

DESCRIPTION

The 212 heat calculator is designed to measure the energy consumed in hot water heating systems and chilled water cooling systems.

The 212 is a high accuracy heat calculator designed to operate with digital output flow meters. Having an IP66 weatherproof case and various mounting options, the 212 is perfect for the most arduous of installations.

The unit can be supplied complete with temperature probes and will interface with a wide range of flow meters, including positive displacement and inferential water meters, magnetic flow meters with pulse outputs, turbine and impeller meters.

Features

- High accuracy
- 4...20 mA output option
- 4-wire Pt100 RTD temperature inputs
- Heating, cooling and air conditioning
- Calculates and displays volume, energy, temperatures and peak energy
- Built-in density and enthalpy tables
- Meter-bus interface and RS485 communications
- Fully programmable
- Metric or US units
- Watertight to IP66 (Nema 4X)
- Complies with OIML R75 and EN1434 standards
- CE compliant

OPERATION

Provides flexibility to meet all applications

The 212 is able to cross international boundaries in heat meter applications. Datalogging and peak/off-peak operation are standard. In addition, four modes of operation covering heating and cooling ensure that the 212 is flexible enough to meet all energy measurement applications. The high accuracy of the 212 ensures that it meets European and International approvals for heat calculators.

Accuracy to OIML R75 Class 4 and EN1434

The 212 can be supplied with two precision 4-wire Pt100 RTDs and has built-in correction for the non-linearity of the RTDs. For chilled water measurement where the temperature difference (Δt) is likely to be small, provision is made in the set-up program to zero out any offset between RTDs.

The 212 is fully programmable and all set-up data and totals are stored in a non-volatile memory for a minimum of 10 years.



Watertight wall or panel enclosure

The 212 heat calculator is housed in a rugged yet attractive IP66 (Nema 4X) rated polycarbonate enclosure which is completely watertight. Mounting is either by a wall bracket or by panel mount.

Integration with energy management systems

A meter-bus interface enables the 212 heat calculator to be incorporated into energy management systems complying with European IEC 870-5 protocol standards.

The 212 is also supplied with an RS485 bus, which uses industry standard Modbus® RTU protocol, for interfacing to computers and DCS systems.

Data logging flexibility

The 212 heat calculator will store energy totals by hour, day, week or month for up to 31 periods. The totals are stored for each period and can be downloaded to a computer via the meter-bus or RS485 communications ports.

Peak and off-peak registers

If selected, the peak/off-peak feature will assign two separate registers which will totalize peak energy and off-peak energy.

The changeover times between peak and off-peak are fully programmable.

4...20 mA output

A 4...20 mA output option is available and can be programmed to output flow rate, energy flow rate, feed or return temperature or Δt .

NOTE: The high and low alarms are not available if the 4...20 mA option is installed.

Modes of operation

The 212 heat calculator is flexible enough to handle a wide range of applications. Four operating modes are available.

Heating mode where positive Δt 's only are totalized. Cooling mode where negative Δt 's only are totalized. Heating/cooling mode where the flow of energy may be for heating or cooling. In this mode the energy total is increased regardless of whether Δt is positive or negative.

Charge/discharge mode where two separate registers totalize positive and negative totals.

By also measuring the volume of water flowing in the system, the 212 will then compute the energy consumed.

Power is calculated as: $P = V \times \rho \times (h_{TV} - h_{TR})$
where

P = Power (W)

V = Volumetric flow rate (m^3/s)

ρ = Density (kg/m^3)

h_{TV} = Specific enthalpy (J/kg) at feed temperature

h_{TR} = Specific enthalpy (J/kg) at return temperature

The volume, energy, temperatures and peak energy are all calculated and can be displayed on the large LCD.

Calculates the density and enthalpy of water

The 212 heat calculator measures the temperature in the feed and return lines and, from this, calculates the density and enthalpy of the water.

SPECIFICATIONS

Display	Type: 7 digit LCD; 7 numeric digits and 11 alpha characters Digits: 15.5 mm (0.6 in.) high Characters: 6 mm (0.24 in.) high Display units: kWh, MWh, MJ, GJ, therm, BTU x 1000, tons x hours (refrigeration)	Maximum thermal power: 3000 MW Measurement time: 0.5s Accuracy: OIML R75 class 4 and EN1434 Approvals: Approved by Swiss Federal Office of Metrology to OIML class 4 Interference: CE compliance
Power Requirements	DC Power: 12...24V DC @ 100 mA maximum AC Power: Supplied via power adaptor	
Physical	Operating temperature: 5...55° C Storage temperature: -20...70° C Environmental class: EN1434 classes A & C	
Enclosure	Protection: IP66 (Nema 4X) watertight	Materials: Polycarbonate and ABS
Mounting Options	Wall: Wall mount bracket	Panel: Mounting clips
Inputs	Flow meter Type: Frequency or pulse between 0.01 Hz...20 KHz Default low frequency cutoff is 0.25 Hz K-factor range: Programmable in the range 0.001 to 999,999.9 pulses per litre, m3, US gallon or ft3 Signal type: Pulse, open collector, reed switch, proximity switch or coil Location: In either the return or feed lines	Temperature Type: 4-wire Pt100 RTDs to IEC 751. 1/10 DIN Location: 1 x feed line and 1 x return line Linearization: Built-in RTD linearization Temp range: -10...220° C (1...200° C approved) Temp difference: 1...200° K (3...199° K approved) Measurement time: 3s Cable length: < 50 m Connection: G½B
Outputs	Pulse Type: Open collector will sink up to 100 mA, 30V DC maximum Width: 10 ms Function: Volume or energy (scaled) Frequency: 1 pulse every preset number of units of energy or volume total Alarm (Not available with 4...20 mA output) Type: Two solid state opto-isolated relays which will sink up to 100 mA, 30V DC maximum Function: High and low alarms individually programmable as unsigned values for flow rate, energy flow rate, feed temperature, return temperature or temperature difference 4...20 mA output option Function: Volumetric flow rate, energy flow rate, feed or return temperature, Δt Accuracy: 0.1% Span: Programmable Load: Maximum of 300 Ohms at 12V	Meter-bus Type: Conforms to CEN/TC176 meter-bus standard Protocol: IEC 870-5 RS485 Data transmitted: All data calculated can be transmitted Baud rate: 300...9600 baud Parity: Odd, even or none Stop Bits: One or two Bus address: Programmable for multiple instruments on the same bus Protocol: Modbus® RTU

IMPORTANT

Specifications are subject to change without notice.

TERMINAL DESCRIPTIONS

RTD connections		Flow meter signals		Communications		Alarm relays		Power supply	
N°		N°		N°		N°		N°	
1	High temp RTD current (+)	9	Namur switch (+)	24	Meter-bus	52	Relay 0 (+) DC voltage only	50	2V DC supply (+)
2	High temp RTD current (-)	10	Flow signal input	25	Meter-bus	53	Relay 0 (-) DC voltage only	51	12V DC supply (-)
3	Low temp RTD current (+)	11	Coil reference			54	Relay 1 (+) DC voltage only		
4	Low temp RTD current (-)	12	Flow signal common	56	RS485 (+)	55	Relay 1 (-) DC voltage only	58	Shields
5	High temp RTD input (+)			57	RS485 (-)				
6	High temp RTD input (-)					4...20 mA output			
7	High temp RTD input (+)	16	Pulse output (+)			52	4...20 mA (+)		
8	High temp RTD input (-)	17	Pulse output (-)			53	4...20 mA (-)		

PRODUCT CODES

Product code, mounting types & options					
212	.				Heat calculator
Enclosure mounting	0				Wall mounting (no gland holes)
	1				Panel mount brackets
	2				Wall mounting (standard glands)
Output options	0				No option
	1				4...20 mA
Power options		N			DC powered
		E			European adapter (220V AC)
		U			UK adaptor (220V AC)
		A			USA adaptor (100V AC)
		H			Australian adaptor
Temperature sensors		0			Clamp-on RTD, max. 180°C
		8			85 mm insertion
		1			120 mm insertion
		2			210 mm insertion
		C			Custom—Consult factory
Approvals			S		OIML R75 compliant
					No approvals

Typical part number: 212.21NOS



DIMENSIONS

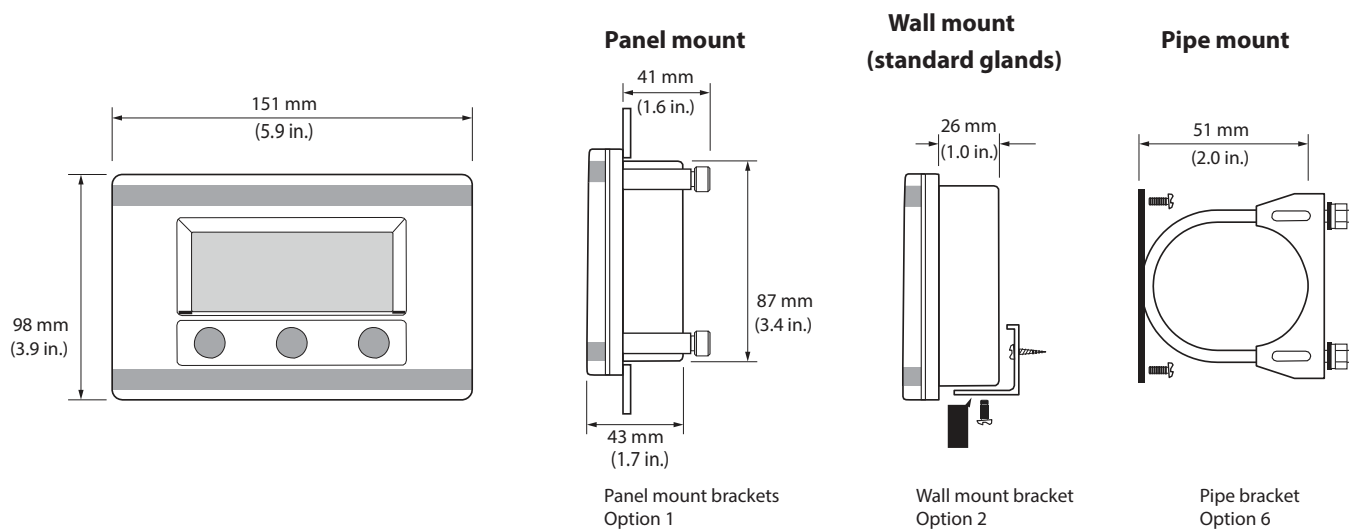


Figure 1: Mounting options

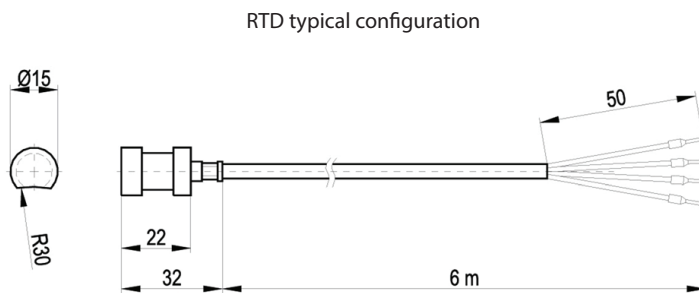


Figure 2: Clamp-on temperature sensors (standard)

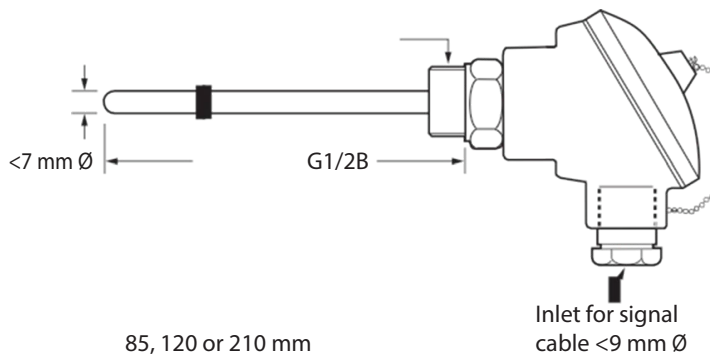


Figure 3: In-line temperature sensors (optional)

Control. Manage. Optimize.

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