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

Technical Information

RMA422

Process transmitter
Multifunctional 1 – 2 channel top hat DIN rail unit with intrinsically safe current input and loop power supply, alarm set point monitoring, mathematics function and 1 – 2 analog outputs.

Application areas

- Plant and machine construction
- Control panels
- Laboratory fittings
- Temperature display and monitoring
- Process display and monitoring
- Process control
- Signal match and transforming
- Signal doubling

Features and benefits

- Flexible:
  1 or 2 current inputs with switchable linearisation and square root extraction
- Powering:
  Integrated loop power supply for connected sensors and transmitters
- Safe:
  Intrinsically safe current input and loop power supply
- Calculating:
  Creating new process measurement results using addition/subtraction/multiplication of the two input signals
- Alarming:
  Flexible alarm set point monitor with two changeover contacts
- Active:
  Scalable current or voltage analog outputs
- Communicative:
  RS232 interface for setting up and measured value output – HART®communication sockets for setting up sensors
- Operative:
  LC display and push buttons for frontend operation
- International approvals:
  – ATEX, CSA-General Purpose
  – GL Germanischer Lloyd / marine approval

CE

Ex

TI072R/09/en
51001905

Endress+Hauser
People for Process Automation

Function and system design

Application areas

Universally presettable current signal monitoring and transmission unit for pressure, level, flow and temperature systems.

Principle

The current signals connected to the analog inputs are digitalised and converted into process units. Using the basic mathematics modes of addition/subtraction/multiplication further process values are calculated using the original two input process values. Digital/analog convertors make two proportional current or voltage signals available for additional peripheral equipment connected to the two analog outputs. LC display and alarm set point monitor round off the system.

Measurement system

Microcontroller controlled measurement system with LC display, analog in-/outputs, alarm relays and loop power supply including HART® communication connection.

Input

Measurement types

Current

Measurement range

Current:
- 0...20 mA (-0.2…22.0 mA) / 4…20 mA (3.85…20.5 mA);
- max. Strom: 50 mA (ohne Beschädigung);
- Ri: 205 Ω

Scale

-19999 to +99999, 0 to 4 decimal points

Offset

-19999 to +99999, 0 to 4 decimal points

Signal damping

low pass, filter constant 0 to 99s

Number

max. 2

A/D resolution

13 bit

Isolation voltage

375 V AC/DC between inputs

Linearisation

Possible using max. 20 points per analog input

Integration time

100 ms for 2 channels

Output

Loop power supply

Output signal	17.0...19.7 V 25 mA, Umax = 27.3 V
Communication resistance	The HART® communication resistor is built in.
Number of outputs	max. 2
Galvanic isolation	To all other current circuits

Analog

Output signal	0/4...20 mA, 20...4/0 mA or 0...10 V, over range + 10 %
Voltage	max. load: 20 mA
Current	max. inductance 500 Ohm
Signal source	Input 1, input 2, mathematic process variables

Scale/zoom	Presettable between 0 and 100% of the signal source
Number	max. 2
Fault conditioning	Presettable 3.5 mA or 22 mA reaction to NAMUR NE43 recommendation
Response Time	max. 200 ms (input signal rise from 10% to 90% FSD)
D/A resolution	Current: 13 bit, Voltage: 13 bit
Galvanic isolation	To all other current circuits

Relays

Output signal	Binary, switch on reaching alarm set point
Number	2
Contact type	1 potential free changeover contact (SPTD)
Contact load	<= 250 VAC, 5 A / 30 VDC, 5 A

Alarm set point function

Operating mode	Off, min-, maximum safety, gradient, alarm
Switch threshold	- 19999 to + 99999
Hysteresis	- 19999 o + 99999
Time delay	0s to 99s
Signal source	Input 1, input 2, mathematic process value
Number	2
Display	1 yellow LED per set point, optional symbols in the LC display
Scan rate	100 ms

Mathematics function

On the two analog input version the two input measured process values can be combined using three basic mathematics functions addition/subtraction/multiplication resulting in a further calculated process value:
Math. Process value = [(factor1 * input1) operator (factor2 * input2)] + offset.
An increase in performance can be seen in the weighting of the two input values using presettable factors. The new calculated mathematic process value is available in the unit for further processing.

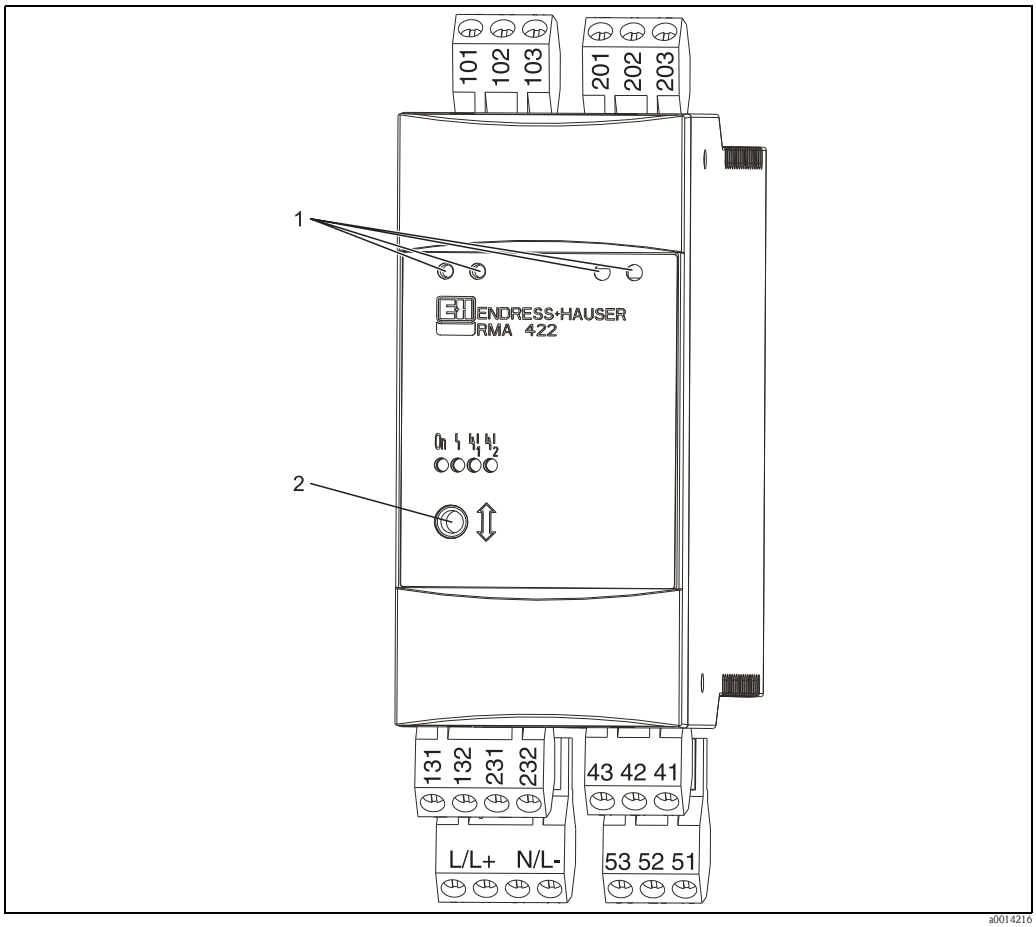
Operator	Addition/subtraction/multiplication
Factor 1/2	-19999 to +99999, 0 to 4 decimal points
Input 1/2	Dependent on the selected input values
Offset	-19999 to +99999, 0 to 4 decimal points

Linearisation/square root extraction

A non linear connection between input signals and process values can be corrected using 20 presettable linearisation points per input signal and the ‘mathematical process value’. The input signal square root curve is already in the unit and only needs to be activated. The calculated process values are available in the unit for further processing.

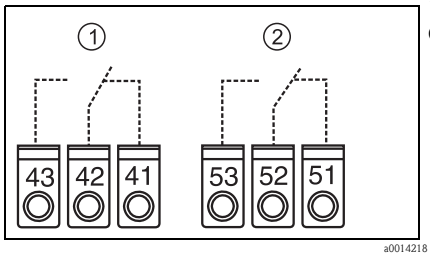
Power supply

Electrical connection

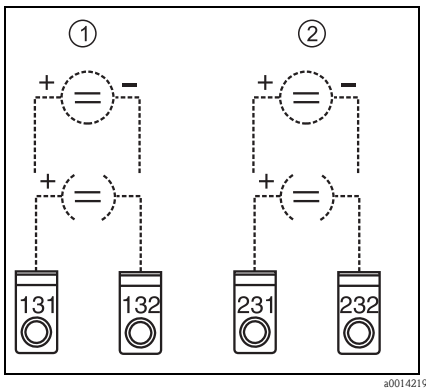


Terminal assignment of the RMA422

1 HART® connections ∅2 mm
2 RS232 connection

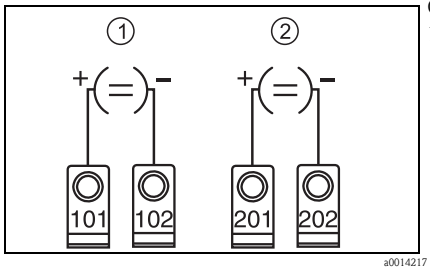


1: Relay 1; 2: Relay 2
Contact condition shown in alarm or power down

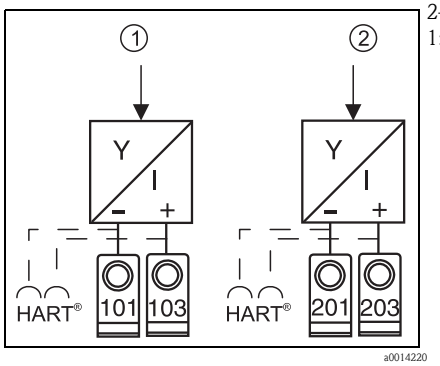


Analog outputs (Internal circuit)
1: Output 1; 2: Output 2

The analog outputs can be set up as either current or voltage sources.



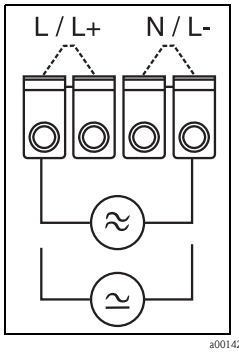
Current inputs 0/4...20 mA
1: Input 1; 2: Input 2



2-wire sensor with loop power supply
1: Input 1; 2: Input 2

Caution!
Take note of the safety instructions in the operating manual before installing!

Power supply



Terminals are internally linked and can be used as supprt for series connection.

90...250 VAC 50/60 Hz
18...36 VDC, 20...28 VAC 50/60 Hz

Fuse	315 mA, slow blow (90...250 V)	630 mA, slow blow (20...28 V)

Power consumption

11.0 VA

Accuracy

Current

Accuracy: 0.1%of FSD
Temperature drift: 0.05% / 10 K ambient temperature

Analog output

Accuracy: 0.1%of FSD
Temperature drift: 0.05% / 10 K ambient temperature

Installation conditions

Installation conditions

Installation angle
No limit.

Ambient conditions

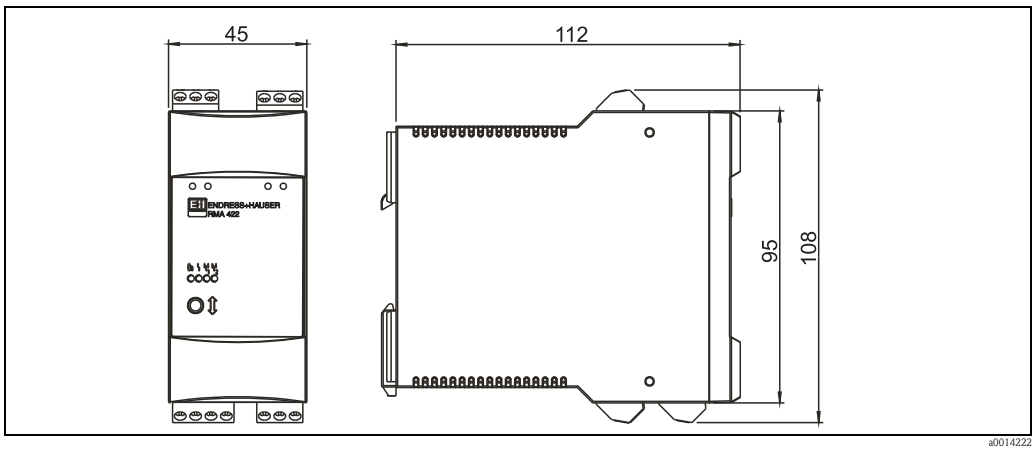
Ambient temperature	- 20 °C..+ 60 °C
Storage temperature	- 30 °C..+ 70 °C
Climatic class	To IEC 60654-1 Class B2
Electrical safety	To IEC 61010-1: Environment < 2000 m height above MSL
Ingress protection	IP 20
EMC/immunity	**RF protection** To CISPR (To EN 55011 Group 1, Class A)
Safety	**Norm** To IEC 61010-1, Overvoltage category II, Installation excess current protection = 10 A
Immunity	**Power failures** 20 ms; no interference **Power up current limit** Imax/In <= 15 T50%<= 50 ms **Electromagnetic fields** To IEC 61000-4-3, 10 V/m **Burst (supply)** To IEC 61000-4-4, 2 kV **Burst (signal)** To IEC 61000-4-4, 1 kV (A), 2 kV (B) **Surge (supply AC)** To IEC 61000-4-5, sym. 1 kV, unsym. 2 kV **Surge (supply DC)** To IEC 61000-4-5, sym. 1 kV, unsym. 2 kV **Surge (signal)** To IEC 61000-4-5, unsym. 1 kV **Cable high frequency** To IEC 61000-4-6, 10 V **Common mode noise rejection** To IEC 770, 110 dB at 250 V, 50/60 Hz no influence on peaks of 275 V, 50/60 Hz **Normal mode noise rejection** > 50 dB at 50/60 Hz

Mechanical construction

Type

Housing for mounting on DIN rail to IEC 60715

Dimensions



Dimensions of RMA422

Weight

approx. 290 g

Materials

- Housing: plastic PC/ABS, UL 94V0

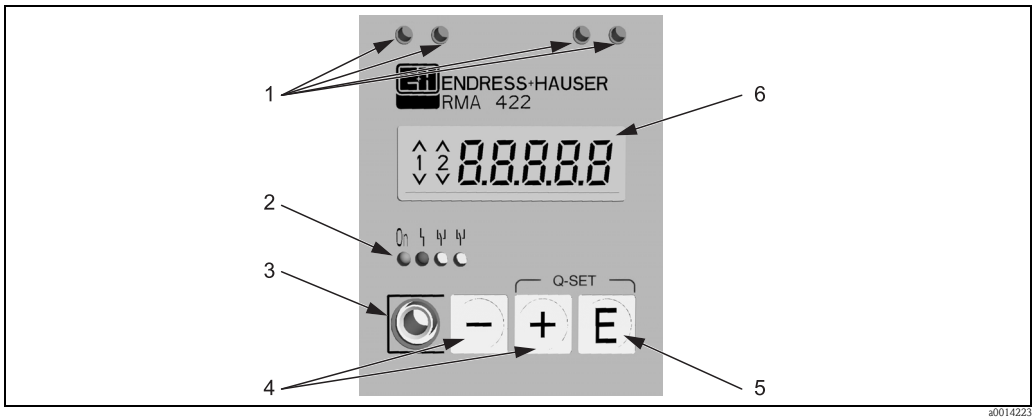
Electrical connection

Keyed plug-on screwed terminals, size 1.5 mm^2 solid core, 1.0 mm^2 stranded with ferrule

Display and operating level

Display and operating level

In normal operation the LC display indicates the default process value. The preset process parameters can be adjusted front end in the LC display during operation without the need for further operating tools. A presettable security code locks the unit out from unauthorised parameter changes.



Display and operating elements of the process transmitter

1: HART® communication sockets Ø2 mm
2: LED's: Operational display, Fault display, Switch condition set point relays
3: RS232 interface
4: Selection keys (option)
5: Enter key(option)
6: 5-digit LC display with set point condition indicators (option)

- Display:
  – LED:
    Operation, 1 x green(2.0 mm)
    Fault condition, 1 x red (2.0 mm)
    Limit condition, 2 x yellow (2.0 mm)
  – LC display, optional:
    Numeric display: 5 x 7 segments (6 mm)
    Alarm set point condition: 2 x channel number, 4 x 1 segment
- Display range
  -19999 to +99999
- Offset
  -19999 to +99999

Operation

3 push button operation (-/+/E)

Remote operation

- Interface
  RS 232, 3.5 mm jack plug socket in housing front plate
- Remote operation
  Using ReadWin® 2000 PC software

Certificates and approvals

CE mark

The measurement system fulfils the legal requirements of the EU guidelines. Endress+Hauser acknowledges a successful test of the unit by applying the CE mark.

Ex-approval

Information about currently available Ex versions (ATEX, FM, CSA) can be supplied by your Sales Centre on request. All explosion protection data are given in a separate documentation which is available upon request. (See "Ordering information" and "Documentation")

GL

GL Germanische Lloyd / marine approval

Power plant seismically tested

acc. to KTA3505

Ordering information

Product structure

RMA422	**Process transmitter** Universal process transmitter. Top-hat rail. 1-/2-channel.									
	Approval:									
	A	Non-hazardous area								
	B	ATEX II(1)GD (EEx ia) IIC								
	E	TIIS [Ex ia] IIC								
	K	Nuclear power plant IFA10XA								
	L	ATEX II(1)GD + Nuclear power plant IFA10XA								
		Power Supply:								
		1	90-250VAC							
		2	18-36VDC, 20-28VAC							
			Measuring Signal:							
			1	1x 0/4-20mA						
			2	2x 0/4-20mA, mathematic						
				Display; Operating:						
				A	5-digit LC; 3 buttons					
				B	w/o; remote configuration, Interface					
					Output:					
					1	Not selected				
					2	1x analog 0/4-20mA SIL, 0-10V				
					3	2x analog 0/4-20mA SIL, 0-10V				
						Relay:				
						1	Not selected			
						2	2x limit SPDT SIL			
							Additional Option:			
							A	Basic version		
							B	Works calib. certif., 5-point		
								Customer specific modifications:		
								Z	Special version, TSP-no. to be spec.	
									Marking:	
									1	Tagging (TAG), on nameplate
									2	Tagging (TAG), metal
									5	Tagging (TAG), paper
RMA422-										⇐ **Order code**, complete

Note!
* RMA422- _ _ _ B 1 1 _ _ _ - Combination not possible!
For the options K and L (Approvals), the hard- and software has been tested for application in nuclear power plants.
The name of the software has been defined and documented as IFA10XA.
For application areas, please refer to the VGB database.

Accessories

Interface cable

Order no.	Designation
RXU10-A1	Cable set RS232 with plug + 9-pin-SubD. plug for connection to PC

Feldgehäuse

Order no.	Designation
51001369	IP66 Field mounting protective housing

Documentation

Operating manual	BA103R/09/
Brochure "System components"	FA016K/09/
ATEX safety instructions	XA003R/09/

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