



# Heat Metering Technology Selection (and getting it right first time)

WATER

HEAT

AMR / BILLING

CONTROLS

ELECTRICITY

GAS

# DMS Company Overview

- Established in 1999, with sustained growth for over 20 years.
- Primarily a provider of multi utility metering solutions to the Building Services, Facilities, Renewables & Energy Management sectors
- Business founded on the premise of providing best in class customer service and technical support with a unique product range
- Exclusive UK supply arrangements with world leading manufacturers



- Next day delivery
- Same day quotations
- Dedicated technical support
- On site technical support
- Commissioning
- Product and application training
- Nationwide coverage
- Centrally located (Nottinghamshire)

WATER

HEAT

AMR / BILLING

CONTROLS

ELECTRICITY

GAS

# DMS Key Products & Services

**DMS**  
METERING  
SOLUTIONS

## Metering:

- Heat / Energy
- Water
- Gas
- Electricity
- Oil
- Steam
- Compressed Air
- Non invasive
- Specialist
- Ancillaries

## Solutions:

- AMR
- Billing
- Prepayment
- Heat Cost Allocation

## Services:

- On site support
- Commissioning
- Refurbishment
- Site assessments

**Sontex**

  
**APATOR**  
POWOGAZ

**Honeywell**

**Itron**

**SIEMENS**



WATER

HEAT

AMR / BILLING

CONTROLS

ELECTRICITY

GAS

# Agenda:

- **Heat / Energy Meter Size Ranges**
- **UK Regulations for Heat / Energy Meters**
- **Heat / Energy Meter Typical Applications**
- **Mechanical Heat / Energy Meters – Technology and Pro's / Cons**
- **Ultrasonic Heat / Energy Meters – Technology and Pro's / Cons**
- **Superstatic Heat / Energy Meters – Technology and Pro's / Cons**
- **Heat / Energy Meter Power Options**
- **Heat / Energy Meter Typical Display Data**
- **Heat / Energy Meter Output Options**
- **Heat / Energy Meter Technology Selection**
- **Heat / Energy Meter Installation**
- **Heat / Energy Temperature Sensors**
- **Check list**

WATER

HEAT

AMR / BILLING

CONTROLS

ELECTRICITY

GAS

# Heat Meter Ranges:

## Compact Meters

- Typically for domestic applications
- Usually battery powered
- 15-20mm connection
- Typically M-Bus or Pulsed Output
- Can be composite or Brass flow part



## Commercial / Industrial Meters

- Full size range from 15mm – 500mm
- Can be mains, 24v or battery powered
- Heat mounted or remote calculator
- Mainly Brass flow parts
- Multiple output and data options



WATER

HEAT

AMR / BILLING

CONTROLS

ELECTRICITY

GAS

# UK Heat Meter Regulations

- For any non domestic application where the meter will be used for Billing (including sub metering) the meter must be MID Class 2 approved - Class 3 is not suitable.
- Class 3 meters can be used for domestic billing



- Heat meters used for non domestic RHI (Renewable Heat Incentive) must also comply with accuracy class 2 or better of the Measuring instrument directive(MID)



WATER

HEAT

AMR / BILLING

CONTROLS

ELECTRICITY

GAS

# Heat / Energy Meter Applications

## Heating Systems

Low Temperature Hot Water (LTHW)

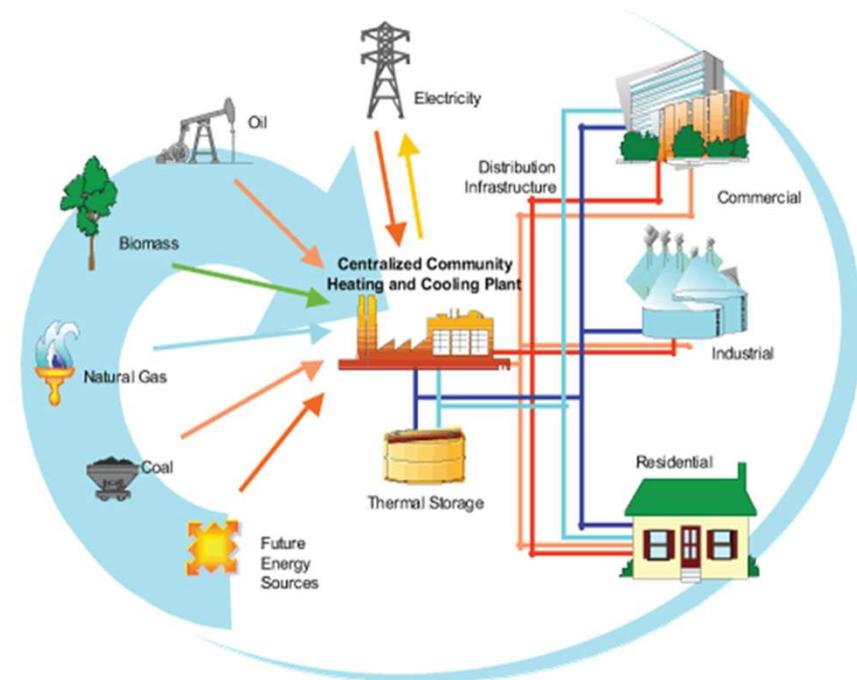
Medium Temperature Hot Water (MTHW)

Chilled Water (CHW)



## Heating Systems

District & Communal Heating



WATER

HEAT

AMR / BILLING

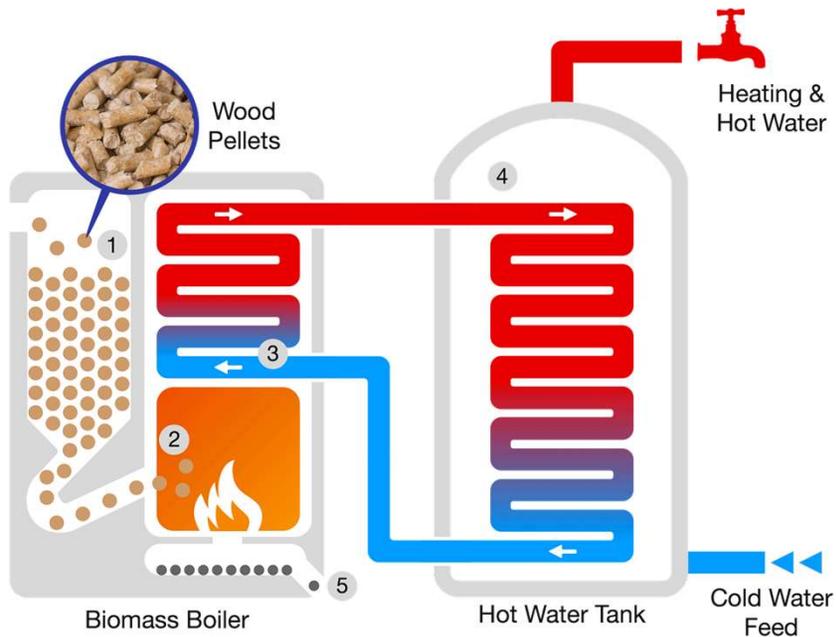
CONTROLS

ELECTRICITY

GAS

# Heat / Energy Meter Applications

## Biomass



## Heat Interface Units (HIU's)



WATER

HEAT

AMR / BILLING

CONTROLS

ELECTRICITY

GAS

# Heat / Energy Meter Applications

- Heat Pumps - Ground Source (GSHP)**
- Air Source (ASHP)**
- Water Source (WSHP)**



WATER

HEAT

AMR / BILLING

CONTROLS

ELECTRICITY

GAS

# Heat Meter Technologies

## Mechanical:

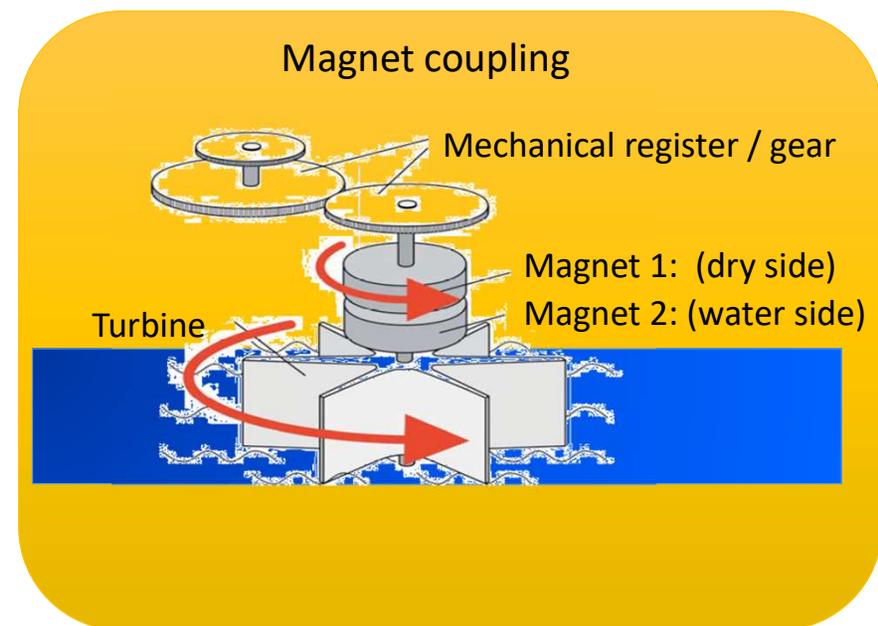
**Principle:** A traditional pulsed mechanical water meter supplied with a separate integrator for energy calculation

**Approval Rating** Class 3 MID (due to the Class 3 rating on the mechanical meter)

**Billing Approved** Not for non domestic

**RHI Approved** Not for non domestic

**Power Supply** Battery / Mains



WATER

HEAT

AMR / BILLING

CONTROLS

ELECTRICITY

GAS

# Heat Meter Technologies

## Mechanical: - Pro's & Con's

Positive	Negative
Easy to replace – basic part of the flow unit can be changed very easily	Poor quality of the medium may distort the measuring result
Magnet free pickup	Deposits on moving parts and bearings
Good dynamic range	Smoothing paths are recommended
All pipe sizes covered DN15 to DN300	Filters are recommended
	Small particles may damage the impeller over time (if not filters used – extra cost)
	Works on pulsed output to the integrator, which limits accuracy and can be distorted by missing pulses / bouncing

WATER

HEAT

AMR / BILLING

CONTROLS

ELECTRICITY

GAS

# Heat Meter Technologies

## Ultrasonic:

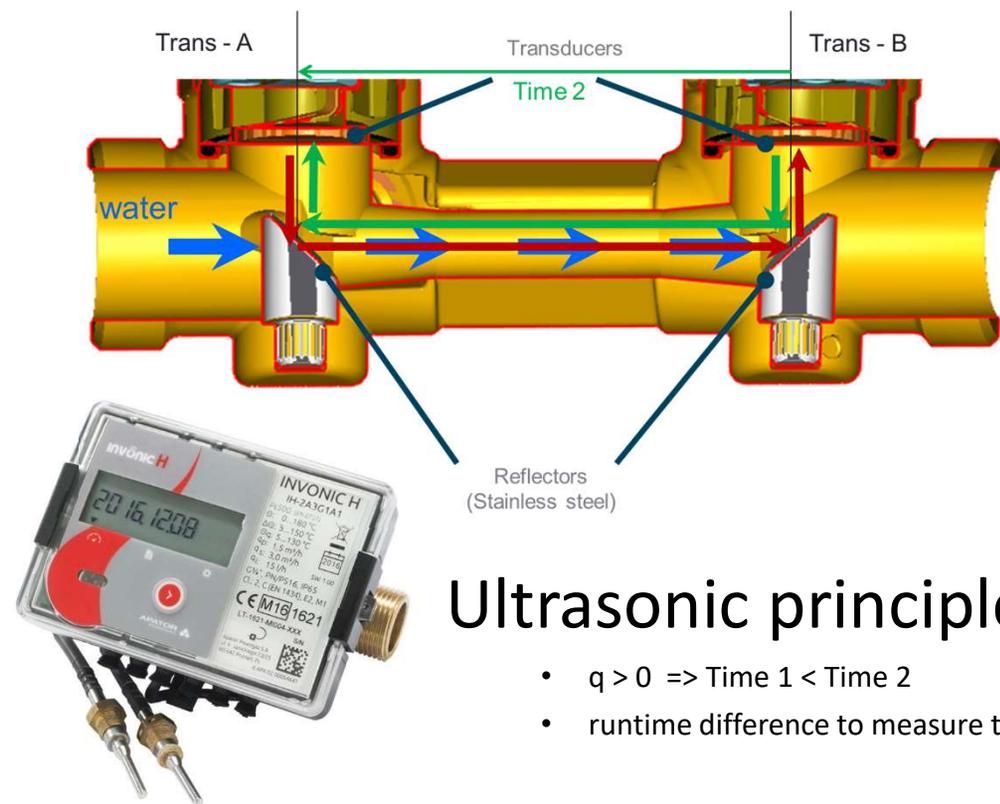
**Principle:** working on the Doppler frequency sensors installed in upstream and down stream picking up flow and disturbance along the pipe and compensated by a temperature sensor.

**Approval Rating** Class 2 MID

**Billing Approved** Yes

**RHI Approved** Yes

**Power Supply** Battery / Mains



## Ultrasonic principle

- $q > 0 \Rightarrow \text{Time 1} < \text{Time 2}$
- runtime difference to measure the flow

WATER

HEAT

AMR / BILLING

CONTROLS

ELECTRICITY

GAS

# Heat Meter Technologies

## Ultrasonic: - Pro's & Con's

Positive	Negative
No moving parts, long term stable measurement	Relative large pressure loss (depending to the application)
No smoothing path required (straight length of pipe – certain sizes)	Expensive maintenance cost (replacement of whole meter only)
Complete flow range of 0.6... 1000m <sup>3</sup> /h	Sensitive to particles and entrapped air
Horizontal and vertical installation possible	Each measurement principle must be analysed individually (re-calibration)
Wide range of communication options	Measuring problems with low pressure 1.5Bar <
	Will not work with Glycol systems above 15% saturation

WATER

HEAT

AMR / BILLING

CONTROLS

ELECTRICITY

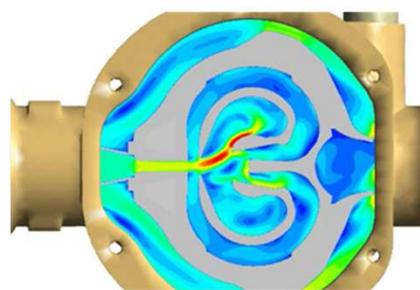
GAS

# Heat Meter Technologies

## Superstatic:

**Principle:** The main part of the flow passes through a Venturi nozzle in the pipe, creating the differential pressure to bypass the other part of the flow through the fluid oscillator. pressure oscillations are converted into an electric signal by a piezo sensor and detected by the integrator

**Approval Rating** Class 2 MID  
**Billing Approved** Yes  
**RHI Approved** Yes  
**Power Supply** Battery / Mains



WATER

HEAT

AMR / BILLING

CONTROLS

ELECTRICITY

GAS

# Heat Meter Technologies

## Superstatic: - Pro's & Con's

Positive	Negative
No moving parts, long term stable measurement	Limited flow options in relation to pipe sizes
No affect from pressure impacts and/or particles within the flow	Measurement in 1 direction
Low maintenance cost - common spare parts for all sizes	Higher weight flow part
Medium-independent measurement possible (glycol tolerant up to 75%)	
For recalibration the measuring head only can be exchanged.	
Complete flow range of 1... 1,500m <sup>3</sup> /h & wide range of communication options	

WATER

HEAT

AMR / BILLING

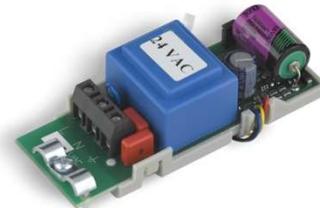
CONTROLS

ELECTRICITY

GAS

# Heat / Energy Meter Power Options

- Compact:** - 6 or 12 year battery
- Commercial & Industrial**
- 6 + 1 year battery “type C”
  - 11 + 1 year battery “type D”
  - 230VAC 45/65 Hz or 115VAC 45/65 Hz
  - 24VAC 45/65 Hz or 12 – 24VDC
  - 230VAC / 24VAC Switching Power Supply



WATER

HEAT

AMR / BILLING

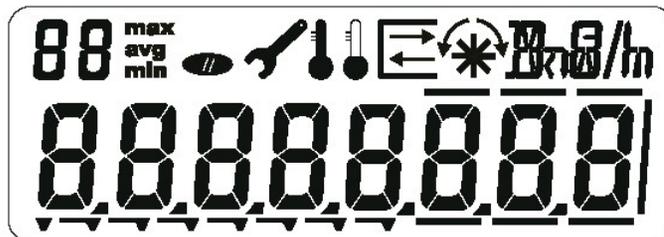
CONTROLS

ELECTRICITY

GAS

## Typical Display Data:

- Verification- and measurement relevant part
- Pt100 / 500
- Optical interface according to IEC1107
- Large and clear LCD-display
- Two operation push buttons
- Non-volatile-memory EEPROM
- Buffered Clock
- Connection for the basic integrator part
- Integrator for heat or flow meter
- 2 set days with date
- 15 monthly values (Energy and Volume)
- 32 maximum values with date and time
- 32 average values



WATER

HEAT

AMR / BILLING

CONTROLS

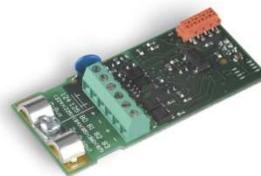
ELECTRICITY

GAS

# Typical Outputs & Protocols:

Universal and flexible communication modules

- Optical for local data readout
- M-Bus Factory Fit or Retro-Fit Cards
- 2 passive analogue outputs 4...20 mA or 0...10V (analogue output)
- MODBUS / BACnet for one or numerous meters to a BMS type system
- LON Works for one or numerous meters to a BMS type system
- Radio / Wireless M-Bus /Lora-mesh networks interface to a fixed or mobile network reader.
- Direct GSM or M-Bus to GSM devices for remote billing services



**M-Bus**



WATER

HEAT

AMR / BILLING

CONTROLS

ELECTRICITY

GAS

# Which technology to chose?

- Mechanical Heat Meters – Lower costs initially (non domestic only - domestic costs are similar to Ultrasonic / Superstatic)  
Not suitable for any non domestic applications which may in future be used for billing or part of any RHI biomass or heat pump application
- Ultrasonic Heat Meters – Long term reliability within heating and cooling systems. Different models required to cover heating, cooling and combined systems, with some limitations on glycol applications
- Superstatic Heat Meters – Long term reliability within heating and cooling systems. Same model covers heating, cooling and combined systems, removing any issues with mixing meters on site (software changes required). Suitable for glycol up to 75%.

WATER

HEAT

AMR / BILLING

CONTROLS

ELECTRICITY

GAS

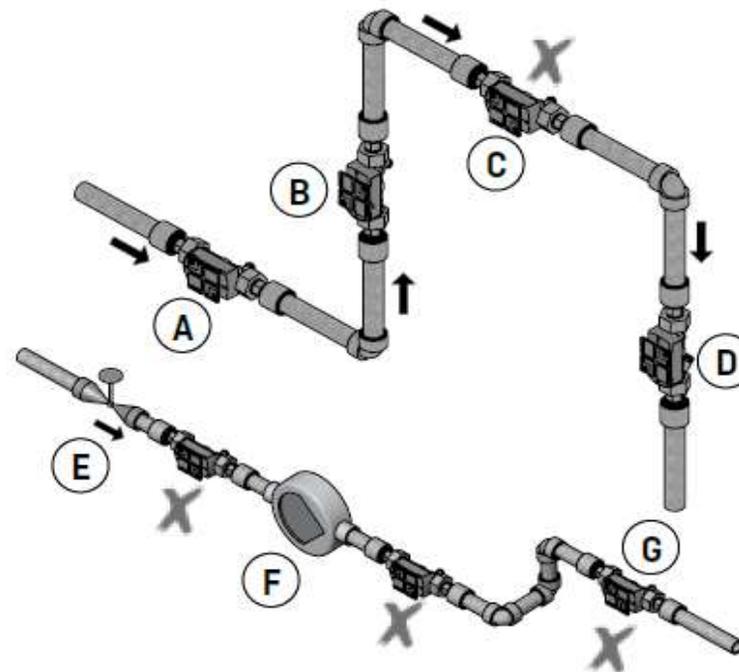
# Typical Heat Meter Installation

## Flow sensor position

Measuring Instruments Directive (MID) 2014/32/EU, OIML R75:2002 and EN 1434:2015.

A straight inlet section will only be necessary in case of heavy flow disturbances before the meter. It is recommended to follow the guidelines of CEN CR 13582.

- A** Recommended position.
- B** Recommended position.
- C** Unacceptable position due to risk of air build-up.
- D** Acceptable position in closed systems.
- E** Ought not to be placed immediately after a valve, with the exception of block valves (ball valve type) which must be fully open when not used for blocking.
- F** Ought not to be placed immediately before or after a pump.
- G** Ought not to be placed immediately after a double bend in two planes.



WATER

HEAT

AMR / BILLING

CONTROLS

ELECTRICITY

GAS

# Temperature Sensors

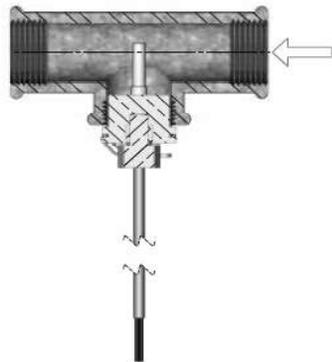
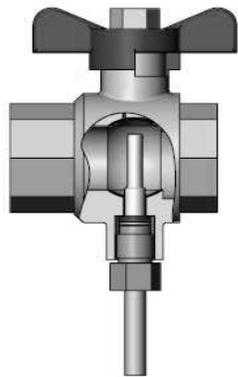
Domestic Standards – DN15 to DN20 Direct Mount

Commercial – DN25 to DN80 Dry Type Pockets

Industrial – DN100 to DN500 Dry Type Pockets

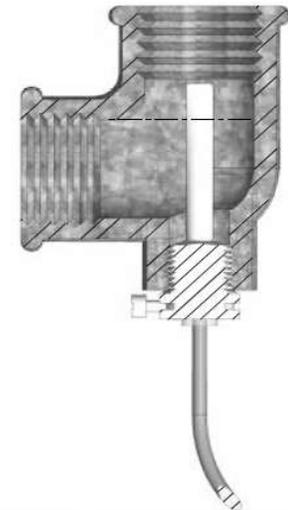
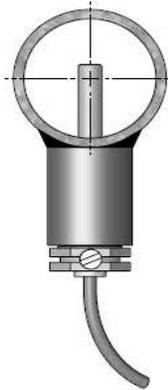
## Short direct sensor (DS)

The short, direct sensors up to DN20 can be mounted in special ball valves with built-in M 10 socket for the short direct sensor. They can also be mounted in installations with standard tee-pieces. R $\frac{1}{2}$  and R $\frac{3}{4}$  brass nipples that fit our short direct sensors. The short direct sensor can be also be mounted directly in selected flow sensors.



## Pocket sensor (PL)

The sensor pockets can be mounted in e.g. a welding sleeve or in a 45° lateral Y-piece. The tip of the sensor pocket must be placed in the middle of the flow. Push the temperature sensors as deep as possible into the pockets. If a short response time is required, "non-hardening" thermally conductive paste can be used. Push the plastic sleeve on the sensor cable into the sensor pocket and secure the cable by means of the enclosed M4 sealing screw. Fasten the screw with your fingers only. Seal the pockets using seal and locking wire.



WATER

HEAT

AMR / BILLING

CONTROLS

ELECTRICITY

GAS

# Heat Meter Check List

1. **Heat Meter** Static, Ultrasonic or Mechanical?
2. **Application:** CHW / LTHW / MTHW etc
3. **Approval Requirements** MID Class 2 or MID Class 3?
4. **Is glycol present** Brand / type and percentage concentration required?
5. **Meter Application** Residential or Industrial & Commercial?
6. **Pipe Size and/or Flow Rates?** Required for sizing
7. **Meter Position** Flow or Return?
8. **Power** 230V Mains / 24VAC / Battery / M-Bus Powered Loop
9. **Communication** M-Bus (wired / wireless) / Pulsed Output / MODBUS etc
10. **Temperature Sensors**
  - Dry Pockets or Short Direct Mount?
  - For Pocket - Ensure the tip of the sensor touches the bottom of the pocket
  - For Direct - Ensure the tip of the sensor is in the middle of the pipe work

WATER

HEAT

AMR / BILLING

CONTROLS

ELECTRICITY

GAS



From Product & Solution Specification,  
through to Supply, Commissioning  
& Ongoing Support

Tel: 01773 534555  
E-mail: [sales@dmsltd.com](mailto:sales@dmsltd.com)  
Web [www.dmsltd.com](http://www.dmsltd.com)

WATER

HEAT

AMR / BILLING

CONTROLS

ELECTRICITY

GAS



■ Thermal Energy ■ Flow Metering ■

**DMS**  
METERING  
SOLUTIONS



**Based in the heart  
of “Watch Valley”  
in Switzerland**



■ Thermal Energy ■ Flow Metering ■

**DMS**  
METERING  
SOLUTIONS

## • Sontex - our roots

- Founded in 1989 by a MBO of the heat meter division of the company Sonceboz SA
- Privately held, the ownership structure is unchanged and guarantees high stability and willingness to invest
- Sontex is globally active through partners and grows 10-15% p.a.
- Sontex currently employs more than 160 persons
- Our plant has 4000m<sup>2</sup> floor space

## • Sontex competences

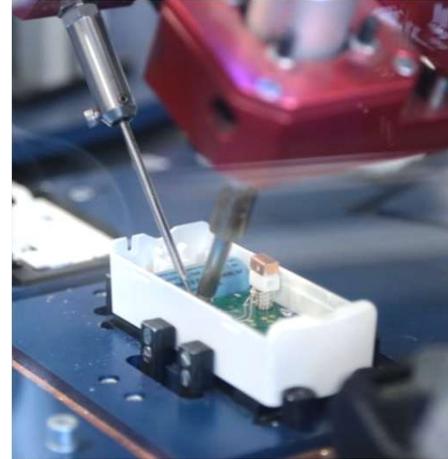
Competences to ensure the success in our markets:

- Precise measuring and low consumption electronic
- Static flow measuring
- Temperature measurement and calculation
- Communication technologies
- Different programming languages
- Certified calibration laboratory for quantities of heat
- MID Module D (process)
- MID Module B (products)
- ISO 9001

# Sontex

■ Thermal Energy ■ Flow Metering ■

## Manufacturing Excellence



**DMS**  
METERING  
SOLUTIONS



**Sontex**

## Fluidic Oscillation Energy Meters

Superstatic 789

High-Tech Composite

Compact, light, precise

qp 1,5 - qp 2,5 m<sup>3</sup>/h



Superstatic 749

Brass

Compact robust

qp 0,6 - qp 2,5 m<sup>3</sup>/h



Superstatic 440

Brass, cast iron, stainless steel

Full fledged functionality

qp 1,5 - qp 1500 m<sup>3</sup>/h

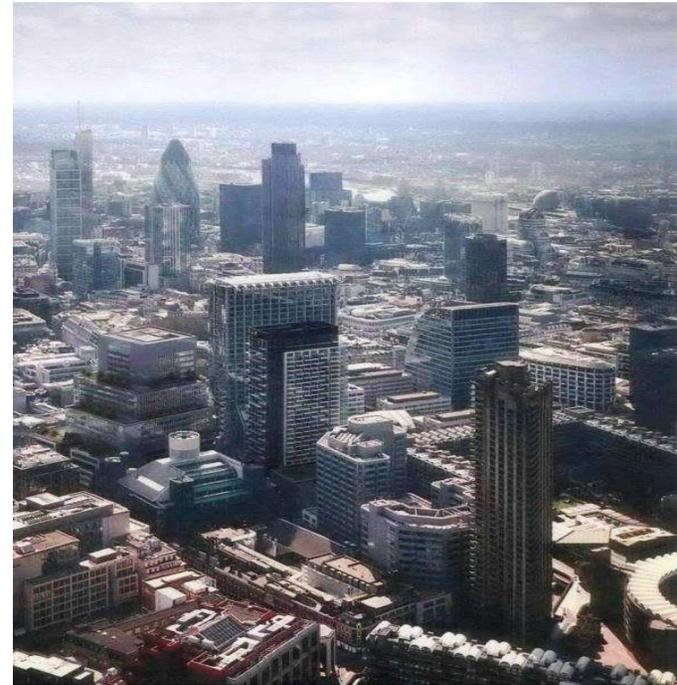


## The Benefits

- Complete range of flows qp 1 - 1500 m<sup>3</sup>/h, DN15 – DN500
- Same meter for horizontal, riser and downward pipes
- Operates independent of water impurities (self cleaning)
- Same meter for heating and cooling: -20°C – 130°C.
- The flow sensor can be fully insulated / wrapped (IP68).
- No reflection or misdirection of the signal (as with Ultrasonic's)
- Best result at AGFW durability test
- No influence on magnetite fouling
- Replaceable sensor head without removal of the pipe
- Operational already from 0,5 bar
- No moving parts / No parts in the pipe
- More than 80 cooling liquids (Glycols) programmed !



- DMS have supplied over 100,000 heat meters over the past 10 years into the UK market with a <math><0.1\%</math> fault rate. (c. 25% market share\*)
- **Duchy Of Cornwall – Mixed Sites Hereford**  
150x 749/440 Mixed Models
- **Milton Court - London:**  
20 Heat Meters Superstatic 440 M-Bus,  
600 Superstatic 749's
- **Jaguar Land Rover (Churchill Project)**  
60 Mixed - Superstatic 440 M-Bus  
& Mixed Water and Gas
- **Galliard Homes (multiple sites) - London**  
800 Superstatic 749/789's



\*Calculated based on market review