5. Troubleshooting

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

Caution: The control circuit contains electrostatic discharge (ESD) sensitive devices. Use standard ESD precautions when handling the control circuit. See Chapter 2, Installation for ESD details.

Tools Needed

Digital Multimeter (DMM)

Quick Check

Check the jumper positions of J12 and J13. Jumper J12 energizes the relay at flow. Jumpers J13 energizes the relay at no flow.

Check that the control circuit is firmly seated into it's 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 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 sensing element placement should have been determined. However, if not, the 12-64 sensing element should be mounted at least 20 diameters downstream and 10 diameters upstream from any bends or interference in the process pipe or duct.

Check for Moisture

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

Check for moisture on the sensing element. If a component of the process media is near its saturation temperature it may condense on the sensing element. Place the sensing element where the process media is well above the saturation temperature of any of the process gases.

Check Application Design Requirements

Application design problems may occur with first time application instruments, although the 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.

Verification of Sensing Element Resistance

The measurements are based on a standard (5K ohm RTD at 70°F, or 21°C) sensing 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 225 ±5 ohms. Be sure to subtract the cable resistance to get the true resistance.

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 and the heater as found in Table 5-1 to determine if the sensing element is functional.

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

If there is an indication of an open or short in the RTD, the sensing element will need to be replaced.

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

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

Table 5-1. Sensing Element Resistances In Ohms

From Terminal (Pin)	To Terminal (Pin)	Expected Ohms*
Heater (7)	Heater (10)	225
Ref Sen (9)	Com Sen (8)	5000
Ref Sen (9)	Act Sen (7)	10000
Act Sen (7)	Com Sen (8)	5000

*Resistance varies with temperature. These values should be ±5 ohms at 70 °F (21 °C).

Verification of Sensing Element Voltage

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

Table 5-2. Sensing Element Voltages

From Terminal Pin	To Terminal Pin	Voltage Expected**
9 (+)	7 (-)	22VDC
7 (+)	8 (-)	12VDC
9 (+)	8 (-)	10VDC
10 (+)	7 (-)	19VDC

**Voltages are dependent on temperature.

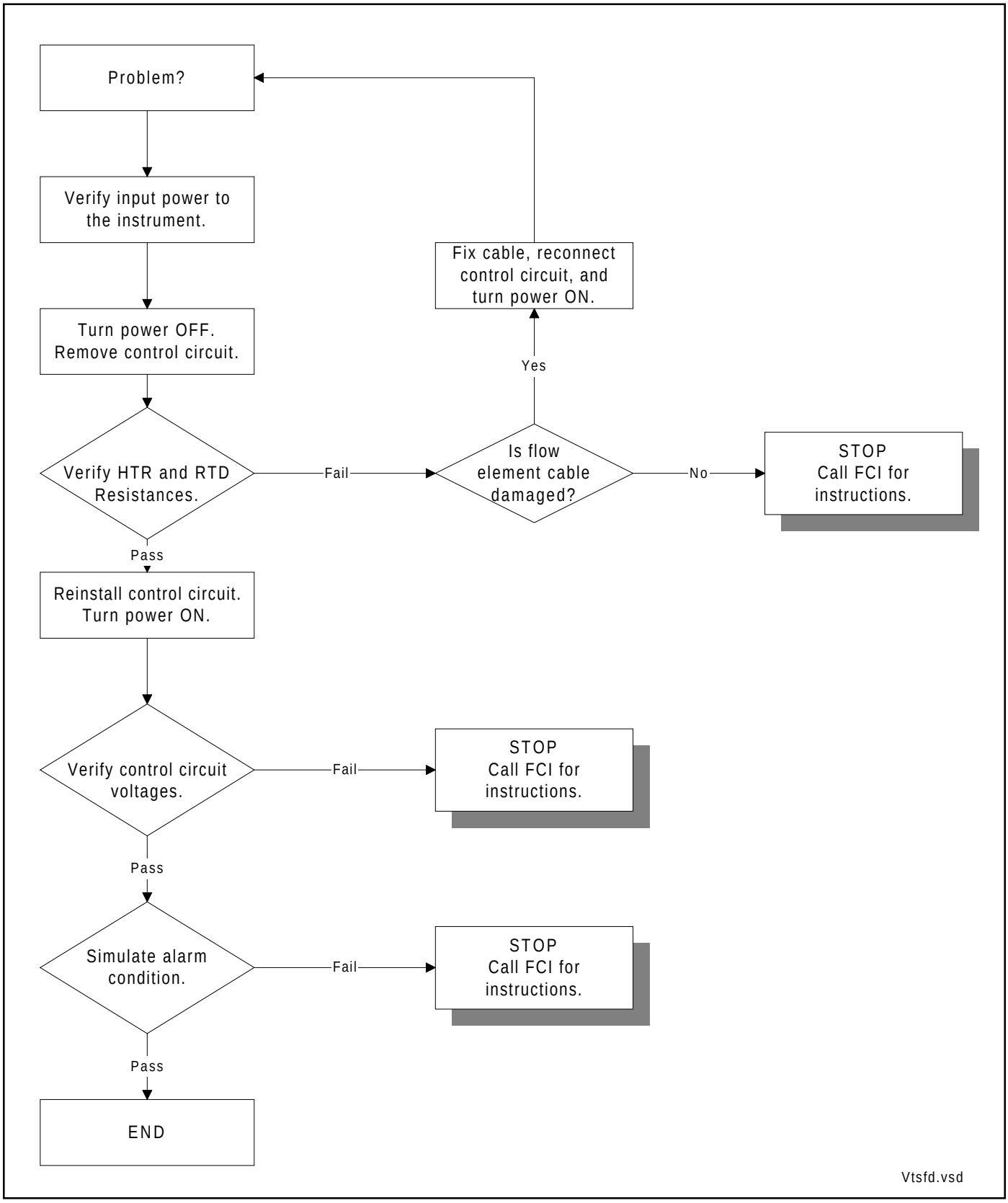

Figure 5-1. Troubleshooting Flow Chart

Spares

FCI recommends that one control circuit, part number 5181-XA3A2A2, be kept as a spare. The X in the part number depends on the input voltage. The X will be a 1 for 115 Vac, 2 for 230Vac or 6 for 24Vdc. 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.