Amber Instruments Ltd

OW-201 - WATERCUT MONITOR
LIQUID/LIQUID CONCENTRATION MONITOR

Description

The AGAR OW-201 is a flow through oil/water monitor spool piece designed for service in line sizes up to 4" and water cut ranges 0-100% or 0-20%. This watercut monitor measures liquid-in-liquid concentrations using microwave absorption technology. Typical applications include crude oil and finished product pipeline monitoring, oil in wastewater, Glycol and water, and aqueous/ organic measurement. The OW-201 series is the second-generation design, microwave based liquid/liquid analyzer developed by Agar Corporation. Agar introduced the first 0-100% water cut monitor to the market in 1985.

The high range monitor utilizes a microwave transmitter (2.45 Gigahertz) to measure bulk dielectric properties of the flow stream. The AGAR OW-201 measures hydrocarbon/water mixtures over the full range of 0-100%, regardless of the continuous phase, or low ranges of 0-1% to 0-20% water. Unlike other microwave, density or capacitance based instruments; the Agar OW-201 is the only device that the accuracy of the measurement is not affected by changing salinity, density, viscosity, temperature or velocity of the components being analyzed. The high frequency signal will maintain accuracy in the presence of process coatings that would be detrimental to optical instruments.

The AGAR OW-201 measures hydrocarbon/water mixtures over the full range of 0-100% (0-1% and 0-10% water ranges available), regardless of which liquid is the continuous phase. Available sizes are 2", 3" and 4".

A high temperature version of the OW-201 capable of process temperatures of 450 F (232 C) has been developed for thermal projects in Canada.

The fluid should be degassed with the sensor installed in a vertical section with ascending flow at a point where the fluids are well mixed to ensure proper measurement.

System Configuration

The OW-201 system consists of the OW-201 sensor and Data Analysis System (DAS) with the microwave measurement electronics housed in the same enclosure. The display and serial communication can be remotely located from the sensor up to 3000 feet away. The OW-201 sensor is a flanged spool assembly that houses the microwave transmitting and receiving antennas. The integrally mounted measurement electronics are supplied in an explosion proof enclosure, and provide the intrinsically safe microwave signal outputs/inputs to the antennas. Calibration of the device is with OWMWin software and a null modem cable. The DAS enclosure can be mounted up to 5' from the sensor.

The DAS is also a flow computer that can provide net oil, net water and flow rates when flow meter input is supplied.

MEASUREMENT CAPABILITIES AND ACCURACY

Model	Range*	Accuracy Absolute	Repeatability Absolute
OW-201-01	0 to 1%	±0.05%	±0.01
OW-201-10	0 to 10%	±0.1%	±0.02
OW-201-100	0 to 100%	±1%	±0.2

* Water Concentration. Contact Factory For Additional Range Options

PHYSICAL DIMENSIONS

Model	Flange Size**	Flange-to Flange Length**
OW-201	2"" (22mm)	27.0""
OW-201	3"" (75mm)	27.75""
OW-201	4"" (102mm)	27.75""

** Typical dimensions. Contact factory for details.

PROCESS CONDITIONS

Ambient Temperature:	-4°F to 158°F (-20°C to 70°C) Optional Low Temp -40°F to 158°F (-40°C to 70°C)
Process Temperature:	Standard Model 32°F to 212°F (0°C to 100°C) High Temperature Model 32°F to 450°F (0°C to 232°C)
Salinity:	0 to 30% by weight
Wetted Parts:	Carbon or Stainless Steel; Graphite, Peek, Kalrez

POWER SUPPLY

100/240 VAC, 50 or 60 Hz or 12/24 VDC
Power Requirements: 24 Watts (100/240 VAC) or 24 Watts (12/24 VDC)

SAFETY CERTIFICATION

ATEX **-** EEx ia IIC T6 (Pending)

UL/C-UL **-** Class1, Division 1, Group C&D, T4

DATA OUTPUT/INPUT

STANDARD:

- Output Data: Oil/water concentration, error status, and temperature standard.
- Input Data: Flow; 1 pulse (0-5 to 0-30 V <2KHz) or 1 analog (4-20 mA)
- User Communication: RS-232, Protocol: Standard N/C - ASCII or Modicon Modbus.
- Density input for low range corretion

OPTIONS:

- If customer's flow meter input provided, Net Oil, Net Water, and Flow Rates are calculated.
- Salinity by weight.
- Outputs:
  - 2 - Analog : 1-5 VDC, 2-10 VDC, HART, 4-20 mA with galvanic isolation or intrensically safe barrier
  - 3 - Pulse : SPST relay or opto-isolated AC/DC switch output
  - 1 - Relay : 1 (SPST relay or opto-isolated AC/DC switch output)
- User Communication : Modem, RS-422
- Remote mounting of display, serial communication port
- Remote DAS Mounting (5' from sensor)
- Isolated Power Supply

The Oil/Water Monitor measures percent water through measurement of certain electrical properties of the hydrocarbon/water mixture. There are other constituents in such oil/water mixtures (such as sulfur, iron sulfide/oxide, etc.) that absorb electromagnetic energy at a rate that is equal to or even greater than that of water. When these interfering constituents are present and their content varies, the resultant change in composition of the oil/water mixture can cause a baseline shift in the energy absorption. The shift will be seen as variations in the measured percent water. This shift can be corrected with automatic instrumentation/algorithm (e.g. densitometer or sulfur analyzer) input or by manual adjustment of the OW-201's zero setting. In either case, prior knowledge of the interfering parameters and their variation will allow for most accurate measurement.

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