



Ultraflux

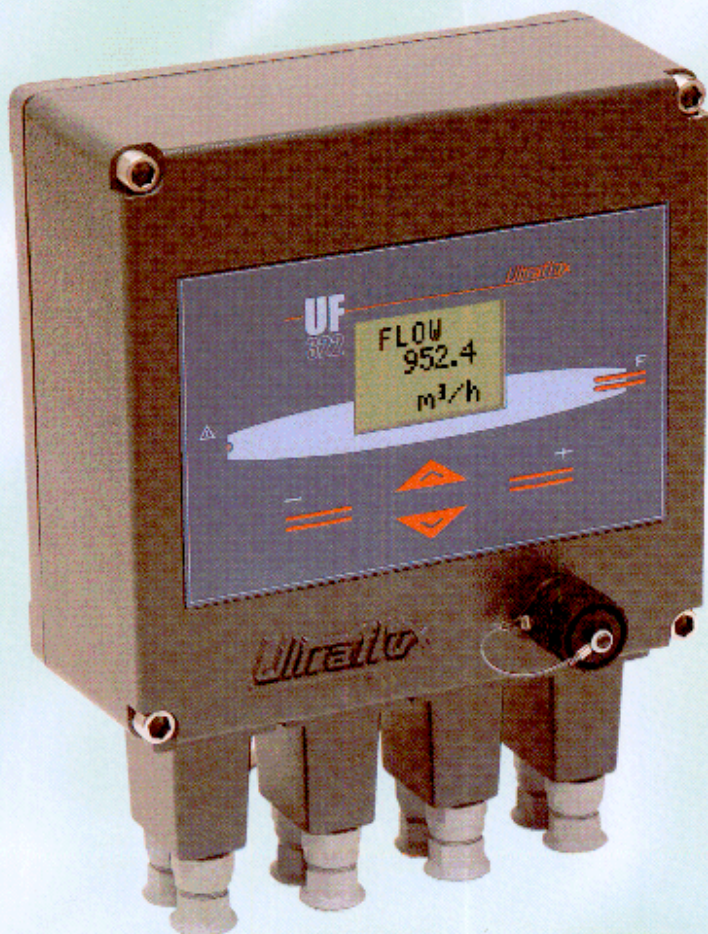
ULTRASONIC MEASUREMENTS

**DIGITAL
ULTRASONIC
FLOWMETER FOR
LIQUIDS OR GAS**

UF 322[®]
(L or G)

Digital Signal
Processing
applied to
flow metering

Single-chord and
dual-chord types



UF 322 flowmeters, like long-proven ULTRAFLUX instruments are based on the well-established ultrasonic time-of-flight difference principle.

Thanks to leading-edge components, even the most standard UF 322 offers you many handy functions including :

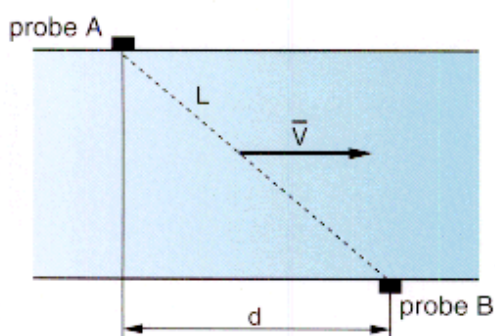
- memory (PCMCIA card),
- conditional totalisation,
- oscilloscope function.

Using innovative acoustic-signal processing techniques, UF 322 flowmeters deliver reliable measurements with unbeaten accuracy (time resolution of some 100 picoseconds).

Ergonomy and clarity of numerical and graphical screens make results very easy to exploit.

... These features combine to provide user-friendly and site-dedicated instruments.

TIME-OF-FLIGHT DIFFERENCE : A PRINCIPLE



- \bar{V} : mean fluid velocity along the chord AB
- L : length of the chord AB
- d : projection of L onto pipe axis
- t_{AB} : A to B transit-time
- t_{BA} : B to A transit-time
- $\Delta t = t_{AB} - t_{BA}$

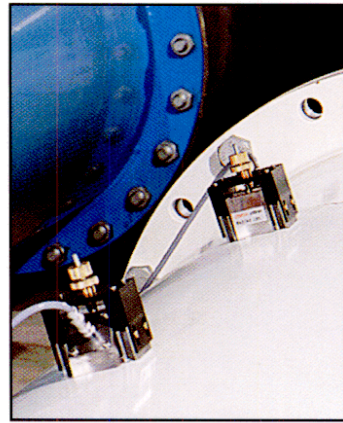
UF 322-1 (single-chord flowmeter) and, respectively, UF 322-2 (dual-chord flowmeter) measure the transit times of counter-propagating ultrasonic waves along one diametral chord and, respectively, two off-centered or diametral chords. Dual-chord systems help withstanding hydraulic disturbances.

As shown in the inset, the mean fluid velocity along each chord is then deduced from the transit times measured and their difference.

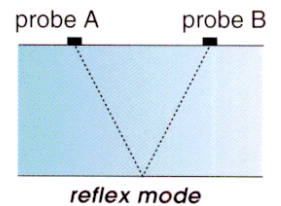
Knowing these velocities, the flowmeters calculate the average velocity over the measurement section, the flowrate and the volume (totalisation).

APPLICATIONS : MEASUREMENTS ON FULL PIPES

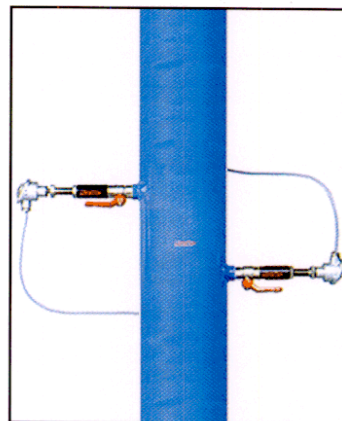
- The ultrasonic technique applies to most fluids, homogeneous or lightly charged, conductive or not, with moderate viscosity (< 500 cst).
- Making the most of their powerful processors, UF 322 flowmeters incorporate sophisticated signal processing techniques to adapt to difficult conditions of measurement.
- The range of measurement stretches from a few mm/s to over 10 m/s.
- UF 322 family accommodates the whole range of ULTRAFLUX clamp-on and wetted transducers. Clamp-on probes do not need pipe-drilling and are protected from pressure and temperature constraints. Wetted probes are designed to resist to difficult conditions (up to 100 bar and 200°C). They can be installed on pipes under pressure.
- Measurements perform on any kind of pipe (steel, metallic, plastic, fibro-cement ...) from 10 mm to 10 m in diameter. Wetted probes have to be used with most concrete pipes.



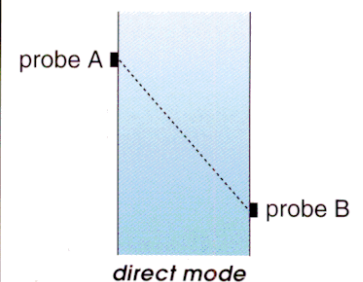
clamp-on probes



reflex mode



wetted probes



direct mode

EXAMPLES

- **Raw and drinking waters :**
Flowrate measurement and counting, process control, network management ...
- **Waste waters :**
Network control, monitoring of input and of output of station...
- **Energy :**
Counting for central heating and air-conditioning ...
- **Chemicals :**
Network and process regulation...
- **Foodstuffs**
- **Crude oil :**
Samplers control for loading or unloading analysis...
- **Refined petroleum products or liquified gas (LPG) :**
Network management...
- **Gas (high and medium pressures) :**
Network control... (intrusive probes)

MEASUREMENTS ON OPEN CHANNELS :

For monitoring rivers, irrigation or sewers, we also propose UF 322 CO. This ULTRAFLUX flowmeter is specially designed to fulfill the specific requirements of open channels. Please, contact our engineers for more information.

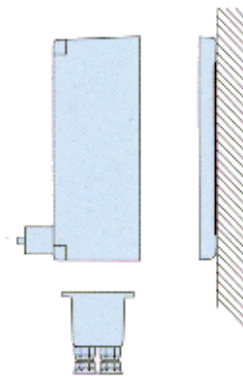
GENERAL CHARACTERISTICS

A CE PRODUCT : protected and non perturbing

A MODULAR CONCEPT :

Facilitated installation and maintenance

thanks to independent :
- wall-plate
- electronic set
- connection blocks



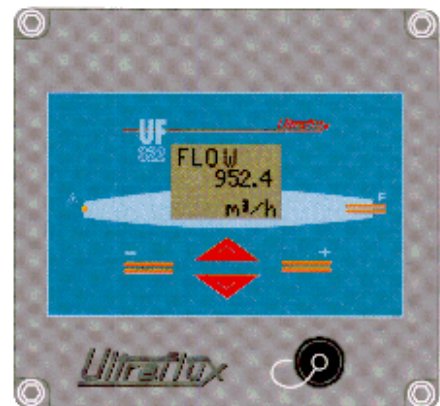
EASE OF USE

offered by ergonomic keyboard and software :

 Function key

 Shifts

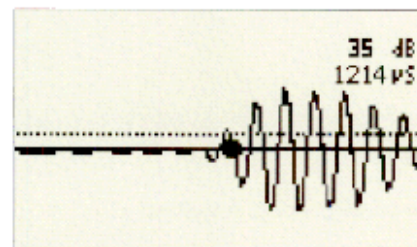
 Change over



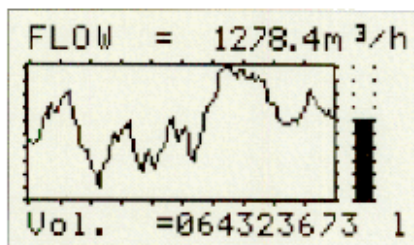
STRAIGHTFORWARD SCREENS :

```
Probaref.= 1595
Probe mounting = U
Nbr. of chords = 1
Ext.Diam= 114.5mm
Pipe = STEEL
Thickness= 7.1mm
O.C = 4/20(F)
```

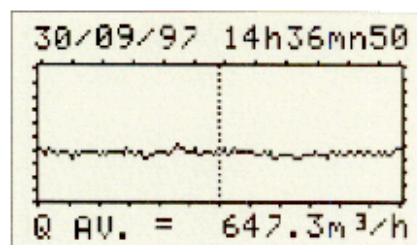
Calibration menu



Help for diagnostics and probes positioning :
echo display (oscilloscope function), default messages



Numerical or graphical readings
(flowrate, volume, flow velocity,
sound velocity, transit-time...)



Storage of measurements : date, time data logger
- 8064 lines of 4 variables (32640 in option) or
- 4032 lines of 9 variables (16200 in option)

RESOURCES :

o Connection to a PC or to a control unit

OPTIONS :

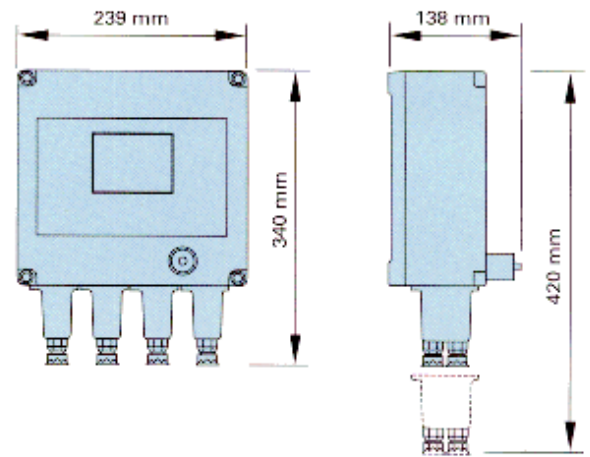
- o Temperature measurement and energy counting
- o Conversion into mass flow
- o LSDP data-retrieval software
- o Memory extension to 32640 measurement samples

TECHNICAL CHARACTERISTICS

1 - MECHANICAL SPECIFICATIONS

Dimensions :

- Weight : 4.2 kg
- Material : cast aluminium - epoxy paint
- Protection : IP 67 - relative humidity 90 % - T_{amb} : - 25 to + 50°C



2 - ELECTRICAL SPECIFICATIONS

- **Power supply** : AC and DC as standard : AC : 220 V (- 15 to + 10 %) 50/60 Hz 120 V option
DC : 12 to 60 V
- **Output signals** : - 4-20 mA current
(high resolution - galvanic separation from the transducers - charge 0 to 1000 Ω maximum)
- 4 NCNO static relays for flow direction, flowrate threshold, volume (totalisation), default ...
cutting power 100 mA / 100V / 10 VA
- RS 232 or 485 for PC or network - speed : 9600 Bauds - JBUS protocol
- **Signals to probes** : [EEx ia] IIB intrinsic safety possible using ULTRASAFE barrier

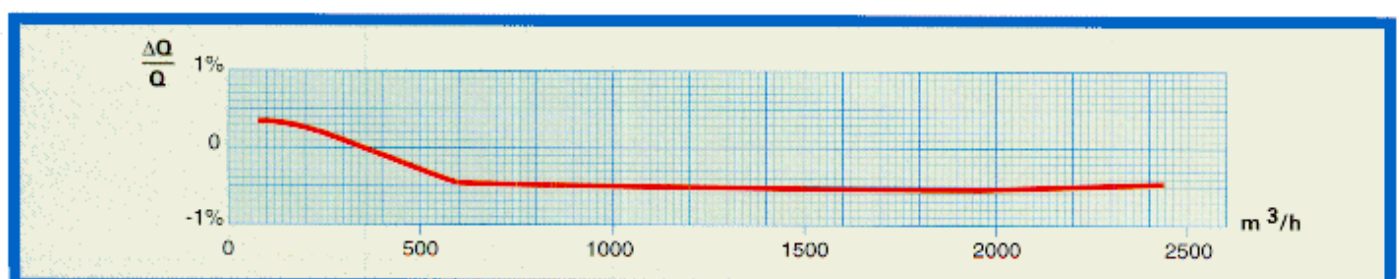
3 - METROLOGY : A PRECISE AND RELIABLE FLOWMETER

Performance on reference simulator

- Minimum response time : 0.3 s
up to 60 s programmable filtering
- Resolution of time measurement : 100 ps
- Absolute accuracy : 200 ps
- Linearity : 0.05 % - Repeatability : 0.02 %
- Temperature stability : 50 ppm/°C

Hydraulic performance :

- They depend on pipe configuration and diameter, on kind of product and on flow range.
- UF 322 adapts measurement data to Reynold's number,
 - A 10-segment linearisation curve can be recorded to compensate for site-related discrepancies.
 - For water, with straight length of 15 \varnothing upstream and 5 \varnothing downstream, typical accuracies are :
 - UF 322-1 : 1 % from 10 to 100 % of the scale
 - UF 322-2 : 0.5 % from 10 to 100 % of the scale



Example of authentic calibration on a DN 500 pipe with clamp-on probes (UF 322-1)

FOR MORE INFORMATION...

As every site is special, you are welcome to fill in a copy of the following form. Our engineers will return you a full quotation along with their advice.

COMPANY NAME : _____ Your name : _____
ADDRESS : _____
_____ Department : _____
Tel. : _____ Site for installation : _____
Fax. : _____

NATURE OF THE PIPE :

- | | |
|---|--------------------------------------|
| <input type="checkbox"/> Full pipe | <input type="checkbox"/> Open chanel |
| - Material : | - Width : |
| - Inner diameter : | - Depth : |
| - Thickness : | - Frame : |
| - Coating if any : - inside : | |
| - outside : | |
| - Likelihood of rugosity or corrosion : | |

FLUID CHARACTERISTICS :

- Nature:
- Temperature of use:
- Pressure of use :

HYDRAULIC CONDITIONS :

- Straight length : - upstream :
- downstream :
- Minimum flowrate :
- Maximum flowrate :

PREFERED TYPE OF INSTALLATION :

- Probes : - clamp-on
- wetted
- installation under pressure
- Spool



PIPE ENVIRONMENT :

- Accessibility (clearing around the pipe):
- Security requirements :

WISHED ACCURACY :

Ultraflux reserves the right to change the specifications without notice at any time

Ultraflux