Level Pressure Flow Temperature Liquid Analysis Registration Systems Components Services Solutions

Technical Information

Easy Analog RNB110-A1/A2/A3, RNB111 and RNB112-A1/A2

System components for processing and adaptation of analog signals – Isolating amplifiers, repeater power supply and passive loop-powered isolators

Your benefits
- Complete family in one housing
- Power supply via
  - DIN rail bus connector: less wiring, easy module change (even during operation)
  - Terminals
- Power supply 19.2 to 30 V possible
- 6.2 mm (0.244") device width
  ➔ Cost saving through reduction in space
- Installation in 120 mm (4.72") small field housings
- Easy configuration via DIP switches, most common configurations printed on device
  ➔ Configuration possible in the field
- High flexibility concerning in-/output signals
  ➔ Wide-range usage
- Low power consumption
  ➔ Small heat loss

Application
- Galvanic isolation of current and voltage signals
- Elimination of ground loops
- Supply of sensors and transmitters (RNB111)

CE

TI116R/06/en
51010010

Endress+Hauser
People for Process Automation

Function and system design

Measuring principle

RNB110-A1	3-way isolating amplifier for galvanic isolation of analog signals, with screw connection Input signal: 0(4)...20 mA, output signal: (0)4..20 mA The voltage supply (19.2...30 V DC) can either be provided via connecting terminal blocks of the module, or via the DIN rail bus connector.
RNB110-A2	3-way isolating amplifier for galvanic isolation of analog signals, with screw connection Input signal: 0...10 V / ± 10 V, output signal: 0..10 V / ± 10 V The voltage supply (19.2...30 V DC) can either be provided via connecting terminal blocks of the module, or via the DIN rail bus connector.
RNB110-A3	Configurable 3-way isolating amplifier for galvanic isolation, conditioning, amplification, and filtering of analog signals. In-/output 0...20 mA, 4...20 mA, 0...10 V, 2...10 V, 0...5 V, 1...5 V Galvanic isolation. The DIP switches accessible on the side of the housing allow the configuration of the input and output signal ranges. The voltage supply (19.2...30 V DC) can either be provided via connecting terminal blocks of the module, or via the DIN rail bus connector.
RNB111	Repeater power supplies have the task of supplying 2 or 3-wire transmitters located in the field and electrically isolating the input signal from the output signal. On the input and output side, the analog standard signals 0...20 mA or 4...20 mA are available, electrically isolated. The voltage supply (19.2...30 V DC) can either be provided via connecting terminal blocks of the module, or via the DIN rail bus connector.
RNB112-A1	Single-channel passive loop-powered isolator for the electrical isolation and filtering of 0(4)...20 mA standard current signals without additional supply voltage.
RNB112-A2	Dual-channel passive loop-powered isolator for the electrical isolation and filtering of 0(4)...20 mA standard current signals without additional supply voltage.

Input

Measured variable

RNB110-A1	RNB110-A2	RNB110-A3	RNB111	RNB112-A1/A2
Current	Voltage	Current, voltage	Current	Current

Measuring range

RNB110-A1	RNB110-A2	RNB110-A3	RNB111	RNB112-A1/A2
0...20 mA	0...10 V -10...+10 V	**0...10 V**[1)] 0...5 V 1...5 V 2...10 V 0...20 mA 4...20 mA	0...20 mA 4...20 mA	0...20 mA 4...20 mA

1) Presetting, please specify different settings in your order

Input

	RNB110-A1	RNB110-A2	RNB110-A3	RNB111	RNB112-A1/A2 (per channel)
Configurable	no	no	yes, pre-configured	no	no
Voltage drop	-	-	-	-	1.7 V (at I =20mA)
Max. current input	50 mA	-	50 mA	28 mA	40 mA
Max voltage input	-	30 V	30 V	-	18 V
Input resistance voltage input	-	100 kΩ	100 kΩ	-	-
Input resistance current input	50 Ω	-	50 Ω	50 Ω	-
Transmitter power supply voltage range	-	-	-	U_B - (max. 4.5 V)	-
Transmitter supply current	-	-	-	< 28 mA	-

Output

Output signal

		RNB110-A1	RNB110-A2	RNB110-A3	RNB111	RNB112-A1/A2
Configurable		no	no	yes, preset	no	no
Output signal		0...20 mA	0...10 V -10...10 V	0...10 V 0...5 V 1...5 V 2...10 V **0...20 mA**[1)] 4...20 mA	4...20 mA 0...20 mA	0...20 mA 4...20 mA
Max. output signal	I_{OUT}	28 mA / 12.5 V	-	28 mA / 12.5 V	28 mA / 12.5 V	-
	U_{OUT}	-	12.5 V / 22 mA	12.5 V / 22 mA	-	-
Load	I_{OUT}	≤ 500 Ω	-	≤ 500 Ω	≤ 500 Ω	< 600 Ω at I = 20 mA output signal
	U_{OUT}	-	≥ 10 kΩ	≥ 10 kΩ	-	-
Ripple	I_{OUT}	< 20 mV_{SS} (500 Ω)	-	< 20 mV_{SS} (500 Ω)	< 20 mV_{SS} (500 Ω)	< 10 mV_{eff}
	U_{OUT}	-	< 20 mV_{SS}	< 20 mV_{SS}	-	-

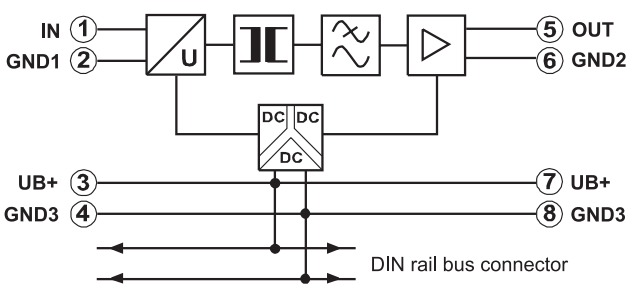
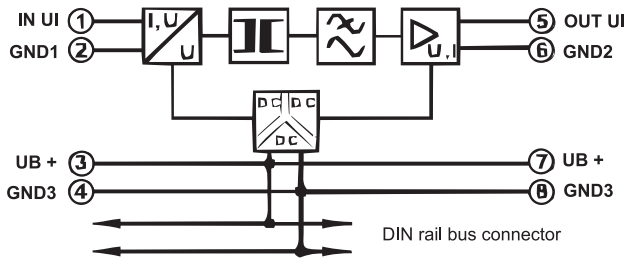
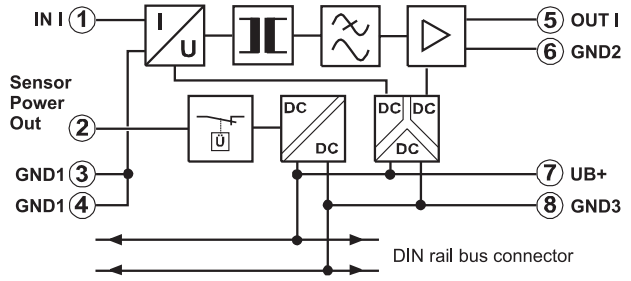
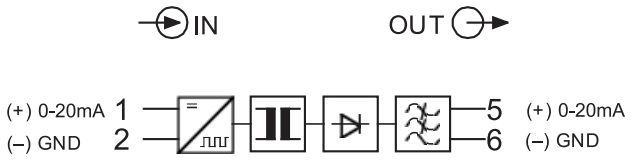
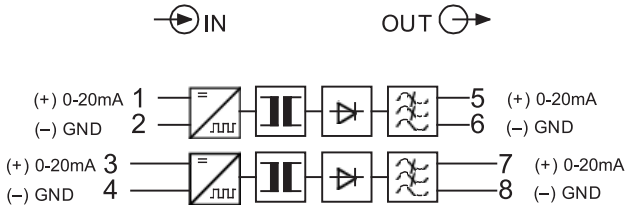
1) Presetting, please specify different settings in your order

Galvanic isolation

Galvanic 3-way isolation
Test voltage: 1.5 kV, 50 Hz, 1 min

Power supply

Electrical connection

RNB110-A1/A2	 *Terminal assignment*
RNB110-A3	 *Terminal assignment*
RNB111	 *Terminal assignment*
RNB112-A1	 *Terminal assignment*
RNB112-A2	 *Terminal assignment*

Supply voltage

RNB110-A1	RNB110-A2	RNB110-A3	RNB111	RNB112-A1/A2
U_B = 19.2 to 30 V				No separate supply voltage

Note!
The voltage supply (19.2...30 V DC) can either be provided via connecting terminal blocks of the module, or via the DIN rail bus connector.

Current consumption

RNB110-A1	RNB110-A2	RNB110-A3	RNB111	RNB112-A1/A2
< 20 mA			< 40 mA	-

Power consumption

RNB110-A1	RNB110-A2	RNB110-A3	RNB111	RNB112-A1/A2
< 450 mW			< 600 mW	-

Performance characteristics

Reference operating conditions

+23 °C ± 5 °C (73.4 °F ± 9 °F)

Maximum measured error

RNB110-A1/A2	RNB110-A3	RNB111	RNB112-A1/A2
max. 0.1% of end value	< 0.1 % with alignment < 0.4 % without alignment	max. 0.2% of end value	max. 0.1% of end value

Temperature coefficient

RNB110-A1/A2/A3	RNB111	RNB112-A1/A2
max. 0.01%/K (0.0056%/°F), typ. 0.002%/K (0.001%/°F)	max 0.01%/K (0.0056%/°F), typ. 0.002%/K (0.001%/°F)	max. 0.002%/K (0.001%/°F) of measured value per 100 Ω load

Cut-off frequency

RNB110-A1/A2/A3	RNB111	RNB112-A1/A2
100 Hz	100 Hz	75 Hz

Step response

RNB110-A1/A2/A3	RNB111	RNB112-A1/A2
3.5 ms	3.5 ms	5 ms at 600 Ω load

Installation

Installation notes

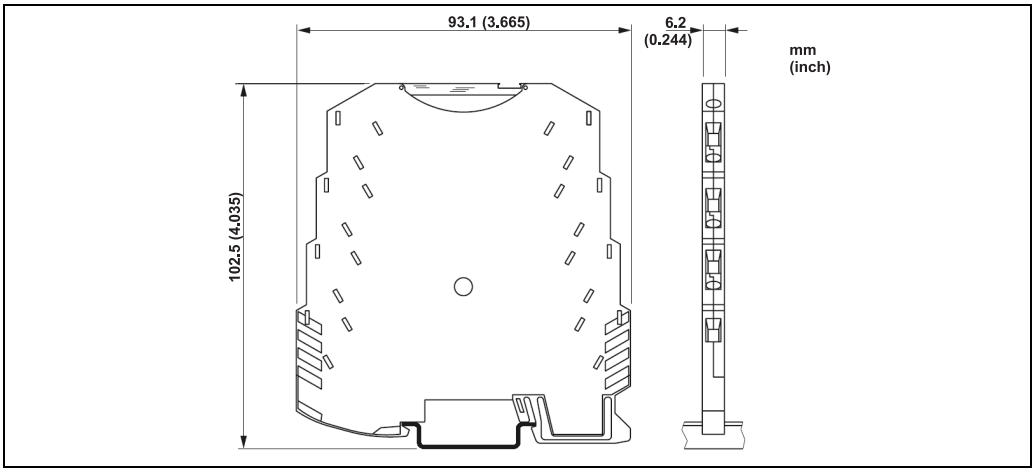
Installation on DIN rail according to IEC 60715.
The DIN rail bus connector can be used to provide the supply voltage (see "Accessories").

Environment

	RNB110-A1/A2/A3	RNB111	RNB112-A1/A2
Ambient temperature limits	-20 °C to +65 °C -4 °F to +149 °F	-20 °C to +60 °C -4 °F to +140 °F	-20 °C to +65 °C -4 °F to +149 °F
Storage temperature	-40 °C to +85 °C -40 °F to +185 °F	-40 °C to +85 °C -40 °F to +185 °F	-40 °C to +85 °C -40 °F to +185 °F
Climate class	IEC 60654-1, B2	IEC 60654-1, B2	IEC 60654-1, B2
Degree of protection	IP20	IP20	IP20
Vibration resistance	4G	4G	4G
Electromagnetic compatibility	CE compliant	CE compliant	CE compliant

Mechanical construction

Design, dimensions



Dimensions of the Easy Analog devices

approx. 55 g

Material

Housing: PBT

Terminals data

Conductor cross section solid min.	0.14 mm²
Conductor cross section solid max.	2.5 mm²
Conductor cross section stranded min.	0.2 mm²
Conductor cross section stranded max.	2.5 mm²
Conductor cross section AWG/kcmil min.	26
Conductor cross section AWG/kcmil max.	12
Stripping length	12 mm (0.47")
Screw thread	M3
Connection type	Screw connection

Human interface

The 3-way isolating amplifier RNB110-A3 can be configured via DIP switches accessible on the side of the housing.

Certificates and approvals

CE mark

The device complies with the legal requirements of the EC directives. Endress+Hauser confirms that the device has been successfully tested by affixing to it the CE mark.

Other standards and guidelines

IEC 60529: Degrees of protection through housing (IP code)

IEC 61010: Protection measures for electrical equipment for measurement, control, regulation and laboratory procedures

EN 61326/A1 (IEC 1326): Electromagnetic compatibility (EMC requirements)

Ordering information

Product structure RNB110

Isolating Amplifier RNB110						
Configurable 3-way isolating amplifier, electrical isolation, conditioning, amplifying and filtering of standard-normal signals DIP switch: configuration of in-/output signal ranges. Voltage supply (19.2...30 V DC) via connecting terminal blocks / DIN rail bus connector.						
	Approval:					
	A	Non-hazardous area				
		Input, Output:				
		1	Current 0/4-20 mA			
		2	Voltage 0-10 V / 0/1-10 V			
		3	Voltage 0-10 V / 0/1-10 V, current 0/4-20 mA			
			Factory configuration Input/Output:			
			A	0-20 mA		
			B	0-10 V		
			C	0-10 V / 0-20 mA, adjustable		
			X	Special version, to be specified		
				Connection:		
				1	Screw strip	
				3	Screw connection, power terminal block	
				4	Screw connection, DIN rail bus connector	
				5	Screw connection, power terminal block, DIN rail bus connector	
					Version:	
					A	Standard
RNB110-	A				A	⇐ Order code complete

Product structure RNB111

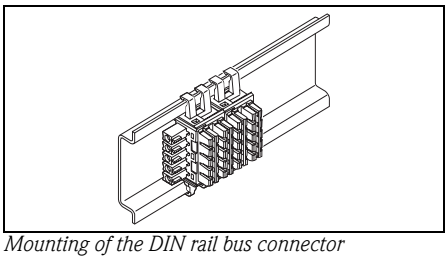
Isolating Power Supply RNB111						
Galvanic isolation of 2-/3-conductor transmitters. Power supply (19.2...30 V DC) via connecting terminal blocks / DIN rail bus connector.						
	Approval:					
	A	Non-hazardous area				
		Configuration:				
		1	0-20 mA			
			Connection:			
			1	Screw strip		
			3	Screw connection, power terminal block		
			4	Screw connection, DIN rail bus connector		
			5	Screw connection, power terminal block, DIN rail bus connector		
				Version:		
				A	Standard	
RNB111-	A	1		A	⇐ Order code complete	

Product structure RNB112

Barrier RNB112						
Passive, with galvanic isolation, filtering of inputs.						
	Approval:					
	A	Non-hazardous area				
		Input, Output:				
		1	1 channel			
		2	2 channel			
			Configuration:			
			A	0-20 mA		
				Connection:		
				1	Screw strip	
				3	Screw connection, power terminal block	
				4	Screw connection, DIN rail bus connector	
				5	Screw connection, power terminal block, DIN rail bus connector	
					Version:	
					A	Standard
RNB112-	A		A		A	⇐ Order code complete

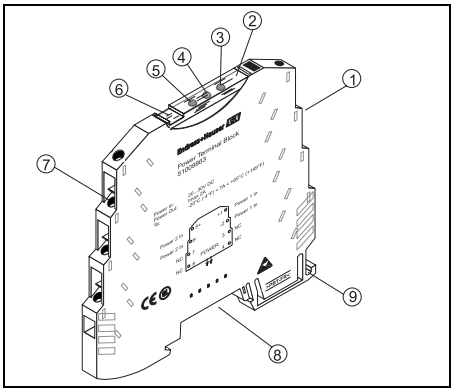
Accessories

DIN rail bus connector (order no. 51009864)



Mounting of the DIN rail bus connector

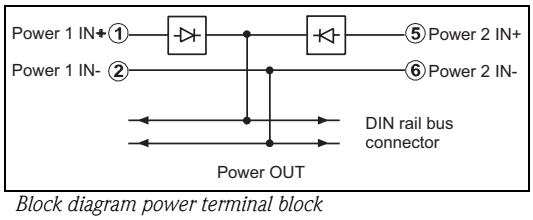
Power terminal block (order no. 51009863)



Power terminal block, operating elements

1 *Input: Supply voltage 1*
2 *Transparent cover*
3 *LED: Reverse polarity indicator Power IN1*
4 *LED: Bus voltage state indicator*
5 *LED: Reverse polarity indicator Power IN2*
6 *Groove for Tag*
7 *Input: Supply voltage 2*
8 *Connection for DIN rail bus connector*
9 *Universal snap on foot for mounting rails*

The power terminal block is used to feed the supply voltage to the DIN rail bus connector (order no. 51009864, see above).
Design and dimensions are the same as for all other Easy Analog devices except RNB130.
Two separate voltage inputs allow a redundant voltage supply of 24 V DC and a maximum current of 2 A.
A green LED on the front panel (fig. on the left, pos. 4) lights up when there is supply voltage on the DIN rail bus connector.
Red LEDs (fig. on the left, pos. 3 and 5) light up when supply voltages are connected to the wrong poles. When the supply voltage has been connected correctly, the respective red LED extinguishes.



Block diagram power terminal block

The power terminal block can be snapped onto all 35 mm DIN rails following IEC 60715.

System power supply RNB130

Further information can be found in the respective Technical Information (see "Documentation").

Documentation

- Technical Information RNB127 and RNB128 (TI117R/09/en)
- Technical Information RNB150 (TI118R/09/en)
- Technical Information RNB140 (TI119R/09/en)
- Technical Information RNB130 (TI120R/09/en)
- Operating Instructions RNB110-A1 (BA203R/09/b4)
- Operating Instructions RNB110-A2 (BA203R/09/b4)
- Operating Instructions RNB110-A3 (BA204R/09/b4)
- Brochure "System Components" (FA016K/09/en)

International Head Quarter

Endress+Hauser
GmbH+Co. KG
Instruments International
Colmarer Str. 6
79576 Weil am Rhein
Germany

Tel. +49 76 21 9 75 02
Fax +49 76 21 9 75 34 5
www.endress.com
info@ii.endress.com

Endress+Hauser

People for Process Automation

TI116R/09/en/09.05
51010010
FrameMaker+SGML 6.0