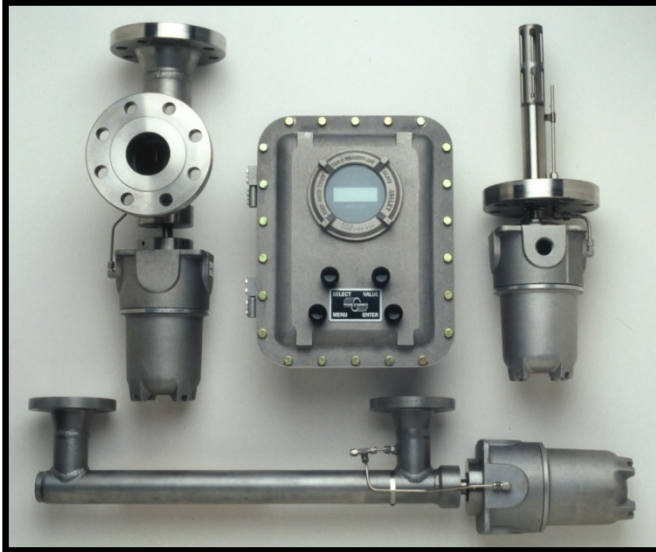


## **Phase Dynamics**

*Technology for Precision Measurements*

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### *Family of Water Cut Analyzers*



- **Low Range (0-4%, 0-10%, 0-20%)**
- **Mid Range (0 to Inversion)**
- **Full Range (0-100%)**
- **High Range (80-100%)**
- ***Heuristic Salinity™* Optional**
- **Insertion Analyzers for Installation In Pipes 6" and Larger**
- **Flow-Through Analyzers in 1" To 4" Pipe Sizes**
- **Three Styles of Flow-Through Configurations**

- **CSA, FM, ATEX & PED**
- **RTD Temperature Measurement**
- **Configurable 4-20mA & Alarm**
- **True Net Oil and Net Water (With Flow Input)**

- **USB Data Logging capability**
- **Density Correction Included**
- **Optional Touch Screen Electronics**
- **Modbus RTU, HART**
- **24 VDC, 120 VAC and 230 VAC**

This family of Water Cut Analyzers developed specifically for use in the oil industry by a major oil company.

The Full Range analyzer is used for well testing on two phase separators even in 90-100% water cut situations.

Time based data logging through a USB port using any plug in USB drive is standard. This provides invaluable information to visualize and optimize production.

Salinity does not affect the measurement because of Phase Dynamic's ability to determine the salinity using the patented Heuristic Salinity<sup>®</sup> module (optional).

The Low Range Analyzer has been used for custody transfer by major oil companies for over 25 years. Density compensation is built in.

Phase Dynamics utilizes the patented, "Oscillator Load Pull" microwave technology. This

technology provides the sensitivity to water percentage which no other vendor can match.

The LCD display or optional color touch screen indicates the measurement value as well as temperature, net oil, net water, and emulsion phase.

Full digital Modbus RTU access to the information is standard. Electronics are available in NEMA 4 or explosion proof enclosures.

## Water Cut Analyzer Operational Specifications

PARAMETER	Low Range		Mid Range	Full Range	High Range
RANGE	0-4% & 0-10%	0-20%	0-Inversion	0-100%	80-100%
UNCERTAINTY*	0.04% 0-4% 0.1% 4-10%	0.04% 0-4% 0.1% 4-10% 0.2% 10-20%	0.5% Oil Phase Only	Oil Phase 0.5% Water Phase 1%	0.6% Water Phase Only
REPEATABILITY	+/- 0.02%	+/- 0.1%	+/- 0.1%	Oil Phase +/- 0.1% Water Phase +/- 0.5	Water Phase +/- 0.3%
RESOLUTION	0.01%	0.1%	0.1%	0.1%	0.1%
FLUID TEMPERATURE	32 - 160° F	32 - 160° F	32 - 160° F	32 - 160° F	32 - 160° F
HIGH TEMP. VERSION	32 - 600° F	32 - 600° F	32 - 600° F	32 - 600° F	32 - 600° F
SALINITY	Not Affect	Not Affect	Not Affect	0.01% - 25% Water Phase Oil Phase Salt Not a Factor	0.01% - 25% Water Phase

\* Percentages are expressed as absolute water content 2 Sigma deviation (95% Confidence).

## General Analyzer Specifications

### Measurement Section:

Pressure Ratings:

Flange Sizes up to ANSI 1,500; Raised Face Flanges Standard;  
RTJ and Flat Face Optional

Construction:

316/316L Standard; Other Materials Available; Designed and  
Fabricated per ASME B31.3 & ASME IX; Full Material  
Certifications Optional

Certifications:

CSA Class 1, Div. 1, Groups C&D  
FM Approval  
CE Mark, Ex II 2 GD  
Ex d IIB T5

Process Connections:

Low Range Analyzers: 1, 2, 3, 4 inch Flanges  
Insertion Type Only in 3" Flange  
All Other Analyzers: 2, 3, 4 inch Flanges

### Electronics Enclosures:

3 to 6 Conduit Entry Explosion Proof Enclosures:

17.4 H x 14.0 W x 9.9 D inches; 59 lbs., NEMA 4X,7,9  
Class 1, Div. 1, Groups C & D; Ex d IIB T5

8 Conduit Entry Explosion Proof Enclosures:

17.4 H x 14.0 W x 11.9 D inches; 71 lbs., NEMA 4X,7,9  
Class 1, Div. 1, Groups C & D; Ex d IIB T5

### Outputs & Alarms:

Outputs Analog: 4-20mA, Enhanced 1each, Expanded 5 each

Outputs Digital: 4 MODBUS RTU, HART optional

Includes 1 Field Definable Relay, NO or NC Rated 1A, 120V  
System Error Dry Contact, NO or NC Rated 1A, 120 V

### Process/Ambient Temperatures:

Fluid Temperature Compensation:

Automatic with Built-in RTD Temperature Probe

Ambient Temperature Ranges:

Measurement Section: -40° to +140° F

Electronics: +32° to +140° F

- 40° to +140° F (With Optional Heater)

Operational Fluid Temperatures:

Standard 32° to 160° F, Optional 32° to 600° F

### Cables:

Between Standard Analyzer Measurement Section and Electronics  
Enclosure:

Dedicated 19 Conductor, 22 AWG, 3 Twisted Pairs, 1/2"  
Diameter, Special Factory installed Military Connector  
(armored cable not available). 150 feet Maximum Length  
between Electronics and Measurement Section.

### Certifications:

Explosion Proof Enclosures; CSA, FM, ATEX/PED (Optional)  
NEMA4X Fiberglass Enclosure; CSA Approved (Optional)  
NACE MR0175

### Power Requirements:

18-28 VDC

120-230 VAC 50-60 Hz (Optional)

16 Watts Typical, 27 Watts Maximum, 34 Watts Expanded