ABLE FT ULTRASONIC FLARE GAS METER

Incorporating DataFlow Data Analysis System and
FlareMaster Flare Metering Enhancement Tool

Flare Metering with Reduced Uncertainty

ABLE

MEASURE | CONTROL | MANAGE

FlareMaster FT –
The World's First SIL 2 Rated Flare Meter

Application

- Measurement of flare and vent gas, characterised by a large velocity range, low pressure and large pipe diameters
- Flare gas mass flow and density calculation with detailed gas live composition and analysis options
- Leak detection and loss calculation for precise mass balance determination and process optimisation
- Accurate measurement of very low flow rates

General Description

The ABLE FlareMaster FT is the first SIL 2 flare gas meter and is capable of measuring any flare gas flow velocity up to several hundred metres per second. Based around a compact flow transmitter design, the ABLE FlareMaster FT can be retrofitted to any existing flare line nozzle configuration.

Key Features

- Built in redundancy of flow measurement & automatic verification via secondary measurement method
- Significantly extended flow measurement range, providing the widest range on the market, up to 1000 m/s
- High process temperature operation range from -70 to +200°C.
- Immunity against loss of measurement from probe contamination and liquid carry over
- Easy and fast to install and retrofits to all existing nozzle options (diametric 45° and bias 90° installs)
- Wetted non-intrusive sensor design options for all pipe diameters from 6 inch up to 80 inch
- Low maintenance costs, and lower frequency service intervals
- Serial interface and Modbus protocol with all conventional comm protocol options available
- High reliability and measurement accuracy throughout entire range
- Extended processing options including detailed gas composition analysis options available
- SIL2 rated

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ISO 9001
ISO 14001 : 2015 REGISTERED Certificate No:288612019
ISO 45001 : 2018 REGISTERED Certificate No:372832021
Registered in England No. 01851002. VAT No. GB 417 2481 61

System Components

The ABLE FlareMaster FT comprises two Model TF200 standard transducers (a sender and a receiver unit) and an MFT200 control unit/transmitter. The MFT200 provides signal inputs/outputs, derives reference values (standardisation) and also calculates flow velocity, sound velocity, standard and actual volume flow, mass flow, totalised standard volume flow, totalised mass flow, molecular weight, density, pressure and temperature. The DataFlow software provides access to all parameters, contains graphical display of measured values, trend curves and has an incident ledger for all measurement events and parameter changes.

Operation Summary & Features – Flaremaster

Flow measurement verification

FlareMaster, which is embedded in the ABLE FT, independently verifies the volume and mass flow rate in real time using a different computation principle than the meter's Time-of-Flight ultrasonic measurement, giving a verification within a 5% tolerance. This ensures confidence in the accuracy of the ultrasonic measurement. This feature also indicates when the meter operation is compromised such as flagging when maintenance of the probes is required.

Flow measurement data repair in real time

FlareMaster uses independent flow measurement to automatically identify and repair measurement errors from the ultrasonic flow meter, such as those due to sooty and oily-deposits on the transducer probes, or periods of liquid carry over. This repair is performed in real time without any loss of flow measurements into the control room.

Extended flow range

The ultrasonic flare meter typically has an upper flow velocity measurement limit of between 70 and 90 m/sec, depending on pipe size and gas composition. During emergency blowdown conditions the flare flow velocity can easily exceed the upper limit of the ultrasonic flow meter, and operators are forced to find other means to estimate the flare velocity in order to report the mass totals. FlareMaster measures the flow independently of the Time-of-Flight measurement and does not have an upper flow velocity limit. This secondary measurement is cross calibrated to the ultrasonic meter and extends the flow range to ensure even the most extreme blowdown velocities are measured, even up to several hundred metres per second.

Redundancy of flare measurements

FlareMaster provides redundancy of measurement, so that even in the event of total transducer failure, the flare measurement is not lost, as FlareMaster continues to provide the cross calibrated flow measurement from its secondary method until the ultrasonic measurement is restored.

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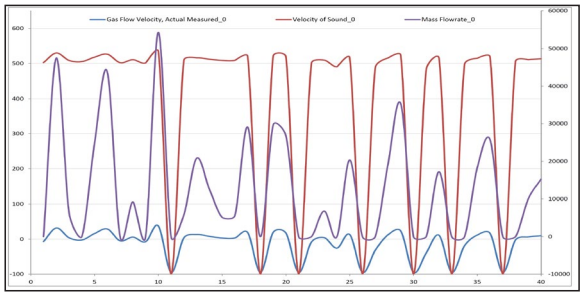
Operation Summary & Features – Dataflow – An Enhanced Data Gathering And Analysis Tool

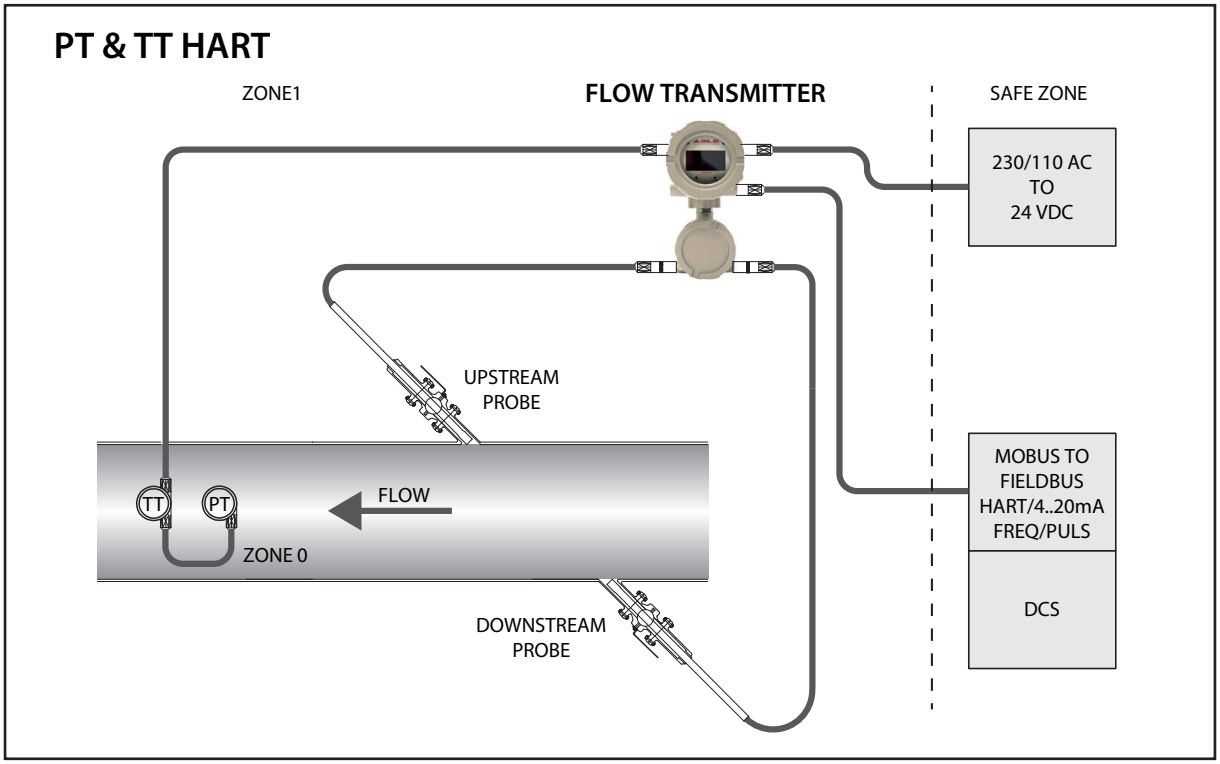
Data capture, storage of multiple FGM process data

Remote interrogation and parallel monitoring of FGM systems from safe area using a standard web browser user interface allowing:

- Download of process data in Excel XLSX format
- Graphing of key flare gas process data including; actual, standard, and mass flow, velocity, pressure, temperature and density



Standard Installation Options – General Arrangement



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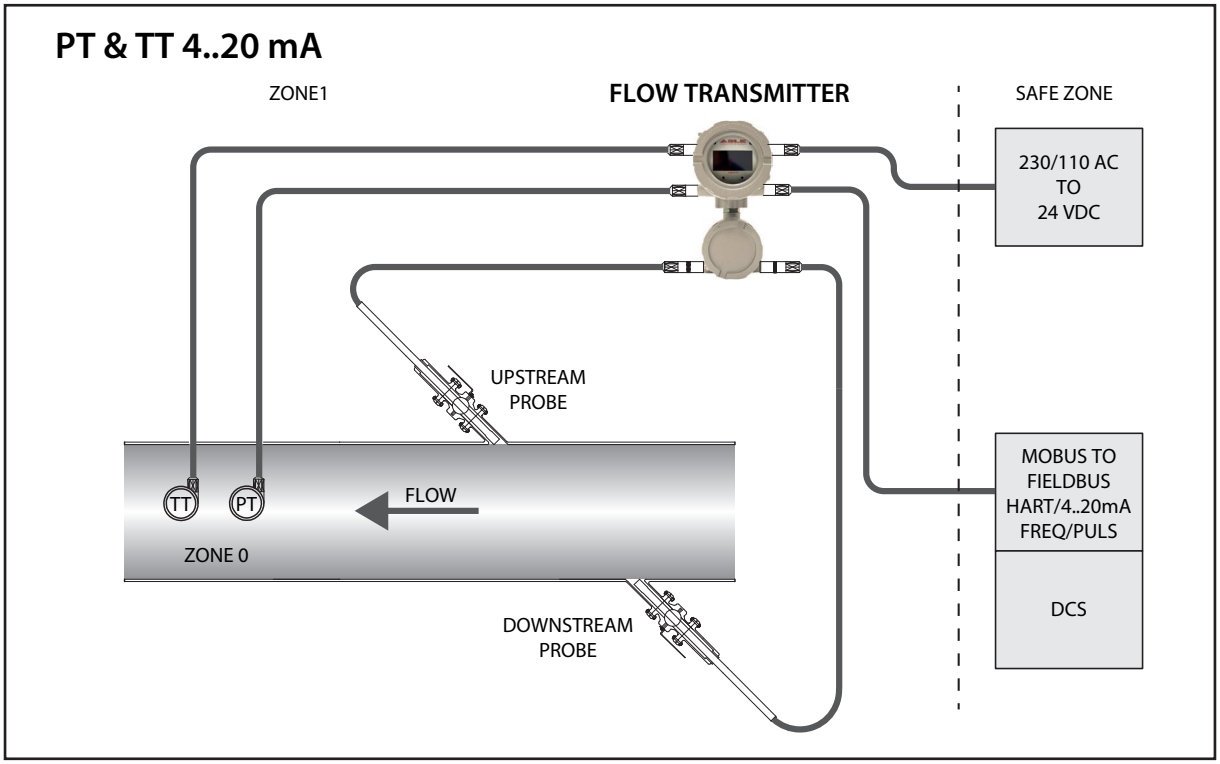

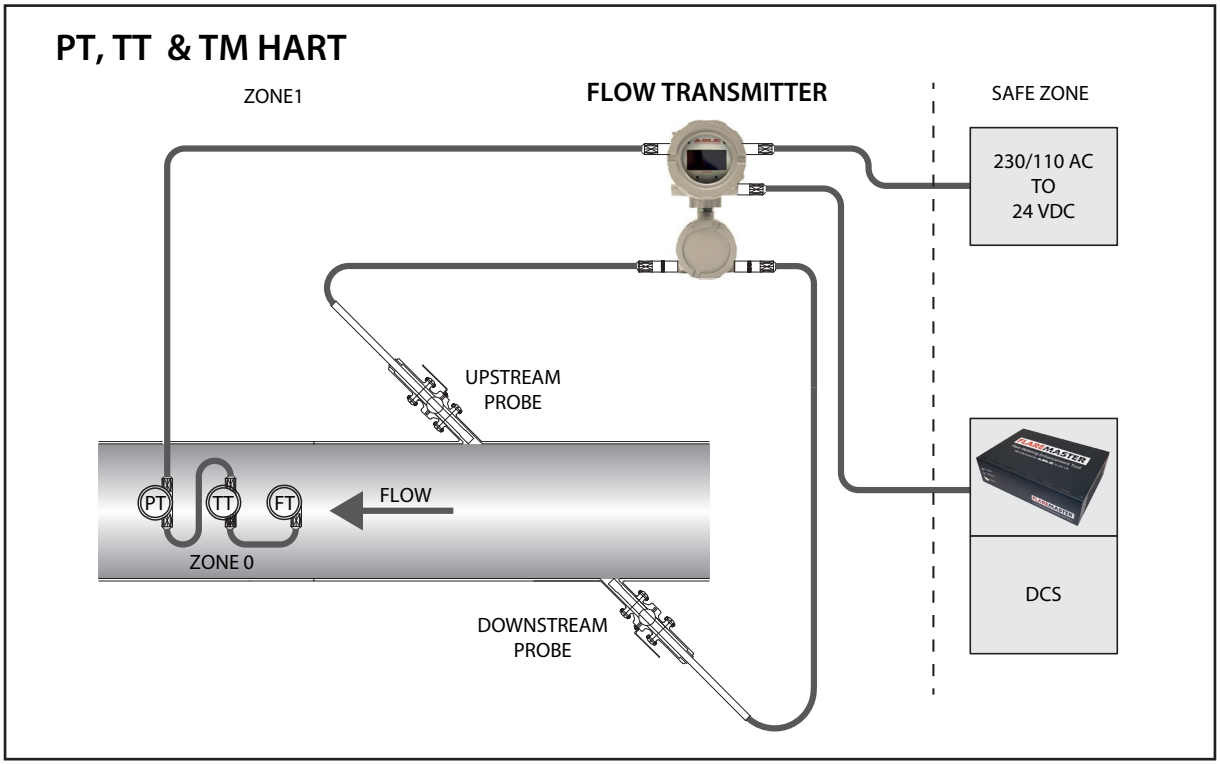

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ABLE's FT has been specially designed to retrofit to any style of existing flare nozzle arrangement*. There are dedicated jigs for fast, economical and accurate mounting of transducer holders for new installs and spools. These holders are welded onto the pipeline at an angle suitable for each different pipe size. The meter can either be delivered as a hot/cold tap version or with a prefabricated spool piece.

Cross duct installation: the two sender / receiver units are mounted on both sides of the duct at 45° to the wall or, alternatively, the transducer holders are orientated at 48° (downstream) and 42° (upstream).

**Including Bias 90*

Technical Data – ABLE FlareMaster FT

Measured Values	Flow velocity, Sound velocity, Standard and actual volume flow, mass flow, totalized standard volume flow, totalized mass flow, molecular weight, density, pressure, temperature.	
Measurement Principle	Ultrasonic Time of Flight	
Design Pressure ASME VIII Div.1 & ASME B31.3:Ed.2017	1.04 MPa/10.4 BarA	
Operating Temperature – ATEX Ex ia IIC T4-T6 Zone 0	-70°C to 200°C	
Design Temperature – ASME VIII Div.1 & ASME B31.3: Ed.2017	-150°C to +300°C	
Power Consumption	< 40 W	
Electrical Safety	CE	
Safety Integrity Level (SIL)	SIL 2	
Protection Rating	Flow Transmitter – Aluminium/Stainless Steel IP66	
Measurement Ranges (Application Dependent)	Flow velocity 0 to 120 m/s Pipe size 6 to 80 inch Sound velocity 200 to 1000 m/s Temperature -70 to 200 °C Pressure 0.6 to 10 BarA	
Accuracy*/**	1 to 5%, application dependent	
Repeatability**	1%	
Turn Down Ratio	1:4000	
Inputs	2 x HART input, up to 15 transmitter each input / 2 x 4…20 mA 2 x Rs-485 Modbus	
Outputs	2 x RS-485 (Modbus RTU) Optionally – 4..20 mA – HART Frequency / Pulse	
Hazardous Area Certification	**Flow Transmitter** ATEX Ex 2G Ex db IIC Gb Zone 1	**Transducers** ATEX Ex ia IIC T4-T6 Zone 0

**For fully developed flow profile*

***Accuracy and repeatability stated above do not include the enhancements resulting from the application of FlareMaster*

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