

Testing Switches and Relays

On Easy-wire CR, CH+, CH2

Introduction

You can test switches and relays using OPEN and CLOSE Instructions. Each state of a switch or relay must be tested. For example, the single pole, single throw switch below has two states, opened and closed. In the closed state J5-3 is connected to J17-12; In the opened state J5-3 is not connected to J17-12.



The test instructions used to test the switch are shown below. In this case only one OPEN Instruction is used to test the open state and one CLOSE Instruction is used to test the closed state.

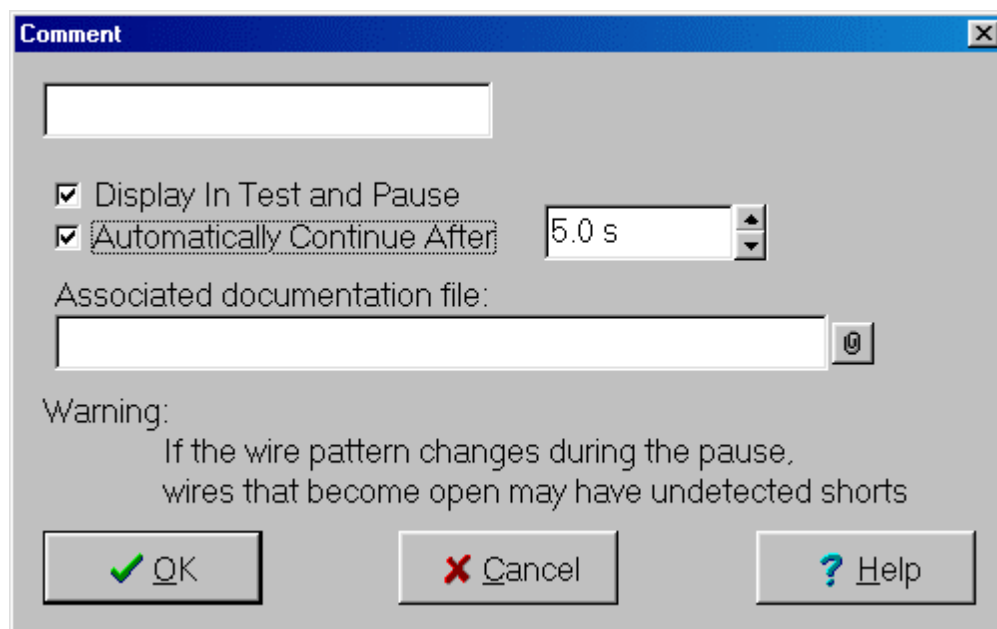
OPEN J5-3 J17-12
CLOSE J5-3 J17-12

In this example when easy-wire processes the OPEN Instruction, the switch must be open for the OPEN Instruction to complete. If the switch is not open, the test window displays *Not open J5-3 J17-12* until the switch is opened. When the OPEN Instruction is completed, the easy-wire software processes the next test instruction, in this case the CLOSE Instruction. Again the tester must recognize a closed state between the two points before the test can continue. If the tester does not recognize the closed state, the tester will prompt in the test window *Not closed J5-3 J17-12*.

Giving Operators Prompts to Activate a Switch

If desired a Comment Instruction may be added before each OPEN and CLOSE Instruction to instruct the operator to identify and correctly activate the switch. Alternatively, you can use a [Comment Instruction](#) before an OPEN or CLOSE Instruction to guide operators in identifying and activating switches during the test.

Comment Instruction



Ensuring Switches or Relays Are Tested Correctly

Verify the test for the switch or relay. This requires you to fully understand how the tested device works, correctly program each state, and ensure possible failure conditions are detected. Whenever possible observe the best practices below. If you have problems, use this list as a troubleshooting guide.

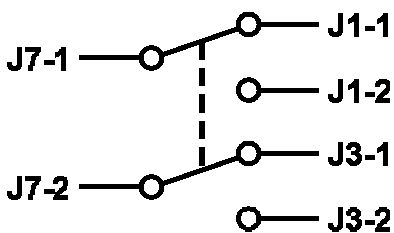
1. Create OPEN and CLOSE instructions that fully represent each possible switch state.
2. Group all the test instructions for a given switch state together, and group all the test instructions for a switch together. Do not mix wire instructions in between OPEN and CLOSE instructions for a switch.
3. Place the OPEN Instructions for a given switch state before the CLOSE Instructions. This is especially true if the tester should display a short or miswire in the connections to the switch.
4. If a switch contact is connected to multiple test points, use the test point that is the lowest system point to program the OPEN and CLOSE Instructions.
5. Place instructions for testing switches at the end of the test.

More Switch Examples Before programming more complex switches or relays, make sure to understand these examples.

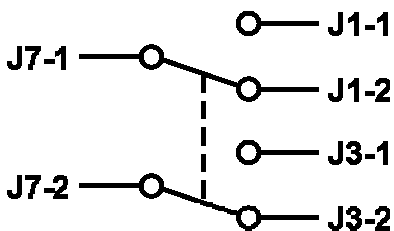
[Double Pole, Double Throw](#)

Double Pole, Double Throw (DPDT)

The DPDT has two states. To effectively test this switch, both states of the switch must have a set of instructions as shown.



The instructions to test this switch in this state would be:
OPEN J7-1 J1-2
OPEN J7-2 J3-2
CLOSE J7-1 J1-1
CLOSE J7-2 J3-1

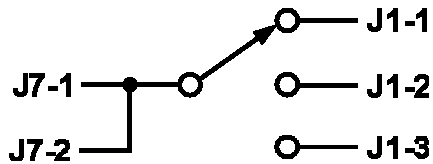


The instructions to test this switch in this state would be:
OPEN J7-1 J1-1
OPEN J7-2 J3-1
CLOSE J7-1 J1-2
CLOSE J7-2 J3-2

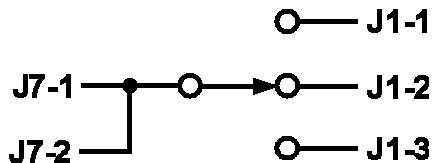
[Single Pole, Three Way](#)

Single Pole, Three Way

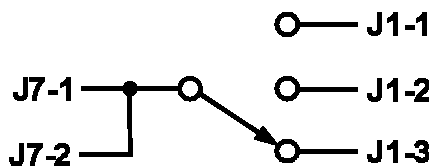
In a three way switch there are three states that need to be tested. Note in this example, there is an internal connection in the switch connecting test points J7-1 and J7-2. Only one of these points, ideally the one that corresponds to the lowest system point, needs to be used for the OPEN and CLOSE Instructions. In a test program the internal connection should be tested with a Wire Instruction previous to the OPEN and CLOSE Instructions for the switch.



The instructions to test this switch in this state would be:
OPEN J7-1 J1-2
OPEN J7-1 J1-3
CLOSE J7-1 J1-1



The instructions to test this switch in this state would be:
OPEN J7-1 J1-1
OPEN J7-1 J1-3
CLOSE J7-1 J1-2



The instructions to test this switch in this state would be:
OPEN J7-1 J1-1
OPEN J7-1 J1-2
CLOSE J7-1 J1-3

Testing Relays

Relays are essentially switches that are activated by a voltage that is applied to the relay coils. OPEN and CLOSE Instructions are used for testing relays just as they are for switches. During the test an operator can manually connect the voltage to the coil to activate the relay.

Do NOT apply live voltage to test points of the tester. Never apply this voltage to the test points of the tester. Make sure fixturing to the relay coil points is wired only to the external voltage source and not to the test points.