

# MD-04 MPFM Technology

Well testing equipment for repeatable, highly accurate measurements and reduced field development costs

## Applications

- Exploration, appraisal, and production well testing
- Well cleanup optimization
- Production and fiscal allocation
- Production trending
- Artificial lift system optimization
- Flow measurements in slugs, foams, emulsions, and heavy oil

## Benefits

- Improved fluid characterization services
- Enhanced response time
- Reduced field development costs
- Improved well diagnostic and early detection of water entry and gas coning
- Eliminated test lines and test separators
- Enhanced installation and operation safety
- Reduced gas flaring and eliminated fluid disposal

## Features

- Repeatable, highly accurate measurements
- Exceptional dynamic response
- No need for separation and flow calibration
- High-frequency data acquisition
- Archived database and automatic reports

Designed for easy deployment, **MD-04** MPFM is the most versatile multiphase equipment in the market. It does not make use of any nuclear source and can therefore be handled without concerns over radioactivity. This new generation of inline MPFM has been developed by some of China's top scientists and engineers. The technology lets you measure oil, gas and water flow rates without bulky separation. The equipment is extremely cost competitive, has no moving parts and is maintenance free.

The technology is based on new scientific developments and uses innovations in the mathematical modeling of multiphase flow. Real-time measurements of phase fraction are generated non-intrusively using only a combination of sensors to perform a transient non-Newtonian multiphase flow analysis. It has immediate dynamic response to fluctuating flows, requires no stabilization time, is not affected by complex flow regimes such as slug flow, foam, or emulsion environments, and can answer the challenges in heavy oil production.



MD-04 vertically mounted



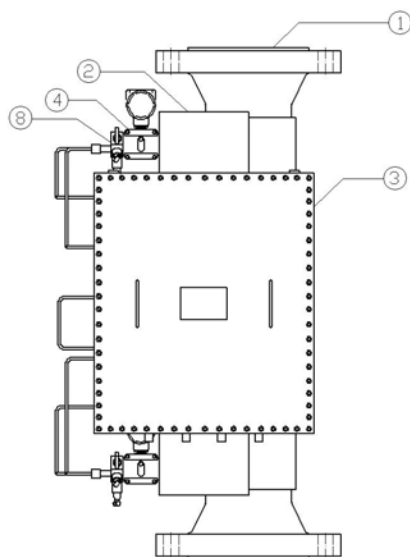
MD-04 horizontally mounted

## How the game is changing...

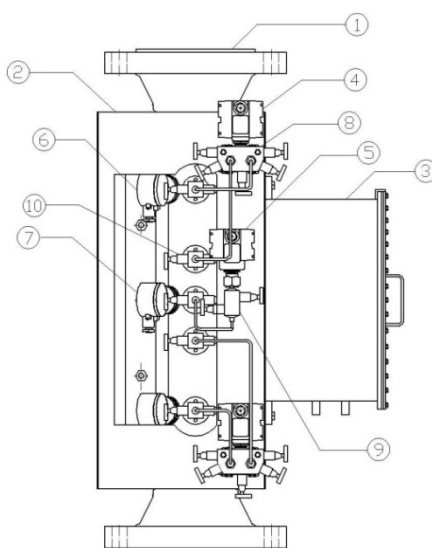
The **MD-04** technology is the first safe and affordable total metering solution that is so affordable that every wellhead can be equipped with an MPFM. It is easily installed to a new well, and without any *a priori* information, it can immediately measure on a real-time basis and provide data through its flow computer using the **FlowMaster** software, a completely automated and user-friendly data delivery system which enables well testing operators to view results, automatically produce reports and perform decisions on the spot.



# MD-04 MPFM Technology



Frontal View



Side View

- 1 Process Pipe
- 2 Sleeve
- 3 Flow Computer Box
- 4 PD Transmitter
- 5 P Transmitter
- 6 Ultrasound Doppler
- 7 T Transmitter
- 8 Five valves Set
- 9 Two valves Set
- 10 Two valves Set

## Typical Specifications (MD-04 can be designed to your requirements)

Service	H <sub>2</sub> S (wetted parts)		
Max. working pressure, MPa [psi]	34 [5000] (higher pressures available per design)		
Temperature rating, °C [°F]	-20 to 150 [-4 to 302]		
Ambient working, °C [°F]	-20 to 85 [-4 to 185]		
Ambient storage, °C [°F]	-40 to 85 [-40 to 185]		
Water/liquid ratio, %	0 to 100		
Gas volume fraction, %	0 to 100		
Liquid viscosity at line conditions	Suitable for heavy oil		
Sample flow ranges			
Sample pipe diameter mm [in]	65 [2.5]	75 [3]	100 [4]
Total Liquids flow rate, m <sup>3</sup> /d [BPD]	80 - 800 [580 - 5,800]	150 - 1,500 [1,100 - 11,000]	200 - 2,000 [1,500 - 15,000]
Repeatability (total mass rate at line conditions)	Better than ±1%		
Resolution (total mass rate at line conditions)	Better than ±0.1%		
System Length, m [ft]	1.2 [4]		
Approximate Weight, kg [lbm]	300 [660] with flanges and flow computer		
Power consumption, W	Less than 100		
Hazardous area classification	ATEX EEx de II B T4 IP 66		

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