
5. Troubleshooting



Warning: Only qualified personnel should attempt to test this instrument. The operator assumes all responsibilities for safe practices while troubleshooting.

Tools Needed

Digital Multimeter (DMM)

Quick Check

Check the jumper positions of J12 and J13. If present, check the jumper positions of J16 and J17. Jumper J12 and J17 energize the relay(s) at flow or wet. Jumpers J13 and J16 energize the relay(s) at no flow.

Check that the control circuit is firmly seated into its socket.

Check if power is present and customer fuses are good, if they are used.

Follow the trouble shooting flow chart in Figure 5-1 near the end of this chapter.

Non-maintenance Observations

At this point, observe the system setup to verify operation. No disassembly or testing is required at this time.

Check Serial Numbers

Verify that the serial number of the flow element and the control circuit are the same when the instrument is used with the remote enclosure option. The flow element and the control circuit are a matched set and cannot be operated independently of each other.

Check Input Power

Verify that the correct power source is turned on and connected.

Check the Instrument Installation

Review the information on instrument installation in Chapter 2 to verify correct mechanical and electrical installation.

At the time of order, the flow element placement should have been determined. However, if not, the flow element should be mounted at least 20 diameters downstream and 10 diameters upstream from any bends or interference in the process pipe or duct for best accuracy.

Check for Moisture

Check for moisture on the control circuit. Moisture on the control circuit may cause intermittent operation.

If a component of the process media is near its saturation temperature, it may condense on in the flow element tubing. Place the flow element where the process media is well above the saturation temperature of any of the process gases.

Check Application Design Requirements

Application design problems can occur when instruments are first installed into the process media. The application design should also be checked on instruments that have been in operation for some time. If the application design does not match field conditions, errors occur.

1. Review the application design with plant operation personnel and plant engineers.
2. Ensure that plant equipment such as pressure and temperature instruments conform to the actual conditions.
3. Verify operating temperature, operating pressure, line size, and gas medium.

Control Circuit Dash Number Specification

Verify that wiring is connected per the wiring diagram in Appendix A.

Verification of Flow Element Resistance

The measurements are based on a standard (4K ohm RTD at 70°F, or 21°C) flow element. Variation of ± 100 ohms from nominal is to be expected, depending on temperature. The maximum allowable difference in resistance between matched RTD's is 1% at ambient temperature (immersed in water). The heater resistance should be 221 ± 5 ohms.

1. Turn off the operating power to the instrument.
2. Gently remove (pull straight out) the control circuit from the socket. Using a DMM, measure the resistance of the active and reference RTD sensing elements.



Note: The resistance of the active RTD will be greater than the resistance of the reference RTD whenever the heater is on.

3. Measure the resistances as found in Table 5-1 to determine if the flow element is functional. The resistance is dependent on a temperature of 70°F (21°C)

Table 5-1. Flow Element Resistances In Ohms

Terminal Pin Number (Wire Color)	Resistance In Ohms
From Pin 7 (White, Black and Shield) To Pin 8 (Yellow)	4000
From Pin 8 (Yellow) To Pin 9 (Red)	4000
From Pin 7 (White, Black and Shield) To Pin 10 (Blue)	221
From Pin 7 (White, Black and Shield) To Pin 9 (Red)	8000
From Pin 8 (Yellow) To Pin 10 (Blue)	4221
From Pin 9 (Red) To Pin 10 (Blue)	8221
Shield To All Pins	Open Circuit

If an open circuit exists for one RTD and a value of twice the resistance exists for the other RTD, then there is probably a miswiring or mislabeling problem.

After replacing the flow element, it will be necessary to follow the set point adjustment procedures found in the Operation chapter before returning the instrument to service.

If the flow element resistance is correct, proceed to the voltage verification test.

Verification of Flow Element Voltage

If the above resistance checks are good, plug in the control circuit and apply power. Measure the voltages in Tables 5-2. If the voltages are not correct, then remove and replace the control circuit.

Table 5-2. Flow Element Voltages

From Terminal Pin	Pin	Voltage Expected*
9 (+)	7 (-)	22VDC
8 (+)	7 (-)	12VDC
9 (+)	8 (-)	10VDC
10 (+)	7 (-)	22VDC (2 Watt Heater) 19VDC (1.5 Watt Heater) 15 VDC (1 Watt Heater)

**Voltages are dependent on temperature.

Spares

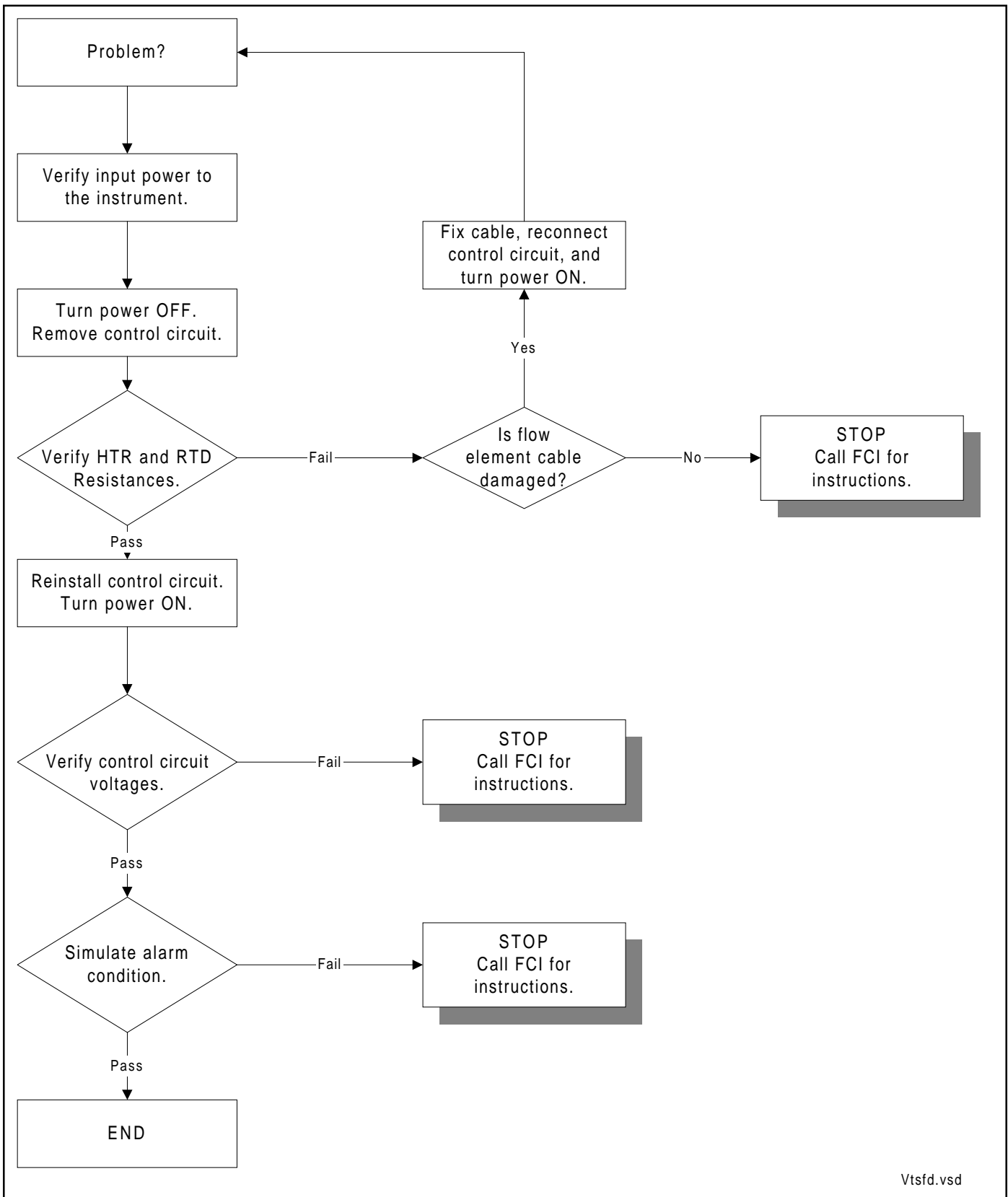
FCI recommends that one control circuit be kept as a spare. Check the Order Information Sheet that was filled out at the time of order for the correct part and dash number. Contact FCI for specific recommendations.

Defective Parts

Before returning any equipment to FCI, obtain an return authorization (RA) number for authorization, tracking, and repair/replacement instructions. If a return is required, remove the defective part or instrument, replace it with a spare, calibrate, and then return the defective part or instrument to FCI freight prepaid for disposition.

Customer Service

1. In the event of problems or inquiries regarding the instrument, please contact the Regional or Country Authorized FCI Field Agent. There is an extensive list of these representatives at the front of this manual.
2. Before contacting the FCI representative, be sure that all the applicable information is near so that a more effective, efficient and timely response may be provided.
3. Refer to Appendix C for specific Customer Service policy provisions.



Vtsfd.vsd

Figure 5-1. Troubleshooting Flow Chart