



OPERATING INSTRUCTIONS

RANGER ELITE™ LTRE ULTRASONIC LEVEL TRANSMITTER



Principle of Operation

Please read carefully! No liability can be accepted for damage caused by improper use or installation of the Ranger Plus™ Level Transmitter.

The Ranger Elite™ Ultrasonic Level Transmitter provides accurate non-contacting level measurement up to 480" (12.m) and features Two-Wire Loop-Powered 4-20 mA Analog Output. The adaptive signal and automatic echo detection & control provides effortless and accurate level measurements in one non-contacting transmitter. The 2" NPT mount on the transducer makes mounting into a standard tank nozzle or fitting easy and affordable. The operator interface uses a 4 line graphic display that allows for easy level indication and configuration. The push buttons on the front face are easy to navigate even without using a programming manual. Plus, the HART communications output talks directly to the standard Tracer Talker™ Software to configure, monitor and data log your application. Download the free Tracer Talker software and purchase one communication tool.

Safety Precautions

If you are unsure of the suitability of a Ranger Elite™ Ultrasonic 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.

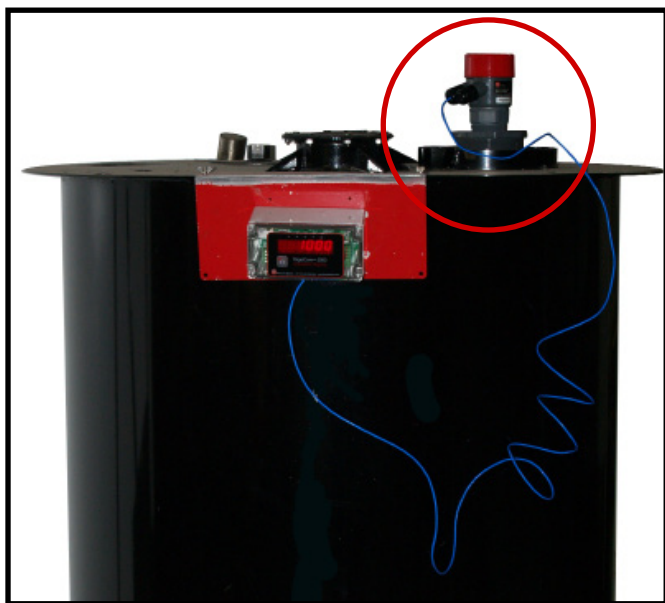
Disclaimer

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.

FEATURES & BENEFITS

- Easy installation and start-up
- Large 4 line graphic display
- Standard HART Communication interface
- Durable powder coated aluminum housing for long life
- 2" NPT threaded process connection
- Short 8" dead band and up to 40 feet measurement range
- Adjustable filters compensate for tank mixers or turbulence
- Temperature compensation for improved accuracy
- Adjustable sensitivity & gain plus auto-tuning signal process

APPLICATION PHOTO



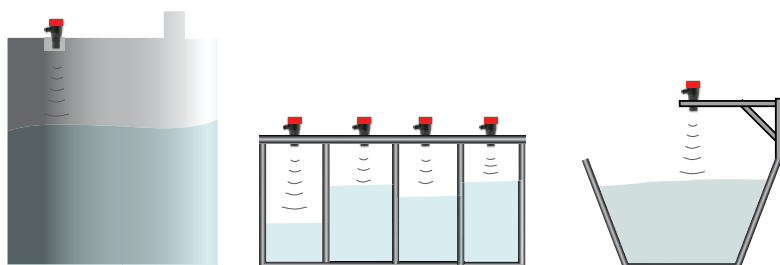
SPECIFICATIONS

Frequency	50 kHz
Operating Voltage	7-28VDC at the terminal (residual ripple no greater than 100mV)
Power Consumption	500mW @ 24VDC
Analog Resolution	14 bits
Communications	4-20mA with HART
Blanking Distance	10 inch (250mm)
Maximum Range	40 ft. (12m)
Resolution	0.04 inches (1mm)
Electronic Accuracy	± 0.25% of maximum range
Operating Temperature	-40°F to 140°F (-40°C to 60°C)
Maximum Operating Pressure	0 - 44 PSI (-0.5 to 3 bar)
Beam Angle	7°
Materials	<ul style="list-style-type: none"> • Transducer PVDF • Housing Powder coated aluminum
Display	4 line graphic display
Keypad	4 keys = CAL, RUN, UP, DOWN
Memory	> 10 years data retention
Enclosure Sealing	IP67
Cable Entries	M20 Cable Glands
Mounting	2" NPT
Typical Weight	2.2 lbs (1kg)
Volume	<ul style="list-style-type: none"> • Pre-set common vessel shapes • 32 point programmable linearization table • Requires PC connection with Tracer Talker™ Communication Software

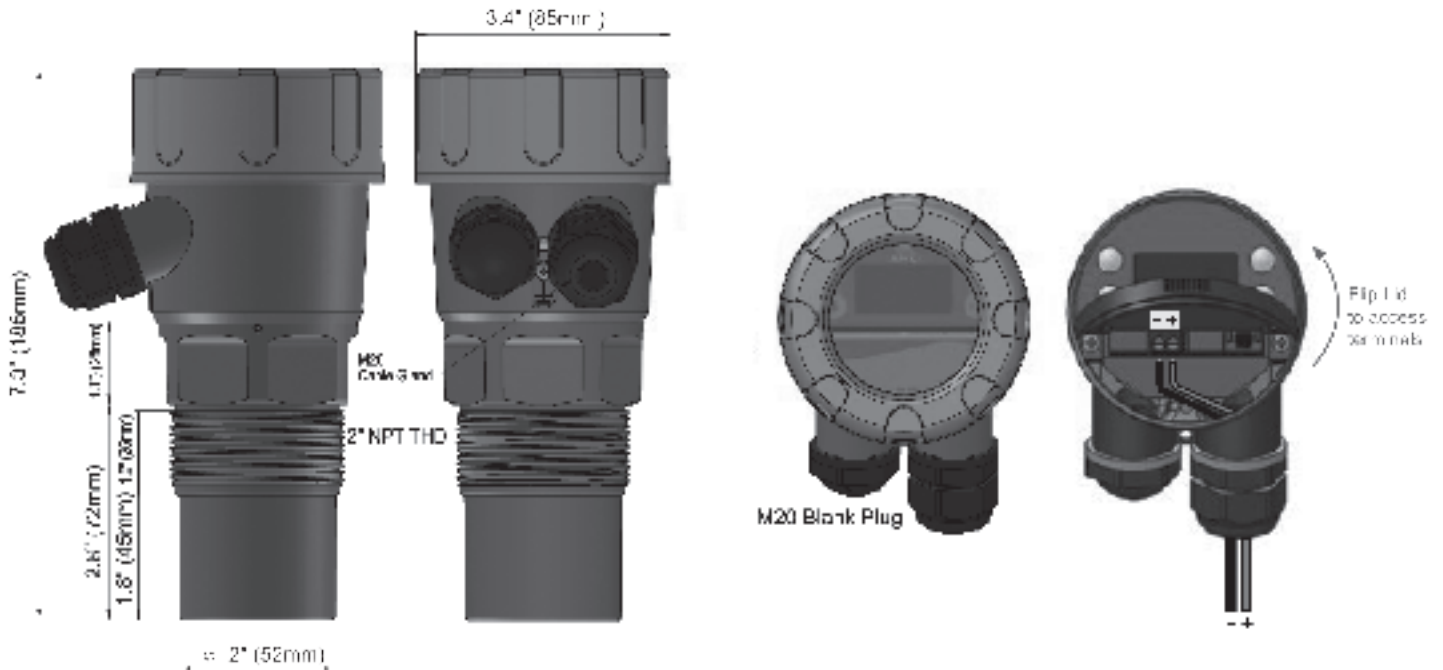
Specifications are subject to change without notice.

TYPICAL APPLICATIONS

- Pump Stations
- Wet Wells
- Tanks
- Chemical Storage
- Power Generator Fuel Storage
- Water Towers
- Basin Levels
- Sumps
- Shipping Containers
- Plating Chemical Tanks



DIMENSIONS (Inches)

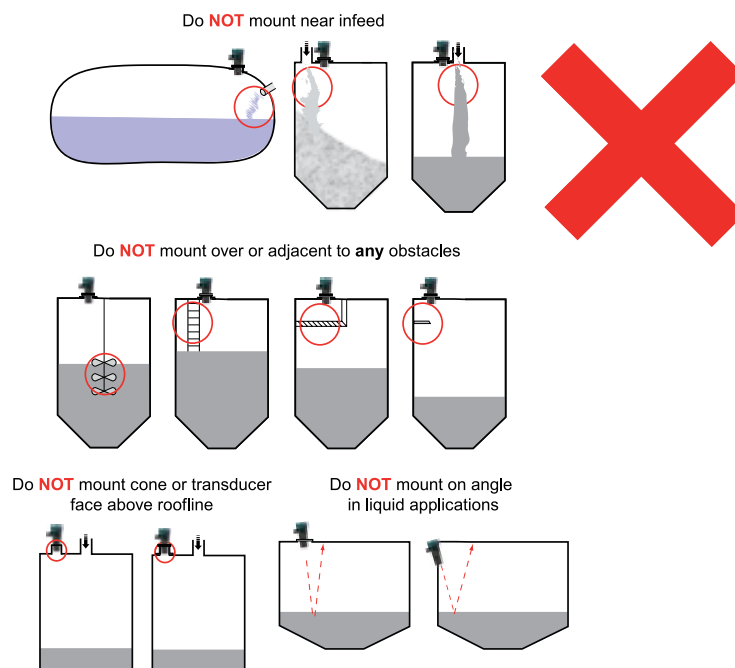


INSTALLATION

MOUNTING

- Sensor should be mounted 1/3 the diameter of the vessel from the vessel wall
- Unit should never be closer than 10" (250mm) to the liquid surface
- Do not mount over or near objects which can interfere with the measurement
- Do not mount in the center of a curved roof to avoid the potential of parabolic echos

These are examples of common INCORRECT mountings which can prevent the unit from operating correctly.



POWERING THE UNIT

When power is applied, the unit will start up automatically. The LCD will scroll through its boot diagnostics and display the serial numbers, software version and model types for the amplifier and transducer.

The selected Display Mode will be visible with a measurement.

The top right hand corner diagnostic indicates either the operating mode or the current output. The unit will re-scan for the level whenever it is powered up.



INTEREFACE

BUTTON	ACTION	NAVIGATION / FUNCTION
CAL	Press and release Press and hold for 3 seconds	Access Main Menu Select / Proceed Access AutoSet Menu
RUN	Press and release	Cancel / Return Re-activate unit
▲ ▼	Press and release	Scroll between live diagnostics

SOFTWARE

STARTUP

The Ranger Elite™ uses automatic sensitivity control to detect and maintain the level. After applying power to the unit, allow 20-30 seconds for the unit to adjust to the application*

**For best results ensure there is a liquid level present in the application or flat surface below the transducer.*

MAIN MENU

To access the main menu press “CAL”

To access AutoSet menu press and hold “CAL” for 3 seconds

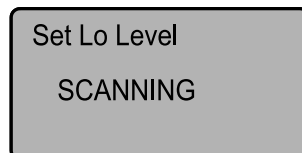
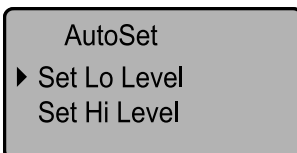
SETUP

PARAMETER	DESCRIPTION	OPTIONS			
Display Mode	Set LCD measurement display mode	Level	% Level	Space	Volume*
Display Unit	Adjust displayed measurement unit	CenMetre	Metres	Feet	Inches
Low Level	Set Low level measurement point (4mA)	Adjustable			
High Level	Set High level measurement point (20mA)	Adjustable			
Damping	Adjust output response time & smoothness	Adjustable in seconds			
Failsafe	Set failsafe output	3.50mA 4mA	3.80mA 20mA	20.20mA LastKnown	

**Volume mode requires PC with Tracer Talker™ Software.*

AutoSet

Use AutoSet to scan and program the unit High or Low level to the distance detected. After the scan you will be prompted to accept the distance measured. The High and Low level can also be manually adjusted in ‘Setup’.



ADVANCED SETTINGS

PARAMETER	DESCRIPTION	OPTIONS	
Comms	Adjust HART protocol settings	Device ID Default 1	BaudRate 1200
Blanking	Blanking is a dead-band / non-measured range. The unit cannot measure within this range	Adjustable - recommended default 250mm (10")	
Tracking	Adjust tracking response time for application. The faster the tracking, the more responsive the measurement is, but it is less smooth the output signal. InstaTrack provides pulse by pulse live measurement.	Slow Medium Fast InstaTrack	
Mapping	Set High level measurement point (20mA) Mapping creates a digital 'map' of false echoes caused by problem mounting and structures. Select 'ExecuteMap' to set a mapped distance, conduct or delete Mapping. Select 'MappedDist' to view a previously mapped distance.	MappedDist	
		ExecuteMap	Set Map Dist
EchoSize	The unit will target this echo size (measured in signal voltage) during operation. High values can increase stability but make the unit more susceptible to false echoes. Lower values can make the unit less sensitive and less likely to see false echoes.	0.4 - 2.49V Default 0.59V	
Analog	Adjust Analog output. Switch from 4-20mA current and 20mA current	4-20mA 20-4mA	Tune 4mA Tune 20mA
Sensitivity	Increase or decrease the unit Automatic Sensitivity Control range. 20 is maximum / highest Sensitivity	0: Lowest 10: Default 20: Highest	
WaveBoost	WaveBoost adds additional echo amplification on top of the Automatic Sensitivity Control. WaveBoost should only be used if maximum sensitivity is not sufficient	0: Lowest (default) 20: Maximum	
Factory Reset	Restore all parameters to factory default	Yes / No	
Device Info	Displays product type, serial number & software revision		
Lock Code	Enable / Disable lock code If enabled, select lock code number	Enable / Disable Default Disabled	1-200

HART Universal / Common Practice command list

COMMAND NO.	FUNCTION
0	Read unique identifier
1	Read Primary Variable
2	Read current and percent of range
3	Read current and four predefined dynamic variables
6	Write polling addr
7	Read loop configuration
8	Read Dynamic Variable Classifications
11	Read unique ident. associated with tag
12	Read message
13	Read Tag, Description, Date
14	Read PV sensor information
15	Read output information
16	Read final assembly number
17	Write message
18	Write Tag, Description, Date
19	Write final assembly number
20	Read Long Tag
34	Write damping value
35	Write range values
44	Write PV units
57	Read unit tag, descriptor, date
58	Write unit tag, descriptor, date
59	Write number of response preambles
109	Burst mode control
110	Read all dynamic variables

TROUBLESHOOTING

UNIT IS DISPLAYING INCORRECT DISTANCE

- Confirm display mode is suitable
 - Space is measured from Sensor face to measured level.
 - Material is measured from Low Level to measured level.
- If unit is measuring too deep increase Sensitivity. If the unit continues to measure too deep, increase WaveBoost
- If unit is measuring too high, reduce Sensitivity and ensure WaveBoost is set to 0.
- Check if material is present to be measured. Unit will output and display FailSafe reading if it cannot detect a level within range.

ANALOGUE TREND IS ERRATIC / UNSTABLE

- Increase 'Damping' value for smoother trends.
- Choose a slower 'Tracking' speed.
- Check there are no objects interfering with the transit pulse in the application (such as ladders and cross beams).

UNIT IS LOCKED UP OR FLAT LINE MEASUREMENT

- Confirm there is material within measurement range, the unit may go to Failsafe if there is no flat level available.
- If the unit is locked to a high level perform Mapping for distance beyond false echoes.
- If the unit is locked higher than the real level check for objects interfering with the transit pulse in the application (such as ladders and cross beams). Lower the Sensitivity/WaveBoost. Re-locate the installation to avoid the interfering object.
- If the unit is locked lower than the real level confirm the application is not within Blanking distance. Increase Sensitivity/WaveBoost until unit measures correct level.
- Tracking speed may be too slow for the application. Increase Tracking speed.

PLC INDICATION DOES NOT MATCH MEASUREMENT

- Connect a Multimeter in series with the powered loop. Compare the 'mA' diagnostic on the display with the mA reading on the loop. If these values do not match, disconnect the loop wires and measure the resistance across the loop. This should not exceed specification.
- Confirm High Level and Low Level are set to the same values in Ranger Elite™ and control system.

AUTOSET FAILS

- Increase 'Sensitivity' to a higher value.
- Allow the unit to run for a longer time (one minute). Re-attempt the AutoSet.
- Increase WaveBoost and re-attempt the AutoSet.
- Set High and Low level manually in 'Setup' menu.

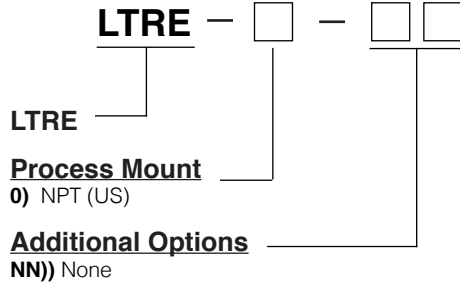
Ordering Information

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: **LTRE-0-NN** *Ranger Elite™ Ultrasonic Level Transmitter with 2" NPT Process Connection and 8" to 480" Measuring Range*



Wireless Monitoring Option (1) *(Ranger Elite with Guardian 1000™ shown)*



Ordering Notes:

(1) For wireless monitoring option add Guardian 1000™ to order