PLC-3, -3/10 Family Memory Modules
(1775-ME4, -MEF, -ME8, -MS4,
-MS8 Series A, -MEA, -MED, -MSA,
-MSD Series B)

Installation Data

To the Installer

This document provides you with the following information:

- what this package contains
- installing your memory module
- installing your battery
- interpreting the status indicators
- monitoring memory errors
- specifications

What This Memory Module Package Contains

Your memory module package should contain one of the following memory modules: 1775-ME4, -ME8, -MEA, -MED, -MEF, -MS4, -MS8, -MSA, or -MSD.

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Initial Handling

The PLC-3 or PLC-3/10 memory module is shipped in a static-shielded bag to guard against electrostatic damage. Observe the following precautions when handling the module.

⚠️ **ATTENTION:** Under some conditions, electrostatic discharge can degrade performance or damage the module. Observe the following precautions to guard against electrostatic damage.

- Touch a grounded object to discharge yourself before handling the module.
- Do not touch the backplane connector or connector pins.
- When not in use, keep the module in its static-shield bag.

Installing Your Memory Module

Each memory module requires one slot in the PLC-3 processor chassis (1775-A1, -A2) or the PLC-3/10 processor chassis (1775-A3).

To install your memory module:

⚠️ **ATTENTION:** Remove power to the PLC-3 or PLC-3/10 processor chassis before removing or inserting a memory module in the PLC-3 or PLC-3/10 chassis. Failure to observe this warning could result in damage to PLC-3, -3/10 components and/or undesired operation with injury to personnel.

Important: Do not insert a PLC-3/10 memory module into the PLC-3 Main Processor Chassis (1775-A1, -A2). The PLC-3/10 memory modules are not compatible with the PLC-3 programmable controller.

1. Remove power to the processor chassis.

2. Insert memory module into the processor chassis, guiding the module into the plastic tracks on the top and bottom of the slot.

3. Snap the chassis latch over the top of the module to secure its position.

4. Set the thumbwheel switch.

    A thumbwheel switch on the front of the 1775-ME4, -ME8, -MEA, -MED, or -MEF memory module lets you change the module identification. Use this switch to address the module with a unique

number (1 to 15) that distinguishes it from other memory modules (Table A).

Table A
Setting the Thumbwheel Switch

If you are using:	Set the thumbwheel switch(es):
one memory module	1
more than one memory module	consecutively, starting at 1

5. Return power to the processor chassis.

Installing/Replacing the Battery

The PLC-3, -3/10 Memory Module battery holder can hold a lithium battery (1770-XR) or a nickel-cadmium battery (1770-BH).

Either battery provides backup power for the memory module when the module does not receive power from the PLC-3 or PLC-3/10 Power Supply (1775-P1, -P2, -P3). The battery backup time at 60°C (worst-case operational temperature) for each battery is shown in Table B.

Table B
Battery Backup Time

If you are using this module:	The lithium Battery backup time is:	The nickel-cadmium battery backup time is:
ME4, ME8, MS4, MS8	365 days	120 hours
MEA, MSA	300 days	90 hours
MED, MSD	150 days	45 hours
MEF	75 days	22 hours

The lithium battery:

- provides extended backup time

- is not rechargeable

- must be removed and replaced when the BATTERY-LOW indicator is on

The nickel-cadmium battery:

- provides short-term backup

- is rechargeable

- automatically recharges while the module is being powered by the power supply (it takes approximately 48 hours to recharge)

A lower ambient temperature will result in longer battery backup times for both types.

> ⚠ **ATTENTION:** Neither the 1770-XR nor the 1775-BH are off-the-shelf batteries (the 1770-XR contains a fuse and the 1775-BH consists of three cells). Substituting any other battery could result in an unsafe condition and would negate the memory modules suitability for use in Class-1 Division-2 Hazardous Locations.

To install your battery:

> ⚠ **ATTENTION:** Maintain power to the memory module thru the entire replacement procedure. If you replace the battery while the power supply is turned off, memory contents will be altered. If data stored in one memory module is lost, you must re-enter the entire memory contents.
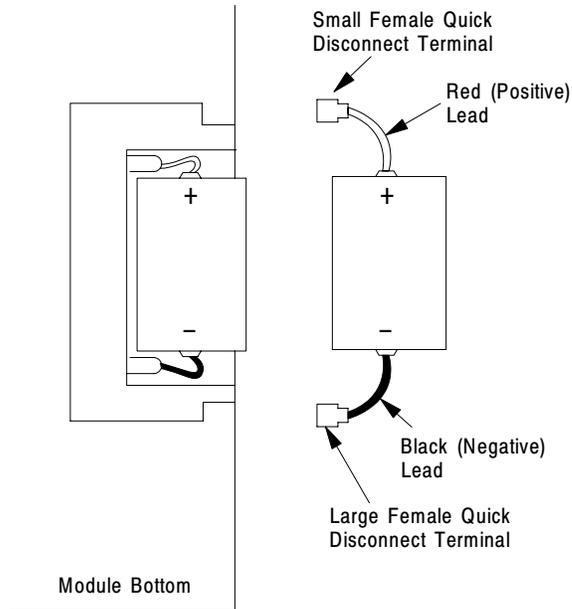
1. Locate the battery compartment front cover on memory module.

2. Loosen the two mounting screws on the battery compartment front cover and remove the battery compartment front cover.

3. Read the caution label located on the battery compartment front cover.

4. Write the current date on the new batteries.

    a. Locate the two date labels supplied with the new battery and write the date on both labels.

    b. Place one date label on the battery compartment front cover.

    c. If the battery label has space for the date, write directly on the label. Otherwise, place the second date label on the battery.

5. Remove the old battery. See the following publications for detailed information on handling and disposing of batteries (Table C).

Table C
Battery Publications

If your battery is:	Refer to this publication:
Lithium	1770-2.19 (formerly 1770-951)
Nickel-Cadmium	1775-2.11 (formerly 1775-918)

6. Install the new battery into the battery compartment. Observe that the female quick-disconnect terminals are of two different sizes to guard against improper installation (Figure 1). Install the charging contact toward the back of the module.
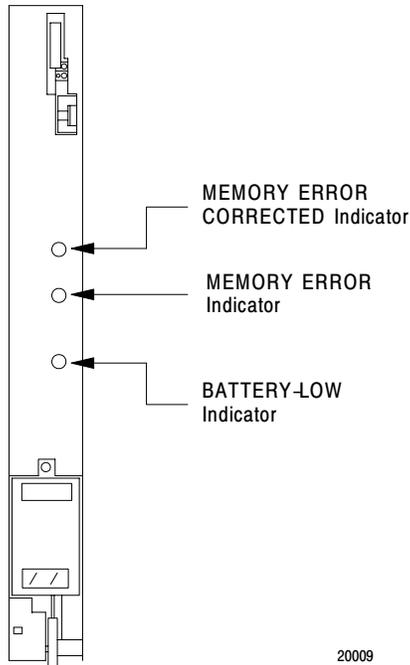
Figure 1
Battery Orientation

Small Female Quick Disconnect Terminal

Red (Positive) Lead

+   +

−   −

Black (Negative) Lead

Large Female Quick Disconnect Terminal

Module Bottom

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7. Replace the battery compartment front cover and secure it to the battery compartment by tightening the mounting screws.

8. Check to see that the battery-low indicator, located on the front of the memory module, is off. If the indicator remains on with the battery connected properly, replace the battery.

Interpreting the Status Indicators

There are three LED indicators on the front of the PLC-3, -3/10 Memory Module Figure 2. These indicators provide important information about the status of the module (Table D).

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Figure 2
Status Indicators

MEMORY ERROR
CORRECTED Indicator

MEMORY ERROR
Indicator

BATTERY-LOW
Indicator

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Table D
Interpreting Status Indicators

Indicators:	If the Indicator is:	Then:
Memory Error Corrected	Yellow (Steady)	single-bit error (hard or soft) was detected and corrected since power turn-on
	Off	no single-bit errors were detected, since power turn-on
	When you turn on the PLC-3, -PLC-3/10 processor, this LED should be off. If this LED is on at power up, a hard error is present, and you should replace the module and send it in for repair.	
Memory Error	Red (Steady)	an uncorrectable error (hard or soft) has been detected (multi-bit error within a single word)
	Off	no uncorrectable memory errors were detected
	When the memory module turns on this LED, it reports a parity error. If this LED comes on again after clearing and reloading memory, replace the module with a spare and send it in for repair.	
Battery Low	Red (Steady)	the on-board battery can no longer provide backup, or battery is not present in the battery holder
	Off	the PLC-3 processor is turned on and the battery is functioning properly

Monitoring Memory Errors

Your memory module uses two methods to monitor memory errors.

- Error Detection and Correction (EDC)

- accumulating errors for module status

EDC

EDC automatically detects and corrects soft and hard single-bit memory errors in words of memory without interrupting system operation:

- soft error – refers to a temporary disturbance such as an electrical noise

- hard error – refers to the physical failure of a component such as a RAM chip

A memory with EDC has 22 bits per word; 16 bits to store the data and 6 extra bits to store an error checking code.

The EDC memory module uses the Hamming code technique to detect all single-bit and double-bit errors within each word. When the module detects a single-bit error, it will:

- use the six error-checking bits to determine which of the 22 bits is in error

- send out the correct data

Accumulating Errors for Module Status

Your memory module keeps an accumulated total of the number of memory accesses in which an error is encountered.

This total is located in module status area word E2.1.1.0.2.0. Note that the third digit of this word is the thumbwheel number set on your memory module.

The value of this word will continually increase if a hard error is present. The value will increment only at the time of the disturbance if a soft error occurs.

Specifications

	PLC-3					PLC-3/10			
	ME4	**ME8**	**MEA (Series B)**	**MED (Series B)**	**MEF**	**MS4**	**MS8**	**MSA (Series B)**	**MSD (Series B)**
Memory Capacity (words)	16K	32K	64K	128K	256K	16K	32K	64K	128K
+5v	2.5A	2.6A	1.8A	1.8A	1.9A	2.5A	2.6A	1.8A	1.8A
Power Supply +15V	0.15A								
Load -15V	OA								
Memory Type	Static CMOS RAM with Error Detection and Correction (EDC)								
Environmental Conditions	Operational Temperature: 0 to 60°C (32 to 140° F) Storage Temperature: 0 to 85° C (-40 to 185° F) Relative Humidity: 5 to 95% (without condensation)								

Allen-Bradley
PLC-3, -3/10 Family Memory Modules
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