

**User Guide** 

# **Ultrasonic energy meter SonoMeter 40** Test and calibration instruction





### SonoMeter 40

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User Guide General information	SonoMeter 40				
	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	<ul> <li>The test mode is activated by the meter's control button according to the following procedure:</li> <li>long press the button, on the meter's LCD select page "INF";</li> <li>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 m<sup>3</sup>" (when it is necessary to activate the volume pulse output via the optical interface);</li> <li>long press the button, open the 4- digits security password input window:</li> <li>PS: 0</li></ul>				
	<ul> <li>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;</li> <li>the password value is fixed: 0001.</li> </ul>				

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 recolution onergy	TEST 000000.00 Wh	Updated every second.
4.1	High-resolution energy	TEST PULSE	Indicated as "PULSE", if the energy test pulse output is activated.
		TEST m <sup>3</sup> 00.000000	Updated every second.
4.2	High-resolution integrated volume	test m <sup>3</sup> PULSE	Indicated as "PULSE m <sup>3</sup> ", 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 <sup>3</sup> 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
4./	To activate volume pulse output (when energy pulse output is active)	TEST m <sup>3</sup> 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.

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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).

lanagment Help									
MBus addr.: Device ID : 254	Program settings	Store configuration	Restore configuration	Heat meter mode: Normal	operation				
Device configuration MBus c	onfiguration RI	configuration C	ounters Archive	Adjustment					
LCD						Device mode		Integrators	
		10100.7				qp,m3/h - L,mm - qp/qi:	1,5-L110-100 🔻	E Measument units:	MWh 🔻
1.1 Enor/Date:	3		time:			Tmax, °C: 90 -	dTmin, K: 3 🔻	E decimal point:	0,001 👻
1.3 E*:	1	1.11 Device II	);			Limid type:	Water	Twiff	
1.4 E1:	1	1.12 Control n	umber: 🗸			Vasting Vasting Cooling V	lasting w	Tariff 1 Caustan	<b>x</b>
1.5 E2:	~	1.13 Error cod	e: 🗸			Freeding riceating-Cooling. H	ioaring V	Taniff I Counter.	E *
1.6 V:	~	1.14 Flow rate				Pow/Keturn:	etum 🔻	Tantt I Trigger:	P, KW -
	~	1.15 Battery n	eplacement: 🥌			Set month day:	31	lanff 1 Threshold:	0
1.8 V2:	V					Set date of year:	12 🗢 31 🗢	Tanff 1 condition:	MAX 🔻
BIL								Tariff 2 Counter:	E v
2.1 E / Data:		9 E*mth / Data:	1	2.17 Qmax mth / Data: 2.18 Timer with / Data:	1	Power supply:	1 batt. 🔻	Tariff 2 Trigger	P kW
2.2 E*/ Data:		11 E2mth / Data:	~	2.13 Timax mtn / Data: 2.19 T2max mth / Data:	1	Battery life time, year:	16,0	Tariff 2 Threshold	0
2.4 E2 / Data		12 Vmth / Data:	1	2.20 dTmax mth / Data:	2	Transport mode:	Off 🔻	Taniff 2 condition:	MAY
2.5 V / Data:		13 V1mth / Data	1	2.21 T1min mth / Data	4			Tariff 2 condition.	MAA V
2.6 V1 / Data:	2	.14 V2mth / Data:	1	2.22 T2min mth / Data:	~	In Out		MBUS	
2.7 V2 / Data:	2	15 Pmax mth / Da	ta: 🗸	2.23 dTmin mth / Data:	~	Chanal 1 On/Off		Additional inteface type:	Off 👻
2.8 Emth / Data:	2	16 P*max mth / D	ata: 🖌	Data LOG deapth, month:	36 🔻	Input/Outpt:	Out 👻	Credits Optic:	65534
						Parameter:	E 💌	MBus1 inteface, credits:	0
3.1 P:	/ 3.9 Time:	1	6.17 V2 Set (Transp	port): 😺 3.25 SN:	~	Pulse value and decimal poi	nt: 0,001 MWh 👻	Aditional interface, credit	s 0
3.2 Q:	3.10 Yeat se	t date: 📈 🛛	.18 MBUS1 Adr:	3.26 td:	$\checkmark$			RE inteface credits:	0
3.3 T1:	2 3.11 Month	set date: 🗹 🗄	8.19 MBUS1 bps:	3.27 tbat:	~	Chanal 2 On/Off		MRUSI hundrate: 2400	w Fran w
3.4 T2:	/ 3.12 Tariff1	config.: 🗸 🗄	3.20 MBUS2 Adr:	✓ 3.28 Test On Wh	~	Input/Outpt:	Out 👻	2400	* Level *
3.5 dT:	/ 3.13 Tariff2	config.: 🖌	8.21 MBUS2 bps:	3.29 Test On m3	~	Parameter:	E 🔻	MBUS2 baudrate: 2400	▼ Even ▼
3.6 Set (Transport):	3.14 In/Out	config.: 🖌	5.22 Medium:	✓ 3.30 Install:	~	Pulse value and decimal poi	int: 0,001 MWh 👻	Optic address:	1
3.7 Batt Data:	3.15 In/Out.	kontig.: 🖌		~				MBUS1 address:	
3.8 Data:	3.16 V1 Set	i ransport): 🖌 👔	5.24 SW versija:	*				MBUS2 address:	
OFF Tran	sport mode	ON TEST	(E pulses) mode	Start E-test		Device S	N: 03000492	Manufacturer code:	AXI
OFF Ser	vice mode	ON TEST	(V pulses) mode	OFF TEST mode		Device I	D: 03000492	Medium code: 0D (F	leat/Cold) 🔻
				🗗 Read	configuration	🛃 Write or	onfiguration	Stop of	mmunication
							(	COM14/2400 Even 11	

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);

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- 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 <sup>3</sup> /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<sup>3</sup>/h):



- 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	Energy pulse value based on displayed energy units:					
of the heat meter, m <sup>3</sup> /h	"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			

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User Guide	SonoMeter 40
User Guide 3. Turn off the test mode	<ul> <li>SonoMeter 40</li> <li>The test mode can be turned off in one of the following ways: <ul> <li>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);</li> <li>by short-circuiting the contacts "SERVICE", (when the test mode is activated in accordance with section 1.2 of this instruction);</li> <li>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);</li> </ul> </li> </ul>
	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: With the removed ADJ protective cover. The Manufacturer warranty is void!!!

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#### **User Guide**

#### SonoMeter 40

#### 4. Meter calibration/ adjustment mode (continuous)

Managment Help							
MBus addr.:		Ø 2	×3				
Device ID :	254 1	Program Store settings configuratio	Restore configuration	Heat meter mode:	Adjustment		
Device configuration	MBus configura	ation RF configuration Co	unters Archive Ad	ljustment			
Flowrate			Temperatures				
Qf 1,430E+9	QfT 0,00	0E+0					
Qz 0,000E+0	QzT 0,00	0E+0	R1lo:	470,0			
RE 0,000E+0	RET 0,000	0E+0	R1hi:	800,0			
N XXXXXX	0 0Tb		R210:	470,0			
	то 2000	0000	R2hi:	800,0	RESET Integrator	s and Archive	
			d Transa	0.2	DECET D-4		
Water	*	Calculate	distant	3.0	KESET Dat	ery une	
Q [m3/h]	Err old [%]	Err [%]	dinm.	3,0	OFF ADJ	Mode	
0,0050	0,00	0,00	dimax.	130,0	Clock correction, ppm:	0 Correct clock	
0,0060	0,00	0,00	1 min	0,0			
0,0070	0,00	0,00	Tmax:	90,0	Build time:	18101101	
0,0080	0,00	0,00					
0,0100	0,00	0,00					
0,0200	0,00	0,00					
0,0400	0.00	0.00					
0.0500	0.00	0.00					
0,0600	0.00	0,00					
0,0700	0,00	0,00					
0,0800	0,00	0,00					
0,0900	0,00	0,00					
0,1000	0,00	0,00					
0,2000	0,00	0,00					
0,4000	0,000	0,00					
T period WOI	RK, s: 10	T period TE	T, s: 1	Q period WORK,	s 1		
					Read configuration	L Write configuration	- Stop communication
						COM16[2400 Even 1]	4

**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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