Technical information
TI072R/09/en
Mat. No. 51001905

Process transmitter *RMA422*

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 analogue 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 analogue 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 front-end operation
- International approvals:
  - ATEX, CSA-General Purpose
  - GL Germanische Lloyd / marine approval

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Application areas

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

Operation and system construction

Principle	The current signals connected to the analogue 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/analogue convertors make two proportional current or voltage signals available for additional peripheral equipment connected to the two analogue outputs. LC display and alarm set point monitor round off the system.
Measurement system	Microcontroller controlled measurement system with LC display, analogue in-/outputs, alarm relays and loop power supply including HART® communication connection.

Inputs

Measurement types	Current
Measurement range	Current: 0...20 mA (-0.2...22.0 mA), 4...20 mA (3.85...20.5 mA); max. Current: 50 mA (without damage); Ri: 5 Ohm
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 of inputs	max. 2
Isolation voltage	90 V AC/DC between inputs
Linearisation	Possible using max. 20 points per analogue input
Integration time	100 ms for 2 channels

Outputs

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

Analogue	
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 sizes
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 V AC, 5 A / 30 V DC, 5 A

Alarm set point function	
Operating mode	Off, min-, maximum safety, gradient, alarm
Switch threshold	- 19999 to + 99999
Hysteresis	- 19999 to + 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 analogue 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.

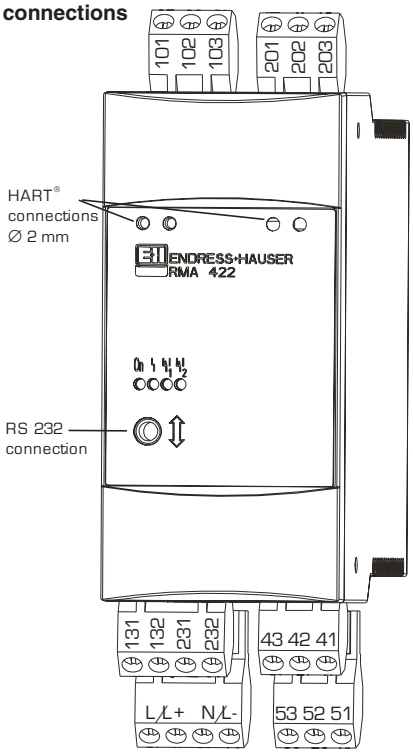
Operator	Addition/subtraction/multiplication
Factor 1/2	-19999 to +99999, 0 to 4 decimal points
Input 1/2	Dependent on the selected input values
Offset	-19999 to +99999, 0 to 4 decimal points

Linearisation/square root extraction

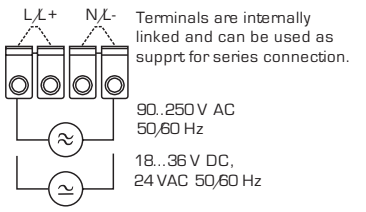
A non linear connection between input signals and process values can be corrected using 20 presettable linearisation points per input signal and the 'mathematical process value'. The input signal square root curve is already in the unit and only needs to be activated. The calculated process values are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

Power supply

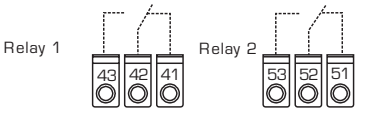
Electrical connections



Power supply

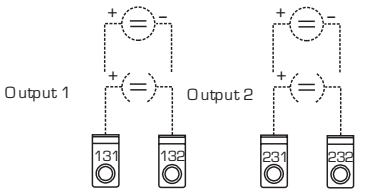


Relays (Internal circuit)



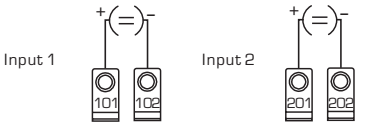
Contact condition shown in alarm or power down

Analogue outputs (Internal circuit)

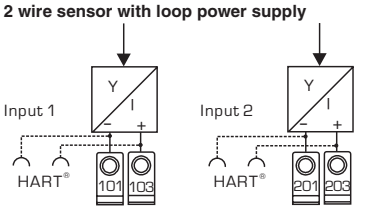


The analogue outputs can be set up as either current or voltage sources.

Current inputs 0/4...20 mA



2 wire sensor with loop power supply



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

Note!

Power supply	90...250 V AC 50/60 Hz
	18...36 V DC, 20...28 V AC 50/60 Hz
Power consumption	11.0 VA
Fuse	315 mA, slow blow (90...250 V) 630 mA, slow blow (20...28 V)

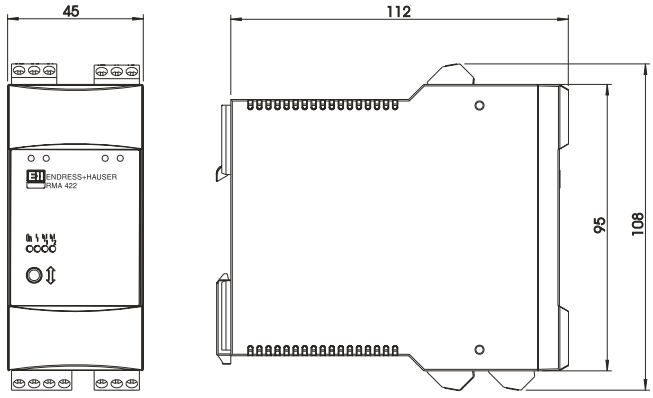
Accuracy

Current	Accuracy: 0.1 % of FSD Temperature drift: 0.05% / 10 K ambient temperature
Analogue 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	IP20
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

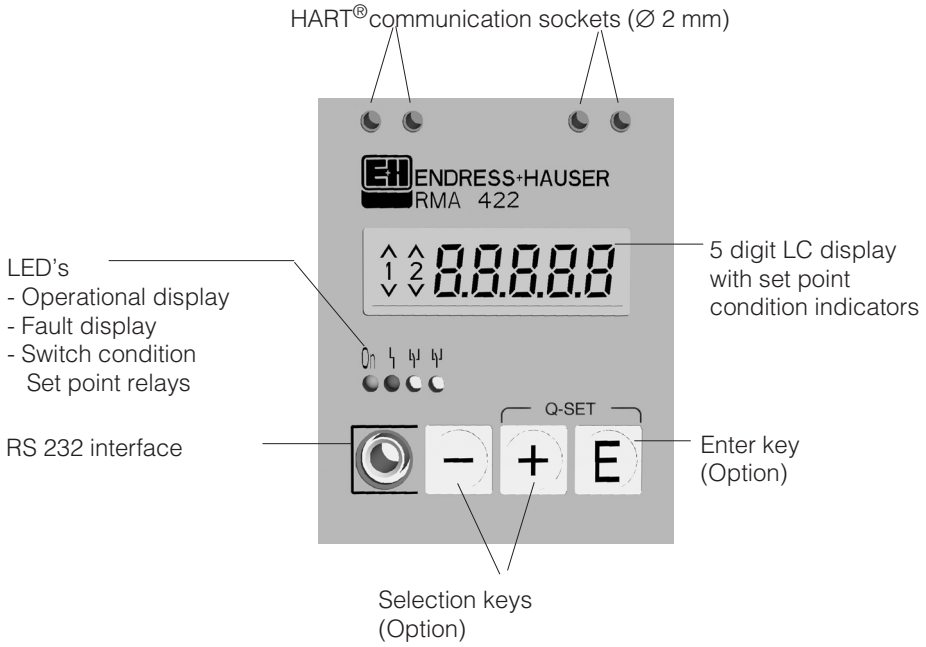
Mechanical construction

Type	Housing for mounting on DIN rail to IEC 60715
Dimensions (in mm)	
Weight	approx. 290 g
Materials	Housing: plastic PC/ABS, UL 94V0
Electrical connection	Keyed plug-on screwed terminals, size 1.5 mm² solid core, 1.0 mm² stranded with ferrule

Display and operating level

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)
Interface	RS 232, 3.5 mm jack plug socket in housing front plate
Remote operation	Using ReadWin 2000 PC software (Windows 95/98/NT or higher)

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.



Certification

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.
GL	Germanische Lloyd / marine approval
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")

Further documentation

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

Technical alterations reserved!

How to order

RMA422 process transmitter

Approval
A Version for non-Ex areas
B ATEX II (1) GD [EEx ia] IIC

Power supply
1 90...250 V, 50/60 Hz
2 18...36 V DC/20...28 V AC, 50/60 Hz

Measuring Signal
1 1 x 0/4...20 mA + loop power supply
2 2 x 0/4...20 mA + loop power supply +Mathematic

Display, Operating
A 5 digit LC, 3 button
B without, remote configuration, Interface RMA422A-VK accessory required

Output
1 Not selected
2 1 x analogue 0/4 ..20 mA / 0...10 V
3 2 x analogue 0/4...20 mA / 0...10 V

Relay
1 Not selected
2 2 x limit relays each with 1 changeover contact

Additional Option
A Basic version
B Works calib. certif., 5-point

RMA422-								←Order code

Note!

* RMA422- _ _ _ B 1 1 _ - Combination not possible

Accessories

ReadWin 2000 PC software for unit setting up including connection cable (approx. 1 m long) with 9 pin Sub. D connector and 3.5 mm jack plug.	Order No. RMA422A - VK
IP66 field mounting protective housing.	Order No. 51001369

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