

Ultrasonic Flowmeters



MINISONIC® 600

Pipe sizes from DN 10 to DN 600 mm (liquids)

MINISONIC® 2000

Pipe sizes up to 3300 mm (liquids)

MINISONIC® G

Gas volume metering, DN size depending on pressure

MINISONIC® SPEED

Open channel velocity measurement

- ✓ Non invasive (clamp-on) probes (except G version) or intrusive (wetted) probes or spools
- ✓ Water resistant to IP 67
- ✓ On site “dry” calibration possible
- ✓ Automatic echo adjustment with ESC mode (Echo Shape Control)
- ✓ Low cost simple installation
- ✓ Virtually no maintenance required
- ✓ High accuracy with no drift over time
- ✓ Protection of flow total display, security locked converter cabinet with seals.

Principle

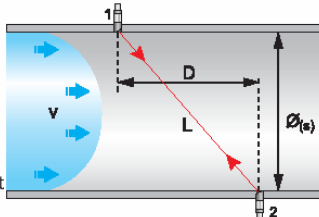
The MINISONIC calculates the speed (v), the flow (Q) and the volume (Vol) of a fluid by measuring the (Δt) difference of the transit time of ultrasonic waves ($t_{21} - t_{12}$):

$$\Delta t = t_{21} - t_{12}$$

$$Q = \frac{\pi \phi^2}{4} \times \frac{L^2}{2D} \times \frac{\Delta t}{t_{21} t_{12}} \times \frac{1}{Kh}$$

$$Vol = Q \times t$$

C : speed of sound in the fluid
Kh : hydraulic coefficient



Typical Applications *

- Water flow of all types of water : network (potable water, raw water, sewage) – pump metering
- Flow of various oil products – refined – crude oil – multi-product pipelines
- Petrochemical and food industries, process metering and control
- Replacement of outdated equipment – retrofit capability

* With exception for two phase or high viscosity liquids

Ultraflux

Ultrasonic Measurements

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flowline
SPECIALISTS IN FLOW MEASUREMENT

SYSTEM DESCRIPTION

New electronics incorporating a new digital signal and measurement processor, allows the MINISONIC range to suit most applications. The unit has an enhanced emission power, a greater receivable gain limit, and a better noise rejection (+20 to 30 dB at final measurement).

A single chord metering unit consists of one converter, two probes with supports and cable.

A dual chord version (two speed measurements on the same pipe) is suitable for hydraulically disturbed flows.

A dual pipe unit allows the flow measurement on two different pipes.

SPECIFICATION

- 2 lines LCD display – 16 characters – programmable - backlight
- Ergonomic keypad and menu configuration – access code if needed
- Dynamic gain up to 89 dB
- High resolution time measurement < 0.1 ns
- Echo analyser (ESC mode) and auto zero function : automatic mode when commissioning
- Multi-parameter outputs : flow, speed, gain, signal quality ratio, etc.
- Windows software PC LS_600 W for extended calibration, expertise and data saving.

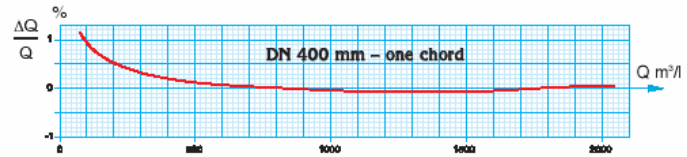
ESC MODE AND AUTOMATIC ZERO FLOW

The best accuracy is achieved with proper selection of probes together with a professional installation.

Good hydraulic conditions must be obtained:

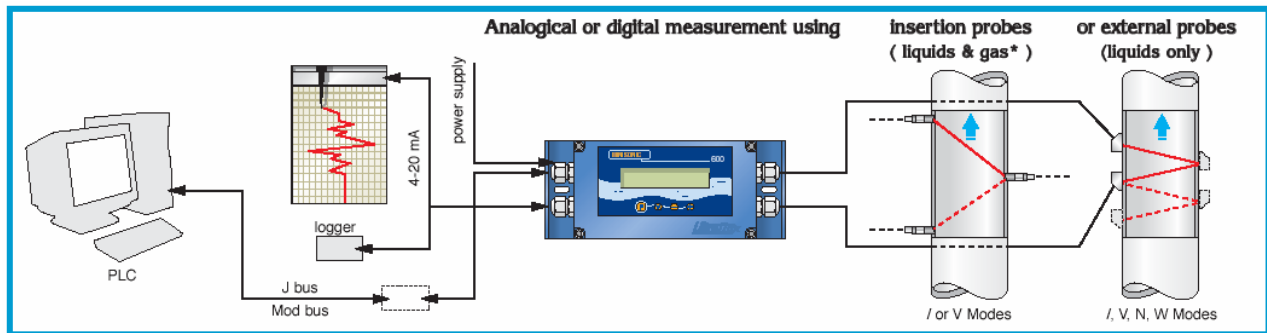
Upstream straight length > 20D minimum.

The ESC mode which acts as an “auto focus” for the ultrasonic signals optimises the global acoustic adjustment to ensure proper results.



PERFORMANCE

- Single chord system
 - Typical accuracy following dry calibration : 0.5% (DN > 100 mm) calibration curve can also be linearised
 - Practical uncertainty with common liquids (water, etc.):
 - DN ≤ 100 mm: +/- 2% if v > 0.3 m/s if not +/- 5 mm/s
 - DN > 100 mm: +/- 1% if v > 0.3 m/s if not +/- 2 mm/s
- Repeatability on test loop : 0.05%
- Bi-directional measurement +/- 15 m/s
- Total Volume metering. Choice of units from 1 cl to 100 m3
- Built-in correction for multi-product or for laminar/turbulent transitions flow.



ELECTRICAL SPECIFICATION

- CE
- Power supply : 9 – 36 VDC (option: 48 V) or 7 to 25 VAC – optional : external transformer 110 V or 230 VAC or internal supply 110V/220V/24V
- Isolated output current 4-20 mA (x2) – 1500 Ohm depending on supply current – active output wiring available (non isolated).
- Static relay (x2) 100 V / 100 mA / 10 VA max
- RS 232 or 485 output, 9600 Bauds maximum or JBus/ModBus protocol

Certifications

MINISONIC EXD : CE008^{Ex} II 2 g eeX D iic t6
 Probes CE0081^{Ex} II 2 G EEx m II T6
 EEx me II T6
 EEx md IIC T6
 Probes CE0081^{Ex} II 1 G EEx ia IIB T3 to T6
 Ultrasafe barrier : CE0081^{Ex} II (1) G [EEx ia] IIB

MECHANICAL SPECIFICATION

- Aluminium cabinet – epoxy coated.
- IP 67 protection – Ambient T° = -25 +50°C
- Size – Weight :
- Industrial type: 237 x 108 x 79 mm – 1.5Kg (wall or pipe mounting)
- Ex proof type: 244 x 130 x 232 mm – 6.6Kg
- Large range of probes IP 55 to IP 68, insertion or external – industrial support.

