

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%)

**Flow-Through Analyzers in 1”
to 4” Pipe Sizes**

**Insertion Analyzers for Installation
in Pipes 6” and Up**

**Three Styles of Flow-Through
Configurations**

CSA & FM Certifications Available
CE & EEx Certifications Available
Temperature Probe Included
Self Calibrating Current Loop
**Configurable Current Loop &
Alarm Outputs**

**Net Oil and Net Water (with pulse
input from flow meter)**
Modbus RTU, Hart Available
24 VDC, 120 VAC and 230 VAC
Self Checking Electronics

This family of Water Cut Analyzers was developed specifically for use in the oil industry. The Low Range Analyzer is typically used for custody transfer or pipelines. The Full Range is used for emulsion control in tanks, for control of high water cut situations, and for interface control. Flexibility for the user is provided for through various configurations including an insertion unit.

Phase Dynamics' Full and Low Range Analyzers offer the most accurate measurement possible. The Low Range Analyzer has been used on custody transfer pipeline installations by many major oil companies. Phase Dynamics utilizes the unique, patented, "Oscillator Load Pull" microwave technology which provides for this outstanding capability.

All functions of the analyzers are accessed through the front panel by four push button switches. The LCD display indicates the measurement value as well as temperature, net oil, net water, and phase of the emulsion (full range only). Full digital 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%
ACCURACY*	+/- 0.04% (0-4%) +/-0.1% (4-10%)	+/- 0.2% Oil Phase Only	+/- 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%	0.10%	0.10%	0.10%	0.10%
FLUID TEMPERATURE	60 - 160° F	60 - 160° F	60 - 160° F	60 - 160° F	60 - 160° F
HIGH TEMP. VERSION	60 - 220° F	60 - 220° F	100 - 600° F	100 - 600° F	100 - 600° F
SALINITY	Not Applicable	Not Applicable	Not Applicable	0.5% - 8% Water Φ Oil Φ Not a Factor	0.5% - 8% Water Φ

* All percentages are expressed as absolute water content percentages

System Specifications

General:

Power Requirements:

100-130 VAC 60 Hz, (50 Hz Optional)
200-260 VAC 50-60 Hz (Optional)
18-28 VDC (Optional)
25 Watts Typical, 50 Watts Maximum

Outputs:

Analog: Field Selectable 0-20mA or 4-20ma, 12 bit D-to-A Conversion
Digital: RS-422 Standard, RS-485 (Optional), Modbus RTU (Optional), Hart (Optional)

Alarm and System Error Relays:

Alarm Dry Contact Closure Rated 1 Amp, 120 VAC, Field Definable Setpoint, NO or NC with Time Delay
System Error Dry Contact Closure Rated 1 Amp, 120 VAC

Flowmeter Inputs:

Voltage or Magnetic Pickup Pulse (3mV to 15V max.) with Field Selectable Definition
Current Input 0-20 or 4-20 mA with Field Selectable Definition

Fluid Temperature Compensation:

Automatic with Built-in RTD Temperature Probe

Ambient Temperature Ranges:

Measurement Section: -40° to +120° F
Electronics: +32° to +120° F; Sun Shade Recommended

Fluid Temperatures:

Standard 60° to 160° F
Optional 60° to 220° F
Optional 100° to 400° F
Optional 100° to 600° F
Lower Temperatures Optional

Certifications:

CSA, FM, CE & EEx (Optional)

System Electronics Enclosures:

Standard Explosion Proof Enclosure:

17.4 H x 14.0 W x 9.9 D inches; 59 lbs., NEMA 4, 7 & 9; Class 1, Div. 1, Groups C&D; EEx d IIB T5 89°C - IP66 (Optional); See Figure 1

Rain and Dust Tight Fiberglass Enclosure:

16.3 H x 10.5 W x 7.9 D inches; 17 lbs., NEMA 4; See Figure 2

Rack Mount Enclosure (Control Room):

7.0 H x 19.0 W x 13.0 D inches; 15 lbs., NEMA 4; Request Drawing

Measurement Section:

Pressure Ratings:

Flange Sizes up to ANSI 1,500; Raised Face Flanges Standard; Others Optional

Construction:

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

Certifications:

Class 1, Div. 1, Groups C&D;
EEx d IIB T5 78°C - IP66 (Optional)

Process Connections:

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

Cable:

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; typically in Conduit.

Water Cut Analyzer Measurement Section Dimensions

Nominal Pipe Size	Configuration "U", "Z", "L" or Insertion (Note 1)	Flange Size (Note 2)	Dimensions Inches				Net Weight lbs.
			A	B	C	D	
1 inch	U & Z	150	39.7	5.1	13.3	24	28
"	U & Z	300	39.7	5.4	13.3	24	31
"	U & Z	600	39.7	5.7	13.3	24	31
"	U & Z	900	39.7	6.3	13.3	24	36
2 inch	U & Z	150	41.8	6.0	14.8	24	52
"	U & Z	300	41.8	6.3	14.8	24	56
"	U & Z	600	41.8	6.6	14.8	24	60
"	U & Z	900	41.8	8.0	14.8	24	72
"	L	150	----	6.2	15	10	36
"	L	300	----	6.5	15	10	40
"	L	600	----	6.8	15	10	44
"	L	900	----	8.0	15	10	56
3 inch	U & Z	150	44.0	7.3	16.2	24	78
"	U & Z	300	43.3	7.6	16.2	24	91
"	U & Z	600	43.3	8.0	16.2	24	91
"	U & Z	900	43.3	8.8	16.2	24	113

Nominal Pipe Size or Type	Configuration "U", "Z", "L" or Insertion (Note 1 & 4)	Flange Size (Note 2)	Dimensions Inches				Net Weight lbs.
			A	B	C	D	
3 inch	L	150	----	7.25	16.2	10	52
"	L	300	----	7.6	16.2	10	60
"	L	600	----	8	16.2	10	60
"	L	900	----	8.8	16.2	10	82
Low Cut	Insertion	150	6.1	5.8	25.8	----	26
Mid/Full/H	Insertion	150	6.1	10.5	25.8	----	37
Low Cut	Insertion	600	6.1	5.8	30.5	----	28
Mid/Full/H	Insertion	600	6.1	10.5	30.5	----	39
4 inch	U & Z	150	33.2	8.5	16.7	12	120
"	U & Z	300	33.7	8.9	16.7	12	140
"	U & Z	600	34.1	9.8	16.7	12	150
"	U & Z	900	34.4	10.3	16.7	12	178
"	L	150	----	8.5	16.1	10	67
"	L	300	----	8.9	16.1	10	87
"	L	600	----	9.75	16.1	10	108
"	L	900	----	10.25	16.1	10	136

Notes:

- Consult Factory for configurations including High Temperature versions
- Flanges are dimensioned as ANSI Raised Face. Higher pressure rating flanges and RTJ flanges are available – consult Factory for dimensions and availability
- Mid Range, Full Range and High Range are not available in 1" pipe
- Insertion units have different lengths depending upon water cut measurement range. The Low Range has different dimensions from Mid, Full or High Range analyzers. All have 3" flanges.

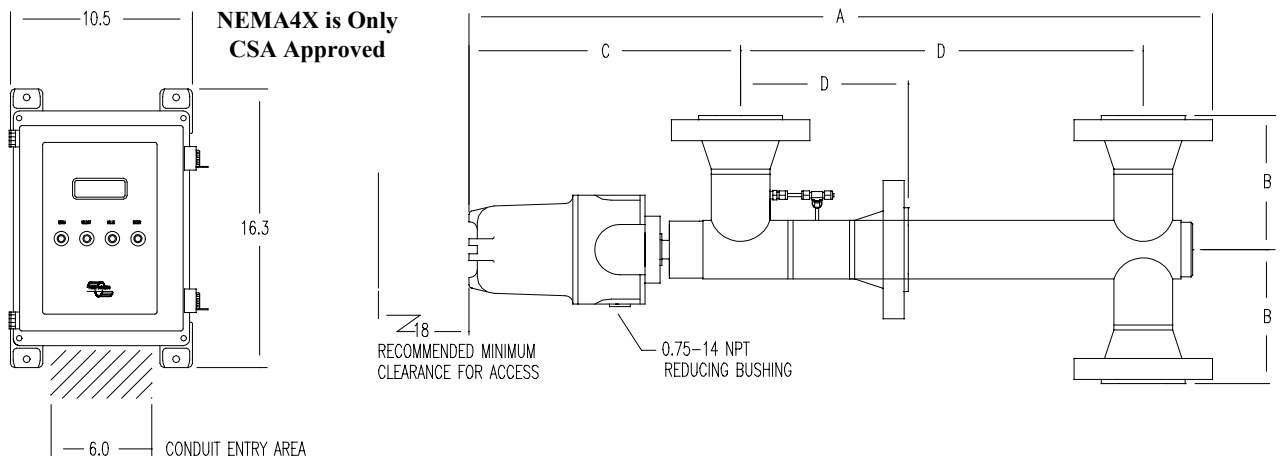


Figure 2

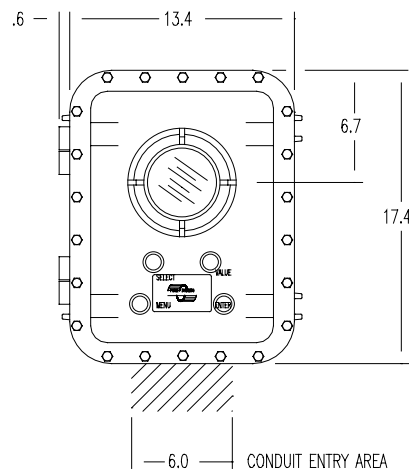
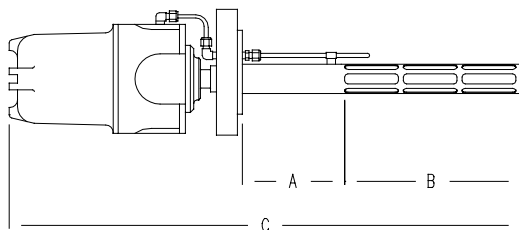


Figure 1



Insertion Analyzer

Group Line Testing

Pipelines

Well Testing

Emulsion Interface Control

Flow-Through

Group Line Testing

Pipelines

Well Testing

Emulsion Interface Control



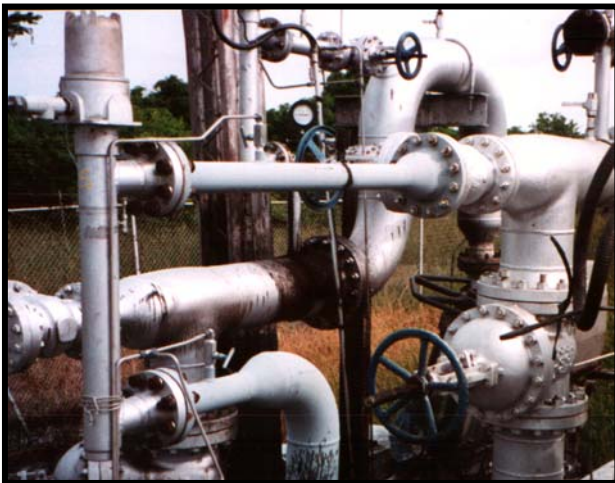
Flow-Through

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For more Information
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Technology for Precision Measurements

