



TOTALFLOW

Technical Bulletin 125

BTU 8000/8100 Troubled Site Survey

Totalflow Technical Bulletin

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1. Purpose

This survey is not intended to give all of the absolute parameters for an installation. Most of these parameters can be found in the BTU 8000 Transmitter manual (2017229) and the BTU startup guide (2017494). This survey is intended to give a technician a list of important things to check when installing a BTU Transmitter and when troubleshooting a problem site. Not all of the following things need to be checked at every site for every problem. However, the more complete a survey is, the more likely it is that the real problem will be found and corrected or future problems will be avoided. This is meant to be a comprehensive list that covers many areas of concern.

Description

Areas of Concern

1. Power
2. Communication
3. Utilities (carrier and calibration gas)
4. Sample conditioning (filters, sample lines and probes)
5. Electrical Safety concerns (National Electric Code, company policy)

Power

Power supply

- i. Voltage and current rating (12.5-16vdc, 2.5Amps min.)
- ii. Distance between power supply and BTU Transmitter (maximum distance 500ft using 10 AWG wire)
- iii. Gauge of wire (minimum 14AWG up to 50ft)
- iv. Voltage at BTU Transmitter (maximum 16VDC). Monitor for 30 seconds at least to see voltage drop due to heater cycling.
- v. Condition of connections (including any splices). Tight and no corrosion
- vi. Check for AC transients (measure AC voltage across the DC terminals on the BTU Transmitter)

Battery backup/solar charging

- i. Type of batteries
- ii. Capacity of batteries
- iii. Age and condition of batteries
- iv. Capacity of solar panels
- v. Description of regulated charger and is it working

Is other equipment connected to power source that could be interfering?

Communication

- a. Which communication ports are used (RS232, RS485, RS422)
- b. What protocols are being used on which ports
- c. How are ports wired
- d. To what other devices is the BTU Transmitter connected
- e. What data is requested (which registers: See BTU MODBUS manual 2100666)
- f. How often is data requested
- g. How does host device (RTU etc.) react if Transmitter fails to respond
- h. Check for ground loops (look for shield wires running long distances and connected at both ends. This can lead to excessive current in comm. circuit)
- i. Is host device grounded
- j. Is BTU Transmitter grounded
- k. Is ground wire attached between BTU and host device (RTU, etc.)
- l. Baud rate, data bits, stop bits, parity (check host and BTU communication port settings)
- m. Check for transients on comm. lines
- n. Is RS485 or RS422 bus terminated (last device only)
- o. Distance between Transmitter and host (approximate)
- p. Noise sources near comm. lines (generators, compressors, high voltage/current)
- q. Cathodic protection at site (check DC and AC potential between soil/pipeline and soil/BTU transmitter using half cell)
- r. Locate nearest cathodic protection ground bed

Utilities

- a. Note Helium quality (99.995 or better) and bottle pressure
- b. Is a moisture trap installed on helium supply and is it in need of replacement
- c. Helium pressure to transmitter (90 or 75 psi)
- d. When was bottle last changed (helium and calibration gas)
- e. Note Calibration gas composition (expiration date, pressure, dew point)
- f. Has system (transmitter, sample lines, probe, cal gas) ever crossed below dew point of calibration gas or sample gas
- g. Has system run completely out of cal gas or helium lately
- h. Are solenoid valves cycling completely
- i. Where are bottles stored (outside, inside, in sun or shade)
- j. Distance of bottles from transmitter, diameter of tubing
- k. Teflon or plastic supply lines are not acceptable on cal or helium or sample
- l. Stainless steel diaphragms in regulators
- m. Only clean tubing and fittings should be used in installation
- n. Verify that the gauges on the Calibration and Helium bottles are correct. (Gauges can read high or low and cause problems)
- o. Verify regulator on sample probe
- p. Purge helium line at inlet to BTU transmitter for 20 seconds to clear moisture from regulators and line

Sample conditioning

- a. Sample gas composition, dew point
- b. Distance probe to sample conditioning system (length of sample line)
- c. Diameter of sample transport line
- d. Check filters (Balston, Genie, inline, liquid traps)
- e. Purge sample lines at connection to sample conditioning system (Sample lines should be clean and dry)
- f. Type of sample probe
- g. Location of probe (straight pipe, elbow, dead end)
- h. Condition of probe tip (clean/dirty)
- i. Bypass flow
 - a. Balston filter 400cc/min
 - b. Genie filter 50cc/min
- j. Size of pipe and length of probe and depth of insertion
- k. Where are bypasses vented
- l. Bypass condition (wet/dry, blocked/open, back pressure from vent header)
- m. Sample and two detector vent conditions (are they wet/dry, are the ends blocked?)
- n. Location of installation (near ocean, lake, swamp etc)
 - a. Look for indication that local conditions cause buildup on vent lines (i.e. salt deposits, insect nests, etc.)
 - b. Installed in shelter or outside

Electrical Safety concerns (NEC)

- a. Area classification (class 1, div. 1; class 1 div. 2; etc.)
- b. Connections made per Totalflow Certification Drawings.
- c. Com wires separate from power (if required)
- d. Conduit and seals installed if required
- e. Intrinsically safe ports treated separately where required
- f. Barriers where required (comm and power) of proper rating (some barriers wont allow enough current to supply BTU transmitter)

Other important information

- a. Serial number of unit
- b. BTUMMI software revision
- c. BTU EPROM/Flash version
- d. Part numbers and serial numbers of stream select module, controller board and GC module
- e. Collect setup file
- f. Collect reports (historical, events, alarms, calibration, current results, raw results, peak table and chromatograms)
- g. Site History- New installation? Old installation? Did the equipment ever work? Has anything changed lately at the site?
- h. Periodic or continuous problem
- i. If periodic problem what else is happening at the site at that time

Useful or required documents and tools

Documents

Startup Guide 2017494

Users Guide 2017229

MODBUS/Printer Console manual p/n 2100666

Certification Drawing

Specific wiring drawings pertinent to installation

Wiring drawings for equipment connected to BTU Transmitter

Tools

BTU MMI software

Allen wrenches

Wrenches

Screw drivers

Volt/Ohm meter



Conclusion

This information will help you or the Totalflow technical support staff in determining if there is a site related problem. The above steps do not cover troubleshooting the BTU transmitter itself. The Operation and Maintenance manual (part number 2017229) lists steps in troubleshooting individual modules of the BTU transmitter.