

## 12. Replacing the Battery Unit

 WARNING	<ul style="list-style-type: none"> <li>■ Do not insert or pull out the motor connectors while the power to the robot system is turned ON. It is extremely hazardous since the Manipulator may move abnormally. Performing any replacement procedure with the power ON is extremely hazardous and may result in electric shock and/or malfunction of the robot system.</li> <li>■ To shut off power to the robot system, pull out the power plug from the power source. Be sure to connect the AC power cable to a power receptacle. DO NOT connect it directly to a factory power source.</li> <li>■ Before performing any replacement procedure, turn OFF the Controller and related equipment, and then pull out the power plug from the power source. Performing any replacement procedure with the power ON is extremely hazardous and may result in electric shock and/or malfunction of the robot system.</li> </ul>
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 WARNING	<ul style="list-style-type: none"> <li>■ Take meticulous care when handling the lithium battery. Improper handling of the lithium battery as mentioned below is extremely hazardous and may result in heat generation, leakage, explosion, or inflammation. It also may cause serious safety problems.                      &lt;Improper Handling&gt;                     <table style="width: 100%; border: none;"> <tr> <td style="width: 50%;">Attempting to charge</td> <td>Deforming by pressure</td> </tr> <tr> <td>Disassembling</td> <td>Short-circuit (Polarity; Positive/Negative)</td> </tr> <tr> <td>Connecting batteries improperly</td> <td>Heating (85 °C or more)</td> </tr> <tr> <td>Exposing to fire</td> <td>Soldering the terminal of the lithium battery directly</td> </tr> <tr> <td>Forcing discharge</td> <td></td> </tr> </table> </li> <li>■ When disposing the battery, consult with the professional disposal services or comply with the local regulation. Make sure that the battery terminal is insulated, even for a used battery. If the terminal contacts with the other metals, it may short and result in heat generation, leakage, explosion, or inflammation.</li> </ul>	Attempting to charge	Deforming by pressure	Disassembling	Short-circuit (Polarity; Positive/Negative)	Connecting batteries improperly	Heating (85 °C or more)	Exposing to fire	Soldering the terminal of the lithium battery directly	Forcing discharge	
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In case of the low lithium battery power, the error to warn the voltage reduction occurs at the Controller startup (the software startup). All position data will be lost and you will need to calibrate all joints.

The life span of the lithium battery varies depending on the energizing hours and installation environment of the Controller. It is about 1.5 years as a rough guide (when the Controller is connected to power for 8 hours a day). When the Controller is not connected to power, the battery consumption will significantly increase compared to when the Controller is energized. If warnings of voltage reduction occur, replace the lithium metal battery even if it has not reached the above product life.

**NOTE**  
 For the EPSON RC+ 7.0 Ver. 7.2.x or later (firmware Ver.7.2.x.x or later), the recommended replacement time for the battery can be checked in the [Maintenance] dialog box of the EPSON RC+ 7.0.  
 For details, refer to the following manual.

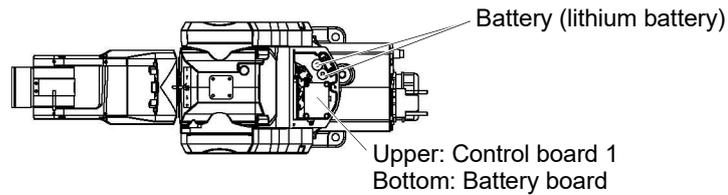
*Robot Controller RC700 / RC700-A Maintenance 6. Alarm*

The battery may run out if it passes the recommended replacement time.

If no warnings of voltage reduction occur, the calibration for all joints is not necessary. You need to perform calibration if the position moves from the originals after replaced the battery.

Always use the lithium battery and battery board designated by us.  
(Refer to *Maintenance: 14. Maintenance Parts List.*)

Be careful of the battery polarity to connect it correctly.



	Name	Quantity	Note
Maintenance Parts	Battery unit (Lithium battery)	1	R13N860011 (2 lithium batteries for replacement)
	Battery board	1	R13N84C011
	Battery relay cable unit	1	1653173 (Reusable. See “Note” below)
Tools	Nippers	1	
	Cross-point screwdriver	1	For covers
	Hexagonal wrench (width across flats: 2.5 mm)	1	For M3 hexagon socket head cap bolts
	Hexagonal wrench (width across flats: 3 mm)	1	For M4 hexagon socket head cap bolts

Note: The battery relay cable unit is reusable. If the cable or the connector latch is broken during replacement of the cable unit and battery, replace the cable unit. For details on the replacement, refer to Removal step (10) and Installation step (55) in *Maintenance 4. Cable Unit.*

## 12.1 Replacing the Battery Unit (Lithium Battery)

1. Turn OFF the controller power.
2. Remove the Arm #1 upper cover.  
For details, refer to *Maintenance: 3. Covers*.
3. Loosen the screws fixing the L-shaped plate on the Arm #1 and remove the plate.

Hexagon socket head cap bolts: 2-M4×8

Be careful not to disconnect the battery connector.



**NOTE**  If you removed all the batteries before connecting the new ones, the calibration data will be deleted and you will need to perform calibration. Follow the steps below to remove the lithium batteries.

4. Cut off the wire tie of the plate.



5. Disconnect the connector of one of two batteries. Then, connect the connector of the new battery.



6. Disconnect the connector of the other battery. Then, connect the connector of the new battery.



7. Bind two batteries to the plate using a wire tie.



Set the wire tie on the groove of the plate.



8. Fix the plate to the Arm #1.  
Hexagon socket head cap bolts: 2-M4×8



9. Install the Arm #1 upper cover.  
For details, refer to *Maintenance: 3. Covers*.
10. Turn ON the controller power.
11. Check operation to see if the manipulator's position and posture are out of position. Move the Manipulator to two or three points (poses) of the registered points.
12. If the Manipulator is out of position, calibrate all the joints and axes.  
For details, refer to *Maintenance: 16. Calibration*.

## 12.2 Replacing the Battery Board

After parts have been replaced (motors, reduction gear units, brakes, timing belts, etc.), the Manipulator cannot perform positioning properly because a gap exists between the origin stored in each motor encoder and its corresponding origin stored in the Controller.

Therefore, it is necessary to match these origins after replacing the parts.

The process of aligning the two origins is called “Calibration”.

Refer to *Maintenance 16. Calibration* and perform the calibration after the parts replacement.

### Removal: Battery board

1. Turn OFF the controller power.
2. Remove the Arm #1 upper cover.  
For details, refer to *Maintenance: 3. Covers*.
3. Disconnect the connector from the control board 1.  
Connector: GS01



4. Remove the control board 1.  
Cross recessed head screws: 3-M3×8



5. Disconnect the three connectors from the battery board.  
Connectors: 2 connectors for the batteries, CN3



6. Remove the battery board fixed to the Arm #1.  
Hexagon socket head cap bolts: 2-M3×8

