

# 11. Lithium Battery and Boards

 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. Inserting or pulling out the motor connectors with the power ON is extremely hazardous and may result in serious bodily injury as the Manipulator may move abnormally, and also 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>■ Use meticulous care when handling the lithium battery. Improper handling of the lithium battery as mentioned below is extremely hazardous, may result in heat generation, leakage, explosion, or inflammation, and may cause serious safety problems.                      &lt;Improper Handling&gt;                     <table style="margin-left: 20px; border: none;"> <tr> <td>- Battery Charge</td> <td>- Deformation by Pressure</td> </tr> <tr> <td>- Disassembly</td> <td>- Short-circuit (Polarity; Positive/Negative)</td> </tr> <tr> <td>- Incorrect Installation</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>- Forced Discharge</td> <td></td> </tr> </table> </li> <li>■ When disposing of the battery, consult with the professional disposal services or comply with the local regulation.                      Spent battery or not, make sure the battery terminal is insulated. If the terminal contacts with the other metals, it may short and result in heat generation, leakage, explosion, or inflammation.</li> </ul>	- Battery Charge	- Deformation by Pressure	- Disassembly	- Short-circuit (Polarity; Positive/Negative)	- Incorrect Installation	- Heating (85°C or more)	- Exposing to Fire	- Soldering the terminal of the lithium battery directly	- Forced 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.



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 RC90 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.

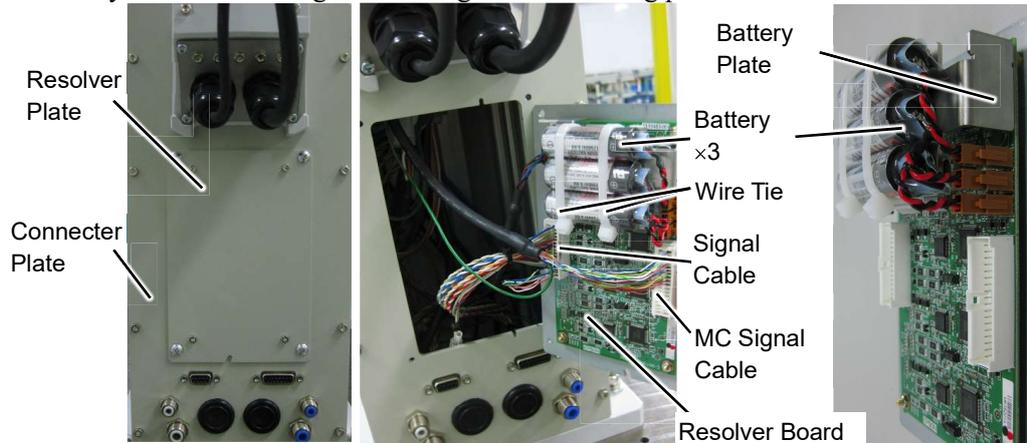
	Name	Quantity	Note
Maintenance parts	Battery unit	1	2167689 Lithium battery for replacement (A set of 3 batteries)
	Resolver board	1	1593214
	Control board	1	2138032
Tools	Nippers	1	For cutting wire tie
	Hexagonal wrench (width across flats: 3 mm)	1	For M4 screw (For replacing battery board)
Material	Wire tie	2	For fixing battery unit (battery)

## 11.1 Replacing the Battery Unit (Lithium Battery)

- Battery unit (lithium battery) Removal
- (1) Turn OFF the controller.
  - (2) Remove the Connector Plate.  
For details, refer to *Maintenance: 3.4 Connector Plate*.
  - (3) Remove the resolver plate from the connector plate.  
Be careful not to disconnect the battery connector.  
Do not remove the signal cable and the M/C cable.



If you disconnect all the current batteries before connecting the new battery, the robot will lose the home position data and the calibration must be executed again. The battery units are exchanged according to the following procedures.



- (4) Cut off the wire tie binding the lithium batteries to the battery plate.
- (5) Bind new batteries to the battery plate with a new wire tie.
- (6) Disconnect one connector of the old three batteries and connect a new one.
- (7) Disconnect the other old batteries connector and connect new ones.
- (8) Mount the resolver plate to the connector plate.
- (9) Turn ON the controller.
- (10) Check if the manipulator moves to points correctly in correct orientation.  
To do so, select some points already registered and move the manipulator to the points.
- (11) If the manipulator does not move to the points correctly, execute the calibration of all joints and axes.  
For details, refer to *Maintenance: 13. Calibration*.