Field display

RIA 261

Digital loop-powered field display
for 4 to 20 mA current loops

Features and benefits

• Loop-powered display, no additional power supply cable required
• 5 digit LC display, 26 mm character height
• Trend bargraph in 10% steps
• Rear illumination without additional power supply
• Measurement range displayed from -19999 to 99999
• Flexible measurement range set up using three push buttons
• Certification
  - ATEX
  - FM
  - CSA
• GL Germanische Lloyd Marine approval
• Two cable entries for wiring the measurement circuit
• Space for installing additional measurement electronics, e.g. temperature head transmitters
• Housing can be lead sealed
• Protection class IP66/NEMA 4X
• GORE-TEX® membrane for pressure compensation

Application

• Plant and machine construction
• Field mounted applications
• Laboratory fittings
• Process display, monitoring
• Suitable for Ex application
Function and system design

Measuring principle

The display measures an analogue measurement signal and indicates this on the display. The display is connected in a 4 to 20 mA current loop and also derives its supply from the loop. The volt drop is almost negligible (< 2.5 V). The dynamic internal resistance (load) makes sure that independently from the loop current, the maximum volt drop is never exceeded. The analogue signal at the input is digitalised, analysed and shown in the rear illuminated display.

Equipment architecture

Micro-controller controlled field mounted display with illuminated LC display. Setting up measurement range, decimal point and offset of the display is easily done on an open unit using the three operational push buttons fitted. Setting up during operation is possible. The rear illuminated display is always active and needs no further wiring for its energy requirement.

Input

Measured variable  Current

Measuring range  4 to 20 mA (polarity protected)

Electrical specifications

- Volt drop (load)  < 2.5 V
- Max. input current (short circuit current)  200 mA
Output

Output signal
The analogue input signal (4 to 20 mA) is not converted. The input signal is digitalised, analysed and shown in the LC display.

Signal on alarm
No measured value seen in the LC display, no rear illumination.

Transmission behaviour
The display allows transmission of the HART® transmission protocol.

Auxiliary energy

Electrical connection

Field mounted display terminal layout

<table>
<thead>
<tr>
<th>Terminal</th>
<th>In and outputs</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Measurement signal (+) 4 to 20 mA Signal input</td>
</tr>
<tr>
<td>2</td>
<td>Connection terminal for further instrumentation Terminal</td>
</tr>
<tr>
<td>3</td>
<td>Measurement signal (-) 4 to 20 mA Signal input</td>
</tr>
<tr>
<td>4</td>
<td>Connection terminal for further instrumentation Terminal</td>
</tr>
</tbody>
</table>

Supply voltage
The power supply is done using the 4 to 20 mA current loop power.
Volt drop: < 2.5 V

Cable entry
2 x M20 cable entries
Alternative: 2 x ½ " NPT cable entries
Performance characteristics

Reference conditions  
* T = 25 °C

Maximum measured error  
< 0.1% of scaled analogue range

Non-repeatability  
Not specified

Influence of ambient temperature  
Temperature drift = 0.01%/K ambient temperature

Operating conditions

Installation instructions  
- Installation area: Wall or pipe mounting (see Accessories)
- Installation angle: No limitations

Environment

Ambient temperature range  
-20 to +60 °C (for Ex areas, see Ex certificate)

Ambient temperature limits  
See ambient temperature range

Storage temperature  
-25 to +70 °C

Climate class  
To EN 60 654-1, Class D1

Degree of protection  
IP66, NEMA 4X

Shock resistance  
Not specified

Vibration resistance  
Not specified

Electromagnetic compatibility  
RF protection  
To EN 55011 Group 1, Class B

Interference safety
- ESD to IEC 1000-4-2, 6 kV/ 8 kV
- Electromagnetic fields to IEC 1000-4-3, 10 V/m
- Burst (power supply) to IEC 1000-4-4, 4 kV
- Surge to IEC 1000-4-5, 1 kV
- Cable high frequency to 1000-4-6, 10 V
### Mechanical construction

**Design, dimensions**

![Diagram of mechanical construction](image)

- Unit dimensions in mm
- Dimensions for wall mounting holes (lower picture) in mm

- There is room available behind the hinged electronics for additional electronics e.g. temperature head transmitter. **Take note of manufacturers installation instructions!**
- Internal dimensions: \( H = 60 \text{ mm}, \ W = 140 \text{ mm}, \ D = 30 \text{ mm} \)
- Housing can be lead sealed
- GORE-TEX® membrane used as pressure compensation fitted to the left of the cable entries

<table>
<thead>
<tr>
<th><strong>Weight</strong></th>
<th>Approx. 800 g</th>
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<table>
<thead>
<tr>
<th><strong>Material</strong></th>
<th><strong>Housing</strong></th>
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<tbody>
<tr>
<td></td>
<td>Die cast aluminium epoxy coated with glass insert</td>
</tr>
</tbody>
</table>

**Wall/stand pipe mounting kit and tensioning tape**

1.4301 stainless steel

<table>
<thead>
<tr>
<th><strong>Terminals</strong></th>
<th></th>
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</thead>
<tbody>
<tr>
<td></td>
<td>Plug in screw terminals inside the housing in order enable loop current connection: Plug on screw terminals, terminal size 1.5 mm(^2) solid core, 1.0 mm(^2) stranded with ferrule</td>
</tr>
<tr>
<td></td>
<td>Earth (ground) connection on housing exterior: Terminal range 2.5 mm(^2)</td>
</tr>
</tbody>
</table>
Human interface

Display elements

• Display
  5 digit LC display, 26 mm character height, rear illuminated
  Bargraph display in 10% steps, markers for over/under range display
• Display range
  -19999 to +99999
• Offset
  -19999 to +32767
• Operation
  Three push button operation (-/+E) integrated in the unit, access when unit is opened
• Signals
  Measurement range over/under value
• Rear illumination
  Illumination brightness increases with an increase in loop current

Certificates and approvals

The measurement system fulfils the legal requirements laid out within the EU regulations 89/336/EWG. Endress+Hauser acknowledges successful testing of the unit by adding the CE mark.

Ex approval

Details regarding the availability of the Ex versions (ATEX, FM, CSA, etc.) can be obtained from your local E+H sales organisation. All relevant data for Ex protection can be found in separate Ex documentation, which can be requested separately.

Ordering information

Product structure

Process display RIA 261

1 channel, presettable scale for 4 to 20 mA, loop powered, 5 digit LC display, rear illuminated, 26 mm digit high, 10 segment bargraph

Certification

A Version for non-Ex areas
B ATEX, II 2(1)G EEx ia IIC T6
C FM IS, Ni I / 1,2 / ABCD T6
D CSA Class I, Div 1,2 Groups ABCD T6

Model

1 Aluminium housing IP66/NEMA4x, M20 epoxy powder coating, 175 x 80 mm
2 Aluminium housing IP66/NEMA4x, NPT 1/2" epoxy powder coating, 175 x 80 mm

Additional features

1 None
2 Mounting set for wall/pipe mounting
3 Works calibration certificate
4 Works calibration certificate / mounting set

RIA 261-
Accessories

Wall and stand pipe mounting kit, pos. B (with tension tape installation, pos. A)
Order number 510 03502

Further documentation

- Operating manual process display RIA 261 (BA 111R/09/)
- Ex additional documentation: ATEX (XA 007R/09/a3) FM, CSA, etc.
- Product group brochure “Displays” (PG 003/R/09/en)
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