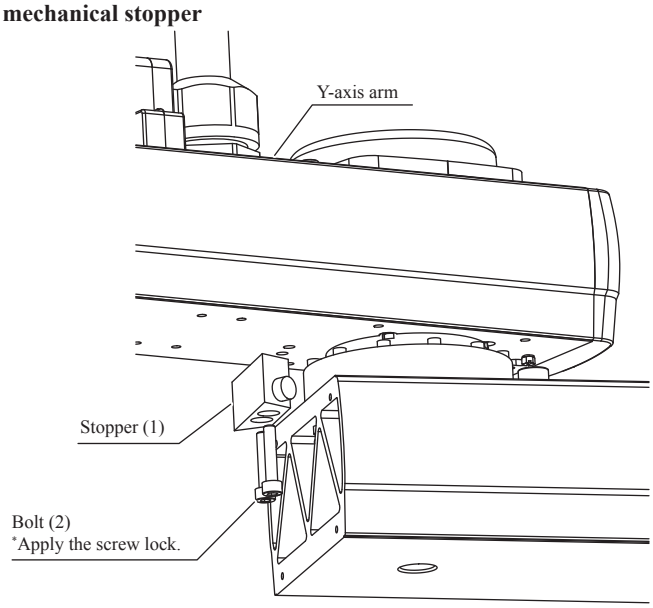
4 ***Remove the X-axis arm cover.***
Remove the cover while referring to "1. Attaching, detaching, and replacing the cover" in Chapter 2.

Removing the arm cover



5 ***Remove the stopper from the Y-axis arm.***
As shown in the figure below, establish a posture in which the Y-axis arm is somewhat tilted relative to the X-axis arm. Remove the bolt, then remove the stopper from the Y-axis arm.
If the posture shown below cannot be obtained, disassemble to the point where the harmonic has been removed from the Y-axis arm (in accordance with the Y-axis harmonic replacement procedure), then remove the stopper.

Removing the mechanical stopper

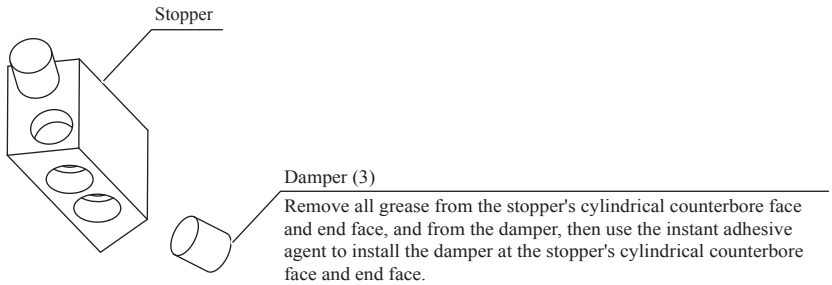


■ Reassembly

Install the new stopper, then reassemble by reversing the disassembly procedure.

1 ***Use the instant adhesive agent to Install the damper on the stopper.***

Installing the damper with the instant adhesive agent



2 ***Secure the stopper to the Y-axis arm with the bolts.***

3 ***Attach the X-axis arm cover.***

4 ***Verify that the movement range is restricted.***

5 ***Go out of the safety enclosure.***

6 ***Turn on the controller.***
Check that no one is inside the safety enclosure, and then turn on the controller.

7 ***Specify the Y-axis plus-direction soft limit setting.***
If the stopper has been installed in the minus-direction, specify a minus-direction soft limit setting.

CAUTION
From a position outside the safety enclosure, verify that the soft limit stops the Y-axis at a position before the stopper.

8 ***Verify that the Y-axis is completely stopped.***
From a position outside the safety enclosure, verify that the maximum soft limit stops the Y-axis at a position before the stopper.

1.2.2.2 Fixed-side stopper

1. Replacement parts

- **R6YXG500, R6YXG600**
  R6YXGS500, R6YXGS600

	Part Name	OMRON Part No.	Part No. / Specs	Q'ty	Remarks
1	Stopper bolt	91312-08016	M8, length: 16	1	
2	Washer	90990-28J091		1	

- **R6YXGH600, R6YXG700, R6YXG800, R6YXG900, R6YXG1000**
  R6YXGS700, R6YXGS800, R6YXGS900, R6YXGS1000

	Part Name	OMRON Part No.	Part No. / Specs	Q'ty	Remarks
1	Stopper bolt	90112-10J025	M10, length: 25	1	
2	Washer	90990-28J093		2	

2. Other tools

Name	Part No.	Manufacturer	Remarks
Hex wrench set			
Screw thread locking agent	Loctite 262	Henkel	High strength type (red)

■ Removal

Disassemble using the following procedure.

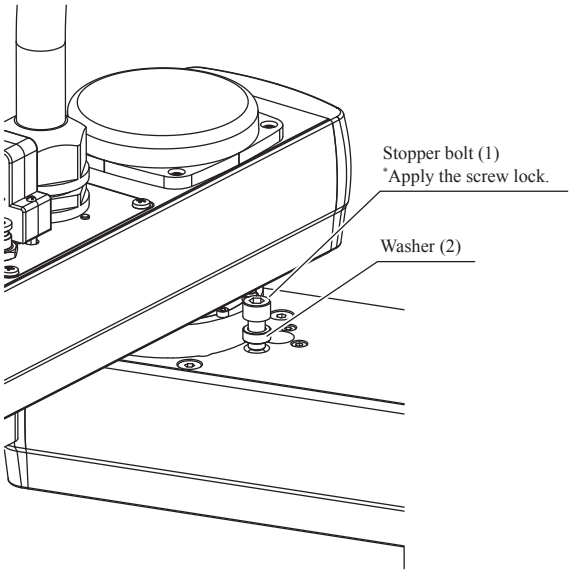
1 ***Turn off the controller.***

2 ***Place a sign indicating the robot is being adjusted.***
Place a sign indicating the robot is being adjusted, to keep others from operating the controller or operation panel.

3 ***Enter the safety enclosure.***

4 ***While in the posture shown in the figure below, remove the stopper bolt and washer from the X-axis arm.***

Mechanical stopper replacement



■ Reassembly

Install the new stopper, then reassemble by reversing the disassembly procedure.

1 ***Secure the washer and stopper bolt to the X-axis.***

2 ***Verify that the movement range is restricted.***

3 ***Go out of the safety enclosure.***

4 ***Turn on the controller.***
Check that no one is inside the safety enclosure, and then turn on the controller.

CAUTION
From a position outside the safety enclosure, verify that the soft limit stops the Y-axis at a position before the stopper.

5 ***Verify that the Y-axis is completely stopped.***
From a position outside the safety enclosure, verify that the maximum soft limit stops the Y-axis at a position before the stopper.

1.2.3 Z-axis mechanical stopper

1.2.3.1 Upper end mechanical stopper

1. Replacement parts

- **R6YXG500, R6YXG600**
  R6YXGS500, R6YXGS600

	Part Name	OMRON Part No.	Part No. / Specs	Q'ty	Remarks
1	Damper	KBF-M1789-001		1	
2	Stopper	KBF-M1780-001		1	
3	Bolt	91312-06018	M6, length: 18	1	
4	Warning label	90K41-001490		1	Required when stopper is replaced.

- **R6YXGH600, R6YXG700, R6YXG800, R6YXG900, R6YXG1000**
  R6YXGS700, R6YXGS800, R6YXGS900, R6YXGS1000

	Part Name	OMRON Part No.	Part No. / Specs	Q'ty	Remarks
1	Damper	KBP-M1789-000		1	
2	Stopper	KBP-M1780-001		1	
3	Bolt	91312-06020	M6, length: 18	1	
4	Warning label	90K41-001490		1	Required when stopper is replaced.

2. Other tools

Name	Part No.	Manufacturer	Remarks
Cleaning wipe			
Calipers, etc.			
Hex wrench set			
Screw thread locking agent	Loctite 262	Henkel	High strength type (red)

■ Removal

Disassemble using the following procedure.

1 ***Turn off the controller.***

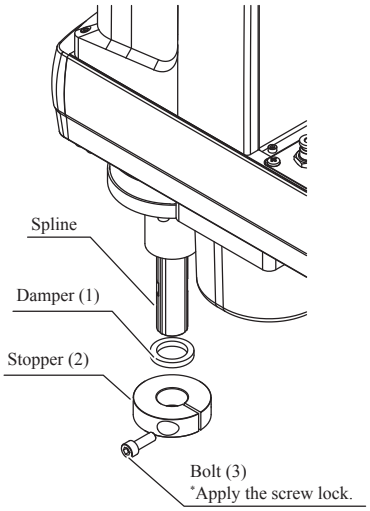
2 ***Place a sign indicating the robot is being adjusted.***
Place a sign indicating the robot is being adjusted, to keep others from operating the controller or operation panel.

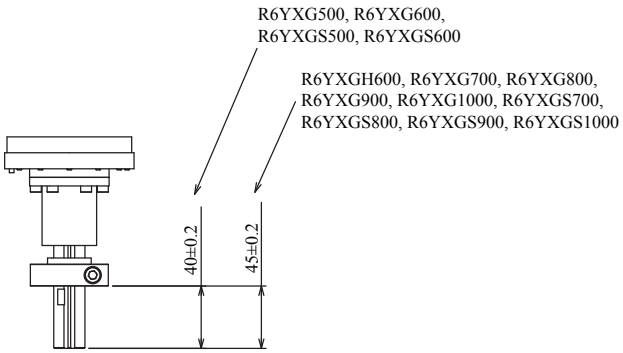
3 ***Enter the safety enclosure.***

4 ***Remove the damper and stopper from the spline.***

If the stopper bolt is covered by warning label, use a cutter to cut away the label so that the bolt head is exposed. Then remove the bolt, and remove the damper and stopper from the spline.

Removal





■ Replacement and reassembly

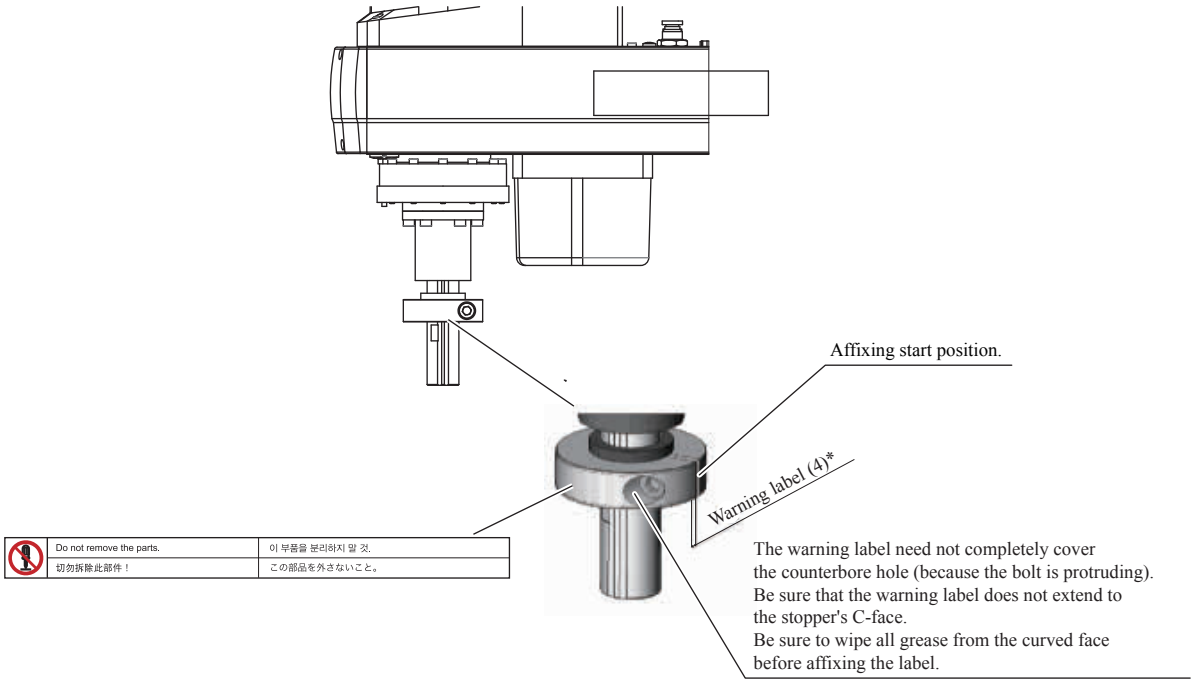
Replace the damaged damper or stopper with a new one as described below, then reassemble by reversing the disassembly procedure.

1 ***Install the damper and stopper on the spline.***

Secure the stopper at its prescribed position.

2 ***If the stopper was replaced, affix a warning label to the stopper.***

Warning label affixing position



* Warning label (4)

R6YXG500, R6YXG600, R6YXGS500, R6YXGS600	2mm
R6YXGH600, R6YXG700, R6YXG800, R6YXG900, R6YXG1000, R6YXGS700, R6YXGS800, R6YXGS900, R6YXGS1000	6mm

1.2.3.2 Lower end mechanical stopper

CAUTION

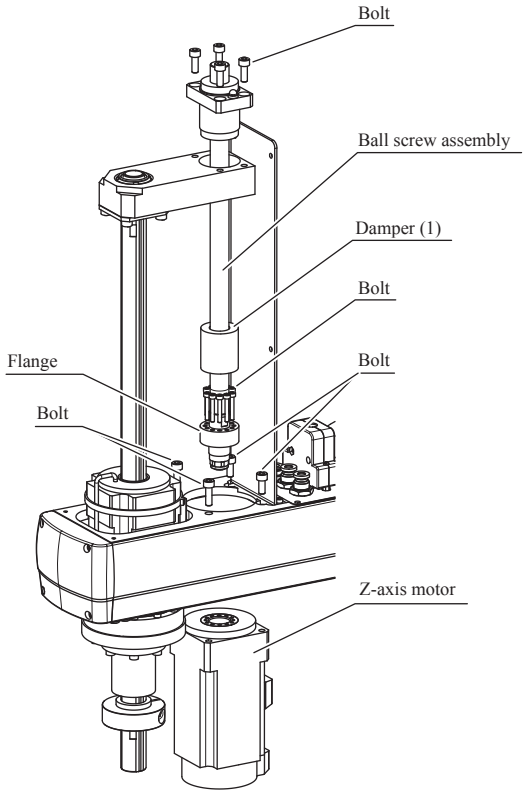
Replacing the mechanical stopper causes a positional deviation.
Therefore, following the replacement, it may be necessary to perform an absolute reset and re-specify the point data.

1. Replacement parts

	Part Name	OMRON Part No.	Part No. / Specs	Q'ty	Remarks
1	Damper	KBP-M1788-001		1	

In order to replace the damper, the ball screw assembly must be detached from the motor and the flange must be detached from the ball screw. These detachments cause a ball screw centerline deviation. Therefore, when a damper replacement is required, the ball screw, the motor assembly (removed as described in Chapter 7 "Replacing the Z-axis ASSY"), or the entire robot should be returned to your distributor where the procedure will then be performed. Alternatively, a service person can be dispatched from your distributor to perform the task onsite.

Damper replacement



Chapter 13 Dog replacement

Contents

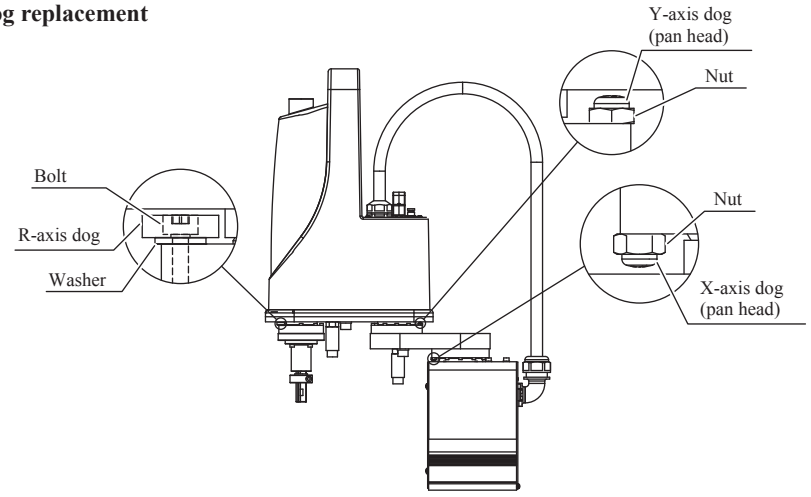
1. Dog replacement

CAUTION

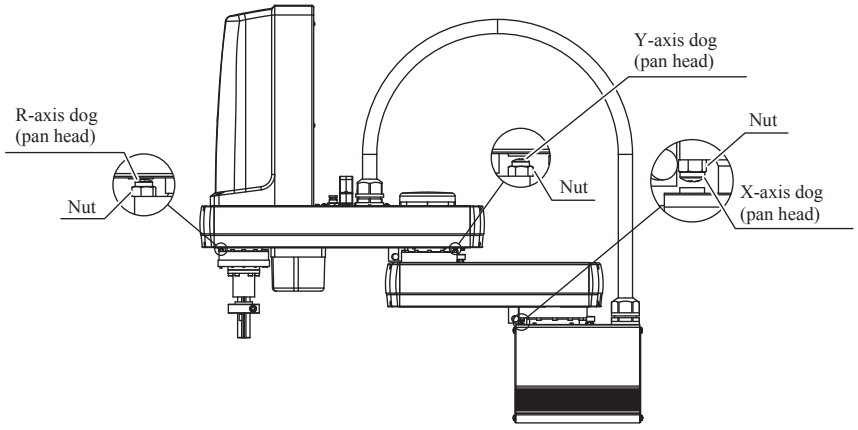
Replacing the dog causes a positional deviation. Therefore, following the replacement, an absolute reset must be performed, and the point data and reference coordinates must be re-specified.

Dogs are present at the X, Y, and R axes, and are detected by the origin point sensor in return-to-origin operations. The dog positions at each axis are shown below.
Damaged dogs must be replaced in accordance with the harmonic replacement procedure for the robot model and axis in question.

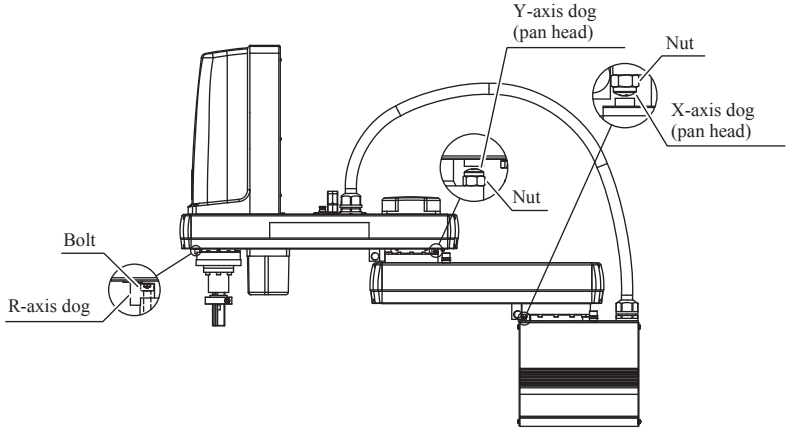
Dog replacement



R6YXGL250, R6YXGL350, R6YXGL400, R6YXGL500, R6YXGL600, R6YXGS300, R6YXGS400
(The illustration shows R6YXGL250)



R6YXG500, R6YXG600, R6YXGS500, R6YXGS600
(The illustration shows R6YXG500)



R6YXGH600, R6YXG700, R6YXG800, R6YXG900, R6YXG1000,
R6YXGS700, R6YXGS800, R6YXGS900, R6YXGS1000
(The illustration shows R6YXG700)

Chapter 14 End face seal replacement

Contents

1. End face seal replacement

CAUTION

Replacing the end face seal causes a positional deviation. Therefore, following the replacement, an absolute reset must be performed, and the point data and reference coordinates must be re-specified.

The R-axis end face seal prevents harmonic grease from leaking to the spline side. This seal must be replaced when in a deteriorated condition.

1.1 R6YXGL250, R6YXGL350, R6YXGL400, R6YXGL500, R6YXGL600, R6YXGS300, R6YXGS400

1. Replacement parts

	Part Name	OMRON Part No.	Part No. / Specs	Q'ty	Remarks
1	End face seal (*1)	KCY-M1886-000		1	

*1: A new end face seal will be subjected to a high level of friction if sufficient R-axis aging has not occurred. Therefore, be sure to perform R-axis aging, and do not replace this seal unless it is damaged.

2. Other tools

Name	Part No.	Manufacturer	Remarks
Harmonic grease	4B No.2 (*1)	Harmonic Drive Systems	Do not use grease if it was purchased 4 or more years ago. The grease has probably deteriorated.

*1: 4.2g

■ Removal

Disassemble using the following procedure.

1 ***Turn off the controller.***

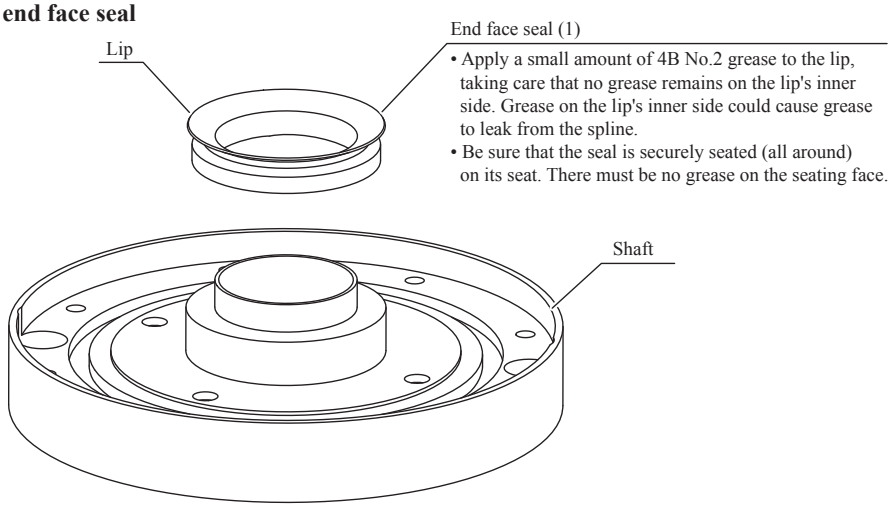
2 ***Place a sign indicating the robot is being adjusted.***
Place a sign indicating the robot is being adjusted, to keep others from operating the controller or operation panel.

3 ***Enter the safety enclosure.***

4 ***Remove the harmonic from the shaft.***
In accordance with the Chapter 5 "2.1.3 Replacing the R-axis harmonic drive" procedure, disassemble to the point where the harmonic is removed from the shaft.

5 ***Remove the end face seal from the shaft.***

Replacing the end face seal



■ Reassembly

Reassemble by reversing the disassembly procedure.

1 ***Install a new end face seal on the shaft.***

2 ***Install the harmonic on the shaft.***

3 ***Apply new grease to the harmonic.***

Wipe off the old grease from the harmonic, then apply new grease as described in Chapter 5 "2.1.3 Replacing the R-axis harmonic drive".

CAUTION

A new end face seal will be subjected to a high level of friction due to contact with the harmonic input area, and an overload error could therefore occur if sufficient R-axis aging has not occurred. Be sure to perform sufficient aging.

1.2 R6YXG500, R6YXG600, R6YXGH600, R6YXG700, R6YXG800, R6YXG900, R6YXG1000 R6YXGS500, R6YXGS600, R6YXGS700, R6YXGS800, R6YXGS900, R6YXGS1000

1. Replacement parts

	Part Name	OMRON Part No.	Part No. / Specs	Q'ty	Remarks
1	End face seal (*1)	KBF-M1886-000		1	R6YXG500, R6YXG600, R6YXGS500, R6YXGS600
		KBP-M1886-000		1	R6YXGH600, R6YXG700, R6YXG800, R6YXG900, R6YXG1000 R6YXGS700, R6YXGS800, R6YXGS900, R6YXGS1000

*1: A new end face seal will be subjected to a high level of friction if sufficient R-axis aging has not occurred. Therefore, be sure to perform R-axis aging, and do not replace this seal unless it is damaged.

2. Other tools

Name	Part No.	Manufacturer	Remarks
Harmonic grease	4B No.2 (*1)	Harmonic Drive Systems	Do not use grease if it was purchased 4 or more years ago. The grease has probably deteriorated.
Harmonic grease (*2)	SK-1A (*1)	Harmonic Drive Systems	Used instead of 4B No.2 for wall-mount inverse model only.

*1 : R6YXG500, R6YXG600, R6YXGS500, R6YXGS600 : 8g
R6YXGH600, R6YXG700, R6YXG800, R6YXG900, R6YXG1000, R6YXGS700, R6YXGS800, R6YXGS900, R6YXGS1000 : 10g

*2: Using 4B No.2 grease an inverse spec. robots could cause harmonic drive damage due to grease leakage and poor lubrication.

■ Removal

Disassemble using the following procedure.

1 ***Turn off the controller.***

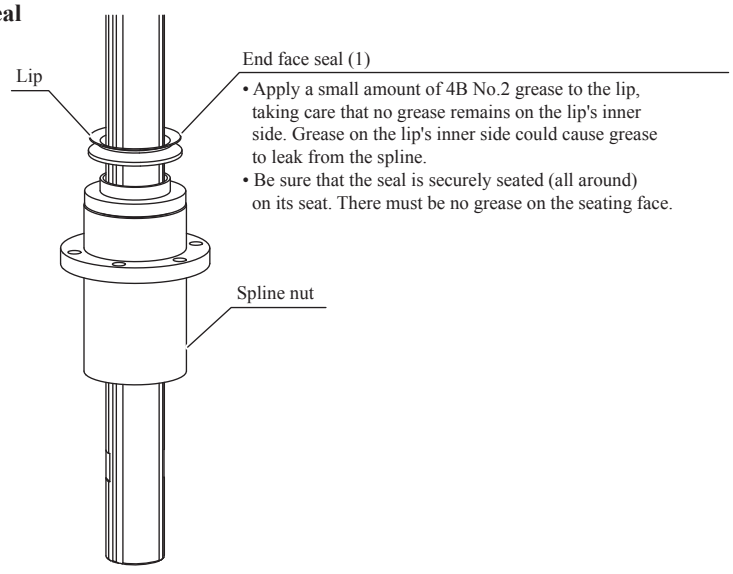
2 ***Place a sign indicating the robot is being adjusted.***
Place a sign indicating the robot is being adjusted, to keep others from operating the controller or operation panel.

3 ***Enter the safety enclosure.***

4 ***Remove the spline nut from the shaft.***
In accordance with the Chapter 5 "2.2.3 Replacing the R-axis harmonic drive" procedure, disassemble to the point where the spline nut is removed from the shaft.

5 ***Remove the end face seal from the spline nut.***

Replacing the end face seal



■ Reassembly

Reassemble by reversing the disassembly procedure.

1 ***Install the end face seal in the spline nut.***

2 ***Apply new grease to the harmonic.***

Disassemble to the point where the harmonic is removed from the Y-axis arm, even if the harmonic is not being replaced. (Do not remove the wave generator.)
Wipe off the old grease from the harmonic, then apply new grease as described in Chapter 5 "2.1.3 Replacing the R-axis harmonic drive".

3 ***In accordance with the harmonic replacement procedure, reassemble by reversing the disassembly procedure.***

CAUTION

A new end face seal will be subjected to a high level of friction due to contact with the harmonic input area, and an overload error could therefore occur if sufficient R-axis aging has not occurred. Be sure to perform sufficient aging.

Chapter 15 Maintenance parts

For details regarding maintenance parts for models R6YXGS300 and R6YXGS400, please contact your distributor.

Contents

1. Maintenance parts

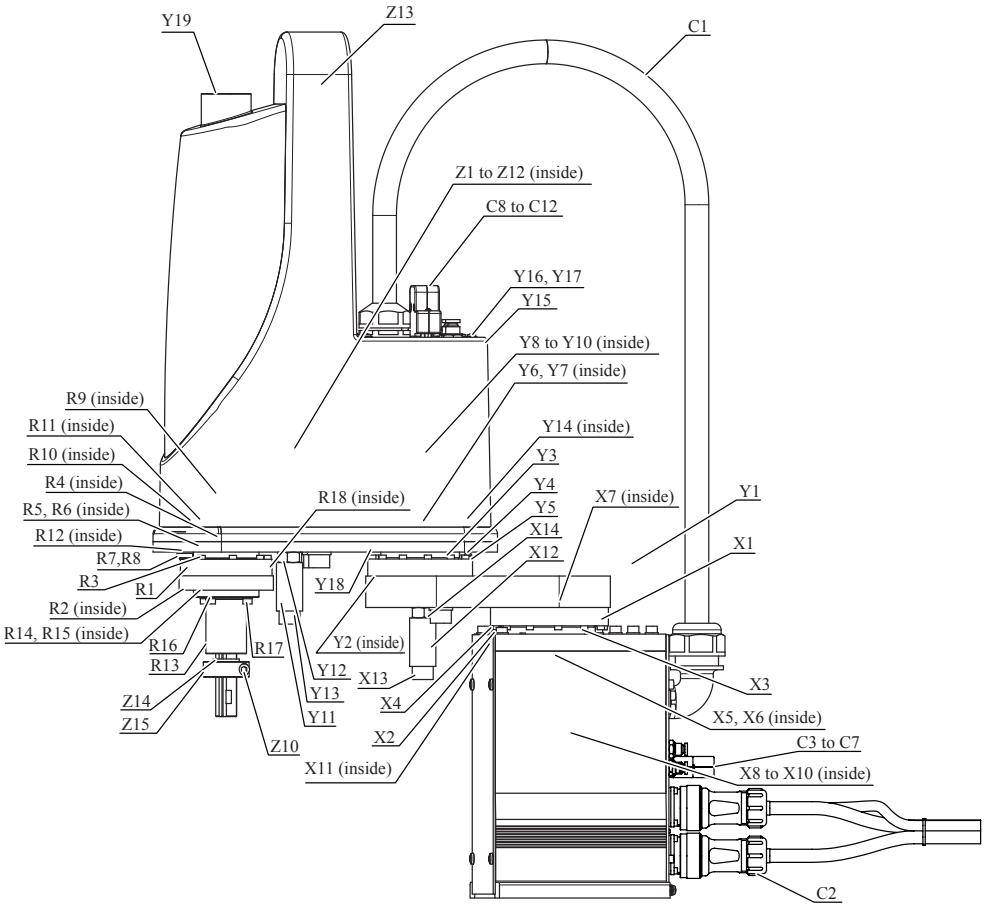
1.1 R6YXGL250, R6YXGL350, R6YXGL400 Standard type

	No.	Part No.	Part name	Q'ty	Remarks	Recommended replacement timing
X-axis	X1	KCY-M2110-001	HARMONIC DRIVE ASSY.	1	Speed reduction unit	See section 2 in Chapter 5 of the Installation Manual.
	X2	98502-03030	SCREW PAN HEAD (+)	1	Lower dog of speed reduction unit	
	X3	91312-03030	BOLT,HEX.SOCKET HEAD	11	Speed reduction unit mounting bolt	
	X4	95302-04600	NUT HEXAGON	1	Nut for dog	
	X5	92903-03600	WASHER,PLAIN	16	Washer for speed reduction unit mounting bolt	
	X6	91312-03018	BOLT HEX.SOCKET HEAD	16	Speed reduction unit mounting bolt	
	X7	KN4-M257K-000	O RING,1	1	Upper O-ring of speed reduction unit	
	X8	KCY-M4880-001	MOTOR ASSY.,1	1	Motor	
	X9	KN3-M2143-000	O RING.,2	1	O-ring for motor mating	
	X10	91312-05014	BOLT HEX.SOCKET HEAD	4	Motor mounting bolt	
	X11	KCY-M4850-600	PROXIMITY SW. ASSY.	1	Sensor	
	X12	KCY-M2197-000	DAMPER,2	1	Mechanical stopper damper	
	X13	90112-10J055	BOLT,HEX.SOCKET HEAD	1	Mechanical stopper bolt	
	X14	90189-02J106	NUT,HEXAGON	1	Nut for mechanical stopper bolt	
Y-axis	Y1	KCY-M2510-001	HARMONIC DRIVE ASSY.	1	Speed reduction unit	See section 2 in Chapter 5 of the Installation Manual.
	Y2	KN4-M1896-000	O RING,2	1	Lower O-ring of speed reduction unit	
	Y3	91312-03025	BOLT,HEX.SOCKET HEAD	11	Speed reduction unit mounting bolt	
	Y4	98502-03030	SCREW PAN HEAD (+)	1	Upper dog of speed reduction unit	
	Y5	95302-04700	NUT HEXAGON	1	Nut for dog	
	Y6	92903-03600	WASHER,PLAIN	16	Washer for speed reduction unit mounting bolt	
	Y7	91312-03022	BOLT,HEX.SOCKET HEAD	16	Speed reduction unit mounting bolt	
	Y8	KCY-M4881-000	MOTOR ASSY.,2	1	Motor	
	Y9	91312-04008	BOLT HEX.SOCKET HEAD	2	Motor mounting bolt	
	Y10	KN3-M257K-000	O RING,1	1	O-ring for motor mating	
	Y11	KCY-M2197-000	DAMPER,2	1	Mechanical stopper damper	
	Y12	90189-02J106	NUT,HEXAGON	1	Mechanical stopper bolt	
	Y13	90112-10J055	BOLT,HEX.SOCKET HEAD	1	Nut for mechanical stopper bolt	
	Y14	KCY-M4850-100	PROXIMITY SW. ASSY	1	Sensor	
	Y15	KCY-M1314-001	COVER,4	1	Y-axis cover	
	Y16	92903-03200	WASHER PLAIN	4	Washer for Y-axis cover screw	
	Y17	98902-03006	SCREW BINDING HEAD	4	Y-axis cover screw	
	Y18	98902-03016	SCREW,BINDING HEAD	4	Y-axis cover screw	
	Y19	KCY-M1321-000	LABEL	1	Label on top of Y-axis cover	
Z-axis	Z1	KCY-M4882-001	MOTOR ASSY.,3	1	Motor	These parts need to be replaced as a set.
	Z2	91312-04012	BOLT,HEX.SOCKET HEAD	2	Motor mounting bolt	
	Z3	KCY-M1753-000	COUPLING	1	Coupling	
	Z4	KCY-M1750-000	SCREW,BALL	1	Ball screw	
	Z5	KCY-M1744-000	PLATE	1	Bearing outer ring holding plate	
	Z6	KAI-M2273-000	BEARING	1	Ball screw support bearing	
	Z7	KCY-M1788-000	DAMPER,1	1	Lower end damper	
	Z8	90112-2AJ010	BOLT,HEX.SOCKET HEAD	8	Bolt for outer ring holding plate	
	Z9	KCY-M1778-000	SLEEVE,LOCK 1	1	Bearing inner ring holding plate	
	Z10	KCY-M1712-000	HOLDER	1	Bearing housing	
	Z11	91312-03014	BOLT HEX.SOCKET HEAD	4	Ball screw mounting bolt	
	Z12	91312-04014	BOLT,HEX.SOCKET HEAD	4	Z-axis ASSY mounting bolt	
	Z13	90933-01J002	BEARING	2	Upper bearing of ball spline shaft	
	Z14	KN3-M1788-100	DAMPER,1	1	Upper end damper	
	Z15	KCY-M1780-001	STOPPER,1	1	Upper end stopper	
R-axis	R1	KCY-M1821-000	HARMONIC DRIVE ASSY.	1	Speed reduction unit	See section 2 in Chapter 5 of the Installation Manual.
	R2	KN3-M1895-000	O RING	1	Lower O-ring of speed reduction unit	
	R3	91312-03022	BOLT,HEX.SOCKET HEAD	8	Speed reduction unit mounting bolt	
	R4	90990-17J034	O-RING	1	O-ring for input part of speed reduction unit	
	R5	92903-03600	WASHER,PLAIN	12	Washer for speed reduction unit mounting bolt	
	R6	91312-03014	BOLT,HEX.SOCKET HEAD	12	Speed reduction unit mounting bolt	
	R7	KCY-M1888-000	DOG,R	1	Upper dog of speed reduction unit	
	R8	90990-28J064	WASHER,PLAIN	1	Washer for upper dog of speed reduction unit	
	R9	KCY-M4883-000	MOTOR ASSY.,3	1	Motor	
	R10	91312-05016	BOLT HEX.SOCKET HEAD	4	Motor mounting bolt	
	R11	KN3-M2144-000	O RING,3	1	Lower O-ring of motor	
	R12	KCY-M4850-400	PROXIMITY SW. ASSY	1	Sensor	
	R13	KCY-M1840-001	SPLINE,BALL	1	Ball spline	These parts need to be replaced as a set.
	R14	90990-17J032	O-RING	1	Upper O-ring of ball spline nut (outside)	
	R15	KN5-M181H-000	O RING,4	1	Upper O-ring of ball spline nut (inside)	
	R16	90990-36J002	WASHER,SEAL	4	Seal washer for ball spline nut mounting bolt	
	R17	91312-04012	BOLT,HEX.SOCKET HEAD	4	Ball spline nut mounting bolt	
	R18	KCY-M1886-000	SEAL	1	End face seal inside speed reduction unit	
Cables	C1	KCY-M4843-002	HARNESS,MACHINE 2	1	Machine harness	
	C2	KCB-M6214-011	CABLE,ROBOT	1	Robot cable (3.5m)	
		KCB-M6214-111		1	Robot cable (5m)	
		KCB-M6214-211		1	Robot cable (10m)	
	C3	K58-M4872-101	CONNECTOR E/L 2	1	D-sub connector on base side	
	C4	K58-M4839-001	PANEL,CONECTOR	1	Hood for D-sub connector on base side	
	C5	KN3-M2296-000	BOLT	2	D-sub connector on base side mounting bolt	
	C6	92903-03100	WASHER SPRING	2	D-sub connector on base side mounting spring washer	
	C7	95302-03600	NUT HEXAGON	2	D-sub connector on base side mounting nut	
	C8	K58-M4871-101	CONNECTOR E/L 1	1	D-sub connector on Y-axis arm side	
	C9	K58-M4839-001	PANEL,CONNECTOR	1	Hood for D-sub connector on Y-axis arm side	
	C10	KN3-M2296-000	BOLT	2	D-sub connector on Y-axis arm side mounting bolt	
	C11	92903-03100	WASHER SPRING	2	D-sub connector on Y-axis arm side mounting spring washer	
	C12	95302-03600	NUT HEXAGON	2	D-sub connector on Y-axis arm side mounting nut	

1.2 R6YXGL500, R6YXGL600 Standard type

	No.	Part No.	Part name	Q'ty	Remarks	Recommended replacement timing
X-axis	X1	KCY-M2110-001	HARMONIC DRIVE ASSY.	1	Speed reduction unit	See section 2 in Chapter 5 of the Installation Manual.
	X2	98502-03030	SCREW PAN HEAD (+)	1	Lower dog of speed reduction unit	
	X3	91312-03030	BOLT,HEX.SOCKET HEAD	11	Speed reduction unit mounting bolt	
	X4	95302-04600	NUT HEXAGON	1	Nut for dog	
	X5	92903-03600	WASHER,PLAIN	16	Washer for speed reduction unit mounting bolt	
	X6	91312-03018	BOLT HEX.SOCKET HEAD	16	Speed reduction unit mounting bolt	
	X7	KN4-M257K-000	O RING,1	1	Upper O-ring of speed reduction unit	
	X8	KCY-M4880-001	MOTOR ASSY.,1	1	Motor	
	X9	KN3-M2143-000	O RING.,2	1	O-ring for motor mating	
	X10	91312-05014	BOLT HEX.SOCKET HEAD	4	Motor mounting bolt	
	X11	KCY-M4850-600	PROXIMITY SW. ASSY.	1	Sensor	
	X12	KCY-M2197-000	DAMPER,2	1	Mechanical stopper damper	
	X13	90112-10J055	BOLT,HEX.SOCKET HEAD	1	Mechanical stopper bolt	
	X14	90189-02J106	NUT,HEXAGON	1	Nut for mechanical stopper bolt	
Y-axis	Y1	KCY-M2510-001	HARMONIC DRIVE ASSY.	1	Speed reduction unit	See section 2 in Chapter 5 of the Installation Manual.
	Y2	KN4-M1896-000	O RING,2	1	Lower O-ring of speed reduction unit	
	Y3	91312-03025	BOLT,HEX.SOCKET HEAD	11	Speed reduction unit mounting bolt	
	Y4	98502-03030	SCREW PAN HEAD (+)	1	Upper dog of speed reduction unit	
	Y5	95302-04700	NUT HEXAGON	1	Nut for dog	
	Y6	92903-03600	WASHER,PLAIN	16	Washer for speed reduction unit mounting bolt	
	Y7	91312-03022	BOLT,HEX.SOCKET HEAD	16	Speed reduction unit mounting bolt	
	Y8	KCY-M4881-000	MOTOR ASSY.,2	1	Motor	
	Y9	91312-04008	BOLT HEX.SOCKET HEAD	2	Motor mounting bolt	
	Y10	KN3-M257K-000	O RING,1	1	O-ring for motor mating	
	Y11	KCY-M2197-000	DAMPER,2	1	Mechanical stopper damper	
	Y12	90189-02J106	NUT,HEXAGON	1	Mechanical stopper bolt	
	Y13	90112-10J055	BOLT,HEX.SOCKET HEAD	1	Nut for mechanical stopper bolt	
	Y14	KCY-M4850-100	PROXIMITY SW. ASSY	1	Sensor	
	Y15	KCY-M1314-100	COVER,4	1	Y-axis cover	
	Y16	92903-03200	WASHER PLAIN	4	Washer for Y-axis cover screw	
	Y17	98902-03006	SCREW BINDING HEAD	4	Y-axis cover screw	
	Y18	98902-03016	SCREW,BINDING HEAD	4	Y-axis cover screw	
	Y19	KCY-M1321-000	LABEL	1	Label on top of Y-axis cover	
Z-axis	Z1	KCY-M4882-001	MOTOR ASSY.,3	1	Motor	These parts need to be replaced as a set.
	Z2	91312-04012	BOLT,HEX.SOCKET HEAD	2	Motor mounting bolt	
	Z3	KCY-M1753-000	COUPLING	1	Coupling	
	Z4	KCY-M1750-000	SCREW,BALL	1	Ball screw	
	Z5	KCY-M1744-000	PLATE	1	Bearing outer ring holding plate	
	Z6	KAI-M2273-000	BEARING	1	Ball screw support bearing	
	Z7	KCY-M1788-000	DAMPER,1	1	Lower end damper	
	Z8	90112-2AJ010	BOLT,HEX.SOCKET HEAD	8	Bolt for outer ring holding plate	
	Z9	KCY-M1778-000	SLEEVE,LOCK 1	1	Bearing inner ring holding plate	
	Z10	KCY-M1712-000	HOLDER	1	Bearing housing	
	Z11	91312-03014	BOLT HEX.SOCKET HEAD	4	Ball screw mounting bolt	
	Z12	91312-04014	BOLT,HEX.SOCKET HEAD	4	Z-axis ASSY mounting bolt	
	Z13	90933-01J002	BEARING	2	Upper bearing of ball spline shaft	
	Z14	KN3-M1788-100	DAMPER,1	1	Upper end damper	
	Z15	KCY-M1780-001	STOPPER,1	1	Upper end stopper	
R-axis	R1	KCY-M1821-000	HARMONIC DRIVE ASSY.	1	Speed reduction unit	See section 2 in Chapter 5 of the Installation Manual.
	R2	KN3-M1895-000	O RING	1	Lower O-ring of speed reduction unit	
	R3	91312-03022	BOLT,HEX.SOCKET HEAD	8	Speed reduction unit mounting bolt	
	R4	90990-17J034	O-RING	1	O-ring for input part of speed reduction unit	
	R5	92903-03600	WASHER,PLAIN	12	Washer for speed reduction unit mounting bolt	
	R6	91312-03014	BOLT,HEX.SOCKET HEAD	12	Speed reduction unit mounting bolt	
	R7	KCY-M1888-000	DOG,R	1	Upper dog of speed reduction unit	
	R8	90990-28J064	WASHER,PLAIN	1	Washer for upper dog of speed reduction unit	
	R9	KCY-M4883-000	MOTOR ASSY.,3	1	Motor	
	R10	91312-05016	BOLT HEX.SOCKET HEAD	4	Motor mounting bolt	
	R11	KN3-M2144-000	O RING,3	1	Lower O-ring of motor	
	R12	KCY-M4850-400	PROXIMITY SW. ASSY	1	Sensor	
	R13	KCY-M1840-001	SPLINE,BALL	1	Ball spline	These parts need to be replaced as a set.
	R14	90990-17J032	O-RING	1	Upper O-ring of ball spline nut (outside)	
	R15	KN5-M181H-000	O RING,4	1	Upper O-ring of ball spline nut (inside)	
	R16	90990-36J002	WASHER,SEAL	4	Seal washer for ball spline nut mounting bolt	
	R17	91312-04012	BOLT,HEX.SOCKET HEAD	4	Ball spline nut mounting bolt	
	R18	KCY-M1886-000	SEAL	1	End face seal inside speed reduction unit	
Cables	C1	KCY-M4843-102	HARNESS,MACHINE 2	1	Machine harness	
	C2	KCB-M6214-011	CABLE,ROBOT	1	Robot cable (3.5m)	
		KCB-M6214-111		1	Robot cable (5m)	
		KCB-M6214-211		1	Robot cable (10m)	
	C3	K58-M4872-101	CONNECTOR E/L 2	1	D-sub connector on base side	
	C4	K58-M4839-001	PANEL,CONECTOR	1	Hood for D-sub connector on base side	
	C5	KN3-M2296-000	BOLT	2	D-sub connector on base side mounting bolt	
	C6	92903-03100	WASHER SPRING	2	D-sub connector on base side mounting spring washer	
	C7	95302-03600	NUT HEXAGON	2	D-sub connector on base side mounting nut	
	C8	K58-M4871-101	CONNECTOR E/L 1	1	D-sub connector on Y-axis arm side	
	C9	K58-M4839-001	PANEL,CONNECTOR	1	Hood for D-sub connector on Y-axis arm side	
	C10	KN3-M2296-000	BOLT	2	D-sub connector on Y-axis arm side mounting bolt	
	C11	92903-03100	WASHER SPRING	2	D-sub connector on Y-axis arm side mounting spring washer	
	C12	95302-03600	NUT HEXAGON	2	D-sub connector on Y-axis arm side mounting nut	

Standard type



1.3 R6YXGL250, R6YXGL350, R6YXGL400 Tool flange mount type

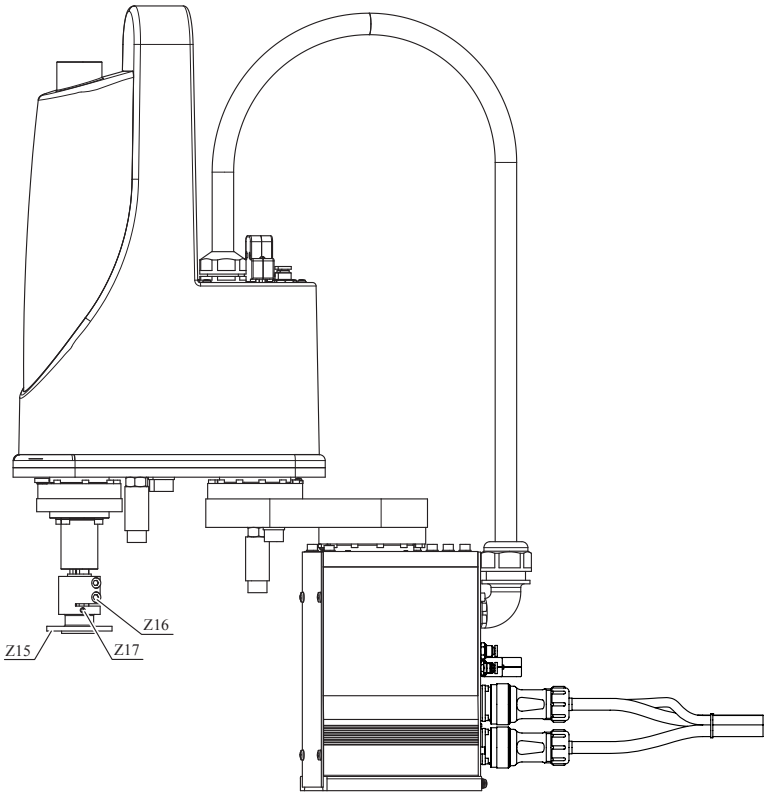
	No.	Part No.	Part name	Q'ty	Remarks	Recommended replacement timing
X-axis	X1	KCY-M2110-001	HARMONIC DRIVE ASSY.	1	Speed reduction unit	See section 2 in Chapter 5 of the Installation Manual.
	X2	98502-03030	SCREW PAN HEAD (+)	1	Lower dog of speed reduction unit	
	X3	91312-03030	BOLT,HEX.SOCKET HEAD	11	Speed reduction unit mounting bolt	
	X4	95302-04600	NUT HEXAGON	1	Nut for dog	
	X5	92903-03600	WASHER,PLAIN	16	Washer for speed reduction unit mounting bolt	
	X6	91312-03018	BOLT HEX.SOCKET HEAD	16	Speed reduction unit mounting bolt	
	X7	KN4-M257K-000	O RING,1	1	Upper O-ring of speed reduction unit	
	X8	KCY-M4880-001	MOTOR ASSY.,1	1	Motor	
	X9	KN3-M2143-000	O RING.,2	1	O-ring for motor mating	
	X10	91312-05014	BOLT HEX.SOCKET HEAD	4	Motor mounting bolt	
	X11	KCY-M4850-600	PROXIMITY SW. ASSY.	1	Sensor	
	X12	KCY-M2197-000	DAMPER,2	1	Mechanical stopper damper	
	X13	90112-10J055	BOLT,HEX.SOCKET HEAD	1	Mechanical stopper bolt	
	X14	90189-02J106	NUT,HEXAGON	1	Nut for mechanical stopper bolt	
Y-axis	Y1	KCY-M2510-001	HARMONIC DRIVE ASSY.	1	Speed reduction unit	See section 2 in Chapter 5 of the Installation Manual.
	Y2	KN4-M1896-000	O RING,2	1	Lower O-ring of speed reduction unit	
	Y3	91312-03025	BOLT,HEX.SOCKET HEAD	11	Speed reduction unit mounting bolt	
	Y4	98502-03030	SCREW PAN HEAD (+)	1	Upper dog of speed reduction unit	
	Y5	95302-04700	NUT HEXAGON	1	Nut for dog	
	Y6	92903-03600	WASHER,PLAIN	16	Washer for speed reduction unit mounting bolt	
	Y7	91312-03022	BOLT,HEX.SOCKET HEAD	16	Speed reduction unit mounting bolt	
	Y8	KCY-M4881-000	MOTOR ASSY.,2	1	Motor	
	Y9	91312-04008	BOLT HEX.SOCKET HEAD	2	Motor mounting bolt	
	Y10	KN3-M257K-000	O RING,1	1	O-ring for motor mating	
	Y11	KCY-M2197-000	DAMPER,2	1	Mechanical stopper damper	
	Y12	90189-02J106	NUT,HEXAGON	1	Mechanical stopper bolt	
	Y13	90112-10J055	BOLT,HEX.SOCKET HEAD	1	Nut for mechanical stopper bolt	
	Y14	KCY-M4850-100	PROXIMITY SW. ASSY	1	Sensor	
	Y15	KCY-M1314-001	COVER,4	1	Y-axis cover	
	Y16	92903-03200	WASHER PLAIN	4	Washer for Y-axis cover screw	
	Y17	98902-03006	SCREW BINDING HEAD	4	Y-axis cover screw	
	Y18	98902-03016	SCREW,BINDING HEAD	4	Y-axis cover screw	
	Y19	KCY-M1321-000	LABEL	1	Label on top of Y-axis cover	
Z-axis	Z1	KCY-M4882-001	MOTOR ASSY.,3	1	Motor	These parts need to be replaced as a set.
	Z2	91312-04012	BOLT,HEX.SOCKET HEAD	2	Motor mounting bolt	
	Z3	KCY-M1753-000	COUPLING	1	Coupling	
	Z4	KCY-M1750-000	SCREW,BALL	1	Ball screw	
	Z5	KCY-M1744-000	PLATE	1	Bearing outer ring holding plate	
	Z6	KAI-M2273-000	BEARING	1	Ball screw support bearing	
	Z7	KCY-M1788-000	DAMPER,1	1	Lower end damper	
	Z8	90112-2AJ010	BOLT,HEX.SOCKET HEAD	8	Bolt for outer ring holding plate	
	Z9	KCY-M1778-000	SLEEVE,LOCK 1	1	Bearing inner ring holding plate	
	Z10	KCY-M1712-000	HOLDER	1	Bearing housing	
	Z11	91312-03014	BOLT HEX.SOCKET HEAD	4	Ball screw mounting bolt	
	Z12	91312-04014	BOLT,HEX.SOCKET HEAD	4	Z-axis ASSY mounting bolt	
	Z13	90933-01J002	BEARING	2	Upper bearing of ball spline shaft	
	Z14	KN3-M1788-100	DAMPER,1	1	Upper end damper	
	Z15	KCY-M1790-000	SHAFT	1	Tool flange	
	Z16	91312-05014	BOLT HEX.SOCKET HEAD	2	Tool flange mounting bolt	
	Z17	92A08-05308	SCREW,SET	1	Tool flange mounting set screw	
R-axis	R1	KCY-M1821-000	HARMONIC DRIVE ASSY.	1	Speed reduction unit	See section 2 in Chapter 5 of the Installation Manual.
	R2	KN3-M1895-000	O RING	1	Lower O-ring of speed reduction unit	
	R3	91312-03022	BOLT,HEX.SOCKET HEAD	8	Speed reduction unit mounting bolt	
	R4	90990-17J034	O-RING	1	O-ring for input part of speed reduction unit	
	R5	92903-03600	WASHER,PLAIN	12	Washer for speed reduction unit mounting bolt	
	R6	91312-03014	BOLT,HEX.SOCKET HEAD	12	Speed reduction unit mounting bolt	
	R7	KCY-M1888-000	DOG,R	1	Upper dog of speed reduction unit	
	R8	90990-28J064	WASHER,PLAIN	1	Washer for upper dog of speed reduction unit	
	R9	KCY-M4883-000	MOTOR ASSY.,3	1	Motor	
	R10	91312-05016	BOLT HEX.SOCKET HEAD	4	Motor mounting bolt	
	R11	KN3-M2144-000	O RING,3	1	Lower O-ring of motor	
	R12	KCY-M4850-400	PROXIMITY SW. ASSY	1	Sensor	
	R13	KCY-M1840-001	SPLINE,BALL	1	Ball spline	These parts need to be replaced as a set.
	R14	90990-17J032	O-RING	1	Upper O-ring of ball spline nut (outside)	
	R15	KN5-M181H-000	O RING,4	1	Upper O-ring of ball spline nut (inside)	
	R16	90990-36J002	WASHER,SEAL	4	Seal washer for ball spline nut mounting bolt	
	R17	91312-04012	BOLT,HEX.SOCKET HEAD	4	Ball spline nut mounting bolt	
	R18	KCY-M1886-000	SEAL	1	End face seal inside speed reduction unit	
Cables	C1	KCY-M4843-002	HARNESS,MACHINE 2	1	Machine harness	
	C2	KCB-M6214-011	CABLE,ROBOT	1	Robot cable (3.5m)	
		KCB-M6214-111		1	Robot cable (5m)	
		KCB-M6214-211		1	Robot cable (10m)	
	C3	K58-M4872-101	CONNECTOR E/L 2	1	D-sub connector on base side	
	C4	K58-M4839-001	PANEL,CONECTOR	1	Hood for D-sub connector on base side	
	C5	KN3-M2296-000	BOLT	2	D-sub connector on base side mounting bolt	
	C6	92903-03100	WASHER SPRING	2	D-sub connector on base side mounting spring washer	
	C7	95302-03600	NUT HEXAGON	2	D-sub connector on base side mounting nut	
	C8	K58-M4871-101	CONNECTOR E/L 1	1	D-sub connector on Y-axis arm side	
	C9	K58-M4839-001	PANEL,CONNECTOR	1	Hood for D-sub connector on Y-axis arm side	
	C10	KN3-M2296-000	BOLT	2	D-sub connector on Y-axis arm side mounting bolt	
	C11	92903-03100	WASHER SPRING	2	D-sub connector on Y-axis arm side mounting spring washer	
	C12	95302-03600	NUT HEXAGON	2	D-sub connector on Y-axis arm side mounting nut	

1.4 R6YXGL500, R6YXGL600 Tool flange mount type

	No.	Part No.	Part name	Q'ty	Remarks	Recommended replacement timing
X-axis	X1	KCY-M2110-001	HARMONIC DRIVE ASSY.	1	Speed reduction unit	See section 2 in Chapter 5 of the Installation Manual.
	X2	98502-03030	SCREW PAN HEAD (+)	1	Lower dog of speed reduction unit	
	X3	91312-03030	BOLT,HEX.SOCKET HEAD	11	Speed reduction unit mounting bolt	
	X4	95302-04600	NUT HEXAGON	1	Nut for dog	
	X5	92903-03600	WASHER,PLAIN	16	Washer for speed reduction unit mounting bolt	
	X6	91312-03018	BOLT HEX.SOCKET HEAD	16	Speed reduction unit mounting bolt	
	X7	KN4-M257K-000	O RING,1	1	Upper O-ring of speed reduction unit	
	X8	KCY-M4880-001	MOTOR ASSY.,1	1	Motor	
	X9	KN3-M2143-000	O RING.,2	1	O-ring for motor mating	
	X10	91312-05014	BOLT HEX.SOCKET HEAD	4	Motor mounting bolt	
	X11	KCY-M4850-600	PROXIMITY SW. ASSY.	1	Sensor	
	X12	KCY-M2197-000	DAMPER,2	1	Mechanical stopper damper	
	X13	90112-10J055	BOLT,HEX.SOCKET HEAD	1	Mechanical stopper bolt	
	X14	90189-02J106	NUT,HEXAGON	1	Nut for mechanical stopper bolt	
Y-axis	Y1	KCY-M2510-001	HARMONIC DRIVE ASSY.	1	Speed reduction unit	See section 2 in Chapter 5 of the Installation Manual.
	Y2	KN4-M1896-000	O RING,2	1	Lower O-ring of speed reduction unit	
	Y3	91312-03025	BOLT,HEX.SOCKET HEAD	11	Speed reduction unit mounting bolt	
	Y4	98502-03030	SCREW PAN HEAD (+)	1	Upper dog of speed reduction unit	
	Y5	95302-04700	NUT HEXAGON	1	Nut for dog	
	Y6	92903-03600	WASHER,PLAIN	16	Washer for speed reduction unit mounting bolt	
	Y7	91312-03022	BOLT,HEX.SOCKET HEAD	16	Speed reduction unit mounting bolt	
	Y8	KCY-M4881-000	MOTOR ASSY.,2	1	Motor	
	Y9	91312-04008	BOLT HEX.SOCKET HEAD	2	Motor mounting bolt	
	Y10	KN3-M257K-000	O RING,1	1	O-ring for motor mating	
	Y11	KCY-M2197-000	DAMPER,2	1	Mechanical stopper damper	
	Y12	90189-02J106	NUT,HEXAGON	1	Mechanical stopper bolt	
	Y13	90112-10J055	BOLT,HEX.SOCKET HEAD	1	Nut for mechanical stopper bolt	
	Y14	KCY-M4850-100	PROXIMITY SW. ASSY	1	Sensor	
	Y15	KCY-M1314-100	COVER,4	1	Y-axis cover	
	Y16	92903-03200	WASHER PLAIN	4	Washer for Y-axis cover screw	
	Y17	98902-03006	SCREW BINDING HEAD	4	Y-axis cover screw	
	Y18	98902-03016	SCREW,BINDING HEAD	4	Y-axis cover screw	
	Y19	KCY-M1321-000	LABEL	1	Label on top of Y-axis cover	
Z-axis	Z1	KCY-M4882-001	MOTOR ASSY.,3	1	Motor	These parts need to be replaced as a set.
	Z2	91312-04012	BOLT,HEX.SOCKET HEAD	2	Motor mounting bolt	
	Z3	KCY-M1753-000	COUPLING	1	Coupling	
	Z4	KCY-M1750-000	SCREW,BALL	1	Ball screw	
	Z5	KCY-M1744-000	PLATE	1	Bearing outer ring holding plate	
	Z6	KAI-M2273-000	BEARING	1	Ball screw support bearing	
	Z7	KCY-M1788-000	DAMPER,1	1	Lower end damper	
	Z8	90112-2AJ010	BOLT,HEX.SOCKET HEAD	8	Bolt for outer ring holding plate	
	Z9	KCY-M1778-000	SLEEVE,LOCK 1	1	Bearing inner ring holding plate	
	Z10	KCY-M1712-000	HOLDER	1	Bearing housing	
	Z11	91312-03014	BOLT HEX.SOCKET HEAD	4	Ball screw mounting bolt	
	Z12	91312-04014	BOLT,HEX.SOCKET HEAD	4	Z-axis ASSY mounting bolt	
	Z13	90933-01J002	BEARING	2	Upper bearing of ball spline shaft	
	Z14	KN3-M1788-100	DAMPER,1	1	Upper end damper	
	Z15	KCY-M1790-000	SHAFT	1	Tool flange	
	Z16	91312-05014	BOLT HEX.SOCKET HEAD	2	Tool flange mounting bolt	
	Z17	92A08-05308	SCREW,SET	1	Tool flange mounting set screw	
R-axis	R1	KCY-M1821-000	HARMONIC DRIVE ASSY.	1	Speed reduction unit	See section 2 in Chapter 5 of the Installation Manual.
	R2	KN3-M1895-000	O RING	1	Lower O-ring of speed reduction unit	
	R3	91312-03022	BOLT,HEX.SOCKET HEAD	8	Speed reduction unit mounting bolt	
	R4	90990-17J034	O-RING	1	O-ring for input part of speed reduction unit	
	R5	92903-03600	WASHER,PLAIN	12	Washer for speed reduction unit mounting bolt	
	R6	91312-03014	BOLT,HEX.SOCKET HEAD	12	Speed reduction unit mounting bolt	
	R7	KCY-M1888-000	DOG,R	1	Upper dog of speed reduction unit	
	R8	90990-28J064	WASHER,PLAIN	1	Washer for upper dog of speed reduction unit	
	R9	KCY-M4883-000	MOTOR ASSY.,3	1	Motor	
	R10	91312-05016	BOLT HEX.SOCKET HEAD	4	Motor mounting bolt	
	R11	KN3-M2144-000	O RING,3	1	Lower O-ring of motor	
	R12	KCY-M4850-400	PROXIMITY SW. ASSY	1	Sensor	
	R13	KCY-M1840-001	SPLINE,BALL	1	Ball spline	These parts need to be replaced as a set.
	R14	90990-17J032	O-RING	1	Upper O-ring of ball spline nut (outside)	
	R15	KN5-M181H-000	O RING,4	1	Upper O-ring of ball spline nut (inside)	
	R16	90990-36J002	WASHER,SEAL	4	Seal washer for ball spline nut mounting bolt	
	R17	91312-04012	BOLT,HEX.SOCKET HEAD	4	Ball spline nut mounting bolt	
	R18	KCY-M1886-000	SEAL	1	End face seal inside speed reduction unit	
Cables	C1	KCY-M4843-102	HARNESS,MACHINE 2	1	Machine harness	
	C2	KCB-M6214-011	CABLE,ROBOT	1	Robot cable (3.5m)	
		KCB-M6214-111		1	Robot cable (5m)	
		KCB-M6214-211		1	Robot cable (10m)	
	C3	K58-M4872-101	CONNECTOR E/L 2	1	D-sub connector on base side	
	C4	K58-M4839-001	PANEL,CONECTOR	1	Hood for D-sub connector on base side	
	C5	KN3-M2296-000	BOLT	2	D-sub connector on base side mounting bolt	
	C6	92903-03100	WASHER SPRING	2	D-sub connector on base side mounting spring washer	
	C7	95302-03600	NUT HEXAGON	2	D-sub connector on base side mounting nut	
	C8	K58-M4871-101	CONNECTOR E/L 1	1	D-sub connector on Y-axis arm side	
	C9	K58-M4839-001	PANEL,CONNECTOR	1	Hood for D-sub connector on Y-axis arm side	
	C10	KN3-M2296-000	BOLT	2	D-sub connector on Y-axis arm side mounting bolt	
	C11	92903-03100	WASHER SPRING	2	D-sub connector on Y-axis arm side mounting spring washer	
	C12	95302-03600	NUT HEXAGON	2	D-sub connector on Y-axis arm side mounting nut	

Tool flange mount type

(Only the pars different from those of the standard type are shown.)



1.5 R6YXGL250, R6YXGL350, R6YXGL400 User wiring/tubing through spline type

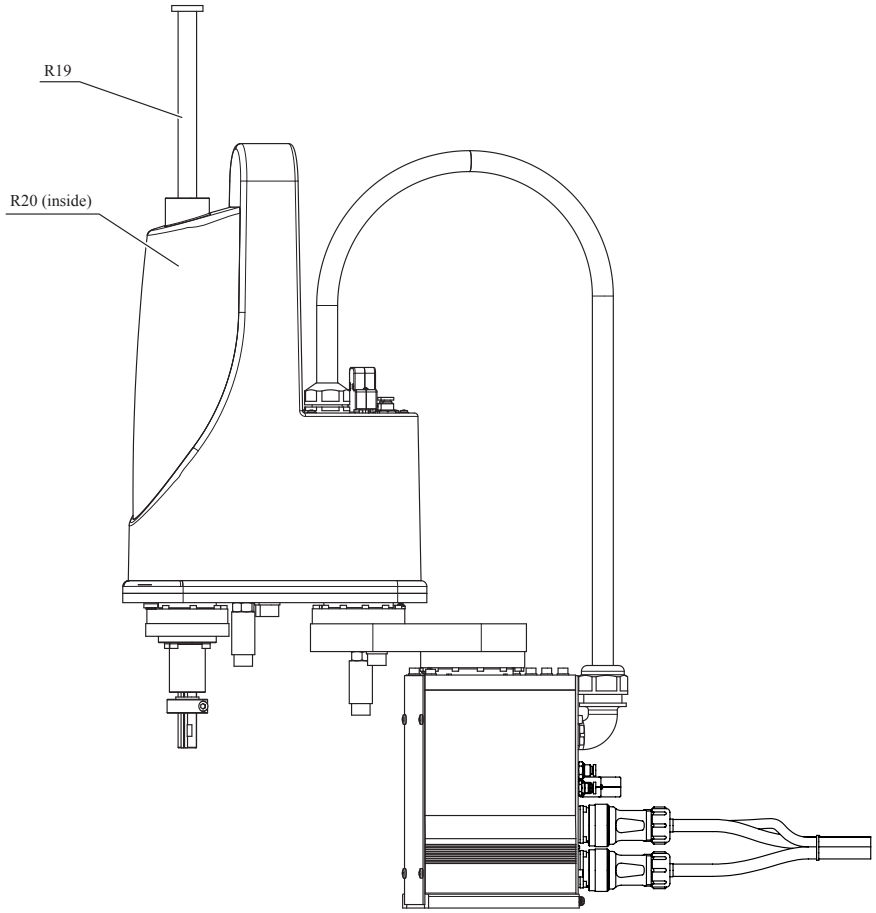
	No.	Part No.	Part name	Q'ty	Remarks	Recommended replacement timing
X-axis	X1	KCY-M2110-001	HARMONIC DRIVE ASSY.	1	Speed reduction unit	See section 2 in Chapter 5 of the Installation Manual.
	X2	98502-03030	SCREW PAN HEAD (+)	1	Lower dog of speed reduction unit	
	X3	91312-03030	BOLT,HEX.SOCKET HEAD	11	Speed reduction unit mounting bolt	
	X4	95302-04600	NUT HEXAGON	1	Nut for dog	
	X5	92903-03600	WASHER,PLAIN	16	Washer for speed reduction unit mounting bolt	
	X6	91312-03018	BOLT HEX.SOCKET HEAD	16	Speed reduction unit mounting bolt	
	X7	KN4-M257K-000	O RING,1	1	Upper O-ring of speed reduction unit	
	X8	KCY-M4880-001	MOTOR ASSY.,1	1	Motor	
	X9	KN3-M2143-000	O RING.,2	1	O-ring for motor mating	
	X10	91312-05014	BOLT HEX.SOCKET HEAD	4	Motor mounting bolt	
	X11	KCY-M4850-600	PROXIMITY SW. ASSY.	1	Sensor	
	X12	KCY-M2197-000	DAMPER,2	1	Mechanical stopper damper	
	X13	90112-10J055	BOLT,HEX.SOCKET HEAD	1	Mechanical stopper bolt	
	X14	90189-02J106	NUT,HEXAGON	1	Nut for mechanical stopper bolt	
Y-axis	Y1	KCY-M2510-001	HARMONIC DRIVE ASSY.	1	Speed reduction unit	See section 2 in Chapter 5 of the Installation Manual.
	Y2	KN4-M1896-000	O RING,2	1	Lower O-ring of speed reduction unit	
	Y3	91312-03025	BOLT,HEX.SOCKET HEAD	11	Speed reduction unit mounting bolt	
	Y4	98502-03030	SCREW PAN HEAD (+)	1	Upper dog of speed reduction unit	
	Y5	95302-04700	NUT HEXAGON	1	Nut for dog	
	Y6	92903-03600	WASHER,PLAIN	16	Washer for speed reduction unit mounting bolt	
	Y7	91312-03022	BOLT,HEX.SOCKET HEAD	16	Speed reduction unit mounting bolt	
	Y8	KCY-M4881-000	MOTOR ASSY.,2	1	Motor	
	Y9	91312-04008	BOLT HEX.SOCKET HEAD	2	Motor mounting bolt	
	Y10	KN3-M257K-000	O RING,1	1	O-ring for motor mating	
	Y11	KCY-M2197-000	DAMPER,2	1	Mechanical stopper damper	
	Y12	90189-02J106	NUT,HEXAGON	1	Mechanical stopper bolt	
	Y13	90112-10J055	BOLT,HEX.SOCKET HEAD	1	Nut for mechanical stopper bolt	
	Y14	KCY-M4850-100	PROXIMITY SW. ASSY	1	Sensor	
	Y15	KCY-M1314-001	COVER,4	1	Y-axis cover	
	Y16	92903-03200	WASHER PLAIN	4	Washer for Y-axis cover screw	
	Y17	98902-03006	SCREW BINDING HEAD	4	Y-axis cover screw	
	Y18	98902-03016	SCREW,BINDING HEAD	4	Y-axis cover screw	
Z-axis	Z1	KCY-M4882-001	MOTOR ASSY.,3	1	Motor	These parts need to be replaced as a set.
	Z2	91312-04012	BOLT,HEX.SOCKET HEAD	2	Motor mounting bolt	
	Z3	KCY-M1753-000	COUPLING	1	Coupling	
	Z4	KCY-M1750-000	SCREW,BALL	1	Ball screw	
	Z5	KCY-M1744-000	PLATE	1	Bearing outer ring holding plate	
	Z6	KAI-M2273-000	BEARING	1	Ball screw support bearing	
	Z7	KCY-M1788-000	DAMPER,1	1	Lower end damper	
	Z8	90112-2AJ010	BOLT,HEX.SOCKET HEAD	8	Bolt for outer ring holding plate	
	Z9	KCY-M1778-000	SLEEVE,LOCK 1	1	Bearing inner ring holding plate	
	Z10	KCY-M1712-000	HOLDER	1	Bearing housing	
	Z11	91312-03014	BOLT HEX.SOCKET HEAD	4	Ball screw mounting bolt	
	Z12	91312-04014	BOLT,HEX.SOCKET HEAD	4	Z-axis ASSY mounting bolt	
	Z13	90933-01J002	BEARING	2	Upper bearing of ball spline shaft	
	Z14	KN3-M1788-100	DAMPER,1	1	Upper end damper	
	Z15	KCY-M1780-001	STOPPER,1	1	Upper end stopper	
R-axis	R1	KCY-M1821-000	HARMONIC DRIVE ASSY.	1	Speed reduction unit	See section 2 in Chapter 5 of the Installation Manual.
	R2	KN3-M1895-000	O RING	1	Lower O-ring of speed reduction unit	
	R3	91312-03022	BOLT,HEX.SOCKET HEAD	8	Speed reduction unit mounting bolt	
	R4	90990-17J034	O-RING	1	O-ring for input part of speed reduction unit	
	R5	92903-03600	WASHER,PLAIN	12	Washer for speed reduction unit mounting bolt	
	R6	91312-03014	BOLT,HEX.SOCKET HEAD	12	Speed reduction unit mounting bolt	
	R7	KCY-M1888-000	DOG,R	1	Upper dog of speed reduction unit	
	R8	90990-28J064	WASHER,PLAIN	1	Washer for upper dog of speed reduction unit	
	R9	KCY-M4883-000	MOTOR ASSY.,3	1	Motor	
	R10	91312-05016	BOLT HEX.SOCKET HEAD	4	Motor mounting bolt	
	R11	KN3-M2144-000	O RING,3	1	Lower O-ring of motor	
	R12	KCY-M4850-400	PROXIMITY SW. ASSY	1	Sensor	
	R13	KCY-M1840-001	SPLINE,BALL	1	Ball spline	These parts need to be replaced as a set.
	R14	90990-17J032	O-RING	1	Upper O-ring of ball spline nut (outside)	
	R15	KN5-M181H-000	O RING,4	1	Upper O-ring of ball spline nut (inside)	
	R16	90990-36J002	WASHER,SEAL	4	Seal washer for ball spline nut mounting bolt	
	R17	91312-04012	BOLT,HEX.SOCKET HEAD	4	Ball spline nut mounting bolt	
	R18	KCY-M1886-000	SEAL	1	End face seal inside speed reduction unit	
	R19	KCY-M1872-000	SHAFT	1	Spline extension shaft	
	R20	91312-03010	BOLT,HEX.SOCKET HEAD	4	Spline extension shaft mounting bolt	
Cables	C1	KCY-M4843-002	HARNESS,MACHINE 2	1	Machine harness	
	C2	KCB-M6214-011	CABLE,ROBOT	1	Robot cable (3.5m)	
		KCB-M6214-111		1	Robot cable (5m)	
		KCB-M6214-211		1	Robot cable (10m)	
	C3	K58-M4872-101	CONNECTOR E/L 2	1	D-sub connector on base side	
	C4	K58-M4839-001	PANEL,CONECTOR	1	Hood for D-sub connector on base side	
	C5	KN3-M2296-000	BOLT	2	D-sub connector on base side mounting bolt	
	C6	92903-03100	WASHER SPRING	2	D-sub connector on base side mounting spring washer	
	C7	95302-03600	NUT HEXAGON	2	D-sub connector on base side mounting nut	
	C8	K58-M4871-101	CONNECTOR E/L 1	1	D-sub connector on Y-axis arm side	
	C9	K58-M4839-001	PANEL,CONNECTOR	1	Hood for D-sub connector on Y-axis arm side	
	C10	KN3-M2296-000	BOLT	2	D-sub connector on Y-axis arm side mounting bolt	
	C11	92903-03100	WASHER SPRING	2	D-sub connector on Y-axis arm side mounting spring washer	
	C12	95302-03600	NUT HEXAGON	2	D-sub connector on Y-axis arm side mounting nut	

1.6 R6YXGL500, R6YXGL600 User wiring/tubing through spline type

	No.	Part No.	Part name	Q'ty	Remarks	Recommended replacement timing
X-axis	X1	KCY-M2110-001	HARMONIC DRIVE ASSY.	1	Speed reduction unit	See section 2 in Chapter 5 of the Installation Manual.
	X2	98502-03030	SCREW PAN HEAD (+)	1	Lower dog of speed reduction unit	
	X3	91312-03030	BOLT,HEX.SOCKET HEAD	11	Speed reduction unit mounting bolt	
	X4	95302-04600	NUT HEXAGON	1	Nut for dog	
	X5	92903-03600	WASHER,PLAIN	16	Washer for speed reduction unit mounting bolt	
	X6	91312-03018	BOLT HEX.SOCKET HEAD	16	Speed reduction unit mounting bolt	
	X7	KN4-M257K-000	O RING,1	1	Upper O-ring of speed reduction unit	
	X8	KCY-M4880-001	MOTOR ASSY.,1	1	Motor	
	X9	KN3-M2143-000	O RING.,2	1	O-ring for motor mating	
	X10	91312-05014	BOLT HEX.SOCKET HEAD	4	Motor mounting bolt	
	X11	KCY-M4850-600	PROXIMITY SW. ASSY.	1	Sensor	
	X12	KCY-M2197-000	DAMPER,2	1	Mechanical stopper damper	
	X13	90112-10J055	BOLT,HEX.SOCKET HEAD	1	Mechanical stopper bolt	
	X14	90189-02J106	NUT,HEXAGON	1	Nut for mechanical stopper bolt	
Y-axis	Y1	KCY-M2510-001	HARMONIC DRIVE ASSY.	1	Speed reduction unit	See section 2 in Chapter 5 of the Installation Manual.
	Y2	KN4-M1896-000	O RING,2	1	Lower O-ring of speed reduction unit	
	Y3	91312-03025	BOLT,HEX.SOCKET HEAD	11	Speed reduction unit mounting bolt	
	Y4	98502-03030	SCREW PAN HEAD (+)	1	Upper dog of speed reduction unit	
	Y5	95302-04700	NUT HEXAGON	1	Nut for dog	
	Y6	92903-03600	WASHER,PLAIN	16	Washer for speed reduction unit mounting bolt	
	Y7	91312-03022	BOLT,HEX.SOCKET HEAD	16	Speed reduction unit mounting bolt	
	Y8	KCY-M4881-000	MOTOR ASSY.,2	1	Motor	
	Y9	91312-04008	BOLT HEX.SOCKET HEAD	2	Motor mounting bolt	
	Y10	KN3-M257K-000	O RING,1	1	O-ring for motor mating	
	Y11	KCY-M2197-000	DAMPER,2	1	Mechanical stopper damper	
	Y12	90189-02J106	NUT,HEXAGON	1	Mechanical stopper bolt	
	Y13	90112-10J055	BOLT,HEX.SOCKET HEAD	1	Nut for mechanical stopper bolt	
	Y14	KCY-M4850-100	PROXIMITY SW. ASSY	1	Sensor	
	Y15	KCY-M1314-100	COVER,4	1	Y-axis cover	
	Y16	92903-03200	WASHER PLAIN	4	Washer for Y-axis cover screw	
	Y17	98902-03006	SCREW BINDING HEAD	4	Y-axis cover screw	
	Y18	98902-03016	SCREW,BINDING HEAD	4	Y-axis cover screw	
Z-axis	Z1	KCY-M4882-001	MOTOR ASSY.,3	1	Motor	These parts need to be replaced as a set.
	Z2	91312-04012	BOLT,HEX.SOCKET HEAD	2	Motor mounting bolt	
	Z3	KCY-M1753-000	COUPLING	1	Coupling	
	Z4	KCY-M1750-000	SCREW,BALL	1	Ball screw	
	Z5	KCY-M1744-000	PLATE	1	Bearing outer ring holding plate	
	Z6	KAI-M2273-000	BEARING	1	Ball screw support bearing	
	Z7	KCY-M1788-000	DAMPER,1	1	Lower end damper	
	Z8	90112-2AJ010	BOLT,HEX.SOCKET HEAD	8	Bolt for outer ring holding plate	
	Z9	KCY-M1778-000	SLEEVE,LOCK 1	1	Bearing inner ring holding plate	
	Z10	KCY-M1712-000	HOLDER	1	Bearing housing	
	Z11	91312-03014	BOLT HEX.SOCKET HEAD	4	Ball screw mounting bolt	
	Z12	91312-04014	BOLT,HEX.SOCKET HEAD	4	Z-axis ASSY mounting bolt	
	Z13	90933-01J002	BEARING	2	Upper bearing of ball spline shaft	
	Z14	KN3-M1788-100	DAMPER,1	1	Upper end damper	
	Z15	KCY-M1780-001	STOPPER,1	1	Upper end stopper	
R-axis	R1	KCY-M1821-000	HARMONIC DRIVE ASSY.	1	Speed reduction unit	See section 2 in Chapter 5 of the Installation Manual.
	R2	KN3-M1895-000	O RING	1	Lower O-ring of speed reduction unit	
	R3	91312-03022	BOLT,HEX.SOCKET HEAD	8	Speed reduction unit mounting bolt	
	R4	90990-17J034	O-RING	1	O-ring for input part of speed reduction unit	
	R5	92903-03600	WASHER,PLAIN	12	Washer for speed reduction unit mounting bolt	
	R6	91312-03014	BOLT,HEX.SOCKET HEAD	12	Speed reduction unit mounting bolt	
	R7	KCY-M1888-000	DOG,R	1	Upper dog of speed reduction unit	
	R8	90990-28J064	WASHER,PLAIN	1	Washer for upper dog of speed reduction unit	
	R9	KCY-M4883-000	MOTOR ASSY.,3	1	Motor	
	R10	91312-05016	BOLT HEX.SOCKET HEAD	4	Motor mounting bolt	
	R11	KN3-M2144-000	O RING,3	1	Lower O-ring of motor	
	R12	KCY-M4850-400	PROXIMITY SW. ASSY	1	Sensor	
	R13	KCY-M1840-001	SPLINE,BALL	1	Ball spline	These parts need to be replaced as a set.
	R14	90990-17J032	O-RING	1	Upper O-ring of ball spline nut (outside)	
	R15	KN5-M181H-000	O RING,4	1	Upper O-ring of ball spline nut (inside)	
	R16	90990-36J002	WASHER,SEAL	4	Seal washer for ball spline nut mounting bolt	
	R17	91312-04012	BOLT,HEX.SOCKET HEAD	4	Ball spline nut mounting bolt	
	R18	KCY-M1886-000	SEAL	1	End face seal inside speed reduction unit	
	R19	KCY-M1872-000	SHAFT	1	Spline extension shaft	
	R20	91312-03010	BOLT,HEX.SOCKET HEAD	4	Spline extension shaft mounting bolt	
Cables	C1	KCY-M4843-102	HARNESS,MACHINE 2	1	Machine harness	
	C2	KCB-M6214-011	CABLE,ROBOT	1	Robot cable (3.5m)	
		KCB-M6214-111		1	Robot cable (5m)	
		KCB-M6214-211		1	Robot cable (10m)	
	C3	K58-M4872-101	CONNECTOR E/L 2	1	D-sub connector on base side	
	C4	K58-M4839-001	PANEL,CONECTOR	1	Hood for D-sub connector on base side	
	C5	KN3-M2296-000	BOLT	2	D-sub connector on base side mounting bolt	
	C6	92903-03100	WASHER SPRING	2	D-sub connector on base side mounting spring washer	
	C7	95302-03600	NUT HEXAGON	2	D-sub connector on base side mounting nut	
	C8	K58-M4871-101	CONNECTOR E/L 1	1	D-sub connector on Y-axis arm side	
	C9	K58-M4839-001	PANEL,CONNECTOR	1	Hood for D-sub connector on Y-axis arm side	
	C10	KN3-M2296-000	BOLT	2	D-sub connector on Y-axis arm side mounting bolt	
	C11	92903-03100	WASHER SPRING	2	D-sub connector on Y-axis arm side mounting spring washer	
	C12	95302-03600	NUT HEXAGON	2	D-sub connector on Y-axis arm side mounting nut	

User wiring/tubing through spline type

(Only the pars different from those of the standard type are shown.)



1.7 R6YXGL250, R6YXGL350, R6YXGL400
Tool flange mount and user wiring/tubing through spline type

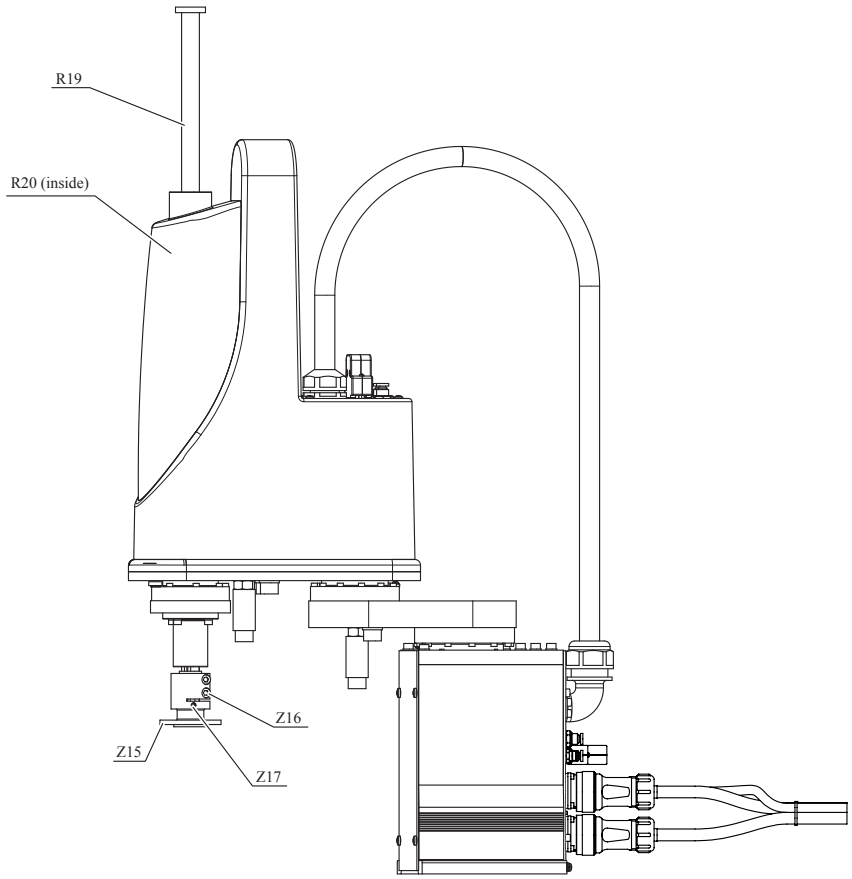
	No.	Part No.	Part name	Q'ty	Remarks	Recommended replacement timing
X-axis	X1	KCY-M2110-001	HARMONIC DRIVE ASSY.	1	Speed reduction unit	See section 2 in Chapter 5 of the Installation Manual.
	X2	98502-03030	SCREW PAN HEAD (+)	1	Lower dog of speed reduction unit	
	X3	91312-03030	BOLT,HEX.SOCKET HEAD	11	Speed reduction unit mounting bolt	
	X4	95302-04600	NUT HEXAGON	1	Nut for dog	
	X5	92903-03600	WASHER,PLAIN	16	Washer for speed reduction unit mounting bolt	
	X6	91312-03018	BOLT HEX.SOCKET HEAD	16	Speed reduction unit mounting bolt	
	X7	KN4-M257K-000	O RING,1	1	Upper O-ring of speed reduction unit	
	X8	KCY-M4880-001	MOTOR ASSY.,1	1	Motor	
	X9	KN3-M2143-000	O RING.,2	1	O-ring for motor mating	
	X10	91312-05014	BOLT HEX.SOCKET HEAD	4	Motor mounting bolt	
	X11	KCY-M4850-600	PROXIMITY SW. ASSY.	1	Sensor	
	X12	KCY-M2197-000	DAMPER,2	1	Mechanical stopper damper	
	X13	90112-10J055	BOLT,HEX.SOCKET HEAD	1	Mechanical stopper bolt	
	X14	90189-02J106	NUT,HEXAGON	1	Nut for mechanical stopper bolt	
Y-axis	Y1	KCY-M2510-001	HARMONIC DRIVE ASSY.	1	Speed reduction unit	See section 2 in Chapter 5 of the Installation Manual.
	Y2	KN4-M1896-000	O RING,2	1	Lower O-ring of speed reduction unit	
	Y3	91312-03025	BOLT,HEX.SOCKET HEAD	11	Speed reduction unit mounting bolt	
	Y4	98502-03030	SCREW PAN HEAD (+)	1	Upper dog of speed reduction unit	
	Y5	95302-04700	NUT HEXAGON	1	Nut for dog	
	Y6	92903-03600	WASHER,PLAIN	16	Washer for speed reduction unit mounting bolt	
	Y7	91312-03022	BOLT,HEX.SOCKET HEAD	16	Speed reduction unit mounting bolt	
	Y8	KCY-M4881-000	MOTOR ASSY.,2	1	Motor	
	Y9	91312-04008	BOLT HEX.SOCKET HEAD	2	Motor mounting bolt	
	Y10	KN3-M257K-000	O RING,1	1	O-ring for motor mating	
	Y11	KCY-M2197-000	DAMPER,2	1	Mechanical stopper damper	
	Y12	90189-02J106	NUT,HEXAGON	1	Mechanical stopper bolt	
	Y13	90112-10J055	BOLT,HEX.SOCKET HEAD	1	Nut for mechanical stopper bolt	
	Y14	KCY-M4850-100	PROXIMITY SW. ASSY	1	Sensor	
	Y15	KCY-M1314-001	COVER,4	1	Y-axis cover	
	Y16	92903-03200	WASHER PLAIN	4	Washer for Y-axis cover screw	
	Y17	98902-03006	SCREW BINDING HEAD	4	Y-axis cover screw	
	Y18	98902-03016	SCREW,BINDING HEAD	4	Y-axis cover screw	
Z-axis	Z1	KCY-M4882-001	MOTOR ASSY.,3	1	Motor	These parts need to be replaced as a set.
	Z2	91312-04012	BOLT,HEX.SOCKET HEAD	2	Motor mounting bolt	
	Z3	KCY-M1753-000	COUPLING	1	Coupling	
	Z4	KCY-M1750-000	SCREW,BALL	1	Ball screw	
	Z5	KCY-M1744-000	PLATE	1	Bearing outer ring holding plate	
	Z6	KAI-M2273-000	BEARING	1	Ball screw support bearing	
	Z7	KCY-M1788-000	DAMPER,1	1	Lower end damper	
	Z8	90112-2AJ010	BOLT,HEX.SOCKET HEAD	8	Bolt for outer ring holding plate	
	Z9	KCY-M1778-000	SLEEVE,LOCK 1	1	Bearing inner ring holding plate	
	Z10	KCY-M1712-000	HOLDER	1	Bearing housing	
	Z11	91312-03014	BOLT HEX.SOCKET HEAD	4	Ball screw mounting bolt	
	Z12	91312-04014	BOLT,HEX.SOCKET HEAD	4	Z-axis ASSY mounting bolt	
	Z13	90933-01J002	BEARING	2	Upper bearing of ball spline shaft	
	Z14	KN3-M1788-100	DAMPER,1	1	Upper end damper	
	Z15	KCY-M1790-000	SHAFT	1	Tool flange	
	Z16	91312-05014	BOLT HEX.SOCKET HEAD	2	Tool flange mounting bolt	
	Z17	92A08-05308	SCREW,SET	1	Tool flange mounting set screw	
R-axis	R1	KCY-M1821-000	HARMONIC DRIVE ASSY.	1	Speed reduction unit	See section 2 in Chapter 5 of the Installation Manual.
	R2	KN3-M1895-000	O RING	1	Lower O-ring of speed reduction unit	
	R3	91312-03022	BOLT,HEX.SOCKET HEAD	8	Speed reduction unit mounting bolt	
	R4	90990-17J034	O-RING	1	O-ring for input part of speed reduction unit	
	R5	92903-03600	WASHER,PLAIN	12	Washer for speed reduction unit mounting bolt	
	R6	91312-03014	BOLT,HEX.SOCKET HEAD	12	Speed reduction unit mounting bolt	
	R7	KCY-M1888-000	DOG,R	1	Upper dog of speed reduction unit	
	R8	90990-28J064	WASHER,PLAIN	1	Washer for upper dog of speed reduction unit	
	R9	KCY-M4883-000	MOTOR ASSY.,3	1	Motor	
	R10	91312-05016	BOLT HEX.SOCKET HEAD	4	Motor mounting bolt	
	R11	KN3-M2144-000	O RING,3	1	Lower O-ring of motor	
	R12	KCY-M4850-400	PROXIMITY SW. ASSY	1	Sensor	
	R13	KCY-M1840-001	SPLINE,BALL	1	Ball spline	These parts need to be replaced as a set.
	R14	90990-17J032	O-RING	1	Upper O-ring of ball spline nut (outside)	
	R15	KN5-M181H-000	O RING,4	1	Upper O-ring of ball spline nut (inside)	
	R16	90990-36J002	WASHER,SEAL	4	Seal washer for ball spline nut mounting bolt	
	R17	91312-04012	BOLT,HEX.SOCKET HEAD	4	Ball spline nut mounting bolt	
	R18	KCY-M1886-000	SEAL	1	End face seal inside speed reduction unit	
	R19	KCY-M1872-000	SHAFT	1	Spline extension shaft	
	R20	91312-03010	BOLT,HEX.SOCKET HEAD	4	Spline extension shaft mounting bolt	
Cables	C1	KCY-M4843-002	HARNESS,MACHINE 2	1	Machine harness	
	C2	KCB-M6214-011	CABLE,ROBOT	1	Robot cable (3.5m)	
		KCB-M6214-111		1	Robot cable (5m)	
		KCB-M6214-211		1	Robot cable (10m)	
	C3	K58-M4872-101	CONNECTOR E/L 2	1	D-sub connector on base side	
	C4	K58-M4839-001	PANEL,CONECTOR	1	Hood for D-sub connector on base side	
	C5	KN3-M2296-000	BOLT	2	D-sub connector on base side mounting bolt	
	C6	92903-03100	WASHER SPRING	2	D-sub connector on base side mounting spring washer	
	C7	95302-03600	NUT HEXAGON	2	D-sub connector on base side mounting nut	
	C8	K58-M4871-101	CONNECTOR E/L 1	1	D-sub connector on Y-axis arm side	
	C9	K58-M4839-001	PANEL,CONNECTOR	1	Hood for D-sub connector on Y-axis arm side	
	C10	KN3-M2296-000	BOLT	2	D-sub connector on Y-axis arm side mounting bolt	
	C11	92903-03100	WASHER SPRING	2	D-sub connector on Y-axis arm side mounting spring washer	
	C12	95302-03600	NUT HEXAGON	2	D-sub connector on Y-axis arm side mounting nut	

1.8 R6YXGL500, R6YXGL600
Tool flange mount and user wiring/tubing through spline type

	No.	Part No.	Part name	Q'ty	Remarks	Recommended replacement timing
X-axis	X1	KCY-M2110-001	HARMONIC DRIVE ASSY.	1	Speed reduction unit	See section 2 in Chapter 5 of the Installation Manual.
	X2	98502-03030	SCREW PAN HEAD (+)	1	Lower dog of speed reduction unit	
	X3	91312-03030	BOLT,HEX.SOCKET HEAD	11	Speed reduction unit mounting bolt	
	X4	95302-04600	NUT HEXAGON	1	Nut for dog	
	X5	92903-03600	WASHER,PLAIN	16	Washer for speed reduction unit mounting bolt	
	X6	91312-03018	BOLT HEX.SOCKET HEAD	16	Speed reduction unit mounting bolt	
	X7	KN4-M257K-000	O RING,1	1	Upper O-ring of speed reduction unit	
	X8	KCY-M4880-001	MOTOR ASSY.,1	1	Motor	
	X9	KN3-M2143-000	O RING.,2	1	O-ring for motor mating	
	X10	91312-05014	BOLT HEX.SOCKET HEAD	4	Motor mounting bolt	
	X11	KCY-M4850-600	PROXIMITY SW. ASSY.	1	Sensor	
	X12	KCY-M2197-000	DAMPER,2	1	Mechanical stopper damper	
	X13	90112-10J055	BOLT,HEX.SOCKET HEAD	1	Mechanical stopper bolt	
	X14	90189-02J106	NUT,HEXAGON	1	Nut for mechanical stopper bolt	
Y-axis	Y1	KCY-M2510-001	HARMONIC DRIVE ASSY.	1	Speed reduction unit	See section 2 in Chapter 5 of the Installation Manual.
	Y2	KN4-M1896-000	O RING,2	1	Lower O-ring of speed reduction unit	
	Y3	91312-03025	BOLT,HEX.SOCKET HEAD	11	Speed reduction unit mounting bolt	
	Y4	98502-03030	SCREW PAN HEAD (+)	1	Upper dog of speed reduction unit	
	Y5	95302-04700	NUT HEXAGON	1	Nut for dog	
	Y6	92903-03600	WASHER,PLAIN	16	Washer for speed reduction unit mounting bolt	
	Y7	91312-03022	BOLT,HEX.SOCKET HEAD	16	Speed reduction unit mounting bolt	
	Y8	KCY-M4881-000	MOTOR ASSY.,2	1	Motor	
	Y9	91312-04008	BOLT HEX.SOCKET HEAD	2	Motor mounting bolt	
	Y10	KN3-M257K-000	O RING,1	1	O-ring for motor mating	
	Y11	KCY-M2197-000	DAMPER,2	1	Mechanical stopper damper	
	Y12	90189-02J106	NUT,HEXAGON	1	Mechanical stopper bolt	
	Y13	90112-10J055	BOLT,HEX.SOCKET HEAD	1	Nut for mechanical stopper bolt	
	Y14	KCY-M4850-100	PROXIMITY SW. ASSY	1	Sensor	
	Y15	KCY-M1314-100	COVER,4	1	Y-axis cover	
	Y16	92903-03200	WASHER PLAIN	4	Washer for Y-axis cover screw	
	Y17	98902-03006	SCREW BINDING HEAD	4	Y-axis cover screw	
	Y18	98902-03016	SCREW,BINDING HEAD	4	Y-axis cover screw	
Z-axis	Z1	KCY-M4882-001	MOTOR ASSY.,3	1	Motor	These parts need to be replaced as a set.
	Z2	91312-04012	BOLT,HEX.SOCKET HEAD	2	Motor mounting bolt	
	Z3	KCY-M1753-000	COUPLING	1	Coupling	
	Z4	KCY-M1750-000	SCREW,BALL	1	Ball screw	
	Z5	KCY-M1744-000	PLATE	1	Bearing outer ring holding plate	
	Z6	KAI-M2273-000	BEARING	1	Ball screw support bearing	
	Z7	KCY-M1788-000	DAMPER,1	1	Lower end damper	
	Z8	90112-2AJ010	BOLT,HEX.SOCKET HEAD	8	Bolt for outer ring holding plate	
	Z9	KCY-M1778-000	SLEEVE,LOCK 1	1	Bearing inner ring holding plate	
	Z10	KCY-M1712-000	HOLDER	1	Bearing housing	
	Z11	91312-03014	BOLT HEX.SOCKET HEAD	4	Ball screw mounting bolt	
	Z12	91312-04014	BOLT,HEX.SOCKET HEAD	4	Z-axis ASSY mounting bolt	
	Z13	90933-01J002	BEARING	2	Upper bearing of ball spline shaft	
	Z14	KN3-M1788-100	DAMPER,1	1	Upper end damper	
	Z15	KCY-M1790-000	SHAFT	1	Tool flange	
	Z16	91312-05014	BOLT HEX.SOCKET HEAD	2	Tool flange mounting bolt	
	Z17	92A08-05308	SCREW,SET	1	Tool flange mounting set screw	
R-axis	R1	KCY-M1821-000	HARMONIC DRIVE ASSY.	1	Speed reduction unit	See section 2 in Chapter 5 of the Installation Manual.
	R2	KN3-M1895-000	O RING	1	Lower O-ring of speed reduction unit	
	R3	91312-03022	BOLT,HEX.SOCKET HEAD	8	Speed reduction unit mounting bolt	
	R4	90990-17J034	O-RING	1	O-ring for input part of speed reduction unit	
	R5	92903-03600	WASHER,PLAIN	12	Washer for speed reduction unit mounting bolt	
	R6	91312-03014	BOLT,HEX.SOCKET HEAD	12	Speed reduction unit mounting bolt	
	R7	KCY-M1888-000	DOG,R	1	Upper dog of speed reduction unit	
	R8	90990-28J064	WASHER,PLAIN	1	Washer for upper dog of speed reduction unit	
	R9	KCY-M4883-000	MOTOR ASSY.,3	1	Motor	
	R10	91312-05016	BOLT HEX.SOCKET HEAD	4	Motor mounting bolt	
	R11	KN3-M2144-000	O RING,3	1	Lower O-ring of motor	
	R12	KCY-M4850-400	PROXIMITY SW. ASSY	1	Sensor	
	R13	KCY-M1840-001	SPLINE,BALL	1	Ball spline	These parts need to be replaced as a set.
	R14	90990-17J032	O-RING	1	Upper O-ring of ball spline nut (outside)	
	R15	KN5-M181H-000	O RING,4	1	Upper O-ring of ball spline nut (inside)	
	R16	90990-36J002	WASHER,SEAL	4	Seal washer for ball spline nut mounting bolt	
	R17	91312-04012	BOLT,HEX.SOCKET HEAD	4	Ball spline nut mounting bolt	
	R18	KCY-M1886-000	SEAL	1	End face seal inside speed reduction unit	
	R19	KCY-M1872-000	SHAFT	1	Spline extension shaft	
	R20	91312-03010	BOLT,HEX.SOCKET HEAD	4	Spline extension shaft mounting bolt	
Cables	C1	KCY-M4843-102	HARNESS,MACHINE 2	1	Machine harness	
	C2	KCB-M6214-011	CABLE,ROBOT	1	Robot cable (3.5m)	
		KCB-M6214-111		1	Robot cable (5m)	
		KCB-M6214-211		1	Robot cable (10m)	
	C3	K58-M4872-101	CONNECTOR E/L 2	1	D-sub connector on base side	
	C4	K58-M4839-001	PANEL,CONECTOR	1	Hood for D-sub connector on base side	
	C5	KN3-M2296-000	BOLT	2	D-sub connector on base side mounting bolt	
	C6	92903-03100	WASHER SPRING	2	D-sub connector on base side mounting spring washer	
	C7	95302-03600	NUT HEXAGON	2	D-sub connector on base side mounting nut	
	C8	K58-M4871-101	CONNECTOR E/L 1	1	D-sub connector on Y-axis arm side	
	C9	K58-M4839-001	PANEL,CONNECTOR	1	Hood for D-sub connector on Y-axis arm side	
	C10	KN3-M2296-000	BOLT	2	D-sub connector on Y-axis arm side mounting bolt	
	C11	92903-03100	WASHER SPRING	2	D-sub connector on Y-axis arm side mounting spring washer	
	C12	95302-03600	NUT HEXAGON	2	D-sub connector on Y-axis arm side mounting nut	

User wiring/tubing through spline and tool flange mount type

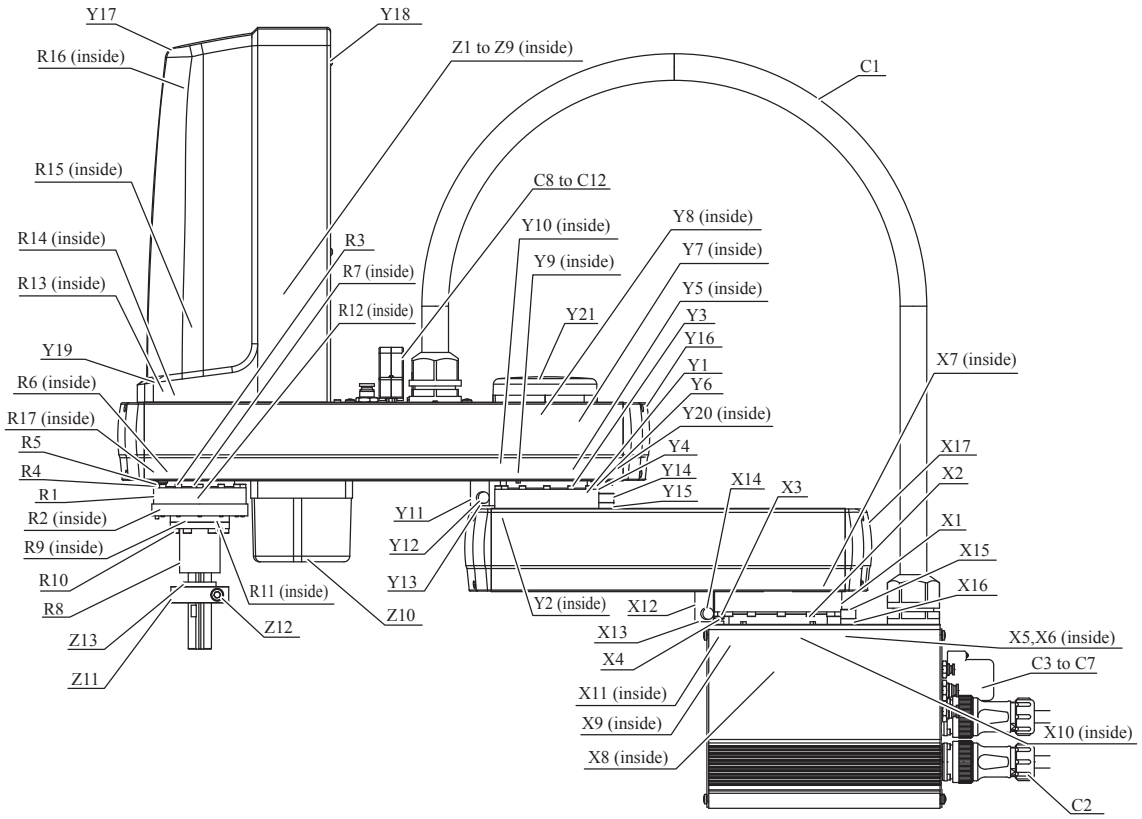
(Only the pars different from those of the standard type are shown.)



1.9 R6YXG500, R6YXG600 Z=200mm stroke type

	No.	Part No.	Part name	Q'ty	Remarks	Recommended replacement timing
X-axis	X1	KBF-M2110-000	HARMONIC DRIVE ASSY.	1	Speed reduction unit	See section 2 in Chapter 5 of the Installation Manual.
	X2	91312-04030	BOLT HEX.SOCKET HEAD	11	Speed reduction unit mounting bolt	
	X3	95302-05600	NUT HEXAGON	1	Nut for dog	
	X4	98502-04030	SCREW PAN HEAD (+)	1	Lower dog of speed reduction unit	
	X5	91312-04020	BOLT HEX.SOCKET HEAD	16	Speed reduction unit mounting bolt	
	X6	92903-04600	WASHER PLAIN	16	Washer for speed reduction unit mounting bolt	
	X7	KN4-M2143-000	O RING,1	1	Upper O-ring of speed reduction unit	
	X8	90K94-8417FX	MOTOR ASSY.,1	1	Motor	
	X9	91312-06016	BOLT HEX.SOCKET HEAD	4	Motor mounting bolt	
	X10	90990-17J030	O-RING	1	Upper O-ring for motor mating	
	X11	KCY-M4850-400	PROXIMITY SW. ASSY	1	Sensor	
	X12	KBF-M2193-001	STOPPER	1	Stopper block	
	X13	91312-06030	BOLT HEX.SOCKET HEAD	2	Bolt for stopper block	
	X14	KN3-M2596-002	DAMPER	2	Damper for stopper block	
	X15	91312-08016	BOLT HEX.SOCKET HEAD	2	Stopper bolt	
	X16	90990-28J091	WASHER,PLAIN	2	Washer for stopper bolt	
	X17	KBF-M1535-000	PLATE,2	2	X-axis arm end cap	
Y-axis	Y1	KBF-M2510-000	HARMONIC DRIVE ASSY.	1	Speed reduction unit	See section 2 in Chapter 5 of the Installation Manual.
	Y2	KN4-M257K-000	O RING,1	1	Lower O-ring of speed reduction unit	
	Y3	91312-03030	BOLT,HEX.SOCKET HEAD	11	Speed reduction unit mounting bolt	
	Y4	95302-04600	NUT HEXAGON	1	Nut for dog	
	Y5	91312-03016	BOLT,HEX.SOCKET HEAD	16	Speed reduction unit mounting bolt	
	Y6	98502-03030	SCREW PAN HEAD (+)	1	Upper dog of speed reduction unit	
	Y7	KBF-M2511-000	TUBE	1	Coil tube of speed reduction unit	
	Y8	90K94-6217FY	MOTOR ASSY.,2	1	Motor	
	Y9	KN3-M2143-000	O RING.,2	1	O-ring for motor mating	
	Y10	91312-05012	BOLT HEX.SOCKET HEAD	4	Motor mounting bolt	
	Y11	KBF-M2587-001	STOPPER,1	1	Stopper block	
	Y12	KN3-M2596-002	DAMPER	2	Damper for stopper block	
	Y13	91312-05025	BOLT HEX.SOCKET HEAD	2	Bolt for stopper block	
	Y14	91312-08016	BOLT HEX.SOCKET HEAD	1	For stopper bolt	
	Y15	90990-28J091	WASHER,PLAIN	1	Washer for stopper bolt	
	Y16	KBF-M1534-000	PLATE,1	2	Y-axis arm end cap	
	Y17	KBF-M1314-002	COVER,4	1	Y-axis arm upper resin cover (Z-axis 200mm)	
	Y18	92012-03008	BOLT,BUTTON HEAD	4	Mounting bolt for rear of Y-axis arm upper resin cover (Z-axis 200mm)	
	Y19	91312-03020	BOLT HEX.SOCKET HEAD	2	Mounting bolt for front of Y-axis arm upper resin cover	
	Y20	KCY-M4850-300	PROXIMITY SW. ASSY	1	Sensor	
	Y21	KBF-M1316-000	COVER,6	1	Y-axis motor resin cover	
Z-axis	Z1	KBF-M4882-002	MOTOR ASSY.,3	1	Motor	These parts need to be replaced as a set.
	Z2	KBP-M1750-001	SCREW,BALL	1	Ball screw (Z-axis 200mm)	
	Z3	KBP-M1778-001	SLEEVE,LOCK	1	Nylon nut	
	Z4	KBP-M1753-003	FLANGE	1	Motor and ball screw shaft connection flange	
	Z5	KBP-M1788-001	DAMPER,1	1	Lower end damper	
	Z6	91312-05014	BOLT HEX.SOCKET HEAD	4	Ball screw nut mounting bolt	
	Z7	91312-03020	BOLT,HEX.SOCKET HEAD	10	Motor and ball screw shaft connection flange mounting bolt	
	Z8	91312-05012	BOLT HEX.SOCKET HEAD	2	Motor mounting bolt	
	Z9	91312-05016	BOLT HEX.SOCKET HEAD	2	Motor mounting bolt	
	Z10	KBF-M1315-000	COVER,5	1	Z-axis motor cover	
	Z11	KBF-M1780-001	STOPPER,1	1	Upper end stopper	
	Z12	91312-06018	BOLT HEX.SOCKET HEAD	1	Upper end stopper mounting bolt	
	Z13	KBF-M1789-001	DAMPER,2	1	Upper end stopper damper	
R-axis	R1	KBF-M1821-100	HARMONIC DRIVE ASSY.	1	Speed reduction unit	See section 2 in Chapter 5 of the Installation Manual.
	R2	KN4-M1896-000	O RING,2	1	Lower O-ring of speed reduction unit	
	R3	91312-03025	BOLT,HEX.SOCKET HEAD	11	Speed reduction unit mounting bolt	
	R4	95302-04600	NUT HEXAGON	1	Nut for upper dog of speed reduction unit	
	R5	98502-03030	SCREW PAN HEAD (+)	1	For upper dog of speed reduction unit	
	R6	91312-03014	BOLT,HEX.SOCKET HEAD	16	Speed reduction unit mounting bolt	
	R7	90990-17J034	O-RING	1	O-ring for input part of speed reduction unit	
	R8	KBF-M1840-002	SPLINE,BALL	1	Ball spline (Z-axis 200mm)	These parts need to be replaced as a set.
	R9	KBF-M1871-000	SHAFT,1	1	Upper collar of ball spline nut	
	R10	91312-04010	BOLT HEX.SOCKET HEAD	6	Ball spline nut mounting bolt	
	R11	90990-17J031	O-RING	1	Upper O-ring of ball spline	
	R12	KBF-M1886-000	SEAL	1	End face seal inside speed reduction unit	
	R13	91312-05014	BOLT HEX.SOCKET HEAD	4	Motor bolt	
	R14	90990-17J032	O-RING	1	Lower O-ring of motor	
	R15	KBF-M4883-002	MOTOR ASSY.,4	1	Motor	
	R16	90933-01J003	BEARING	2	Upper bearing of ball spline	
	R17	KCY-M4850-500	PROXIMITY SW.,ASSY.	1	Sensor	
Cables	C1	KBF-M4843-004	HARNESS,MACHINE 2	1	Machine harness	
	C2	KCB-M6214-011	CABLE,ROBOT	1	Robot cable (3.5m)	
		KCB-M6214-111		1	Robot cable (5m)	
		KCB-M6214-211		1	Robot cable (10m)	
	C3	KN0-M4872-002	CONNCTOR E/L 2	1	D-sub connector on base side	
	C4	KN0-M4839-001	PANEL,CONECTOR	1	Hood for D-sub connector on base side	
	C5	KN3-M2296-000	BOLT	2	D-sub connector on base side mounting bolt	
	C6	92903-03100	WASHER SPRING	2	D-sub connector on base side mounting spring washer	
	C7	95302-03600	NUT HEXAGON	2	D-sub connector on base side mounting nut	
	C8	KN0-M4871-002	CONNCTOR E/L 1	1	D-sub connector on Y-axis arm side	
	C9	KN0-M4839-001	PANEL,CONECTOR	1	Hood for D-sub connector on Y-axis arm side	
	C10	KN3-M2296-000	BOLT	2	D-sub connector on Y-axis arm side mounting bolt	
	C11	92903-03100	WASHER SPRING	2	D-sub connector on Y-axis arm side mounting spring washer	
	C12	95302-03600	NUT HEXAGON	2	D-sub connector on Y-axis arm side mounting nut	
	C13	90990-42J048	JOINT	9	Joint for harness air tube	

Z=200mm stroke type

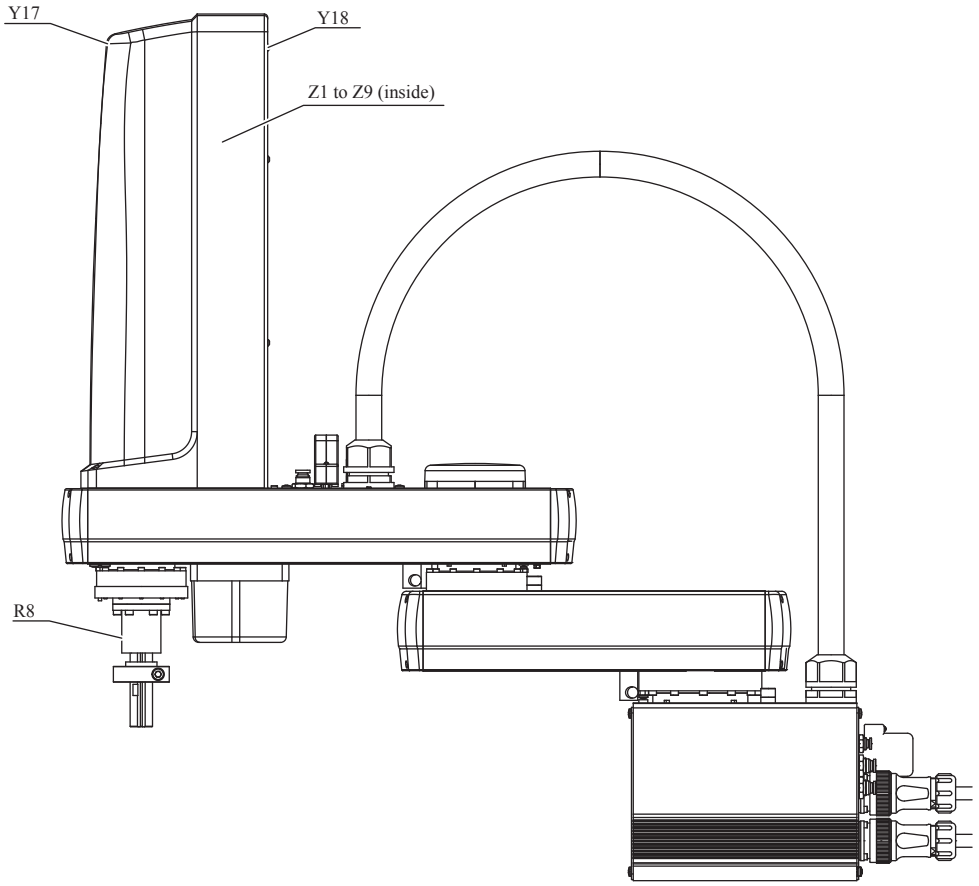


1.10 R6YXG500, R6YXG600 Z=300mm stroke type

	No.	Part No.	Part name	Q'ty	Remarks	Recommended replacement timing
X-axis	X1	KBF-M2110-000	HARMONIC DRIVE ASSY.	1	Speed reduction unit	See section 2 in Chapter 5 of the Installation Manual.
	X2	91312-04030	BOLT HEX.SOCKET HEAD	11	Speed reduction unit mounting bolt	
	X3	95302-05600	NUT HEXAGON	1	Nut for dog	
	X4	98502-04030	SCREW PAN HEAD (+)	1	Lower dog of speed reduction unit	
	X5	91312-04020	BOLT HEX.SOCKET HEAD	16	Speed reduction unit mounting bolt	
	X6	92903-04600	WASHER PLAIN	16	Washer for speed reduction unit mounting bolt	
	X7	KN4-M2143-000	O RING,1	1	Upper O-ring of speed reduction unit	
	X8	90K94-8417FX	MOTOR ASSY.,1	1	Motor	
	X9	91312-06016	BOLT HEX.SOCKET HEAD	4	Motor mounting bolt	
	X10	90990-17J030	O-RING	1	Upper O-ring for motor mating	
	X11	KCY-M4850-400	PROXIMITY SW. ASSY	1	Sensor	
	X12	KBF-M2193-001	STOPPER	1	Stopper block	
	X13	91312-06030	BOLT HEX.SOCKET HEAD	2	Bolt for stopper block	
	X14	KN3-M2596-002	DAMPER	2	Damper for stopper block	
	X15	91312-08016	BOLT HEX.SOCKET HEAD	2	Stopper bolt	
	X16	90990-28J091	WASHER,PLAIN	2	Washer for stopper bolt	
	X17	KBF-M1535-000	PLATE,2	2	X-axis arm end cap	
Y-axis	Y1	KBF-M2510-000	HARMONIC DRIVE ASSY.	1	Speed reduction unit	See section 2 in Chapter 5 of the Installation Manual.
	Y2	KN4-M257K-000	O RING,1	1	Lower O-ring of speed reduction unit	
	Y3	91312-03030	BOLT,HEX.SOCKET HEAD	11	Speed reduction unit mounting bolt	
	Y4	95302-04600	NUT HEXAGON	1	Nut for dog	
	Y5	91312-03016	BOLT,HEX.SOCKET HEAD	16	Speed reduction unit mounting bolt	
	Y6	98502-03030	SCREW PAN HEAD (+)	1	Upper dog of speed reduction unit	
	Y7	KBF-M2511-000	TUBE	1	Coil tube of speed reduction unit	
	Y8	90K94-6217FY	MOTOR ASSY.,2	1	Motor	
	Y9	KN3-M2143-000	O RING.,2	1	O-ring for motor mating	
	Y10	91312-05012	BOLT HEX.SOCKET HEAD	4	Motor mounting bolt	
	Y11	KBF-M2587-001	STOPPER,1	1	Stopper block	
	Y12	KN3-M2596-002	DAMPER	2	Damper for stopper block	
	Y13	91312-05025	BOLT HEX.SOCKET HEAD	2	Bolt for stopper block	
	Y14	91312-08016	BOLT HEX.SOCKET HEAD	1	For stopper bolt	
	Y15	90990-28J091	WASHER,PLAIN	1	Washer for stopper bolt	
	Y16	KBF-M1534-000	PLATE,1	2	Y-axis arm end cap	
	Y17	KBF-M1314-102	COVER,4	1	Y-axis arm upper resin cover (Z-axis 300mm)	
	Y18	92012-03008	BOLT,BUTTON HEAD	6	Mounting bolt for rear of Y-axis arm upper resin cover (Z-axis 300mm)	
	Y19	91312-03020	BOLT HEX.SOCKET HEAD	2	Mounting bolt for front of Y-axis arm upper resin cover	
	Y20	KCY-M4850-300	PROXIMITY SW. ASSY	1	Sensor	
	Y21	KBF-M1316-000	COVER,6	1	Y-axis motor resin cover	
Z-axis	Z1	KBF-M4882-002	MOTOR ASSY.,3	1	Motor	These parts need to be replaced as a set.
	Z2	KBP-M1750-101	SCREW,BALL	1	Ball screw (Z-axis 300mm)	
	Z3	KBP-M1778-001	SLEEVE,LOCK	1	Nylon nut	
	Z4	KBP-M1753-003	FLANGE	1	Motor and ball screw shaft connection flange	
	Z5	KBP-M1788-001	DAMPER,1	1	Lower end damper	
	Z6	91312-05014	BOLT HEX.SOCKET HEAD	4	Ball screw nut mounting bolt	
	Z7	91312-03020	BOLT,HEX.SOCKET HEAD	10	Motor and ball screw shaft connection flange mounting bolt	
	Z8	91312-05012	BOLT HEX.SOCKET HEAD	2	Motor mounting bolt	
	Z9	91312-05016	BOLT HEX.SOCKET HEAD	2	Motor mounting bolt	
	Z10	KBF-M1315-000	COVER,5	1	Z-axis motor cover	
	Z11	KBF-M1780-001	STOPPER,1	1	Upper end stopper	
	Z12	91312-06018	BOLT HEX.SOCKET HEAD	1	Upper end stopper mounting bolt	
	Z13	KBF-M1789-001	DAMPER,2	1	Upper end stopper damper	
R-axis	R1	KBF-M1821-100	HARMONIC DRIVE ASSY.	1	Speed reduction unit	See section 2 in Chapter 5 of the Installation Manual.
	R2	KN4-M1896-000	O RING,2	1	Lower O-ring of speed reduction unit	
	R3	91312-03025	BOLT,HEX.SOCKET HEAD	11	Speed reduction unit mounting bolt	
	R4	95302-04600	NUT HEXAGON	1	Nut for upper dog of speed reduction unit	
	R5	98502-03030	SCREW PAN HEAD (+)	1	For upper dog of speed reduction unit	
	R6	91312-03014	BOLT,HEX.SOCKET HEAD	16	Speed reduction unit mounting bolt	
	R7	90990-17J034	O-RING	1	O-ring for input part of speed reduction unit	
	R8	KBF-M1840-102	SPLINE,BALL	1	Ball spline (Z-axis 300mm)	These parts need to be replaced as a set.
	R9	KBF-M1871-000	SHAFT,1	1	Upper collar of ball spline nut	
	R10	91312-04010	BOLT HEX.SOCKET HEAD	6	Ball spline nut mounting bolt	
	R11	90990-17J031	O-RING	1	Upper O-ring of ball spline	
	R12	KBF-M1886-000	SEAL	1	End face seal inside speed reduction unit	
	R13	91312-05014	BOLT HEX.SOCKET HEAD	4	Motor bolt	
	R14	90990-17J032	O-RING	1	Lower O-ring of motor	
	R15	KBF-M4883-002	MOTOR ASSY.,4	1	Motor	
	R16	90933-01J003	BEARING	2	Upper bearing of ball spline	
	R17	KCY-M4850-500	PROXIMITY SW.,ASSY.	1	Sensor	
Cables	C1	KBF-M4843-004	HARNESS,MACHINE 2	1	Machine harness	
	C2	KCB-M6214-011	CABLE,ROBOT	1	Robot cable (3.5m)	
		KCB-M6214-111		1	Robot cable (5m)	
		KCB-M6214-211		1	Robot cable (10m)	
	C3	KN0-M4872-002	CONNCTOR E/L 2	1	D-sub connector on base side	
	C4	KN0-M4839-001	PANEL,CONECTOR	1	Hood for D-sub connector on base side	
	C5	KN3-M2296-000	BOLT	2	D-sub connector on base side mounting bolt	
	C6	92903-03100	WASHER SPRING	2	D-sub connector on base side mounting spring washer	
	C7	95302-03600	NUT HEXAGON	2	D-sub connector on base side mounting nut	
	C8	KN0-M4871-002	CONNCTOR E/L 1	1	D-sub connector on Y-axis arm side	
	C9	KN0-M4839-001	PANEL,CONECTOR	1	Hood for D-sub connector on Y-axis arm side	
	C10	KN3-M2296-000	BOLT	2	D-sub connector on Y-axis arm side mounting bolt	
	C11	92903-03100	WASHER SPRING	2	D-sub connector on Y-axis arm side mounting spring washer	
	C12	95302-03600	NUT HEXAGON	2	D-sub connector on Y-axis arm side mounting nut	
	C13	90990-42J048	JOINT	9	Joint for harness air tube	

Z=300mm stroke type

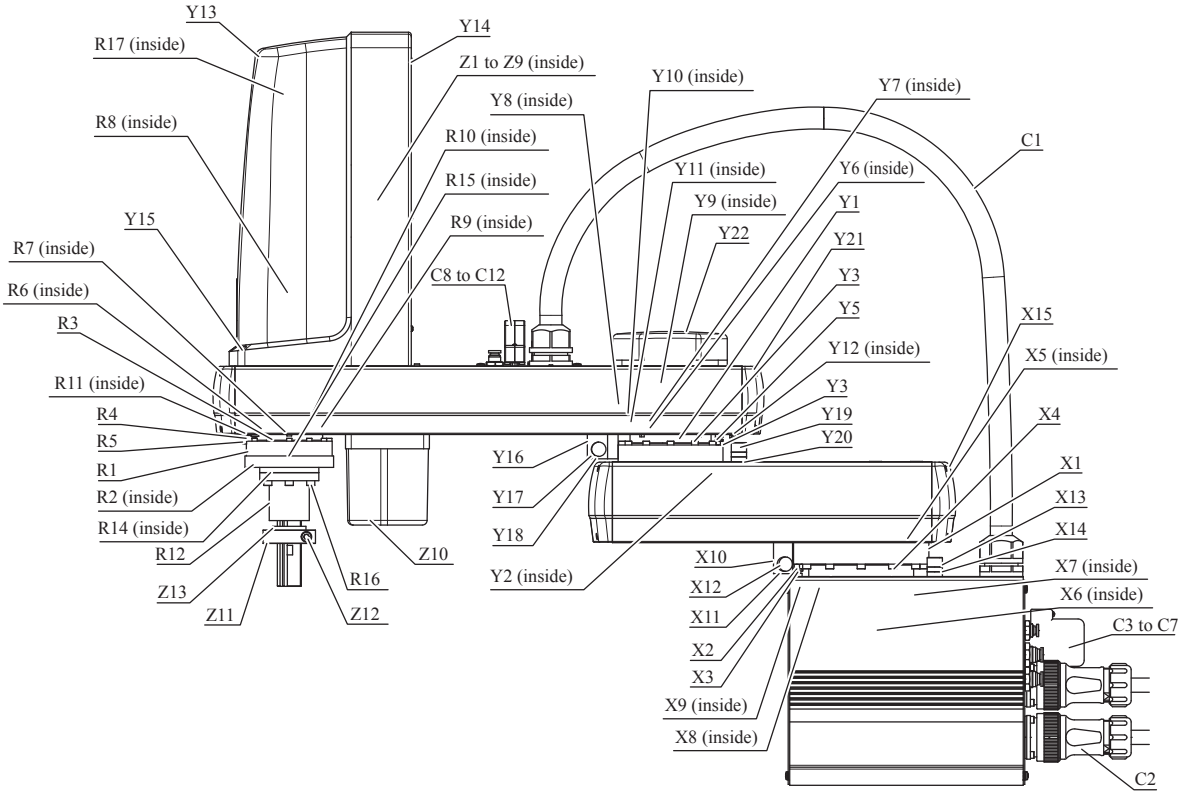
(Only the pars different from those of the Z=200mm stroke type are shown.)



1.11 R6YXGH600 Z=200mm stroke type

	No.	Part No.	Part name	Q'ty	Remarks	Recommended replacement timing
X-axis	X1	KBP-M2110-000	HARMONIC DRIVE ASSY.	1	Speed reduction unit	See section 2 in Chapter 5 of the Installation Manual.
	X2	95302-06600	NUT HEXAGON	1	Nut for dog	
	X3	98502-05040	SCREW PAN HEAD (+)	1	Lower dog of speed reduction unit	
	X4	91312-05040	BOLT HEX.SOCKET HEAD	27	Speed reduction unit mounting bolt	
	X5	KN5-M2159-000	0 RING.,1	1	Upper O-ring of speed reduction unit	
	X6	90K94-8E173X	MOTOR ASSY.,1	1	Motor	
	X7	91312-05016	BOLT HEX.SOCKET HEAD	4	Motor mounting bolt	
	X8	90990-17J035	O-RING	1	Upper O-ring of motor	
	X9	KCY-M4850-500	PROXIMITY SW.,ASSY.	1	Sensor	
	X10	KBP-M2193-001	STOPPER	1	Stopper block	
	X11	91312-08040	BOLT HEX.SOCKET HEAD	2	Stopper block mounting bolt	
	X12	KN5-M2196-001	DAMPER	2	Damper for stopper block	
	X13	90112-10J030	BOLT HEX.S.H	2	Stopper bolt	
	X14	90990-28J093	WASHER,PLAIN	4	Washer for stopper bolt	
	X15	KBP-M1535-000	PLATE,2	2	X-axis arm end cap	
Y-axis	Y1	KBP-M2510-000	HARMONIC DRIVE ASSY.	1	Speed reduction unit	See section 2 in Chapter 5 of the Installation Manual.
	Y2	KN4-M2143-000	O RING,1	1	Lower O-ring of speed reduction unit	
	Y3	91312-04030	BOLT HEX.SOCKET HEAD	11	Speed reduction unit mounting bolt	
	Y4	95302-05600	NUT HEXAGON	1	Nut for dog	
	Y5	98502-04030	SCREW PAN HEAD (+)	1	Upper dog of speed reduction unit	
	Y6	92903-04600	WASHER PLAIN	16	Washer for speed reduction unit mounting bolt	
	Y7	91312-04020	BOLT HEX.SOCKET HEAD	16	Speed reduction unit mounting bolt	
	Y8	KBP-M2511-000	TUBE	1	Coil tube of speed reduction unit	
	Y9	90K94-8417FY	MOTOR ASSY.,2	1	Motor	
	Y10	91312-06016	BOLT HEX.SOCKET HEAD	4	Motor mounting bolt	
	Y11	90990-17J030	O-RING	1	Lower O-ring of motor	
	Y12	KCY-M4850-500	PROXIMITY SW.,ASSY.	1	Sensor	
	Y13	KBP-M1314-003	COVER,4	1	Y-axis arm upper resin cover (Z-axis 200mm)	
	Y14	92012-03008	BOLT,BUTTON HEAD	6	Mounting bolt for rear of Y-axis arm upper resin cover (Z-axis 200mm)	
	Y15	91312-03016	BOLT,HEX.SOCKET HEAD	2	Mounting bolt for front of Y-axis arm upper resin cover (Z-axis 200mm)	
	Y16	KBP-M2587-000	STOPPER,1	1	Stopper block	
	Y17	KN5-M2196-001	DAMPER	2	Damper for stopper block	
	Y18	91312-08035	BOLT HEX.SOCKET HEAD	2	Stopper block mounting bolt	
	Y19	90112-10J025	BOLT HEX.S.H.	2	Stopper bolt	
	Y20	90990-28J093	WASHER,PLAIN	4	Washer for stopper bolt	
	Y21	KBP-M1316-000	COVER,6	1	Upper cover of Y-axis motor	
	Y22	KBF-M1535-000	PLATE,2	2	Y-axis arm end cap	
Z-axis	Z1	KBP-M4882-001	MOTOR ASSY.,3	1	Motor	These parts need to be replaced as a set.
	Z2	KBP-M1750-001	SCREW,BALL	1	Ball screw (Z-axis 200mm)	
	Z3	KBP-M1778-001	SLEEVE,LOCK	1	Nylon nut	
	Z4	KBP-M1753-003	FLANGE	1	Motor and ball screw shaft connection flange	
	Z5	KBP-M1788-001	DAMPER,1	1	Lower end damper	
	Z6	91312-05014	BOLT HEX.SOCKET HEAD	4	Ball screw nut mounting bolt	
	Z7	91312-03020	BOLT,HEX.SOCKET HEAD	10	Motor and ball screw shaft connection flange mounting bolt	
	Z8	91312-05016	BOLT HEX.SOCKET HEAD	2	Motor mounting bolt	
	Z9	91312-05020	BOLT HEX.SOCKET HEAD	2	Motor mounting bolt	
	Z10	KBP-M1315-000	COVER,5	1	Z-axis motor cover	
	Z11	KBP-M1780-001	STOPPER,1	1	Upper end stopper	
	Z12	91312-06020	BOLT HEX.SOCKET HEAD	1	Upper end stopper mounting bolt	
	Z13	KBP-M1789-000	DAMPER,2	1	Upper end stopper damper	
R-axis	R1	KBP-M1821-011	HARMONIC DRIVE ASSY.	1	Speed reduction unit	See section 2 in Chapter 5 of the Installation Manual.
	R2	KN3-M2159-000	O RING.,1	1	Lower O-ring of speed reduction unit	
	R3	91312-03025	BOLT,HEX.SOCKET HEAD	11	Speed reduction unit mounting bolt	
	R4	91312-03030	BOLT,HEX.SOCKET HEAD	1	Dog mounting bolt	
	R5	KBP-M1888-000	DOG,R	1	Upper dog of speed reduction unit	
	R6	91312-03016	BOLT,HEX.SOCKET HEAD	16	Speed reduction unit mounting bolt	
	R7	90990-17J037	O-RING	1	O-ring for input part of speed reduction unit	
	R8	KBP-M4883-001	MOTOR ASSY.,4	1	Motor	
	R9	90990-17J038	O-RING	1	Lower O-ring of motor	
	R10	91312-06016	BOLT HEX.SOCKET HEAD	4	Motor mounting bolt	
	R11	KCY-M4850-900	PROXIMITY SW. ASSY	1	Sensor	
	R12	KBP-M1840-001	SPLINE,BALL	1	Ball spline (Z-axis 200mm)	These parts need to be replaced as a set.
	R13	KBP-M1871-000	SHAFT,1	1	Upper collar of ball spline nut	
	R14	90990-17J036	O-RING	1	Upper O-ring of ball spline nut	
	R15	KBP-M1886-000	SEAL	1	End face seal inside speed reduction unit	
	R16	91312-05014	BOLT HEX.SOCKET HEAD	6	Ball spline nut mounting bolt	
	R17	90933-01J022	BEARING	2	Upper bearing of ball spline nut	
Cables	C1	KBF-M4843-004	HARNESS,MACHINE 2	1	Machine harness (R6YXGH600)	
	C2	KCB-M6214-011	CABLE,ROBOT	1	Robot cable (3.5m)	
		KCB-M6214-111		1	Robot cable (5m)	
		KCB-M6214-211		1	Robot cable (10m)	
	C3	KN0-M4872-002	CONNCTOR E/L 2	1	D-sub connector on base side	
	C4	KN0-M4839-001	PANEL,CONECTOR	1	Hood for D-sub connector on base side	
	C5	KN3-M2296-000	BOLT	2	D-sub connector on base side mounting bolt	
	C6	92903-03100	WASHER SPRING	2	D-sub connector on base side mounting spring washer	
	C7	95302-03600	NUT HEXAGON	2	D-sub connector on base side mounting nut	
	C8	KN0-M4871-002	CONNCTOR E/L 1	1	D-sub connector on Y-axis arm side	
	C9	KN0-M4839-001	PANEL,CONECTOR	1	Hood for D-sub connector on Y-axis arm side	
	C10	KN3-M2296-000	BOLT	2	D-sub connector on Y-axis arm side mounting bolt	
	C11	92903-03100	WASHER SPRING	2	D-sub connector on Y-axis arm side mounting spring washer	
	C12	95302-03600	NUT HEXAGON	2	D-sub connector on Y-axis arm side mounting nut	
	C13	90990-42J048	JOINT	9	Joint for harness air tube	

R6YXGH600 Z=200mm stroke type

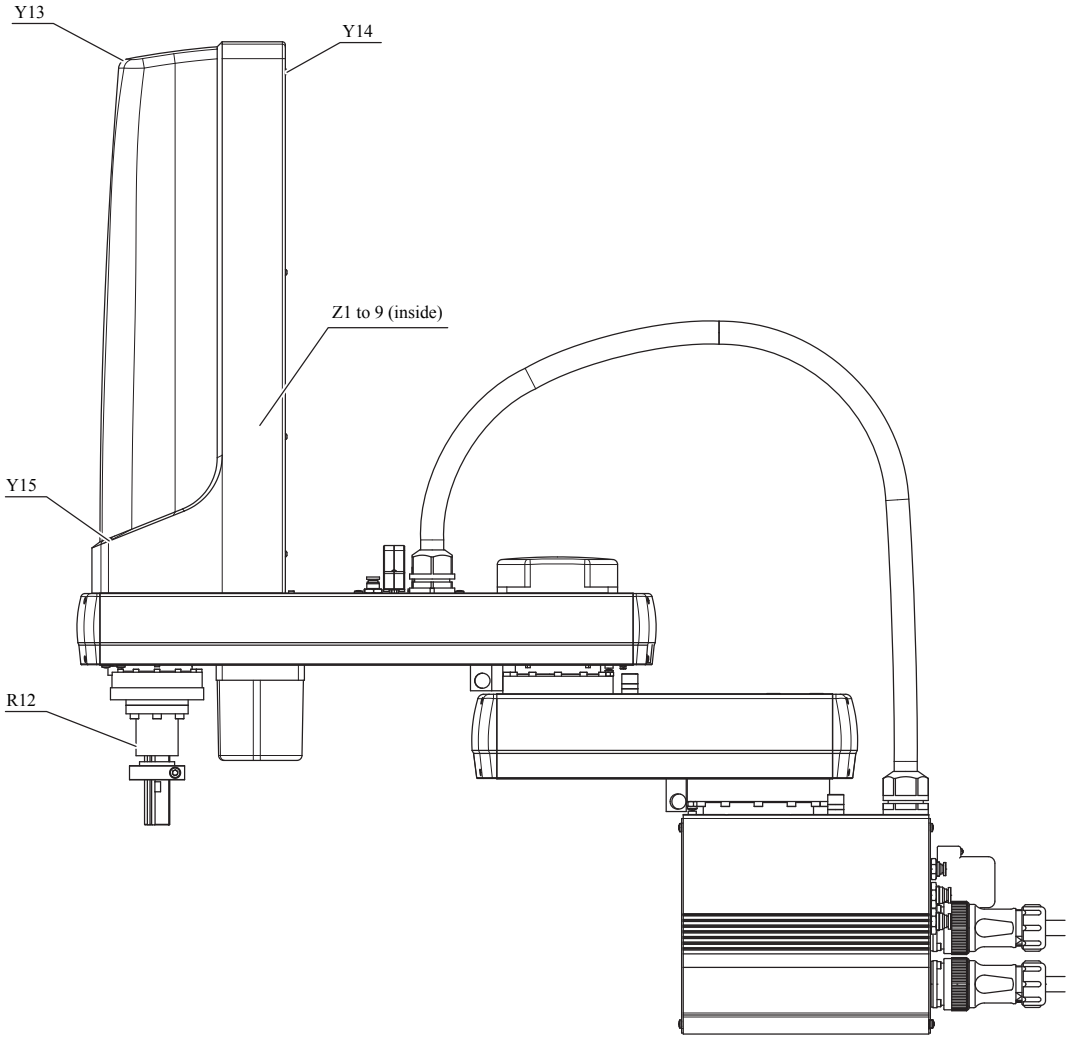


1.12 R6YXGH600 Z=400mm stroke type

	No.	Part No.	Part name	Q'ty	Remarks	Recommended replacement timing
X-axis	X1	KBP-M2110-000	HARMONIC DRIVE ASSY.	1	Speed reduction unit	See section 2 in Chapter 5 of the Installation Manual.
	X2	95302-06600	NUT HEXAGON	1	Nut for dog	
	X3	98502-05040	SCREW PAN HEAD (+)	1	Lower dog of speed reduction unit	
	X4	91312-05040	BOLT HEX.SOCKET HEAD	27	Speed reduction unit mounting bolt	
	X5	KN5-M2159-000	0 RING.,1	1	Upper O-ring of speed reduction unit	
	X6	90K94-8E173X	MOTOR ASSY.,1	1	Motor	
	X7	91312-05016	BOLT HEX.SOCKET HEAD	4	Motor mounting bolt	
	X8	90990-17J035	O-RING	1	Upper O-ring of motor	
	X9	KCY-M4850-500	PROXIMITY SW.,ASSY.	1	Sensor	
	X10	KBP-M2193-001	STOPPER	1	Stopper block	
	X11	91312-08040	BOLT HEX.SOCKET HEAD	2	Stopper block mounting bolt	
	X12	KN5-M2196-001	DAMPER	2	Damper for stopper block	
	X13	90112-10J030	BOLT HEX.S.H	2	Stopper bolt	
	X14	90990-28J093	WASHER,PLAIN	4	Washer for stopper bolt	
	X15	KBP-M1535-000	PLATE,2	2	X-axis arm end cap	
Y-axis	Y1	KBP-M2510-000	HARMONIC DRIVE ASSY.	1	Speed reduction unit	See section 2 in Chapter 5 of the Installation Manual.
	Y2	KN4-M2143-000	O RING,1	1	Lower O-ring of speed reduction unit	
	Y3	91312-04030	BOLT HEX.SOCKET HEAD	11	Speed reduction unit mounting bolt	
	Y4	95302-05600	NUT HEXAGON	1	Nut for dog	
	Y5	98502-04030	SCREW PAN HEAD (+)	1	Upper dog of speed reduction unit	
	Y6	92903-04600	WASHER PLAIN	16	Washer for speed reduction unit mounting bolt	
	Y7	91312-04020	BOLT HEX.SOCKET HEAD	16	Speed reduction unit mounting bolt	
	Y8	KBP-M2511-000	TUBE	1	Coil tube of speed reduction unit	
	Y9	90K94-8417FY	MOTOR ASSY.,2	1	Motor	
	Y10	91312-06016	BOLT HEX.SOCKET HEAD	4	Motor mounting bolt	
	Y11	90990-17J030	O-RING	1	Lower O-ring of motor	
	Y12	KCY-M4850-500	PROXIMITY SW.,ASSY.	1	Sensor	
	Y13	KBP-M1314-102	COVER,4	1	Y-axis arm upper resin cover (Z-axis 400mm)	
	Y14	92012-03008	BOLT,BUTTON HEAD	8	Mounting bolt for rear of Y-axis arm upper resin cover (Z-axis 400mm)	
	Y15	91312-03050	BOLT,HEX.SOCKET HEAD	2	Mounting bolt for front of Y-axis arm upper resin cover (Z-axis 400mm)	
	Y16	KBP-M2587-000	STOPPER,1	1	Stopper block	
	Y17	KN5-M2196-001	DAMPER	2	Damper for stopper block	
	Y18	91312-08035	BOLT HEX.SOCKET HEAD	2	Stopper block mounting bolt	
	Y19	90112-10J025	BOLT HEX.S.H.	2	Stopper bolt	
	Y20	90990-28J093	WASHER,PLAIN	4	Washer for stopper bolt	
	Y21	KBP-M1316-000	COVER,6	1	Upper cover of Y-axis motor	
	Y22	KBF-M1535-000	PLATE,2	2	Y-axis arm end cap	
Z-axis	Z1	KBP-M4882-001	MOTOR ASSY.,3	1	Motor	These parts need to be replaced as a set.
	Z2	KBP-M1750-201	SCREW,BALL	1	Ball screw (Z-axis 400mm)	
	Z3	KBP-M1778-001	SLEEVE,LOCK	1	Nylon nut	
	Z4	KBP-M1753-003	FLANGE	1	Motor and ball screw shaft connection flange	
	Z5	KBP-M1788-001	DAMPER,1	1	Lower end damper	
	Z6	91312-05014	BOLT HEX.SOCKET HEAD	4	Ball screw nut mounting bolt	
	Z7	91312-03020	BOLT,HEX.SOCKET HEAD	10	Motor and ball screw shaft connection flange mounting bolt	
	Z8	91312-05016	BOLT HEX.SOCKET HEAD	2	Motor mounting bolt	
	Z9	91312-05020	BOLT HEX.SOCKET HEAD	2	Motor mounting bolt	
	Z10	KBP-M1315-000	COVER,5	1	Z-axis motor cover	
	Z11	KBP-M1780-001	STOPPER,1	1	Upper end stopper	
	Z12	91312-06020	BOLT HEX.SOCKET HEAD	1	Upper end stopper mounting bolt	
	Z13	KBP-M1789-000	DAMPER,2	1	Upper end stopper damper	
R-axis	R1	KBP-M1821-011	HARMONIC DRIVE ASSY.	1	Speed reduction unit	See section 2 in Chapter 5 of the Installation Manual.
	R2	KN3-M2159-000	O RING.,1	1	Lower O-ring of speed reduction unit	
	R3	91312-03025	BOLT,HEX.SOCKET HEAD	11	Speed reduction unit mounting bolt	
	R4	91312-03030	BOLT,HEX.SOCKET HEAD	1	Dog mounting bolt	
	R5	KBP-M1888-000	DOG,R	1	Upper dog of speed reduction unit	
	R6	91312-03016	BOLT,HEX.SOCKET HEAD	16	Speed reduction unit mounting bolt	
	R7	90990-17J037	O-RING	1	O-ring for input part of speed reduction unit	
	R8	KBP-M4883-001	MOTOR ASSY.,4	1	Motor	
	R9	90990-17J038	O-RING	1	Lower O-ring of motor	
	R10	91312-06016	BOLT HEX.SOCKET HEAD	4	Motor mounting bolt	
	R11	KCY-M4850-900	PROXIMITY SW. ASSY	1	Sensor	
	R12	KBP-M1840-001	SPLINE,BALL	1	Ball spline (Z-axis 400mm)	These parts need to be replaced as a set.
	R13	KBP-M1871-000	SHAFT,1	1	Upper collar of ball spline nut	
	R14	90990-17J036	O-RING	1	Upper O-ring of ball spline nut	
	R15	KBP-M1886-000	SEAL	1	End face seal inside speed reduction unit	
	R16	91312-05014	BOLT HEX.SOCKET HEAD	6	Ball spline nut mounting bolt	
	R17	90933-01J022	BEARING	2	Upper bearing of ball spline nut	
Cables	C1	KBF-M4843-004	HARNESS,MACHINE 2	1	Machine harness (R6YXGH600)	
	C2	KCB-M6214-011	CABLE,ROBOT	1	Robot cable (3.5m)	
		KCB-M6214-111		1	Robot cable (5m)	
		KCB-M6214-211		1	Robot cable (10m)	
	C3	KN0-M4872-002	CONNCTOR E/L 2	1	D-sub connector on base side	
	C4	KN0-M4839-001	PANEL,CONECTOR	1	Hood for D-sub connector on base side	
	C5	KN3-M2296-000	BOLT	2	D-sub connector on base side mounting bolt	
	C6	92903-03100	WASHER SPRING	2	D-sub connector on base side mounting spring washer	
	C7	95302-03600	NUT HEXAGON	2	D-sub connector on base side mounting nut	
	C8	KN0-M4871-002	CONNCTOR E/L 1	1	D-sub connector on Y-axis arm side	
	C9	KN0-M4839-001	PANEL,CONECTOR	1	Hood for D-sub connector on Y-axis arm side	
	C10	KN3-M2296-000	BOLT	2	D-sub connector on Y-axis arm side mounting bolt	
	C11	92903-03100	WASHER SPRING	2	D-sub connector on Y-axis arm side mounting spring washer	
	C12	95302-03600	NUT HEXAGON	2	D-sub connector on Y-axis arm side mounting nut	
	C13	90990-42J048	JOINT	9	Joint for harness air tube	

R6YXGH600 Z=400mm stroke type

(Only the parts different from those of the R6YXGH600 Z=200mm stroke type are shown.)

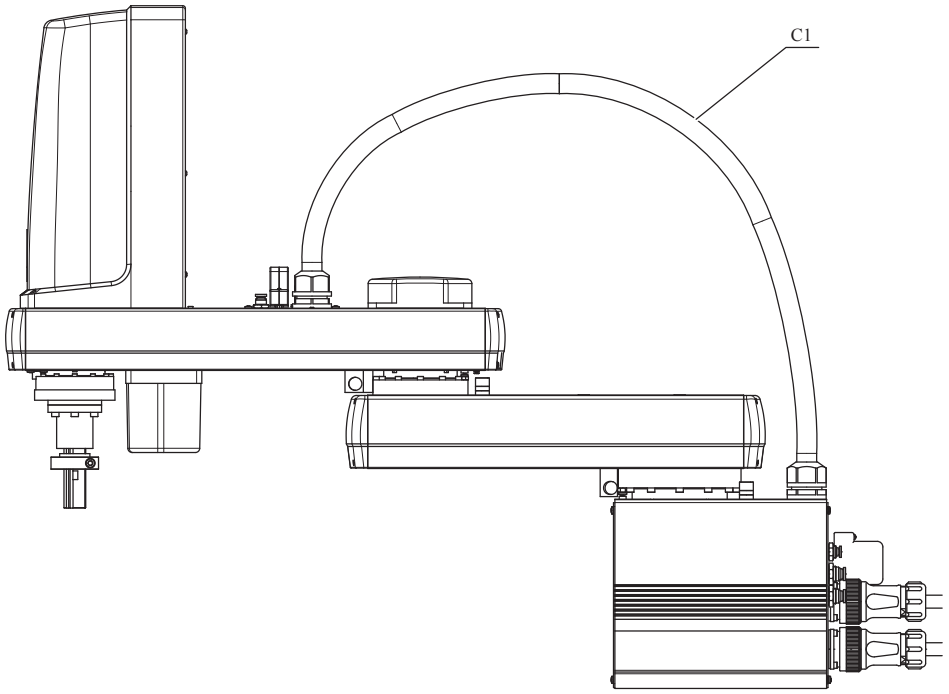


1.13 R6YXG700, R6YXG800 Z=200mm stroke type

	No.	Part No.	Part name	Q'ty	Remarks	Recommended replacement timing
X-axis	X1	KBP-M2110-000	HARMONIC DRIVE ASSY.	1	Speed reduction unit	See section 2 in Chapter 5 of the Installation Manual.
	X2	95302-06600	NUT HEXAGON	1	Nut for dog	
	X3	98502-05040	SCREW PAN HEAD (+)	1	Lower dog of speed reduction unit	
	X4	91312-05040	BOLT HEX.SOCKET HEAD	27	Speed reduction unit mounting bolt	
	X5	KN5-M2159-000	0 RING.,1	1	Upper O-ring of speed reduction unit	
	X6	90K94-8E173X	MOTOR ASSY.,1	1	Motor	
	X7	91312-05016	BOLT HEX.SOCKET HEAD	4	Motor mounting bolt	
	X8	90990-17J035	O-RING	1	Upper O-ring of motor	
	X9	KCY-M4850-500	PROXIMITY SW.,ASSY.	1	Sensor	
	X10	KBP-M2193-001	STOPPER	1	Stopper block	
	X11	91312-08040	BOLT HEX.SOCKET HEAD	2	Stopper block mounting bolt	
	X12	KN5-M2196-001	DAMPER	2	Damper for stopper block	
	X13	90112-10J030	BOLT HEX.S.H	2	Stopper bolt	
	X14	90990-28J093	WASHER,PLAIN	4	Washer for stopper bolt	
	X15	KBP-M1535-000	PLATE,2	2	X-axis arm end cap	
Y-axis	Y1	KBP-M2510-000	HARMONIC DRIVE ASSY.	1	Speed reduction unit	See section 2 in Chapter 5 of the Installation Manual.
	Y2	KN4-M2143-000	O RING,1	1	Lower O-ring of speed reduction unit	
	Y3	91312-04030	BOLT HEX.SOCKET HEAD	11	Speed reduction unit mounting bolt	
	Y4	95302-05600	NUT HEXAGON	1	Nut for dog	
	Y5	98502-04030	SCREW PAN HEAD (+)	1	Upper dog of speed reduction unit	
	Y6	92903-04600	WASHER PLAIN	16	Washer for speed reduction unit mounting bolt	
	Y7	91312-04020	BOLT HEX.SOCKET HEAD	16	Speed reduction unit mounting bolt	
	Y8	KBP-M2511-000	TUBE	1	Coil tube of speed reduction unit	
	Y9	90K94-8417FY	MOTOR ASSY.,2	1	Motor	
	Y10	91312-06016	BOLT HEX.SOCKET HEAD	4	Motor mounting bolt	
	Y11	90990-17J030	O-RING	1	Lower O-ring of motor	
	Y12	KCY-M4850-500	PROXIMITY SW.,ASSY.	1	Sensor	
	Y13	KBP-M1314-003	COVER,4	1	Y-axis arm upper resin cover (Z-axis 200mm)	
	Y14	92012-03008	BOLT,BUTTON HEAD	6	Mounting bolt for rear of Y-axis arm upper resin cover (Z-axis 200mm)	
	Y15	91312-03016	BOLT,HEX.SOCKET HEAD	2	Mounting bolt for front of Y-axis arm upper resin cover (Z-axis 200mm)	
	Y16	KBP-M2587-000	STOPPER,1	1	Stopper block	
	Y17	KN5-M2196-001	DAMPER	2	Damper for stopper block	
	Y18	91312-08035	BOLT HEX.SOCKET HEAD	2	Stopper block mounting bolt	
	Y19	90112-10J025	BOLT HEX.S.H.	2	Stopper bolt	
	Y20	90990-28J093	WASHER,PLAIN	4	Washer for stopper bolt	
	Y21	KBP-M1316-000	COVER,6	1	Upper cover of Y-axis motor	
	Y22	KBF-M1535-000	PLATE,2	2	Y-axis arm end cap	
Z-axis	Z1	KBP-M4882-001	MOTOR ASSY.,3	1	Motor	These parts need to be replaced as a set.
	Z2	KBP-M1750-001	SCREW,BALL	1	Ball screw (Z-axis 200mm)	
	Z3	KBP-M1778-001	SLEEVE,LOCK	1	Nylon nut	
	Z4	KBP-M1753-003	FLANGE	1	Motor and ball screw shaft connection flange	
	Z5	KBP-M1788-001	DAMPER,1	1	Lower end damper	
	Z6	91312-05014	BOLT HEX.SOCKET HEAD	4	Ball screw nut mounting bolt	
	Z7	91312-03020	BOLT,HEX.SOCKET HEAD	10	Motor and ball screw shaft connection flange mounting bolt	
	Z8	91312-05016	BOLT HEX.SOCKET HEAD	2	Motor mounting bolt	
	Z9	91312-05020	BOLT HEX.SOCKET HEAD	2	Motor mounting bolt	
	Z10	KBP-M1315-000	COVER,5	1	Z-axis motor cover	
	Z11	KBP-M1780-001	STOPPER,1	1	Upper end stopper	
	Z12	91312-06020	BOLT HEX.SOCKET HEAD	1	Upper end stopper mounting bolt	
	Z13	KBP-M1789-000	DAMPER,2	1	Upper end stopper damper	
R-axis	R1	KBP-M1821-011	HARMONIC DRIVE ASSY.	1	Speed reduction unit	See section 2 in Chapter 5 of the Installation Manual.
	R2	KN3-M2159-000	O RING.,1	1	Lower O-ring of speed reduction unit	
	R3	91312-03025	BOLT,HEX.SOCKET HEAD	11	Speed reduction unit mounting bolt	
	R4	91312-03030	BOLT,HEX.SOCKET HEAD	1	Dog mounting bolt	
	R5	KBP-M1888-000	DOG,R	1	Upper dog of speed reduction unit	
	R6	91312-03016	BOLT,HEX.SOCKET HEAD	16	Speed reduction unit mounting bolt	
	R7	90990-17J037	O-RING	1	O-ring for input part of speed reduction unit	
	R8	KBP-M4883-001	MOTOR ASSY.,4	1	Motor	
	R9	90990-17J038	O-RING	1	Lower O-ring of motor	
	R10	91312-06016	BOLT HEX.SOCKET HEAD	4	Motor mounting bolt	
	R11	KCY-M4850-900	PROXIMITY SW. ASSY	1	Sensor	
	R12	KBP-M1840-001	SPLINE,BALL	1	Ball spline (Z-axis 200mm)	These parts need to be replaced as a set.
	R13	KBP-M1871-000	SHAFT,1	1	Upper collar of ball spline nut	
	R14	90990-17J036	O-RING	1	Upper O-ring of ball spline nut	
	R15	KBP-M1886-000	SEAL	1	End face seal inside speed reduction unit	
	R16	91312-05014	BOLT HEX.SOCKET HEAD	6	Ball spline nut mounting bolt	
	R17	90933-01J022	BEARING	2	Upper bearing of ball spline nut	
Cables	C1	KBP-M4843-002	HARNESS,MACHINE 2	1	Machine harness (R6YXG700, R6YXG800)	
	C2	KCB-M6214-011	CABLE,ROBOT	1	Robot cable (3.5m)	
		KCB-M6214-111		1	Robot cable (5m)	
		KCB-M6214-211		1	Robot cable (10m)	
	C3	KN0-M4872-002	CONNCTOR E/L 2	1	D-sub connector on base side	
	C4	KN0-M4839-001	PANEL,CONECTOR	1	Hood for D-sub connector on base side	
	C5	KN3-M2296-000	BOLT	2	D-sub connector on base side mounting bolt	
	C6	92903-03100	WASHER SPRING	2	D-sub connector on base side mounting spring washer	
	C7	95302-03600	NUT HEXAGON	2	D-sub connector on base side mounting nut	
	C8	KN0-M4871-002	CONNCTOR E/L 1	1	D-sub connector on Y-axis arm side	
	C9	KN0-M4839-001	PANEL,CONECTOR	1	Hood for D-sub connector on Y-axis arm side	
	C10	KN3-M2296-000	BOLT	2	D-sub connector on Y-axis arm side mounting bolt	
	C11	92903-03100	WASHER SPRING	2	D-sub connector on Y-axis arm side mounting spring washer	
	C12	95302-03600	NUT HEXAGON	2	D-sub connector on Y-axis arm side mounting nut	
	C13	90990-42J048	JOINT	9	Joint for harness air tube	

R6YXG700, R6YXG800 Z=200mm stroke type

(Only the parts different from those of the R6YXGH600 Z=200mm stroke type are shown.)

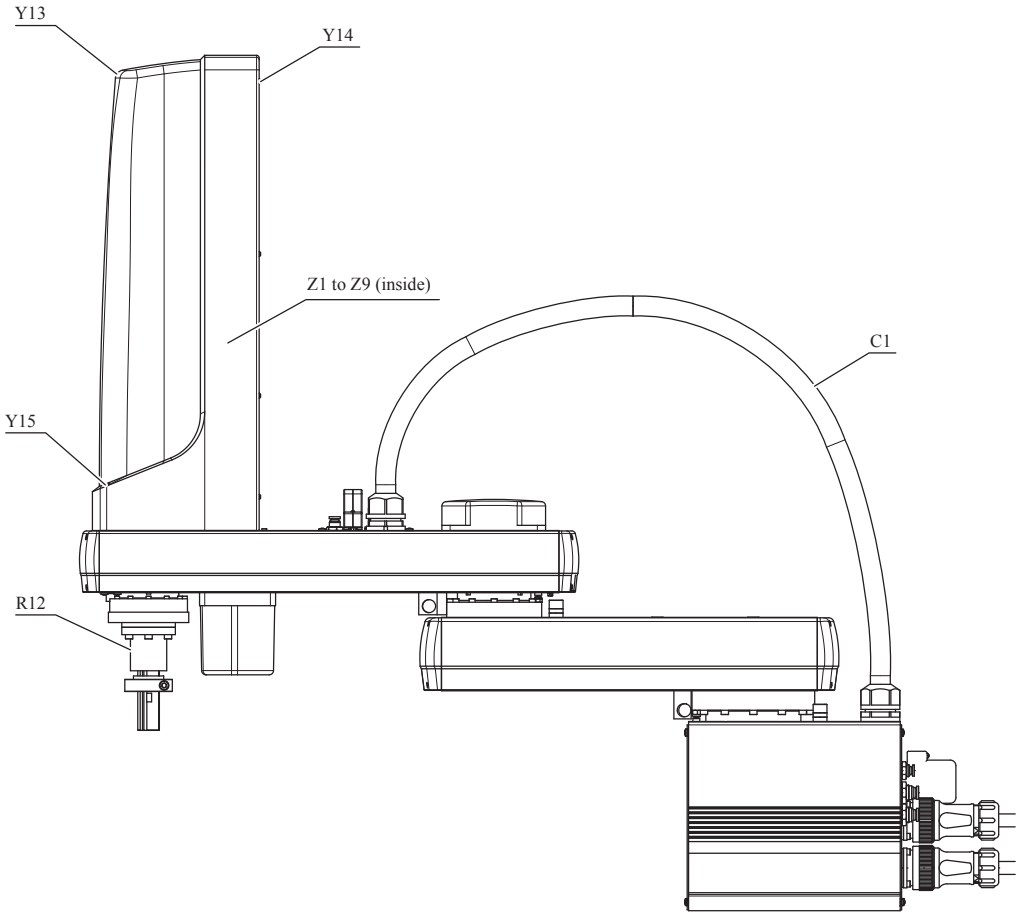


1.14 R6YXG700, R6YXG800 Z=400mm stroke type

	No.	Part No.	Part name	Q'ty	Remarks	Recommended replacement timing
X-axis	X1	KBP-M2110-000	HARMONIC DRIVE ASSY.	1	Speed reduction unit	See section 2 in Chapter 5 of the Installation Manual.
	X2	95302-06600	NUT HEXAGON	1	Nut for dog	
	X3	98502-05040	SCREW PAN HEAD (+)	1	Lower dog of speed reduction unit	
	X4	91312-05040	BOLT HEX.SOCKET HEAD	27	Speed reduction unit mounting bolt	
	X5	KN5-M2159-000	0 RING.,1	1	Upper O-ring of speed reduction unit	
	X6	90K94-8E173X	MOTOR ASSY.,1	1	Motor	
	X7	91312-05016	BOLT HEX.SOCKET HEAD	4	Motor mounting bolt	
	X8	90990-17J035	O-RING	1	Upper O-ring of motor	
	X9	KCY-M4850-500	PROXIMITY SW.,ASSY.	1	Sensor	
	X10	KBP-M2193-001	STOPPER	1	Stopper block	
	X11	91312-08040	BOLT HEX.SOCKET HEAD	2	Stopper block mounting bolt	
	X12	KN5-M2196-001	DAMPER	2	Damper for stopper block	
	X13	90112-10J030	BOLT HEX.S.H	2	Stopper bolt	
	X14	90990-28J093	WASHER,PLAIN	4	Washer for stopper bolt	
	X15	KBP-M1535-000	PLATE,2	2	X-axis arm end cap	
Y-axis	Y1	KBP-M2510-000	HARMONIC DRIVE ASSY.	1	Speed reduction unit	See section 2 in Chapter 5 of the Installation Manual.
	Y2	KN4-M2143-000	O RING,1	1	Lower O-ring of speed reduction unit	
	Y3	91312-04030	BOLT HEX.SOCKET HEAD	11	Speed reduction unit mounting bolt	
	Y4	95302-05600	NUT HEXAGON	1	Nut for dog	
	Y5	98502-04030	SCREW PAN HEAD (+)	1	Upper dog of speed reduction unit	
	Y6	92903-04600	WASHER PLAIN	16	Washer for speed reduction unit mounting bolt	
	Y7	91312-04020	BOLT HEX.SOCKET HEAD	16	Speed reduction unit mounting bolt	
	Y8	KBP-M2511-000	TUBE	1	Coil tube of speed reduction unit	
	Y9	90K94-8417FY	MOTOR ASSY.,2	1	Motor	
	Y10	91312-06016	BOLT HEX.SOCKET HEAD	4	Motor mounting bolt	
	Y11	90990-17J030	O-RING	1	Lower O-ring of motor	
	Y12	KCY-M4850-500	PROXIMITY SW.,ASSY.	1	Sensor	
	Y13	KBP-M1314-102	COVER,4	1	Y-axis arm upper resin cover (Z-axis 400mm)	
	Y14	92012-03008	BOLT,BUTTON HEAD	8	Mounting bolt for rear of Y-axis arm upper resin cover (Z-axis 400mm)	
	Y15	91312-03050	BOLT,HEX.SOCKET HEAD	2	Mounting bolt for front of Y-axis arm upper resin cover (Z-axis 400mm)	
	Y16	KBP-M2587-000	STOPPER,1	1	Stopper block	
	Y17	KN5-M2196-001	DAMPER	2	Damper for stopper block	
	Y18	91312-08035	BOLT HEX.SOCKET HEAD	2	Stopper block mounting bolt	
	Y19	90112-10J025	BOLT HEX.S.H.	2	Stopper bolt	
	Y20	90990-28J093	WASHER,PLAIN	4	Washer for stopper bolt	
	Y21	KBP-M1316-000	COVER,6	1	Upper cover of Y-axis motor	
	Y22	KBF-M1535-000	PLATE,2	2	Y-axis arm end cap	
Z-axis	Z1	KBP-M4882-001	MOTOR ASSY.,3	1	Motor	These parts need to be replaced as a set.
	Z2	KBP-M1750-201	SCREW,BALL	1	Ball screw (Z-axis 400mm)	
	Z3	KBP-M1778-001	SLEEVE,LOCK	1	Nylon nut	
	Z4	KBP-M1753-003	FLANGE	1	Motor and ball screw shaft connection flange	
	Z5	KBP-M1788-001	DAMPER,1	1	Lower end damper	
	Z6	91312-05014	BOLT HEX.SOCKET HEAD	4	Ball screw nut mounting bolt	
	Z7	91312-03020	BOLT,HEX.SOCKET HEAD	10	Motor and ball screw shaft connection flange mounting bolt	
	Z8	91312-05016	BOLT HEX.SOCKET HEAD	2	Motor mounting bolt	
	Z9	91312-05020	BOLT HEX.SOCKET HEAD	2	Motor mounting bolt	
	Z10	KBP-M1315-000	COVER,5	1	Z-axis motor cover	
	Z11	KBP-M1780-001	STOPPER,1	1	Upper end stopper	
	Z12	91312-06020	BOLT HEX.SOCKET HEAD	1	Upper end stopper mounting bolt	
	Z13	KBP-M1789-000	DAMPER,2	1	Upper end stopper damper	
R-axis	R1	KBP-M1821-011	HARMONIC DRIVE ASSY.	1	Speed reduction unit	See section 2 in Chapter 5 of the Installation Manual.
	R2	KN3-M2159-000	O RING.,1	1	Lower O-ring of speed reduction unit	
	R3	91312-03025	BOLT,HEX.SOCKET HEAD	11	Speed reduction unit mounting bolt	
	R4	91312-03030	BOLT,HEX.SOCKET HEAD	1	Dog mounting bolt	
	R5	KBP-M1888-000	DOG,R	1	Upper dog of speed reduction unit	
	R6	91312-03016	BOLT,HEX.SOCKET HEAD	16	Speed reduction unit mounting bolt	
	R7	90990-17J037	O-RING	1	O-ring for input part of speed reduction unit	
	R8	KBP-M4883-001	MOTOR ASSY.,4	1	Motor	
	R9	90990-17J038	O-RING	1	Lower O-ring of motor	
	R10	91312-06016	BOLT HEX.SOCKET HEAD	4	Motor mounting bolt	
	R11	KCY-M4850-900	PROXIMITY SW. ASSY	1	Sensor	
	R12	KBP-M1840-001	SPLINE,BALL	1	Ball spline (Z-axis 400mm)	These parts need to be replaced as a set.
	R13	KBP-M1871-000	SHAFT,1	1	Upper collar of ball spline nut	
	R14	90990-17J036	O-RING	1	Upper O-ring of ball spline nut	
	R15	KBP-M1886-000	SEAL	1	End face seal inside speed reduction unit	
	R16	91312-05014	BOLT HEX.SOCKET HEAD	6	Ball spline nut mounting bolt	
	R17	90933-01J022	BEARING	2	Upper bearing of ball spline nut	
Cables	C1	KBP-M4843-002	HARNESS,MACHINE 2	1	Machine harness (R6YXG700, R6YXG800)	
	C2	KCB-M6214-011	CABLE,ROBOT	1	Robot cable (3.5m)	
		KCB-M6214-111		1	Robot cable (5m)	
		KCB-M6214-211		1	Robot cable (10m)	
	C3	KN0-M4872-002	CONNCTOR E/L 2	1	D-sub connector on base side	
	C4	KN0-M4839-001	PANEL,CONECTOR	1	Hood for D-sub connector on base side	
	C5	KN3-M2296-000	BOLT	2	D-sub connector on base side mounting bolt	
	C6	92903-03100	WASHER SPRING	2	D-sub connector on base side mounting spring washer	
	C7	95302-03600	NUT HEXAGON	2	D-sub connector on base side mounting nut	
	C8	KN0-M4871-002	CONNCTOR E/L 1	1	D-sub connector on Y-axis arm side	
	C9	KN0-M4839-001	PANEL,CONECTOR	1	Hood for D-sub connector on Y-axis arm side	
	C10	KN3-M2296-000	BOLT	2	D-sub connector on Y-axis arm side mounting bolt	
	C11	92903-03100	WASHER SPRING	2	D-sub connector on Y-axis arm side mounting spring washer	
	C12	95302-03600	NUT HEXAGON	2	D-sub connector on Y-axis arm side mounting nut	
	C13	90990-42J048	JOINT	9	Joint for harness air tube	

R6YXG700, R6YXG800 Z=400mm stroke type

(Only the parts different from those of the R6YXGH600 Z=200mm stroke type are shown.)

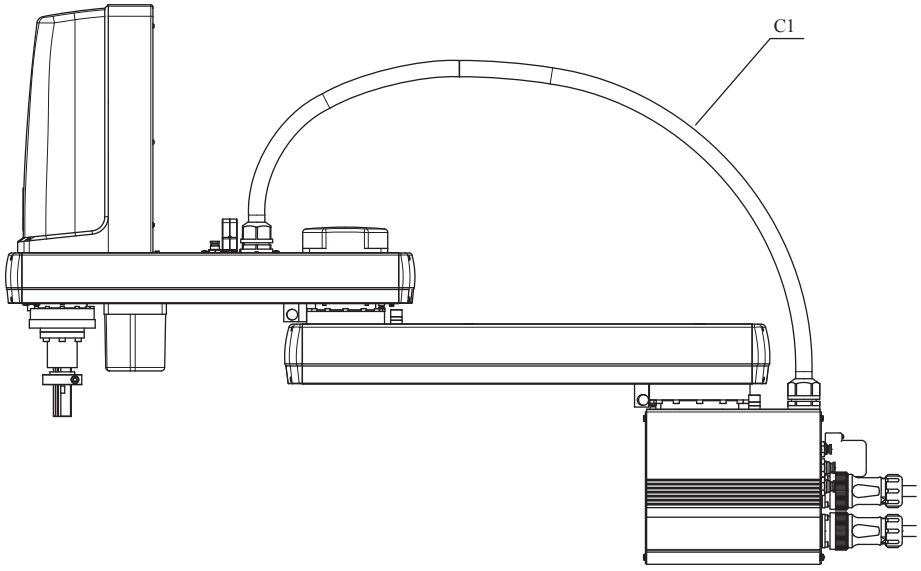


1.15 R6YXG900, R6YXG1000 Z=200mm stroke type

	No.	Part No.	Part name	Q'ty	Remarks	Recommended replacement timing
X-axis	X1	KBP-M2110-000	HARMONIC DRIVE ASSY.	1	Speed reduction unit	See section 2 in Chapter 5 of the Installation Manual.
	X2	95302-06600	NUT HEXAGON	1	Nut for dog	
	X3	98502-05040	SCREW PAN HEAD (+)	1	Lower dog of speed reduction unit	
	X4	91312-05040	BOLT HEX.SOCKET HEAD	27	Speed reduction unit mounting bolt	
	X5	KN5-M2159-000	0 RING.,1	1	Upper O-ring of speed reduction unit	
	X6	90K94-8E173X	MOTOR ASSY.,1	1	Motor	
	X7	91312-05016	BOLT HEX.SOCKET HEAD	4	Motor mounting bolt	
	X8	90990-17J035	O-RING	1	Upper O-ring of motor	
	X9	KCY-M4850-500	PROXIMITY SW.,ASSY.	1	Sensor	
	X10	KBP-M2193-001	STOPPER	1	Stopper block	
	X11	91312-08040	BOLT HEX.SOCKET HEAD	2	Stopper block mounting bolt	
	X12	KN5-M2196-001	DAMPER	2	Damper for stopper block	
	X13	90112-10J030	BOLT HEX.S.H	2	Stopper bolt	
	X14	90990-28J093	WASHER,PLAIN	4	Washer for stopper bolt	
	X15	KBP-M1535-000	PLATE,2	2	X-axis arm end cap	
Y-axis	Y1	KBP-M2510-000	HARMONIC DRIVE ASSY.	1	Speed reduction unit	See section 2 in Chapter 5 of the Installation Manual.
	Y2	KN4-M2143-000	O RING,1	1	Lower O-ring of speed reduction unit	
	Y3	91312-04030	BOLT HEX.SOCKET HEAD	11	Speed reduction unit mounting bolt	
	Y4	95302-05600	NUT HEXAGON	1	Nut for dog	
	Y5	98502-04030	SCREW PAN HEAD (+)	1	Upper dog of speed reduction unit	
	Y6	92903-04600	WASHER PLAIN	16	Washer for speed reduction unit mounting bolt	
	Y7	91312-04020	BOLT HEX.SOCKET HEAD	16	Speed reduction unit mounting bolt	
	Y8	KBP-M2511-000	TUBE	1	Coil tube of speed reduction unit	
	Y9	90K94-8417FY	MOTOR ASSY.,2	1	Motor	
	Y10	91312-06016	BOLT HEX.SOCKET HEAD	4	Motor mounting bolt	
	Y11	90990-17J030	O-RING	1	Lower O-ring of motor	
	Y12	KCY-M4850-500	PROXIMITY SW.,ASSY.	1	Sensor	
	Y13	KBP-M1314-003	COVER,4	1	Y-axis arm upper resin cover (Z-axis 200mm)	
	Y14	92012-03008	BOLT,BUTTON HEAD	6	Mounting bolt for rear of Y-axis arm upper resin cover (Z-axis 200mm)	
	Y15	91312-03016	BOLT,HEX.SOCKET HEAD	2	Mounting bolt for front of Y-axis arm upper resin cover (Z-axis 200mm)	
	Y16	KBP-M2587-000	STOPPER,1	1	Stopper block	
	Y17	KN5-M2196-001	DAMPER	2	Damper for stopper block	
	Y18	91312-08035	BOLT HEX.SOCKET HEAD	2	Stopper block mounting bolt	
	Y19	90112-10J025	BOLT HEX.S.H.	2	Stopper bolt	
	Y20	90990-28J093	WASHER,PLAIN	4	Washer for stopper bolt	
	Y21	KBP-M1316-000	COVER,6	1	Upper cover of Y-axis motor	
	Y22	KBF-M1535-000	PLATE,2	2	Y-axis arm end cap	
Z-axis	Z1	KBP-M4882-001	MOTOR ASSY.,3	1	Motor	These parts need to be replaced as a set.
	Z2	KBP-M1750-001	SCREW,BALL	1	Ball screw (Z-axis 200mm)	
	Z3	KBP-M1778-001	SLEEVE,LOCK	1	Nylon nut	
	Z4	KBP-M1753-003	FLANGE	1	Motor and ball screw shaft connection flange	
	Z5	KBP-M1788-001	DAMPER,1	1	Lower end damper	
	Z6	91312-05014	BOLT HEX.SOCKET HEAD	4	Ball screw nut mounting bolt	
	Z7	91312-03020	BOLT,HEX.SOCKET HEAD	10	Motor and ball screw shaft connection flange mounting bolt	
	Z8	91312-05016	BOLT HEX.SOCKET HEAD	2	Motor mounting bolt	
	Z9	91312-05020	BOLT HEX.SOCKET HEAD	2	Motor mounting bolt	
	Z10	KBP-M1315-000	COVER,5	1	Z-axis motor cover	
	Z11	KBP-M1780-001	STOPPER,1	1	Upper end stopper	
	Z12	91312-06020	BOLT HEX.SOCKET HEAD	1	Upper end stopper mounting bolt	
	Z13	KBP-M1789-000	DAMPER,2	1	Upper end stopper damper	
R-axis	R1	KBP-M1821-011	HARMONIC DRIVE ASSY.	1	Speed reduction unit	See section 2 in Chapter 5 of the Installation Manual.
	R2	KN3-M2159-000	O RING.,1	1	Lower O-ring of speed reduction unit	
	R3	91312-03025	BOLT,HEX.SOCKET HEAD	11	Speed reduction unit mounting bolt	
	R4	91312-03030	BOLT,HEX.SOCKET HEAD	1	Dog mounting bolt	
	R5	KBP-M1888-000	DOG,R	1	Upper dog of speed reduction unit	
	R6	91312-03016	BOLT,HEX.SOCKET HEAD	16	Speed reduction unit mounting bolt	
	R7	90990-17J037	O-RING	1	O-ring for input part of speed reduction unit	
	R8	KBP-M4883-001	MOTOR ASSY.,4	1	Motor	
	R9	90990-17J038	O-RING	1	Lower O-ring of motor	
	R10	91312-06016	BOLT HEX.SOCKET HEAD	4	Motor mounting bolt	
	R11	KCY-M4850-900	PROXIMITY SW. ASSY	1	Sensor	
	R12	KBP-M1840-001	SPLINE,BALL	1	Ball spline (Z-axis 200mm)	These parts need to be replaced as a set.
	R13	KBP-M1871-000	SHAFT,1	1	Upper collar of ball spline nut	
	R14	90990-17J036	O-RING	1	Upper O-ring of ball spline nut	
	R15	KBP-M1886-000	SEAL	1	End face seal inside speed reduction unit	
	R16	91312-05014	BOLT HEX.SOCKET HEAD	6	Ball spline nut mounting bolt	
	R17	90933-01J022	BEARING	2	Upper bearing of ball spline nut	
Cables	C1	KBP-M4843-102	HARNESS,MACHINE 2	1	Machine harness (R6YXG900, R6YXG1000)	
	C2	KCB-M6214-011	CABLE,ROBOT	1	Robot cable (3.5m)	
		KCB-M6214-111		1	Robot cable (5m)	
		KCB-M6214-211		1	Robot cable (10m)	
	C3	KN0-M4872-002	CONNCTOR E/L 2	1	D-sub connector on base side	
	C4	KN0-M4839-001	PANEL,CONECTOR	1	Hood for D-sub connector on base side	
	C5	KN3-M2296-000	BOLT	2	D-sub connector on base side mounting bolt	
	C6	92903-03100	WASHER SPRING	2	D-sub connector on base side mounting spring washer	
	C7	95302-03600	NUT HEXAGON	2	D-sub connector on base side mounting nut	
	C8	KN0-M4871-002	CONNCTOR E/L 1	1	D-sub connector on Y-axis arm side	
	C9	KN0-M4839-001	PANEL,CONECTOR	1	Hood for D-sub connector on Y-axis arm side	
	C10	KN3-M2296-000	BOLT	2	D-sub connector on Y-axis arm side mounting bolt	
	C11	92903-03100	WASHER SPRING	2	D-sub connector on Y-axis arm side mounting spring washer	
	C12	95302-03600	NUT HEXAGON	2	D-sub connector on Y-axis arm side mounting nut	
	C13	90990-42J048	JOINT	9	Joint for harness air tube	

R6YXG900, R6YXG1000 Z=200mm stroke type

(Only the parts different from those of the R6YXGH600 Z=200mm stroke type are shown.)

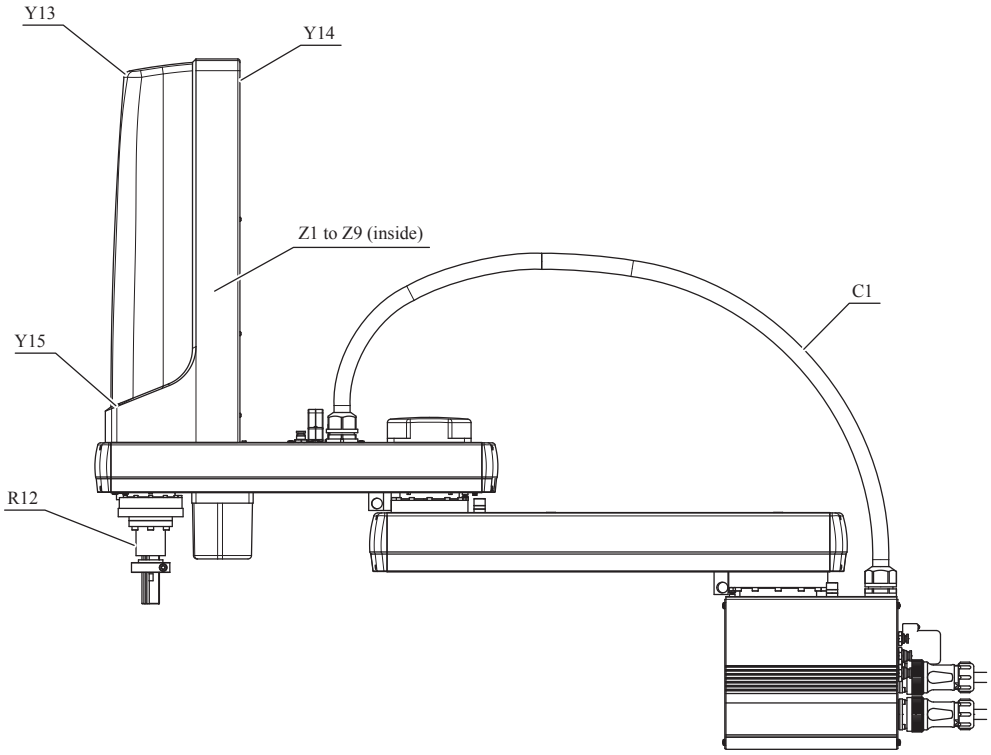


1.16 R6YXG900, R6YXG1000 Z=400mm stroke type

	No.	Part No.	Part name	Q'ty	Remarks	Recommended replacement timing
X-axis	X1	KBP-M2110-000	HARMONIC DRIVE ASSY.	1	Speed reduction unit	See section 2 in Chapter 5 of the Installation Manual.
	X2	95302-06600	NUT HEXAGON	1	Nut for dog	
	X3	98502-05040	SCREW PAN HEAD (+)	1	Lower dog of speed reduction unit	
	X4	91312-05040	BOLT HEX.SOCKET HEAD	27	Speed reduction unit mounting bolt	
	X5	KN5-M2159-000	0 RING.,1	1	Upper O-ring of speed reduction unit	
	X6	90K94-8E173X	MOTOR ASSY.,1	1	Motor	
	X7	91312-05016	BOLT HEX.SOCKET HEAD	4	Motor mounting bolt	
	X8	90990-17J035	O-RING	1	Upper O-ring of motor	
	X9	KCY-M4850-500	PROXIMITY SW.,ASSY.	1	Sensor	
	X10	KBP-M2193-001	STOPPER	1	Stopper block	
	X11	91312-08040	BOLT HEX.SOCKET HEAD	2	Stopper block mounting bolt	
	X12	KN5-M2196-001	DAMPER	2	Damper for stopper block	
	X13	90112-10J030	BOLT HEX.S.H	2	Stopper bolt	
	X14	90990-28J093	WASHER,PLAIN	4	Washer for stopper bolt	
	X15	KBP-M1535-000	PLATE,2	2	X-axis arm end cap	
Y-axis	Y1	KBP-M2510-000	HARMONIC DRIVE ASSY.	1	Speed reduction unit	See section 2 in Chapter 5 of the Installation Manual.
	Y2	KN4-M2143-000	O RING,1	1	Lower O-ring of speed reduction unit	
	Y3	91312-04030	BOLT HEX.SOCKET HEAD	11	Speed reduction unit mounting bolt	
	Y4	95302-05600	NUT HEXAGON	1	Nut for dog	
	Y5	98502-04030	SCREW PAN HEAD (+)	1	Upper dog of speed reduction unit	
	Y6	92903-04600	WASHER PLAIN	16	Washer for speed reduction unit mounting bolt	
	Y7	91312-04020	BOLT HEX.SOCKET HEAD	16	Speed reduction unit mounting bolt	
	Y8	KBP-M2511-000	TUBE	1	Coil tube of speed reduction unit	
	Y9	90K94-8417FY	MOTOR ASSY.,2	1	Motor	
	Y10	91312-06016	BOLT HEX.SOCKET HEAD	4	Motor mounting bolt	
	Y11	90990-17J030	O-RING	1	Lower O-ring of motor	
	Y12	KCY-M4850-500	PROXIMITY SW.,ASSY.	1	Sensor	
	Y13	KBP-M1314-102	COVER,4	1	Y-axis arm upper resin cover (Z-axis 400mm)	
	Y14	92012-03008	BOLT,BUTTON HEAD	8	Mounting bolt for rear of Y-axis arm upper resin cover (Z-axis 400mm)	
	Y15	91312-03050	BOLT,HEX.SOCKET HEAD	2	Mounting bolt for front of Y-axis arm upper resin cover (Z-axis 400mm)	
	Y16	KBP-M2587-000	STOPPER,1	1	Stopper block	
	Y17	KN5-M2196-001	DAMPER	2	Damper for stopper block	
	Y18	91312-08035	BOLT HEX.SOCKET HEAD	2	Stopper block mounting bolt	
	Y19	90112-10J025	BOLT HEX.S.H.	2	Stopper bolt	
	Y20	90990-28J093	WASHER,PLAIN	4	Washer for stopper bolt	
	Y21	KBP-M1316-000	COVER,6	1	Upper cover of Y-axis motor	
	Y22	KBF-M1535-000	PLATE,2	2	Y-axis arm end cap	
Z-axis	Z1	KBP-M4882-001	MOTOR ASSY.,3	1	Motor	These parts need to be replaced as a set.
	Z2	KBP-M1750-201	SCREW,BALL	1	Ball screw (Z-axis 400mm)	
	Z3	KBP-M1778-001	SLEEVE,LOCK	1	Nylon nut	
	Z4	KBP-M1753-003	FLANGE	1	Motor and ball screw shaft connection flange	
	Z5	KBP-M1788-001	DAMPER,1	1	Lower end damper	
	Z6	91312-05014	BOLT HEX.SOCKET HEAD	4	Ball screw nut mounting bolt	
	Z7	91312-03020	BOLT,HEX.SOCKET HEAD	10	Motor and ball screw shaft connection flange mounting bolt	
	Z8	91312-05016	BOLT HEX.SOCKET HEAD	2	Motor mounting bolt	
	Z9	91312-05020	BOLT HEX.SOCKET HEAD	2	Motor mounting bolt	
	Z10	KBP-M1315-000	COVER,5	1	Z-axis motor cover	
	Z11	KBP-M1780-001	STOPPER,1	1	Upper end stopper	
	Z12	91312-06020	BOLT HEX.SOCKET HEAD	1	Upper end stopper mounting bolt	
	Z13	KBP-M1789-000	DAMPER,2	1	Upper end stopper damper	
R-axis	R1	KBP-M1821-011	HARMONIC DRIVE ASSY.	1	Speed reduction unit	See section 2 in Chapter 5 of the Installation Manual.
	R2	KN3-M2159-000	O RING.,1	1	Lower O-ring of speed reduction unit	
	R3	91312-03025	BOLT,HEX.SOCKET HEAD	11	Speed reduction unit mounting bolt	
	R4	91312-03030	BOLT,HEX.SOCKET HEAD	1	Dog mounting bolt	
	R5	KBP-M1888-000	DOG,R	1	Upper dog of speed reduction unit	
	R6	91312-03016	BOLT,HEX.SOCKET HEAD	16	Speed reduction unit mounting bolt	
	R7	90990-17J037	O-RING	1	O-ring for input part of speed reduction unit	
	R8	KBP-M4883-001	MOTOR ASSY.,4	1	Motor	
	R9	90990-17J038	O-RING	1	Lower O-ring of motor	
	R10	91312-06016	BOLT HEX.SOCKET HEAD	4	Motor mounting bolt	
	R11	KCY-M4850-900	PROXIMITY SW. ASSY	1	Sensor	
	R12	KBP-M1840-001	SPLINE,BALL	1	Ball spline (Z-axis 400mm)	These parts need to be replaced as a set.
	R13	KBP-M1871-000	SHAFT,1	1	Upper collar of ball spline nut	
	R14	90990-17J036	O-RING	1	Upper O-ring of ball spline nut	
	R15	KBP-M1886-000	SEAL	1	End face seal inside speed reduction unit	
	R16	91312-05014	BOLT HEX.SOCKET HEAD	6	Ball spline nut mounting bolt	
	R17	90933-01J022	BEARING	2	Upper bearing of ball spline	
Cables	C1	KBP-M4843-102	HARNESS,MACHINE 2	1	Machine harness (R6YXG900, R6YXG1000)	
	C2	KCB-M6214-011	CABLE,ROBOT	1	Robot cable (3.5m)	
		KCB-M6214-111		1	Robot cable (5m)	
		KCB-M6214-211		1	Robot cable (10m)	
	C3	KN0-M4872-002	CONNCTOR E/L 2	1	D-sub connector on base side	
	C4	KN0-M4839-001	PANEL,CONECTOR	1	Hood for D-sub connector on base side	
	C5	KN3-M2296-000	BOLT	2	D-sub connector on base side mounting bolt	
	C6	92903-03100	WASHER SPRING	2	D-sub connector on base side mounting spring washer	
	C7	95302-03600	NUT HEXAGON	2	D-sub connector on base side mounting nut	
	C8	KN0-M4871-002	CONNCTOR E/L 1	1	D-sub connector on Y-axis arm side	
	C9	KN0-M4839-001	PANEL,CONECTOR	1	Hood for D-sub connector on Y-axis arm side	
	C10	KN3-M2296-000	BOLT	2	D-sub connector on Y-axis arm side mounting bolt	
	C11	92903-03100	WASHER SPRING	2	D-sub connector on Y-axis arm side mounting spring washer	
	C12	95302-03600	NUT HEXAGON	2	D-sub connector on Y-axis arm side mounting nut	
	C13	90990-42J048	JOINT	9	Joint for harness air tube	

R6YXG900, R6YXG1000 Z=400mm stroke type

(Only the parts different from those of the R6YXGH600 Z=200mm stroke type are shown.)



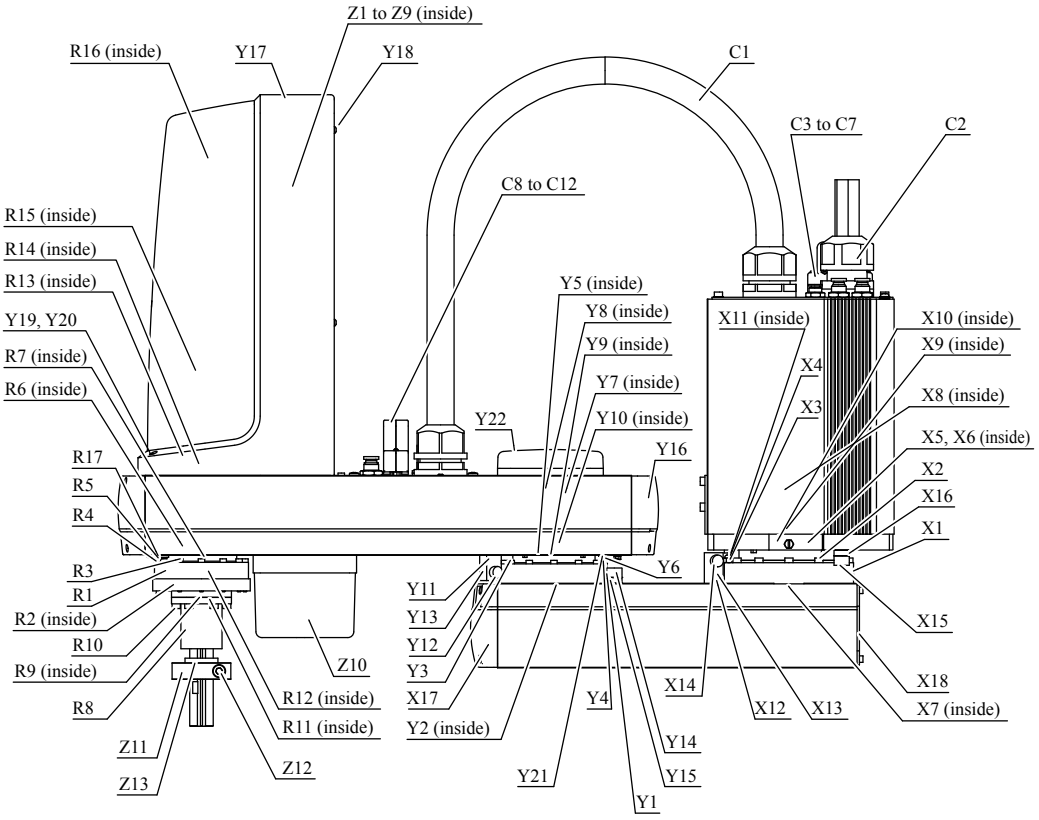
1.17 R6YXGS300, R6YXGS400

For details regarding maintenance parts for models R6YXGS300 and R6YXGS400, please contact your distributor.

1.18 R6YXGS500, R6YXGS600

	No.	Part No.	Part name	Q'ty	Remarks	Recommended replacement timing
X-axis	X1	KBF-M2110-000	HARMONIC DRIVR ASSY.	1	Speed reduction unit	See section 2 in Chapter 5 of the Installation Manual.
	X2	91312-04030	BOLT HEX.SOCKET HEAD	11	Speed reduction unit mounting bolt	
	X3	95302-05600	NUT HEXAGON	1	Nut for dog	
	X4	98502-04030	SCREW PAN HEAD(+)	1	Dog of speed reduction unit	
	X5	91312-04020	BOLT HEX.SOCKET HEAD	16	Speed reduction unit mounting bolt	
	X6	92903-04600	WASHER PLAIN	16	Washer for speed reduction unit mounting bolt	
	X7	KN4-M2143-000	O RING,1	1	O-ring of speed reduction unit	
	X8	90K94-8417FX	MOTOR ASSY.,1	1	Motor	
	X9	91312-06016	BOLT HEX.SOCKET HEAD	4	Motor mounting bolt	
	X10	90990-17J030	O-RING	1	O-ring for motor mating	
	X11	KCY-M4850-400	PROXIMITY SW.ASSY	1	Sensor	
	X12	KBF-M2193-001	STOPPER	1	Stopper block	
	X13	91312-06030	BOLT HEX.SOCKET HEAD	2	Stopper block mounting bolt	
	X14	KN3-M2596-002	DAMPER	2	Damper for stopper block	
	X15	91312-08016	BOLT HEX.SOCKET HEAD	2	Stopper bolt	
	X16	90990-28J091	WASHER,PLAIN	2	Washer for stopper bolt	
	X17	KBF-M1535-000	PLATE,2	1	X-axis arm end cap (Resin)	
	X18	KDA-M1535-000	PLATE,2	1	X-axis arm end cap (Aluminum plate)	
Y-axis	Y1	KBF-M2510-000	HARMONIC DRIVR ASSY.	1	Speed reduction unit	See section 2 in Chapter 5 of the Installation Manual.
	Y2	KN4-M257K-000	O RING,1	1	O-ring of speed reduction unit	
	Y3	91312-03030	BOLT HEX.SOCKET HEAD	11	Speed reduction unit mounting bolt	
	Y4	95302-04600	NUT HEXAGON	1	Nut for dog	
	Y5	91312-03016	BOLT HEX.SOCKET HEAD	16	Speed reduction unit mounting bolt	
	Y6	98502-03030	SCREW PAN HEAD(+)	1	Dog of speed reduction unit	
	Y7	KBF-M2511-000	TUBE	1	Coil tube of speed reduction unit (Wall-mount model only)	
	Y8	90K94-6217FY	MOTOR ASSY.,2	1	Motor	
	Y9	KN3-M2143-000	O RING.,2	1	O-ring for motor mating	
	Y10	91312-05012	BOLT HEX.SOCKET HEAD	4	Motor mounting bolt	
	Y11	KDA-M2587-000	STOPPER,1	1	Stopper block (For R6YXGS500)	
		KBF-M2587-001			Stopper block (For R6YXGS600)	
	Y12	KN3-M2596-002	DAMPER	2	Damper for stopper block	
	Y13	91312-05025	BOLT HEX.SOCKET HEAD	2	Stopper block mounting bolt	
	Y14	91312-08016	BOLT HEX.SOCKET HEAD	1	Stopper bolt	
	Y15	90990-28J091	WASHER,PLAIN	1	Washer for stopper bolt	
	Y16	KBF-M1534-000	PLATE,1	2	Y-axis arm end cap	
	Y17	KBF-M1314-002	COVER,4	1	Y-axis arm upper resin cover (Z-axis 200mm)	
		KBF-M1314-102			Y-axis arm upper resin cover (Z-axis 300mm)	
	Y18	92012-03008	BOLT,BUTTON HEAD	4	Mounting bolt for rear of Y-axis arm upper resin cover (Z-axis 200mm)	
				6	Mounting bolt for rear of Y-axis arm upper resin cover (Z-axis 300mm)	
	Y19	91312-03020	BOLT HEX.SOCKET HEAD	2	Mounting bolt for front of Y-axis arm upper resin cover	
	Y20	92903-03600	WASHER,PLAIN	2	Mounting washer for front of Y-axis arm upper resin cover	
	Y21	KCY-M4850-300	PROXIMITY SW.ASSY	1	Sensor	
	Y22	KBF-M1316-000	COVER,6	1	Y-axis motor resin cover	
Z-axis	Z1	KBF-M4882-001	MOTOR ASSY.,3	1	Motor	These parts need to be replaced as a set.
	Z2	KBP-M1750-001	SCREW,BALL	1	Ball screw (Z-axis 200mm)	
		KBP-M1750-101			Ball screw (Z-axis 300mm)	
	Z3	KBP-M1778-001	SLEEVE,LOCK	1	Nylon nut	
	Z4	KBP-M1753-003	FLANGE	1	Motor and ball screw shaft connection flange	
	Z5	KBP-M1788-001	DAMPER,1	1	Lower end damper	
	Z6	91312-05014	BOLT HEX.SOCKET HEAD	4	Ball screw nut mounting bolt	
	Z7	91312-03020	BOLT HEX.SOCKET HEAD	10	Motor and ball screw shaft connection flange mounting bolt	
	Z8	91312-05012	BOLT HEX.SOCKET HEAD	2	Motor mounting bolt	
	Z9	91312-05016	BOLT HEX.SOCKET HEAD	2	Motor mounting bolt	
	Z10	KBF-M1315-000	COVER,5	1	Z-axis motor cover	
	Z11	KBF-M1780-001	STOPPER,1	1	Upper end stopper	
	Z12	91312-06018	BOLT HEX.SOCKET HEAD	1	Upper end stopper mounting bolt	
	Z13	KBF-M1789-001	DAMPER,2	1	Upper end stopper damper	
R-axis	R1	KBF-M1821-100	HARMONIC DRIVR ASSY.	1	Speed reduction unit	See section 2 in Chapter 5 of the Installation Manual.
	R2	KN4-M1896-000	O RING,2	1	O-ring of speed reduction unit	
	R3	91312-03025	BOLT HEX.SOCKET HEAD	11	Speed reduction unit mounting bolt	
	R4	95302-04600	NUT HEXAGON	1	Nut for dog	
	R5	98502-03030	SCREW PAN HEAD(+)	1	Dog of speed reduction unit	
	R6	91312-03014	BOLT HEX.SOCKET HEAD	16	Speed reduction unit mounting bolt	
	R7	90990-17J034	O-RING	1	O-ring for input part of speed reduction unit	
	R8	KBF-M1840-002	SPLINE,BALL	1	Ball spline (Z-axis 200mm)	These parts need to be replaced as a set.
		KBF-M1840-102			Ball spline (Z-axis 300mm)	
	R9	KBF-M1871-000	SHAFT,1	1	Upper collar of ball spline nut	
	R10	91312-04010	BOLT HEX.SOCKET HEAD	6	Ball spline nut mounting bolt	
	R11	90990-17J031	O-RING	1	Upper O-ring of ball spline	
	R12	KBF-M1886-000	SEAL	1	End face seal inside speed reduction unit	
	R13	91312-05014	BOLT HEX.SOCKET HEAD	4	Motor mounting bolt	
	R14	90990-17J032	O-RING	1	O-ring of motor	
	R15	KBF-M4883-001	MOTOR ASSY.,4	1	Motor	
	R16	90933-01J003	BEARING	2	Upper bearing of ball spline	
	R17	KCY-M4850-500	PROXIMITY SW.ASSY	1	Sensor	
Cables	C1	KDA-M4843-001	HARNESS,MACHINE 2	1	Machine harness (For R6YXGS500)	
		KDA-M4843-101			Machine harness (For R6YXGS600)	
	C2	KBF-M6211-005	CABLE,ROBOT	1	Robot cable (3.5m)	
		KBF-M6211-105			Robot cable (5m)	
		KBF-M6211-205			Robot cable (10m)	
	C3	KN0-M4872-002	CONNCTOR E/L 2	1	D-sub connector on base side	
	C4	KN0-M4839-001	PANEL,CONECTOR	1	Hood for D-sub connector on base side	
	C5	KN3-M2296-000	BOLT	2	D-sub connector on base side mounting bolt	
	C6	92903-03100	WASHER SPRING	2	D-sub connector on base side mounting spring washer	
	C7	95302-03600	NUT HEXAGON	2	D-sub connector on base side mounting nut	
	C8	KN0-M4871-002	CONNCTOR E/L 1	1	D-sub connector on Y-axis arm side	
	C9	KN0-M4839-001	PANEL,CONECTOR	1	Hood for D-sub connector on Y-axis arm side	
	C10	KN3-M2296-000	BOLT	2	D-sub connector on Y-axis arm side mounting bolt	
	C11	92903-03100	WASHER SPRING	2	D-sub connector on Y-axis arm side mounting spring washer	
	C12	95302-03600	NUT HEXAGON	2	D-sub connector on Y-axis arm side mounting nut	
	C13	90990-42J048	JOINT	9	Joint for harness air tube	

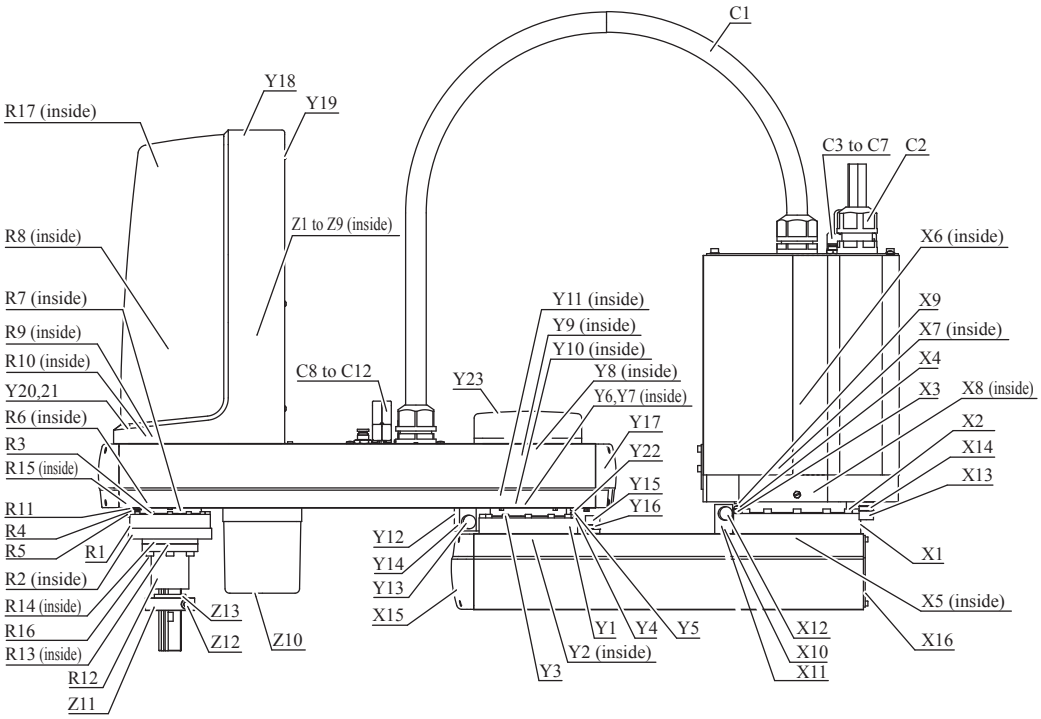
R6YXGS500, R6YXGS600



1.19 R6YXGS700, R6YXGS800, R6YXGS900, R6YXGS1000

	No.	Part No.	Part name	Q'ty	Remarks	Recommended replacement timing
X-axis	X1	KDB-M2110-000	HARMONIC DRIVR ASSY.	1	Speed reduction unit	See section 2 in Chapter 5 of the Installation Manual.
	X2	91312-05040	BOLT HEX.SOCKET HEAD	27	Speed reduction unit mounting bolt	
	X3	95302-06600	NUT HEXAGON	1	Nut for dog	
	X4	98502-05040	SCREW PAN HEAD(+)	1	Dog of speed reduction unit	
	X5	KN5-M2159-000	O RING,1	1	O-ring of speed reduction unit	
	X6	90K94-8E173X	MOTOR ASSY.,1	1	Motor	
	X7	91312-05016	BOLT HEX.SOCKET HEAD	4	Motor mounting bolt	
	X8	90990-17J035	O-RING	1	O-ring for motor mating	
	X9	KCY-M4850-500	PROXIMITY SW.ASSY	1	Sensor	
	X10	KBP-M2193-001	STOPPER	1	Stopper block	
	X11	91312-08040	BOLT HEX.SOCKET HEAD	2	Stopper block mounting bolt	
	X12	KN5-M2196-001	DAMPER	2	Damper for stopper block	
	X13	90112-10J030	BOLT HEX.SOCKET HEAD	2	Stopper bolt	
	X14	90990-28J093	WASHER,PLAIN	2	Washer for stopper bolt	
	X15	KBP-M1535-000	PLATE,2	1	X-axis arm end cap (Resin)	
	X16	KDB-M1535-000	PLATE,2	1	X-axis arm end cap (Aluminum plate)	
Y-axis	Y1	KBP-M2510-000	HARMONIC DRIVR ASSY.	1	Speed reduction unit	See section 2 in Chapter 5 of the Installation Manual.
	Y2	KN4-M2143-000	O RING,1	1	O-ring of speed reduction unit	
	Y3	91312-04030	BOLT HEX.SOCKET HEAD	11	Speed reduction unit mounting bolt	
	Y4	95302-05600	NUT HEXAGON	1	Nut for dog	
	Y5	98502-04030	SCREW PAN HEAD(+)	1	Dog of speed reduction unit	
	Y6	91312-04020	BOLT HEX.SOCKET HEAD	16	Speed reduction unit mounting bolt	
	Y7	92903-04600	WASHER PLAIN	16	Washer for speed reduction unit mounting bolt	
	Y8	KBP-M2511-000	TYUBE	1	Coil tube of speed reduction unit (Wall-mount model only)	
	Y9	90K94-8417FY	MOTOR ASSY.,2	1	Motor	
	Y10	90990-17J030	O-RING	1	O-ring for motor mating	
	Y11	91312-06016	BOLT HEX.SOCKET HEAD	4	Motor mounting bolt	
	Y12	KDB-M2587-000	STOPPER,1	1	Stopper block (For R6YXGS700)	
		KDB-M2587-100			Stopper block (For R6YXGS800)	
		KBP-M2587-000			Stopper block (For R6YXGS900, R6YXGS1000)	
	Y13	KN5-M2196-001	DAMPER	2	Damper for stopper block	
	Y14	91312-08035	BOLT HEX.SOCKET HEAD	2	Stopper block mounting bolt	
	Y15	90112-10J025	BOLT HEX.SOCKET HEAD	1	Stopper bolt	
	Y16	90990-28J093	WASHER,PLAIN	2	Washer for stopper bolt	
	Y17	KBF-M1535-000	PLATE,2	2	Y-axis arm end cap	
	Y18	KBP-M1314-003	COVER,4	1	Y-axis arm upper resin cover (Z-axis 200mm)	
		KBP-M1314-102			Y-axis arm upper resin cover (Z-axis 400mm)	
	Y19	92012-03008	BOLT,BUTTON HEAD	6	Mounting bolt for rear of Y-axis arm upper resin cover (Z-axis 200mm)	
				8	Mounting bolt for rear of Y-axis arm upper resin cover (Z-axis 400mm)	
	Y20	91312-03016	BOLT HEX.SOCKET HEAD	2	Mounting bolt for front of Y-axis arm upper resin cover	
	Y21	92903-03600	WASHER,PLAIN	2	Mounting washer for front of Y-axis arm upper resin cover	
	Y22	KCY-M4850-500	PROXIMITY SW.ASSY	1	Sensor	
	Y23	KBP-M1316-000	COVER,6	1	Y-axis motor resin cover	
Z-axis	Z1	KBP-M4882-001	MOTOR ASSY.,3	1	Motor	These parts need to be replaced as a set.
	Z2	KBP-M1750-001	SCREW,BALL	1	Ball screw (Z-axis 200mm)	
		KBP-M1750-201			Ball screw (Z-axis 400mm)	
	Z3	KBP-M1778-001	SLEEVE,LOCK	1	Nylon nut	
	Z4	KBP-M1753-003	FLANGE	1	Motor and ball screw shaft connection flange	
	Z5	KBP-M1788-001	DAMPER,1	1	Lower end damper	
	Z6	91312-05014	BOLT HEX.SOCKET HEAD	4	Ball screw nut mounting bolt	
	Z7	91312-03020	BOLT HEX.SOCKET HEAD	10	Motor and ball screw shaft connection flange mounting bolt	
	Z8	91312-05016	BOLT HEX.SOCKET HEAD	2	Motor mounting bolt	
	Z9	91312-05020	BOLT HEX.SOCKET HEAD	2	Motor mounting bolt	
	Z10	KBP-M1315-000	COVER,5	1	Z-axis motor cover	
	Z11	KBP-M1780-001	STOPPER,1	1	Upper end stopper	
	Z12	91312-06020	BOLT HEX.SOCKET HEAD	1	Upper end stopper mounting bolt	
	Z13	KBP-M1789-000	DAMPER,2	1	Upper end stopper damper	
R-axis	R1	KBP-M1821-011	HARMONIC DRIVR ASSY.	1	Speed reduction unit	See section 2 in Chapter 5 of the Installation Manual.
	R2	KN3-M2159-000	O RING.,1	1	O-ring of speed reduction unit	
	R3	91312-03025	BOLT HEX.SOCKET HEAD	11	Speed reduction unit mounting bolt	
	R4	91312-03030	BOLT,HEX.SOCKET HEAD	1	Dog mounting bolt	
	R5	KBP-M1888-000	DOG,R	1	Dog of speed reduction unit	
	R6	91312-03016	BOLT HEX.SOCKET HEAD	16	Speed reduction unit mounting bolt	
	R7	90990-17J037	O-RING	1	O-ring for input part of speed reduction unit	
	R8	KBP-M4883-000	MOTOR ASSY.,4	1	Motor	
	R9	90990-17J038	O-RING	1	O-ring of motor	
	R10	91312-06016	BOLT HEX.SOCKET HEAD	4	Motor mounting bolt	
	R11	KCY-M4850-900	PROXIMITY SW.ASSY	1	Sensor	
	R12	KBP-M1840-001	SPLINE,BALL	1	Ball spline (Z-axis 200mm)	These parts need to be replaced as a set.
		KBP-M1840-101			Ball spline (Z-axis 400mm)	
	R13	KBP-M1871-000	SHAFT,1	1	Upper collar of ball spline nut	
	R14	90990-17J036	O-RING	1	Upper O-ring of ball spline	
	R15	KBP-M1886-000	SEAL	1	End face seal inside speed reduction unit	
	R16	91312-05014	BOLT HEX.SOCKET HEAD	6	Ball spline nut mounting bolt	
	R17	90933-01J022	BEARING	2	Upper bearing of ball spline	
Cables	C1	KDB-M4843-000	HARNESS,MACHINE 2	1	Machine harness (For R6YXGS700)	
		KDB-M4843-100			Machine harness (For R6YXGS800)	
		KDB-M4843-200			Machine harness (For R6YXGS900)	
		KDB-M4843-300			Machine harness (For R6YXGS1000)	
	C2	KBF-M6211-005	CABLE,ROBOT	1	Robot cable (3.5m)	
		KBF-M6211-105			Robot cable (5m)	
		KBF-M6211-205			Robot cable (10m)	
	C3	KN0-M4872-002	CONNCTOR E/L 2	1	D-sub connector on base side	
	C4	KN0-M4839-001	PANEL,CONECTOR	1	Hood for D-sub connector on base side	
	C5	KN3-M2296-000	BOLT	2	D-sub connector on base side mounting bolt	
	C6	92903-03100	WASHER SPRING	2	D-sub connector on base side mounting spring washer	
	C7	95302-03600	NUT HEXAGON	2	D-sub connector on base side mounting nut	
	C8	KN0-M4871-002	CONNCTOR E/L 1	1	D-sub connector on Y-axis arm side	
	C9	KN0-M4839-001	PANEL,CONECTOR	1	Hood for D-sub connector on Y-axis arm side	
	C10	KN3-M2296-000	BOLT	2	D-sub connector on Y-axis arm side mounting bolt	
	C11	92903-03100	WASHER SPRING	2	D-sub connector on Y-axis arm side mounting spring washer	
	C12	95302-03600	NUT HEXAGON	2	D-sub connector on Y-axis arm side mounting nut	
	C13	90990-42J048	JOINT	9	Joint for harness air tube	

R6YXGS700, R6YXGS800, R6YXGS900, R6YXGS1000



2. Consumable parts

NOTE

For details about consumable part locations, see “1. Maintenance parts” in this Chapter.

Robot model	Consumable part	Q'ty	Remarks
R6YXGL250, R6YXGL350, R6YXGL400	KCY-M4843-002	1	Machine harness
R6YXGL500, R6YXGL600	KCY-M4843-102	1	Machine harness
R6YXG500, R6YXG600, R6YXGH600	KBF-M4843-004	1	Machine harness
R6YXG700, R6YXG800	KBP-M4843-002	1	Machine harness
R6YXG900, R6YXG1000	KBP-M4843-102	1	Machine harness
R6YXGS300	S02C-M8U07-002	1	Machine harness
R6YXGS400	S02C-M8U07-201	1	Machine harness
R6YXGS500	KDA-M4843-001	1	Machine harness
R6YXGS600	KDA-M4843-101	1	Machine harness
R6YXGS700	KDB-M4843-000	1	Machine harness
R6YXGS800	KDB-M4843-100	1	Machine harness
R6YXGS900	KDB-M4843-200	1	Machine harness
R6YXGS1000	KDB-M4843-300	1	Machine harness

3. Basic specification

3.1 R6YXGL250, R6YXGL350, R6YXGL400, R6YXGL500, R6YXGL600

Robot model			R6YXGL250	R6YXGL350	R6YXGL400
Axis specifications	X-axis	Arm length	100mm	200mm	250mm
		Rotation angle	±140°		
	Y-axis	Arm length	150mm		
		Rotation angle	±144°		
	Z-axis	Stroke	150mm		
	R-axis	Rotation angle	±360°		
Motor		X-axis	200W		
		Y-axis	150W		
		Z-axis	50W		
		R-axis	100W		
Maximum speed		XY resultant	4.5m/s	5.6m/s	6.1m/s
		Z-axis	1.1m/s		
		R-axis	1020°/s		
Repeatability (*1)		XY-axes	±0.01mm		
		Z-axis	±0.01mm		
		R-axis	±0.004°		
Payload			Standard specifications 5kg, Option specifications 4kg (*3)		
R-axis tolerable moment of inertia (*2)			$0.05kgm^2$ ($0.5kgfcms^2$)		
User wiring			0.2sq×10 cables		
User tubing			⌀4×3		
Travel limit			1.Soft limit 2.Mechanical stopper (XYZ-axes)		
Robot cable			3.5m (option: 5m, 10m)		
Weight			18.5kg (*4)	19.0kg (*4)	19.5kg (*4)

*1 At constant ambient temperature (XY)
*2 There are limits to acceleration coefficient settings.
*3 Maximum payload is 4kg when tool frange and hollow shaft options are installed.
*4 This is the weight including 10m cable..

* The Z-axis spline may vibrate in a Z-axis operation speed range of 20% to 40% depending on the arm position or Z-axis position. If the Z-axis spline vibrates, operate it beyond this operation speed range.

Robot model			R6YXGL500	R6YXGL600
Axis specifications	X-axis	Arm length	250mm	350mm
		Rotation angle	±140°	
	Y-axis	Arm length	250mm	
		Rotation angle	±144°	
	Z-axis	Stroke	150mm	
	R-axis	Rotation angle	±360°	
Motor		X-axis	200W	
		Y-axis	150W	
		Z-axis	50W	
		R-axis	100W	
Maximum speed		XY resultant	5.1m/s	4.9m/s
		Z-axis	1.1m/s	
		R-axis	1020°/s	
Repeatability (*1)		XY-axes	±0.01mm	
		Z-axis	±0.01mm	
		R-axis	±0.004°	
Payload			Standard specifications 5kg, Option specifications 4kg (*3)	
R-axis tolerable moment of inertia (*2)			$0.05kgm^2$ ($0.5kgfcms^2$)	
User wiring			0.2sq×10 cables	
User tubing			φ4×3	
Travel limit			1.Soft limit 2.Mechanical stopper (XYZ-axes)	
Robot cable			3.5m (option: 5m, 10m)	
Weight			21.0kg (*4)	22.0kg (*4)

*1 At constant ambient temperature (XY)
*2 There are limits to acceleration coefficient settings.
*3 Maximum payload is 4kg when tool frange and hollow shaft options are installed.
*4 This is the weight including 10m cable..

* The Z-axis spline may vibrate in a Z-axis operation speed range of 20% to 40% depending on the arm position or Z-axis position. If the Z-axis spline vibrates, operate it beyond this operation speed range.

Noise level

Equivalent sound level of robot, Laeq (A) (when there is 10dB or larger difference from the back ground sound pressure level)	Position where the noise level is measured
76.2dB	1.25m apart from the back of the robot, 1.6m height from the floor surface.

Note: The noise level can be higher when the robot is set nearby the objects that cause sound reflection.

3.2 R6YXG500, R6YXG600, R6YXGH600, R6YXG700, R6YXG800, R6YXG900, R6YXG1000

Robot model			R6YXG500	R6YXG600
Axis specifications	X-axis	Arm length	200mm	300mm
		Rotation angle	±130°	
	Y-axis	Arm length	300mm	
		Rotation angle	±145°	
	Z-axis	Stroke	200, 300mm	
	R-axis	Rotation angle	±360°	
Motor		X-axis	400W	
		Y-axis	200W	
		Z-axis	200W	
		R-axis	200W	
Maximum speed		XY resultant	7.6m/s	8.4m/s
		Z-axis	2.3m/s (200mm stroke Z-axis) 1.7m/s (300mm stroke Z-axis)	
		R-axis	1700°/s	
Repeatability (*1)		XY-axes	±0.01mm	
		Z-axis	±0.01mm	
		R-axis	±0.004°	
Payload			10kg	
R-axis tolerable moment of inertia (*2)			0.30kgm^2 (3.0kgfcms^2)	
User wiring			0.2sq×20 cables	
User tubing			⌀6×3	
Travel limit			1.Soft limit 2.Mechanical stopper (XYZ-axes)	
Robot cable			3.5m (option: 5m, 10m)	
Weight			30kg	31kg

*1 At constant ambient temperature (XY)
*2 There are limits to acceleration coefficient settings.

Robot model			R6YXGH600	R6YXG700	R6YXG800	R6YXG900	R6YXG1000
Axis specifications	X-axis	Arm length	200mm	300mm	400mm	500mm	600mm
		Rotation angle	±130°				
	Y-axis	Arm length	400mm				
		Rotation angle	±150°				
	Z-axis	Stroke	200, 400mm				
	R-axis	Rotation angle	±360°				
Motor		X-axis	750W				
		Y-axis	400W				
		Z-axis	400W				
		R-axis	200W				
Maximum speed		XY resultant	7.7m/s	8.4m/s	9.2m/s	9.9m/s	10.6m/s
		Z-axis	2.3m/s (200mm stroke Z-axis) 1.7m/s (400mm stroke Z-axis)				
		R-axis	920°/s				
Repeatability (*1)		XY-axes	±0.02mm				
		Z-axis	±0.01mm				
		R-axis	±0.004°				
Payload			20kg				
R-axis tolerable moment of inertia (*2)			1.0kgm^2 (10.0kgfcms^2)				
User wiring			0.2sq×20 cables				
User tubing			∅6×3				
Travel limit			1.Soft limit 2.Mechanical stopper (XYZ-axes)				
Robot cable			3.5m (option: 5m, 10m)				
Weight			50kg	52kg	54kg	56kg	58kg

*1 At constant ambient temperature (XY)
*2 There are limits to acceleration coefficient settings.

Noise level

Equivalent sound level of robot, Laeq (A) (when there is 10dB or larger difference from the back ground sound pressure level)	Position where the noise level is measured
78.4dB	1m apart from the back of the robot, 1.6m height from the floor surface.

Note: The noise level can be higher when the robot is set nearby the objects that cause sound reflection.

3.3 R6YXGS300, R6YXGS400, R6YXGS500, R6YXGS600, R6YXGS700, R6YXGS800, R6YXGS900, R6YXGS1000

Robot model			R6YXGS300	R6YXGS400	R6YXGS500	R6YXGS600
Axis specifications	X-axis	Arm length	150mm	250mm	200mm	300mm
		Rotation angle	±120°	±125°	±105°	±130°
	Y-axis	Arm length	150mm		300mm	
		Rotation angle	±130°	±144°	±125°	±145°
	Z-axis	Stroke	150mm		200, 300mm	
	R-axis	Rotation angle	±360°			
Motor		X-axis	200W		400W	
		Y-axis	150W		200W	
		Z-axis	50W		200W	
		R-axis	100W		200W	
Maximum speed		XY resultant	4.4m/s	6.1m/s	7.6m/s	8.4m/s
		Z-axis	1.1m/s		2.3m/s (200mm stroke Z-axis) 1.7m/s (300mm stroke Z-axis)	
		R-axis	1020°/s (Wall-mount model) 720°/s (Wall-mount inverse model)		1700°/s (Wall-mount model) 800°/s (Wall-mount inverse model)	
Repeatability (*1)		XY-axes	±0.01mm			
		Z-axis	±0.01mm			
		R-axis	±0.004°			
Payload			Standard specifications 5kg, Option specifications 4kg (*3)		10kg	
R-axis tolerable moment of inertia (*2)			0.05kgm^2 (0.5kgfcms^2)		0.30kgm^2 (3.0kgfcms^2)	
User wiring			0.2sq×10 cables		0.2sq×20 cables	
User tubing			φ4×3		φ6×3	
Travel limit			1.Soft limit 2.Mechanical stopper (XYZ-axes)			
Robot cable			3.5m (option: 5m, 10m)			
Weight			19.5kg (*4)	20kg (*4)	30kg (*4)	31kg (*4)

*1 At constant ambient temperature (XY)
*2 There are limits to acceleration coefficient settings.
*3 Maximum payload is 4kg when tool frange and hollow shaft options are installed.
*4 This is the weight including 10m cable.

* The Z-axis spline may vibrate in a Z-axis operation speed range of 20% to 40% depending on the arm position or Z-axis position. If the Z-axis spline vibrates, operate it beyond this operation speed range.

Robot model			R6YXGS700	R6YXGS800	R6YXGS900	R6YXGS1000
Axis specifications	X-axis	Arm length	300mm	400mm	500mm	600mm
		Rotation angle	±130°			
	Y-axis	Arm length	400mm			
		Rotation angle	±130°	±145°	±150°	
	Z-axis	Stroke	200, 400mm			
	R-axis	Rotation angle	±360°			
Motor		X-axis	750W			
		Y-axis	400W			
		Z-axis	400W			
		R-axis	200W			
Maximum speed		XY resultant	8.4m/s	9.2m/s	9.9m/s	10.6m/s
		Z-axis	2.3m/s (200mm stroke Z-axis) 1.7m/s (300mm stroke Z-axis)			
		R-axis	920°/s (Wall-mount model) 480°/s (Wall-mount inverse model)			
Repeatability (*1)		XY-axes	±0.02mm			
		Z-axis	±0.01mm			
		R-axis	±0.004°			
Payload			20kg			
R-axis tolerable moment of inertia (*2)			1.0kgm^2 (10.0kgfcms^2)			
User wiring			0.2sq×20 cables			
User tubing			φ6×3			
Travel limit			1.Soft limit 2.Mechanical stopper (XYZ-axes)			
Robot cable			3.5m (option: 5m, 10m)			
Weight			53/55kg (*3)	55/57kg (*3)	57/59kg (*3)	59/61kg (*3)

*1 At constant ambient temperature (XY)
*2 There are limits to acceleration coefficient settings.
*3 This is the weight including 10m cable.

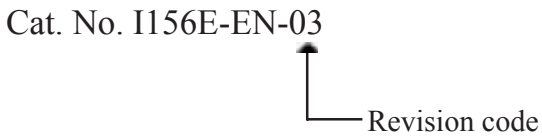
Noise level

Equivalent sound level of robot, Laeq (A) (when there is 10dB or larger difference from the back ground sound pressure level)	Position where the noise level is measured
78.4dB	1m apart from the back of the robot, 1.6m height from the floor surface.

Note: The noise level can be higher when the robot is set nearby the objects that cause sound reflection.

Revision history

A manual revision code appears as a suffix to the catalog number on the front cover manual.



The following table outlines the changes made to the manual during each revision.

Revision code	Date	Description
01	December 2012	Original production
02	November 2013	Information regarding new models (R6YXGS300 and R6YXGS400) was added
03	July 2016	YRCX controller was added

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Authorized Distributor:

Cat. No. I156E-EN-03

Note: Specifications subject to change without notice.

Printed in Europe