

Data Sheet	Level Sensor Products	Rev. AB
LevelMaster Sensors	Product Overview	

INTRODUCTION

The Totalflow LevelMaster uses a patented multilayer transformer technology that results in a low cost, no maintenance (no moving parts), high performance level sensor. A single LevelMaster sensor is capable of either single or dual level measurement using one or two floats, in the dual measurement configuration each float is designed for the density of their respective fluids. All level measurements are accurate over the full vertical range of the sensor.

The unique LevelMaster sensor technology results in a standard relative accuracy of +/-0.1 " and a repeatability of +/- .05 " on sensors up to 25 feet in length. For custody transfer and other applications requiring higher precision a special calibration option is available with a +/- 0.05" relative accuracy and +/- .05" repeatability. Longer sensors, up to 35 feet support +/- 0.5 inch relative accuracy with +/- 0.25" repeatability. In support of custody transfer applications, the standard RTD on each LevelMaster is positioned to measure the fluid temperature at the load line.

Level and temperature measurement values are available as a digital (RS-485) output. Analog outputs are also optionally available.

The Totalflow LevelMaster intelligent digital level sensor has been widely deployed in oil and gas, and chemical applications including:

- Electronic custody transfer
- Monitoring and control of liquid levels in tanks
- Leak detection and spill prevention
- Level and Pump control
- Safely gauge H2S tanks
- Call-Out exception reporting
- High and Low alarm capability
- Meets or exceeds industry standards

The measurement reliability, life cycle and accuracy of the Totalflow LevelMaster sensor are unsurpassed by competing technologies.

FEATURES

- Low power
- Patented standard 0.1 inch (2.5mm) high relative accuracy technology
- High precision .05 (1.25mm) relative accuracy option
- Measurement repeatability of plus or minus .05 inches (1.25mm)
- Resolution of .01 inches (.25mm)
- Ultra reliable long life design
- Utilizes simple ASCII communications protocol
- Easily interfaces to any RTU or PLC device
- Simple to install
- Simple one-time installation calibration (set it and forget it)
- Available in lengths from 2 foot (0.6 meters) to 35 foot (10.6 meters)
- Designed for Single or Dual floats
- Single RTD for fluid temperature measurement
- CSA and UL Certified for use in Division 1 Group D Hazardous Environments
- International approvals pending
- RS485 communications port (up to 16 tanks can be connected in parallel on the same bus)
- Two year warranty

Local access to LevelMaster data is provided using Totalflow's MasterLink software (Windows based) or through a locally mounted flow computer or RTU. A flow computer or RTU can be used to support stand-alone (local) operation or remote operation via interface to communications networks. Up to 16 LevelMaster sensors can be connected, together to one RTU (or flow computer) using standard integrated RS-485 communications. Host software packages available for LevelMaster applications include Totalflow's WinCCU32, TDS32 (dde/opc server), iVision SCADA software and TF.Net web software.

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Operation can be stand-alone with only local display using a local flow computer or RTU, or telemetered for remote transmission of local data. Up to 16 sensors can be connected together to one RTU using integrated RS485 communications for cost savings.

In service for over 40 U.S. oil producers, Totalflow LevelMaster intelligent digital level sensors are used for detailed production data reporting, including hourly production rates and custody transfer information.

APPLICATIONS

Oil and Gas

Oil and gas production sites that use tank storage for liquids are ideal applications for the LevelMaster digital level sensor. Not only is the LevelMaster environmentally safe, one sensor can be used to measure two liquids (oil and water). An optional second float is all that is required.

Oil and Gas Application Examples:

- Automated monitoring of oil production
- Accurate daily production records for oil and water
- Custody transfer reporting of oil volumes and temperature
- Safe, ground level tank gauging for H2S locations
- High level alarms
- Emergency shut-down (ESD) to prevent spills
- Automation of water disposal wells
- Automation of water flood systems
- Automation of terminal applications
- Production trending available when used with Totalflow RTU or EFM
- Meets or exceeds requirements for Federal Land (BLM)
- Accurate inventory
- Real time alarms and reports

Chemical

It is difficult today to find a sensor that will live in corrosive environments such as chemical tanks. The Totalflow LevelMaster is perfectly suited for chemical tank applications due to the specially designed outer casing.

The LevelMaster has been proven in the chemical industry with years of reliable service.

Chemical Examples:

- Accurate inventories
- Real time inventories
- Remote monitoring of vendor managed inventory
- Impartial witness of all tank volumes
- Decrease lag time and receivables

SPECIFICATIONS

- Length: 2-35 feet (0.6 to 10.6 meters) in 1 foot (0.31 meters) increments
- Casing Material: Fiberglass or Stainless Steel
- Tube Diameter: Outside diameter – approximately 1.95 inches (48.45mm).
- Float Material: Nitrophyl.
- Float Diameter: Standard float 3.8 inches Outside Diameter (88.9mm). Smaller outside diameters available.
- Standard Level Relative Accuracy +/- .1 inches (2.5mm) on sensors up to 25 ft
- Optional High Accuracy calibration +/- 0.05 inch (1.25mm) with certificate of calibration on sensors up to 25 ft.
- Relative Accuracy of +/- .5 inch on sensors from 25 to 35 ft. (with a fluid temperature range of -40 to 104 F (-40 to +40 C)
- Level Resolution: ± 0.01 inch (0.25mm)

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- Level Repeatability: Plus or minus 0.05 inch (1.25 mm) on sensors up to 25 ft
Plus or minus 0.25 inch (6.25) on sensors greater than 25 ft. (with a fluid temperature range of -40 to 104 F (-40 to +40 C)).
- Multiple Floats: Option for two floats with the ability to detect 1.5 inches (38.10mm) or more of lower density fluid.
- RTD Temperature Sensor Accuracy: $\pm 1^{\circ}\text{F}$ (0.6°C)
- Temperature Sensor: Range 0 F to 255 F (-17.7 to 123.8 C) , Location 12 inches (300 mm) from bottom. Options for placing sensor in different locations.
- Power Requirements: 9-18 VDC, 7 mA standby, 40 mA transmitting. May be power cycled for maximum low power operation.
- Environmental Temperature Range: -40 F to 185 F (-40°C to +85°C)
- Associated Software: Laptop computer based LevelMaster setup & calibration

Software (MasterLink) includes provisions for sensor diagnostics, WinCCU32 host data collection, editing and reporting package, TDS32-OPC host driver for DDE/OPC data acquisition and control, iVision SCADA software and TF.Net web software.

Totalflow flow computers and RTU may be equipped with a push to read button for local display of level(s) and temperature.

Associated Hardware: Standard 4 inch (10.16mm) reducer bushing with compression fitting for standard 4 inch (10.16mm) diameter tank-top port.

High-Pressure Tanks: Stainless Steel Casing available as an option for high pressure (up to 1,500 psig, 103.4 bar) applications.

Hazardous Location Certifications: UL/CSA approved for intrinsically safe operation in Class 1, Division 1, Group D areas when connected through a Totalflow certified barrier board in accordance with either Totalflow drawing 2018387-CD (CSA)

COMMUNICATIONS

- Output: Standard digital serial half duplex RS485
- 2-wire, or full duplex RS422 4-wire transmission.
- Simple ASCII public domain protocol can be interfaced to any host system
- Communication Speed: 1200 or 9600 bps

WIRING

- Special integrated Power/RS485 cable, offering environmental protection for cable tray or direct burial applications
- Recommended Wiring: 2 twisted pair for 2-wire, 3 twisted pair for 4-wire, 20-22 AWG. (The power and ground wires must be a larger gauge for long cable runs to avoid large voltage drops.)

Tank height is defined as the active measurement range, and is what should be specified when ordering the LevelMaster product. Twelve inches of additional length is provided on the sensor assembly outer housing for mounting in most tank designs, including but not limited to flat top, angle top, or dome top tanks.

The LevelMaster product is designed for applications in many liquids including but not limited to culinary water, oils, solvents, chemicals, acids, etc. Please specify which material is to be measured when ordering the LevelMaster product. All field wiring in hazardous locations to/from the LevelMaster product should be verified using Totalflow hazardous area certification drawings 2018387-CD (Class 1, Division 1). Additional information can be found in the Totalflow LevelMaster Operations and Maintenance Manual part number 2018374-001 (or latest revision).

For more information, contact your local ABB Totalflow Sales office or visit www.abb.com/totalflow.