||||| *DYNASONICS* TFXL Ultrasonic Water Meter Trouble Shooting Guide

Trouble Shooting Steps

Display is not on

Open the enclosure cover and verify that the indicator light [D2] (located just left of the computer plug in) is illuminated. If it is not, one of the following is the cause:

1. 11-30 Vdc is not present on the power input terminals—measure the voltage on the bottom two screws on the wiring terminals. The TFXL consumes 250 mA of current during operation.
2. The fuse F1 (small part located just to the right of the wiring terminals) is open—measure continuity across F1 (surface mount part). It would be very difficult to replace this fuse in the field. It is recommended that a unit with a open fuse be returned to the factory for evaluation.
3. The flow meter's power regulators are damaged (return to factory)

ERROR 0010 on the display

This is the "low signal strength" error code, which typically means that the pipe is empty or gas locked—this code is normal and does not indicate a problem with the flow meter. This error occurs when measured signal strength is below the "Low Signal Cutoff" established in UltraLink.

If the pipe is empty:
- This error will clear by itself when the pipe fills with water

If the pipe is full of water:
- Verify that grease has been placed between the gray block and the pipe. Replace grease.
- Does the gray block fit properly on the pipe? These blocks are supposed to fit snuggly. No additional filler material between the block and pipe should be present or is required.
- If the meter is mounted on a horizontal pipe, verify that the meter is not mounted with the white box right on top of the pipe—there can be a gas pocket present. Mount the meter on the side of the pipe.
- Verify that the two black and two red wires are connected to the wiring terminal block TB1 located under the display circuit board.
- Are there a lot of gas bubbles in the water. Excessive gas content can lead to low signal strength levels. Does signal strength increase when the throttling valve is closed off?

Meter indicates flow when the pump is off or pipe is empty

When pump is off the pipe goes empty:
- The meter will read negative flow if the water in the pipe is flowing backwards—many times indicating that the check valve is defective and leaking. Once the pipe goes empty, the meter should display ERROR 0010.
- Adjust the Signal Strength Cutoff to a value 5% higher than the measured Signal Strength with a empty pipe. Verify that the measured Signal Strength is greater than the Signal Strength Cutoff when the pipe is full of water.
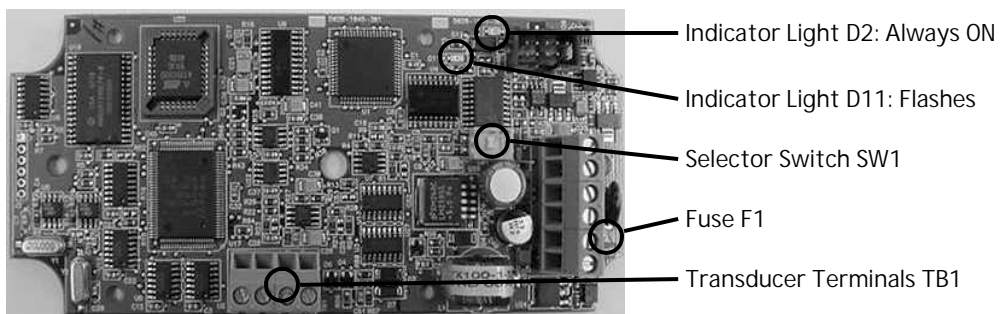
When the pump is off the pipe stays full of water:
- Verify that the Low Flow Cutoff is set to at least 3%.
- Perform a Zero Flow Calibration.
    1. Shut off valves ensuring that flow is completely stopped.
    2. Press Calibration button in UltraLink— Goto Zero Flow screen (Screen 2).
    3. Press Set button, Press Next button, Press Finish button.

When pump is off the pipe stays partially filled:
- The meter will likely act erratic and the piping should be changed. It is best to operate the TFXL on pipes that are positioned to be either entirely full or entirely empty.

Component Locations

- Indicator Light D2: Always ON
- Indicator Light D11: Flashes
- Selector Switch SW1
- Fuse F1
- Transducer Terminals TB1

Trouble Shooting Steps

Pulse output is not being picked up by the target acquisition system

- Verify that the small, white DIP-switch located to the upper left side of the wiring terminal block is set correctly. If the switch is ON, the output will be a 5V square-wave that is DC ground referenced. The 5V square-wave is polarized, so the negative output must be connected to the target ground and the positive output is connected to the pulse input of the target. If the switch is OFF, the output will be a 0.5 Vpp saw-tooth waveform (0.18 Vrms) that is not ground referenced—simulates a turbine meter magnetic pickup output. The 0.5 Vpp saw-tooth wave is not polarized, so wiring orientation is not critical.
- Verify that the indicator light [D11] located to the left of the PC connection is blinking. If it is not, the meter is not transmitting data. Power cycle the meter to reset the microprocessors.
- Verify that the flow direction is correct. The TFXL will not output pulses when the flow is reading negative values (unless programmed to do so).
- Verify that configuration parameters are set correctly. See below.

Meter display readings do not match readings indicated on target acquisition system

Pulse or Frequency Output is being used:
- Verify that the k-factor listed on the side of the TFXL enclosure has been entered into the target system.
- Verify that the UltraLink Configuration Output parameters are properly set.
    1. The Output Module #1 should be set to RATE.
    2. Verify that the values entered for Flow@ 0Hz and Flow@ 1KHz are correct.
    3. Flow@ 0 Hz should be set to 0 GPM. Flow@ 1KHz should be entered as the highest flow rate expected.

$$\textbf{K-factor} \;=\; \frac{60{,}000}{\text{GPM@ 1KHz}}$$ If maximum flow is 50 GPM, the K-factor would be 1,200 pulses/gallon

    4. To test the output, select the Test box and enter in a flow rate. The pulse output on the meter will output a pulse train that is equal to the K-factor calculated above.

4-20mA Output is being used:
- Verify that the target system is configured for the output span that is listed on the side of the TFXL meter.
- Verify that the UltraLink Configuration Output parameters are properly set.
    1. The Output Module #1 should be set to RATE.
    2. Verify that the values entered for Flow@ 0Hz [4mA] and Flow@ 1KHz [20 mA] are correct.
    3. To test the output, select the Test box and enter in a flow rate. The current output on the meter will output a current that is proportional to the range of flow entered in #2.

Standard Meter Configuration—UltraLink   1″ Schedule 40 Steel Pipe

BASIC
General:
Standard Configurations:
TFXL 1″ Schedule 40 Steel Pipe

FLOW
Flow Rate Units: Gallons/Min
Totalizer Units: Oil Barrels E0
Min Flow: 0 GPM
Max Flow: 50 GPM
Damping: 80
Low Flow Cutoff: 5%
Low Signal Cutoff: 5%
Substitute Flow: 0%

ADVANCED
Time Domain Filter: 8
Low Signal Cutoff: 5%
Substitute Flow: 0%
Short Pulse Duration: 0
Auto Short Pulse box: off
Flow Filter (Damping): 80
Flow Filter Hysterysis: 5%
Flow Filter MinHysterysis: 303
Flow Filter Sensitivity: 3
Bad Data Rejection: 3

OUTPUT
Module #1: RATE
Flow@0Hz: 0
Flow@1KHz: 50

DISPLAY
Display: Both
Display Total: Positive
Display Dwell Time: 7

Flow readings are erratic

- The pipe is not completely filled with water. Adjust piping so that the pipe is completely filled with water when a measurement is to be made. When the pump is off, the pipe should either remain completely filled or become completely empty.
- Program filter parameters are not adjusted properly—See above.