# K-10b

# ELECTRICIAN TRAINING

## SKILL DEVELOPMENT GUIDE

### PLC (Modicon)
### K-10b: Replace Processor
**Issued 01/01/98**

# Task Preview

**Replace Processor**

At Caterpillar when a PLC stops functioning, the Learner troubleshoots to determine if the problem is with the processor.  If the processor has stopped functioning, the Learner replaces it with a new one from the crib.  The Learner must be careful when replacing the processor or further downtime may occur.  After replacing the processor, the Learner must verify its operation by cycling the machine.

**How your skills will be checked**

The Skill Check will require you to replace a processor.   All tools, materials, and resources will be available.  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

When a processor has been determined as faulty, replace the processor.

**Task Standards**

1.  You ensure that the replacement processor matches with the original processor identically before replacing it.

2.  The replaced processor communicates with the programmer, which allows you to reinstall the machine program.

3.  After replacing the processor, you cycle the machine to verify that the processor is functioning within specifications.

# What You Will Need

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

o Follow all Caterpillar Facility Safety Standards when performing this task in the plant.

o 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.

o Wear safety glasses and hearing protection in assembly and production areas.

o P190 programmer (Typically used with the 184, 384, 484, 584, 884, and 984 processors.)

o P230 programmer (Used with the 984 processor and the 184, 384, 484, 584, and 884 processors in the P190 emulator mode.)

o PLC communication cable

o Tape Loader Tape (P190 only)

o Program Loader Tape (P190 only)

o Wiggy voltage tester

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

# Task Steps

**Replace Processor**

1. **Lock out and tag out the 480-volt disconnect after shutting off power.**

2. **Perform a voltage check with a Wiggy voltage tester to verify that the power supply to the processor is terminated.**

   o Check voltage at the 480 box from phase to phase and from each fuse to the ground.

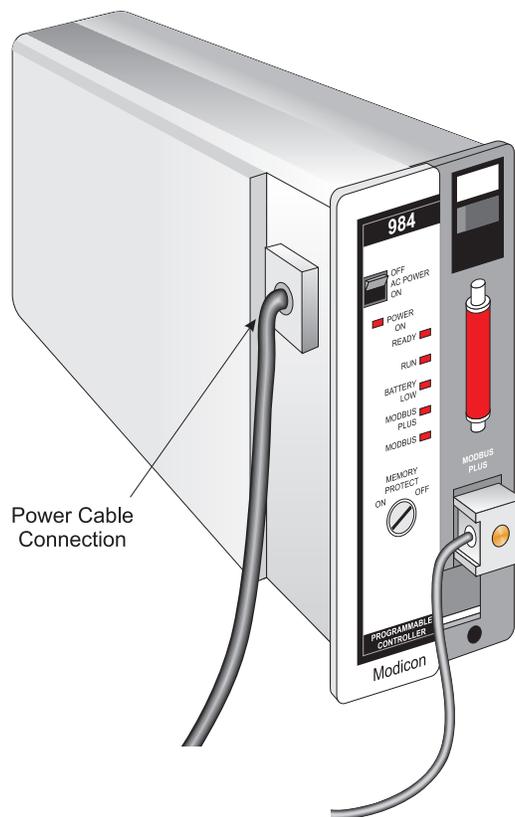3. **Disconnect the main power cable from the processor.** *See Figure 10-1.*



*Figure 10-1*
*984 Power Cable Connection*

**4.    Remove all communication cables from the processor.**

   o   The number of cables may vary according to the processor.

**5.    Remove the original processor and select the replacement processor.**

| If the processor is a | then: |
|---|---|
| 984 or 884 series | unscrew the two mounting screws on the front of the processor panel. |
| | pull the entire processor out of the mounting slot. |
| | take the bad processor to the "crib" and select the correct new one. |
| | set the DIP switches on the new processor to the same as the original processor in order to configure the processor. |
| 184, 384, 584 series | remove all of the panel mounting bolts. |
| | ⊟ **Warning: Be careful when removing a 184, 384, or 584 processor. The weight of the processor may exceed 50 lb.** |
| | Pull the entire unit out of the cabinet and take it to the crib. |
| | Select a new or repaired processor (184 or 384 replacement will likely be a repaired unit). |

**6.    Install the new processor.**

   o   Make sure the 984 and 884 processors insert all the way into place.

   o   Be sure that there are no bent pins on the processor.

   o   The mounting screws should screw all the way in until the unit is securely in place.

**7.    Reconnect the data communication cables.**

**8.    Reconnect the power supply.**

**9.    Re-power the unit by removing the lockout and tagout on the 480-volt disconnect.**

10. **Verify that the new processor is functioning correctly.**

   o Load the machine program into the processor.

   o Put the processor into the "Run" mode.

   o If the processor is not communicating with the programmer, then check the connections.  If the processor is either an 884 or a 984, then verify that you have properly seated the unit in the slot.

11. **Verify that the machine runs according to specifications.**

# Concept Check

**Replace Processor**

Answer the following questions to check your understanding of replacing a processor. 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. Replace a bad processor with a new or repaired one from what location?

       a. Shop

       b. Warehouse

       c. Crib

       d. Blue storage cabinet

2. Which processor is not likely to have a new replacement but a repaired replacement processor instead.

       a. 184

       b. 384

       c. 584

       d. 884

       e. 984

3. You should verify that there are no bent pins when replacing the 884 or 984 processor.

       a. True

       b. False

4. On the 984 and 884 PLC units what must be configured the same as the original processor?

      a. Dip switch

      b. Pin

      c. Jumper

5. You must insert the 884 and 984 processors into the slot, push them into place, and ensure that the pins are not bent. What is another way to verify that the processor is seated correctly?

      a. Use the Wiggy voltage tester.

      b. The facial plate is flush with the slot housing.

      c. The mounting bolts will screw all the way in.

      d. The programmer will communicate with the processor.

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

# 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**

Practice installing the 884 and 984 processors into the housing with your Trainer's supervision.  Practice seating the processor into the slot and verifying that the pins are not bent before installing.  Do not force the unit into the housing but be sure that the unit is seated completely into the housing.  Be prepared to discuss safety issues regarding the removal and installation of the processors.

**Practice Objective**

You should remove and install the 884 and 984 processors.  With your Trainer's supervision, you should perform all of the steps to remove and reinstall the processor.  You should discuss the safety issues with your Trainer regarding the removal and installation of the processor.  These issues include performing lockout and tagout procedures, installing the correct processor with the correct configuration, and all issues associated with restarting the machine.

# 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.