Advanced sensors
by **PAC**

EX-400M
Side Stream ppm, Solids and Oil Droplet Water Analyzer

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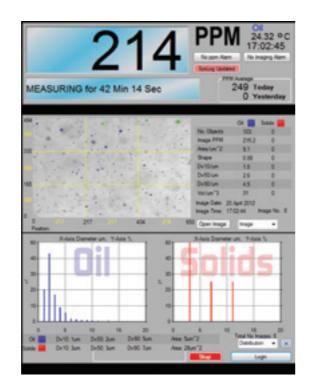
Ultrasonics   Microscopy

The EX-400M is a side stream unit that uses video microscopy to measure concentrations of oil in water, Total Suspended Solids (TSS), oil droplet size and gas bubble size, whilst still taking advantage of patented self cleaning technology to keep fouling from impacting the data gathered.

Features

- Patented ultrasonic cleaning
- Video microscopy measurement
- Side stream format
- Periodic homogenisation of sample
- Sample point
- Measurement ranges 0-1,000ppm
- Accuracy ±4% and measurement repeatability 98%
- Particle and droplet size information e.g. Dv10, Dv50 and Dv90 data
- Immediate on-screen results
- Additional offline reprocessing capability for review of results
- Remote management and diagnostics
- Easy to install (no sample conditioning)
- Multiple communications options - 4-20mA, HART, Modbus, Extended Ethernet or WiFi
- Data and image storage on analyzer for up to 120 days
- Automatic PDF report generation

Benefits

- Easy to use
- Ability to measure and distinguish between oil, solids and gas particles
- Low Cost Of Ownership (COO) with zero routine maintenance
- No degradation of signal or recalibration
- Side stream format offers improved sample control
- Sample point facilitates laboratory correlation
- Remote control and monitoring (ideal for un-manned locations and remote process monitoring)

Microscopy Specification

Measurement principle	CCD Camera 2D Image
Image Resolution	2 Million Pixels
Illumination	Controlled LED (lifetime 5 years)
Number of Images Per Dataset	1-500 Images (User Configurable)
Time between each Image	0.1 to 10 Seconds (User Configurable)
Imaging Modes	Flowing, Static, High Gas Content Mode

Microscopy Image Processing

Advanced Sensors Image Processing Engine (no 3rd party Algorithms)
Shape and object matching used to classify objects in the image
No need to change parameters for different turbidity samples, due to automatic exposure time and multi-level image threshold algorithms

Measured Items

Content ppm	Hydrocarbon droplets, Suspended Solids, Gas
Size distribution	Hydrocarbons droplets, Suspended Solids, Gas
Turbidity	Measurements in AU

Microscopy ppm

Range	0-1,000ppm
Calibration	4 parameter curve fit with gain correction
Auto-Calibration	Microscopy ppm can auto calibrate itself

Sample of Microscopy Measured Parameters

ppm	Turbidity
% Concentration	No. of Objects Per Image
High Sensitivity Circularity	Aspect Ratio
Convexity	Elongation
Size	DV10, DV50 and DV90
Diameter PED (Circle of Equal Perimeter)	Configurable Object Sharpness
Length, Width	Volume, Area

Microscopy Size Range

Dimensional Range	1-450um
Accuracy	±4% of measurement range
Repeatability	> 98%
Calibration	Particle size calibrated with standardized beads

Microscopy Turbidity

Range	0-1,500 AU Light
Frequency	White Light
Measurement Timeline	Every Image Cycle

Data Storage

Image Storage	30-60 days depending on schedule
Data of every Particle Measured	Rolling FIFO 120 days storage

MiView Offline Software

Powerful client software for complete analysis of data from system	
Connect live to the analyzer over the network for real-time analysis	
View historical data for process review	
Look at the performance of processes at different points	
Generate reports automatically from the data	

Operating Conditions

Process temperature	0°C to 200°C
Process pressure	0-35 barg (design pressure 180 barg)
Process flow	0-25 l/min (optional 0-1000l/min)
Operational ambient temperature	-20°C to 55°C
Cleaning	Ultrasonic (automatic)

Utilities

Power supply	110 or 230 VAC (Pre-configured), 50-60 Hz
Power consumption	60W normal, 300W peak
Instrument air	5-8 barg (for pneumatic valve; electric valve optional)

Weight & Dimensions

Weight (including stand, standard pneumatic Stainless Steel valve assembly, termination box and isolation switch)	Stainless Steel Enclosure: 140.2Kg
Dimensions	670W x 640D x 1120H mm
Clear space	500mm front and rear

Communications

4-20 Ma	Passive
Ethernet	Standard
HART, Modbus, Wireless (WiFi), Extended Ethernet	Optional
Remote access	Standard
Internal data storage	>10 years
Security	Multiple level password protection

Additional Information

Flange fitting	1" ANSI RF standard (optional flange sizes and types available)
Wetted parts	316SS (option of CR22, CR25, Monel, Inconel, Hastelloy, Titanium)
Sample take off point	Standard – integral to analyzer
Viewing window	Standard
Homogenisation	Ultrasonic
Gas removal, solids removal, temp. Conditioning, flow control	Not Required
Ingress protection	IP66
Enclosure material	SS 316L
ATEX Exd II 2 G IIB T4, IECEX, USA and Canada Class 1 Div 1	Purged air not required
Size calibration of objects conforms to ASTM E1951 standard guide for calibrating reticles and light microscope magnifications	
User configurable alarm	