Level | Pressure | Flow | Temperature | Liquid Analysis | Registration | Systems Components | Services | Solutions

Technical Information

RMC621

Flow and Energy Manager
Universal flow and energy computer for gases, liquids and steam

Application

- Energy management
- Chemical industry
- Heating and air conditioning
- Pharmaceutical industry
- Food and beverage
- Plant and panel manufacture
- Oil + petrochemicals

Your benefits

- Suitable for applications with gas, liquid, steam and water
- Intrinsically safe input (optional)
- Simultaneous calculation of up to 3 measuring applications, even if different fluids are used
- Very precise process calculations (density, enthalpy, compressibility) on the basis of equations and/or storable tables with material data
- Calculation standards: IAPWS-IF 97, SGERG88, AGA8, real gas equations (SRK, RK), ISO 5167, tables
- Can be used with all common flow measuring systems (vortex, turbine, MID, orifice plate, differential pressure, etc.)
- Profibus interface (optional)
- Compensation input for density signal
- Logbook function for error messages and parameter changes with date and time
- Configuration and operation using a PC software ReadWin® 2000
- Modular expansion of inputs and outputs
- Large back-lit LC display with colour change in the event of an error

TI098R/09/en
Nr. 51006422

Endress+Hauser
People for Process Automation

Function and system design

Measuring principle

The RMC621 is a multifunctional flow and energy computer. It calculates standard & volumetric flow, mass flow and energy (heat) flow using input signals of flow, differential pressure, pressure, temperature and density. It satisfies requirements for gas (e.g. natural gas, air, steam, etc.) and liquid (e.g. heat transfer liquid, water, etc.) applications.

Calculation
- volumetric flow
- standard (corrected) flow
- mass flow
- heat flow
- energy differential

Sum (counter)
- volumetric flow
- standard (corrected) flow
- mass
- heat
- bidirectional volumetric/mass/energy flow

Input
- current (0/4 to 20 mA)
- PFM
- pulse
- temperature Pt100, Pt500 and Pt1000 in 3- or 4-wire system or with transmitter (e.g. TMT181) with 4 to 20 mA signal

Output
- current 0/4 to 20 mA)
- pulse
- digital (passive)
- relay
- transmitter power supply for each analogue or pulse input

Note!
The number of inputs, outputs, relays and transmitter power supplies contained in the basic device can be individually increased using a maximum of three plug-in cards.

Calculation methods

The flow & energy calculator RMC621 incorporates compensation for flow, gas and fluid measurement according the following equations:

Gases
- Improved ideal gas law: flow correction in consideration of temperature, pressure and the mean value for compressibility.
- Real gas equation (SRK, RK) and possibility to edit tables for the calculation of compressibility and density of technical gases or density input.
- Natural gas using international standards **NX19, SGERG88 and AGA8** (optional).

Liquids
- Density calculation with algorithms and tables.
- Constant heat capacity or table (heating value as a constant).
- Mineral oil density according to standards **ASTM 1250, API 2540, OIML R63** (optional).

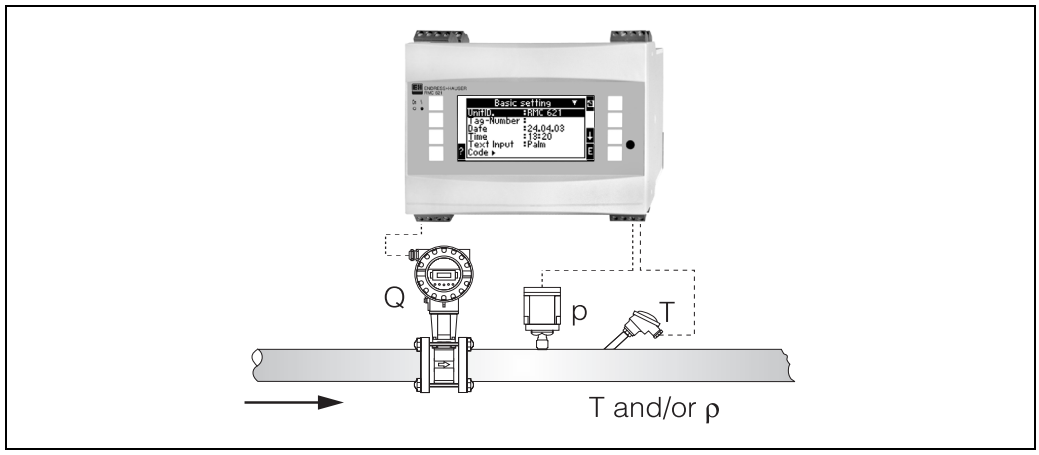
Steam/water
- International calculation standard **IAPWS IF-97** (ASME tables).

Applications

Gas

Standard volume/mass/combustion heat

Calculation of the gas standard volume and the gas mass with the aid of the gas properties stored in the flow computer. The gas standard volume is determined by taking into account the pressure and temperature effect and the compressibility of the gas which describes the deviation of a gas from an ideal gas. The compressibility of the gas (z-factor) is determined using calculation standards or stored tables depending on the type of gas. As an option there is an input to measure the density directly. For combustibles the potential combustion heat is calculated using the mean heating value.

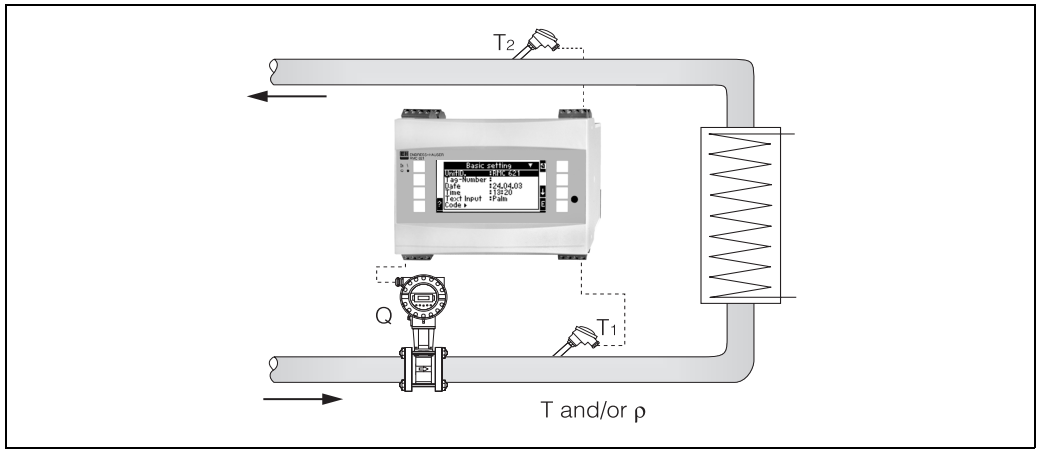


Calculation of the gas standard volume/mass from the input variables flow (Q), pressure (p) and temperature (T) and/or density (ρ)

Liquid

Heat quantity/heat-differential

Calculation of the quantity of heat that is emitted or absorbed by a liquid flow in a heating or cooling system. The quantity of heat is calculated from the process variable for flow and the differential from the flow and return temperature. Bidirectional energy calculations, such as balancing systems with changing flow direction (charging/discharging the heat accumulator) are also possible. As an option there is an input to measure the liquid density directly. For combustibles the potential combustion heat is calculated using the mean heating value.

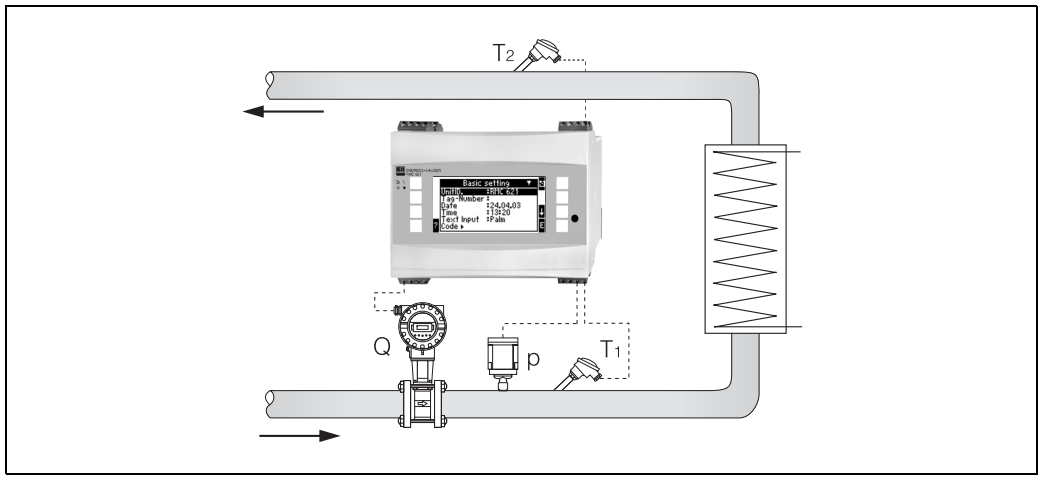


Calculation of the water-quantity of heat and water-heat differential from the input variables flow (Q) and the temperature differential (T_1 – T_2) and/or density (ρ)

Steam

Mass/heat quantity/heat-differential

Calculation of the mass flow and its quantity of heat (energy) in a steam line from the process variables i. e. flow, pressure and temperature. In saturated steam operation, the mass flow is calculated from two input variables (pressure-compensated or temperature-compensated).
In addition the balancing of a steam generation process (phase transition: water → steam) or a steam heating process (phase transition: steam → water) is possible.



Calculation of steam-heat differential from the input variables for flow (Q), pressure (p) and temperature differential (T_1 - T_2)

Measuring system

The analogue input variables are digitised, the pulse and PFM signals recorded using period length/frequency measurement and processed further in the arithmetic unit controlled by the microcontroller. The energy values are calculated depending on the medium and configuration using international standards (IAPWS-IF97, SGERG88), state equations (SRK) or specific tables. This guarantees maximum precision in all temperature ranges. The internal real time clock with back up power is used to integrate the flow values. Both the input variables and the results can be given out via the outputs.
With differential pressure measurement, the coefficients for flow compensation are calculated over the entire working range of the flow sensor.
Configuration of the inputs, outputs, limit values, the display as well as commissioning and maintenance of the device can be performed via 8 soft keys with the back-lit dot matrix display, using RS232/RS485 interface, PC software ReadWin® 2000 and an external control unit.
Online help makes on-site operation easier. The colour change of the background lighting visualises alarm value violations or faults. A functional expansion of the device by means of expansion cards can be made at any time.

Input

Measured variable

Current, PFM, pulse, temperature

Input signals

Flow, differential pressure, pressure, density

Measuring range

Measured variable	Input		
Current	■ 0/4 to 20 mA +10% overreach ■ Max. input current 150 mA ■ Input impedance < 10 Ω ■ Accuracy 0.1% of full scale value ■ Temperature drift 0.04% / K ambient temperature ■ Signal attenuation low-pass filter 1st order, filter constants adjustable 0 to 99 s ■ Resolution 13 Bit ■ Fault recognition 3.6 mA or 21 mA limit as per NAMUR NE43		
PFM	■ Frequency range 0.01 Hz to 12.5 kHz ■ Signal level 2 to 7 mA low; 13 to 19 mA high ■ Measurement method: period length/frequency measurement ■ Accuracy 0.01% of measured value ■ Temperature drift 0.1% / 10 K ambient temperature		
Pulse	■ Frequency range of 0.01 Hz to 12.5 kHz ■ Signal level 2 to 7 mA low; 13 to 19 mA high with approx. 1.3 kΩ dropping resistor at max. 24 V voltage level		
Temperature	Resistance thermometer (RTD) according to ITS 90:		
	Designation	Measuring range	Accuracy (4-wire connection)
	Pt100	-200 to 800 °C	0.03% of full scale value
	Pt500	-200 to 250 °C	0.1% of full scale value
	Pt1000	-200 to 250 °C	0.08% of full scale value
	■ Type of connection: 3 or 4-wire system ■ Measuring current 500 µA ■ Resolution 16 Bit ■ Temperature drift 0.01% / 10 K ambient temperature		

Number:
■ 2 x 0/4 to 20 mA/PFM/pulse (in basic device)
2 x Pt100/500/1000 (in basic device)

Maximum number:
■ 10 (depends on the number and type of expansion cards)

Galvanic isolation

The inputs are galvanically isolated between the individual expansion cards and the basic device (see also 'Galvanic isolation' under Output).

Output

Output signal

Current, pulse, transmitter power supply and switching output

Galvanic isolation

Basic device:

Connection with terminal designation	Power supply (L/N)	Input 1/2 0/4 to 20 mA/ PFM/pulse (10/11) or (110/11)	Input 1/2 TPS (82/81) or (83/81)	Temperature input 1/2 (1/5/6/2) or (3/7/8/4)	Output 1/2 0 to 20 mA/pulse (132/131) or (134/133)	Interface RS232/485 housing front or (102/101)	TPS external (92/91)
Power supply		2.3 kV	2.3 kV	2.3 kV	2.3 kV	2.3 kV	2.3 kV
Input 1/2 0/4-20 mA/ PFM/pulse	2.3 kV			500 V	500 V	500 V	500 V
Input 1/2 TPS	2.3 kV			500 V	500 V	500 V	500 V
Temperature input 1/2	2.3 kV	500 V	500 V		500 V	500 V	500 V
Output 1/2 0-20 mA/pulse	2.3 kV	500 V	500 V	500 V		500 V	500 V
Interface RS232/ RS485	2.3 kV	500 V	500 V	500 V	500 V		500 V
TPS external	2.3 kV	500 V	500 V	500 V	500 V	500 V	

Note!
The specified insulation voltage is the AC testing voltage $U_{eff.}$ which is applied between the connections.
Basis for assessment: IEC 61010-1, protection class II, overvoltage category II

Current - pulse output variable

Current

- 0/4 to 20 mA +10% overreach, invertible
- Max. loop current 22 mA (short-circuit current)
- Load max. 750 Ω at 20 mA
- Accuracy 0.1% of full scale value
- Temperature drift: 0.1% / 10 K ambient temperature
- Output Ripple < 10 mV at 500 Ω for frequencies < 50 kHz
- Resolution 13 Bit
- Error signals 3.6 mA or 21 mA limit adjustable as per NAMUR NE43

Pulse

Basic device:
- Frequency range to 12.5 kHz
- Voltage level 0 to 1 V low, 24 V high ±15%
- Load min. 1 kΩ
- Pulse width 0.04 to 1000 ms

Expansion cards (digital passive, open collector):
- Frequency range to 12.5 kHz
- $I_{max.}$ = 200 mA
- $U_{max.}$ = 24 V ± 15%
- $U_{low/max.}$ = 1.3 V at 200 mA
- Pulse width 0.04 to 1000 ms

Number

Number:
- 2 x 0/4 to 20 mA/pulse (in basic device)

Max. number:
- 8 x 0/4 to 20 mA/pulse (depends on the number of expansion cards)
- 6 x digital passive (depends on the number of expansion cards)

Signal sources

All available multifunctional inputs (current, PFM or pulse inputs) and results can be freely allocated to the outputs.

Switching output

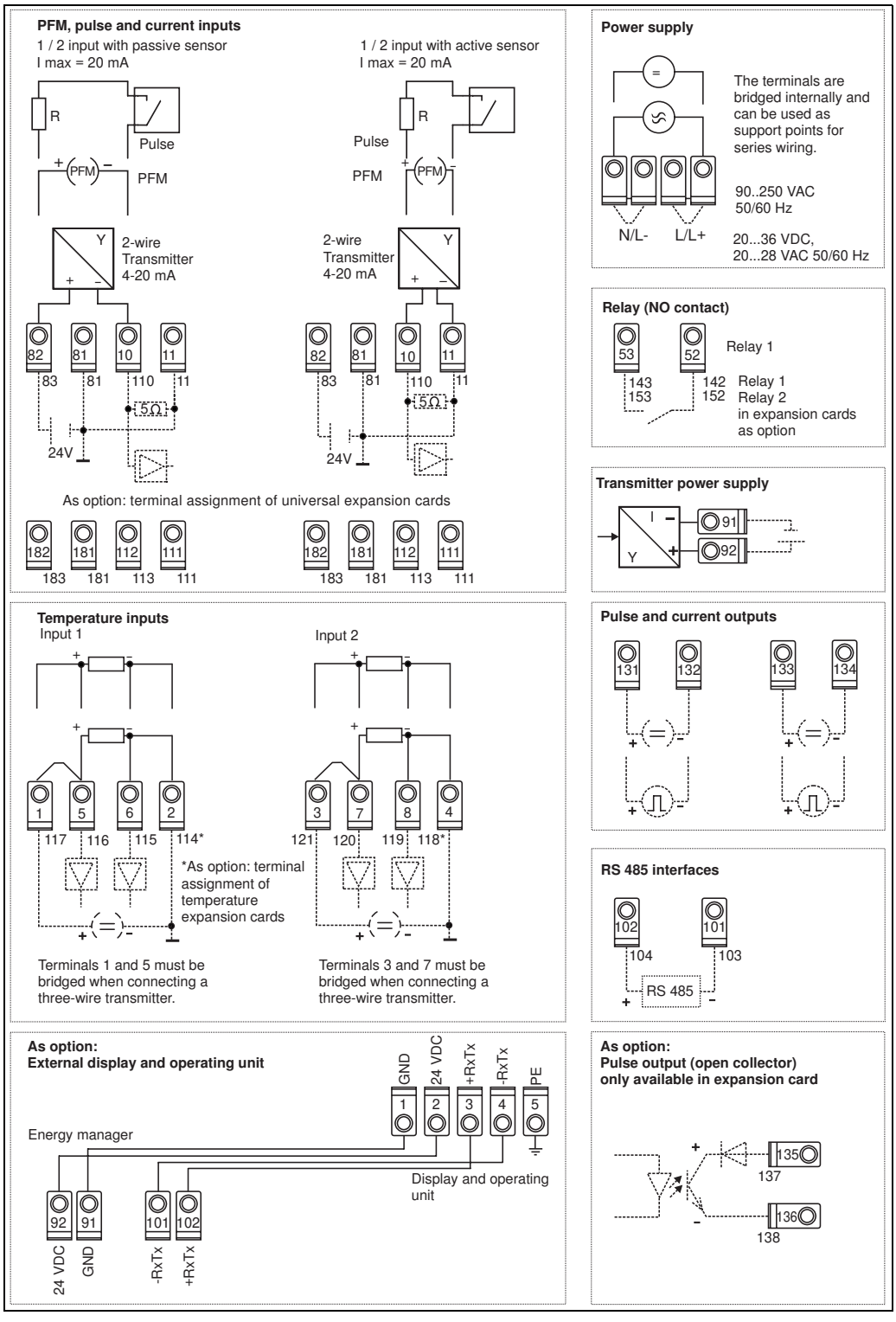
Function	Limit relay switches in these operating modes: minimum, maximum safety, gradient, alarm, saturated steam alarm, frequency/pulse, device error
Switch behaviour	Binary, switches when the alarm value is reached (potential-free NO contact)
Relay switching capacity	Max. 250 V AC, 5 A / 30 V DC, 5 A Note! When using relays on expansion cards, a mixture of low voltage and extra-low voltage is not permitted.
Switching frequency	Max. 5 Hz
Switching threshold	Programmable (wet steam alarm is preset at 2 °C at the factory)
Hysteresis	0 to 99%
Signal source	All available inputs and calculated variables can be allocated freely to the switching outputs.
Number	1 (in basic device) Max. number: 7 (depends on the number and type of expansion cards)
Number of output states	100,000
Scan rate	500 ms

Transmitter power supply and external power supply

- Transmitter power supply unit, terminals 81/82 or 81/83 (optional universal expansion cards 181/182 or 181/183):
  Max. supply voltage 24 V DC ±15%
  Impedance < 345 Ohm
  Max. output current 22 mA (for U_{out} > 16 V)
- Technical data RMC621:
  HART®communication is not impaired
  Number: 2 (in basic device)
  Max. number: 8 (depending on the number and type of expansion cards.
- Additional power supply (e.g. external display), terminals 91/92:
  Supply voltage 24 V DC ± 5%
  Max. current 80 mA, short-circuit proof
  Number 1
  Source resistance < 10 Ω

Power supply

Electrical connection (wiring diagrams)



RMC621 terminal assignment - basic device + expansion cards (optional)

Supply voltage

- Low voltage power unit: 90 to 250 V AC 50/60 Hz
- Extra-low voltage power unit: 20 to 36 V DC or 20 to 28 V AC 50/60 Hz

Power consumption

8 to 26 VA (dependent on the expansion stage)

Connection data interface

RS232

– Connection: 3.5 mm (0.138 in) jack plug on front panel
– Transmission protocol: ReadWin® 2000
– Transmission rate: max. 57,600 Baud

RS-485

– Connection: plug-in terminals 101/102 (in basic device)
– Transmission protocol: (serial: ReadWin® 2000; parallel: open standard)
– Transmission rate: max. 57,600 Baud

Optional: additional RS-485 interface

– Connection: plug-in terminals 103/104
– Transmission protocol and transmission rate same as standard RS-485 interface

Performance characteristics

Reference operating conditions

- Power supply 230 V AC ± 10%; 50 Hz ± 0.5 Hz
- Warm-up period > 30 min
- Ambient temperature range 25 °C ± 5 °C
- Air humidity 39% ± 10% r. h.

Arithmetic unit

Medium	Variable	Range
Liquids	Temperature measuring range	-137 to 300 °C
	Maximum temperature differential range ΔT	0 to 437 K
	Error limit for ΔT	3 to 20 K < 2.0% of measured value 20 to 250 K < 0.3% of measured value
	Arithmetic unit accuracy class	Class 4 (as per EN 1434-1 / OIML R75)
	Measurement and calculation interval	500 ms
Steam	Temperature measuring range	0 to 800 °C
	Pressure measuring range	0 to 1000 bar
	Measurement and calculation interval	500 ms
Techn. gas	Temperature measuring range	-137 to 800 °C
	Pressure measuring range	0 to 500 bar
	Measurement and calculation interval	500 ms
Natural gas	Temperature measuring range	-40 to 200 °C (Nx-19) -60 to 200 °C (SGerg88)
	Pressure measuring range	0 to 120 bar
	Measurement and calculation interval	500 ms

Installation conditions

Installation instructions

Mounting location

In the cabinet on DIN rail IEC 60715

Orientation

no restrictions

Environmental conditions

Ambient temperature

–20 to 60 °C (–4 to 140 °F)

Storage temperature

–30 to 70 °C (–22 to 158 °F)

Climate class

as per IEC 60 654-1 Class B2 / EN 1434 Class 'C'

Degree of protection

- Basic device: IP 20
- External display: IP 65

Electrical safety

Ambient < 2000 m height above sea level

Electromagnetic compatibility

Interference emission

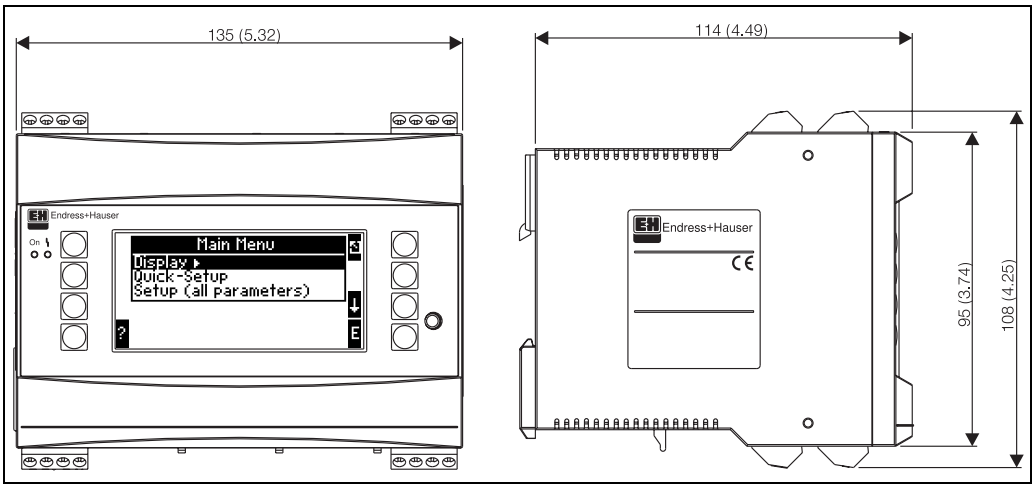
IEC 61326 Class A

Interference immunity

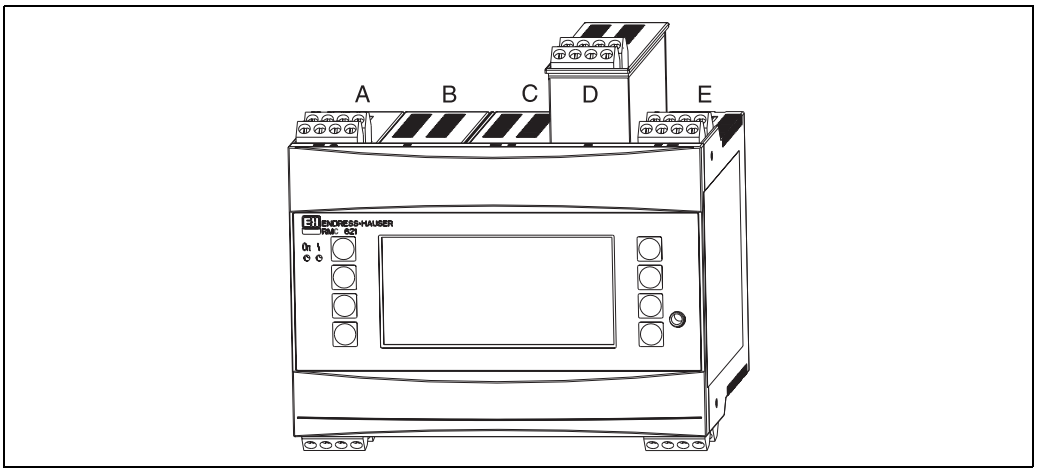
– Power failure: 20 ms, no influence
– Starting current limitation: $I_{max}/I_n \leq 50\%$ (T50% ≤ 50 ms)
– Electromagnetic fields: 10 V/m as per IEC 61000-4-3
– Conducted HF: 0.15 to 80 MHz, 10 V as per IEC 61000-4-3
– Electrostatic discharge: 6 kV contact, indirect as per IEC 61000-4-2
– Burst (power supply): 2 kV as per IEC 61000-4-4
– Burst (signal): 1 kV/2 kV as per IEC 61000-4-4
– Surge (AC power supply): 1 kV/2 kV as per IEC 61000-4-5
– Surge (DC power supply): 1 kV/2 kV as per IEC 61000-4-5
– Surge (signal):500 V/1 kV as per IEC 61000-4-5

Mechanical construction

Design, dimensions



Housing for DIN rail as per IEC 60715; dimensions in mm (inch)



RMC621 upgrade with expansion cards (optional or available as accessories)
– Slots A and E equipped in the basic device
– Slots B, C and D can be upgraded with expansion cards

Weight

- Basic device: 500 g (in maximum configuration with expansion cards)
- Remote control unit: 300 g

Material

Housing: polycarbonate plastic, UL 94V0

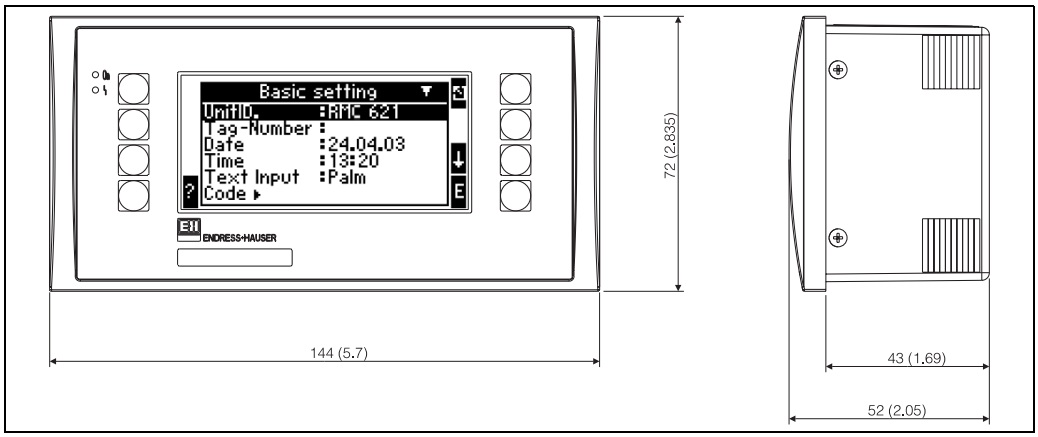
Terminals

Coded, pluggable screw terminals; Clamping area 1.5 mm^2 (0.0023 in^2) solid, 1.0 mm^2 (0.0016 in^2) flexible with wire end ferrule (applies to all connections).

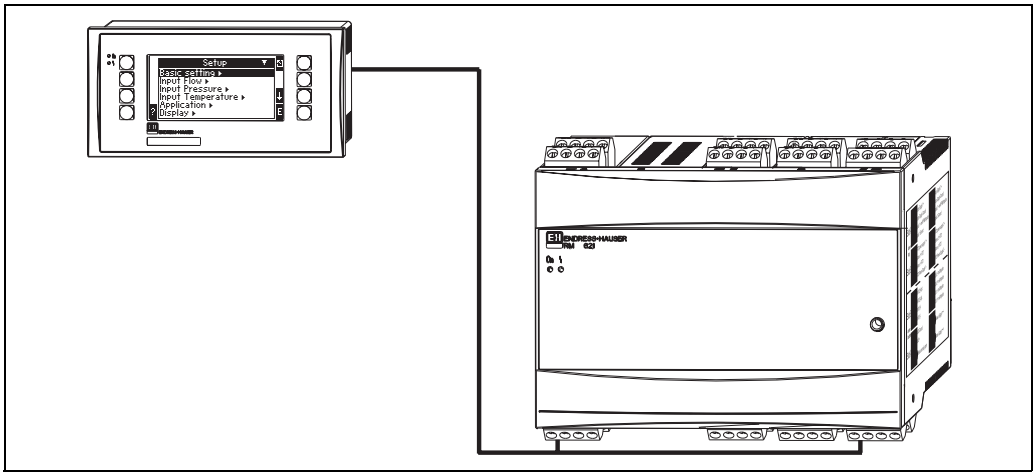
Human interface

Display elements

- Display (optional):
  160 x 80 Dot-matrix LCD with blue background lighting
  Colour changes to red in the event of an error (adjustable)
- LED status display:
  Operation: 1 x green (2 mm; 0.079 in)
  Fault message: 1 x red (2 mm; 0.079 in)
- External display and operating unit (optional or as accessory):
  A display and operating unit can also be connected to the energy manager in the panel mounted housing, dimensions: W = 144 mm (5.7 in) x H = 72 (2.84 in) x D = 43 mm
  (1.7 in). The connection to the integrated RS-485 interface is made using the connecting cable (l = 3 m), which is included in the accessories set. Parallel operation of the external display unit with a device-internal display in the RMC621 is possible.



External display and operating unit for panel mounting (optional or available as accessory); dimensions in mm (inches)



External display and operating unit in the panel mounted housing

Operating elements

Eight front-panel soft keys interact with the display (function of the keys is shown in the display).

Remote operation

RS232 interface (3.5 mm (0.138 in) jack plug on front panel): configuration via PC with PC operating software ReadWin® 2000. RS485 interface.

Real time clock

- Deviation: 30 min per year
- Power reserve: 14 days

Mathematical functions

Flow, differential pressure calculation: EN ISO 5167

Continuous calculation of mass, standard volume, density, enthalpy, quantity of heat using stored algorithms and tables.

- Water / steam: IAWPS-IF97
- Liquids: linear density function and tables for density and heat capacity
  Mineral oil: API 2540, ASTM 1250, OIML R63
- Technical gases: real gas equations (Soave Redlich Kwong), compressibility tables as well as improved ideal gas equation
- Natural gas: NX19, as option: SGERG88, AGA8 (gross-method)

Tables for density, heat value and compressibility can be edited freely or saved.

Certificates and approvals

CE-approval

The measurement system fulfils the requirements demanded by the EU regulations. Endress+Hauser acknowledges successful unit testing by adding the CE mark.

Other standards and guidelines

- IEC 60529:
  Degrees of protection by housing (IP-Code)
- IEC 61010:
  Safety requirements for electrical measurement, control and laboratory instrumentation.
- EN 61326 (IEC 1326):
  Electromagnetic compatibility (EMC requirements)
- NAMUR NE21, NE43
  Standardization association for measurement and control in chemical and pharmaceutical industries.
- IAWPS-IF 97
  International applicable and recognised calculation standard (since 1997) for steam and water. Issued by the International Association for the Properties of Water and Steam (IAPWS).
- OIML R75
  International construction regulation and test specification for water energy managers from the Organisation Internationale de Métrologie Légale.
- EN 1434-1, 2, 5 and 6
- EN ISO 5167
  Flow measurement of fluids with throttle devices

Ordering information

Product structure

RMC621	**Energy manager**				
	For calculating of flow, heat quantity and heat differential of gases, fluids, steam/water; Gas and fluid tables Calculation formula to IAPWS-IF97 for steam/water; according to SGERG, AGA8, SRK, RK for gases. Inputs A: 2 x 0/4 to 20 mA/PFM/pulse with loop power Inputs E: 2 x Pt100/500/1000 Output A: 1 x Relay (closing cont.), 1 x loop power Outputs E: 2 x 0/4 to 20 mA/pulse				
	Version				
	A	Version for non-Ex (non hazardous) area			
	B	ATEX version			
	C	FM AIS I,II,III/1/ABCDEF			
	D	CSA (Ex ia) I,II,III/1/ABCDEF			
		Display/operating keys			
		1	Display and operating keys: none, operating via software ReadWin® 2000		
		2	Display and operating keys: inside unit		
		3	External display and operating keys: via RS485 panel mounting 72 x 144 mm		
		4	External display and operating keys: via second RS485 panel mounting 72 x 144 mm		
			Power supply		
			1	Power supply 90 to 250 V AC, 50/60 Hz	
			2	Power supply 18 to 36 V DC / 20 to 28 V AC, 50/60 Hz	
RMC621-					⇐ **order code (part 1)**

Slot B fitted with:	
A	In/outputs not required
B	Input B: 2 x 0/4 to 20 mA/PFM/pulse with loop power Output B: 2 x 0/4 to 20 mA/pulse 2 x digital, 2 x relays (closing cont.)
C	Input B: 2 x Pt100/500/1000 Output B: 2 x 0/4 to 20 mA/pulse 2 x digital, 2 x relays (closing cont.)
D	Input B: Intrinsically safe, 2 x 0/4 to 20 mA/PFM/pulse with loop power Output B: 2 x 0/4 to 20 mA/pulse 2 x digital, 2 x relays (closing cont.)
E	Input B: Intrinsically safe, 2 x Pt100/500/1000 Output B: 2 x 0/4 to 20 mA/pulse 2 x digital, 2 x relays (closing cont.)

Slot C fitted with:	
A	In/outputs not required
B	Input C: 2 x 0/4 to 20 mA/PFM/pulse with loop power Output C: 2 x 0/4 to 20 mA/pulse 2 x digital, 2 x relays (closing cont.)
C	Input C: 2 x Pt100/500/1000 Output C: 2 x 0/4 to 20 mA/pulse 2 x digital, 2 x relays (closing cont.)
D	Input C: Intrinsically safe, 2 x 0/4 to 20 mA/PFM/pulse with loop power Output C: 2 x 0/4 to 20 mA/pulse 2 x digital, 2 x relays (closing cont.)
E	Input C: Intrinsically safe, 2 x Pt100/500/1000 Output C: 2 x 0/4 to 20 mA/pulse 2 x digital, 2 x relays (closing cont.)

Slot D fitted with:	
A	In/outputs not required
B	Input D: 2 x 0/4 to 20 mA/PFM/pulse with loop power Output D: 2 x 0/4 to 20 mA/pulse 2 x digital, 2 x relays (closing cont.)
C	Input D: 2 x Pt100/500/1000 Output D: 2 x 0/4 to 20 mA/pulse 2 x digital, 2 x relays (closing cont.)
D	Input D: Intrinsically safe, 2 x 0/4 to 20 mA/PFM/pulse with loop power Output D: 2 x 0/4 to 20 mA/pulse 2 x digital, 2 x relays (closing cont.)
E	Input D: Intrinsically safe, 2 x Pt100/500/1000 Output D: 2 x 0/4 to 20 mA/pulse 2 x digital, 2 x relays (closing cont.)

Unit software	
1	Standard software
2	Standard software + SGERG(88)/AGA8
3	Standard software + API2540/ASTM D1240/OIML R63
4	Standard software + SGERG(88)/AGA8 + API2540/ASTM D1240/OIML R63
Y	Other

Operation language	
A	German
B	English
C	French
D	Italian
E	Spanish
F	Dutch
G	Polish
H	American English
K	Czech

Communication	
1	1 x RS232 + 1 x RS485
2	1 x RS232 + 1 x RS485 + cable + software ReadWin® 2000
3	1 x RS232 + external Profibus-DP slave module
4	1 x RS232 + external Profibus-DP slave module + cable + software ReadWin® 2000
5	1 x RS232 + 2 x RS485 (not available with external display via 2. RS485)
6	1 x RS232 + 2 x RS485 + cable + software ReadWin® 2000 (not available with external display via 2. RS485)
7	1x RS232 + 1x RS485 + 1x M-Bus
8	1x RS232 + 1x RS485 + 1x M-Bus + cable + software readwin
A	1x RS232 + 1x RS485 + 1x ModBus
B	1x RS232 + 1x RS485 + 1x ModBus + cable + software Readwin

Additional option	
1	Basic version
2	Works calib. certif., 5-point
K	Standard model, North American region
S	Standard model, China

RMC621-	⇐ **order code (complete)**

Product structure selection aid

The following table contains an overview of the order codes for the expansion cards with the possible applications in an RMC621 energy manager:

Applications in a device	Number of inputs	Product structure (expansion cards)
1 x Saturated steam measurement	1 x Flow pulse 1 x 4 to 20 mA pressure	RMC621-xxxAAAxxxx
1 x Gas standard volume	1 x 4 to 20 mA flow 1 x 4 to 20 mA pressure 1 x Pt100 temperature	
1 x Liquid-heat differential	1 x 4 to 20 mA flow 2 x Pt100 temperature	
2 x Saturated steam	2 x Flow pulse 2 x 4 to 20 mA pressure	RMC621-xxxBAAxxxx
1 x Gas standard volume 1 x Steam-quantity of heat	2 x PFM flow 2 x 4 to 20 mA pressure 2 x Pt500 temperature	
1 x Saturated steam measurement 1 Water-quantity of heat	2 x Flow pulse 1 x 4 to 20 mA pressure 2 x Pt100 temperature	
2 x Liquid-quantity of heat	2 x 4 to 20 mA flow 4 x Pt100 temperature	RMC621-xxxCAAxxxx
1 x Gas standard volume 1 x Liquid-heat differential	2 x 4 to 20 mA flow 4 x Pt100 temperature	
3 x Saturated steam measurement	3 x Flow pulse 3 x 4 to 20 mA pressure	RMC621-xxxBBAxxxx
1 x Steam-quantity of heat 1 x Water-heat differential	1 x PFM flow 1 x Flow pulse 1 x 4 to 20 mA pressure 3 x Pt100 temperature	RMC621-xxxBCAxxxx
1 x Steam-heat differential 1 x Water-heat differential	2 x PFM flow 1 x 4 to 20 mA pressure 4 x Pt100 temperature	
1 x Gas standard volume 1 x Net steam quantity of heat 1 x Liquid-quantity of heat	3 x PFM flow 2 x 4 to 20 mA pressure 4 x Pt100 temperature	RMC621-xxxBBCxxxx
3 x Steam mass	3 x 4 to 20 mA flow 3 x 4 to 20 mA pressure 3 x Pt500 temperature	
3 x Gas standard volume	3 x 4 to 20 mA flow 3 x 4 to 20 mA pressure 3 x Pt500 temperature	
1 x Steam mass 2 x Water-heat differential	3 x PFM flow 1 x 4 to 20 mA pressure 5 x Pt100 temperature	RMC621-xxxBCCxxxx
3 x Water-heat differential	3 x Flow pulse 6 x Pt100 temperature	

Accessories

- PC configuration software ReadWin® 2000 and serial configuration cable with 3.5 mm (0.138 in) jack plug.
  Order No.: RMC621A-VK
- External display and operating unit in the panel mounted housing 144 x 72 x 43 mm (5.7 x 2.84 x 1.7 inches)
  Order No.: RMC621A-AA
- IP 66 protective housing for field mounting DIN rail instrumentation
  Order No.: 52010132
- Profibus interface
  Order No.: RMC621A-P1

Expansion cards

A function expansion of the device by means of max. 3 extension cards (universal and/or temperature cards) is possible.

Extension card temperature Input: 2 x Pt100/500/1000 Output: 2 x 0/4 to 20 mA/pulse, 2 x digital, 2 x relays	Order No.: RMC621A-TA
Extension card universal Input: 2 x 0/4 to 20 mA/PFM/pulse with transmitter power supply Output: 2 x 0/4 to 20 mA/Pulse, 2 x digital, 2 x relays	Order No.: RMC621A-UA

Documentation

- Brochure 'System Components' (FA016K/09)
- Operating manual 'Energy Manager RMC621' (BA144R/09)
- Technical information 'System Components Top-hat Rail Devices' (TI367F/00)
- Technical information 'Vortex Flow Measuring System PROline Prowirl 72' (TI062D/06)

International Head Quarter

Endress+Hauser
GmbH+Co. KG
Instruments International
Colmarer Str. 6
79576 Weil am Rhein
Deutschland

Tel. +49 76 21 9 75 02
Fax +49 76 21 9 75 34 5
www.endress.com
info@ii.endress.com

Endress+Hauser

People for Process Automation

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