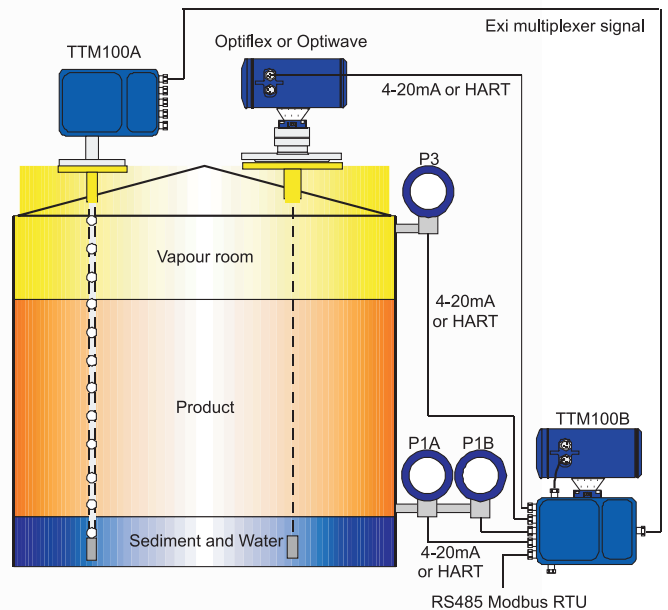


Tank Temperature Gauge TTM 100

from the Tank Management System

Multipoint temperature measurement
Data acquisition system
Tank computer



The TTM 100 tank temperature measuring system consists of a temperature measuring chain with up to 16 individually or symmetrically fitted Pt 100 sensors. The temperatures are measured by Pt 100 elements, a multiplexer and a high resolution temperature stabilized AD Converter. The TTM100 is equipped with 8 extra analogue inputs, 4 in the top part and 4 in the bottom part, to connect pressure transmitters or other additional instruments. The level instrument is connected via 4 to 20 mA HART. A second level instrument can be connected as an option.

The tank computer embedded in the TTM100 calculates the average temperatures of the gas, liquid and sediment & water phases based on the individual temperatures, the liquid level, interface level and strapping table. The tank computer is capable of performing tank related corrections for stilling well expansion, tank shell expansion, floating roof and bulging, all depending on the configuration.

Actual density is calculated with the level and pressure readings with high accuracy. There is an option to fill in reference density via the Modbus interface, e. g. taken from a laboratory. The corrected observed volumes found are input for the API D2540 calculation to determine the volumes at reference conditions and mass.

The computer checks for input errors, calculation errors and process limits. Relay output can be configured to react on these alarms. Alarms are sent via Modbus to a supervisory or SCADA system.

The display can be configured to show 8 process values.

A supervisory or SCADA system can be connected via an RS485 / Modbus link. The same Modbus link can be used to configure the instrument.

Highlights

- Rugged construction
- Max. 16 temperature measuring points (Intrinsic Safety 4-wire Pt 100 connection at the TTM 100A)
- 3 x RS485 interfaces (at the TTM 100B)
- 4 x 4 to 20 mA inputs (Intrinsic Safety at the TTM 100A)
- 4 x 4 to 20 mA / HART inputs (at the TTM 100B)
- 2 Relay outputs for alarms (at the TTM 100B)
- Calculation of the average temperatures
- Calculation of various tank related corrections
- Calculation of actual density
- Calculation of mass, standard volumes and VCF according to API D2540
- Error checking on inputs
- Alarms on process values
- Alarm and error masking
- Configurable via Modbus
- Local display of eight process values
- ATEX Approval

Technical data

Temperature measurement range	-50 °C to + 180 °C (-58 °F to +356 °F)
Accuracy (for overall measuring system)	
Standard	± 0.2 K
Option	± 0.1 K
Optional Temperature sensors	Max. 16 x PT100, intrinsically safe
Standard	Class B
Option	Class B 1/10
Maximum length	max. 40 m (131 ft), flexible version
Max. allowable operating pressure	
Standard	12 bar (174 psig)
Option	25 bar (362 psig)
Sheath probe	Stainless steel 316L
Ambient temperature	
Standard	-25 °C to + 60 °C (-13 °F to + 140 °F)
Option	-40 °C to + 60 °C (-40 °F to + 140 °F)
Power supply	24 V AC/DC, 115 V AC or 230 V AC
Current input	TTM100A: 4x 4 to 20 mA active, intrinsically safe TTM100B: 4x 4 to 20 mA active, 0.001 mA resolution HART Modem for 4 x 4-20 mA inputs at the TTM 100B
Relay output	2 x relay output for alarms
Communication with level meter	4 - 20 mA HART at the TTM 100B
Communication with SCADA	RS 485 interface with Modbus protocol
Approvals	ATEX Ex II 2 G EEx d ib IIC T4 EMC Approval 89/336/EG EN61326 + EN61326/A1
Local display	Dot matrix LCD display with 2 x 16 characters
Connection TTM 100A	Flange: 1,5" ANSI 150 lbs or others
Materials of construction	Aluminium with powder coating
Housing	IP 65 3 threaded holes for M20 flameproofed cable glands



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