

Compact heating meter

Ultrasonic

AT 7500F

Dimension range DN 15-100	PN 16/25	Temperature range +5°C to + 105°C	Material Brass/Cast iron
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Range of application

For measuring thermal energy in heating and cooling systems with water as a heat and cold carrier (no additives such as glycol etc.). The complete meter consists of a flow meter of ultra sound type, electronic integrator with LCD display and temperature sensor pairs PT 500.

Program text

UGA.50 *Meter with compact function

Compact heating meter AT 7500F...complete with flow meter of ultrasonic type, integrator with LCD display and temperature sensor q_p m^3/h , DN i performance.

Remote reading module for connection to a superordinate data system.



AT 7500F

Quality assurance

The meets the demand from SS-EN1434 MID class 2, and performance according to SWEDAC 2006:4- Certified by registered body LEI, certification number LT-1621-MI004-PTB013.

CE-marking

According to MID 2004/22/EG

Material specification

	Components	Material
1	Meter body - Connection (thread/flange)	Brass/Cast iron (DN50-100) Brass/Cast iron (DN50-100)
2	Membrane to ultra sound element	Stainless steel 1.4435
3	O-ring	EPDM 70 Shore A
4	Integrator protection	Polycarbonate
5	Temperature sensor - Protection sleeve - Connection cable	Stainless steel 1.4435 Silicone

Dimensions and weight

Threaded connection, permanent flow q_p 1,5 to 10

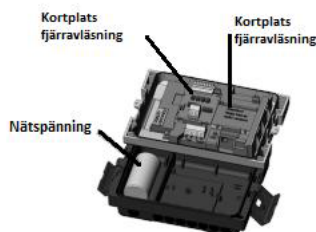
	1,5	2,5	6	10
Permanent flow q_p (m^3/h)	1,5	2,5	6	10
Connection after gauge coupling	DN 15	DN 20	DN 25	DN 40
Build length	110	130	260	300
Weight	0,8	0,9	1,5	3,0
Meter thread *	G 3/4"	G 1"	G 1 1/2"	G 2"

Measurements in mm, weight in kg *) The gauge's thread is one size larger than connection after gauge coupling

Flanged connection, permanent flow q_p 2,5-10

	2,5	6	10	15	25	40	60
Permanent flow q_p (m^3/h)	2,5	6	10	15	25	40	60
Flanged connection	DN 20	DN 25	DN 40	DN 50	DN 65	DN 80	DN 100
Length (mm)	190	260	300	270	300	300	360
Weight	3,0	4,6	6,8				

Measurements in mm, weight in kg



Function and design

AT 7500F is a ultrasonic thermal energy meter for measuring thermal energy in heating and cooling facilities with water as fluid (not glycol). Ideally for, as an example, district heating and 6°C/12°C cooling systems. The meter consists of a flow meter of ultrasonic type, paired PT 500 temperature sensors and a separate electronic integrator with multifunction LCD display for display of accumulated energy and volume. There is also a possibility to read instantaneous values for flow, effect, temperature for inlet, return and temperature difference, max and minium values, and self test with error indication.

AT7500F has a flow meter of ultra sound type, without movable parts. This means that it is free from parts that can be worn out and, since it doesn't have any magnetic parts, is not sensitive of water with a high magnetite content. The flow meter is of direct ultrasonic type according to the duration difference method with an integrated sensor and receiver in each end of the meter pipe. Every measure cycle (one per second) is started by the up stream sensor sending an ultra sound impulse to the down stream receiver/sensor. The time interval between sent and recieved signal is calculated very precisesly by the flow meter. After that the sensors change function. The original receiving sensor now becomes the sending sensor and the ultrasonic signal is sent in the opposite direction. Once again the time interval between sent and received signal is calculated. The time interval in the flow direction is quicker than against the flow. By comparing this time difference the ultrasonic meter can accurately calculate the flow. The flow value is integrated with with the temperature loss over the circuit and the so called s k K-factor, which is calculated and presented as energy amount on the display.

The meters are delivered as a standard with mains supply operation but battery operation is available as an option. The meter should always be installed in the colder pipe line, in other words the return pipe line in heating systems and the input pipe line on coolings systems.

The meter can be supplemented with a remote reading module of the type M-bus, pulse or 4-20 mA signal.

Flow meter

Flow meter	DN	15	20	25	40	50	65	80	100
Nominal flow, q_p	m ³ /h	1,5	2,5	6	10	15	25	40	60
Max flow, q_s	m ³ /h	3	5	12	20	30	50	80	120
Minimum flow, q_i	m ³ /h	0,006	0,010	0,024	0,04	0,06	0,1	0,16	0,24
Start flow	l/h	2,5	4	7	20	40	50	80	120
Overload flow	m ³ /h	4,6	6,7	18,4	24	36	60	90	132
Pressure loss by q_p	mbar	75	100	128	140	140	75	80	75
Dynamic measuring area (q_p/q_i)		250:1	250:1	250:1	250:1	250:1	250:1	250:1	250:1

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Technical data

Pressure and temperature

Pressure	max 16 bar, max 25 bar flanged version
Temperature range	+ 5°C to + 105°C
Measuring cycles (specified in seconds)	
Volume	
Corded operation	1/8 sec
Battery	1 sec
Temperature	
Corded operation	2 sec
Battery	16 sec
Energy, effect	2 sec
LCD	2 sec

Measuring characteristics

Measuring characteristics

Normal flow q_p - minimum flow q_i	250:1 (all models)
Max flow q_s - normal flow q_p	2:1 (all models)
Temperature range media	+ 5 - +105 °C
Accuracy	Class 2 according to EN 1434-1 (all models)

Integrator

Integrator

Temperature range, T	1- +180 °C
Temperature difference range, ΔT	3-177 K
Electromagnetic environment class	Class E 1
Mechanical environment class	Class M 1
Surrounding temperature	5-55 °C
Storage temperature	-25 - 70 °C
Protection class	IP 54 (only flow sensor IP 68)
Display	LC-display with 8 figure display with alternative symbols
Measure unit of consumed energy	kWh / MWh
Temperature sensor	PT 500, dual wire connection
Energy consumption	230 VAC as an option 3,6 vDC lithium battery.
Communication ports for remote reading	2 st
Data ports	- Optic (according to EN 61107, data protocol according to EN 60870-5)
Length of cable between integrator and flow gauge	1,5 m (DN15-20) 3m (DN25-100)
Measurements (BxHxD)	100x90x54 mm

Temperature sensor

Temperature sensor, paired

Resistance elements	Platina Pt 500 according to DIN EN 60751
Temperature range	-20- +150 °C
Insert length/diameter, standard	
Threaded meter DN 15 - DN 40	DN 15-25 45 mm/5,2 mm, 2 m
Flange meter DN 20-40	DN 20-25 45 mm/5,2 mm
Flange meter DN 50-100	DN 50-100 45 mm/5,2 mm
PTB approval	K 7.2

Consumption register

The consumption register is shown on a 8 figure LCD where the values for energy, effect, volume, volume flow, temperature inlet and return, split T and eventual error code is displayed.

The necessary settings and changes are possible when the optical interface or through M-bus.

Display menus

The energy meter has a LCD-display with 8 figures for main values and 6 different menus. Through a simple button press on the rise key (black button) you will be moved between different measure values within a menu group. To cyclically browse between the 6 different menu groups you hold the rise key (black button) down for 3-4 seconds.

The six different menus that are shown are specified below:

1: Main menu

- Accumulated consumption (energy volume)
- Instantaneous values (effekt, flow, temperature, delta T)

2: Reading menu

- Consumption values on a specific date

3: Information menu

- Software version
- Current date and time
- Next target day
- Settings of tariff values
- Breaking point settings between heating and cooling gauging
- adjusted M-Bus addresses

4: Pulse values

- Pulse input 1 and 2 (pulse numbers)
- Pulse output 1 and 2 (pulse numbers)

5: Tariff menu

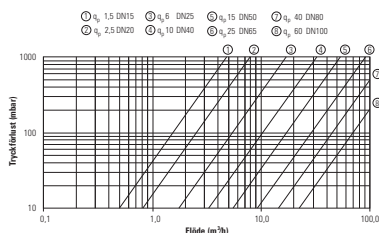
6: Month menu

- Monthly consumption values

7. Cooling register

Sizing

Sizing the meter with flow between q_p and q_s . Do not oversize, if there are more than one possible size, pick the smaller one, control that the pressure loss isn't too big (max 250 mbar). This meter type can not be worn out through overload, since it lacks movable parts. If the nominal flow is exceeded by more than 140% no thermal energy measurement will take place.



Communication ports

For remote reading of measure values and connection to DUC/superordinate control system etc. there are several plugin modules for the energy meter. The integrator is provided with two card slots for remote reading modules. 2 M-bus cards, 2 pulse cards or 1 M-bus card and 1 pulse card can be installed at the same time. For analog remote reading only one card can be used.

The following modules can easily be installed without damaging the verification seal:

M-bus module according to EN 13757, AT 7275EW-M

For remote reading through the M-bus of the meter's effect, flow, temperature etc. It's done through the module's primary or secondary address with a M-Bus master or a level converter (300 or 2400 Baud.). The primary address is, when newly installed, set to "000" in port 1 (right slot) and last two digits in serial number for port 2 (left slot). This can be changed to an address from "001" to "250". The secondary address represents the meter's manufacturing number in a 8 figure serial number. Both addresses can be programmed in the meter or through the M-bus loop and service software Izar Mobile.

If AT 7500F is rebuilt to battery operation, it is recommended to set the M-Bus to read the meter at most once per hour.

Analog module, AT 7275EW-AN

For remote reading through analog 4-20mA signal with two programmable passive outputs, used for frequent measure readings.

Remote reading output/pulse input AT 7275EW-P

For remote reading through pulse of the meter's volume and/or heat quantity. The meter has two open-collector connections bounce free for counting of pulses in an external counter or superordinate systems. By delivery the heating meter is configured with 2 outputs.

Optical interface

An optical data port are also available as a standard and can be used for reading or parameterize the gauge through a PC and service software (e.g. IzarSet).

Remove reading / pulse output

Specification pulse output	
Pulse length	roughly 125 ms +/- 10%
Max voltage	3-30 V DC
Max current	0,02 A

Pulse value

Nominal size q_p (m^3/h)	Pulse value	Pulse value
	Energy	Volume
1,5 to 10	1 kWh (0,001 MWh)	10 liters (0,010 m^3)
15 to 60	1 kWh (0,001 MWh)	100 liters (0,100 m^3)

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Accessories and options

Accessories	Order number
Couplings (2 per meter) for G 3/4 (is also a part of the installation kit below) - G 2	AT 7056A15, 7056-20 /-25 /-40 x 2 st
Stainless steel thermal well G 1/2 45 mm (is also a part of the installation kit below) 52 mm 85 mm	AT 7279-45 (1st DN15-20, 2st DN25) AT 7279-52 (2st DN40) AT 7279-85 (2st DN50-100) Se AT 7278
Ball valve with inner thread. for 27,5 alternatively 45 mm temperature sensors Nickel-plated brass. G 1/2-G 1	Se AT 7278
Installation kit for qp 1,5 (DN 15). Contains: - 2 G 3/4 meter couplings with gaskets - 1 thermal well (45 mm) - 1 110 mm spud	AT 7299-15INST
Installation kit for qp 2,5 (DN 20). Contains: - 2 G 1 meter couplings with gaskets - 1 thermal well (45 mm) - 1 130 mm spud	AT 7299-20INST
Transition piece to obtain 130 mm G 1 build length from 110 mm G 3/4	AT 7055R20-25

Accessories and options

Remote reading modules	
M-Bus module for remote reading according to interface EN 13757-3	AT 7275EW-M
Pulse module for remote reading via open collector pulse	AT 7275EW-P
Analog signal for communication through analog signal 4-20 mA	AT 7275EW-AN
Spare parts	
Temperature sensor paired Pt 500, cable length 2 m. Length 45 mm	AT 7276-45PT500
Batteri 3,6 volt battery for battery powered unit	AT 7500F-BAT

Accessories and options

Options	
Compact meter - in flanged performance *)	AT 7500F...
*) See the section how to order	

Installation

erDuring the meter installation it should be taken in to account that the measuring is done correctly metrologically, and that it is service and reading friendly. The flow meter should be mounted in the pipe line that has the lower temperature, i.e. for heating systems in the return pipe and in cooling systems in the inlet pipe. If the meter is installed on the wrong pipe line the meter is no longer type approved, the measured values are not trustworthy, faulty or they may be missing entirely. During installation in the wrong pipe line the error code "E3" will be shown. Some configuration adjustment of installation in warm pipe line can not be done, a new meter has to be ordered.

The flow meter can be mounted both horizontally and vertically. A straight line before or after the meter isn't necessary, but a calm undisturbed straight line of 3xDN before the meter is recommended to obtain a good and stable flow profile.

Rätten till ändringar utan förbehåll förbehåll.
Armatec ansvarar inte för eventuella tryckfel eller missförstånd.
Dokumentet får kopieras endast i sin helhet.

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The flow meter should be placed on a low point to prevent the effect of air in the system. The placement of the flow meter should also not be directly after a vent or before a pump. It is recommended to install a shut down valve before and after the meter to facilitate a possible replacement of the meter. The meter is recommended to be installed horizontally with the meter pipe tilted 45° to the side.

Note! Meters with threaded connection is only intended for flat seal with required water meter couplings and fiber gaskets, e.g. AT 7056. Threaded joint with, as an example, flax or corresponding seal can not be used.

By media temperature over 90°C, or by contact high surrounding temperature (over 55°C) the electronic parts (integrator) should be mounted in an environment with room temperature. The standard performance has a 1,5 m between integrator and flow sensor. This cable can not be cut or spliced since the integrator and flow sensor are calibrated and certified as a unit. If the cable is cut the compact meter will not work and will need to be replaced by a new compact meter. The integrator is prepared for wall mounting.

Thermowell is used for mounting in G 1/2 pipe sleeve is used with advantages like: For working protection and facilitate replacement of temperature sensor without needing to drain the system. In the DN15 and DN20, one temperature sensor is already pre-mounted in the flow sensor.

Connection of temperature sensors with dual wire connection.

The sensors are marked with blue and red color marking respectively for mounting in cold and hot flow line respectively. The sensor's/thermal well's tip should be placed in the middle of the flow.

For detailed information please see the installation section.

Maintenance and spare parts

The meter has a NOWA compatible verification for revision of an accredited control body or laboratory after expiration time.

The replaceable units in the meter is the remote reading module and the temperature sensor.

Marking

Manufacturing, type designation "EW 773", manufacturing number, manufacturing year, flow data, flow direction, temperature range, class IP, CE marked and LEI certification number.

How to order compact meter

Flanged performance, corded operation, installation in colder pipe lines				
AT-no	qp	Length (mm)	DN	Comment
7500FG15-1,5	1,5	110	15	
7500FG20-2,5-130	2,5	130	20	
7500FG25-6	6	260	25	
7500FG40-10	10	300	40	

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How to order compact meter

Flanged performance, corded operation, installation in colder pipe lines

AT-no	qp	Length (mm)	DN	Comment
7500FG15-1,5	1,5	110	15	
7500FG20-2,5-130	2,5	130	20	
7500FG25-6	6	260	25	
7500FG40-10	10	300	40	

How to order installation details

AT-number	Description
7299-15INST	Installation kit to DN15: qp 1,5
7299-20INST	Installation kit to DN20: qp 2,5
7299-25INST	Installation kit to DN25: qp 6
7299-40INST	Installation kit to DN40: qp 10
7056A15	Coupling DN15 (Also part in installation skit)
7056-20	Coupling DN20 (Also part in installation skit)
7056-25	Coupling DN25
7056-40	Coupling DN40
7279-45	Thermowell is used for threaded and flanged meters DN15-25 (is also part of an installation kit) DN15-20 needs 1 thermowell and DN25 needs 2 thermowell
7279-52	Thermowell is used for threaded and flanged meters DN 40 To DN40 2 Thermowell are required
7279-85	Thermowell is used for threaded and flanged meters DN 50-100 To DN50-100 2 Thermowell are required

How to order remote reading modules

AT-no	Description
7275EW-M	M-bus module
7275EW-P	Pulse module
7275EW-AN	Analog module

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