2. HARDWARE

2.6
HOW TO REPLACE
THE BATTERIES

This chapter describes the method of replacing batteries as follows.

2.6.1 Replacing the CNC Battery for Memory Back Up
2.6.2 Replacing the Batteries for Separate Absolute Pulse Coder
2.6.3 Replacing the Battery for Absolute Pulse Coder
   (α Series Servo Amplifier Module)

Battery for Memory Backup

The CNC has a battery to memorize data of part programs, offset data, system parameters and so on. When the battery was reaching the low level, the CNC would display BAT on the screen before losing the important data in the memory.

When you find the sign BAT, please replace the battery as Subsec. 2.6.1 within a week. If you do not replace the battery, the data in memory could get lost.

Battery for Absolute Pulse Coder

When the machine is equipped with absolute encoder. System such as an absolute pulse coder or absolute linear scale, there is a battery for them separately from the battery for memory backup.

When you get an alarm message No. 307 or 308 APC alarm, please replace the battery within a week following the instructions in 2.6.2 or 2.6.3, or the absolute position could be lost and it would be required to take a procedure of manual reference point return.

2.6.1 Replace the Battery for Memory Back Up

Part programs, offset data, and system parameters are stored in CMOS memory in the control unit. The power to the CMOS memory is backed up by a lithium battery mounted on the front panel of the control unit. The above data is not lost even when the main battery goes dead. The backup battery is mounted on the control unit at shipping. This battery can maintain the contents of memory for about a year.

When the voltage of the battery becomes low, alarm message “BAT” blinks on the CRT display and the battery alarm signal is output to the PMC. When this alarm is displayed, replace the battery as soon as possible. In general, the battery can be replaced within two or three weeks, however, this depends on the system configuration.

If the voltage of the battery becomes any lower, memory can no longer be backed up. Turning on the power to the control unit in this state causes system alarm 910 (SRAM parity alarm) to occur because the contents of memory are lost. Clear the entire memory and reenter data after replacing the battery. The power to the control unit must be turned on when the battery is replaced. If the battery is disconnected when the power is turned off, the contents of memory are lost.

Observe the following precautions for lithium batteries:

WARNING
If an unspecified battery is used, it may explode.
Replace the battery only with the specified battery (A02B–0177–K106.)
Dispose of batteries used in accordance with the applicable laws of your country or the applicable laws or regulations of your local self-governing body. Before disposal, insulate the terminals with tape or something similar to prevent them from being short-circuited.

Replacing the battery according to below procedures:

1. Lithium battery (Order number is *A02B–0177–K106) is required.
2. Turn on the power to the CNC for about 5 minutes.
3. Turn off the power to the entire machine.
4. Referring to the manual provided by the machine tool builder, open the cabinet in which the CNC controller is mounted.
5. The battery used for memory back up is located on the front of the main board.

Remove the battery cover on the main board by holding the upper and lower part of the battery cover and pulling it towards you. Then take off the battery.

Fig.2.6.1(a) Replacing the battery(1)
6. Remove the connector (CP8) on the main board towards you.

7. Connect the connector of new battery to main board.
8. Mount a battery and put the battery cover back on.
9. Close the cabinet.
10. Turn on the power to the machine (CNC) to check that no alarm appears on the screen of display unit.

* FANUC’s order number: A98L–0031–0006
**WARNING**

Turn off the power to the entire machine before opening the cabinet.
Be careful not to touch the high-voltage circuits (marked \( \Delta \) and covered by shock prevention covers) when opening the cabinet and replacing the battery. There is a danger of electric shock if the protective cover is removed from a high-voltage circuit.

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**CAUTION**

Never replace the battery with other than the specified type (A02B–0177–K106).
Turn off the power to the machine before replacing the battery. Complete the replacement work within 30 minutes. The contents of CNC memory may be lost if the power is turned off, and the battery is removed for 10 minutes or more.
If the contents of CNC memory are lost because of the above, a RAM parity system alarm is issued, and the CNC becomes unusable.

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### 2.6.2 Replacing Batteries for Separate Absolute Pulse Coder

One battery unit can maintain current position data for six absolute pulse coders for a year.

When the voltage of the battery becomes low, APC alarms 3n6 to 3n8 (n: axis number) are displayed on the CRT display. When APC alarm 3n7 is displayed, replace the battery as soon as possible. In general, the battery should be replaced within two or three weeks, however, this depends on the number of pulse coders used.

If the voltage of the battery becomes any lower, the current positions for the pulse coders can no longer be maintained. Turning on the power to the control unit in this state causes APC alarm 3n0 (reference position return request alarm) to occur. Return the tool to the reference position after replacing the battery.

Replacing the battery according to below procedures:

1. Prepare 4 commercially available dry cell batteries
2. Turn on CNC power.
   - If the batteries are replaced with the power off, absolute position of the machine is lost.
3. Loosen the screws of battery case lid and remove the lid.
   - Consult with the MTB’s manual for where the battery case is installed.
4. Replace the batteries in the case.  
   Take care to place the batteries facing in the correct direction. (Insert the batteries as shown in the diagram with 2 facing one way and 2 the other.)

![Diagram of battery case and lid]

5. Having exchanged the batteries put the lid back on.
6. Procedure completes.

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### 2.6.3 Replacing Batteries for Absolute Pulse Coder (α Series Servo Amplifier Module)

In case that the α series servo drive is used, the battery for absolute pulse coder could be provided on the α series servo amplifier module instead of the battery case as shown in 1.3. In this case the battery is not an alkaline battery but a lithium battery, A06B–6073–K001. Prepare the battery in advance and replace it by the following procedure.

Observe the following precautions for lithium batteries:

**WARNING**

If an unspecified battery is used, it may explode. Replace the battery only with the specified battery (A06B–6037–K001).

 Dispose of used lithium batteries as follows:

1. **Small quantities**
   Discharge the batteries and dispose of them as ordinary nonflammable garbage.

2. **Large quantities**
   Consult FANUC.
**Procedure for replacing batteries for absolute pulse coder**

**Procedure**

1. Turn on machine (CNC) power.<br>Replace the battery under the emergency stop state for safety, to escape the machine from moving during the replacement work.<br>If the battery is replaced while the power is off, the memorized absolute position data will be lost, thus necessitating a reference position return operation.

2. Remove the battery case on the front panel of α series servo amplifier module (SVM).<br>The battery case can be removed by holding the top of the case and pulling the case towards you.

3. Remove the connector of the battery.
4. Replace the battery, and connect the connector.
5. Attach the battery case.
6. Turn off machine (CNC) power.