

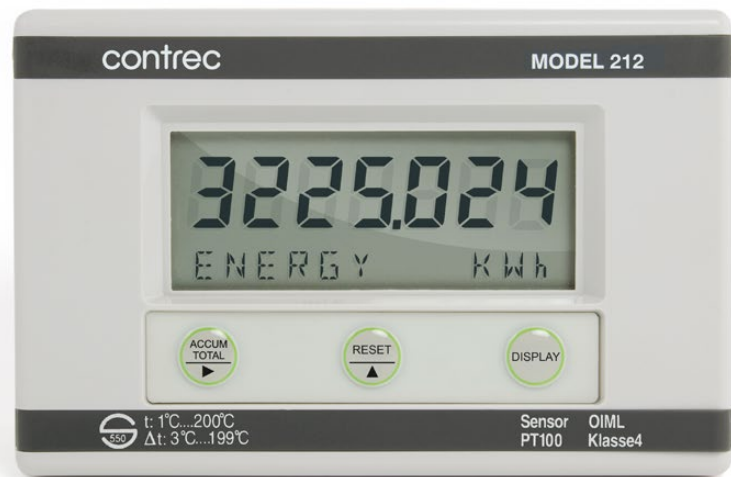
MODEL 212

FEATURES

- High Accuracy
- 4-20mA Output Option
- 4-wire PT100 RTD Temperature Inputs
- Heating, Cooling and Air Conditioning
- Calculates and Displays Volume, Energy, Temperature and Peak Energy
- Built-in Density and Enthalpy Tables
- Meter-bus Interface and RS485 Communications
- Fully Programmable
- Multilingual Capability
- Metric or US Units
- Watertight to IP66 (Nema 4X)
- Complies with OIML R75 and EN1434 Standards
- CE Compliant



Heat Calculator



The 212 Heat Calculator is designed to measure the energy consumed in Hot Water Heating Systems and Chilled Water Cooling Systems.



Field Mounting Heat Calculator

PROVEN IN THOUSANDS OF FIELD INSTALLATIONS
THROUGHOUT THE WORLD.

The 212 is a high accuracy, Heat Calculator designed to operate with digital output flowmeters. Having an IP67 weatherproof case, new tactile keyboard 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 flowmeters, including positive displacement and inferential water meters, magnetic flowmeters with pulse outputs, turbine and paddle wheel flowmeters.



Provides Flexibility to meet all Applications

The 212 is able to cross international boundaries in heat meter applications.

Multilingual capability, 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 inbuilt 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.

Datalogging 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 totalise peak energy and off-peak energy.

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

4-20mA Output

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

Note that the high and low alarms are not available if the 4-20mA 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 totalised.

Cooling Mode where negative Δt 's only are totalised.

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 totalise positive and negative totals.

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.

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 (m³/s)

ρ = Density (kg/m³)

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.

SPECIFICATIONS

Display

Type: 7 digit LCD - 7 numeric digits and 11 alpha characters
Digits: 15.5mm (0.6") high
Characters: 6mm (0.24") high
Display Units: kWh, MWh, MJ, GJ, therm, BTU x 1000, tons x hours (refrigeration)
Maximum Thermal Power: 3000MW
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 to 24Vdc @ 100mA maximum
AC Power: Supplied via power adaptor

Physical

Temperature

Operating: 5 to 55°C
Storage: -20 to +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

Flowmeter

Type: Frequency or pulse between 0.01Hz to 20KHz. Default low frequency cutoff is 0.25Hz
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 RTD's to IEC 751. 1/10 DIN
Location: 1 x Feed Line and 1 x Return Line
Linearisation: Built-in RTD linearisation
Temp Range: -10 to +220°C (1 to 200°C approved)
Temp Difference: 1 to 200K (3 to 199K approved)
Measurement Time: 3s
Cable Length: < 50m
Connection: G $\frac{1}{2}$ B

Outputs

Pulse

Type: Open collector will sink up to 100mA, 30Vdc maximum
Width: 10ms
Function: Volume or Energy (scaled)
Frequency: 1 pulse every preset number of units of energy or volume total

Alarm (Not available with 4-20mA output)

Type: Two solid state opto-isolated relays which will sink up to 100mA, 30Vdc maximum.
Function: High and low alarms individually programmable as unsigned values for flow rate, energy flow rate, feed temperature, return temperature or temperature difference.

4-20mA Output Option

Function: Volumetric flow rate, energy flow rate, feed or return temperature, Δ T
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 to 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

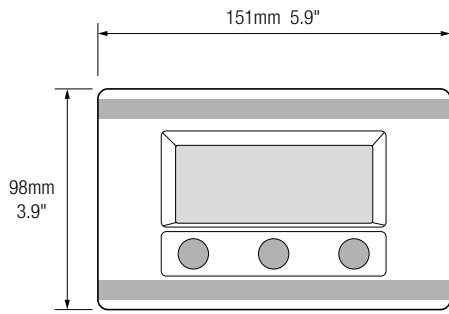
Important: Specifications are subject to change without notice.

TERMINAL DESCRIPTIONS

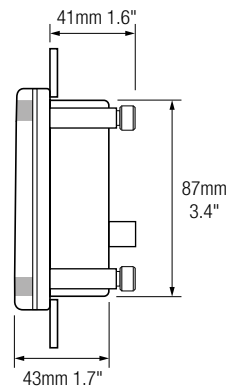
RTD Connections		Flowmeter Signals		Communications		Alarm Relays		Power Supply	
No.		No.		No.		No.		No.	
1	High temp RTD Current (+)	9	Namur Switch (+)	24	Meter-Bus	52	Relay 0 (+) DC voltage only	50	2Vdc Supply (+)
2	High temp RTD Current (-)	10	Flow Signal Input	25	Meter-Bus	53	Relay 0 (-) DC voltage only	51	12Vdc 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 (-)					4-20mA Output			
7	High temp RTD Input (+)	16	Pulse Output (+)			52	4-20mA (+)		
8	High temp RTD Input (-)	17	Pulse Output (-)			53	4-20mA (-)		

DIMENSIONS

Enclosure Dimensions

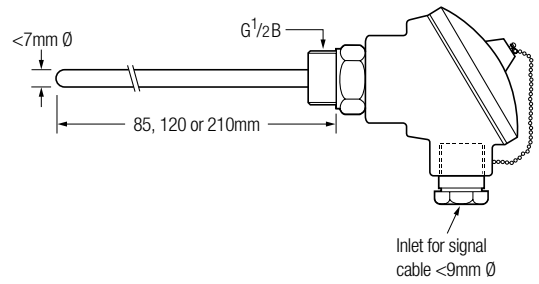


Panel Mount



Panel Mount Brackets
Option 1
(cutout size 87mm 3.4" H
x 141mm 5.6" W)

RTD Typical Configuration



PRODUCT CODES

Product Code, Mounting Types & Options

212 •				Heat Calculator
Enclosure Mounting	0 1 2			Wall Mounting (no gland holes) Panel Mounting * Wall Mounting (standard glands holes)
Output Options	0 1			No Option 4-20mA)
Power Options		N E U A H		DC Powered European Adapter (220Vac) UK Adaptor (220Vac) USA Adaptor (100Vac) Australian Adaptor
Temperature Sensors		0 8 1 2		No Probe 85mm Insertion 120mm Insertion 210mm Insertion
Approvals			S	OIML R75 Compliant No Approvals (<i>leave blank if not with compliance</i>)

Typical Part Number: 212.20E1S

* Note: Cable glands not included

Instruments within the Contrec family:

100 Series – Accurate process instruments for field mounting applications

200 Series – Intrinsically safe, precise and reliable process instruments

400 Series – Rugged and dependable batch and flow control solutions

505 Series – Next generation flow instruments for a variety of applications

515 Series – Precise flow and batch control for more complex applications

LC Series – Robust load computers for petroleum and chemical applications

TRAC 40 – Vehicle mount custody transfer approved registers



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