

Roxar Watercut meter

Low Cut (LC) and High Cut (HC) models

Data Sheet



Continuous in-line measurement of water in oil/water mixture flow

Operating principle

The Roxar Watercut meter (WCM) Low Cut (LC) and High Cut (HC) models use a unique, patented microwave resonance technology to measure the permittivity of an oil/water mixture with an extremely high level of accuracy and sensitivity. The % Water is calculated by relating the permittivity of the mixture to the permittivities of dry oil and water respectively.

Autozero Option

All water-in-oil analyzers are sensitive to variations in the fluid properties (e.g. changes in hydrocarbon density). Roxar has proven a close correlation between the density and the permittivity of a dry hydrocarbon liquid. This patented relationship enables the Meter to continuously compensate for changes in the hydrocarbon liquid composition.

Facts

The Roxar Watercut meter is characterized by:

- Continuous real time measurement
- Unmatched sensitivity and long-term stability
- Full bore or by-pass in-line installation
- No moving or exposed parts
- Customer specified size, rating and material upon request
- Automatic compensation for process temperature
- AutoZero function providing automatic correction for changing fluid properties (optional)
- Coriolis interface for two-phase flow measurement (optional)
- User-friendly, menu based configuration software



INTERPRETATION



MODELING



SIMULATION



WELL & COMPLETION



PRODUCTION & PROCESS

Specifications

Interface Details - Electrical

Power supply:

- 100-240 VAC / 24VDC

Current consumption:

- Max 32W, typically 25W

Electronic housing:

Materials:

- Stainless steel (ATEX) /
- Painted aluminum

Weather protection:

- IP66 / NEMA 7

Mounting:

- Field-mounted, maximum 2 m from sensor

Ambient temperature:

- Non-IS version: -20°C – 60°C (-4°F – 140°F)
- IS version: -20°C – 42°C (-4°F – 108°F)

Weight:

- Approx. 70 kg (ATEX) / 88lb (NEC)

Hazardous area approval:

- EEx de [ia] IIB T5 and Class 1, Div 1, Group C

Temperature transmitter:

- EEx d IIC T6 (IS as option) and Class 1 Div 1, Group B C D

Input/Output

Analogue 4-20mA inputs:

- Input signals: Up to 3 (temperature, mixture density, flow rate, pressure, dryoil density)

Frequency inputs:

- Input signals: Up to 2 (mixture density and total flow rate)

Analogue 4-20mA outputs:

- Output signals: Up to 5 (temperature, % water, oil/water flow rate, etc)

Pulse outputs:

- Output signals: Up to 2 (accumulated volume of oil and water)

Digital I/O:

- ModBus RS232, optional RS422 serial ports, user defined baud rates
- 2 x ASCII string

Transmission distance:

- 15m (RS232)/1000m (RS422)

Interface Details - Mechanical

Connection type to pipe:

- 1" - 4" machined sensor (Fin sensor)
- 6" - 32" spool piece (Endcross sensor)

Materials:

- 1" - 4": Standard: Duplex UNS S31803
Non Standard: SS316, other on request
- 6" - 32": Standard: carbon steel
Non Standard: SS316, other on request

Measurement range:

LowCut version (LC): 0-15% water

HighCut version (HC): 0-50% water

LC/HC plus TopCut: 0-100% water (TopCut requires line density input)

Accuracy:

Inline Calibration:

- 0-1% water: +/-0.05% absolute
- 1-20% water: +/- 5% of reading
- 20-50% water: +/-1% absolute

Density method:

- 0-50% water: +/- (0.3% to 5% of reading) - max. 1% abs.

TopCut:

- 50%-100% water: +/-5% absolute

Repeatability: 0.01%

Sensitivity: 0.005%

Response Time: 0.25-0.40s

Flow conditions: Well mixed

Pressure Drop: Less than 0.2 bar (3 psi)

Weather protection: IP66

Hazardous area approval: Simple Apparatus

Design temperature: Up to 130°C (266°F)

Effect of temperature variations:

- Automatic temperature compensation

Effect of oil density variations:

- +/- 0.027% water per +/-1kg/m³
- Automatic compensation with Autozero (requires a line density input)

Effect of pressure variations:

- Approx. +/-0.00017% water per +/- 1psi
- Automatic compensation with Autozero

Roxar Watercut meter Low Cut (LC) High Cut (HC)



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