OPERATING INSTRUCTIONS

TRACER 1000™ LTT1-2G
GUIDED WAVE RADAR LEVEL TRANSMITTER

Principle of Operation

Please read carefully! No liability can be accepted for damage caused by improper use or installation of the Tracer 1000 2G Level Transmitter.

Featuring TDR (Time Domain Reflectometry) technology, the Tracer 1000™ second generation Guided Wave Radar level transmitter provides continuous level measurement in liquids, solids and slurries. This innovative device has almost no installation restrictions in tanks, silo's and bins up to 80 feet. The Tracer 1000™ 2G has a fully isolated 4-20 mA output that can be scaled for tank level or distance. The unit requires 18 to 30 VDC power. The 4-wire device comes standard with a RS-485 COMMS output can be connected to the Tracer Talker™ software for custom configurations and detailed level processing analysis. The Tracer 1000™ 2G ships pre-calibrated precisely for the customer's application for quick installation and setup. If adjustment is needed in the field the RS485 Communication Tool and Tracer Talker™ software is recommended. TDR technology is not affected by pressure, vacuum, temperature, viscosity, foam or dust. Changes in dielectric constant or coating of the probe do not affect the level measurement due to the dynamic sensing technology programmed into the artificial intelligence of the Tracer 1000™ 2G GWR level transmitter.

⚠ Safety Precautions

If you are unsure of the suitability of a Tracer 1000 2G GWR Level Transmitter for your installation, please consult your FLO-CORP representative for further information.

NOTE: REMOVE ALL PACKING INSERTS BEFORE OPERATING LEVEL TRANSMITTER.

Authorized Personnel

All operations described in this operating instructions manual must be carried out only by trained specialist personnel authorized by the plant operator. During work on and with the device the required personal protection equipment must always be worn.

Warning about misuse

Inappropriate or incorrect use of the instrument can give rise to application-specific hazards, e.g. vessel over fill or damage to system components through incorrect mounting or adjustment.

General Safety Instructions

The user must take note of the safety instructions in this operating instructions manual , the country specific installation standards as well as all prevailing safety regulations and accident prevention rules. The instrument must only be operated in a technically flawless and reliable condition. The operator is responsible for trouble-free operation of the instrument. During the entire duration of use, the user is obliged to determine the compliance of the required occupational safety measures with the current valid rules and regulations and also take note of new regulations.

Disclaimer

The information contained in this document is subject to change without notice. FLO-CORP makes no representations or warranties with respect to the contents hereof and specifically disclaims any implied warranties of merchantability or fitness for a particular purpose.

TECHNOLOGY

The Tracer 1000™ uses TDR Technology: low-energy, high-frequency electromagnetic impulses, generated by the sensor's circuitry, are propagated along the probe which is submerged in the liquid or solid to be measured. When these impulses hit the surface of the media, part of the impulse energy is reflected back up the probe to the circuitry which then calculates the level from the time difference between the impulses sent and the impulses reflected. The sensor can output the analyzed level as a continuous measurement reading through its analog output. TDR Sensors are also known as Guided Radars or Guided Wave Radars.

PRIMARY AREAS OF APPLICATION

- Chemical / Petrochemicals
- Energy
- Food & Beverages
- Plastic Pellets
- Minerals & Mining
- Oil & Gas
- Pharmaceutical
- Pulp & Paper
- Wastewater
- Transport
- Overflow Protection
- Asphalt Blending Tanks
- Alum and Wax Tanks
- Sand and Gravel
- Primary and Secondary Sludge Clarifiers
- Fresh Cooking Oil
- Used Cooking Oil

Tracer 2G with 1 " NPT mounting in liquids, slurries or solids applications.

SPECIFICATION

Signal Output	Isolated 4-20 mA (750 ohms @24Vdc User Voltage Supply, 250 ohms internally driven)
Fail Safe Output	3.8 mA, 4 mA, Last Known, 20 mA, 20.2 mA
Operating Voltage	12-30 Vdc (residual ripple no greater than 100 mV)
Power Consumption	<3W @ 24 Vdc
Communications	RS485 Modbus (RS485 activation required Tracer Talker™ Communication Software and Tool) *Download Virtual COM Port Drivers: www.flowlineoptions.com/tech/software*
Signal Wiring	Recommended Signal Output and Communications Output is twisted shielded pairs, 20-18 AWG
Measurement Range	1.2' to 80' with minimum dielectric constant of 0.3
Resolution	0.0008"
Accuracy	+/- 0.039" (1 mm) or 0.02% of measured distance, whichever is greatest.
Update Interval	100 samples/sec/updated <100 millisec.
Ambient Temp. Effect	+/- 0.005"/K of measured value
Repeatability	+/- 0.02" (0.5mm)

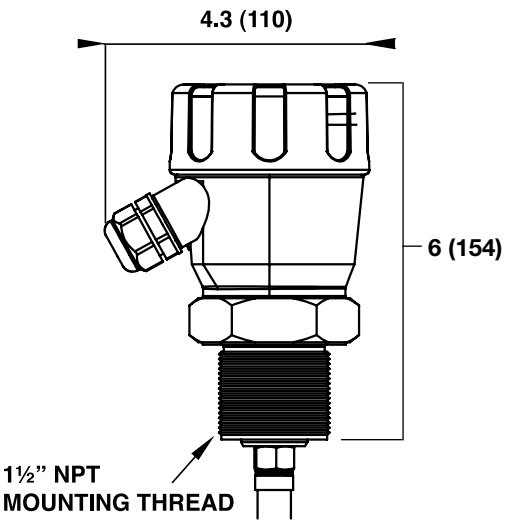
Maximum Operating Temperature	Electronics: -40° to 158°F (-40 to 70°C) Process/Probe: -40° to 398°F standard -50° to 593°F with Temp. Extender Option
Maximum Operating Pressure	-14.50 PSI to 580 PSI
Process Connection/ Type	Standard: 1.50" MNPT Option: 1.50" ANSI 150lb. Flange
Probe Type/Diameter	Rod Probe: 316 Stainless Steel, 0.25" diameter Wire Cable Probe: 316 Stainless Steel, 0.195" diameter Weighted Assembly: 0.75" diameter
Tensile Load	4,270 lbs
Enclosure	NEMA 6: Coated Epoxy Aluminum with IP67 Sealing
Cable Entries	(2) 1/2" NPT Conduit Entries
Approvals	A22 ATEX Grp II Cat 3 GD T75°C IP67 Tamb -40°C to 65°C

Specifications are subject to change without notice.

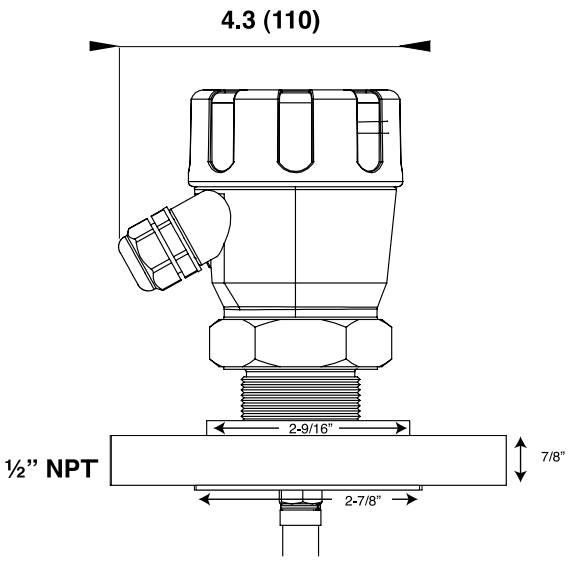
DIMENSIONS inches (mm)

NEMA 4 ENCLOSURE

Standard

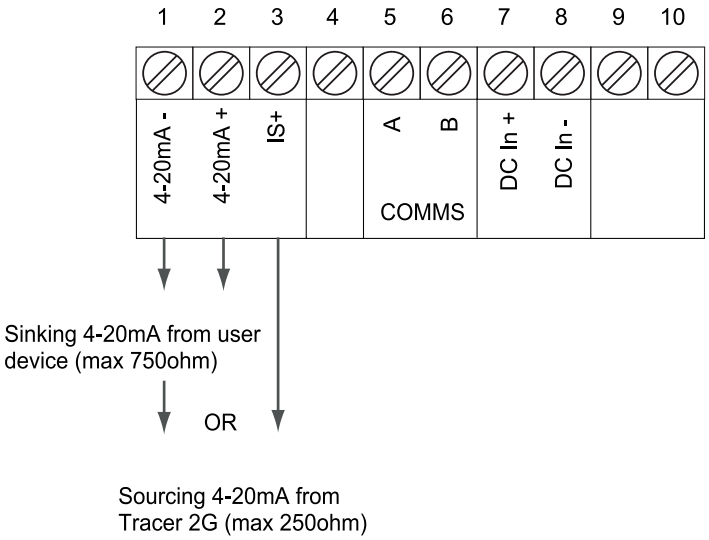


Flange Option

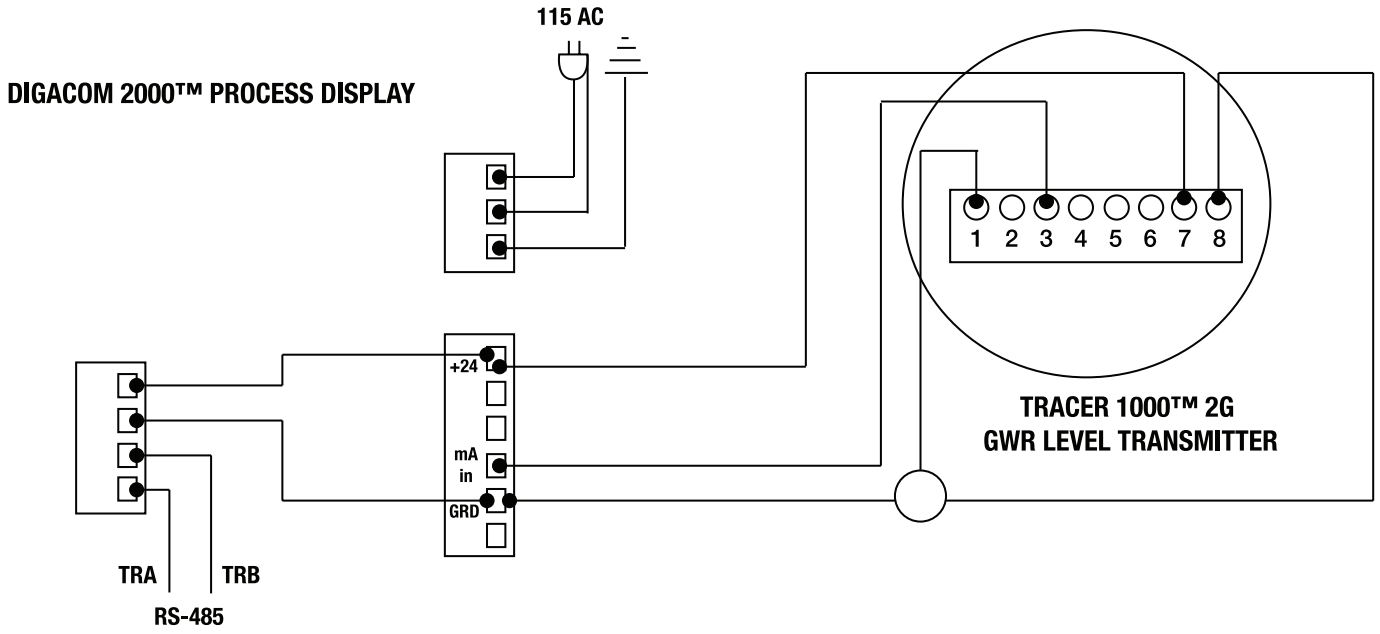


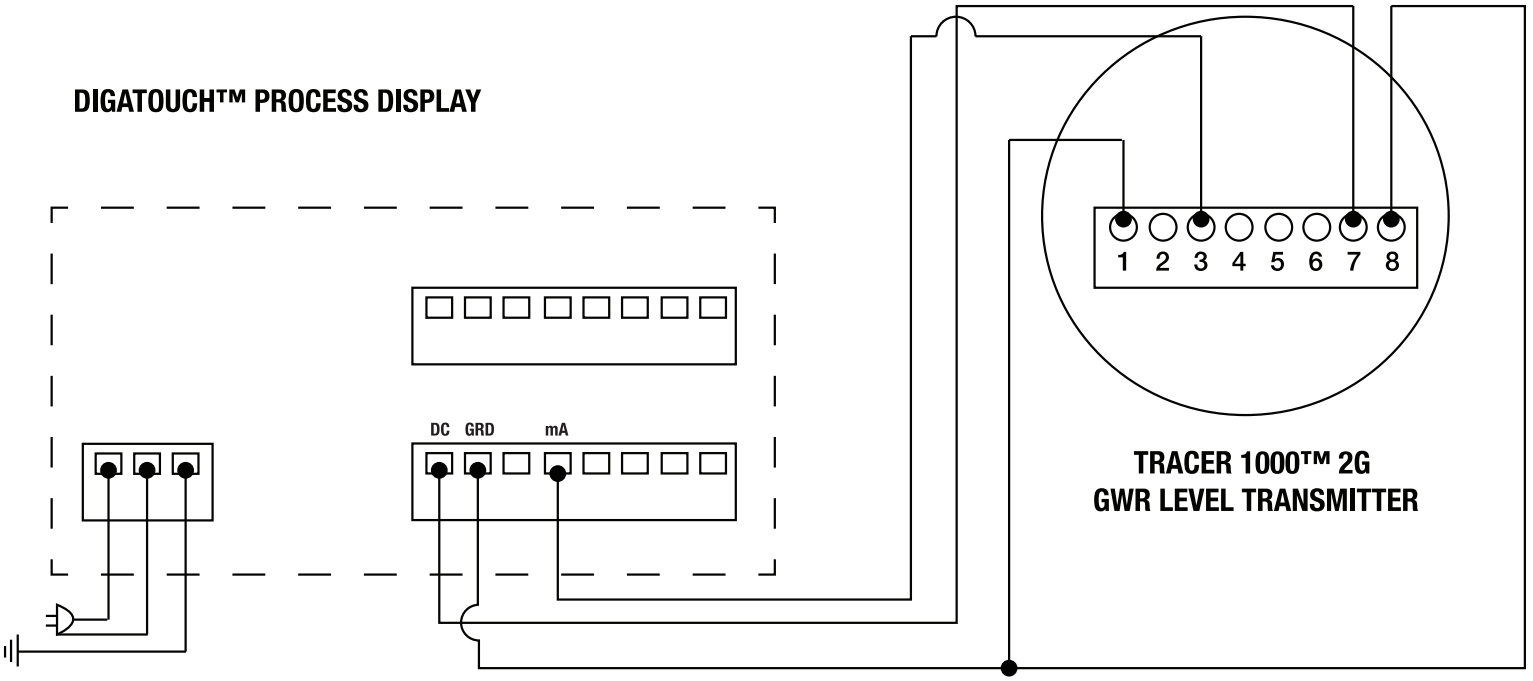
WIRING

**Recommended Cable: Beldon 9418-060-xxxx 18 AWG 4 Conductor*

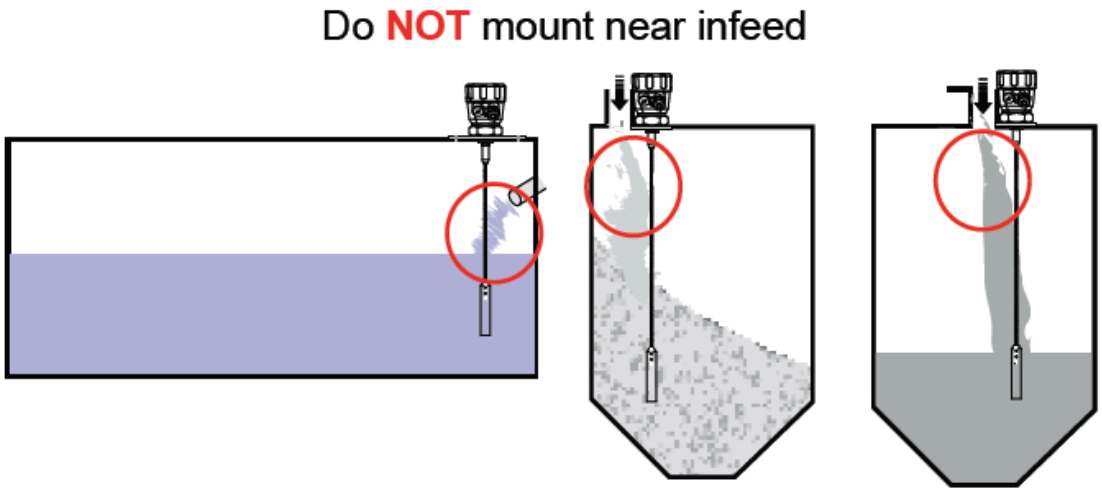


CONNECTION DIAGRAM





MOUNTING REQUIREMENTS



MOUNTING REQUIREMENTS CONTINUED

The Tracer 1000 2G will come factory set for mounting to a metallic flange or fitting unless otherwise instructed at time of order. If mounting to a plastic flange or fitting please indicate at time of order or connect to COMMS and use the Tracer Talker™ Software to digitize sensor at initial installation.

Minimum nozzle diameter should be 2" from Tracer probe unless using Tracer Talker™ at initial installation.

Probes should not contact metallic tank walls, obstructions or structures.

If using cable probes, take into account the possibility of cable sway encroaching clearance requirements of agitators and augers. IF this possibility occurs, secure a ring or mounting connection to the cable weight and to the vessel floor.

TENSILE FORCES

Tensile forces are heavily dependent on the viscosity and abrasive characteristics of the product in the vessel. Ensure the tensile loading is appropriate for the silo cover and mounting structure. The maximum tensile load of the cable probe is 4,275 pounds.

POWERING THE TRACER 1000 2G FOR THE FIRST TIME

1) Confirm the Tracer is mounted within the recommended specifications.

2) Confirm the wiring is correct and all connections are as shown in page 5

3) Apply power to the Tracer.

4) The Tracer will take up to 30 seconds to warm up and stabilize upon initial startup. It will then perform a scan to locate the level which will take approximately 1 second or less. Once the load sequence is complete and the Tracer has taken the first measurement scan the analog output should indicate the material level (factory default) or distance measurement. If the proper analog output is not achieved please contact your FLO-CORP representative for further instructions.

LTCT™ RS485 COMMUNICATION TOOL

The Tracer 1000™ 2G Level Transmitter leaves FLO-CORP's factory pre-configured to the customer's application settings, but if adjustments need to be made in the field the RS485 Communication Tool is recommended. The communication tool and Tracer Talker™ software allows the user to perform a mounting calibration procedure. The software will automatically detect and adjust any deterrent from mounting obstructions and will setup the correct sensitivity settings. It will also allow for a digitize procedure to see the proper auto-calibrate functions in your application. The software will auto-adjust the Tracer 1000™ 2G level transmitter to your application and stabalize the unit.

FEATURES & BENEFITS

- Perform mounting calibration procedure
- Detects and adjusts mounting obstructions
- Auto-calibrate function
- Auto-adjust function
- Software is included with purchase of a communication tool
- Economically priced

COMPATIBLE UNITS

Tracer 1000™ 2G GWR Level Transmitter

Ranger Plus™ Ultrasonic Level Transmitter

SETUP

The Tracer Talker™ PC Interface Software can be used to calibrate, monitor and trouble shoot the Tracer 1000™ 2G GWR Level Transmitter.

The Tracer Talker™ software is a free download from our website *www.flowlineoptions.com/tech/software*

Before connecting the USB you must first install the windows driver. This is also found on our website *www.flowlineoptions.com/tech/software*

Wire the USB to the COMMS terminals. Blue wire to B, blue/white to A and black to DC- or sheild.

Double click the Tracer Talker™ shortcut icon which should be located on your desktop after installation.

General Function Information

Press:

Read All Parameters	To refresh any menu
Green Cell	Read / write successful
Red Cell	Read / write failed

Navigation window options

MENU SELECTION	DESCRIPTION	OPTIONS
File	Load and save custom application settings	Load / Save current setting Load Application setting
View	Adjust view settings, access options menu	Toolbar Status Bar Options
Help	Access Help file & display Tracer Talker™ version info	Help About
Connect	Attempts to open communication or terminate communication with unit	Connect Disconnect
DeviceID	Select DeviceID (if using comms networked units with unique IDs assigned)	Adjustable via Client Information in 'Options' menu
Setup	When connected the setup menus will be listed under the arrow button to the right	Info Screen Quick Set Output Adjust Advanced
Diag	When connected this opens the Diagnostic window where you can view live echo profiles and operational diagnostics and measurements.	
NewView	If you have multiple Tracer™ 1000 2G units connected to a single network you can view the basic measurement	
Flash	For updating unit software. This button is locked	
Report	This button can generate a PDF report of the current settings & serial numbers of the unit or view the settings of a stored report	Preview current setup Preview stored setup

TRACER TALKER™ COMMUNICATION SOFTWARE OVERVIEW

The Tracer Talker™ Software is included with the RS485 Communication Tool for easy setup and diagnostics of the Tracer 1000 2G. This tool will allow the user interface into the programming, setup and diagnostics tools imbedded within the Tracer 1000 2G program. Tracer 1000 2G GWR Level Transmitters ship from the factory with the application data pre-programmed. The Tracer 1000 2G GWR Level Transmitter has advanced auto-tuning parameters that adjust the units sensitivity (to changing dielectric, mounting and obstructions) and gain settings so the user does not have to preform any initial startup settings. The Tracer Talker™ Software may be required on some installations where probe length, mounting or dead band requirements have changed from the initial settings. Please contact the factory if there is a requirement or question regarding the Tracer Talker™ Communication Software.

To download the Virtual COM Port Driver please visit: www.flowlineoptions.com/tech/software

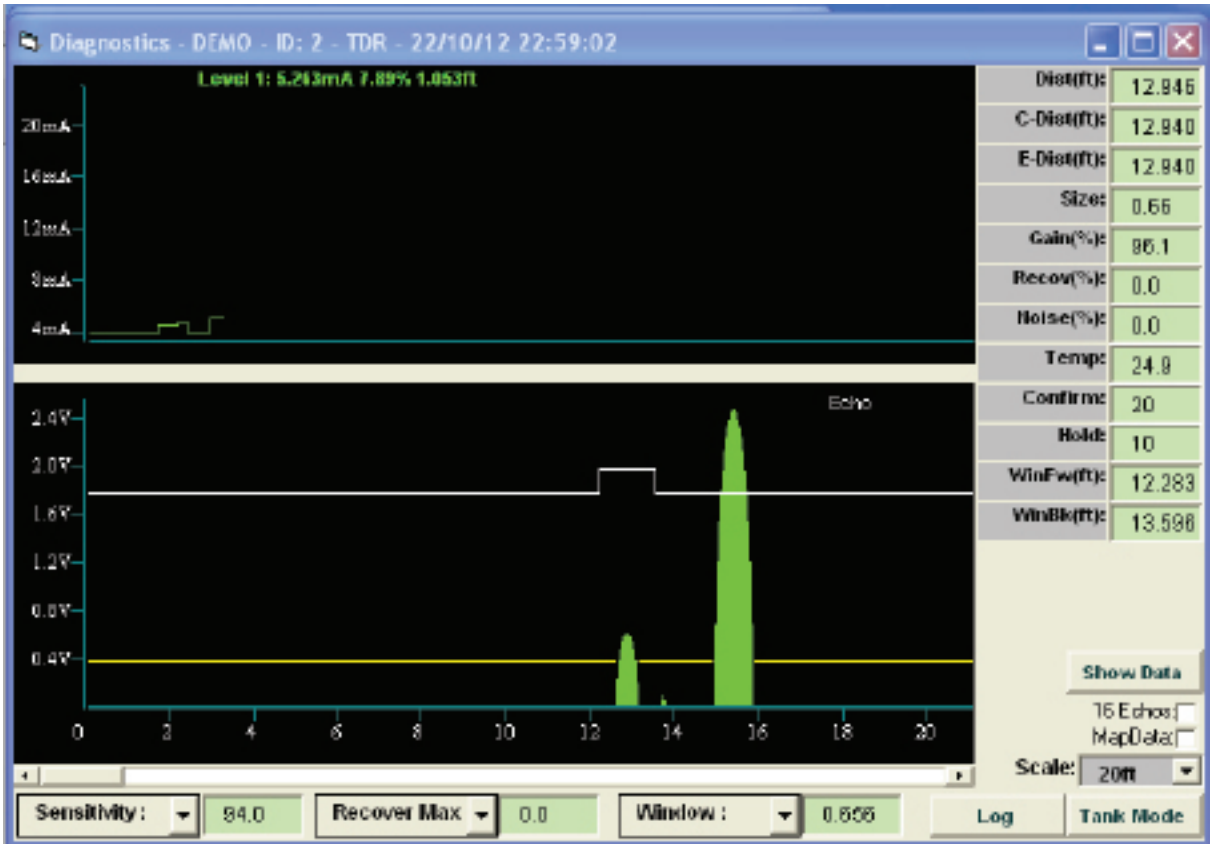


Fig. 1) The *Diagnostics Menu* allows the user to see how the return echo is preforming and make adjustments to the measurement signal.

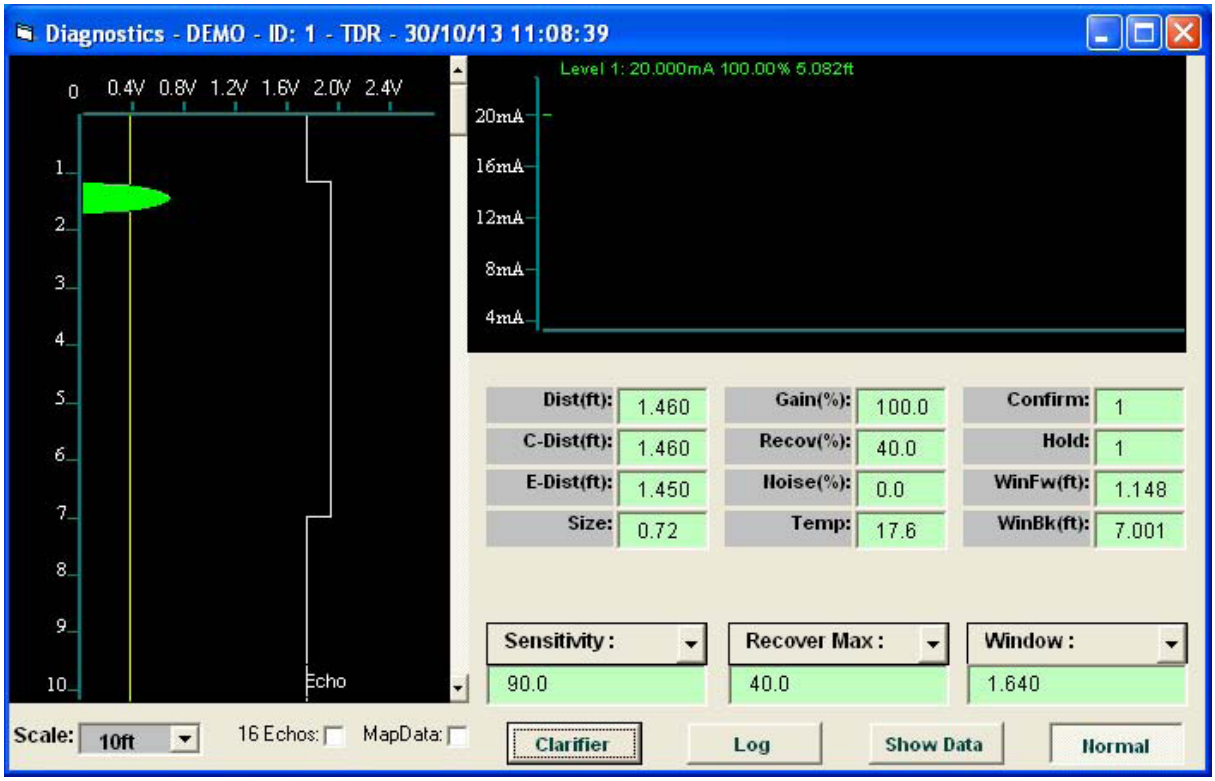


Fig. 2) The *Tank View Menu* allows the user to view their application activity.

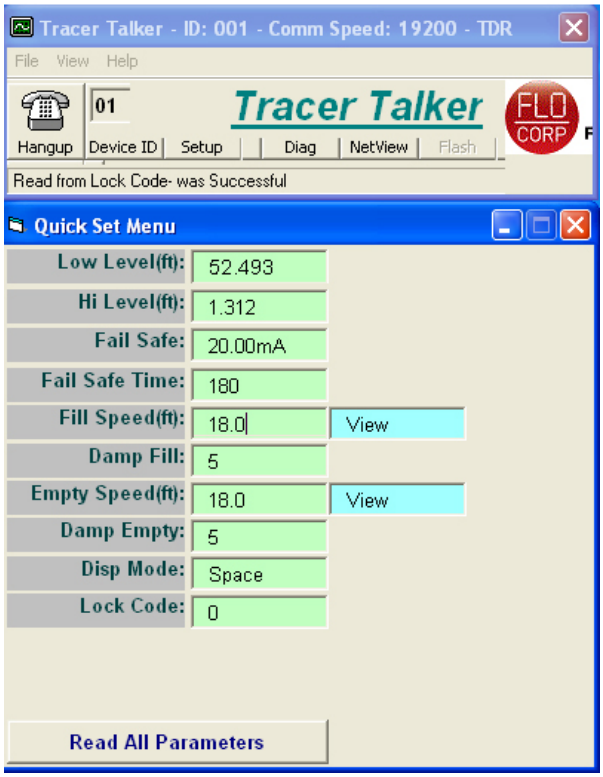


Fig. 3) The *Quick Setup Menu* sets the application base parameters.

The Quickset menu (fig 3) is found on the dropdown arrow of the Setup button. The Quickset menu contains the basic parameters required to get the unit up and running. It is one of the three main menu options in the internal software. The menu will provide fields which the user can edit by clicking in the field and re-entering the correct value.

Example:

Low Level (ft): Enter the distance in feet between the connection point of the Tracer 1000™ 2G and the end of the probe.

Hi Level (ft): Enter the distance in feet between the connection point of the Tracer 1000™ 2G and the highest point of level (must be at least 1.1ft)

Fail Safe: Enter a set failsafe output from the dropdown box.

Fail Safe Time: Enter the amount of time (in seconds) the unit will wait in a fail mode (set countdown clock) before outputting a fail mode set milliamp value.

Fill Speed: Select the applications fill speed
Damp Fill: Select the amount of dampening upon tank filling for stable reading
Empty Speed: Select the applications empty speed
Damp Empty: Select the amount of dampening upon tank empty for stable reading
DispMode: Select the default display mode in; Space, Material Level or % of Material
Lock Code: Enter in a pass code number from 0 to 200

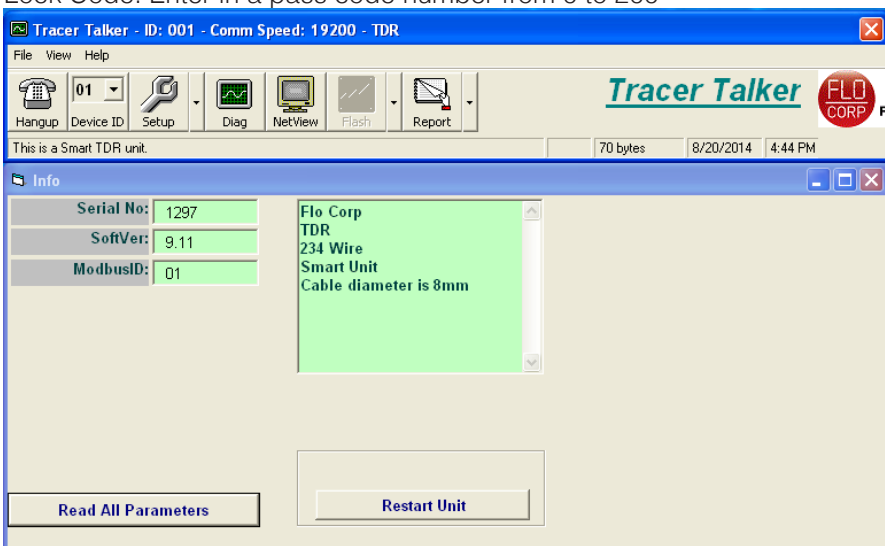


Fig. 4) *Info Screen* with device information

Advanced parameters are for adjusting primary sensitivity, echo controls and filters and executing the auto calibration routines as well as factory resets. Examples:

Digital Bias (%): Sets the amount of digital signal and sensitivity to mapping range. The higher the percentage increases the digital bias or filter. This parameter is auto set and typically does not require adjustment, but can be manually set.

Gain (%): Increase or decrease the amplification of the signal detected by the Sensitivity routines and adjustments. This parameter is auto set and typically does not require adjustment.

Sens Max (%): Adjust the peak Sensitivity cap. This value will be auto set by the Digitize calibration routine.

Sensitivity: The primary adjustment for the unit to detect level accurately. This value is auto set by the Digitize calibration routine but can be manually adjusted.

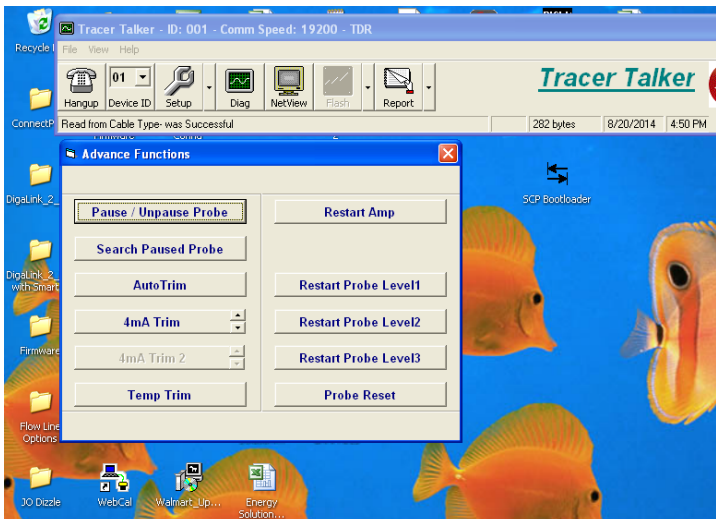


Fig. 5) The *Advanced Setup Menu* allows the user to fine tune the measurement signal and preform a Digitize TDR command for auto tuning in the application.

Echo Size (V): Sets the target echo size that the unit is attempting to maintain. Any signal which is detected by the Sensitivity setting will be either full signal (2.5V) or less. If the signal detected by Sensitivity is less than Echo Size, than the unit uses gain to amplify the signal to the Echo Size.

Threshold (V): Adjust the amount of filter which tells the unit to ignore any echoes of a signal size less than this value (in Volts). This can be used a part of troubleshooting (see Troubleshooting false echo elimination).

Blanking (ft): Blanking is the non-measurable zone closest to the process connection. This can be increased to "Blank" out high false echoes caused by mounting.

Digitize TDR: Perform auto-Digitization of sensitivity based on mounting, tank obstructions and dielectric of material touching the probe.
Probe Reset: Restores probe settings back to factory default. Most probe settings are in the Advanced Setup Menu.
Cal. Mount: Performs a digital mapping routine of a user selected span. Used when there is signal interference at high level or mounting.

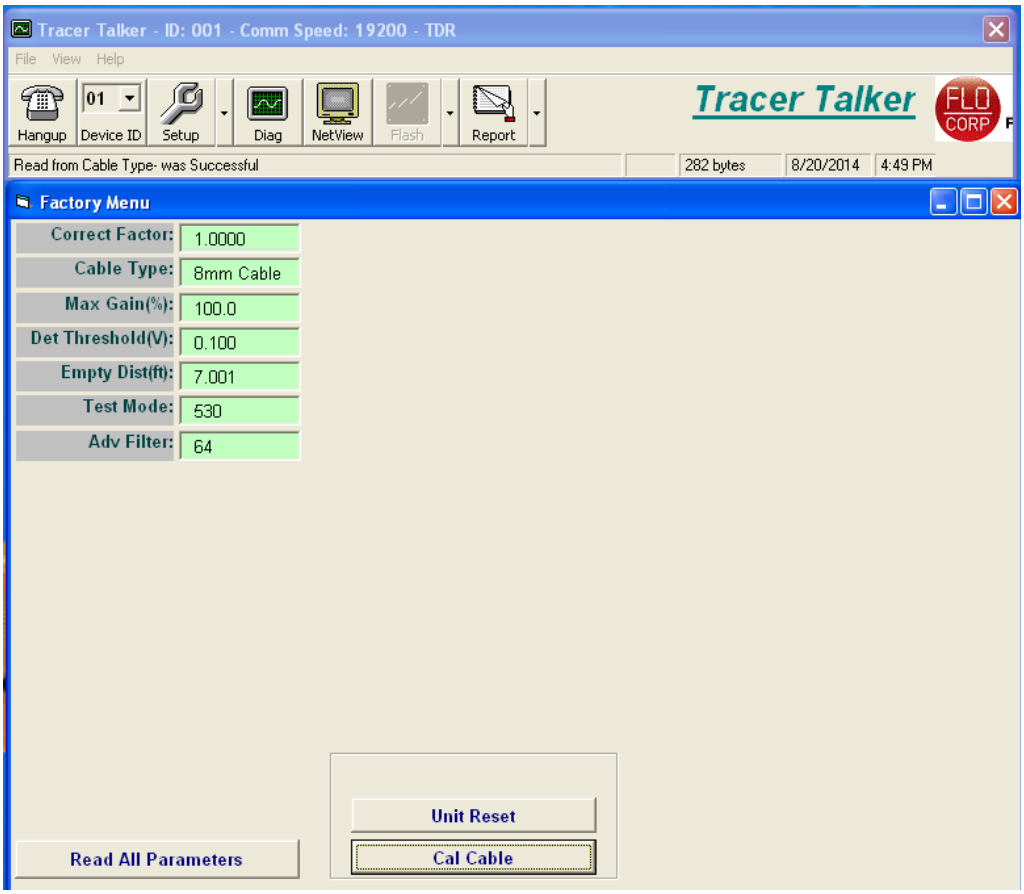


Fig. 4) *Factory Menu*

Ordering Information

FLO-CORP MODEL NUMBER BUILDER For Assistance Call **877.356.5463**

Use the diagram below, working from left to right to construct your FLO-CORP Model Number.
Simply match the category number to the corresponding box number.

Example: LTT1-2G-4-TN6-0-232-NN *Tracer 1000™ second generation GWR level transmitter, 4-Wire with 316 SS PTFE Coated Rod Probe with NEMA 6 enclosure, 1.5" NPT Process Connection, 1/2" NPT Conduit Entries, 232" Probe Length with no additional options*

LTT1-2G – □ – □ □□ – □ – □ – □□□ – □□

LTT1-2G

Wiring Option
4) 4-Wire

Probe Type (1)
R) 316 SS Rod
T) 316 SS PTFE Coated Rod
W) Wire Cable
X) PTFE Coated Wire Cable

Enclosure Rating
N6) NEMA 6

Process Connection (2)
0) 1.5" NPT
1) 1.5" ANSI 150 lb Flange

Conduit Entries & Cable Glands
1) 1/2" NPT (2)
2) Cable Gland (2)
3) 1/2" NPT (1), Cable Gland (1)
4) M20 (2)
5) M20 (1), Cable Gland (1)

Probe Length [L] (3)
xxx) Specify Length in inches (up to 960")

Additional Options
NN) None
04) PTFE Isolation Gasket (4" Diameter)

** NEMA 6 Enclosure Option*

**Multiple configuration methods, please contact FLO-CORP to choose appropriate method

Ordering Notes:
(1) Select the best probe type based on your requirements
(2) For special process connections questions please contact factory.
(3) Specify the L-dimension at the end of the model number (ie: LTT1-2G-4-TN6-1-232"-N). The L-dimension must be specified in inches.

***Additional probe lengths may be available upon request - Please contact factory.*