

K-08a

ELECTRICIAN TRAINING

SKILL DEVELOPMENT GUIDE

PLC (Allen-Bradley)
K-08a: Troubleshoot Peripheral
Issued 01/01/98



Task Preview

Troubleshoot Peripheral

As a first step to identifying a peripheral problem, the Learner must determine if the problem is an input problem from the peripheral device or an output problem to the peripheral device. Typical peripheral devices include motion control modules, motor drives, diagnostic screens, and man-machine interfaces.

Failure to identify the problem could adversely affect the quality of the product and cause excessive downtime.

How your skills will be checked

The Skill Check will require you to troubleshoot a peripheral. 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

Upon notification of a peripheral-related problem, troubleshoot the peripheral.

Task Standards

1. You identify the peripheral-related problem.
2. You recommend the appropriate corrective actions.

What You Will Need

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



- 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 input/output (I/O) chassis.
- Perform Lockout and Tagout procedure if you must place the machine static state.
- Be careful when working near moving or rotating machinery.
- Wear safety glasses and hearing protection in assembly and production areas.



- PC equipped with PLC software
- PLC
- Interconnect cable
- Basic electrical hand tools
- Voltmeter
- Processor Keyswitch Key (if the processor is not in the REM position)
- Password (if necessary)



- Electrical Schematics
- Ladder Diagram printout
- ZMS procedure
- Diagnostic screens (Marquee, Panel View)
- User's Manual for peripheral devices



Task Steps

Troubleshoot Peripheral

1. **Read the diagnostic display (if available) to see if the problem is identified.**
2. **Ask the Operator for information about where the machine stopped in the machine cycle.**
3. **Visually inspect the area where the problem occurred.**
 - If there is a physical problem with the machine, you do not want to activate an output that could result in damage to the equipment or to a part. If the machine has stopped and no physical problem is present, you need to locate the output that will complete the machine cycle.
4. **Determine the proper output needed to create motion.**
 - Refer to the Ladder Diagram printout and the Electrical Schematic.
5. **Check the output module's power and fuses.**
 - The output module is located in the PLC cabinet.
 - Verify that the output is on.
 - Verify that the BLOWN FUSE indicator (if present) is not illuminated. If illuminated, the fuse is blown. Replace the fuse. If the problem is not corrected, proceed to step 6.
6. **Using the interconnect cable, connect the PC to the PLC.**
 - When connecting to a 5/15 or 5/25 - Connect the PC cable to the PEER COMM INTFC communication port (that is for the programming terminal) on the front panel of the PLC.
 - When connecting to a 5/40 - Connect the PC cable to the Data Highway+ communication port Channel 1A on the front panel on the PLC. If communication is not established, connect to the Channel 2A.
7. **Turn the PC power on.**
8. **Press the <PLC-5> function key.**

9. Go online.

- Cursor to the PLC station you need to connect to, using the arrow keys.
- Press the <Online Program> function key. You are now connected to the PLC.

CAUTION! You are online. Incorrect actions could result in injury to personnel or damage to equipment.

10. Monitor the online Ladder Diagram.

11. Using the arrow keys, select the file you must to be monitor.

- The ladder logic file displays; the first rung of the ladder logic displays at the top of the screen.

12. Locate the rung number and file number.

- The rung number and file number information is located in the Ladder Cross Reference section of the Ladder Diagram printout.

13. Using the PLC software, locate the rung number of the instruction you need to find.

14. Observe the rung for instructions that are highlighted or intensified.

15. Determine if the problem is an input from the peripheral device or an output problem to the peripheral device.

- An input problem could account for the output not being energized. If the PLC is not receiving the input from the peripheral device, then the problem is within the peripheral device.
- If the problem is an input, go to the next step. If no problem exists with the input addressed instructions, look at the other addressed instructions.

16. Using the Electrical Schematic, determine the type of input device and the device location.

17. Using the voltmeter, check the voltage to the input device.

- If voltage is not present, the problem could be with the device, machine, or

wiring.

- 18. If the other addressed instructions are not intensified, search for their output instruction rung.**
 - Use the SEARCH function to locate the instruction rung number.
- 19. Repeat steps 12-18 until you locate and identify the problem.**
 - If the output from the PLC controller is OK, the problem is in the peripheral device.
- 20. Exit the PLC-5 software.**
 - Press the <Return to Menu> function key. The PLC-5 PROGRAMMING SOFTWARE screen displays.
 - Press the <Exit Sys> function key. The ALLEN-BRADLEY MAIN MENU INTERFACE screen displays.
- 21. Press the <Exit to DOS> function key.**
- 22. Type cd\ and press <Enter>.**
- 23. Disconnect the PC from the PLC processor.**
 - Power down the PC.

- Remove the interconnect cable from the PLC communication port.



Concept Check

Troubleshoot Peripheral

Answer the following questions to check your understanding of troubleshooting a peripheral. 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. You have located the output that will complete a machine's cycle. Before activating the output, you must verify that there are no physical problems with the machine.
 - a. True
 - b. False
2. To locate a rung number and file number, you can refer to the Ladder Cross Reference section of the Ladder Diagram printout.
 - a. True
 - b. False
3. You have determined that a problem is an input. If no voltage is present, the problem could be with the
 - a. wiring.
 - b. machine.
 - c. device.
 - d. a, b, or c
4. A problem could possibly be the peripheral device if the
 - a. output from the PLC is OK.
 - b. PLC is not receiving an input from the peripheral device.
 - c. output is not energized due to the PLC not receiving an input.

d. a, b, or c

Answers: (1. a 2. a 3. d 4. 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

Your Trainer will designate a processor location for the practice. While your Trainer observes, demonstrate and explain the steps for determining that the problem is peripheral-related. To identify the problem, practice looking at outputs to the peripheral and inputs from the peripheral. Use the Ladder Diagram printout to verify the machine conditions. After identifying the problem, your Trainer will ask you to recommend the corrective action.

Be prepared to demonstrate safe work practices during this activity.

Practice Objective

You should identify the problem and recommend the appropriate corrective action. You should demonstrate safe work practices during this activity.

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.

