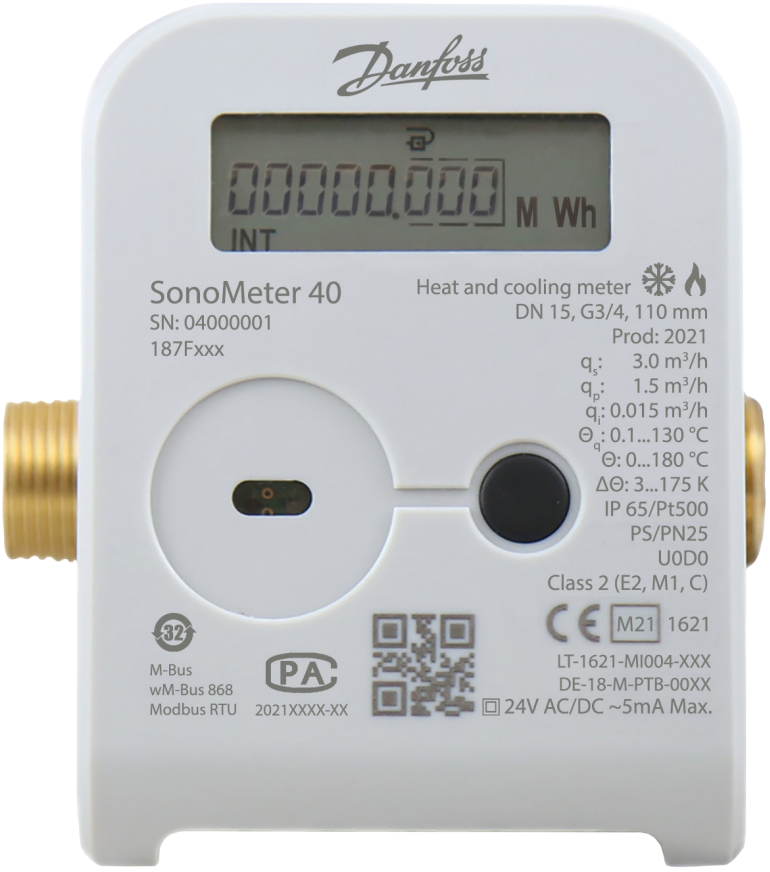
ENGINEERING
TOMORROW

User Guide

Ultrasonic energy meter SonoMeter 40

Test and calibration instruction



Contents

General information

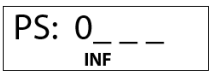
This instruction is designed for the ultrasonic energy meter SonoMeter 40 for flow and energy verification and calibration.

1. Activation of the test mode

The test mode can be activated in one of the following ways:

1.1. Activation of the test mode with the button

The test mode is activated by the meter's control button according to the following procedure:
- long press the button, on the meter's LCD select page „**INF**";
- short press the button, select „**TEST on Wh**" (when it is necessary to activate the energy pulse output via the optical interface) or „**TEST On m³**" (when it is necessary to activate the volume pulse output via the optical interface);
- long press the button, open the 4- digits security password input window:

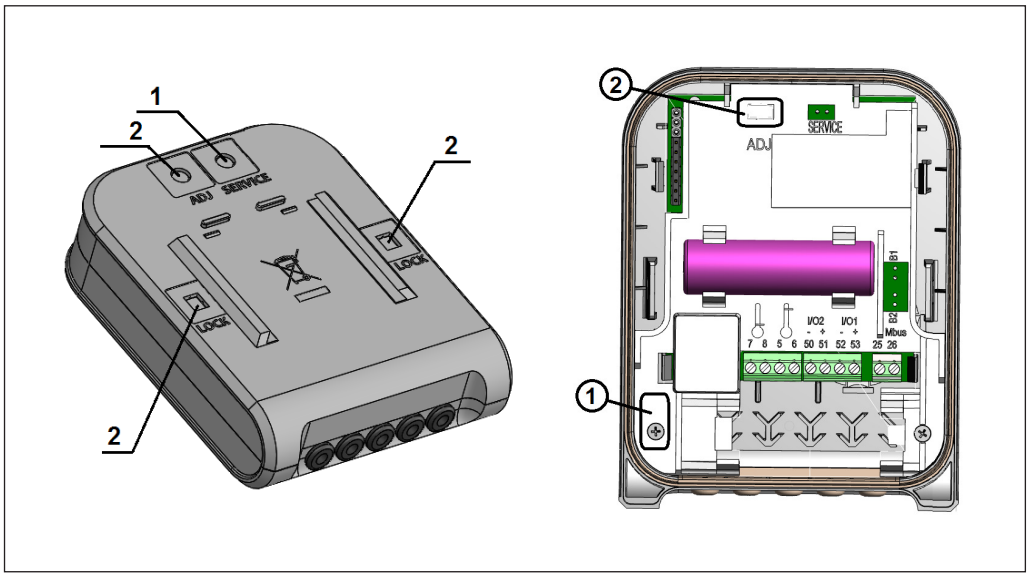


- short press the button, select digit in the first position, after that long press the button and go to the next position;
- after selecting the digit in the fourth position, long press the button, the massage „**PASS**" appears briefly (when the password entered correctly) and the meter switches to test mode – the sign „**TEST**" appears;
- if the password was entered incorrectly, the message „**FAIL**" appears briefly and the meter returns to the operating mode, and the procedure for turning on the test mode must be repeated initially;
- the password value is fixed: **0001.**

NOTE: when the test mode is activated by the button, the volume and energy accumulated in the test mode are added to the meter's energy and volume readings in operating mode (after turning off the test mode).

1.2. Activation of the test mode by short-circuiting the contacts

Remove the breakable partition „SERVICE" (1) on the back of the calculator or open the calculator box by removing the breakable partitions "LOCK" (2).



By short-circuiting the contacts „SERVICE", the SERVICE mode is activated, symbol „<->" and sign „**TEST**" are displayed on the LCD.

1.2. Activation of the test mode by short-circuiting the contacts *(continuous)*

Display readings in the test mode

ID	Parameter	Value	Notes
4.1	High- resolution energy	TEST 000000.00 Wh	Updated every second.
		TEST PULSE	Indicated as "PULSE", if the energy test pulse output is activated.
4.2	High-resolution integrated volume	TEST m^3 00.000000	Updated every second.
		TEST m^3 PULSE	Indicated as "PULSE m^3", if the volume test pulse output is activated.
4.3	Supply heat carrier temperature value	1 TEST 0.0 °C	-
4.4	Return heat carrier temperature value	2 TEST 0.0 °C	-
4.5	Temperature difference	1-2 TEST 0.00 °C	-
4.6	High-resolution flow rate	TEST m^3 0.000 INF	-
4.7	To activate energy pulses output (when volume pulse output is active)	TEST tESt on Wh	Activated by pressing and holding the button
	To activate volume pulse output (when energy pulse output is active)	TEST m^3 tESt on	Activated by pressing and holding the button
4.8	To deactivate the test mode	TEST tESt OFF	Deactivated by pressing and holding the button

In this mode:
- volume pulses are generated via the optical interface of the meter. The button can be used to toggle the energy pulse output by selecting the menu item "tEST on Wh";
- When the meter is supplied with a connected pulse input/output cable , the energy pulses are generated in the 1st pulse output and the volume pulses in the 2nd pulse output;
- it is possible to simulate volume pulses for determination the energy measurement errors;
- it is possible to change the parameters of the meter configuration.

NOTE: when the test mode is activated by short-circuiting the contacts "SERVICE", the volume and energy accumulated in the test mode are not added to the meter's operating mode volume and energy readings.

1.3. Activation of test mode with software "SonoMeter 40 Configurator"

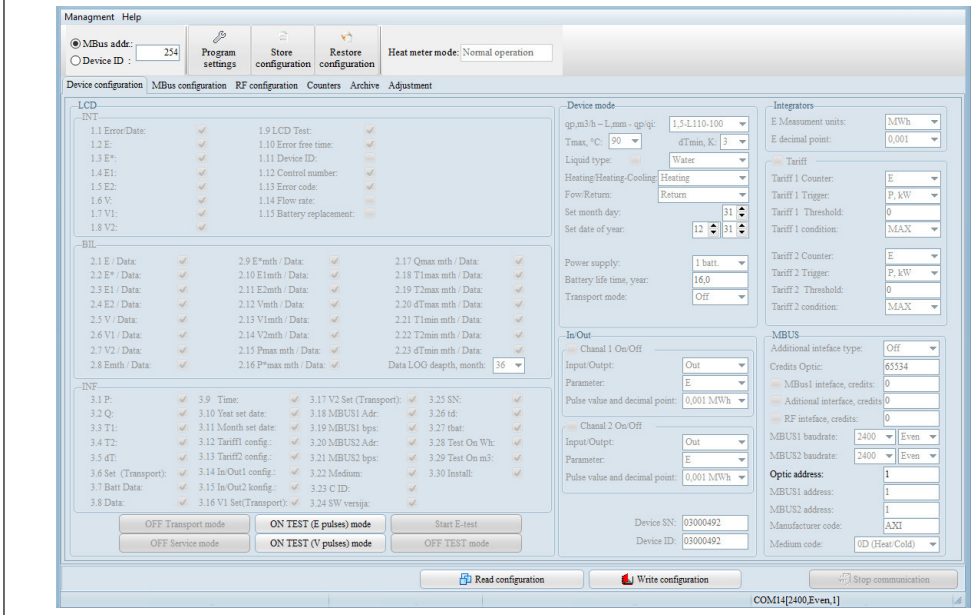
The test mode can be activated via the optical interface using the software "SonoMeter 40 Configurator" and optical scan head in accordance with EN 62056-21 standard. In this case, optionally volume or energy pulses are generated via the optical interface of the meter.

ON TEST (E Pulse) mode – intended for test (TEST) mode activation **(with energy pulse output via optic interface).**

ON TEST (V Pulse) mode – intended for test (TEST) mode activation **(with volume pulse output via optic interface).**

OFF TEST mode – intended for deactivation of the test (TEST) mode.

Start E-test – intended for energy measurement stimulating volume for 150 sec operations (only in the Service mode).



2. Determination of measurement errors of the meter

2.1. Volume measuring errors determination test

The determination of volume measurement errors shall be carried out in the hydrodynamic test bench in the following order:

1) The test mode is activated in accordance with section 1.1, 1.2, or 1.3 of this instruction.
2) The volume measuring errors should be evaluated at control flow rates specified in EN1434-5.
3) The volume of water, passing through the meter can be read directly from the indicating device (with resolution 1 ml);
- Via meter optical output, using the optical reading head according to 62056-21;
- Or trough wired volume pulse 2nd output (for a complete meter with a connected pulse input / output cable and for a meter activated in test mode according to p.1.2 of this instruction);
4) Volume pulse values in test mode are presented in table 1p:

Table 1p

Permanent flow-rate qp of the heat meter, m^3/h	Volume pulse value in test mode, litre/pulse
0,6 and 1,0	0,002
1,5	0,004
2,5	0,005
3,5 and 6	0,02
10; 15 and 25	0,05
40 and 60	0,2

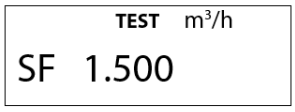
2.2. Energy measurement errors determination test

The energy measurement error of a calculator with temperature sensors pair shall be evaluated by immersing the temperature sensors in a temperature regulated baths. The test shall be performed in the following order:

1) The test mode is activated in accordance with section 1.2 of this instruction;
2) The meter temperature sensors are immersed in thermostatic baths, which form the supply and return line temperature and temperature difference values specified in EN 1434-5.

NOTE: energy measurement error determination may be performed separately for a calculator with a flow sensor. In this case, the temperature and temperature differences of the supply and return line specified in EN 1434-5 are simulated by connecting the reference resistors to the calculator terminals No.5;6;7;8.

3) Long press the button (for more than 5 seconds) activates the simulation of the volume pulses (the meter display periodically shows "SF" with the nominal flow rate of the meter, m^3/h):



4) After 2,5 min. the volume simulation is completed, the sign „SF“ turns off. To calculate the energy measurement error, the simulated volume and energy readings shall be visually read from the meter display;
5) The amount of volume or energy can be read through the wired pulse output (if it is equipped in the meter);
6) The amount of volume or energy can be read through the meter's optical interface output using an optical scan head that complies with EN 62056-21;
7) Energy pulse values in test mode are presented in table 2p:

Table 2p

Permanent flow-rate qp of the heat meter, m^3/h	Energy pulse value based on displayed energy units:		
	„kWh“, „MWh“	„GJ“	„Gcal“
0,6 and 1,0	0,1 Wh/pulse	0,5 kJ/ pulse	0,1 kcal/ pulse
1,5	0,2 Wh/ pulse	1 kJ/ pulse	0,2 kcal/ pulse
2,5	0,5 Wh/ pulse	2 kJ/ pulse	0,5 kcal/ pulse
3,5 and 6	1 Wh/ pulse	5 kJ/ pulse	1 kcal/ pulse
10; 15 and 25	2 Wh/ pulse	10 kJ/ pulse	2 kcal/ pulse
40 and 60	5 Wh/ pulse	20 kJ/ pulse	5 kcal/ pulse
0,6 and 1,0	10 Wh/ pulse	50 kJ/ pulse	10 kcal/ pulse

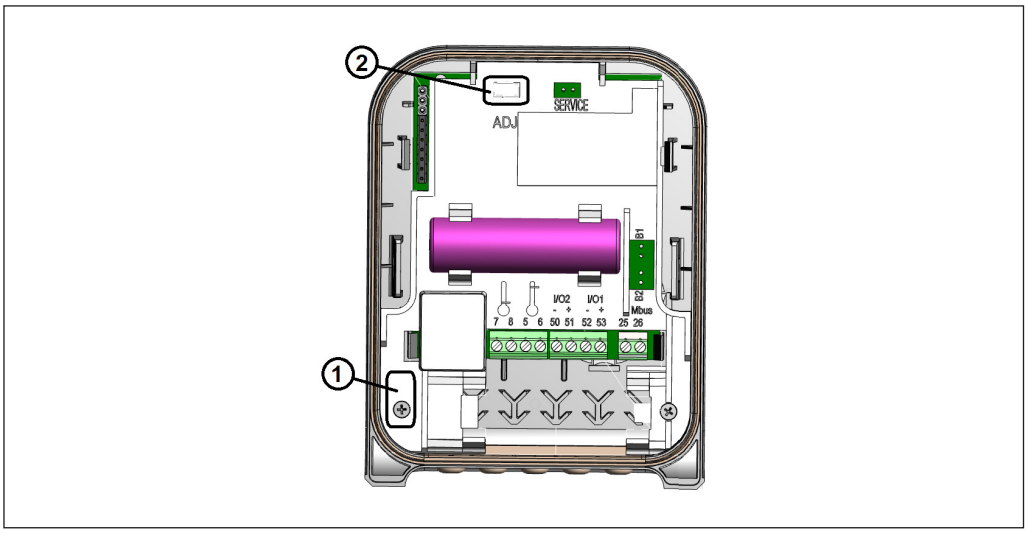
3. Turn off the test mode

The test mode can be turned off in one of the following ways:
- long press the button selects page „INF“ on the meter's LCD → short presses the button selects „tEST off“ on the LCD → long press the button and the test mode is turn off, there is no sign „TEST“ on the screen (when the test mode is activated in accordance with section 1.1 of this instruction);
- by short-circuiting the contacts “SERVICE”, (when the test mode is activated in accordance with section 1.2 of this instruction);
- via the optical interface, using the software “SonoMeter 40 Configurator” and optical head that complies with EN 62056-21 standard (when the test mode is activated in accordance with section 1.1 or 1.3 of this instruction);

NOTE: the meter switches to the operating mode by itself 12 hours after activation the test mode.

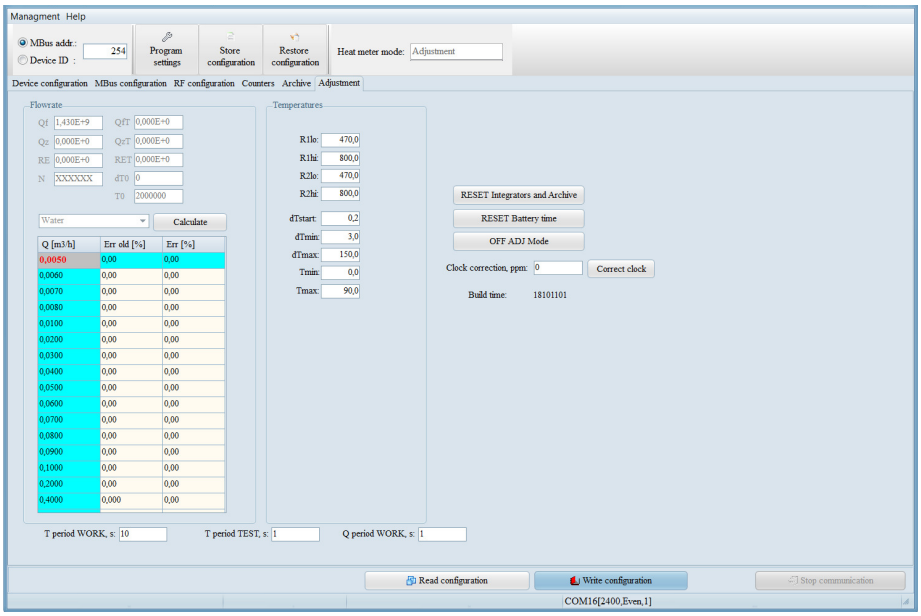
4. Meter calibration/ adjustment mode

Meter calibration/adjustment allows to adjust the meter measurement of volume single point characteristics.
It can be done by using the software “SonoMeter 40 Configurator” and optical scan head in accordance with EN 62056-21 standard.
1) The calibration/adjustment mode can be activated by removing protecting lid (2) of ADJ and shortcutting the pins.
2) The correction parameter for volume can be entered in the SonoMeter 40 Configurator fields “Err[%]”. The correction parameter is confirmed by clicking “Calculate”. “Write configuration” stores the adjustments into the meter permanent memory. “Read configuration” is used to verify that the changes are stored.



NOTE: <u>With the removed ADJ protective cover. The Manufacturer warranty is void!!!</u>

4. Meter calibration/ adjustment mode
(continuous)



RESET Integrators and Loggers – intended to reset the integrator and logger values to a zero.
RESET Battery time – intended to reset the battery lifetime after replacement (the new battery replacement date will be calculated according to the set Battery lifetime value).
OFF ADJ mode – intended for deactivation of the Adjustment mode.

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