STAHL 261440 Binary Output without Auxiliary Power Field Circuit Instruction Manual

Contents

STAHL 261440 Binary Output without Auxiliary Power Field Circuit

Digital output loop powered series 9276

Safety notes

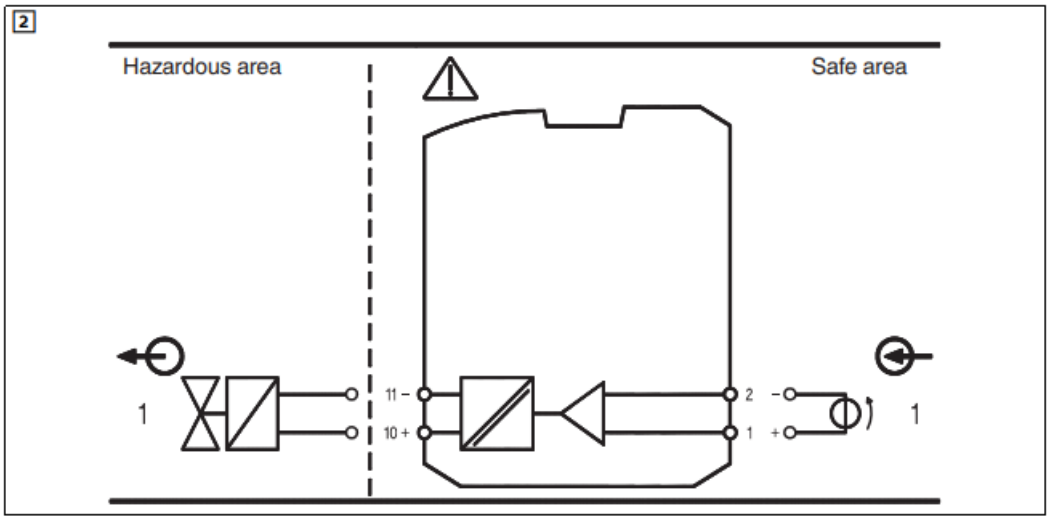
Installation notes

- The device is an associated apparatus (category 1) which belongs to the “Intrinsic Safety” ignition protection class and can be installed in Ex zone 2 as a category 3 device. It meets the requirements of EN 60079-0:2012+A11:2013, EN 60079-11:2012, EN 60079-15:2010 or IEC 60079-0 ed. 6.0, IEC 60079-11 ed. 6.0, and IEC 60079-15 ed. 4.0.
- Installation, operation, and maintenance may only be carried out by qualified electricians. Follow the installation instructions as described. When installing and operating the device, the applicable regulations and safety directives (including national safety directives), as well as general technical regulations, must be observed. For the safety data, refer to this document and the certificates (EU examination certificate and other approvals if appropriate).
- The device must not be opened or modified. Do not repair the device yourself, replace it with an equivalent device. Repairs may only be carried out by the manufacturer. The manufacturer is not liable for damage resulting from violation.
- The IP20 degree of protection (IEC/EN 60529) of the device is intended for use in a clean and dry environment (degree of pollution 2, IEC/EN 60664-1). Do not subject the device to mechanical and/or thermal loads that exceed the specified limits.
- The device complies with the EMC regulations for industrial areas (EMC class A). When using the device in residential areas, it may cause radio interference.

Intrinsic safety

- The device is approved for intrinsically safe (Ex i) circuits up to zone 0 (gas) and zone 20 (dust) in the Ex area. The safety technology values for intrinsically safe equipment and the connecting lines must be observed for the hook-up process (IEC/EC 6007914) and the values specified in this installation note and/or the EU examination certificate must be observed.
- When carrying out measurements on the intrinsically safe side, observe the relevant regulations regarding the connection of intrinsically safe equipment. Use only these approved measuring devices in intrinsically safe circuits.
- If the device was used in circuits which are not intrinsically safe, it is forbidden to use it again in intrinsically safe circuits. Label the device clearly as being not intrinsically safe.

Installation in the Ex area (zone 2)



- Observe the specified conditions for use in potentially explosive areas! Install the device in a suitable, approved housing that meets the requirements of IEC/EN 60079-15 and has at least IP54 protection. Also observe the requirements of IEC/EN 60079-14.
- In potentially explosive areas, only connect and disconnect non-intrinsically safe cables when the power is disconnected.
- The device must be stopped and immediately removed from the Ex area if it is damaged, was subject to an impermissible load, stored incorrectly or if it malfunctions.

4 Potentially dust-explosive areas

- The device is not suitable for installation in zone 22.
- If you nevertheless intend to use the device in zone 22, you must install it in a housing according to IEC/ EN 60079-31. Observe the maximum surface temperatures in this case. Adhere to the requirements of IEC/ EN 60079-14.
- Connection to the intrinsically safe circuit in areas with a danger of dust explosions (zone 20, 21 or 22) is only permitted if the equipment connected to this circuit is approved for this zone (e.g., category 1D, 2D or 3D).

Safety-related applications (SIL)

NOTE
When using the device in safety-related applications, observe the instructions in the safety manual available at r-

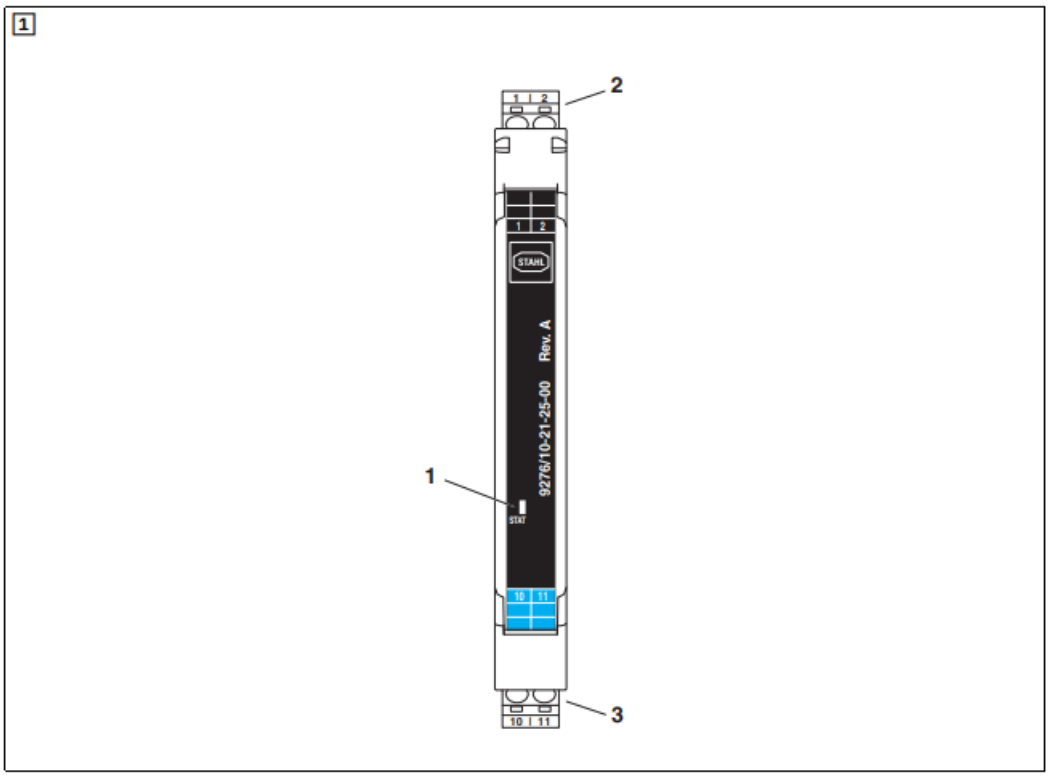
stahl.com, as the requirements may differ for safety-related functions.

Short description

The device is designed for intrinsically and galvanically isolated control of intrinsically safe solenoid valves, alarm transmitters, and alarm indicators installed in the Ex area.

The intrinsically safe output circuit has a linear characteristic curve with an off-load voltage of 21 V DC and a current limit at 25 mA. The power needed is transmitted via the control signal on the input side. The input and the output are electrically isolated from each other.

Operating and indicating elements



1. Yellow “STAT” LED: switching state, lights up when output circuit is active
2. Connection terminal blocks for the safe area (black/green)
3. Connection terminal blocks for the Ex area (intrinsically safe Ex i, blue)

Installation

NOTE: Electrostatic discharge Take protective measures against electrostatic discharge before opening the front cover!

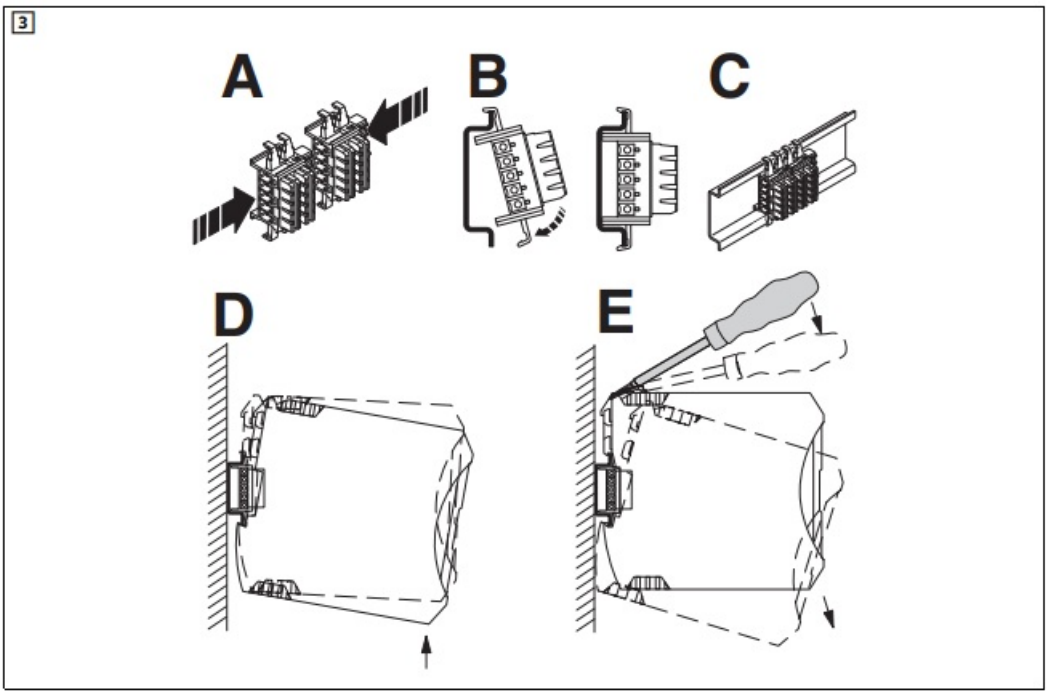
WARNING

- Provide for a switch/circuit-breaker in the vicinity of a device that is marked as disconnect device for this device.
- Provide overcurrent protection (I ≤ 16 A) within the installation.
- To protect the device against mechanical or electrical damage, install it in suitable housing with an appropriate degree of protection according to IEC/EN 60529.
- During installation, servicing, and maintenance work, disconnect the device from all effective power sources,

provided you are not dealing with SELV or PELV circuits.

- If the device is not used as described in the documentation, the intended protection can be negatively affected.
- Thanks to its housing, the device has basic insulation to the neighboring devices, for 300 Veff. If several devices are installed next to each other, this has to be taken into account, and additional insulation has to be installed if necessary! If the neighboring device is equipped with basic insulation, no additional insulation is necessary.
- The voltages present at the input and output are extra-low voltages (ELV). Depending on the application, hazardous voltage (>30 V) to ground may occur. For this event, a safe electrical isolation from the other connection has been implemented.

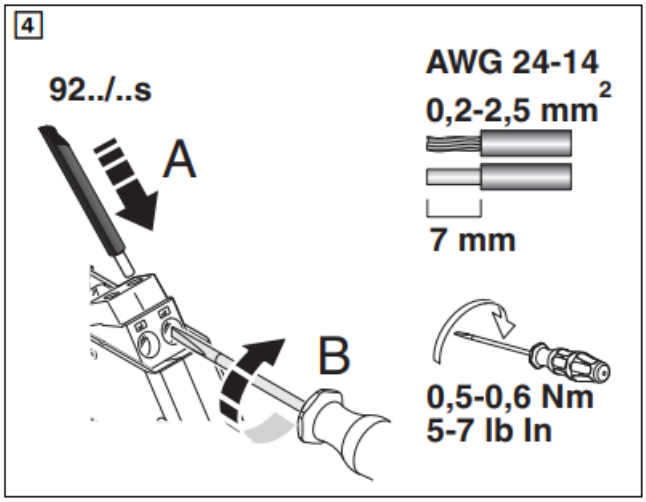
The 9294 pac bus is used to supply active devices. A 9294 pac bus is not required to operate the device. However, the devices can be snapped onto a 9294 pac bus – no electrically conductive connection is established. This means that it is not necessary to disconnect an existing connection of 9294 pac bus elements.

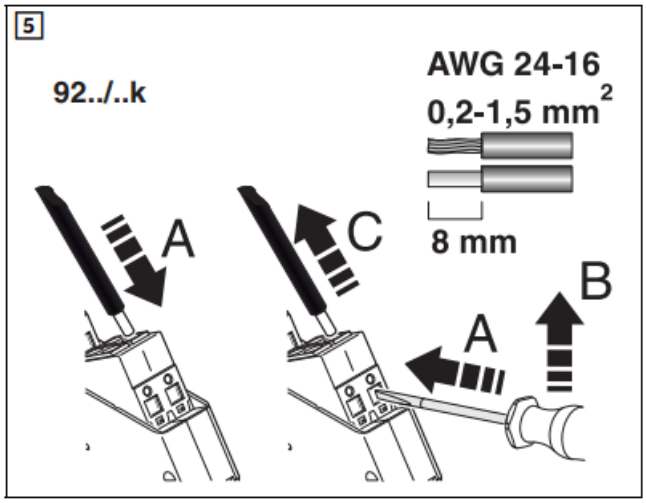


The device can be snapped onto all 35 mm DIN rails according to IEC/EN 60715. When using the 9294/31-12, first insert it to bridge the power supply.
NOTE: Please also observe the direction of the module and pac-Bus 9294 when snapping into position: snap-on foot at the top and connector on the left.

Calculating a valve circuit

In order to connect a solenoid valve to the module, it is necessary to compare the safety data, and calculate the measurements.





- Internal resistance of the solenoid driver (see technical data)
- Guaranteed voltage of the solenoid driver without load (see technical data)
- Current that can be supplied by the solenoid driver
- Maximum permissible cable resistance when solenoid driver and valve are interconnected
- Effective coil resistance of the solenoid valve (the copper resistance of the coil depends on the temperature)
- The current required by the solenoid coil in order for the valve to pick up
- The voltage which is present at the coil with ISV.

RSV and USV are dependent on the ambient temperature due to the copper resistance. The values for RSV and ISV must be obtained from the valve manufacturer. Calculate the cable resistance Rc using the following formula. We recommend calculating the following value for the cable resistance Rc: actual cable resistance + 25 . In the event of a negative resistance, it is no longer possible to guarantee that the connection will function. Function requirements: Iv Isv and Rc > 0

A list of suitable valves can be found at r-stahl.com.

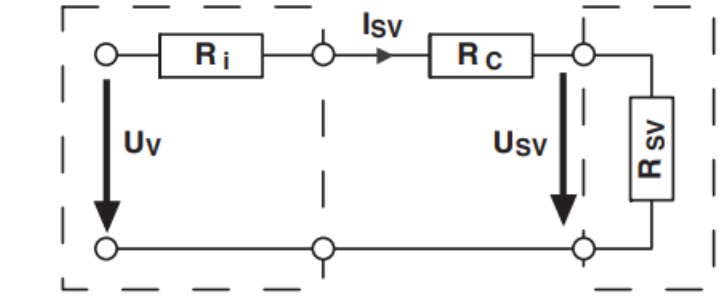
Technical data

Connection method	
	Screw connection
Hardware version	
Input data	⚠ **CAT II (250 V against ⏚)**
Input signal	
Input signal	45 mA for U_e = 24 V DC
Output data	⚠ **CAT II (250 V against ⏚)**
Output voltage	At 25 mA
Non-load voltage	
Current limitation	
Short-circuit-proof	yes
Output resistor	Internal resistance R_i
Typical response time	
General data	
Temperature influence maximum	
Ambient temperature	(Any mounting position)
Storage temperature	
Relative humidity	non-condensing
Use at altitude	
Fire resistance (UL 94)	
Electrical isolation	
Output/input	
Peak value in accordance with IEC/EN 60079-11	
Rated insulation voltage (overvoltage category II; pollution degree 2, safe isolation in accordance with IEC/EN 61010-1)	
50 Hz, 1 min., test voltage	
Safety data as per ATEX	
Max. output voltage U_o	
Max. output current I_o	
Max. output power P_o	
Explosion group	Max. external inductivity L_o/Max. external capacitance C_o

Max. power P_i	negligible
Max. internal inductance L_i	negligible
Max. internal capacitance C_i	negligible
Safety-related maximum voltage U_m	
Conformance/Approvals	**CE-compliant, additionally IEC/EN 61326**
ATEX	IBExU17ATEX1153X
IECEx	IECEx IBE 17.0045X
NEC	See final page
SIL in accordance with IEC 61508	to
Conformance with EMC directive	
Noise emission	
Noise immunity	

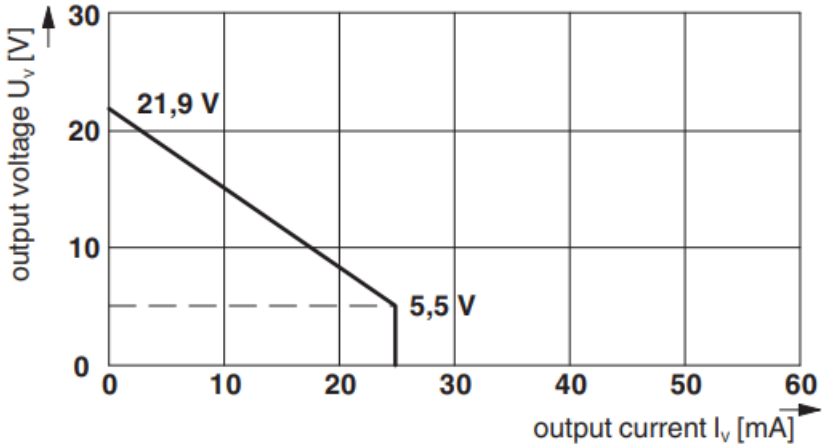
DIMENSION

6

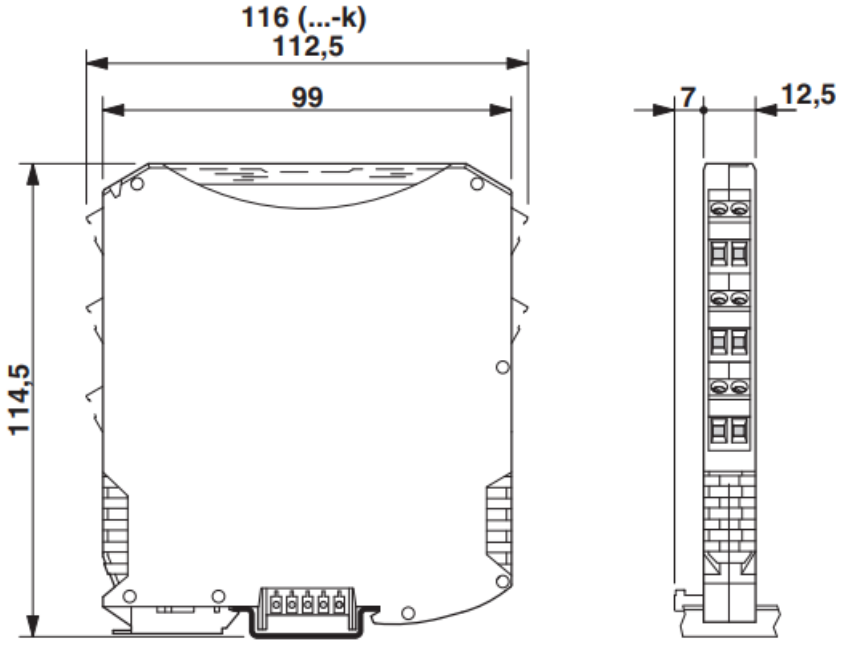


$$R_C \triangleq \frac{U_V}{I_{SV}} - R_i - R_{SV}$$

7



8



ADDRESS: STAHL Schaltgeräte GmbH Am Bahnhof 30, 74638 Waldenburg, Germany
Tel: +49 7942 943-0
Fax: +49 7942 943-4333
Internet: r-stahl.com
E-Mail: info@r-stahl.com

Documents / Resources

	STAHL 261440 Binary Output without Auxiliary Power Field Circuit [pdf] Instruction Manual 261440 Binary Output without Auxiliary Power Field Circuit, 261440, Binary Output without Auxiliary Power Field Circuit, Auxiliary Power Field Circuit, Power Field Circuit, Field Circuit, Circuit, Binary Output, Output

References

- R. STAHL | Explosion Hazard Systems | Industrial Explosion Protection
- You will find a little bit of Stahl chemistry everywhere