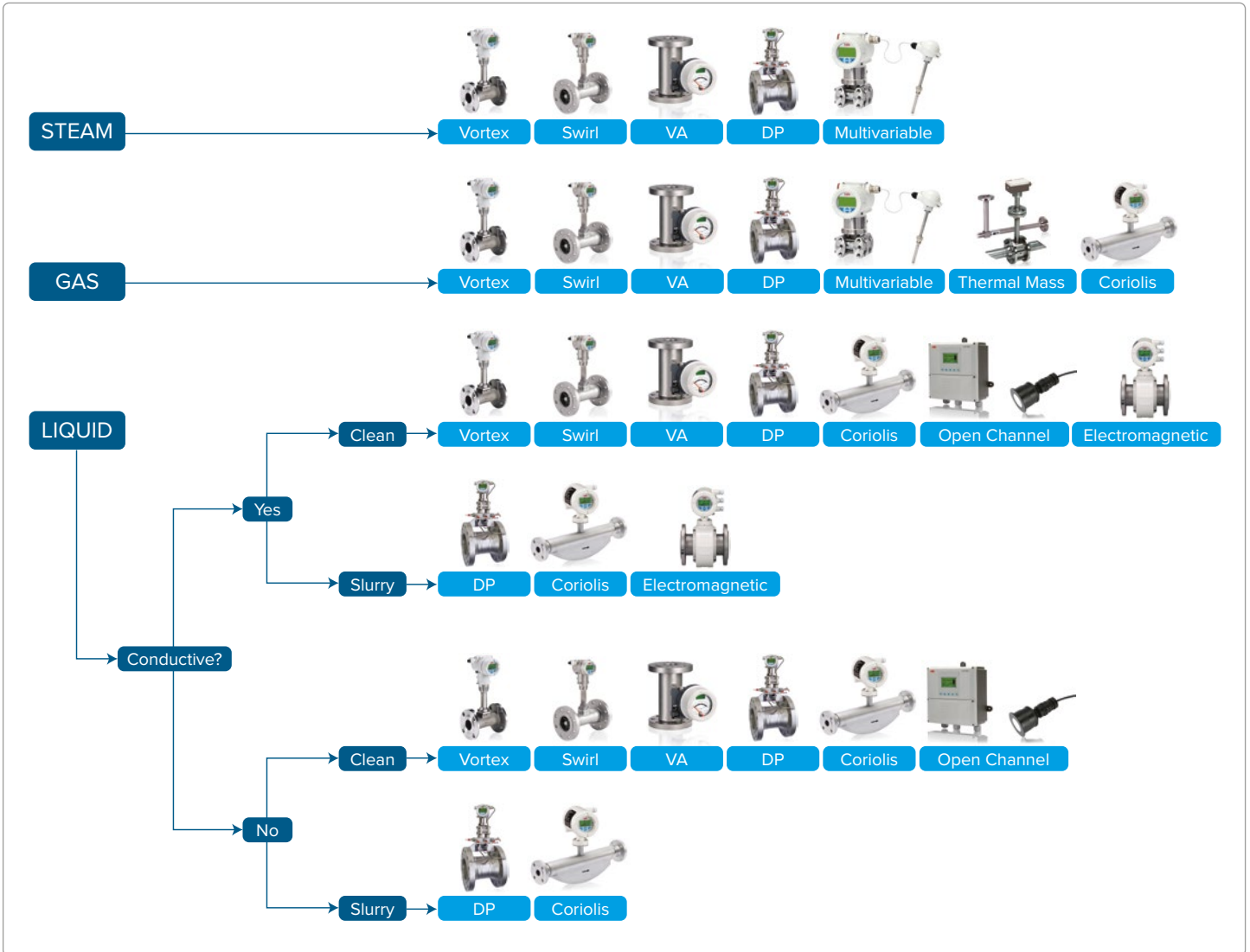






# ABB FLOW MEASUREMENT SELECTION GUIDE



|                 |  | Process Temp °C | Ambient Temp °C | Accuracy                  | Turndown | Size Range                 | Up/Down Requirements       | Pressure Rating                 |
|-----------------|--|-----------------|-----------------|---------------------------|----------|----------------------------|----------------------------|---------------------------------|
| Vortex          |  | -55...400       | -55...70        | ±0.9% Gas<br>0.65% Liquid | 1:20     | DN15...DN300<br>½ to 12"   | 15D/5D                     | PN10...PN160<br>ASME 150...900  |
| Swirl           |  | -55...280       | -55...70        | ±0.5%                     | 1:25     | DN15...DN400<br>½ to 16"   | 3D/2D                      | PN10...PN40<br>ASME 150...300   |
| Variable Area   |  | -55...400       | -40...70        | 1.6%                      | 1:10     | DN15...DN100<br>½ to 4"    | 0D/0D                      | PN10...PN400<br>ASME 150...2500 |
| DP              |  | -50...1300      | -40...85        | 0.5%                      | 1:5      | DN15...DN5000<br>½ to 200" | 5D/3D                      | PN10...PN600<br>ASME 150...2500 |
| Coriolis        |  | -50...200       | -40...60        | 0.1% 1g/l                 | 1:100    | DN10...DN150<br>¼ to 6"    | 0D/0D                      | PN10...PN100<br>ASME 150...600  |
| Open Channel    |  | -20...50        | -20...50        | ±1%                       | 1:20     | N/A                        | N/A                        | Max pressure 4 bar              |
| Electromagnetic |  | -25...180       | -10...60        | ±0.4%                     | 1:100    | DN3...DN2000<br>¼ to 80"   | 3D/2D                      | PN10...PN100<br>ASME 150...600  |
| Thermal Mass    |  | -25...300       | -25...70        | ±1%                       | 1:150    | DN25...DN3000<br>1 to 120" | 15D/5D                     | PN40<br>ASME 150...300          |
| Multivariable   |  | -40...121       | -40...85        | ±0.75%                    | 1:100    | N/A                        | Meter technology dependant | PN100<br>ASME 600               |



# ABB ELECTROMAGNETIC FLOWMETERS



## Suitable for the Water and Wastewater Industries

### WaterMaster - Electromagnetic Flowmeter

#### Features

- OIML R49 and MID approved
- Superior control through advanced sensor design
- Submersible and buriable installation options
- Improved performance through digital signal processing (DSP)
- Intuitive navigation and configuration
- Speed, ease and security in the field
- Detailed diagnostics for rapid decision making
- Large sensor size ranges: 10mm to 2400mm



The WaterMaster flowmeter is the perfect fit for all water and waste water applications. The modular design concept offers flexibility, cost-saving operation and reliability while providing a long service life and exceptionally low maintenance. Integration into ABB asset management systems and use of the self-monitoring and diagnostic functions increase the plant availability and reduce downtimes.

WaterMaster's performance adheres to the most stringent global industry standards and is certified to key international approvals. It's rugged, robust and buriable sensors eliminate the need of expensive meter chambers. Thereby, WaterMaster flowmeters provide a long, productive and maintenance free asset life.

#### Additional features

- Revolutionary data storage enables transmitter interchange and commissioning without the need for re-configuration
- Self-calibrating transmitter with ultra-low temperature coefficient for highest accuracy
- 'Through-the-Glass' (TTG) configuration
- Smart key based functionality and 'easy setup' function
- VeriMaster in-situ verification software option enables the user to perform in situ verification of the flowmeter system
- Minimised downtime with replaceable electronics cartridges
- Type-approved to accuracy Class 1 and Class 2 for any pipe orientation and bidirectional flows
- Type P-approved continuous self-checking of the sensor and transmitter to ensure the highest accuracy and long term performance
- Optimised full-bore series for optimum turndown/low pressure drop, irrigation applications
- Full-bore series for general purpose water metering applications
- Buriable sensors eliminate need for costly chamber construction
- Reduced-bore series for high turn down applications



### AquaProbe - Insertion Electromagnetic Flowmeter

#### Features

- Hot tap 'fit and flow' installation
- Accuracy to  $\pm 2\%$
- 200mm to 8000mm line size
- Self-calibrating WaterMaster transmitter compatible
- Bi-directional
- Fully-submersible IP68
- AC power supply
- 3 year warranty



FEA100 insertion flowmeters are an economic alternative to full bore flowmeters. They comprise an electromagnetic sensing head mounted on the end of a support rod.

FEA100 finds applications in existing water distribution systems where provision for flow metering was not originally made and where a full bore flowmeter would be uneconomical. The assembly can be installed in existing pipelines without the need for major excavations or alterations to pipe work normally associated with the installation of full-bore meters.



### AquaMaster - Electromagnetic Flowmeter

#### Features

- OIML R49 and MID approved
- Renewable (solar/wind) energy option
- Integrated pressure measuring option
- Reduced-bore FER sensor size ranges: FER DN15 to 600mm
- Optional full-bore FEV DN40 to 200mm & FEF DN250 to 600mm
- Mains power with backup version available
- 5-year battery life (typical)
- Quad band GSM/SMS communication
- WITS verified
- Fit and flow
- Flow profile conditioning sensor

AquaMaster conforms to the latest international standards to meet increasing legislative demands for accurate flow metering. Its wide measuring range ensures peak daytime flows are accurately recorded and its exceptional low-flow performance aids network leak detection. Fit and flow for fool proof installation, all data is stored in the sensor to reduce on-site setup. AquaMaster's unique sensor design conditions the flow profile resulting in excellent meter performance in poor hydraulic installation conditions.





# ABB ELECTROMAGNETIC FLOWMETERS



## Suitable for the Process Industries

### ProcessMaster FEP300

#### Features

Excellent accuracies: Standard 0.4% of rate, optional 0.2% of rate  
 Nominal diameter: DN 3 to 2000  
 Process connection: Flange in accordance with DIN 2501 / EN 1092-1, ASME B16.5 / B16.47, JIS, AS2129  
 Nominal pressure: PN 10 to 100, ASME CL 150, 300, 600, 900, 1500, 2500  
 Lining: Hard/soft rubber, PTFE, PFA, ETFE, Linatex  
 Approvals: ATEX, IECEx, FM, cFM, NEPSI, GOST  
 Process diagnosis: Empty pipe and partially filling detection

The ProcessMaster has the industry's widest range of liners, electrodes and sizes combined with standard diagnosis, meeting the needs of even the most demanding process applications. Providing reliable measurement in sectors such as chemical, power, oil & gas, pulp & paper and metals & mining.

Available as integral mount design or remote mount design system. The meter comes with ScanMaster verification software option which allows the customer to perform in situ verification of the flowmeter and the plant.



### HygienicMaster FEH300 / FEH500

#### Features

Excellent accuracies: Standard 0.4% of rate, optional 0.2% of rate  
 Nominal diameter: DN 3 to 100  
 Process connection: Flange in accordance with DIN 2501 / EN 1092-1, ASME B16.5 / B16.47, JIS  
 Threaded pipe connection in accordance with DIN 11851, Weld stubs  
 Tri-Clamp in acc. with DIN 32676, ASME BPE  
 External thread in acc. with ISO228/DIN2999  
 PFA (vacuum tight)  
 Lining: Flange: Stainless steel  
 Process con. material: Variable process connections: 1.4404  
 Approvals: ATEX, IECEx, FM, cFM, NEPSI, GOST  
 Certificates: 3-A, FDA-approved material, EHEDG

The HygienicMaster FEH300 and FEH500 are designed specifically for the food & beverage, pharmaceutical and biotechnical industries.

Manufactured from FDA approved materials and certified in accordance with EHEDG and 3-A. The FEH500 offers the same advanced features as the FEP500 in a hygienic form.



### ProcessMaster FEP500

#### Features

Excellent accuracies: Standard 0.3% of rate, optional 0.2% of rate  
 Nominal diameter: DN 3 to 2000  
 Process connection: Flange in accordance with DIN 2501 / EN 1092-1, ASME B16.5 / B16.47, JIS, AS2129  
 Nominal pressure: PN 10 to 100, ASME CL 150, 300, 600, 900, 1500, 2500  
 Lining: Hard/soft rubber, PTFE, PFA, ETFE, Linatex  
 Approvals: ATEX, IECEx, FM, cFM, NEPSI, GOST  
 Special features: Batch functionality, presetting counter, overrun correction, external start/stop, batch end contact

The modular design of the ProcessMaster FEP500 enhanced version offers the industry's widest range of liners electrodes and sizes to meet the needs of even the most demanding process applications in sectors as diverse as chemical, power, oil & gas, pulp & paper and metals & mining.

Available as integral mount design or remote mount design system. The meter comes with the ScanMaster in situ verification software.



### FSM4000

#### Features

Nominal diameter: DN 3 to 1000  
 Nominal pressure: PN 10 to 40, ASME CL150, 300  
 Process connection: Flanges in accordance with DIN/EN, ASME  
 Liner material: PFA, PTFE, hard/soft rubber, ceramic carbide

The FSM4000 is the perfect fit for fluids with a high solids content, extremely low conductivity or pulsating flow as well as fluids with non-homogeneous conductivity in the process industry. It is a robust flowmeter for heavy duty applications. The design of the flowmeter offers a wide range of industry specific liners, electrodes and sizes.

The powerful transmitter is easy to use and provides a very stable signal output. This meter has an AC excited coil as opposed to the DC versions resulting in a measurement performance that is unsurpassed in applications with high contents of solids, high contents of pulp stock, pulsating flows or other noise.





# ABB VORTEX FLOWMETERS



## VortexMaster FSV430 - Vortex Flowmeter

### Features

Accuracy: Liquids  $\pm 0.65\%$  of rate, gas/steam  $\pm 0.9\%$  of rate  
 Approvals: ATEX, IECEx, cFMus, NEPSI  
 SIL2-certified in accordance with IEC 61508  
 Easy set-up function. Meter configuration through the front glass with closed cover.

Intuitive operation:



The VortexMaster FSV430 is available in flange-mount and wafer-type designs. Vortex meters are ideal for use on petro-chemical raw materials, demineralised water and for direct, cost-effective steam mass flow by using integral temperature measurement. Available in flange-mount and wafer-type.



## SwirlMaster FSS430 - Swirl Flowmeter

### Features

Accuracy:  $\pm 0.5\%$  of rate  
 Approvals: ATEX, IECEx, cFMus, NEPSI  
 SIL2-certified in accordance with IEC 61508  
 Only the shortest possible straight pipe lengths are required. Measuring ranges have been well adapted to the flow rates.

Easy assembly:



The SwirlMaster FSS430 is the basic meter for volume flow applications yet offers great flexibility in installation. Swirl flowmeters can be utilised for highly accurate measurement of the flow of gases, liquids and steam over many temperatures in almost any application.



## VortexMaster FSV450 - Vortex Flowmeter

### Features

In addition to the FSV430 (above)...

- Integrated flow measurement computer functionality
- Gas standard volume and mass flow
- Vapour mass flow, direct energy calculation for vapour and water
- Natural gas calculation in accordance with AGA / SGERG standards



The VortexMaster FSV450 is the universal vortex meter for high end flow applications. Ideal for direct mass or standard flow of gases/liquids or direct mass and energy flow on saturated and overheated steam. It is the advanced version with additional analog input for mass or energy flow measurement.



## SwirlMaster FSS450 - Swirl Flowmeter

### Features

In addition to the FSS430 (above)...

- Integrated flow measurement computer functionality
- Gas standard volume and mass flow, vapour mass flow
- Direct energy calculation for vapour and water
- Natural gas calculation in accordance with AGA / SGERG standards



The SwirlMaster FSS450 is the advanced version with additional analog input for mass or energy flow measurement. Signals from remote sensors like pressure, temperature, density or gas content can be computed directly with the signals from internal flow and temperature.



## FV4000 - Vortex Flowmeter

### Features

Mount design: FV4000-VT4 compact, FV4000-VR4 remote  
 Measuring accuracy: Liquids  $\pm 0.75\%$ , gases/steam  $\pm 1.00\%$  of value  
 High dynamic range: 1:25  
 Measuring temp:  $-55^{\circ}\text{C}$  to  $280^{\circ}\text{C}$ . Extended range up to  $400^{\circ}\text{C}$   
 Approvals: ATEX, IECEx, FM, CSA  
 Optional: Integrated Pt100 for measuring saturated steam



The FV4000 Vortex flowmeter offers most reliable and stable flow measurement for liquids, gases and steam in volume and mass units employing integrated temperature measurement. In addition to fieldbus a freely configurable switching output is also available.



## FS4000 - Swirl Flowmeter

### Features

Mount design: FS4000-ST4 compact, FS4000-SR4 remote  
 High dynamic range: 1:25  
 Measuring temp:  $-55^{\circ}\text{C}$  to  $280^{\circ}\text{C}$   
 Approvals: ATEX, IECEx, FM, CSA  
 Optional: Integrated Pt100 for measuring saturated steam



The FS4000 Swirl flowmeter presents an economical solution for measuring low viscous liquids, gas and steam in volume and mass units employing integrated temperature measurement. In addition to fieldbus a freely configurable switching output is also available.





# ABB CORIOLIS FLOWMETERS



## FCB130 and FCB150 - CoriolisMaster

### Features

- Superior accuracy and speed for filling applications
- Full parameter access with up to 115 kBaud
- Aluminum housing or all stainless steel solution
- DTM based diagnostic and operability functions
- Accuracy for liquids:  
FCB130: Mass and volume: 0.4%/0.25%, density: 10g/l  
FCB150: Mass and volume: 0.15%/0.1%, density: 2g/l or 1g/l



The CoriolisMaster FCB100 series of compact system integration flowmeters feature low pressure drop, high flow capacity and two digital outputs. FCB150 adds DensiMass and FillMass software.



## FCH130 and FCH150 - CoriolisMaster

### Features

- EHEDG, hygienic certification
- Full parameter access with up to 115 kBaud
- Aluminum housing or all stainless steel solution
- DTM based diagnostic and operability functions
- Accuracy for liquids:  
FCH130: Mass and volume: 0.4%/0.25%, density: 10g/l  
FCH150: Mass and volume: 0.15%/0.1%, density: 2g/l or 1g/l



The FCH100 series offers on top EHEDG certified cleanability with polished wetted materials. They can be installed in the tightest spaces. FCH150 adds DensiMass and FillMass software.



## FCB430 and FCB450 - CoriolisMaster

### Features

- Accuracy for liquids and medium temperature:

#### FCB430

Mass/volume: 0.4%/0.25%/0.2%, density: 10g/l, temp: -50 to 160°C

#### FCB450

Mass/volume: 0.15 %/0.1 %, density: 2g/l or 1g/l, temp: -50 to 205°C



The CoriolisMaster FCB400 series is one of the most cost effective meters on the market today. Featuring a new electronics platform that features self-configuration, integrated accuracy verification, built-in valve control and many other smart tools.

The FCB450 adds DensiMass software for direct concentration measurement and FillMass software for filling application control.



## FCH430 and FCH450 - CoriolisMaster

### Features

- EHEDG, hygienic certification
- Accuracy for liquids and medium temperature:

#### FCH430

Mass/volume: 0.4%/0.25%/0.2%, density: 10g/l, temp: -50 to 160°C

#### FCH450

Mass/volume: 0.15 %/0.1 %, density: 2g/l or 1g/l, temp: -50 to 205°C



The CoriolisMaster FCH400 series of compact mass flowmeters for hygienic applications, with five modular I/Os. With no up or down stream piping requirements the compact coriolis flowmeters can be installed in the tightest spaces, enabling applications not previously possible.

The FCH450 adds DensiMass software for direct concentration measurement and FillMass software for filling application control.





# ABB VARIABLE AREA FLOWMETERS



ABB's VA meters are still popular for many flow applications after all these years. Why?

- They are pre-calibrated before they leave the factory
- Once delivered they are very easy to install
- Maintenance is very simple due to their excellent design
- ABB's VA meters have common parts minimising stocking requirements

Many are discovering that ABB VA meters provide cost effective flow measurement for many applications. Why?

- All ABB VA meters are low cost compared to other flow measurement devices
- Very low installation costs; no upstream/downstream straight piping requirements
- Plus their reliability combines for an extremely low cost of ownership
- Long life expectancy also brings low life-cycle cost

## VA Master FAM540

The armoured VA meter is ideal for the chemical, pharmaceutical and food industries. It is exceptionally successful at metering aggressive or opaque fluids or where glass tube variable area flowmeters are not appropriate for safety reasons.

- Short, straight-through design for easy installation
- Optional: PTFE lining and PTFE float for maximum corrosion resistance, 4...20 mA transmitter output, minimum  $\pm$  / or maximum alarms, graphical display, HART communications

### Typical industry applications:

- Deionization, water purification and waste water treatment
- Gas sampling systems and nitrogen generators
- Power utility applications, cooling water and burner control
- Corrosive liquids and chemical injection
- Food and beverage applications



## Armoured Purgemeter FAM3200

Suitable for most low flow, high pressure and corrosive applications.

Used for gas analyser systems, various sampling systems and situations where glass meter tubes are not appropriate for safety reasons.

- Measures even dirty and corrosive gases or liquids.
- Optional: 4...20 mA transmitter output, minimum  $\pm$  / or maximum alarms

### Typical industry applications:

- Water purification
- Chemical injection
- Gas sampling systems
- Food and beverage applications
- Burner control
- Nitrogen generators



## PurgeMaster FGM6100

Ideal for many low flow applications such as purging control lines and instrument enclosures. Excellent for fluid sampling, liquid specific gravity and level measurements.

- Simple snap-in tube construction minimises downtime for cleaning and replacement
- Internal back-check to restrict backflow and draining when tube is removed
- Optional: one or two bi-stable alarms for contact closure (or opening) on rising or falling flow

### Typical industry applications:

- Aeration
- Gas sampling systems
- Purging applications
- Burner control
- Level measurement



## VA Master Glass Tube Meters

Used for a wide variety of liquids and gases in most industrial processes.

Monitors natural gas flows into ovens, furnaces, cooling fluids to protect equipment, sampling systems in laboratories and flow rates into and out of large tanks.

- Easy range change and cleaning - no removal from the line required
- Excellent visibility of flow rate over 12½ to 1 range on a linear scale
- Optional one or two bi-stable alarms for contact closure (or opening) on rising or falling flow

### Typical industry applications:

- Aeration
- Gas sampling systems
- Corrosive liquids
- Food & beverage applications
- Nitrogen generators
- Burner control





# ABB THERMAL MASS FLOWMETERS



## Sensyflow FMT200-D - Thermal Mass Flowmeter

### Features

- Threaded pipe conns: DN 25 to 80
- Quick response time: <0.5s
- Output: 0/4 to 20mA from sensor head
- High accuracy: <2% of rate
- Low pressure drop: 10mbar
- Maintenance-free: No moving parts, no wear



Sensyflow FMT200-D is for direct mass and standard volume flow measurement of compressed air and biogas.

The measurement is independent of operating pressure and temperature. With turndown ratio of 1:100, it allows metering and leakage detection together in one instrument.

The flowmeter sensor uses the hot film anemometer working principle. This method allows for direct measurement of the gas mass flow. As a result, the design excludes the need for pressure and temperature compensation which is normally required.

## Sensyflow FMT500-IG - Thermal Mass Flowmeter

### Features

- Wide measuring: 1:150
- Factory calibration: Process gas calibration with clean gases and gas mixtures
- High accuracy: <1% of rate
- Quick response time: <0.5s
- Output signal: 4 to 20mA, HART, PROFIBUS

Certification: ATEX certification for Zone 0 and 1 (gases) and 21 (dust)

Pipe components for: DN 25 to 200

Weld-on adapters for larger diameters and rectangular ducts



Sensyflow FMT500-IG is a digital mass flowmeter for air, gases and gas mixtures in process applications. The system is supplied with an LCD display, integrated gas temperature measurement and totaliser functions. The integral mount design of the metering system comprises a transmitter, flowmeter sensor and a pipe component. In the remote mount design the flowmeter sensor and the transmitter are connected via cable.



## Sensyflow FMT400 - Thermal Mass Flowmeter

### Features

- Pipe component conns: DN 25 to 200 standard version  
DN 25 to 80 hygienic version
- Output: 0/4 to 20mA from sensor head
- Hygienic versions available: CIP and SIP certified
- Heavy duty: Up to 300°C, maximum 40 bar
- Wide measuring range: 1:150
- Certifications: ATEX, Zone 2 and 22, CSA, GOST, DVGW



Sensyflow FMT400-VTS is a robust and variable designed flowmeter for direct mass flow measurement of gases and gas mixtures with known composition as process engineering version. Sensyflow FMT400-VTCS is the hygienic version for food and beverage and pharmaceuticals industries. It is suitable for CIP and SIP applications.

The devices of the Sensyflow FMT400-series operate according to the thermal measuring principle of a hot film anemometer. The measuring systems of the FMT400 series are made up of a transmitter, flowmeter sensor and a pipe component. The transmitter directly delivers an electrically isolated 0/4 to 20 mA output signal.



## Sensyflow FMT700-P - Thermal Mass Flowmeter

### Features

- Wide measuring range: 1:40
- Highest accuracy: <1% of measured value
- Quick response time: <12ms
- Maintenance-free: Detection of rapid load changes on engine test benches
- Nominal diameter: No moving parts, no wear, DN 25 to 200



Sensyflow FMT700-P is for direct mass flow measurement of air. The measurement is independent of operating pressure and temperature. It supplies best accuracy together with an unrivalled response time. Used in quality assurance, test bench applications, research and development.

It is the reference system for intake air measurement of the leading car manufacturers worldwide. The measuring system comprises a flowmeter sensor, a measuring section and a supply/evaluation unit.

The sensor is designed as a measuring tube and accommodates the sensor unit and an electronic transmitter circuit. It is available in various diameters and is installed in the measuring section using quick-clamping connectors.





# ABB DIFFERENTIAL PRESSURE FLOWMETERS



ABB Differential Pressure flow products provide world-class measurement solutions for any industry.

Latest innovations in DP primaries and transmitters deliver technological solutions to make it easier for you to run your plant efficiently and economically.

This results in products that are easy to configure, easy to integrate, and easy to maintain.

## Orifice Plates, Unions & Carriers

### Range includes:

- Paddle-type plates - square edged, quarter circle/conical, eccentric
- RTJ plates - with male or female process connections
- Orifice carriers - with integral tapping connections
- Orifice metering runs - with upstream/downstream pipe sections
- Complete Flanged Orifice Unions (Orifice Flange Assemblies)
  - with integral tapping connections
  - butt-weld or slip-on pipe connections
  - to ASME B16.36

Devices based on orifice plates remain one of the popular of flow metering technologies. As well as measuring flow, they are used to restrict the flowrate to a certain value or to reduce the pressure at a certain flowrate.



The technology is thoroughly proven and is available from ABB in a wide range of designs to suit most applications. From simple plates to metering runs ABB have an orifice plate, union or orifice carrier for all applications.

## Venturi Tubes

ABB Venturi tubes offer excellent resistance to wear and consequently require virtually no maintenance. They have a very long service life which is typically the whole life of the plant on which they are installed. They produce a low net pressure loss and therefore reduce energy costs by typically 20 to 25%, with a consequent reduction in greenhouse gas emissions. Wide range of sizes and materials to match application.



ABB are specialists in the engineering and supply of venturi tubes in the demanding applications found in oil and gas, petrochemicals and process industries. Many units are in use in Liquefied Natural Gas (LNG) plants, Gas to Liquids (GTL) processes and in refining.

ABB manufacture and supply the complete loop, from DP, pressure and temperature sensors and transmitters through to complete process automation systems.

## Torbar Averaging Pitot Tubes

High performance with minimal pressure loss.

Being insertion devices with a relatively small aspect ratio, Torbars incur a very low pressure loss and are also very economical both to purchase and install, especially in larger pipelines and rectangular ducts.

Torbars are also available in retractable versions, allowing insertion and withdrawal from a pipeline without draining the process fluid.

Torbars have unique sensor design features, offering more accurate and more stable measurement over a very wide flow range.

The torbar incurs a pressure loss many times lower than that of other DP devices, meaning that energy costs incurred in restoring the lost pressure are minimal. Installation is also much simpler as it typically only requires a single hole in the pipe wall.



## Wedge Meters

The ABB WedgeMeter product range is adaptable to almost any process condition or installation requirement.

Wedge meters are particularly suitable for fluids that are dirty, viscous, abrasive or with a tendency to foul, providing accurate measurements and resisting conditions that would normally wear the sensitive measurement surfaces found in orifice plate, turbine and cone meter or positive displacement meters. In addition they have the widest flow range of any DP-based flow device and require shorter upstream and downstream straight pipe lengths. The wedge element allows any solids or entrained gases to pass through the meter without hold-up.



Available with tapping designs that can accept remote seal elements, the WedgeMeter avoids the blockage of impulse lines and response time problems that other devices can encounter when metering slurries and viscous products.



# ABB DIFFERENTIAL PRESSURE FLOWMETERS



## Differential Transmitters

Please refer to our ABB Pressure Measurement brochure for more information on differential transmitters.



## Multivariable Transmitters

The multivariable transmitter measures and calculates the mass flow as a function of differential pressure DP as well as absolute pressure and the temperature. Therefore it should be used whenever DP flow measurement needs a compensation of temperature and pressure. The main advantage is to have just one single device in the field instead of several transmitters and a mass flow calculator.



The multivariable transmitter calculates the mass flow for gases, vapours and liquids with dynamic flow compensation directly from the three process variables of differential pressure, absolute pressure and temperature.

Flow measurement using differential pressure transmitters has proven its effectiveness in numerous applications over many years. Differential pressure transmitters are the most cost-effective alternative to other measurement methods when dealing with high pressures and/or temperatures or large pipeline sizes.

Wetted parts are available in almost any corrosion resistance for additional moderate investment. The transmitters require minimal maintenance. However, a change in the density of the measuring medium leads to a false measuring result with this type of flow measurement.

The 266-series multivariable transmitters from ABB, with advanced multisensor technology, are tailored specifically to meet these requirements. Differential pressure, process pressure and process temperature can be measured simultaneously. The quality of the measurement is considerably enhanced by a dynamic compensation that considers changes in density as well as variable flow parameters such as the flow coefficient, Reynolds number and pipe and orifice diameter.

The mass or standard volume flow of the measuring medium can be selected as the measurement result to be output; the heat flow can also be selected when measuring water or steam.

Using only one measuring device instead of three has considerable advantages for the user. Easy setup of the measuring point, and a reduced need for shut-off valves, process connections, electrical connections, cabling and I/O modules for transferring measurement results to higher-level systems - all of these factors combined result in potential cost savings of 30 to 40%.



## Compact Differential Pressure Flowmeters

ABB's Compact DP flowmeters are all one-piece assemblies that come fully factory configured and pressure tested, solving many of the problems associated with sizing, selection, installation and operation of conventional DP flow systems.

They combine all the major components needed into single assemblies, saving time and cost in the engineering and procurement processes, as well as eliminating the need for users to specify, source and install many separate components.



### OriMaster FPD500

OriMaster is a compact orifice flowmeter that combines a wafer-mounted orifice carrier, integral manifold and transmitter into a single, fully codable, orifice-based flowmeter.

OriMaster is supplied in two versions - one for volumetric flow and one for mass (or corrected volume) flow.



### PitoMaster FPD550

PitoMaster is a compact averaging pitot flowmeter that combines a threaded or flanged mounted insertion meter, an integral 3 or 5 valve manifold and a transmitter into a single, fully codable insertion flowmeter. It utilises ABB's new 266 series DP and multivariable transmitters, all of which have optional Through The Glass (TTG) technology, offering meter configuration without the need to remove the transmitter cover.

In addition there is the option of an alloy or stainless steel body. Being an insertion meter, it offers easy installation into existing pipelines, together with very low overall pressure losses.

### IOMaster FPD510 - Compact Orifice Flowmeter

A fully coded, one-piece flowmeter that combines the features and benefits of integral orifice metering with a 3 or 5 valve instrument manifold and the latest ABB DP and multivariable transmitters. IOMaster is available in sizes DN15, DN25 and DN40 and is designed for metering small flowrates of clean liquids or gases in relatively small pipelines. OriMaster is supplied in two versions - one for volumetric flow and one for mass (or corrected volume) flow.



### WedgeMaster FPD570 - Compact Wedge Meter

WedgeMaster compact wedge flowmeters offer a focus on providing solution-solving flowmeter systems, coupled to the latest in ABB transmitter technology. WedgeMaster has no moving parts and no tendency to wear or foul. WedgeMaster devices are the logical choice when there are concerns over meter performance and longevity. In addition, WedgeMaster performs at very low Reynolds Numbers and with short upstream straight pipe lengths.



# ABB OPEN CHANNEL FLOW MEASUREMENT



## LST300 - Compact Ultrasonic Level Transmitter

### Features

- Maintenance free, non-contact continuous level sensor
- 2-wire instrument with HART digital communication
- Up to 10m measurement range
- Wide temperature range of -40 to 85°C
- Accuracy of  $\pm 2\text{mm}$
- Beam angle as low as  $5^\circ$  with false echo filtering for narrow spaces
- Easy installation with graphic echo display, advanced diagnostic and easy setup menu
- Unique GAP technology ensures the best performance under any condition
- IP66/67 and NEMA 4X (can submerge to 1 m depth for 30 minutes)
- ATEX, IEC & FM Intrinsic safe and non-sparking approved

The LST300 is a high performance ultrasonic level transmitter that accurately measures open channel flow in ranges up to 10m. It is a non-contact, level measuring instrument designed for use on liquid level in a wide range of applications and industries.

LST300 represents the future of level measurement. While using intelligent compact transmitters has always been attractive, certain limitations prevented their use in many applications. LST300 removes those old obstacles. Whether you have the risk of flooding or corrosive materials in the process, LST300 survive these conditions easily. With metal at the top and PVDF at the bottom, LST300 is the first compact ultrasonic to be resistant to corrosion on the entire instrument. Ingress protection approvals up to IP68 (optional) ensure the entire device can survive flooding.



LST300 combines the most advanced functions found on any ultrasonic in any class, in a compact form. Installation becomes easy thanks to the graphic echo display and advanced diagnostics. The false echo filtering algorithm combined with the best-in-class beam angle ensures easy installation in narrow areas with many obstructions.

With through the glass technology, you never have to open the cover to configure the instrument. It is hard to believe that all this functionality is available on a device powered by only two-wire loop power.



## LST400 - Ultrasonic Level Transmitter

### Features

- Range to 50ft / 15m
- Isolated 4-20mA output with HART 7
- Graphic LCD display
- Integrated analytical software
- 5 configurable relays / 8Amp
- Configurable as open channel flowmeter
- Pump cycling
- Pump monitoring
- Narrow beam angle makes installation easy, even in small channels
- Built in totalisation function makes it easy to keep track of total volumes over a long period of time
- Open channel flow measurement in either V-Notch, flumes or weirs systems

The LST400 is an ultrasonic level transmitter capable of measuring liquid level up to 15 meters or flow rates in all types of open channel flow applications. The transmitter has a single 4-20mA DC analog output with HART 7 and five relay outputs.

A transducer is fitted above the surface, facing down towards the material being measured. The open channel flow meter uses a level measurement from the sensor and converts this reading into a flow measurement.

Temperature compensation is standard on all instruments, resulting in reliable and accurate measurement in changing ambient conditions



The transmitter's microprocessor simultaneously fires an electronic pulse to the transducer and starts a timer. The transducer converts this electronic pulse to an acoustic pulse, which is directed toward the surface of the material being measured.

When the acoustic pulse contacts the surface of the material, energy is reflected back to the transducer, which converts this reflected energy back to an electronic pulse. This pulse is sent back to the microprocessor, which stops the timer and determines the "time of flight" of the signal.

By combining the speed of sound through air and the "time of flight" of the pulse, the microprocessor accurately determines the level of the product. Powerful software removes false echoes from the signal and electronic filters remove ambient noise.





**W H Good Automation Ltd**  
Carrs Industrial Estate  
Haslingden  
Rossendale  
Lancashire  
BB4 5JT

**Tel** 01706 216667  
**Email** [instruments@whgood.co.uk](mailto:instruments@whgood.co.uk)  
**Web** [whgood.co.uk](http://whgood.co.uk)