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71543142
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Technical Information
RLN42

NAMUR isolating amplifier

Two-channel NAMUR isolating amplifier with universal power supply and relay signal output

Application

- Isolating amplifier for the transmission of binary switch signals
- Input for proximity sensors according to NAMUR (EN60947-5-6) and floating contacts or contacts with resistance circuit
- Galvanic 3-way isolation
  Suitable for safety-oriented applications up to SIL 2 in accordance with IEC61508
- Optionally with resistive coupling element for line monitoring of mechanical switching contacts
- Monitoring of input circuits for line faults such as line break and short-circuit (LFD), disengageable
- Output-side relay contacts as signal output, direction of action (operating current behavior or closed circuit current behavior) can be selected via DIP switches
- For ambient temperatures –40 to 60 °C (–40 to 140 °F)

Your benefits

- Wide range power supply of 19.2 to 253 $V_{AC/DC}$
- Compact housing width: 17.5 mm (0.69 in)
- Installation in Ex zone 2 permitted in the option with Ex approval
- Simple and fast wiring with pluggable terminals

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Function and system design

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Product design

NAMUR isolating amplifier

- The NAMUR isolating amplifier is designed for the operation of proximity switches (according to EN 60947-5-6 (NAMUR)) and open and mechanical contacts with resistive coupling elements. One relay (changeover) per channel is available as a signal output. The power supply is designed as a universal power supply (UP).
- The device is optionally available with Ex approvals for the intrinsically safe operation of proximity switches installed in the hazardous area. Separate Ex documentation (XA) is supplied with these devices. Compliance with the installation instructions and connection data in this documentation is mandatory!
- A resistive coupling element (1 kΩ / 10 kΩ) is available as an optional accessory and can be used to monitor line faults of sensors with mechanical contacts. The resistive coupling element is installed onsite directly at the contact to be monitored or in the sensor connection compartment.

Dependability

We only provide a warranty if the device is installed and used as described in the Operating Instructions.

Input

Version

The following version is available:
2-channel

Input data

(floating switch contacts with resistive coupling elements to connect NAMUR proximity switches (IEC/EN 60947-5-6))

Switch points	Blocking: < 1.2 mA Conducting: > 2.1 mA	Line fault detection	Line break: 0.05 mA < I_{IN} < 0.35 mA Short-circuit: 100 Ω < R_{sensor} < 360 Ω
Short-circuit current	~ 8 mA	Open-circuit voltage	~ 8 V_{DC}
Switching hysteresis	< 0.2 mA		

Output

Relay output data

Relay output data

Contact version	1 changeover per channel	Mechanical operating life	10^7 switching cycles
Maximum switching voltage/current	250 V_{DC} (2 A) / 120 V_{DC} (0.2 A) / 30 V_{DC} (2 A)	Recommended minimum load	5 V / 10 mA
Maximum switching capacity	500 VA	Switching frequency (no load)	≤ 20 Hz
Contact material	AgSnO2, hard gold plated	Direction of action	Operating current or closed circuit current

Signal on alarm

Output behavior in an alarm condition	If line fault detection is switched on and the line to the sensor is disconnected or short-circuits, the relay de-energizes in such a way that the output is set to the safe, non-conducting state.
Line break in input	0.05 mA < I_{IN} < 0.35 mA
Line short circuit in input	100 Ω < R_{sensor} < 380 Ω

Ex connection data

See associated XA Safety Instructions

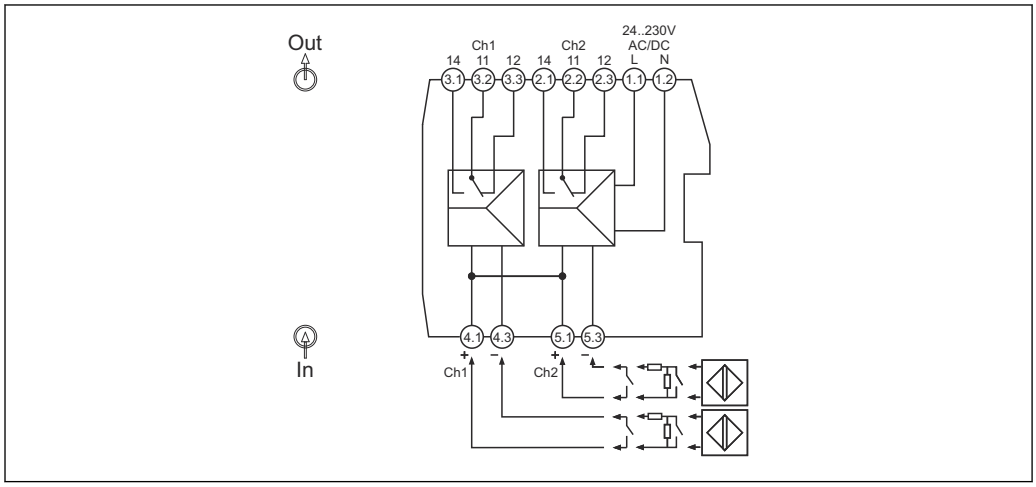
Galvanic isolation

Input / output	Peak value as per EN 60079-11 375 V
Input / power supply	Peak value as per EN 60079-11 375 V

Power supply

Terminal assignment

Quick wiring guide



1 Terminal assignment RLN42

Supply voltage

The modules are supplied with 24 to 230 $V_{AC/DC}$ via terminals 1.1 and 1.2.

Important connection data

Power supply

Supply voltage range	24 to 230 $V_{AC/DC}$ (-20% / +10%, 0/50/60 Hz)	Maximum current consumption	≤ 80 mA (230 V_{AC}) ≤ 42 mA (24 V_{DC})
Power dissipation	≤ 1.3 W	Power consumption	≤ 1.1 W

Terminals

Terminal design	Cable design	Cable cross-section
Screw terminals Tightening torque: minimum 0.5 Nm/maximum 0.6 Nm	Rigid or flexible (Stripping length = 7 mm (0.28 in)	0.2 to 2.5 mm² (24 to 14 AWG)
	Flexible with wire end ferrules (with or without plastic ferrule)	0.25 to 2.5 mm² (24 to 14 AWG)
Push-in spring terminals	Rigid or flexible (Stripping length = 10 mm (0.39 in)	0.2 to 2.5 mm² (24 to 14 AWG)
	Flexible with wire end ferrules (with or without plastic ferrule)	0.25 to 2.5 mm² (24 to 14 AWG)

Performance characteristics

Response time

Following a change of state at the input, the output adopts the safe state in ≤ 40 ms.

Installation

Mounting location

The device is designed for installation on 35 mm (1.38 in) DIN rails in accordance with IEC 60715 (TH35).

The device's housing provides basic insulation from neighboring devices for 300 Veff. If several devices are installed side by side, this must be taken into consideration and additional insulation must be provided if necessary. If the adjacent device also offers basic insulation, no additional insulation is required.

NOTICE

- When using in hazardous areas, the limit values of the certificates and approvals must be observed.

Installing a DIN rail device

The device can be installed in any position (horizontal or vertical) on the DIN rail without lateral clearance from neighboring devices. No tools are required for installation. The use of end brackets (type "WEW 35/1" or similar) on the DIN rail is recommended to fix the device.

Environment

Important ambient conditions

Ambient temperature range	−40 to 60 °C (−40 to 140 °F)	Storage temperature	−40 to 80 °C (−40 to 176 °F)
Degree of protection	IP 20	Overvoltage category	III
Pollution degree	2	Humidity	10 to 95 % No condensation
Altitude	≤ 2 000 m (6 562 ft)		

Shock and vibration resistance

Vibration resistance as per DNVGL-CG-0339 : 2015 and DIN EN 60068-2-27
DIN rail device: 2 to 100 Hz at 0.7g (general vibration stress)

Shock resistance as per KTA 3505 (section 5.8.4 Shock test)

Electromagnetic compatibility (EMC)

Interference immunity as per EN 61000-6-2

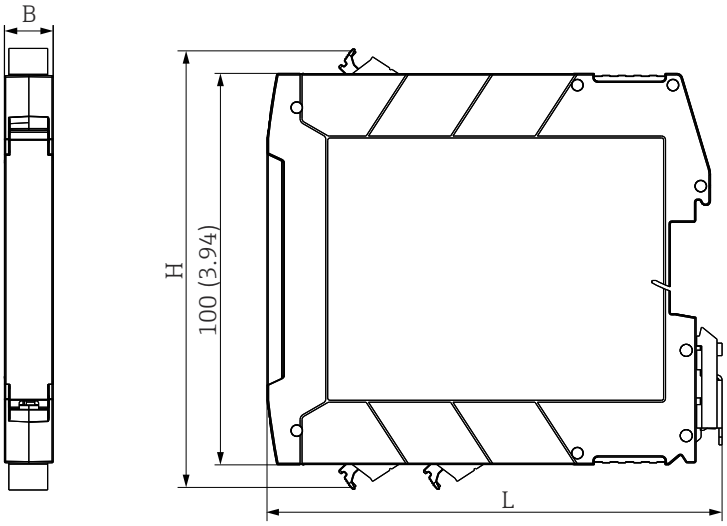
Interference emission as per EN 61000-6-4

Mechanical construction

Design, dimensions

Dimensions in mm (in)

Terminal housing for mounting on DIN rail



Width (B) x length (L) x height (H) (with terminals): 17.5 mm (0.69 in) x 116 mm (4.57 in) x 107.5 mm (4.23 in)

Weight

Device with terminals (values rounded up):

Approx. 140 g (4.94 oz)

Color

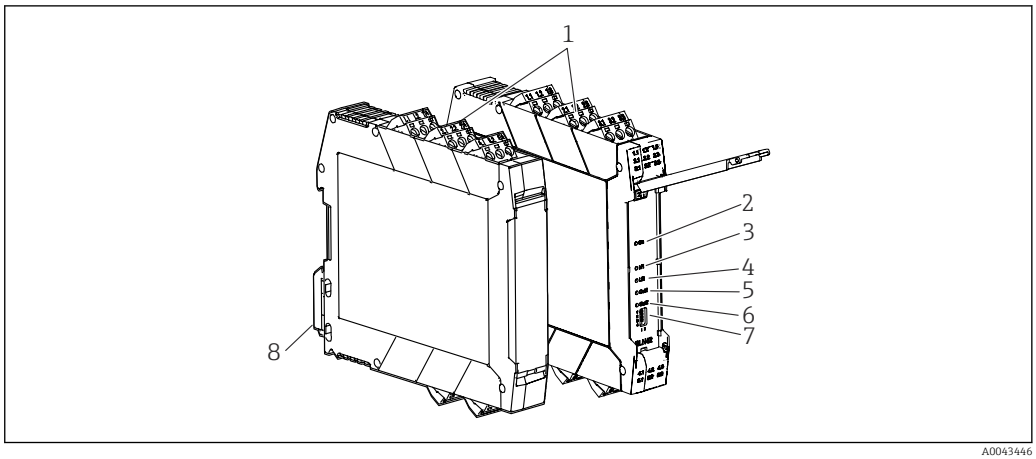
Light gray

Materials

All the materials used are RoHS-compliant.

Housing: polycarbonate (PC); flammability rating according to UL94: V-0

Display and operating elements



2 *Display and operating elements*

1 *Plug-in screw or push-in terminal*
2 *Green LED "On", power supply*
3 *Red LED "LF1", line fault of sensor cable 1*
4 *Red LED "LF2", line fault of sensor cable 2*
5 *Yellow LED "OUT1", status relay 1*
6 *Yellow LED "OUT2", status relay 2*
7 *DIP switches 1 to 4*
8 *DIN rail clip for DIN rail mounting*

Local operation

Hardware settings / configuration

Any device settings using the DIP switch must be made when the device is de-energized.

Direction of action

At the device, the direction of action (operating or closed circuit current behavior) can be selected and line fault detection can be enabled or disabled via DIP switches.

DIP switch 1 = channel 1; DIP switch 3 = channel 2

All DIP switches are set to the "I" position when the device is delivered from the factory:
- I = normal phase (operating current behavior)
- II = inverse phase (closed circuit current behavior)

Line fault detection

DIP switch 2 = channel 1; DIP switch 4 = channel 2

I = line fault detection switched off - **not permitted for safety-oriented applications!**

II = line fault detection switched on

If a line fault occurs, the relay is de-energized and the red LED "LF" flashes (NE 44).

NOTICE

Error detection malfunctions

- For switch contacts with an open circuit, line fault detection (LF) must be disabled or the corresponding resistance circuit (1 kΩ/10 kΩ) must be provided directly at the contact. (See the "Quick wiring guide" and "Accessories" sections of the Operating Instructions)

Truth table, 2-channel

Sensor at input			Input circuit	DIP switch Channel 1		DIP switch Channel 2		Output Relay contact		LED		Permitted for safety-oriented applications
Switch	Contacts with resistive coupling elements	NAMUR	Status	1	2	3	4	NO contact	NC contact	OUT yellow	LF red	
Open	Open	Blocking	OK	I	I	I	I	Open	Closed			No
Closed	Closed	Conducting	OK	I	I	I	I	Closed	Open	X		No
Open	Open	Blocking	OK	II	I	II	I	Closed	Open	X		No
Closed	Closed	Conducting	OK	II	I	II	I	Open	Closed			No
	Open	Blocking	OK	I	II	I	II	Open	Closed			Yes
	Closed	Conducting	OK	I	II	I	II	Closed	Open	X		Yes
	Any state	Any state	Wire break	I	II	I	II	Open	Closed		X	Yes
	Any state	Any state	Short circuit	I	II	I	II	Open	Closed		X	Yes
	Open	Blocking	OK	II	II	II	II	Closed	Open	X		Yes
	Closed	Conducting	OK	II	II	II	II	Open	Closed			Yes
	Any state	Any state	Wire break	II	II	II	II	Open	Closed		X	Yes
	Any state	Any state	Short circuit	II	II	II	II	Open	Closed		X	Yes

Ordering information

Detailed ordering information is available for your nearest sales organization www.addresses.endress.com or in the Product Configurator under www.endress.com :

1. Click Corporate
2. Select the country
3. Click Products
4. Select the product using the filters and search field
5. Open the product page

The Configuration button to the right of the product image opens the Product Configurator.

Product Configurator - the tool for individual product configuration

- Up-to-the-minute configuration data
- Depending on the device: Direct input of measuring point-specific information such as measuring range or operating language
- Automatic verification of exclusion criteria
- Automatic creation of the order code and its breakdown in PDF or Excel output format
- Ability to order directly in the Endress+Hauser Online Shop

Accessories

Various accessories, which can be ordered with the device or subsequently from Endress+Hauser, are available for the device. Detailed information on the order code in question is available from your local Endress+Hauser sales center or on the product page of the Endress+Hauser website: www.endress.com.

Device-specific accessories

Type	Order code
Resistive coupling element, 1K/10K Ohm (x 1)	71505353

Service-specific accessories

Accessories	Description
Configurator	Product Configurator - the tool for individual product configuration ▪ Up-to-the-minute configuration data ▪ Depending on the device: Direct input of measuring point-specific information such as measuring range or operating language ▪ Automatic verification of exclusion criteria ▪ Automatic creation of the order code and its breakdown in PDF or Excel output format ▪ Ability to order directly in the Endress+Hauser Online Shop The Configurator is available on the Endress+Hauser website at: www.endress.com -> Click "Corporate" -> Select your country -> Click "Products" -> Select the product using the filters and search field -> Open product page -> The "Configure" button to the right of the product image opens the Product Configurator.

Accessories	Description
W@M	Life cycle management for your plant W@M offers assistance with a wide range of software applications over the entire process: from planning and procurement to the installation, commissioning and operation of the measuring devices. All the relevant information is available for every measuring device over the entire life cycle, such as the device status, device-specific documentation, spare parts etc. The application already contains the data of your Endress+Hauser device. Endress+Hauser also takes care of maintaining and updating the data records. W@M is available: Via the Internet: www.endress.com/lifecyclemanagement

Certificates and approvals

For the approvals available, see the Configurator on the specific product page: www.endress.com → (search for device name)

CE mark

The product meets the requirements of the harmonized European standards. As such, it complies with the legal specifications of the EC directives. The manufacturer confirms successful testing of the product by affixing to it the CE-mark.

Functional safety

A SIL version of the device is optionally available. It can be used in safety equipment in accordance with IEC 61508 up to SIL 2.

Please refer to Safety Manual FY01035K for the use of the device in safety instrumented systems according to IEC 61508.

Protection against modifications:

As it is not possible to disengage the operating elements (keys and DIP switches), a lockable control cabinet is required for use in SIL applications. The cabinet must be locked by key. A normal electrical cabinet key does not suffice for this purpose.

Documentation

The following document types are available in the Downloads section of the Endress+Hauser website (www.endress.com/downloads):

For an overview of the scope of the associated Technical Documentation, refer to the following:
- *W@M Device Viewer* (www.endress.com/deviceviewer): Enter the serial number from the nameplate
- *Endress+Hauser Operations App*: Enter the serial number from the nameplate or scan the matrix code on the nameplate

Brief Operating Instructions (KA)	**Guide that takes you quickly to the 1st measured value** The Brief Operating Instructions contain all the essential information from incoming acceptance to initial commissioning.
Operating Instructions (BA)	**Your reference guide** These Operating Instructions contain all the information that is required in various phases of the life cycle of the device: from product identification, incoming acceptance and storage, to mounting, connection, operation and commissioning through to troubleshooting, maintenance and disposal.
Safety Instructions (XA)	Depending on the approval, the following Safety Instructions (XA) are supplied with the device. They are an integral part of the Operating Instructions. The nameplate indicates the Safety Instructions (XA) that are relevant to the device.
Supplementary device-dependent documentation	Additional documents are supplied depending on the device version ordered: Always comply strictly with the instructions in the supplementary documentation. The supplementary documentation is an integral part of the device documentation.

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