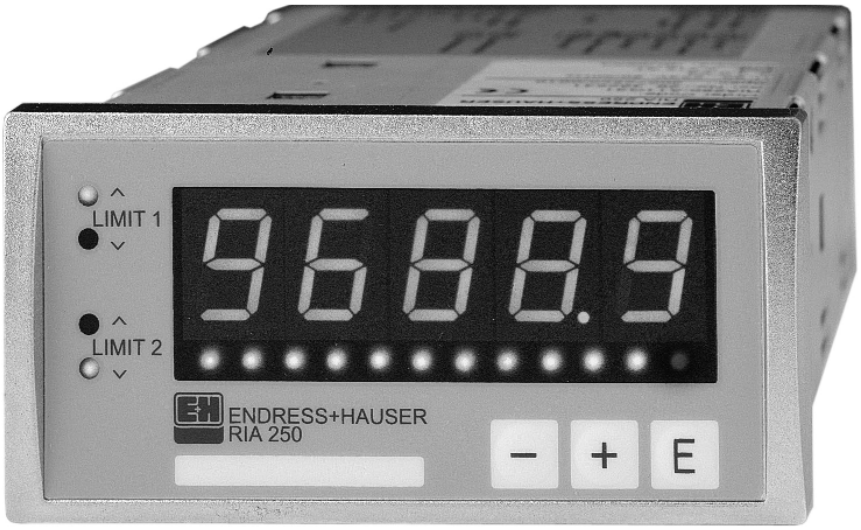
Level | Pressure | Flow | Temperature | Liquid Analysis | Registration | Systems Components | Services | Solutions

Technical Information

RIA250

Process display
Multifunctional 1 channel display with universal input, loop power supply, limit monitor and analog output



Application

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

Benefits at a glance

- All normal measurement signals can be directly connected (bipolar voltage and current, thermocouple, RTD)
- Active numeric measured value display with bar graph
- Flexible set point monitor with 2 relay contacts
- Adjustable current or voltage analog output
- Integrated loop power supply for connected sensors
- RS232 interface for setup configuration and measured value output
- Certification:

TI060R/09/en
51000120

Endress+Hauser
People for Process Automation

Function and system design

Measuring principle

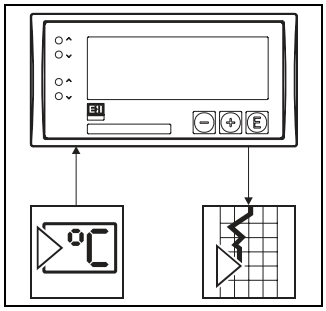
The display receives an analog signal and shows the corresponding value on the display. The analog output transmits this displayed value either as a current or voltage. Two presettable limit values monitor the measured value for any infringement of the preset conditions and control the two output relays. Transmitters connected are directly powered by the unit.

Measuring system

The presettable universal input enables direct connection of various sensors, whether current, voltage, RTD or thermocouple. Using the built-in loop power supply the unit can also power the connected sensors and then evaluate the signal returning from the sensor to the input of the unit. Two presettable set points monitor the measured value for any deviation from the preset conditions.
This opens up a number of possibilities for direct process control. The scaleable analog output offers an instrument from which a matched signal for further analysis equipment can be obtained. Simple setting up using an interface and PC program as well as manual on site setting up are available.

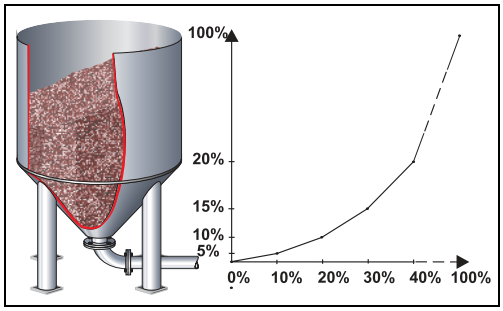
Transmitter

Using the linearization function and the analog output, the RIA250 process display can also be applied as an easy-to-use amplifier. The large number of already stored temperature linearization tables as well as a square root function can be easily selected from the setup menu.
Example:
The signal from a temperature sensor is connected to the input of the unit, then linearized and displayed as a temperature value.
The analog output is made available to other instrumentation (e.g. data loggers or recorders) as a current or voltage signal proportional to the displayed value.



Linearization

Up to 32 points maximum.
The RIA250 display has a built-in linearization function. It is possible for the user to set up a connection between the input signal and the value to be displayed on the unit. These points can be set up using the three front mounted push buttons, or they can be easily defined and transmitted using the ReadWin® 2000 configuration software.
Example: Linearization of a tank signal that describes the relationship between the filling height and the tank volume.



Limit function

The additional limit function monitors the measured signal once per second in order to see that the preset parameters have been adhered to. Both limits can be individually set up for minimum or maximum security, as a high or low limit with presettable hysteresis as well as being able to define a switch time delay.
The set point infringement is indicated using 2 LEDs, as an option, an output relay can be activated.

Input

Measured variable

Voltage, current, resistance thermometer (RTD), thermocouple (TC)

Measuring range

Voltage	+/-100mV; max. +/-5V, +/-10V; max. +/-50V R_i: 1MΩ
Current	0/4...20mA; max. 200mA; R_i: 5Ω
RTD	Pt100, -200 to +850°C (-328 to +1652°F), DIN EN60751) Ni100, -60 to +180°C (-76 to +356°F, DIN 43760) Sensor current, approximately 250 µA, pulsed Connection: 2 wire, 3-wire, 4-wire Cable compensation, 40Ω
Thermocouple	Type T, -270 to +400°C (-454 to +752°F) Type J, -210 to +1200°C (-346 to +2192°F) Type K, -200 to +1372°C (-328 to +2502°F) Type R, -50 to +1800°C (-58 to +3272°F) Type S, 0 to 1800°C (32 to 3272°F) Type B, 0 to 1820°C (32 to 3308°F) Type N, -270 to +1300°C (-454 to +2372°F) Type U, -200 to +600°C (-328 to +1112°F) Type L, -200 to +900°C (-328 to +1652°F) Type W3, 0 to 2315°C (+32 to +4199°F) Type W5, 0 to 2315°C (32 to 4199°F)
Type T, J, K, R, S, B, N to DIN EN60584 Type U, L to DIN 43710; Type W3, W5 to ASTME988-96	

Integration time

1 s

Output

Loop power supply

24 V, ± 20%, 30 mA

Number of outputs

1

Galvanic isolation

To all other current circuits.

Optional analog output

The RIA250 display can be fitted with an analog output (optional). The output signal is proportional to the displayed measured value and the bar graph displays the input signal position.
Special features:
- Current/Voltage output
- Galvanic isolation
- Infinite scaling within the display range
- Presettable fault operation to NAMUR recommendation NE43

Output signal
0/4 to 20 mA, 20 to 4/0 mA or 0 to 10 V, ± 10% over range

Voltage
Output current maximum, 20 mA

Current
Load maximum 500Ω

Fault message
Presettable 3.6 mA or 21 mA. Actions to NAMUR recommendation NE43

D/A resolution
Current; 13 bit; voltage, 15 bit

Number of outputs
1

Galvanic isolation
To all other current circuits

Optional relay output

Output signal
Binary, switches when set point is reached

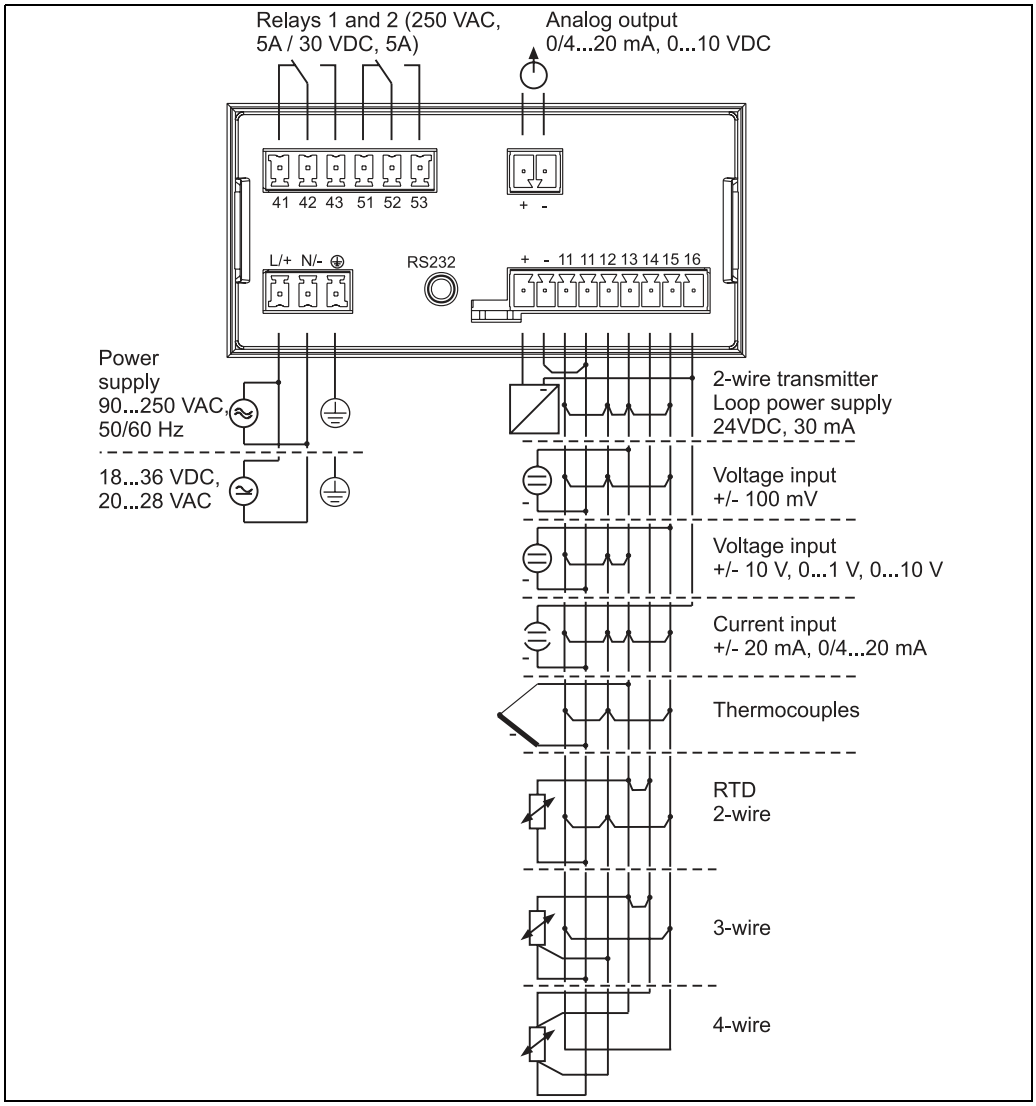
Number of relays
2

Contact type
DPDT

Contact load
< maximum 250 VAC, 5A

Electrical connection

Electrical connection



Terminal assignment RIA250

Supply voltage

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

Power consumption

11.5 VA (90...250 VAC)
5.5 VA (18...36 VDC; 20-28 VAC)

Performance characteristics

Accuracy

Voltage	0.05% of end value
	Temperature drift, 0.01% / 10K ambient temperature
Current	0.05% of end value
	Temperature drift, 0.01% / 10K ambient temperature
RTD	2-wire, ± 0.8°C (± 1.4°F)
	3-wire, ± 0.5°C (± 0.9°F)
	4-wire, ± 0.3°C (± 0.5°F)
	Temperature drift, 0.01% / 10K ambient temperature
Thermocouple	Type T: ± 0.2°C (± 0.4°F); T < -150°C, ± 1.0°C (T < -238°F)
	Type J: ± 0.2°C (± 0.4°F); T < -150°C, ± 1.0°C (T < -238°F)
	Type K: ± 1.0°C (± 1.8°F)
	Type R: ± 1.0°C (± 1.8°F)
	Type S: ± 1.0°C (± 1.8°F)
	Type N: ± 1.0°C (± 1.8°F)
	Type B: T > 400°C, ± 1.0°C (T > 752°F, ± 1.8°F)
	Type U: ± 0.5°C (± 0.9°F)
	Type L: ± 0.5°C (± 0.9°F)
	Type W3: ± 1.0°C (± 1.8°F)
	Type W5: ± 1.0°C (± 1.8°F)
	Temperature drift, 0.01% / 10K ambient temperature
Analog output	0.04% of end value
	Temperature drift, 0.05% / 10K ambient temperature
Thermocouple cold junction	± 0.5°C (± 0.9°F)
	Resolution, 0.1°C (0.2°F)

Installation

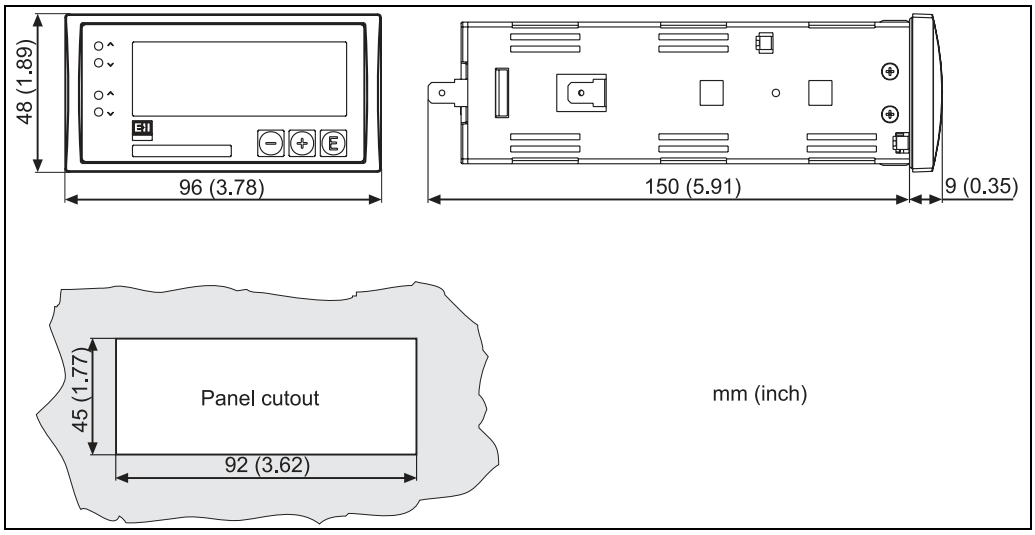
Installation instructions	**Mounting location** Panel cutout 48 x 96 mm (1.89 x 3.78 inches), see 'Mechanical construction'. **Installation angle** No restrictions.

Environment

Ambient temperature	-10 to +50°C (15 to 120°F)
Storage temperature	-30 to +70°C (-20 to +155°F)
Climatic class	To EN 60654-1 Class B2
Ingress Protection	NEMA 4x, IP 65 front; NEMA 1, IP 20 for terminals
RFI protection	To EN 55011 Group 1, Class A
Normal safety	To EN 61010-1 protection Class 1, over voltage category II, installation over current protection < 10 A
Altitude	Up to 2000 m (6560 ft.) above sea level according to IEC 61010-1, EN 61010-1, CSA 1010.1-92
ESD	To EN 61000-4-2, 6kV/8kV
Electromagnetic fields	To EN 61000-4-3, 10V/m
Burst (supply)	To EN 61000-4-4, 4 kV
Burst (signal)	To EN 61000-4-4, 4 kV
Surge (AC supply)	To EN 61000-4-5, sym. 1 kV, unsym. 2 kV
Surge (DC supply)	To EN 61000-4-5, sym. 0.5 kV, unsym. 1 kV
Cable high frequency	To EN 61000-4-6, 10 V
Common mode noise rejection	80 dB at 60 V, 50/60 Hz
Normal mode noise rejection	60 dB at input range 1/10, 50/60 Hz

Mechanical construction

Design, dimensions



Dimensions of the RIA251

Weight

approximately 600 g (1.32 lbs)

Material

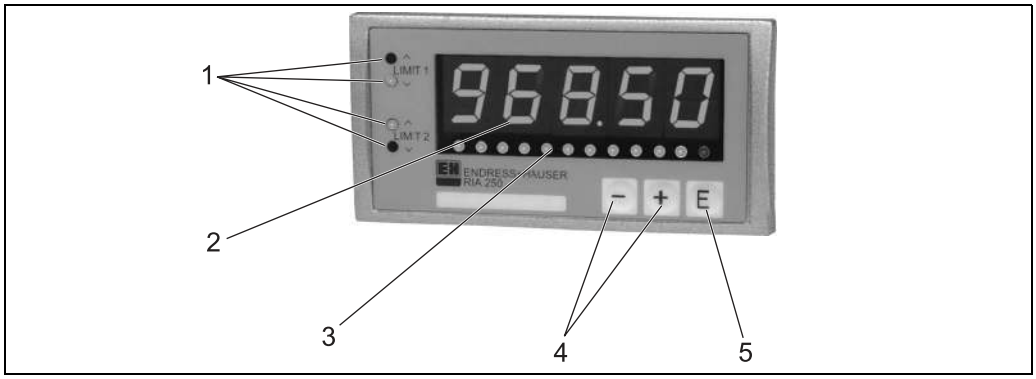
- Housing front: Die cast aluminium
- Housing casing: Galvanized sheet steel
- Housing rear panel: Plastic ABS

Electrical connection

Plug on screw terminals, 1.5 mm^2 (16 AWG) solid, 1.0 mm^2 (18 AWG) stranded with ferrule

Human interface

Display and operating elements



Display and operating elements RIA250

1) Alarm limit indicators
2) 5-digit LED display
3) 12-segment LED bargraph display
4) Selection push buttons
5) Enter push button

- Display
  5-digit LED, 13 mm (0.5") character height, rear illuminated. Bargraph display in 10% increments, markers for over/under range display.
- Range
  -199999 to +99999

- Offset
  -199999 to +32767
- Signals
  Measurement range over/under value
- Rear illumination
  Illumination brightness increases with an increase in loop current

Operation

3 push button operation (-/+/E), integrated in the unit, access when unit is opened

Interface

RS232, connects to rear panel, 3.5 mm stereo connection.
The RIA250 can be set up extremely easily using the built-in RS232 serial interface and the Endress+Hauser ReadWin® 2000 PC software. Safe and secure setup is made possible via on-line help text. ReadWin® 2000 software and interface cable are optionally available.
Special features:
- Compatible with Windows® 95/98/2000/NT/XP/CE PC operating system
- Storage of unit settings in a data bank
- Instantaneous value display
- Printout of unit settings

Certificates and approvals

CE

By attaching the CE mark, Endress+Hauser confirms that the instrument fulfills all the requirements of the relevant EC directives (89/336/EWG)

GL approval

Certification for GL-Germanischer Lloyd marine approval

UL

Recognized component to UL 3111-1

CSA

CSA General purpose

Ordering information

Product structure

RIA250	Electronical indicator. 1 channel, scalable. Trend indication, limit marker yellow. Loop power supply 24VDC, 30mA. Interface RS232, ReadWin 2000. Approval: GL (German Llyod) Marine. UL listed + CSA GP. Linearization table 32-point.

	Approval							
	A	Non-hazardous area						
		Power supply						
		1	90-250VAC					
		2	18-36VDC, 20-28VAC					
			Measuring signal					
			1	0/4-20mA, +/-100mV, +/-10V Thermocouple, Pt100, Ni100				
				Display				
				R	5-digit LED, red			
				G	5-digit LED, green			
					Output			
					1	Not selected		
					2	2x relay limit DPDT		
					3	Analog 0/4-20mA / 0-10V + 2x relay, Limit DPDT		
						Housing		
						1	Panel mounting, 48x96x150mm	
						2	Panel mounting, 48x96x150mm + WCC=Works calib. certif.	
						3	Field housing, IP65 204x155x215mm	
						4	Field housing, IP65 204x155x215mm + WCC=Works calib. certif.	
						J	Standard model Japan, panel mounting, 48x96x150mm	
							Marking	
							1	Tagging (TAG), on nameplate
							2	Tagging (TAG), metal
							5	Tagging (TAG), paper
RIA250-	A		1					⇐ **Order code**

Documentation

- System components – field and panel installation display unit, energy manager, active barrier, process transmitter and overvoltage protection: FA016K/09
- Operating instructions ’Process display RIA250’: BA107R/09

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