

K-07b

ELECTRICIAN TRAINING

SKILL DEVELOPMENT GUIDE

**Duty K: PLC (Modicon)
K-07b: Replace I/O Module**

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Task Preview

Replace I/O Module

At Caterpillar, the Learner replaces I/O module whenever they are determined as bad, if there is a new machine installation, or when there is a modification to a machine. The replacement is an identical module from the crib. The Learner must perform the replacement carefully or a “wreck” could occur, producing more downtime, or causing injury to personnel. After reinstalling the module, the Learner verifies that the machine functions according to specifications.

How Your Skills Will Be Checked

The Skill Check will require you to replace an I/O module. 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

When an I/O module is faulty or when a new machine installation has occurred, replace the I/O module.

Task Standards

1. The replaced module is identical to the original module.
2. The replaced module communicates with the processor, allowing the machine program to run according to specifications.
3. You cycle the machine to verify that the module is functioning within specifications.

What You Will Need

This section contains the safety information, tools, and resources you will need before replacing an I/O module.



- Follow all Caterpillar Facility Safety Standards when performing this task in the plant.
- 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.
- Wear safety glasses and hearing protection in assembly and production areas.



- 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
- Wiggy voltage tester



- Basic Help Keys, which are available on programmer software
- Modsoft Programmer User's Manual (GM-MSFT-001 Rev. F)
- Lockout/Tagout Procedures



Task Steps

Replace I/O Module

Note: Before you turn off the power to the processor, check to ensure that the Memory Protect Switch is “ON”.

1. **Lock out and tag out the 480-volt power supply panel.**
 - This removes power from the PLC.
2. **Verify that the power is off by using a “Wiggy” voltage tester.**
 - Check voltage at the 480 box from phase to phase and from each phase to ground.
 - Check for 110v at the transformer to verify no other power source is in use (Optional).

WARNING! Failure to remove power from the processor can result in a “wreck”. Replacing an I/O module while power is supplied can result in movement of the machine when you install the new module.

3. **Remove the two mounting screws at the front of the module.**

- 4. Pull the module straight out of the mounting slot. See Figure 7-1.**

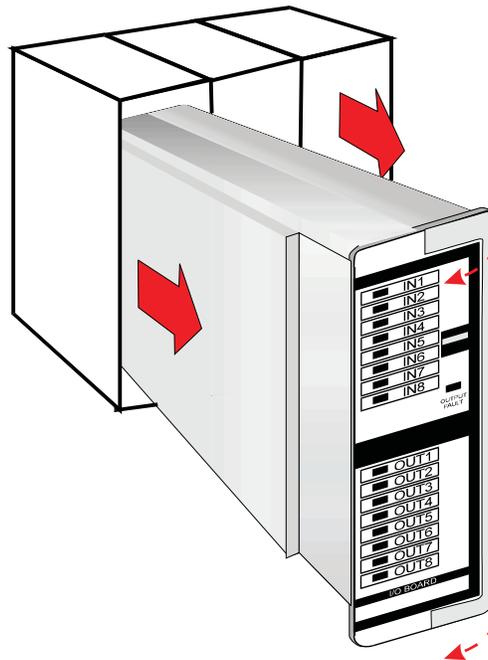


Figure 7-1
The module slides straight out of the slot.

- 5. Exchange the old module for a new module at the crib.**
 - Verify that the module numbers match.
 - Return to the job site with the new module.
- 6. Install the new module by sliding it straight into the same slot.**
 - Make sure the module seats correctly.

7. Tighten the mounting screws into the front mounting holes on the module.

- The module is not seated correctly if the mounting screws will not tighten.

WARNING! If the screws are not securely fastened the module could loosen from vibration and cause a shutdown.

8. Remove the lockout and tagout from the 480-volt power supply to restore power to the PLC.

9. Verify that the module is functioning by following Skill Development Guide, K-06: Troubleshoot I/O Module, and by cycling the machine.



Concept Check

Replace I/O Module

Answer the following questions to check your understanding of replacing an I/O module. 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. When checking voltage at the 480-volt power supply, and after performing the lockout and tagout procedures, you should check from phase to phase and from each phase to ground.
 - a. True
 - b. False
2. When removing an input or output module, you should pull up and then straight out.
 - a. True
 - b. False
3. What reference should you verify when switching the original module out for a new module?
 - a. DIP switches
 - b. serial number
 - c. module number
 - d. jumpers
4. The module is not seated correctly if the mounting screws will not tighten.
 - a. True
 - b. False

5. If the _____ are not fastened tightly, then the module could vibrate and cause a shutdown.
- a. Jumpers
 - b. Dip Switches
 - c. Fastening brackets
 - d. Mounting screws

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

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 removing and installing the 800 series input and output modules into the housing with your Trainer's supervision. Be prepared to discuss safety issues regarding the removal and installation of the modules.

Practice Objective

You should remove and install one of the 800 series I/O modules. With your Trainer's supervision, you should perform all of the steps to remove and reinstall the module. You should discuss the safety issues regarding the removal and installation of the processor with your trainer (e.g., lockout and tagout procedures, installing the correct processor with the correct configuration, and 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.