

K-03b

ELECTRICIAN TRAINING

SKILL DEVELOPMENT GUIDE

**DUTY K: PLC (Modicon)
K-03b: Load Program**

Issued 01/01/98



Task Preview

Load Program

You need to load a program if a new machine is installed, a processor goes bad, a new machine program is written, or a PLC lockup has occurred. Loading a program incorrectly could result in erasing the machine program or loading an older version of the program, which could result in a “wreck” or more downtime.

The PLC programmer may need to be hooked up at the PLC site. If working with the P190 programmer, then you must load the program from the tape drive to the PLC. If working with the P230, you must load the program from the hard drive (C: drive) to the PLC. You must turn the MEMORY PROTECT KEYLOCK off to enable the PLC to load the new program. Perform a verification of the program after it is loaded.

How your skills will be checked

The Skill Check will require you to load a program in the shop or training room. The Evaluator will arrange the availability of all the tools, materials, and resources you will need to demonstrate the task. The Evaluator will verify that your demonstration meets the skill objective by observing or measuring each task standard. You must demonstrate safe work practices during the Skill Check. Contact your Evaluator whenever you are ready for the Skill Check.



Skill Objective

Upon notification of a new machine installation, a bad processor, a PLC lockup, or a new machine program, load a program.

Task Standards

1. The program is loaded on the P190 when the “Load Complete” prompt is displayed.
2. The program is loaded on the P230 when the Controller Status Information Screen is displayed.
3. The “Verify OK” prompt indicates the program loaded successfully for both programmers.

What You Will Need

This section contains the safety information, tools, and resources you will need before loading a program.



- Follow all Caterpillar Facility Safety Standards when performing this task in the plant.
- You will perform this task online. Perform the steps carefully; mistakes could result in injury to personnel or damage to the equipment.
- Use caution when working around the PLC; high voltage is present on the inside of the PLC cabinet door and near the I/O chassis.



- P190 programmer (Typically used with the 184, 384, 484, 584, 884, and 984 processors.)
- P230 programmer (Used with the 984 processor and the 184, 384, 484, 584, and 884 processors in the P190 emulator mode.)
- PLC communication cable
- Tape Loader Tape (P190 only)
- Program Loader Tape (P190 only)
- Modicon Bus Plus (Used with all processors.)



- Basic Help Keys, available on programmer software
- Modsoft Programmer User's Manual (GM-MSFT-001 Rev. F)
- Modicon P230 Quick Key reference card
- Modbus Plus Data Highway Chart



Task Steps

P190 PROGRAMMER

1. **Locate the PLC number on the Modbus Plus Data Highway Chart.**
 - You can usually locate the Modbus Plus Data Highway Chart next to the Machine print taped on the work cabinet door. *See Figure 3-1.*

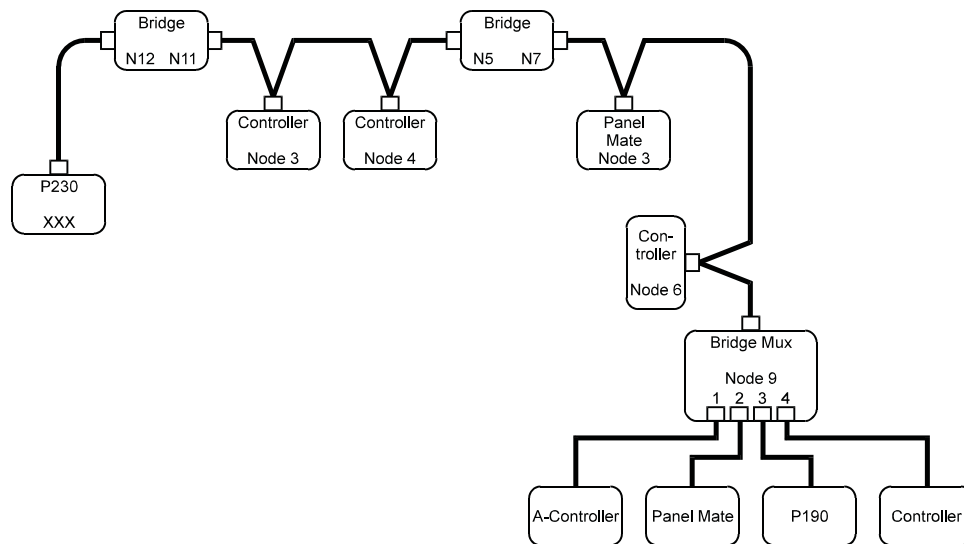


Figure 3-1
Example of the Modbus Plus Data Highway Chart

2. **Power up the unit.**

3. Insert the tape loader tape.

- When the “Insert Tape” prompt displays, insert the tape. *See Figure 3-2.*

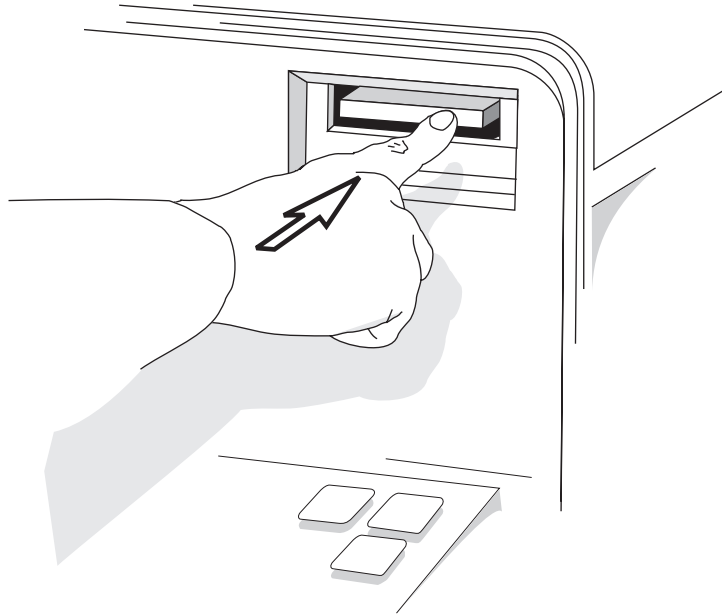


Figure 3-2
P190 Tape Drive Slot

4. Enter the AR: number.

- When the <Attach Unit> prompt appears on the software label keys, enter the unit number assigned from the Modbus Plus Data Highway Chart to the PLC on which you are working. *See Figure 3-3.*

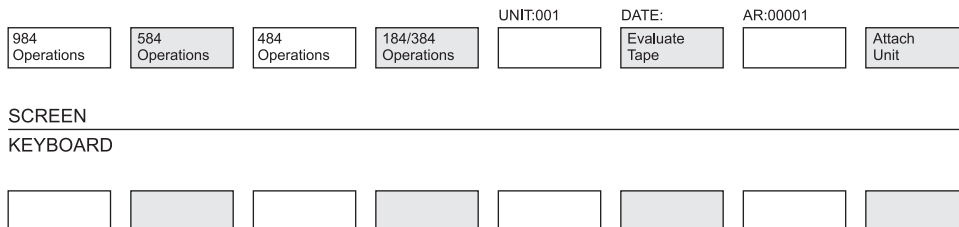


Figure 3-3
Software Label Keys: <ATTACH UNIT> Prompt

5. **Enter the controller operations menu.**

- Press the <### operations> software label key (### = processor number; i.e., 184, 984).
- Then press the <Controller Operations> software label key. See Figure 3-4.

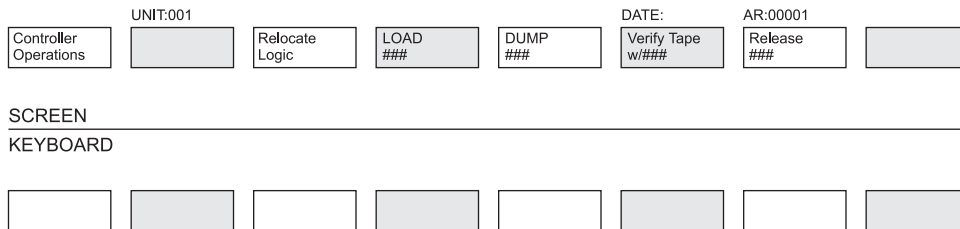


Figure 3-4
Software Label Keys: PLC Operations Option

6. **Stop the controller.**

- Press the <Stop> software label key.
- The prompt should read “Stop Controller Requested.”
- Press the <Proceed> software label key. Verify that the run light goes out on the processor. See Figure 3-5.

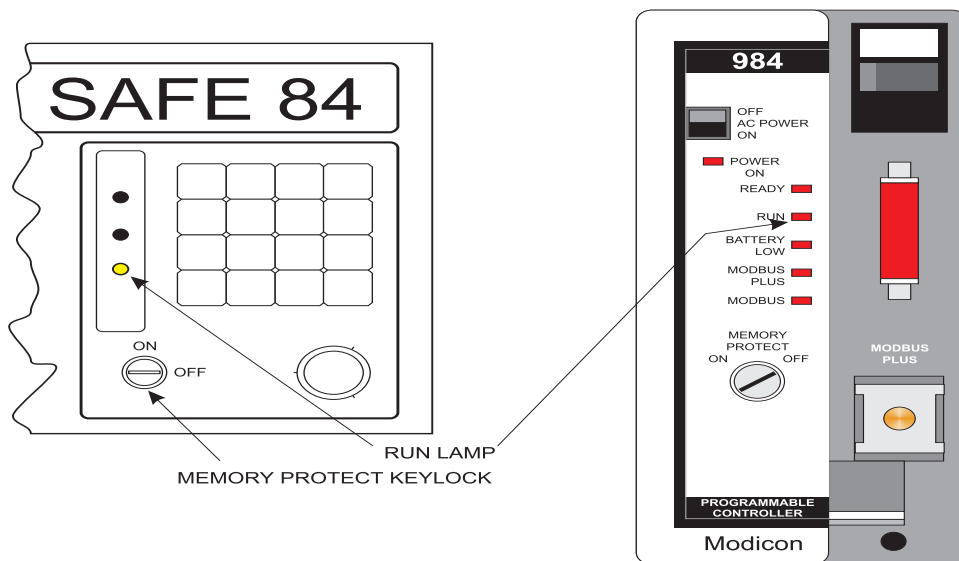


Figure 3-5
Run lights on the 584 and the 984 controllers

7. Load the program.

- Press the <Load ###> software label key.
- Remove the tape loader tape.
- Turn the MEMORY PROTECT KEYLOCK off.

WARNING: Verify that you have the correctly labeled tape before loading.

- Insert the program tape into the tape slot.
- Press the <Proceed> software label key. Wait for the screen to display “Load Complete.”

8. Verify the load.

- Press the <Verify Load> software label key to verify that the load was successful.
- The prompt should read “Verify OK”.

9. Restart the controller.

- Press the <Controller Operations> software label key.
- Press the <Start ###> software label key.
- Press the <Proceed> software label key.
- Verify that the PLC “Run” light is illuminated.

10. Release the PLC.

- Press the <Release ###> software label key.

Note: If the PLC is not released, then other programmers will be blocked from communicating with this PLC.

11. Log out.

- Press the <Logout> software label key.

P230 PROGRAMMER

1. Power up the unit.
2. Verify that the MEMORY PROTECT KEY LOCK is on.
3. Enter the Modsoft Directory.
 - Tab over to the “Directory Tree” and select the “Modsoft” directory from the DOSSHELL directory screen.
4. Select the “Modsoft.exe” file.
 - Use the <Tab> key to move the cursor to the files area.
 - Use the arrow keys to highlight the “Modsoft.exe” file and press the <Enter> key.
 - Press the <Enter> key again when the Modsoft Default screen appears. See *Figure 3-6*.

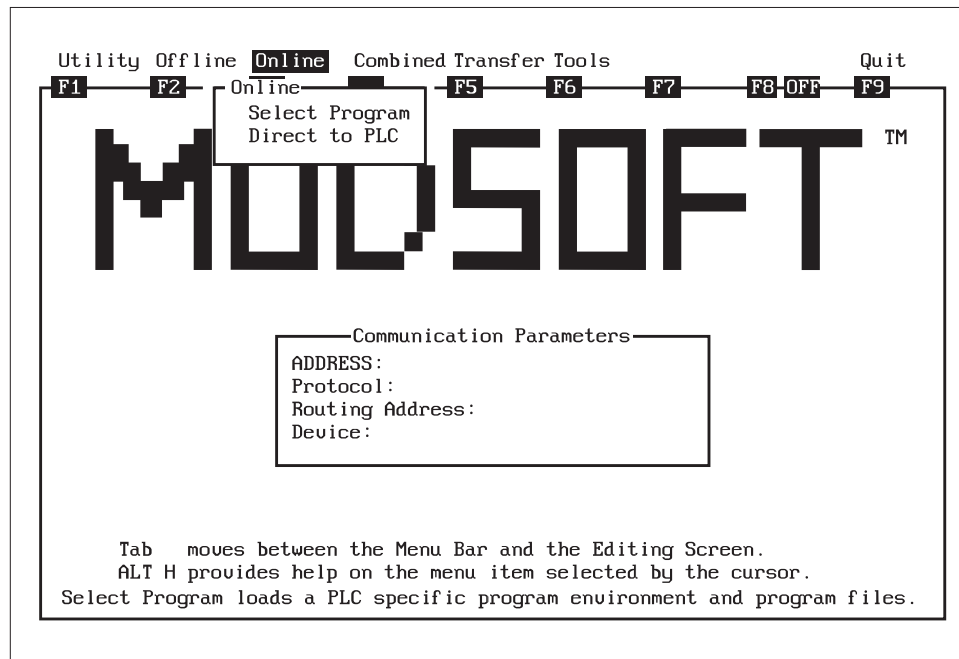


Figure 3-6
Modsoft Default Screen

5. Select the “Transfer” menu. See *Figure 3-7*.

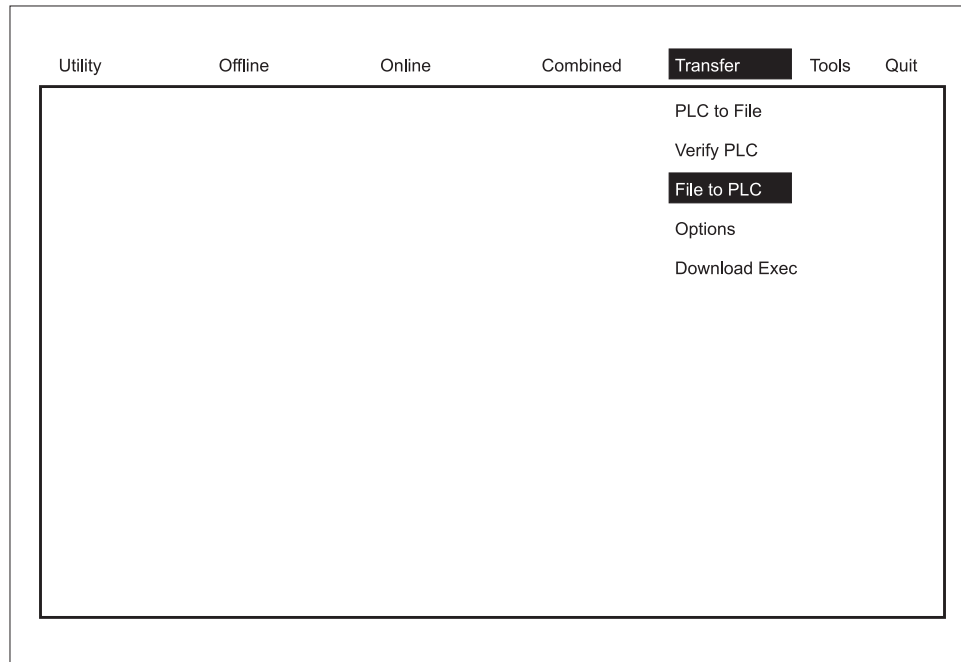
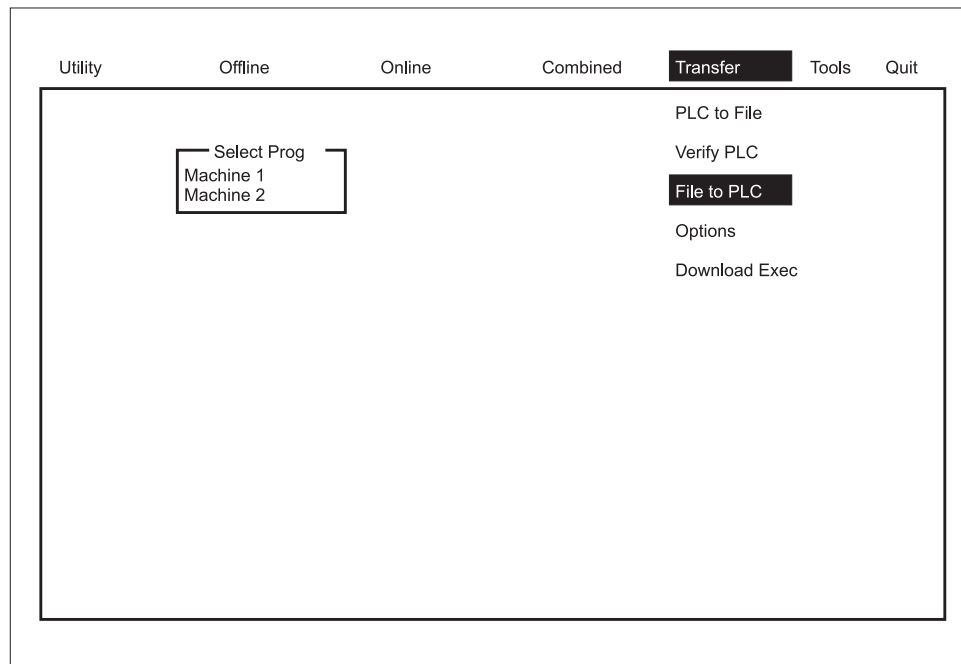


Figure 3-7
Modsoft Main Menu with Options

- Use the right arrow key to move the cursor to the “Transfer” menu.
- If the PLC machine program is not backed up, then perform a backup from the “PLC to File” option so there will be a copy of the present PLC program.
- If the PLC program is backed up, then move the cursor to the “File to PLC” option and press the <Enter> key.

6. Select the program to load. See Figure 3-8.



**Figure 3-8
Select Program Pop-Up Menu**

- Use the up and down arrows to find the desired program to load and then press the <Enter> key.
- 7. Turn Off the MEMORY PROTECT KEYLOCK on the PLC.**
- 8. Stop the controller.**
- When the prompt for “stop controller?” appears, press the <Y> key. Then press the <Enter> key.
 - Verify that the “Run” light goes out on the controller.
- 9. Wait for the program to load.**
- The “Controller Status Information” screen should display when the program is successfully loaded.

10. Restart the controller.

- When the program has finished loading, press <Y>, then press the <Enter> key to restart the controller.
- Verify that the controller “Run” light is on.

11. Exit the “Controller Status Information” screen.

- Press the <Esc> key to exit the “Controller Status Information” screen or press <Enter>.

12. Verify that the program loaded successfully.

- Move the cursor to “Verify PLC” under the Transfer menu.
- Press the <Enter> key.
- Select the program you need to verify, then press the <Enter> key.
- The prompt “Verify Result OK” should appear if the program is loaded correctly.

13. Exit Modsoft.

- Press the <Esc> key more than once or the <F9> key to quit.
- Press the <Y> key to exit.



Concept Check

Load Program

Answer the following questions to check your understanding of loading a program. Circle the correct answer in each question. Then compare your responses with the answers at the bottom of this page. Some of the questions may have more than one correct answer. If you have difficulty answering a question, review the Skill Development Guide or ask your Trainer for assistance.

1. **The PLC unit number is found on the**
 - a. machine print.
 - b. Modbus Plus Data Highway Chart.
 - c. Modbus Plus Connection Box.
 - d. Ladder Diagram.

2. **When you stop the controller, you should verify that which light extinguishes?**
 - a. Power
 - b. Ready
 - c. Run
 - d. Busy

3. **After restarting the controller, you should release the PLC when using the P190, in order to allow other programmers to communicate with the controller.**
 - a. True
 - b. False

4. **When using the P230 programmer, what screen appears when the program finishes loading?**
- a. Controller Status Information Screen
 - b. Segment Status Screen
 - c. DOSSHELL Directory
 - d. Logout Screen
5. **When using the P230 programmer, you should never back up the PLC program before loading a new program.**
- a. True
 - b. False

Answers: (1. b 2. c 3. a 4. a 5. b)

Next Step

If you are ready to demonstrate the task now, ask your Evaluator or Trainer to schedule the Skill Check. However, if you need to practice some of the steps first, continue to the next section.



Practice

The following practice will help prepare you for the Skill Check. Ask your Trainer to set up the practice for you. After you complete a practice, ask your Trainer to check your work.

Practice 1

Observe all of the Modicon PLC types (184, 384, 584, 884, 984) and learn where the MEMORY PROTECT KEYLOCK on each of the units is located. Find the “Power On” or “Power” light and the “Run” light on all PLCs. Practice entering the load program mode and turning the controller off and on to load a program with your Trainer’s supervision. Observe the “Run” light as you turn the controller off and on. Be prepared to discuss safe work practices associated with stopping and starting a controller.

Practice Objective 1

You should identify the “Power” or “Power ON” and “Run” lights on all PLC types. You should understand the use of the MEMORY PROTECT KEYLOCK, including knowledge of Memory Protect “On” and “Off” and the location of the KEYLOCK for all PLC types. Stopping and starting the controller should result in the “Run” light extinguishing when the controller is stopped and illuminating when the controller is restarted.

Practice 2

Locate the Modbus Plus Data Highway Chart at the various controller sites. Practice identifying controllers on the Modbus Plus Data Highway Chart. Locate a needed controller on the chart and verify the number by entering the unit number at the programmer and communicating with the controller.

Practice Objective 2

You should identify the location of the Modbus Plus Data Highway Chart at the various PLC sites. The location of the PLC you are using is important in using the chart and entering a program to communicate with that PLC. You should demonstrate your ability to locate the unit number and connect with the PLC from which you need to work.

Practice 3

Practice loading programs using the P190 and P230 processors with your Trainer's supervision. Verify that the load was successful.

Practice Objective 3

You should load a program with both types of programmers. You should accomplish verification of the load by following the prompt "Verify Load?". Verification should result in the prompt "Verify OK".

Next Step

Continue to practice until you are ready for the Skill Check. When you are ready to demonstrate the task, ask your Evaluator or Trainer to schedule the Skill Check.

