

Heat Meter Integrator

Features



- Battery backup
- Data logging for up to 15 years
- Measures heating or cooling and heat/cooling

Specification

Display type	7 (8) digit LCD, 7.6mm high
Nom. flow rate (Qp)	0.6m ³ /h to 1000 m ³ /h
Pulsed Output	Pulse length = 32ms, 30Vdc @ 10mA max.
Sensor element	Matched pair of PT500b (to EN 60751)
Sensor cable	Silicon
Sensor lead length	1.5m, 3m or 5m
Memory	EEPROM
HiCap battery	3.65Vdc, lithium
HiCap battery life	Up to 10 years
Backup battery	AA lithium cell
Backup battery life	Up to 20 years
Power supply options:	
	230Vac
	24Vac
Power consumption	<1W
Weight	400g
Temperature range:	
Ambient	5 to 55°C
Media	2 to 180°C
Storage:	-20 to +60°C
Protection	IP54
Conformity	EN 1431 Class C (MID Class E2)
Country of origin	Denmark

Product Codes

MW-HM601-67-C Heat meter integrator

Top output modules

- 0 None
- 8 Pulse output

Base output modules

- 00 None
- 20 M-bus
- 24 LonWorks FTT10A/pulse inputs*

Supply modules

- 2 Battery
- 7 230Vac
- 8 24Vac

PT500 Temp. sensors

- A Pocket sensor set with 1.5m cable
- B Pocket sensor set with 3m cable
- C Pocket sensor set with 5m cable
- D Pocket sensor set with 10m cable

Flow sensor

- L Water meter with reed switch
- 1 Ultrasonic meter (heating only)**

Meter type

- 2 Heating system - MID market
- 5 Cooling system
- 6 Heat/cooling system

* -7 & -8 Supply module only

** Please refer to MW-65-5 datasheet

Replacement items:

MW-HM66-PK65	65mm Stainless steel pocket
MW-HM66-3M	Matched sensors with 3m cable
MW-HM66-5M	Matched sensors with 5m cable
MW-HM66-10M	Matched sensors with 10m cable

Technical Overview

The MW-HM601 series heat meter integrators are designed to measure and record heat energy in installations where water is the primary heat transfer medium.

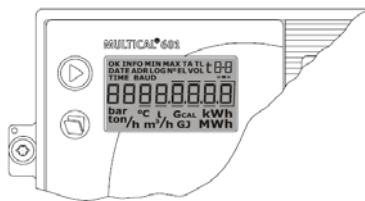
The most common application for heat meters is to provide accurate energy consumption data for sub metering or billing purposes

The MW-HM601 receives volume pulses from the connected flow meter and calculates the energy for every predetermined water volume. The energy calculation includes temperature measurements in flow and return as well as correction for density and heat content according to EN 1434.

Display

The MW-HM601 is equipped with a clear LC display including 8 digits, units of measurement and information panel. In connection with energy and volume readings 7 digits and the corresponding units of measurement are used, whereas 8 digits are used when e.g. a meter number is shown.

As a starting point the display shows the accumulated energy. When the push buttons are activated the display reacts immediately by showing other readings. The display automatically returns to energy reading 4 minutes after last activation of the push buttons.



Calculation

MW-HM601 calculates energy based on the formula in EN 1434-1:2004 in which the international temperature scale from 1990 (ITS-90) and the pressure definition of 16 bar is used.

The energy calculation can in a simplified way be expressed as: Energy = V × ΔΘ × k.

The calculator always calculates energy in [Wh], and then it is converted into the selected measuring unit.

$$E \text{ [Wh]} = V \times \Delta\Theta \times k \times 1000$$

$$E \text{ [kWh]} = E[\text{Wh}] / 1,000$$

$$E \text{ [MWh]} = E[\text{Wh}] / 1,000,000$$

$$E \text{ [GJ]} = E[\text{Wh}] / 277,780$$

$$E \text{ [Gcal]} = E[\text{Wh}] / 1163,100$$

Calculation (continued)

V

Is the supplied (or simulated) water volume in m3. E.g. if a CCC code = 119 is used, the calculator will be programmed to receive 100 pulses/liter. E.g. if 10,000 pulses are added this corresponds to 10,000/100 = 100 liters or 0.1 m3.

ΔΘ

Is the temperature difference measured, e.g. ΔΘ = flow temperature – return flow temperature. Please note, that various temperatures are used to calculate ΔΘ as the MW-HM601 calculates various different energy types. Both in the display and during data reading each energy type is uniquely defined, e.g.:

Heat energy: E1 = V1(T1-T2)k



Cooling energy: E3 = V1 (T2-T1)k



k

Is the thermal coefficient of water which is calculated on the basis of formula in EN 1434-1:2004 (identical with the energy formula in OIML R75-1:2002).

Measuring temperature

Temperature measurements are made in connection with each integration (energy calculation) and every 10 sec. when the display shows temperature. The measuring circuit has a temperature range of 0.00°C...185.00°C. In case of a disconnected temperature sensor the display shows 200.00°C and in connection with a short-circuited temperature sensor it shows 0.00°C. In both cases the info code for sensor error will appear.

Information Codes

The MW-HM601 constantly surveys a number of important functions. Where serious errors have occurred in the measuring system or in the installation, a flashing "info" will appear in the display while the error exists. The "Info" panel will flash for as long as the error exists no matter which reading is selected. The "Info" panel will automatically turn off, when the source of error has been corrected.



Info code	Description	Response time
0	No error	-
1	No supply voltage	-
8	Sensor T1 outside measuring range	1...10 min
4	Sensor T2 outside measuring range	1...10 min
32	Sensor T3 outside measuring range	1...10 min
64	Leak in cold water system	24 hours
256	Leak in heating water system	24 hours
512	Burst in heating system	120 sec.

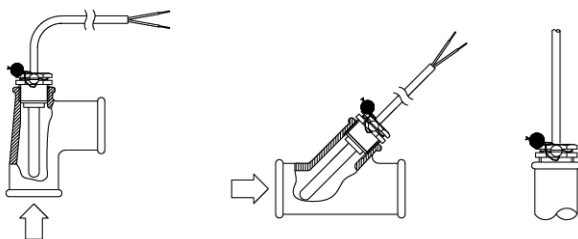
Temperature Sensors

Temperature sensors used to measure flow and return temperatures makeup a matched pair of sensors and must never be separated. The MW-HM601 is supplied with temperature sensors. According to EN 1434 or OIML R75 the cable length must not be changed. Replacement of sensors, if required, must always be made in pairs.

One sensor is marked with a red sign, and must be installed in the flow pipe. The other sensor is marked with a blue sign, and must be installed in the return pipe.

Temperature sensors should be inserted to the bottom of the pockets. If a quick response time is required, "non hardening" heat conducting paste can be used.

Push the plastic sleeve on the sensor cable into the sensor pocket and secure the cable with the supplied M4 sealing screw. Fasten the screw with your fingers only. Seal the pockets using seal and sealing wire.



Power Supply

The MW-HM601 can be power supplied by means of a built-in lithium battery, an internal 24 VAC mains module or an internal 230 VAC mains module.

The two wires from the battery or mains module are mounted in terminals 60 and 61 of the calculator. The polarity has to be correct; connect the red wire to terminal no. 60 (+) and the black wire to terminal no. 61 (-).

-2 Battery supply

The battery is marked with installation year, e.g. 2007, as well as production date.

Optimal battery life is obtained by keeping the battery temperature below 30°C, e.g. by wall mounting.

The voltage of a lithium battery is almost constant throughout the whole lifetime of the battery (approx. 3.65 V). Therefore, it is not possible to determine the remaining capacity by measuring the voltage.

The battery cannot and must not be charged and must not be short-circuited.

Used batteries must be handed in for approved destruction,

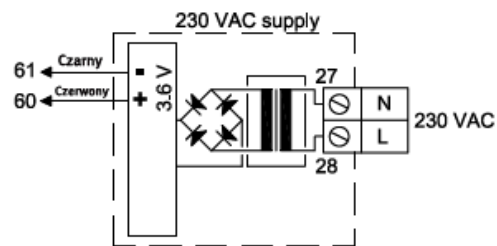
Mains modules

The modules are protection class II and are connected via a two-wire cable (without earth) through the cable bush of the calculator placed in the right side of the connecting base. Use a connecting cable with an outer diameter of 5–10 mm and ensure correct dismantling as well as correct mounting of the cable relief.

Max. permitted fuse: 6 A

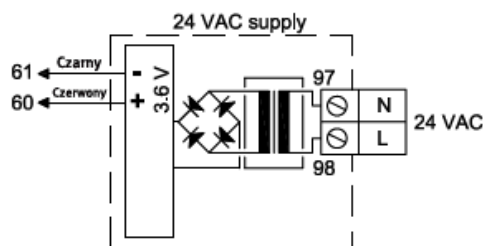
-7 230Vac

This module is used for direct mains connection.



-8 24Vac

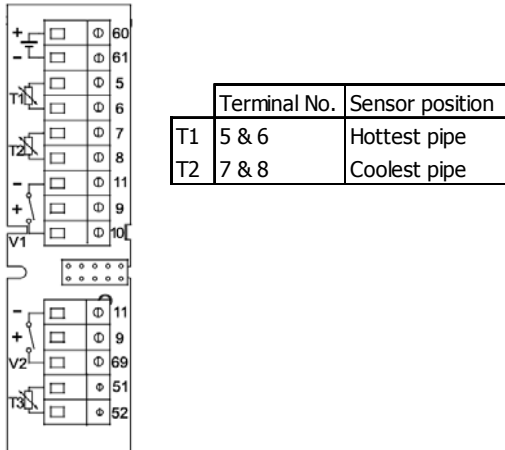
NOTE The MW-HM601 cannot be supplied from 24Vdc.



Connections

The polarity of the temperature sensors T1, T2 and T3 is unimportant. .

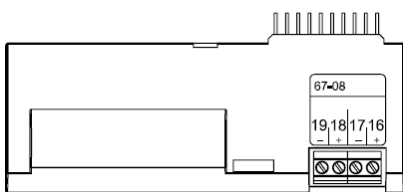
Flow sensors with Reed switch output must be connected to terminals 11-10



Top modules

-08 RTC + hourly data logger + pulse outputs

This top module has two configurable pulse outputs, which are suitable for volume and energy pulses for heat meters, cooling meters and combined heat/cooling meters. The pulse resolution follows the display (determined in the CCC-code). E.g. CCC=119 (qp 1.5): 1 pulse/kWh and 1 pulse/0.01 m3. The pulse outputs are optoisolated @ 30Vdc and 10mA max.



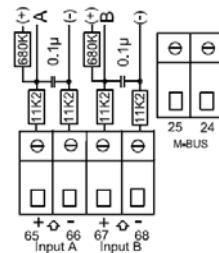
Normally energy (CE) is connected to 16-17 and volume (CV) to 18-19.

Furthermore, the module includes a hourly data logger.

Base modules

-20 M-Bus

M-Bus can be mounted in star, ring or bus topology. Depending on the power supply of the M-Bus Master as well as the total cable resistance, up to 250 meters can be connected.



Cable resistance < 29 Ohm

Cable capacity < 180 nF

The M-Bus network is to be connected to terminals 24 and 25. The polarity is unimportant.

M-Bus is supplied with pulse inputs.

-24 LonWorks, FTT-10A + pulse inputs

The LonWorks module is used for data transfer from the MW-HM601 either for data reading/registration for adjusting purposes via the Lon-bus.

The module must be provided with 24Vac voltage supply.

A list of network variables (SNVT) and further information on the LonWorks module is available on request.

