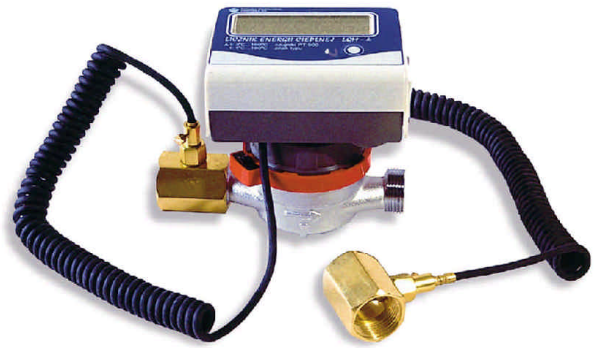
QM-II-K Compact Heat Meter

METRON fmc
Metering & Control



QM-II-K compact heat meter

Compact version of QM-II-K heat meter includes QM-II-K heat integrator and velocity-type flow meter with pulse output placed in one case where computer paired temperature sensors of Pt 500 type are connected. The above version enables the heat meter of compact type to be mounted both on supply and on return of the heating system. Heat meters of compact type are designed mainly for heat energy to be measured in detached houses and multi storey houses with tenants living separately there.
With additional flow meters and pair of temperature sensors mounted, one integrator can measure heat energy consumed in the second heating system /i.e. warm tap water. There is a possibility to measure cold tap water consumption after two additional flow meters have been connected.
We offer supplementary equipment to heat meters such as valves, filters, and connecting accessories.

Basic technical data of QM-II integrator

Specification	Symbol	Unit	Value
Minimal counted unit of heat energy	Q_e	GJ	0,001
Minimal counted unit of heat carrier volume	V_e	m^3	0,001
Maximal power	P_d	kW	0,01 - 99,99
Temperature range of heat carrier	t	°C	1 - 180
Range of temperature difference	Δt	°C	3 - 160
Permissible limit error (calculated according to the formula)	E_i	%	$\pm(0,5+3/\Delta t)$
Threshold power	P_p	kW	0,01 - 99,99
Threshold flow rate	q_p	m^3/h	0,001 - 9,9999
Supply voltage	U_z	V	3,6
Battery life	—	year	5
Protection degree IEC-529	IP	—	IP-54
Ambient temperature	t_a	°C	from 5 to 55
Relative humidity	W	%	< 90

The measurement of the of heat energy consumed is achieved by measuring the volume of the heating agent and temperature difference. The volume of heat energy is limited integral of the volumes resulted from the product of heat coefficient and temperature difference.

In order to measure the volume of flowing heat agent, a velocity-type flow meter with pulse output or ultrasonic flow meter with pulse transmitter open pipe type are used. Temperature measurement of heat agent is synchronised with pulses of the flow meter and then heat energy is calculated.

Heat coefficient "k" is dependant on t and t_2 and the place of mounting of the water meter. It is designated based on an algorithm elaborated by designers of the meter. Records in registers of RAM are transferred to EEPROM non-volatile memory every hour in the moment when the function of transmission of data to reader is activated by the consumer. Calculations of heat energy are omitted in case when t_1-t_2<0.

Growth rates of volume taken from the following periods of integration are the sum of volume of the heat carrier and particular growth rates are designated as products of flow meter constant and number of pulses calculated during that period.

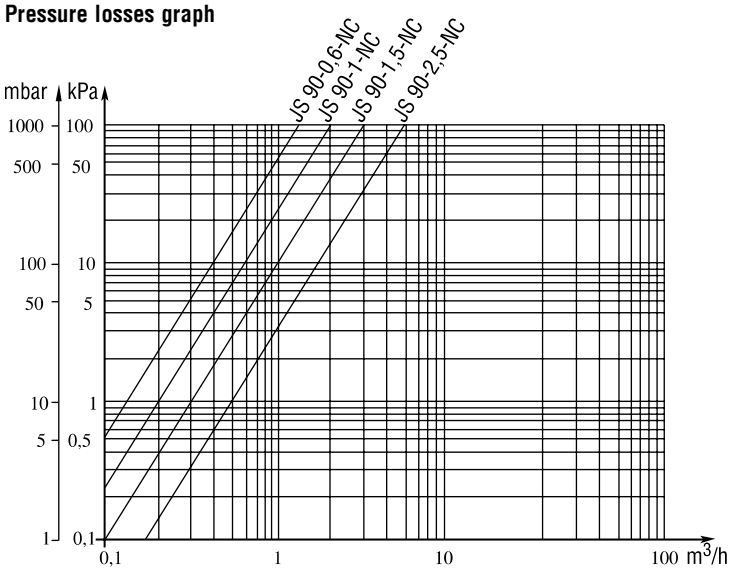
Making use of Pt 500 type temperature sensors, QM-II type integrator determines temperature values of the heat carrier with accuracy of 0,01°C on supply (t_1) and return (t_2).Those data are stored in register of RAM memory. The same method is used to determine the temperature difference.

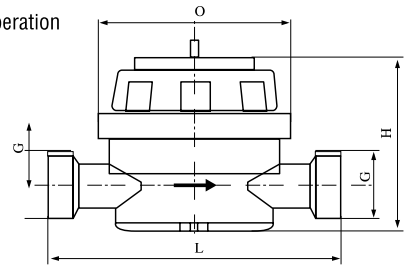
The instantaneous power is determined after the integration period is over when temperature difference is higher than zero and it is calculated as the quotient of the heat energy growth rate and the length of integration period. Integration period is determined by pulses coming from flow meter. Pulses are calculated and when they get the value equal to some constant figure /division scale/ then one integration period will be over and another one will start. After one minute passed from the beginning of the integration period and the amount of calculated pulses is smaller than division scale then the first pulse to be appeared will cause that the period of integration will be completed. The value of instantaneous power for the period of one hour is the maximal power.
The instantaneous and maximal flow rates are calculated by the same method like for suitable power.

There is possibility to measure over-threshold energy by QM – II heat energy integrator. In such situation the threshold for power or flow rate should be settled over which over-threshold energy has to be calculated. The integrator counts the over-threshold energy only from one threshold settled.

QM-II-K COMPACT HEAT METER

Pressure losses graph



Designation of type			JS 90-0,6-NE	JS 90-1,0-NE	JS 90-1,5-NE	JS 90-1,5-G1-NE	JS 90-2,5-NE
Nominal diameter	DN	mm	15	15	15	20	20
Nominal flow rate	q_p	m^3/h	0,6	1,0	1,5	1,5	2,5
Maximal flow rate	q_i	m^3/h	1,2	2,0	3,0	3,0	5,0
Minimal flow rate – horizontal position of operation – H	q_i	dm^3/h	12	20	30	30	50
Minimal flow rate – vertical position of operation – V	q_i	dm^3/h	24	40	60	60	100
Start – up threshold – H	—	dm^3/h	3,5	6	8	8	15
Relative error	E_{Pd}	%	$E_{Pu} = (3 + 0{,}05\ q_p/q)$				
Pulse processing constant	V_i	imp/dm^3	124,780	85,334	60,000	60,000	34,892
Permissible pressure loss	Δp	MPa	0,1				
Nominal pressure	—	MPa	1,5				
Maximal temperature	—	^0C	90				
Position of operation 	—		horizontal H / vertical V				
	G		G 3/4	G 3/4	G 3/4	G 1	G 1
	L	mm	110	110	110	130	130
	H	mm	68				
	D	mm	73				
Weight (without connecting elements)		kg	0,4	0,4	0,4	0,45	0,45