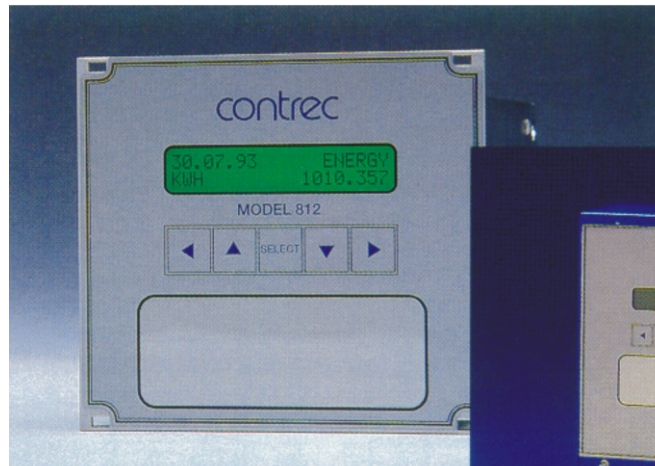


Energy Flow Computer

Model 812

Features

- Displays Energy Consumption, Mass and Volumetric flow
- Hot and Cold water systems
- Stores and displays energy usage over 4 years
- 4-wire RTD temperature inputs
- Designed to OIML recommendation R75
- Programmable SG and Enthalpy Tables
- Programmable language



Overview

Designed to measure the energy used in hot water heating systems and chilled water cooling systems, the 812 Energy Flow Computer provides exceptional accuracy for medium to large systems.

Data storage for trend analysis

The ability to store the energy consumption as daily, weekly, monthly and yearly totals means that trends can be easily analysed and, therefore, operating costs minimised.

Peak measurements of energy and temperature are recorded against time and date, further enabling peak consumption times to be identified.

Input and output options

A wide range of flowmeters can be interfaced to the 812 including turbine, positive displacement and magnetic flowmeters.

Output options include up to four analog (4-20mA) outputs of flow rates and temperatures. Up to four relay outputs are also available and enable setpoints to be programmed on flow rates and temperatures as well as providing a fault alarm.

Fully programmable

The 812 Energy Flow Computer is fully programmable and is initially set-up by the supplier according to application information provided by the customer.

Alternatively, an optional program can be provided on disk, which enables the instrument to be programmed using a laptop or desktop computer.

All parameters, including message displays can be programmed and the totals read via the computer.

Rack or wall mounting

The standard 812 is designed to be mounted in a standard 19" rack, while an optional wall mount version is also available.

The facia provides a window behind which relevant calibration parameters can be displayed as required by some weights and measures authorities.

The rear of the instrument can also be sealed to prevent tampering.

Energy Flow Computer

Model 812

Operation

The temperature in both the feed and return lines is measured via two Pt100 RTDs. Both Specific Heat Capacity and Density Tables are programmed into the Model 812 and by referencing the feed and return temperatures to these tables the flow density and Specific Heat Capacity can be determined.

Because these tables are programmable specifically for the medium (eg. water or water and glycol) a very high level of accuracy can be achieved. Both the Density and Specific Heat are stored as tables in 5°C steps from -40°C to 200°C.

Tables for water are provided as standard and are downloaded from the computer with other operating parameters for the 812. It is possible to enter and store other tables in the computer program, covering all heating/cooling mediums which may be required.

For maximum accuracy, 4-wire RTD measurement is used and internally corrected for non-linearities which are inherent to an RTD. It is recommended that Class A RTDs are used and that they should be purchased as a matched pair.

The energy consumption is calculated as:

$$E = \frac{V \times}{3.6} [C_{P(T_V)} \times T_V - C_{P(T_R)} \times T_R]$$

where E = Power (kW)
 V = Volumetric Flow Rate (m³/h)
 ρ = Density (kg/dm³)
 C_p = Specific Heat Capacity (kJ/kg°C)
 T_v = Feed Temperature (°C)
 T_r = Return Temperature (°C)

The Model 812 will accept flow inputs from most flowmeters and the volumetric flow rate is calculated as follows:

1. For Pulse Inputs

$$V = \frac{\text{Frequency} \times 3.6}{k}$$

where k = pulses per litre

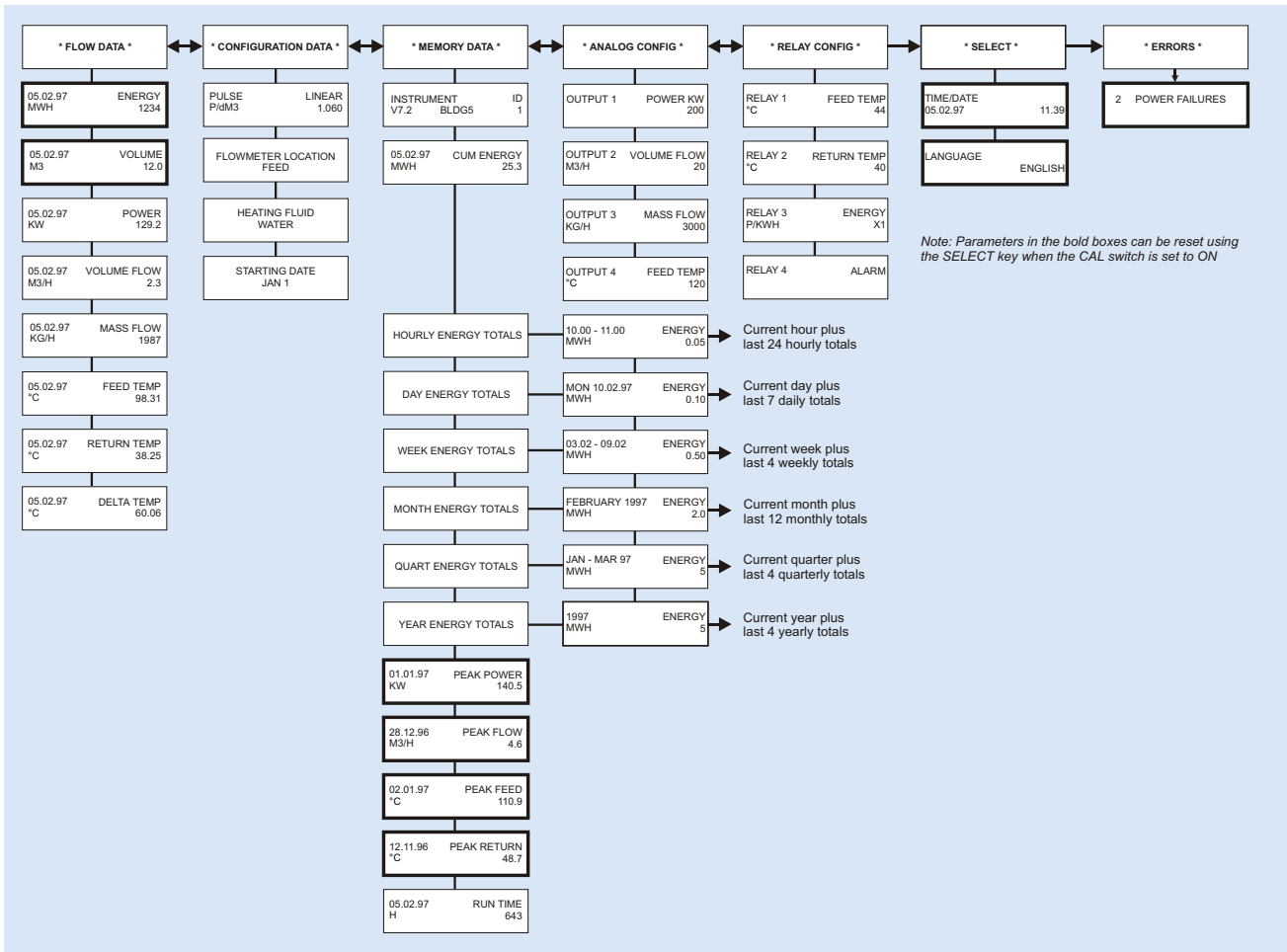
For applications where the flowmeter output is slightly non-linear (such as with turbine flowmeters), up to 10 K-factors can be programmed to correspond with different frequency ranges.

2. For Analog Inputs

$$V = \text{Span} \times A^n$$

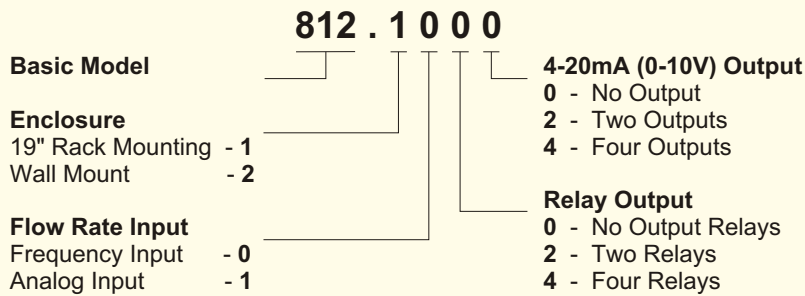
where Span = Flow rate at 20mA in m³/h
 A = The normalised signal input between 0 and 1
 n = 1 for linear flowmeters and 0.5 for differential pressure devices

Display Windows



Ordering Information

When specifying please indicate model(s) required using the following method.



Note: When the Relay Option is installed a 5-24V dc output is also available for powering sensors

General

Display	2 line x 20 character (5.5mm high) backlit LCD.
Range	Energy can be displayed in MWh or kWh. All calculations are in SI units.
Language	Programmable messages enable the display to be shown in most European based languages. English and German are standard.
Transducer Supply	5-24V dc, 50mA. Voltage is adjusted via a trimpot on the rear panel (limited to 5V dc if no relay outputs are required).
Operating Temperature	0 to 50°C.
Supply	190 to 260V ac mains.
Battery Back-up	All data is backed up by battery. Battery life is 10 years.
Enclosure	19" Eurocard 3HE x 28TE.
Facia	Membrane with window to enable calibration data to be mounted behind the window.
Dimensions	143mm (wide) x 129mm (high) x 210mm (deep).
Wall Mount Enclosure	An optional wall mount enclosure is available.

Flow Input

Frequency Input

Frequency:	0.1 to 2000Hz.
K-factor:	0.04 to 100,000 pulses/litre.
Type:	Most types of pulse and frequency outputs including open collector, reed switch and mV signals from turbines.
Non-linearity:	A programmable 10 point linearity correction curve can be programmed to compensate for flowmeter non-linearities.

Analog Input

Type:	4-20mA or 0-10V.
Input Resistance:	250 ohms for 4-20mA, 10 Kohms for 0-10V.
Input Relationship:	Linear or Square Root.
Cut-off:	Programmable cut-off.

Temperature Input

Type	Pt100 RTD (100 ohms at 0°C). Two matched Class A RTDs with 4-wire outputs.
Connection	4-wire connection to both the feed and return RTDs.
Linearity	RTDs are internally corrected for non-linearity.

Accuracy

Approvals	Approved by Swiss Federal Office of Metrology to OIML Class 4.
Sealing	The RS232 connector and CAL switch are covered by a plate which can be sealed to prevent tampering or resetting of totals.

RS232

Function	A 9 pin connector provides an interface to a laptop computer or PC for programming.
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Analog Output Option

Type	Two or four analog output channels. Isolated 4-20mA or 0-10V.
Functions	Selectable as: Power, Volume, Mass Flow Rate, Feed or Return Temperature or Temperature Difference.

Relay Output Option

Type	Two or four moving coil relays.
Maximum Voltage	250V ac or 30V dc.
Maximum Current	5 Amps.
Function	Power, Volumetric Flow Rate, Mass Flow Rate, Feed or Return Temperature or Temperature Difference, Pulse Output (x1, x10, x100) or Fault Alarm.

Important: Specifications are subject to change without notice.

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