

ABLE INSTRUMENTS & CONTROLS

ABLE SLUGMASTER®

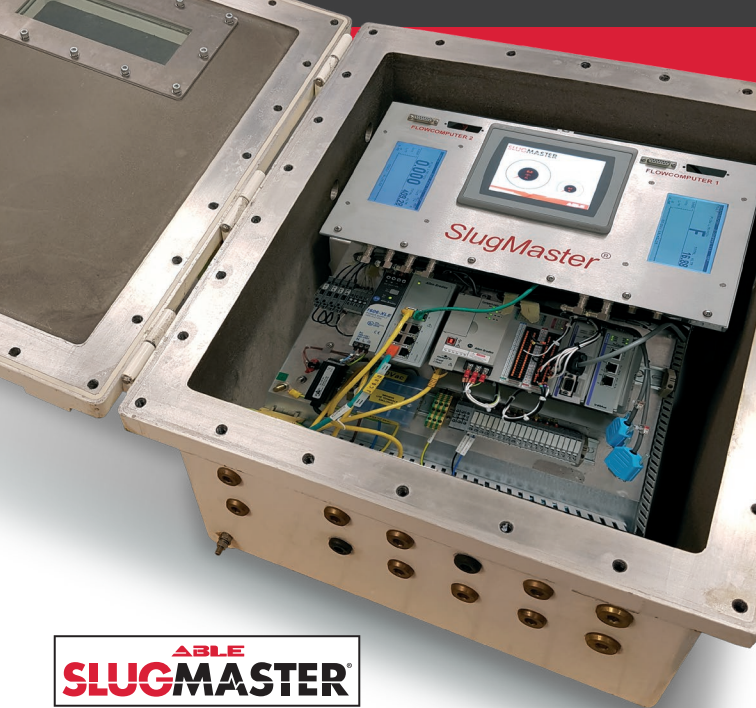
THE WORLD'S MOST INTELLIGENT FLOWMETER



UNIQUE DUAL TECHNOLOGY ULTRASONIC FLOW METER

- ▲ Designed for difficult slug, plug and partial empty pipe flow metering applications
- ▲ Unique dual technology ultrasonic flow meter
- ▲ Multiphase versions available for dual and three phase flow metering
- ▲ High accuracy
- ▲ Requires minimal straight pipe
- ▲ Clamp-on, no pressure loss
- ▲ Ideal for applications with varying levels of aeration, solids, coatings and pressure surges

ABLE



ABLE
SLUGMASTER

THE WORLD'S FIRST INTELLIGENT DUAL ULTRASONIC FLOW METERING SYSTEM

The ABL SlugMaster uses two ultrasonic flow metering technologies and a smart PLC to intelligently select which technology to use, based on the process conditions being measured. Constant metering is achieved regardless of solids and gas contamination. The changeover between the metering technologies is calculated with unique mathematical software, which enables exceptional measurement accuracy.

For more information regarding the ABL SlugMaster, please email info@able.co.uk

INDEPENDENT PRIMARY AND SECONDARY ULTRASONIC TRANSMISSION:

These technologies are used to measure flow consistently & accurately across a whole range of process conditions including heavy aeration and solids contamination.



Available in dedicated versions, specifically to consistently measure flow without interruption caused by the change in process parameters.

PATENTED WIDE BEAM DTF TIME OF FLIGHT AND FAST FOURIER TRANSFORM TECHNOLOGY:

Time of flight, ultrasonic flow metering is used during low aeration periods with intelligent switching to Reflexor metering during heavy aeration and slugging, slurry or solid particle entrainment. Reflexor operating mode utilizes Doppler flow detection along with digital signal processing techniques to successfully measure flow under conditions that may not be suitable for transit-time flow measurement. The Reflexor samples the flow stream as it detects Dopplershift. It converts the Doppler shift information by use of Fast Fourier Transform (FFT) and filters the FFT to determine the flow rate.

NON-INTRUSIVE, CLAMP-ON DESIGN:

The non-invasive nature of the SlugMaster's clamp-on technology means that it is immune to the potentially corrosive effects. This approach avoids the need to cut into the pipe and interrupt the flow. No welding means no extra parts, saving on both labour and costs. It also means no leakage, which prevents contamination. Furthermore, one clamp-on meter can be used on a variety of pipe sizes and fluids and dual-channel meters can measure flow in two separate pipes using a second set of transducers.



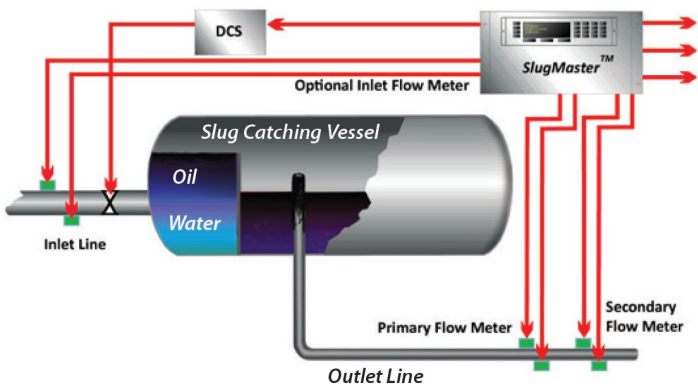
The core, patented technology at the heart of the SlugMaster series, is a dual measurement, intelligent algorithm



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INNOVATIVE VOTING LOGIC INTELLIGENTLY SELECTS THE MOST SUITABLE TECHNOLOGY BASED ON PROCESS CONDITIONS:

Ordinarily, the changeover point between these two technologies would be difficult to achieve, yet with the ABLE SlugMaster, an accurate and seamless changeover between the two metering technologies is achieved with unique mathematical software that enables accuracies that exceed the raw changeover of both meters.



APPLICATION – SLUGCATCHER

When oil is pumped over a considerable distance, usually between the wellhead and installation, often large pockets of gas or congealed oil will build up at elevated points in the pipeline. As the velocity in the pipeline increases, the gas pockets and congealed oil is dislodged and flows towards the platform or processing unit. At this point, a slug catcher is typically employed to vent off the gas and remove the congealed oil for processing. Accurate flow measurement of the oil from the outlet of the slug catcher is vital for allocation and billing purposes. The difficult process conditions of slugging due to heavy fluctuating aeration, and slurry or solid particle entrainment are not ideal for most flow meters. Furthermore, the inherent coating in this process rules out any insertion type flow meters for this application.

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SLUGMASTER™

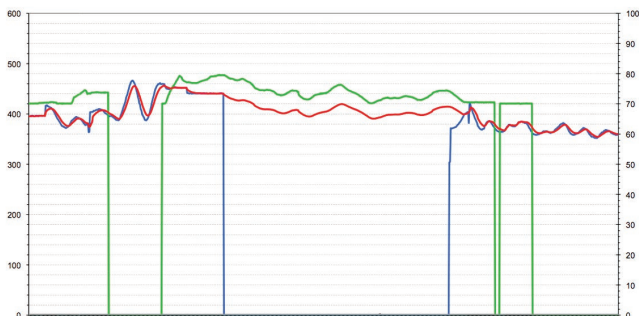
ABLE SLUGMASTER®

The ABLE SlugMaster® flow meter system is a dual technology ultrasonic flow metering system specifically developed to consistently measure liquid flow without interruptions caused by the changes in process parameters. The ABLE SlugMaster® system deals effectively with the problematic process conditions by the use of dual ultrasonic technologies, available in dedicated or portable versions. Time of flight, ultrasonic flow metering is used during low aeration periods with intelligent switching to Reflexor metering during heavy aeration and slugging, slurry or solid particle entrainment.

ABLE's time of flight ultrasonic flow meters have exceptional measurement accuracy, even with small levels of aeration. In the ABLE SlugMaster® system, this accuracy is used to calibrate a tandem Reflexor meter during the window when both meters are able to operate due to low aeration in the fluid.

By calibrating the Reflexor to the time of flight at the point where time of flight is just failing to measure, the Reflexor becomes vastly more accurate than a standard Reflexor out of the box.

In the graph below, the blue line represents the time of flight flow meter as it experiences heavy aeration and begins to become unstable until the flow measurement is eventually lost. At this point the Reflexor flow, represented by the green line, begins to pick up as it measures in heavy aeration. The ABLE SlugMaster® software cross calibrates the Reflexor to the time flight so that a calibrated Reflexor flow is developed and an accurate transition is achieved between both metering devices.



For more information regarding the ABLE SlugMaster, please email info@able.co.uk

ABLE SLUGMASTER® TECHNICAL INFORMATION

TYPICAL PERFORMANCE BASED ON 6" (DN150) SCHEDULE 40 STEEL PIPE

Power Supply	24Vdc, 100-120Vac, 200-250Vac versions
Enclosure Classification	ATEX EExd IIA & IIB, IP66, Zones 1, 2, 21, 22
Transducer Cable Length	Up to 300 metres
Electronic Temperature Range	-18°C to +60°C
Transducer Temperature Range	Universal up to +121°C High precision T1 -40°C to +66°C High precision T2 +15°C to +121°C 991 universal up to +232°C
TOF Calibrated Accuracy	Universal 1% to 2% High Precision 0.5% to 1% Ultra High Precision 0.2% to 0.5%
TOF Resolution	-0.01 ft/sec (0.003 m/s)
TOF Repeatability	High Precision 0.15% Universal 0.25%
Data Logging	4Gb (approx 24 mths continuous standard)
Display	40 Character Alpha Numeric
Main Output	Volumetric Flow, any units / any time scale
Data Outputs	Ethernet DHCP, RS232, 4-20mA, Alarm vfc Relays
Inputs	Density, Pressure, Temperature



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