

SV

Monterings- och bruksanvisning

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Användning / funktion

The battery-operated sononic 3 calculator is a component of a combination thermal energy meter in accordance with EN 1434. It receives signals from connected flow sensors and temperature sensors, and calculates the energy transferred from these.

It is authorised for measuring circuit water in accordance AGFW (FW 510) in heating systems. It is not authorised for use for billing purposes in systems with glycol admixtures.

Variants:

- T1: 1 pulse = 1 l
- T25: 1 pulse = 25 l
- T250: 1 pulse = 250 l
- TX: Pulse value of on-site flow sensor can only be selected once



Leveransinnehåll

- 1 x sononic 3 calculator
- 1 x mounting plate
- 1 x mounting set (2 screws / 2 dowels)
- 3 x cable grommet (pre-assembled)
- 1 x manual including declarations of conformity



Varningsinformation



WARNING!

Risk för explosion

Vid felaktig hantering av det litium-metall-batteri som sitter i enheten kan batteriet explodera och orsaka bränder eller personskador.

Enheten och LITIUM-METALL-BATTERIET

- ▶ får inte hettas upp över de temperaturer för förvaring och drift av enheten vilka anges i detta dokument.
- ▶ får ej kastas på eld.
- ▶ får ej utsättas för vatten.
- ▶ får ej kortslutas.
- ▶ får ej öppnas eller skadas.
- ▶ får ej laddas upp.
- ▶ får ej svetsas eller lödas.



WARNING!

Danger of injury due to electric shock, fire or explosion

Connecting to an external voltage (230 V) can cause injuries due to electric shock as well as explosion of the battery and subsequent fire.

- ▶ Do not connect any external power sources to the device.



Observera

Transport och distribution

- Det är bara tillåtet att transportera sononic 3 calculator i originalförpackningen.

UN3091 LITIUMMETALLBATTERIER I UT-RUSTNING

De certifikat som krävs för transport kan beställas från ista SE, med angivande av artikelnummer.

Lagring / kassering

- Lagra utrustningen torrt och frostfritt.
- Denna produkt omfattas av direktiv 2012/19/ EU om hantering av elektriskt och elektroniskt avfall (WEEE) och får inte kastas i hushållssoporna. Bortskaffa den uttjänta produkten via härför avsedda kanaler eller lämna in den till närmaste ista-filial.

Notes on use and handling the meter

- Mätaren får endast monteras av specialutbildad personal.
- Only remove user seals if you are authorised to do so. The seals must be replaced after the work is completed.
- To properly adhere to calibration error limits, the current state-of-the-art as well as notes and facts in this manual must be observed.
- Använd utrustningen i en miljö som uppfyller de gällande driftsvillkoren.

Om monteringen

- Check to see whether the installation site (flow/return) and the flow sensor pulse value is appropriate for the type sononic 3 calculator (see type plate and type plate loop).
- The flow sensor and temperature sensor of the energy meter must be located in the same partial circuit of the system (same circuit rule).
- Beakta kabellängderna när monteringsplatsen bestäms.
- Anslutningsledningen till flödessensorn får vara max. 10 m lång.
- If possible, when installing the calculator and cables, as recommended in EN 1434-6,

Clause 4.2, maintain a minimum distance of 60 cm from strong electromagnetic fields (e.g. from frequency-controlled pumps and power cables) or their wiring.

- If used as a cold meter or combined heat/cold meter, the calculator must be attached so that condensation cannot penetrate the calculator via the connected cables.
- Klämskruvarna hos räkneverkets anslutningar måste sitta på ledningen eftersom det annars inte uppstår kontakt.
- Anslut endast temperaturgivarpar och flödessensorer med egen EGMärkning.
- Temperaturgivarpar med en längd på högst 3 m (2-ledarteknik) resp. högst 30 m (4-ledarteknik) är tillåtna.
- The temperature sensors may only be installed symmetrically in the warm and cold lines.
- Litium-metall-batteriet är fast inbyggt i denna enhet och får inte bytas ut.



Montering



WARNING!

Danger of injury due to electric shock and explosion

Drilling into electricity cables or gas pipes can cause an electric shock or explosion.

- ▶ Always inspect or test the assembly area for concealed electrical cables, as well as gas pipes laid in the wall, before assembling electronics on a wall.



NOTERING

Danger of water damage

Drilling into water pipes can cause water damage.

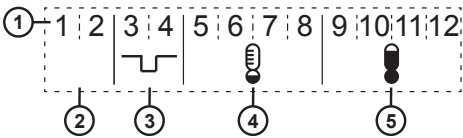
- ▶ Inspect the assembly location for any concealed pipes which are laid in the wall before assembling the electronics.

1. Attach the mounting plate to the wall.
2. Engage calculator in mounting plate.
3. Open clamping cover.
4. Undo/remove strain relief.
5. Thread cables through sleeves.
 - Left sleeve: Pulse cable of flow sensor
 - Central sleeve: Cold line temperature sensor cable
 - Right sleeve: Hot line temperature sensor cable
6. Connect the lines (see connection).

- 7. Attach strain relief.
- 8. Close clamping cover
- 9. Installation of the temperature sensor as per its installation instructions.

Anslutning

Terminal labelling



- 1. Numbering of the terminals
- 2. Terminals 1 + 2: Not used.
- 3. Terminal 3: Connection of flow sensor pulse cable – earth
- Terminal 4: Connection of flow sensor pulse cable – pulse
- 4. Terminals 5 – 8: Cold line temperature sensor cable connection
- 5. Terminals 9 – 12: Hot line temperature sensor cable connection

Anslutning flödessensorer

	Cable to terminal no.				
	whi te	gre en	brow n	blu e	red
sonsonic II flow sensor	-	4	-	-	3
US flow sensor (Diehl variant)	4	-	-	3	-
US flow sensor (Zenner vari- ant)	-	4	-	3	-
US flow sensor (variant L&G)	reverse polarity pro- tected				
KTZ* / ultego III flow sensor	reverse polarity pro- tected				

* Do not connect cable shielding

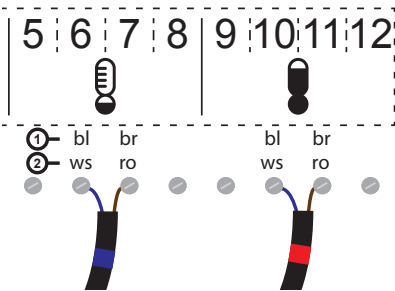
Variant	hot line / red sensor marking	cold line / blue sensor marking
combined heat/cold meter	Flow	Return
Cold meter	Return	Flow

Abbreviations used on the terminals:

bl = blue gn = green ws = white
br = brown ge = yellow ro = red

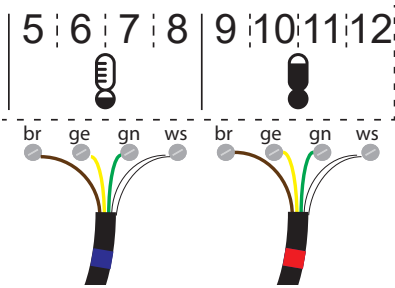
In case of calculators without permanently connected temperature sensors, connector sensor cables as follows:

2 wire technology



- 1. ista temperature sensor, Ø 5.0 mm
- 2. ista / Jumo temperature sensor, Ø 5.2 and 6.0 mm

4 wire technology



User interface

Button functions

The following activities can be carried out using the button:

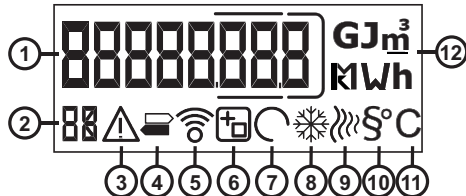
Button function	Length / interval	Function in display loops
Short depress of button	< 2 seconds	Change to next display within same loop (from last to first menu item)
Longer press of button	> 2 seconds	Continuous change to next display loop, as long as button is pressed (< 1 minute)
Double-click	2-times for 0.5 seconds	Activating certain functions (e. g. editor)

Display

In measuring mode, the display is generally deactivated as long as

- no button has been pressed within the past 60 s and
- no error exists in the device.

The display is activated by pressing a button. First, a display test is shown, where all display elements are shown. The display switches over to display 1A automatically.



- 1. Measured values with optional three, one or without a full stop (visualised by full stop and frame)
- 2. Number of the currently shown display
- 3. Error detected
- 4. Wrong flow direction (not relevant for sensor-sonic 3 calculator)
- 5. Radio status
 - off: Device not accessible with ista service tools
 - on: Device accessible with ista service tools
 - flashing: Device is accessible with ista service tools, installation or service mode
- 6. Module detected
- 7. Flow detected
- 8. Cold value
- 9. Heat value
- 10. calibrated value
- 11. in °C:
 - Temperature
 - Temperature difference
- 12. Units for
 - Energy in kWh, MWh, GJ
 - Volume in m³
 - Power in kW
 - Time in h

If the value currently shown on the display changes, it is updated automatically. This mainly affects current consumption values, but also device parameters such as radio status, M-bus primary addresses etc., which can be written via external interfaces (radio, M-bus).

Avläsningsserier

The following table shows symbols which signify display conduct or actions required from the user within the display loop description.

Sym- bol	Description
	Displays automatically change every 2 sec

Loop 1: Measuring loop

Number	Display	Meaning
1A		Current meter reading for thermal energy ¹
		Current meter reading for cold energy ²
1B		Last reference date value for thermal energy ¹
		Last reference date value for cold energy ²
		Last reference date value for total volume ³
		Last reference date value, cold volume ^{3,4}
		Date of last reference date
1C		Second-to-last reference date value for thermal energy ¹
		Second-to-last reference date value for cold energy ²
		Second-to-last reference date value for total volume ³
		Second-to-last reference date value, cold energy ^{3,4}
		Date of second-to-last reference date

1. For heat meters and combined heat/cold meters only
2. For cold meters and combined heat/cold meters only
3. For combined heat/cold meters, if necessary, calculate the “heat volume” as the difference between the “total volume” and the sum of the “cold volume” and “error volume”.
4. For combined heat/cold meters only
5. The “error volume” is volume for which, for various reasons, no energy could be calculated.
6. If necessary, calculate the “heat volume” for heat meters or “cold volume” for cold meters as the difference between the “total volume” and the “error volume”.

Loop 2: Wireless service loop

You can initiate wireless commissioning and activate fast service beacons via the wireless service loop.

NOTERING

- ▶ Wireless M-bus telegrams can only be activated via ista radio after the activation of the bidirectional ista radio system via display 2A or 2B.

NOTERING

- ▶ After activation of the radio, manual parameterisation via the parameterising loop is no longer possible.

Number	Display	Meaning
2A		Activation of installation beacons by double-clicking (maximum 14 times); if no parametrisation takes place via ista service tools, then the radio is deactivated

Number	Display	Meaning
V		Activation of 30 fast service beacons by double-clicking (maximum 20 times a day)
V		No further activation of installation beacons (at all) or service beacons (until daily change) possible
2B	● 	One-off activation of installation beacons by double-clicking; if no parametrisation takes place via ista service tools, then the radio is activated with default parameters, parameters set via the parameterising loop are overwritten
2C	● 	Activation of wireless M-bus telegrams by double-clicking ¹

1.Protected by password 2

Loop 2: Wireless service loop

NOTERING

- ▶ Wireless M-bus telegrams can only be activated via ista radio after the activation of the bidirectional ista radio system via display 2A or 2B.

NOTERING

- ▶ After activation of the radio, manual parameterisation via the parameterising loop is no longer possible.

2A: — Activation of installation beacons by double-clicking (maximum 14 times); if no parametrisation takes place via ista service tools, then the radio is deactivated ('SEtUP') # Activation of 30 fast service beacons by double-clicking (maximum 20 times a day) ('rEAd') # No further activation of installation beacons (at all) or service beacons (until daily change) possible ('no rEAd')

2B: | One-off activation of installation beacons by double-clicking; if no parameterisation takes place via ista service tools, the radio is activated with default parameters ('A *SEtUP*')
2C: | Activation of wireless M-bus telegrams by double-clicking ('C1 *SEtUP*')¹

1.Protected by password 2

Loop 3: Diagnostics loop

In the diagnostics loop, you will find extensive information on the device's current status.

Number	Display	Meaning
3A		No existing device errors
		Existing device error ¹
		Number of days in operation since production
		Number of error days since production
3B		Current flow
3C		Current heat output ²
		Current cold output ²
3D		Current flow temperature
3E		Current return temperature
3F		Current temperature difference Δt ³
3G		Maximum flow since production
		Maximum temperature of the current billing period
		Maximum temperature difference Δt of the current billing period ³

- 1.Description of the device errors in the 'error status' section
- 2.Dependent on current count mode (heat/cold)
- 3.Becomes negative, if T_{flow} < T_{return} (cold measurement or sensor mixed up)

Loop 4: Type plate loop

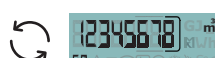
You can find information on the current configuration of the device in the type plate loop.

- 4A: — M-bus ID number (part of secondary address)
- 4B: | Flow sensor pulse value (litres per pulse) ("LPX.X") / (Flow sensor installation site for hot line ("LoC hot")¹ # Flow sensor installation site for cold line ("LoC cold")¹)
- 4C: | Device can no longer be read out via the module until the day changes ("no CrEdt")² # M-bus module detected with bus address (primary) ("Bus XXX")² # Pulse output module detected ("PULSEOut")²
- 4D: | Glycol type³ / Glycol concentration ("ConC XX")³
- 4E: | Radio off ("rF OFF") # WalkBy ("rF PdA") # ista radio ("rF nEt") # OMS C1 + WalkBy ("rF C1")
- 4F: | Radio network number (first 8 digits) # Radio network number (last 8 digits)
- 4G: | Measuring interval in seconds ("SEC X")
- 4H: | Sensor type Pt500 ("Pt 500")/ Detected sensor connection technology: 2-wire ("PtLnE 2") # Detected sensor connection technology: 4-wire ("PtLnE 4") # Sensor connection technology not detected ("PtLnE 0")
- 4I: | Software version
- 4J: | Hash code

- 1.Display shows the planned (programmed) installation site of the flow sensor, not the actual site.
- 2.Display only if a module was detected
- 3.Display only for glycol meters

Loop 5: Statistics loop

In the statistics loop, you can read the values at the end of the month for energy and volumes, and the respective reference date of the last 14 months.

Number	Display	Meaning
5A		Reference date from last month
		Thermal energy value from end of last month ¹
		Cold energy value from end of last month ²
		End of month value total volume last month ³
		Cold volume last month ^{3,4}
5B		Same as 5A for the previous 13 months
5N		

- 1.For heat meters and combined heat/cold meters only
- 2.For cold meters and combined heat/cold meters only
- 3.For combined heat/cold meters, if necessary, calculate the "heat volume" as the difference between the "total volume" and the "cold volume".
- 4.For combined heat/cold meters only

Loop 5: Statistics loop

In the statistics loop, you can read the values at the end of the month for energy and volumes, and the respective reference date of the last 14 months.

- 5A: — Reference date of last month / End of month value for thermal energy for last month¹ / End of month value for cold energy for last month² / End of month value for total volume for last month³ / Cold volume for last month^{3,4}
- 5B – 5N: | As 5A for the previous 13 months

- 1.For heat meters and combined heat/cold meters only
- 2.For cold meters and combined heat/cold meters only
- 3.For combined heat/cold meters, if necessary, calculate the "heat volume" as the difference between the "total volume" and the "cold volume".
- 4.For combined heat/cold meters only

Loop 6: Tariff loop

In the tariff loop, you can read the values at the end of the month for the maximum performance and flow, and each reference date from the last 14 months.

Number	Display	Meaning
6A		Reference date from last month
		Maximum heat performance value from end of last month ¹
		Maximum cold performance value from end of last month ²
		Maximum flow value from end of last month
6B		Same as 6A for the previous 13 months
6N		

- 1.Only for heat meter and combined heat meter/cold meters
- 2.Only for cold meters and combined heat/cold meters

Editor

The following activities can be carried out in the editor, using the button:

Button function	Length / interval	Function in editor
Short press of button	< 2 seconds	- Jump to next point to be entered (or from last to first) - Change to next entry with selection list
Longer press of button	> 2 seconds	Change to current point to be entered
Double-click	2-times for 0.5 seconds	Exiting editor and saving changed values

The current points to be worked on are indicated by flashing.

Password entry

To avoid undesired changes to the parameterisation of the device, the parameterisation loop is protected by password 1 and the activation of wireless M-bus telegrams is protected by password 2.

- Password 1 has four digits and consists of the current month and year in the format 'MMYY' (example: January 2019 equals "0119"). You must enter the password once during the first parameterisation process. It is then valid until the next deactivation of the display.
- Password 2 has three digits and consists of the first three digits in the serial number (Example: Serial number of the device '914000069' -> password 2 = '914'.)

You reach the screen for entering the password from the parameterisation loop or display 2C by double-clicking.

Number	Display	Meaning
PA -PI		Entry of password 1
		Password is correct
V		Password incorrect

Parameter entry

You access the entry to be edited automatically from the corresponding entry in the parameterising loop after successfully entering the password if required. After entering the required value, exit the editor with a double-click.

- PA: || Reference date
- PC: Pulse value: || Flow sensor undefined ("undEF") | 1.0 | 2.5 | 10.0 | 25.0 | 100.0 |

- 250.0 | 500.0 | 1000.0 | 2500.0 | 10000.0 | 25000.0 litres per pulse (LPP)¹
- PD: || M-Bus primary address ("BUS XXX")
- PE: Pulse output type || heat energy ("En hot")² | cold energy ("En cold")³ | volume ("Fluid")
- PF: Pulse output value || 1 pulse per increase of last digit in display ("Auto")
- 1 pulse per | 0.1 | 1.0 | 10.0 | 100.0 | 1000.0 kWh⁴
- 1 pulse per | 0.001 | 0.010 | 0.100 | 1.000 m³⁵
- PI: || Discard entry from PC ("dIScArD") | save entry from PC ("SEt") || entry is being saved ("SEtting") / (save successful ("SEt dOnE") # save failed ("SEt FAIL"))

1. Only for TX variant
2. Only for heat and combined heat/cold meters
3. Only for cold meters and combined heat/cold meters
4. Only for heat or cold energy pulse output types
5. Only for volume pulse output type

Error status

Number	Display	Meaning
3A		Calculation unit error – check temperature sensor and replace temperature sensor and / or device if necessary ¹
		Temperature measurement error – check temperature sensor and replace temperature sensor and / or device if necessary ¹
		Flow measurement error - replace device ¹
		Internal error – replace device ¹
		End of life – replace device ¹
		System error – replace device ²

1. Combinations of the stated errors are possible.
2. Permanent display. Access to display loops no longer possible.

- 3A "ERR C": Computing unit error – check temperature sensor; replace temperature sensor and / or device if necessary¹
- 3A "Err t": Temperature measurement error - check temperature sensor; replace temperature sensor and / or device if necessary¹
- 3A "Err U": Internal error – replace device¹
- 3A "Err L": End of life – replace device¹
- "SysError": System error – replace device²

1. Combinations of the stated errors are possible.
2. Permanent display. Access to display loops no longer possible.

Driftstart

NOTERING

- ▶ When commissioning a heat meter, a commissioning record must be prepared in accordance with PTB K6.
1. Parametrise the device manually or via wireless connection, using the above parameterising loop.
 2. Check function.
 3. Clean the device exterior with a soft damp cloth. Do not use cleaning products.
 4. Seal meter.

Utbyte

1. Make a note of meter reading.
2. Open clamping cover.
3. Undo/remove strain relief.
4. Disconnect the cables.
5. Undo/remove terminal labelling.
6. Remove the ALU (fold back the clamp using a screwdriver).
7. For more see installation from point 2 onward.

**Tekniska data**

- *Ambient conditions to EN 1434:* Classes M1 / E1
- *Ambient temperature:* Storage: -25 °C to +55 °C, Operation: +5 °C to +55 °C
- *Relative humidity:* 5 % to 95 %, non-condensing
- *Protection class:* IP 65 as per EN 60529
- *Temperaturgivare:* Typ Pt500 enligt EN 60751
- *Temperature measurement range limits (Θ) / Temperature difference limits ($\Delta\Theta$):*

	$\Theta_{\min}$	$\Theta_{\max}$	$\Delta\Theta_{\min}$	$\Delta\Theta_{\max}$
Heat meter	5 °C	150 °C	3 K	100 K
Combined heat/cold meter	1 °C	150 °C	3 K	100 K
Cold meter	1 °C	25 °C	3 K	20 K

- *Combined heat / cold meter changeover criteria:* $\Delta\Theta_{\text{grenz}} = 0.19 \text{ K}$, $\Theta_{\text{in_umsch}} = 20 \text{ °C}$
- *Pulse value:* 1 / 25 / 250 l/pulse set by the factory in accordance with type plate (T1, T25, T250 versions), 1 / 2.5 / 10 / 25 / 100 / 250 / 500 / 1000 / 2500 / 10000 / 25000 l/im-pulse can be adjusted oncer (TX version)
- *Impulsingång:* Klass IB enligt EN 1434
- *Main dimensions:* Width: 93 mm, Height (without cable sockets): 134,5 mm, Height (with cable sockets): 149 mm, Depth: 35 mm
- *Power supply:* 1 x 3.6 V AA lithium metal battery
- *Livslängd:* 10 års drift+ 1 års driftreserv + 1 års lagring
- *Wireless interfaces:* Frequency range: 868 MHz, Maximum transmission power: < 10 mW, Wireless M-Bus: Operating mode C1 as per EN 13757-4; transmission interval: 4 minutes

**Godkännande**

- Heat (MID): DE-19-MI004-PTB029
- Cold (national approval for Germany): DE-21-M-PTB-0025
- Cold (national approval for Switzerland): CH-T2-21779-00

Upphovsrätt

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