

# TSG-500

## True Specific Gravity and Temperature Meter

FORERUNNER  
TECHNOLOGIES

FT-TECHINFO-231  
REV 1

TECHNICAL  
INFORMATION

Traditional problems which exist till today with density determination by differential pressure measurements are hydraulic transmission losses, lateral fluid forces caused by agitation, and high susceptibility to damage because of oversized diaphragms.

Besides solving the issues mentioned above, the TSG-500 has several industry firsts. Its onsite adjustment of pressure probes distance allows one system to be optimized on the fly to the depth of any tank onsite. Also, with the integral temperature sensor, true Specific Gravity calculation becomes possible since H<sub>2</sub>O density is compensated with liquid temperature. With both sensor and transmitter electronics submerged and integrated into one waterproof housing, unprecedented downsizing of diaphragm diameters oriented downwards has been achieved.



## Specifications

### **Model**

TSG-500

### **Application**

Density, Specific Gravity and Temperature measurements of liquids

### **Implementation**

Density calculation by differential pressure measurement; Specific Gravity calculation with liquid temperature compensation; Field-installable data acquisition module conditions sensor signals while allowing calibration and network or WITS settings

### **Operating Range**

Density: 0-20 ppg (0-2.4 g/cc)  
Specific Gravity: 0-2.2  
Temperature: 0-150°C (0-302°F)

### **Precision<sup>1</sup>**

Density: 0.05 ppg (0.006 g/cc)  
Specific Gravity: 0.006  
Temperature: 0.1°C

### **Repeatability<sup>1</sup>**

Density: 0.1 ppg (0.012 g/cc)  
Specific Gravity: 0.012  
Temperature: 0.4°C (1°F)

### **Power Requirement**

18-28VDC, < 3W Consumption

### **Connectivity and Signals**

WITS Level 0 by RS-232 Serial or TCP/IP  
Analog Outputs 0-10 VDC

### **Operating Temperature**

-25 to 70 °C (-40 to 158 °F)

### **Permissible Humidity**

5% to 95%, non-condensing

### **Weight**

Sensor System: 14.5 kg (32 lbs)<sup>2</sup>  
DAQ box: 2.3 kg (5 lbs)

### **Approvals / Certification**

Pressure Probes: Class 1 Div 1, Groups C&D  
Temperature: ATEX II 1G EEx ia IIC T6/5/4; FM IS Class I, Div 1+2, Group A,B,C,D  
DAQ Box: IP 66; UL/ULC Type 2,3,4,4X,5,12,13

## Features

- Allows onsite adjustment of HP (High Pressure) and LP (Low Pressure) probes distance, while maintaining easy wizard-driven calibration process.
- Full calibration can be done with onboard keypad – does not require any extra communications equipment like HART communicator, PLC, PC, etc.
- With the integral temperature sensor, water density adjusted to liquid temperature (as measured) can be used to produce actual Specific Gravity calculations which are at least 5% more accurate than non-compensated SG calculated readings.
- The data acquisition module comes with built-in approved Intrinsically Safe barriers, allowing installation of sensors in Class 1 Div 1 (Zone 1) hazardous environments.

**NOTES:** **1** – Precision and reliability of Density and SG increase in direct proportion with the separation distance between pressure probes; values stated here are for 36 inches (91 cm) separation **2** – DAQ Box can be converted to Class I Div 1 (Zone 1) or Class I Div 2, utilizing explosion-rated or extended-safety enclosures; manufacturing of box will have to be done by a certified hazloc builder systems; contact Forerunner Tech for more details