<u>**FT3 Flowmeter Troubleshooting Guide**</u>
<u>**Fox Thermal Instruments**</u>
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This document has been created to assist Fox's technical service staff to resolve flowmeter problems. Your assistance to provide complete details is appreciated.

Section A: General information:
1. What is the serial number and model number of the flowmeter?

2. Please describe the problems in detail.

3. Approximately when did the problem start? Did the flowmeter ever work properly or has the problem existed since the initial installation?

Section B: Troubleshooting:
1. Perform a ZERO-CAL Check test. Record the values and Pass/Fail results.

2. Perform a CAL-V test. Record the values and Pass/Fail results.

3. Cycle thru displays to provide all alarm codes shown. If there is no display you can read the alarms using a laptop and Fox's FT3 View software.

4. Remote sensor units only: What are the wire/cable specifications (length, gauge) which connect the electronics housing to the sensor junction box?

5. The serial number on the electronics housing must match the serial number on the probe/sensor assembly. It is a common mistake to mix the serial numbers when multiple meters with remote electronics are orders. Please confirm the probe serial number is the same as on the electronics housing.

6. If the sensor is remote, carefully check for proper wire terminations at the sensor junction box and at the electronics housing terminal block (please refer to the Model FT3 Instruction Manual). Please note that the symptoms of incorrectly wiring between the remote junction box to main electronics can result in a zero flow reading, a very low temperature reading and/or alarm codes 22 and 23 indications.

7. What is the measured input power to the flowmeter?

8. Check the fuse and LED status lights for FT3.
    *   With the power off take a resistance measurement across the fuse to ensure it is a closed circuit.
    *   Apply power, on the right side between the rear of the display and the housing, do you see a LED blinking once per second?
    *   On the left side of the display on the board under the display, do you see one LED on and steady and an LED blinking once per second?

9. Have any of the flowmeter settings been changed since you receive the meter from Fox?

10. What is the CSV voltage? This information can be taken from the Engineering Display: press F1 and F2 at the same time and release (see page 28 of the FT3 Manual). The screen will change to display #10.

The flow rate will be on the upper line and the CSV voltage will be on the lower line of the display. Record the CSV and flow rate then press F4 to exit the Engineering Displays.

11. If advised by a Fox technical representative please confirm the following sensor resistances are correct.
    - For a non-remote meter, remove the display and disconnect sensor wires from TS-8 (the sensor termination terminal strip located at the bottom of FT3 board # 104036) before taking measurements: White to White wires= 200 to 225 ohms, Red to Red = .1 ohms, Red to Yellow = 9 to 10 ohms. Record the results.

Link to the Fox model FT3 Instruction Manual: http://www.foxthermalinstruments.com/pdf/ft3/FT3_Manual.pdf

Section C: Investigating flowmeter inaccuracy:

12. What is the expected flow rate, and what is the flow rate at which the unit is measuring? Please provide specific data.

13. Are the readings taken from the flowmeter display or from the customers system (PLC or DCS)? The 4mA and 20mA settings in the PLC or DCS must match the flowmeters settings. If you are using the 4 to 20 mA output also confirm that the measurement unit (SCFM, KG/HR, NM3H, etc.) in the Fox meter is the same as in your PLC/DCS.

14. Did the meter ever read accurately or do you believe it has read in error since it was installed?

15. Is the gas you are measuring the same as is shown of the flowmeter Calibration Certificate? If not, what gas are you currently measuring?

16. Has there been any change in meter location or pipe configuration?

17. For insertion flowmeters, is the insertion depth setting in accordance with the instruction manual?

18. What is the inside diameter (ID) of the pipe? Is the actual pipe ID the same as listed on the Calibration Certificate? Is the area setting programmed into the flowmeter correctly?

19. Do the STP (Standard Temperature and Pressure) settings (values and units) in the meter match what is on the calibration certificate? This is a requirement for accurate measurement.

20. How much straight pipe is upstream and downstream of the flowmeter?
    - For Insertion flow meters: Fox recommends a minimum of 15 diameters of straight pipe upstream of the flow meter and 10 diameters downstream.
    - For Inline flow meters: Fox recommends a minimum of 8 diameters of straight pipe upstream of the flow meter and 4 diameters downstream.

21. Is the arrow on the flow meter probe pointing in the direction of flow?

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