

# EX-400M

Side Stream ppm, Solids and Oil Droplet Water Analyzer



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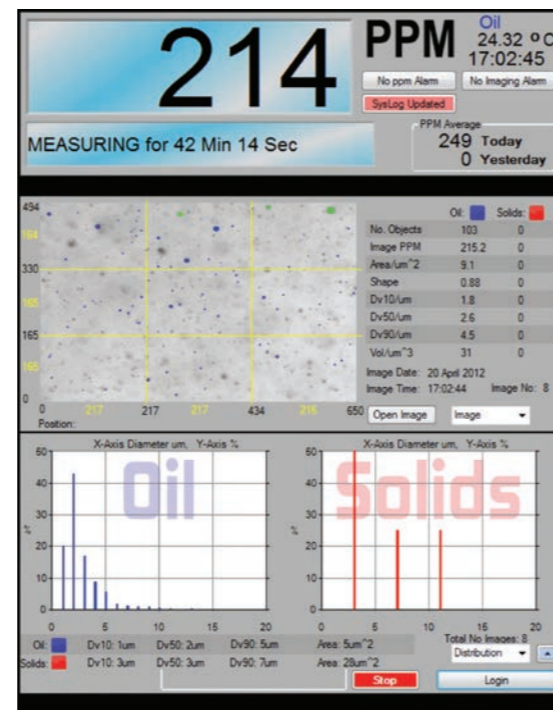
Ultrasonics

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
- Measurement repeatability  $\pm 4\%$  of full scale range
- Particle and droplet size information e.g. Dv10, Dv50 and Dv90 data
- Immediate on-screen results
- Remote management and diagnostics
- Easy to install (no sample conditioning required)
- Multiple communications options - 4-20mA, HART, Modbus, Extended Ethernet
- 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 no routine maintenance
- No degradation of signal or recalibration required
- 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
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	As required

### 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
Repeatability	$\pm 4\%$ of measurement range
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

<b>Operating Conditions</b>	
Process temperature	Up to 100°C
Process pressure	Up to 35 barg
Process flow	5-15 l/m
Operational ambient temperature	-20°C to 55°C
Cleaning	Ultrasonic (automatic)
<b>Utilities</b>	
Power supply	110 or 230 VAC (Pre-configured), 50-60 Hz
Power consumption	60W normal, 300W peak
Instrument air	5.5-7 barg (for pneumatic valve; electric valve optional)
<b>Weight &amp; Dimensions</b>	
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
<b>Communications</b>	
4-20 Ma (2)	Passive
Ethernet	Standard
HART, Modbus, Wireless (WiFi), Extended Ethernet	Optional*
Digital Input (1), Digital Output (2)	Standard
Remote access	Standard
Internal data storage	>10 years
Security	Multiple level password protection
<b>Additional Information</b>	
Flange fitting	1" ANSI RF standard (optional flange sizes and types available)
Wetted parts	316SS (other materials available upon request)
Sample take off point	Standard – integral to analyzer
Viewing window	Standard
Homogenisation	Ultrasonic
Ingress protection	IP66
Enclosure material	316L SS
Analyzer	CE compliant, ATEX, IECEx, INMETRO (for SS enclosure only), Class 1 Division 1 (groups C&D; T3&T4), Class 1 Division 2 (groups A, B, C, D; T4), Class 1 Zone 1 (T3&T4)
Size calibration of objects conforms to ASTM E1951 standard guide for calibrating reticles and light microscope magnifications	
User configurable alarm	

\* HART - PPM internal temperature, flow status - START cycle and STOP cycle functionality only  
 MODBUS RTU only; implemented via HART to MODBUS converter