13.　Replacing the Battery Unit

⚠ (lightning symbol) **WARNING**	■ Do not remove or install the motor connectors while the power is ON.　It is extremely hazardous since the Manipulator may move abnormally.　Also, operating the Manipulator with the power ON may result in electrical shock and/or malfunction of the robot system. ■ 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. ■ Be sure to turn OFF the controller and relevant equipment and disconnect the power plugs before starting replacement.　Operating the Manipulator with the power ON is extremely hazardous and may result in electrical shock and/or malfunction of the robot system.

|	
⚠ (exclamation symbol) **WARNING**	■ 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. <Improper Handling> <table><tr><td>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</td></tr><tr><td>Forcing discharge</td><td>directly</td></tr></table> ■ 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 buttery.　If the terminal contacts with the other metals, it may short and result in heat generation, leakage, explosion, or inflammation.

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 is 1.5 years.　Even if the Manipulator is constantly connected to power, you need to replace the battery every 1.5 years.

If no warnings of voltage reduction occur, the calibration for all joints is not necessary. However, 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.

Be careful of the battery polarity to connect it correctly.
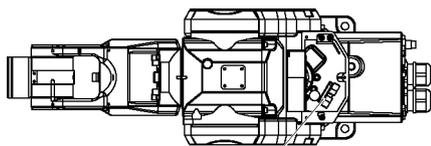
Lithium battery & Battery board

	Name	Quantity	Note
Maintenance Parts	Battery unit (Lithium battery)	1	R13ZA00600300
	Battery board	1	R13B041202
Tools	Nippers	1	
	Hexagonal wrench (width across flats: 3 mm)	1	For M4 screw

13.1 Replacing the Battery Unit (Lithium Battery)

Removal: Battery unit (Lithium battery)

1. Turn OFF the controller.

2. Remove the Arm #1 cover.
   For details, refer to *Maintenance: 3. Covers*.

3. Pull out the battery board from the Arm #1.
   Carefully pull out the battery board; otherwise the connectors will be disconnected.
   Be careful of the cables length.

Battery board
2-M4×8
Arm #1

4. Connect the connector of the new lithium battery to the battery board.
   Use the connector available of 2 connectors (X60A, X60B) on the upper side of the battery board.

X60A
X60B
Battery unit (Lithium battery)
Battery board
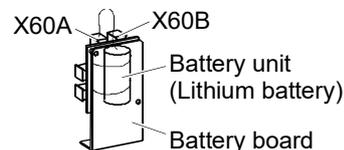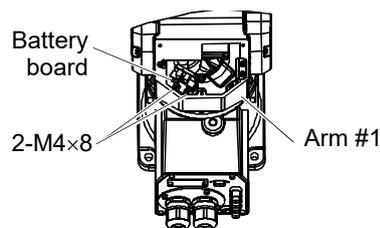
   Always connect the new battery unit before disconnecting the old battery unit.
   Otherwise, all position data for each arm will be lost and you will need to calibrate again (ENCRESET).

5. Cut off the wire tie fixing the cable of old battery unit.

6. Cut off the wire tie fixing the battery unit to remove it.

Installation: Battery unit (Lithium battery)

1. Mont the new battery unit to the battery board.

2. Referring to the Removal step (4), bind the lithium battery cable and the connector cable connected to the battery board with the wire tie.

3. Mount the battery board to the Arm #1.
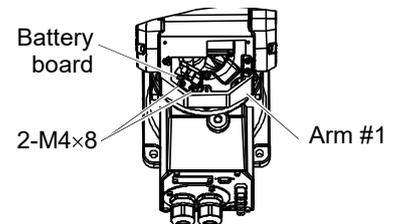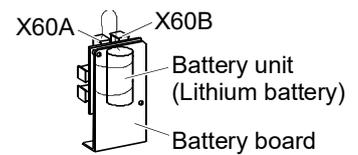
4. Mount the Arm #1 cover.
   For details, refer to *Maintenance: 3. Covers*.

5. Turn ON the controller.

6. Check the arm positions and orientations.
   Move the arms to some points (pose) of the currently registered points.

7. If any position and orientation were changed from the originals, perform the calibration for all joints and axes.
   For details, refer to *Maintenance: 16. Calibration*.