

# Process Display *RIA 250*

**Multifunctional 1 channel display with universal input, loop power supply, alarm limits, and analog output**



## Application Areas

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

## Advantages

- Multi functional:  
All normal measurement signals can be directly connected (bipolar voltage and current, thermocouple, RTD)
- Display:  
Active numeric measured value display with bar graph
- Alarm:  
Flexible set point monitor with 2 relay contacts
- Active:  
Adjustable current or voltage analog output
- Power:  
Integrated loop power supply for connected sensors
- Communicative:  
RS 232 interface for set-up configuration and measured value output

Endress + Hauser

The Power of Know How



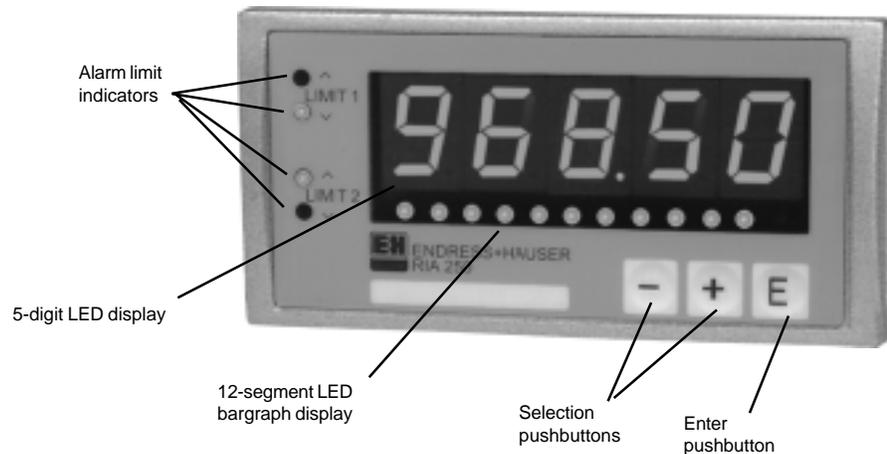
## Functions

The presettable universal input enables direct connection of various sensors, including current, voltage, RTD and thermocouples. Using the built-in loop power supply, the RIA 250 can power a connected sensor, and then it can evaluate its signal to the RIA 250. Two presettable alarm set points monitor the measured value for any deviation from the preset conditions.

The adjustable analog output offers an instrument from which a matched signal for further analysis equipment can be obtained. Simple configuration is available directly at the RIA 250 via a PC interface.

Process control is simplified with the RIA 250 which can transmit power to a transmitter, receive and indicate a universal input, and transmit an analog output signal (optional) or communicate via RS232.

## Display



## Interface with ReadWin 2000 PC Software



The RIA 250 can be set up extremely easily using the built-in RS 232 serial interface and the Endress+Hauser ReadWin 2000 PC software. Safe and secure set-up is made possible via on-line help text. ReadWin 2000 software and interface cable are optionally available.

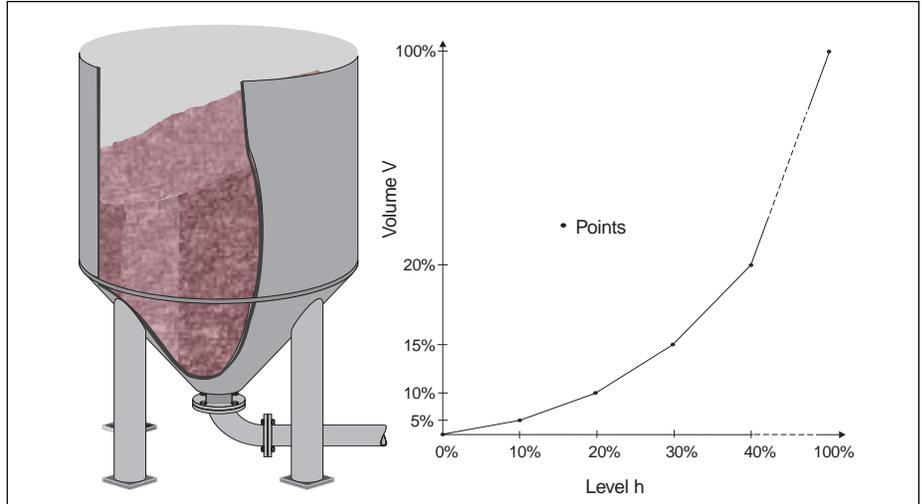
### Special Features

- 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

## Linearization

The RIA 250 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 3 front mounted push buttons, or they can be easily defined and transmitted using the ReadWin 2000 operator software.

Example:  
Linearization of a vessel signal that describes the relationship between the filling height and the vessel volume.



## Analog Output

The RIA 250 display can be fitted with an analog output (optional). The output signal is proportional to the displayed measured value and the bargraph 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
- Invertable measurement signal output

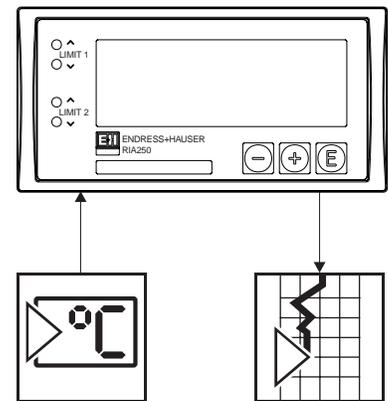
## Transmitter

Using the linearization function and the analog output, the RIA 250 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 set-up 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.

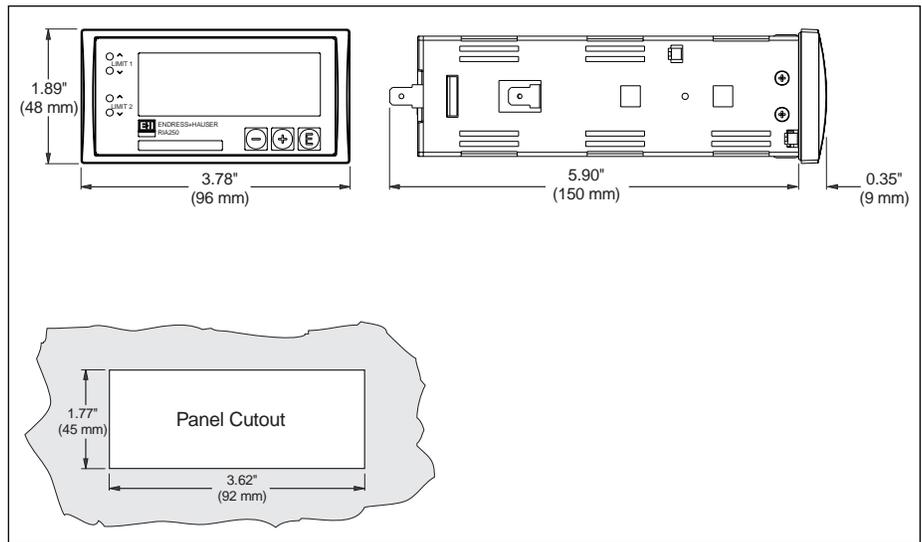


## Alarm Limits

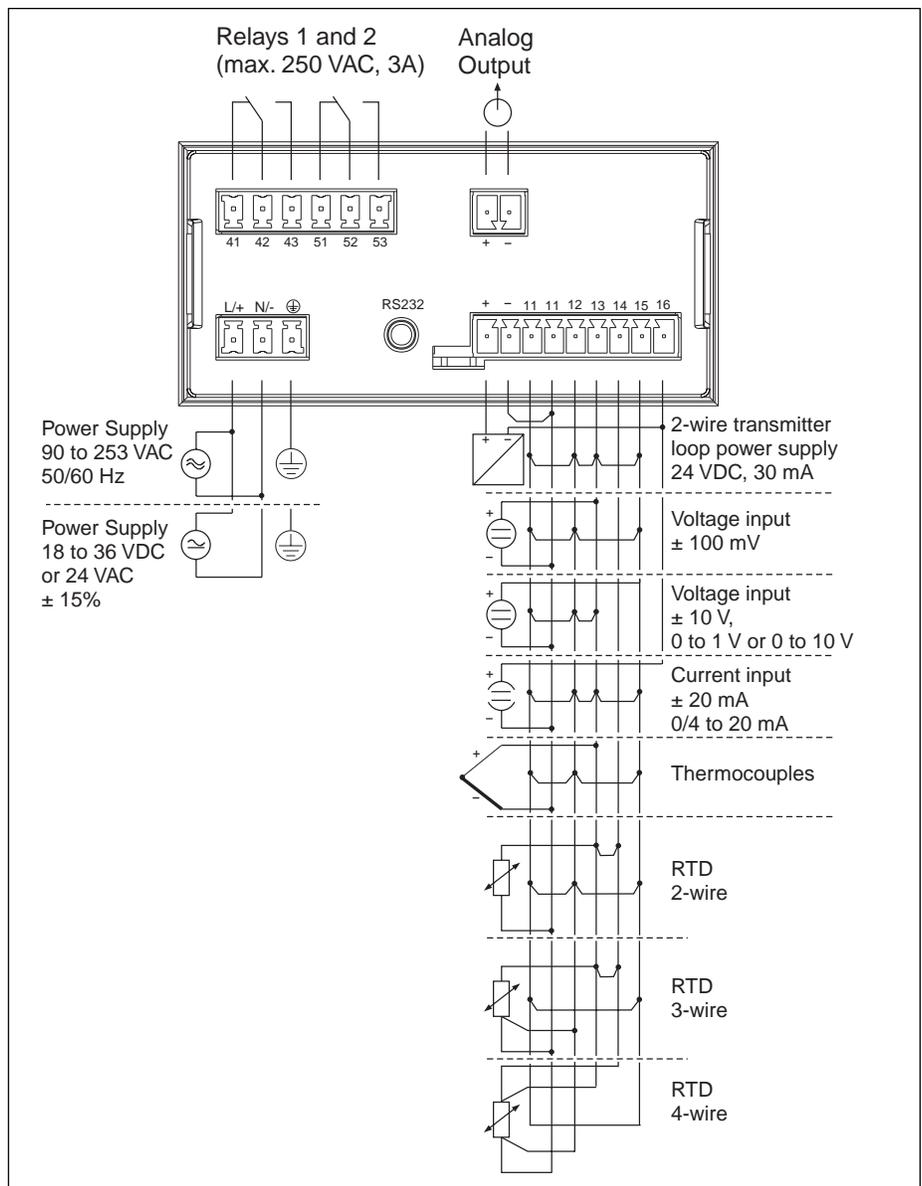
The additional limit function monitors the measured signal once per second to verify that the preset parameters have been maintained.

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. An optional output relay can be activated.

# Dimensions



# Electrical Connection



# Technical Data

## General

Manufacturer	Endress+Hauser
Description	RIA 250
Application	Process display for panel mounting

## Application

Process Display, Transmitter	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. A connected transmitter can be directly powered by the unit.
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## Operation and System Construction

Principle	The analog signal is digitized, analyzed and indicated on the display. A digital analog convertor makes a proportional current or voltage signal available for additional peripheral equipment at the output terminals
Measurement System	Microcontroller controlled display with LED display, analog input, analog output, limit relays and loop power supply

## Input

Input Types	Voltage, current, resistive thermometer (RTD), and thermocouple (TC)
Measurement Ranges	Voltage: $\pm 100$ mV, maximum $\pm 5$ V $\pm 10$ V, maximum $\pm 50$ V $R_i = 1$ M $\Omega$
	Current: 0/4 to 20 mA, maximum 200 mA, $R_i = 5\Omega$
	RTD: Pt 100, -328° to +1562°F (-200° to +850°C, DIN EN60751) Ni 100, -76° to +356°F (-60° to +180°C, DIN43760) Sensor current, approximately 250 $\mu$ A, pulsed Connection; 2-wire, 3-wire, 4-wire Cable compensation, 40 $\Omega$
	Thermocouple: Type T, -454° to +752°F (-270° to +400°C) Type J, -346° to +2192°F (-210° to +1200°C) Type K, -328° to +2502°F (-200° to +1372°C) Type R, -58° to +3272°F (-50° to +1800°C) Type S, +32° to +3272°F (0° to +1800°C) Type B, +32° to +3308°F (0° to +1820°C) Type N, -454° to +2372°F (-270° to +1300°C) Type U, -328° to +1112°F (-200° to +600°C) Type L, -328° to +1652°F (-200° to +900°C) Type W3, +32° to +4199°F (0° to + 2315°C) Type W5, +32° to +4199°F (0° to + 2315°C) Type T, J, K, R, S, B, N to DIN EN60584 Type U, L to DIN 43710; Type W3, W5 to ASTM E988-96
Linearization	Up to 32 points maximum
Integration Time	1 second

## Output

Loop Power Supply	24 V, $\pm 20\%$ , 30 mA
Number of Outputs	1
Galvanic Isolation	To all other current circuits

## Optional Analog Output

Output Signal	0/4 to 20 mA, 20 to 4/0 mA or 0 to 10 V, $\pm 10\%$ over range
Voltage	Output current maximum, 20 mA
Current	Load maximum 500 $\Omega$
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	SPDT
Contact Load	< = maximum 250 VAC, 3A

## 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, $\pm 1.4^{\circ}\text{F}$ ( $\pm 0.8^{\circ}\text{C}$ ) 3-wire, $\pm 0.9^{\circ}\text{F}$ ( $\pm 0.5^{\circ}\text{C}$ ) 4-wire, $\pm 0.5^{\circ}\text{F}$ ( $\pm 0.3^{\circ}\text{C}$ ) Temperature drift, 0.01% / 10K ambient temperature
Thermocouple	Type T: $\pm 0.4^{\circ}\text{F}$ ( $\pm 0.2^{\circ}\text{C}$ ); T < $-238^{\circ}\text{F}$ , $\pm 1.8^{\circ}\text{F}$ (T < $-150^{\circ}\text{C}$ , $\pm 1.0^{\circ}\text{C}$ ) Type J: $\pm 0.4^{\circ}\text{F}$ ( $\pm 0.2^{\circ}\text{C}$ ); T < $-238^{\circ}\text{F}$ , $\pm 1.8^{\circ}\text{F}$ (T < $-150^{\circ}\text{C}$ , $\pm 1.0^{\circ}\text{C}$ ) Type K: $\pm 1.8^{\circ}\text{F}$ ( $\pm 1.0^{\circ}\text{C}$ ) Type R: $\pm 1.8^{\circ}\text{F}$ ( $\pm 1.0^{\circ}\text{C}$ ) Type S: $\pm 1.8^{\circ}\text{F}$ ( $\pm 1.0^{\circ}\text{C}$ ) Type N: $\pm 1.8^{\circ}\text{F}$ ( $\pm 1.0^{\circ}\text{C}$ ) Type B: T > $752^{\circ}\text{F}$ , $\pm 1.8^{\circ}\text{F}$ (T > $400^{\circ}\text{C}$ , $\pm 1.0^{\circ}\text{C}$ ) Type U: $\pm 0.9^{\circ}\text{F}$ ( $\pm 0.5^{\circ}\text{C}$ ) Type L: $\pm 0.9^{\circ}\text{F}$ ( $\pm 0.5^{\circ}\text{C}$ ) Type W3: $\pm 1.8^{\circ}\text{F}$ ( $\pm 1.0^{\circ}\text{C}$ ) Type W5: $\pm 1.8^{\circ}\text{F}$ ( $\pm 1.0^{\circ}\text{C}$ ) Temperature drift, 0.01% / 10K ambient temperature
Analog Output	0.04% of end value Temperature drift, 0.05% / 10K ambient temperature
Thermocouple Cold Junction	$\pm 0.9^{\circ}\text{F}$ ( $\pm 0.5^{\circ}\text{C}$ ) Resolution, $0.2^{\circ}\text{F}$ ( $0.1^{\circ}\text{C}$ )

## Application Conditions

Ambient Temperature	15° to 120°F (-10° to + 50°C)
Storage Temperature	-20° to +155°F (-30° to + 70°C)
Climatic Class	To EN 60654-1 Class B2
Ingress Protection	NEMA 4 (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, overvoltage category II, installation over current protection $\leq 10\text{ A}$
ESD	To EN 61000-4-2, 6kV/8kV
Electromagnetic Fields	To EN 61000-4-3, 10 V/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

Dimensions	H, 1.9" (48 mm); W, 3.8" (96 mm); D, 5.9" (150 mm)
Weight	1.3 lbs (600 g)
Materials	Housing front, die cast aluminum Casing, galvanized sheet steel Rear panel, ABS plastic
Electrical Connection	Plug on screw terminals, 16 AWG (1.5 mm <sup>2</sup> ) solid, 18 AWG stranded cable (1.0 mm <sup>2</sup> ) with ferrule

## Display and Operation

Display	LED display, 2 color Numeric display, 5 x 7 segment (red or green) 0.5" (13 mm) Bargraph display, 12 segment, yellow Limit indicator, 4 x 1 segment, yellow
Range	-19999 to + 99999
Operation	3 pushbuttons (+, -, E) and/or ReadWin 2000 software
Interface	RS 232, connects to rear panel, 3.5 mm stereo connection
Limit Function	Off, minimum, maximum, alarm
Number of Limits	2
Limit Display	2 LEDs per limit
Scan Rate	1 second

## Input Power

Power Supply	90 to 253 VAC, 50/60 Hz Optional 18 to 36 VDC, 24 VAC ±15%, 50/60 Hz
Power Consumption	4 VA

## Certificates

CE Mark	89/336/EWG and 73/23/EWG guide lines By attaching the CE mark, Endress+Hauser confirms that the instrument fulfills all the requirements of the relevant EC directives
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## Ordering Information

### RIA 250 Process Display

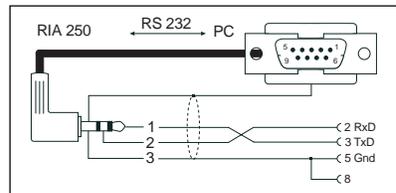
RIA 250 -  1  2  3  4  5  6

- 1 Certification
  - A General purpose
- 2 Power Supply
  - 1 90 to 253 VAC, 50/60 Hz
  - 2 18 to 36 VDC / 20 to 28 VAC, 50/60 Hz
- 3 Signal Input
  - 1 0/4 to 20 mA, 0 to 10 V, ±100 mV, ±10 V thermocouple and Pt 100, Ni 100
- 4 Display
  - R Red numeric display, 5-digit
  - G Green numeric display, 5-digit
- 5 Analog Output / Limit Relays
  - 1 Analog output and limit relays not required
  - 2 2 limit relays, SPDT, 250 VAC, 3A
  - 3 Analog output 0/4 to 20 mA, 0 to 10 V and 2 limit relays (SPDT, 250 VAC, 3A)
- 6 Model
  - K Standard North American region, panel mounted
  - L NEMA 4X field mounted housing, North American region
  - 2 Factory calibration certificate, panel mounted
  - 4 Factory calibration certificate, NEMA 4X (IP 65) field housing

### Accessories

PC software ReadWin 2000 for unit set up with 3 ft. (1 m) connection cable, 9 pin Sub. D connector and 3.5 mm stereo plug (plugs into rear of RIA 250).

**Part No.RMA421A-VM**



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