

MINISONIC® P

User Guide

This simple and compact guide is intended for users in the field.
In case of difficulty or in-depth questions, please refer to the technical manual.

Description of the Minisonic P "Standard Pack"

This pack includes:

- The Minisonic P converter delivered with a leather effect carry pouch, a strap and a pocket for cables and accessories.
- Probe connection, 2.5m long, terminating in a Y (1 and 2).
- PC comms cable – in two parts.
- Charger/auxiliary power supply module and its mains power cable.
- PC windows software LS_600W** on CD-ROM.
- Technical manual supplied on CD-ROM.
- Durable soft blue carry case for storing probes, mountings, accessories (gel,...) and the Minisonic P itself.

Additional equipment necessary or recommended:

- Probes suitable for the application depending on the diameter of the pipe and the fluid to be measured.

For information:

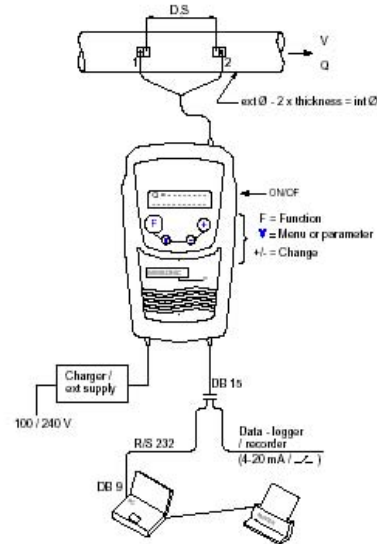
DN 10 to 110mm → SE_1586;
DN 50 to 600mm → SE_1515;
DN 100 to 6000mm → SE_1599

Alternatives:

DN 25 to 1000mm → SE_1662/SE_1596;
DN 80 to 2000mm → SE_1595;

- Supports or straps for assembly on the pipe (depending on nominal diameter)
- Gel for coupling the probes with the pipe = BT or HT (low/high temperature option)
- Two extension cables 5m long if O.D. > 600mm
- A tape measure and a thickness gauge if the pipes are not specified.
- Peripherals for recording the measurements = data logger, PC with software.

Ergonomics of Minisonic P - Connections



MENUS – Organisation and Parameters

1. Powering Up:

Display of welcome message : (Init)

- Minisonic P ➤ software version + serial number
- Name / Company
- Measurement display ➤ probe information / D.S. = interprobe distance.
- Flow rate Q* = /Messages

2. Measurements Menu:

Display of flow rate QT = Q1 + messages (search, echo, default,...)

- F = other information: gain (mode) = xxdB + IQ (quality) = xx % (channel 1)
- Fluid velocity = xx + speed of sound = xx m/s
- Measurements of times T and dT
- Totalisers t₁ and t₂ ➤ date / time
- Battery recharge condition (%)
- Calculated KH + Reynolds number
- Programmed probes and requested interval DS 1

3. Functions and parameter menus:

Access by F "n" times or F then (+/-)

Enter by (✓)

Exit from the menus, automatic or timeout, or by (F) ➤ measurement function

- F = once ➤ Access menu "Calibration Allowed" + access code field if it has been activated (≠ 0) (✓) code change + menu language (+/-)

• F = twice ➤ "Pipe Settings"

- (✓) outside diameter / circumference (+/-)
- (✓) material (+/-) ➤ list + other
- (✓) thickness mm = xxx.x (+/-)
- (✓) If other : CM = xxx m/s (characteristic)

• F = three times ➤ "Q Settings"

- (✓) choice of units (m³/h)
- (✓) maximum flow rate (graphic display on PC)
- (✓) product = water or other (➤ characteristic)
- (✓) co = xxx m/s Delta C = xxx m/s
- (✓) hydraulic correction
- (✓) K-Hydro = AUTO or Manual (= 1.xxx)
- (✓) fluid viscosity (Cstock – mm²/s)
- (✓) pipe roughness (mm)
- (✓) turbulence / laminar transition zone
Reynolds critical (2800) range (LBR = 3)

• F = four times ➤ "Probe/Echo Settings"

- and Echo amplification modes.
- (✓) Probe = Ref. SE_xxxx (external probe) or SM (wet probe) or SP (special probe if any)
- (✓) Probe assembly: \ = direct V = reflex
N = 3 crossings W = double reflex
- (✓) Gain management = ESC by default or Auto + Margin or Manual.
- (✓) If SM = Length and Axial D between probes

• F = five times ➤ "General Settings"

- (✓) Display backlighting (ON/OFF/TEMP)
- (✓) measurement filtering = xx cycles
- (✓) memory if default = xx sec.
- (✓) Assignment of totalizers 1 and 2 + units (+ Q / - Q or +/- Q)
- (✓) Assignment of relays + adjustment of threshold and volume pulse duration.
- (✓) Totalizer reset to zero
- (✓) Assignment and Adjustment of scale 4-20 mA of SA and SA 2.
- (✓) R/S communication = N°J Bus (1) – Bauds (9600)

• F = six times ➤ "Autozero Settings"

- (✓) status display (Delta To = xx ns) or Reset (Delta To = 0) or Autozero, then launching of the function by (F)

• F + 1 = (if authorized) ➤ "Factory Settings"

- (✓) S.E correction (coefficient = 0.5 to 1.5) depending on application and pipe diameter.

• F + 1 = I / O Test with simulation on outputs SA 1 and SA 2 (4-20 mA) and relays 1 and 2 state.

4. Recommended Method of Use:

- Avoid the access code.
- Before going to the site, fill in the main menu according to your criteria, choice, selection of probes ➤ see the recommended values below.
- On site, enter the measurement points data (diameter,...)
- Install the probes as requested by the meter (D.S.= interprobe distance)
- Check (read) the measurement and values related to its quality.
- Only carry out a zero (autozero) if the "zero flow" conditions are verified.

PRACTICAL USE

1. [Recommended Choice and Values before use on site:](#)

- Flow Rate Menus / General / Probes:
- The flow rate / volume units and the choice of probes, pipes and fluids are the responsibility of the user.
- Use the automatic management modes = KH auto – ESC gain.
- Use the V mode (Reflex) as much as possible.
- Other values: Filtering = 5 to 10;
 - Memory = 10 to 30
 - N.JBus = 1 / 9600 Bauds
- If fluid = Water : $1\ 300 < C < 1\ 600$ m/s
 - Viscosity = 1 cst
- If fluid = Other : carefully fill in C_o and do not enter too low Delta C (15 to 20% of C_o) and enter the viscosity (centiStocke of mm^2/s)

'FACTORY' ADJUSTMENT – CONSULT US

2. [Choices Related to Measurement Points Parameter Settings On Site:](#)

- Define the pipe as accurately as possible.
 - Pipe parameter setting menu: outside diameter thickness...
- Confirm the fluid, the flow range and the unit.
 - Flow rate parameter setting menu
- Choose suitable probes ➤ Probe menu/echo and the assembly mode (V,...)
- Read the required distance between probes = D.S.
 - Display in Measurement Menu

3. [Install and Connect the Probes:](#)

- Attach sensors to the side of the pipe when in the horizontal plane.
- Clean the pipe and the locations chosen for the probes. There is no need to scrape off high quality paint.
- Spread a little coupling gel over these points.
- Apply a dab of gel on each probe.
- Install the probes, if necessary with their bracket, ensure they are firmly attached.
- Connect the probes to the **Minisonic P**.

4. [Read the Measurements:](#)

- Leave the ESC mode engaged ("Echo Search" message). This Mode restarts automatically but it may be restarted by turning the Minisonic P off and on.
- After a few seconds the flow rate should be displayed ➤ $Q = \dots$ Read this flow rate and monitor it as necessary...
- Check the quality on the other indicated values :
 - Gain not too high and stable – good signal criteria.
 - IQ = High (100%) – no signal rejects or very few.
- Speed of sound close to C_o – good control of the parameter settings.
- Significant dT – zero setting barely critical – otherwise check Q_o (Delta To).

5. [Record the Measurement if Necessary](#)

- Our **LS_600W*** software allows you to use your PC as a data logger. To do so, use the cable for connection supplied and refer to the NT 204 and NT 214 manuals.
- An external data logger may be connected either to our 4-20mA outputs (Q_o ...), or to our relay outputs copying the volume incrementing. Connections to 15 pin male DB = 4-20mA (200 Ω max) = SA 1 (10 and 11 / SA (12 and 13)
Re 1 = pin 7 and 14 / Re 2 = pin 8 and 15
- Set the parameters of the flow scale (4-20mA) or the totalizer unit.

* *This software allows the adjustment of the period and the duration of the recordings. The software can call up your Excel spreadsheet and use a recording management macro.*

ADVICE – PROBLEMS - SOLUTIONS

A choice of suitable probes with respect to site conditions is essential. All our probes have a recommended range but the practical limits result mainly from the pipe itself (corrosion, deposits,...)

Selection Criteria: High frequency (HF) probes can be more accurate. Low frequency (LF) probes penetrate further but are noisier.

The size of a sensor limits its installation in a small pipe, above all in the V mode (contact).

➤ **Ask Ultraflux for advice**

The choice of assembly mode:

V mode: recommended in more than 90% of cases.
W mode: used in exceptional cases and reserved for very small pipes.

\ mode: used as final recourse or when recommended for large pipe.

➤ for instance: V mode + LF probes = no measurement ➤ test in \ mode.

N mode: reserved more particularly for fixed station applications.

The position of the probes is not critical (a deviation of a few mm is tolerable) but installation must be well done, with good coupling; it helps get good results and facilitates the expression of the ESC mode.

Despite compliance with a good installation, the result is not satisfactory:

Did you enter the right sizes?

➤ Measure the pipe dimensions again.

Do you have the right fluid? (C_o , ΔC)

➤ If the C value returned by Minisonic P differs a great deal from the entered C_o value = rerun the procedure with $C_o = C$.

Advice : a broad ΔC facilitates echo capture.

The quality index I.Q. varies and is far from 100% = electrical interference? Aerated fluid?

The gain value varies = presence of bubbles? High solids content?

➤ Try with sensors in the direct mode.

The gain value is very high (>65%) or the ESC mode (echo search) starts too often:

➤ Try with gain in AUTO mode and a reasonable margin (5 to 10 dB). In this case, Minisonic P will allow higher amplification.

You have a measurement but it does not correspond to what you expect:

Have you allowed straight lengths upstream and downstream of the sensors?

Statistically the measurement is by default (a few %) when the straight length is short.

ZERO SETTING

Were you able to check the zero setting of the Minisonic P and zero flow rate?

Minisonic P has an excellent theoretical zero setting (electronic autozero).

Very low flows may cause measurement errors.

➤ does flow rate = zero (check). Go to the Zero Settings menu and choose "Autozero". Exit (F) and wait until the signs (*) have disappeared before reapplying the flow rate.

Minisonic P will have optimized the zero at this measurement point by taking into account its Δt_o . Then reapply $\Delta t_o = 0$ if you have changed position.

Another customary check on water flow rate:

The relation between speed of sound / temperature is reliable (see the training manual) and may be used to check the proper control of pipe geometry:

C too low ➤ inside diameter set too small, with obvious effect of flow rate display.