

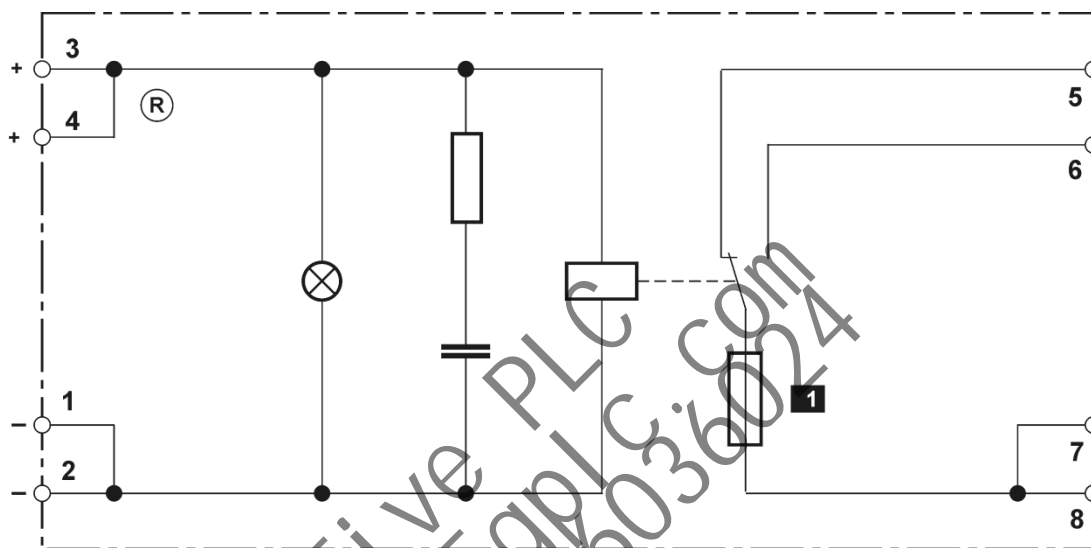


SAFETY
NONSTOP



H 4116: Relay in Terminal Housing

safety-related, for circuits up to SIL 2 in accordance with IEC 61508



1 Fuse: max. 4 A (time-lag), delivery condition: 4 A (time-lag)

Figure 1: Block Diagram

The module is tested in accordance with:

- IEC 61508, Part 1 - 7:2010
- IEC 61511:2016
- EN 50156-1:2015
- EN 60664-1:2007
- EN 50178:1997 VDE 0160
- EN 298:2012
- NFPA 85:2015
- NFPA 86:2015

The device may be used in environments meeting the requirements of the following standards:

- EN 61000-6-2:2005
- EN 61000-6-7:2015
- EN 61326-3-1:2008
- EN 61326-3-2:2008

Due to its low current consumption, the relay can be directly energized from the outputs of safety-related modules with a load capacity of at least 20 F. The output signal of the module may thus not be loaded additionally. An LED indicates that the relay coil is energized.

Input voltage	24 VDC, -15...+20 %
Current consumption	20 mA
Output	1 potential-free change-over contact, sealed Relay data: see below
Switching time	approx. 7 ms
Reset time	approx. 5 ms
Ambient temperature	-25...+50 °C
Degree of protection	IP20 in accordance with IEC/EN 60529 (VDE 0470 Part 1)
Power dissipation	1...2 W

The device features safe separation between the output contact and the input in accordance with EN 50178. The air and creepage distances are designed for overvoltage class III up to 300 V.

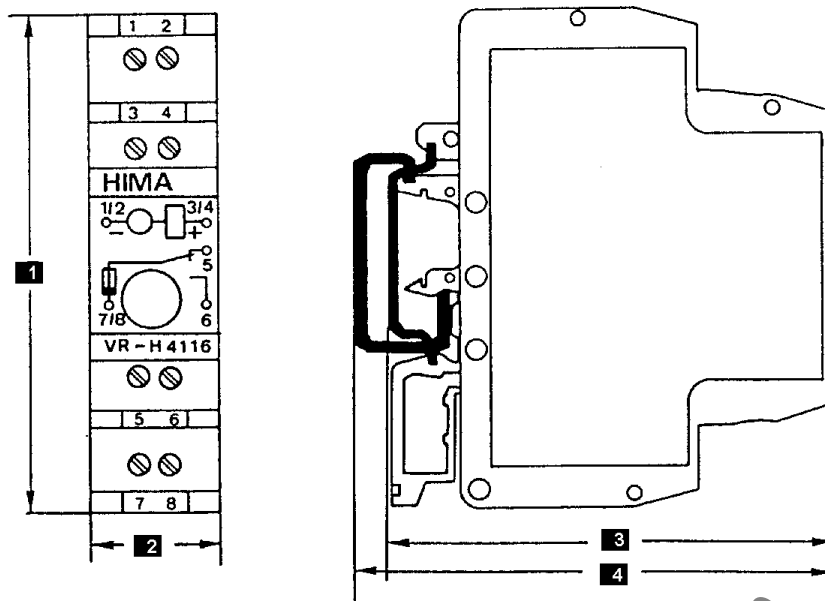
Relay Data

Contact material	AgNi, hard gold plated
Switching voltage	≥ 1 mV ≤ 250 VAC / VDC
Switching current	≥ 1 mA ≤ 4 A (for safety-related application as well)
Fuse	≤ 4 A (time-lag), delivery condition: 4 A (time-lag)
Switching capacity AC	≤ 1000 VA, $\cos \varphi > 0.5$
Switching capacity DC	Up to 30 V: ≤ 120 W Up to 250 V: ≤ 40 W

Remark: With inductive loads, suitable measures such as the use of free-wheeling diodes must be implemented to prevent induction voltages when de-energizing the relay.

Bounce time	approx. 1 ms
Lifetime	
mechanical	≥ 10 ⁷ switching operations
electrical	≥ 2.5 × 10 ⁵ switching operations (at ohmic full load and ≤ 0.1 switching operations per second)

Mechanical Design and Dimensions



- 1** Height: 80 mm
- 2** Width: 20 mm
- 3** Depth: 70.5 mm, with DIN rail
- 4** Depth: 75.5 mm, with C rail

Figure 2: Mechanical Design and Dimensions

Terminal cross-section	0.25...2.5 mm ² (AWG 14)
Tightening torque	0.5...0.6 Nm
Stripping length	8 mm
Type of mounting	On 35 mm DIN rail or on C rail
Mounting position	Horizontal or vertical
Mounting distance	Not required

1 Operating Instructions

Observe the following points when installing and operating the H 4116 device:

1.1 Use of H 4116 in Zone 2


The H 4116 device is suitable for mounting in the explosive atmospheres of zone 2. To this end, the special conditions must be observed.

The device meets the requirements of the following directives and standards:

Compliance	Standard	Description
IECEX	IEC 60079-0:2011	Explosive atmospheres - Part 0: Equipment - General requirements
ATEX 2014/34/EU	EN 60079-0:2012 + A11:2013	
IECEX	IEC 60079-15:2010	Explosive atmospheres - Part 15: Equipment protection by degree of protection "n"
ATEX 2014/34/EU	EN 60079-15:2010	

Table 1: Standard for HIMA Components in Zone 2

The device must be labeled with the following Ex marking:

 II 3G Ex nC IIC T4 Gc


Marking	Description
	Explosion protection marking complying with the relevant directive.
II	Equipment group, for all areas with explosive atmosphere, other than underground mines.
3G	Equipment category, for use in areas in which explosive gas atmosphere is unlikely to occur or, if it does occur, will persist for a short period only.
Ex	Explosion protection complying with the relevant standard.
nA	Type of protection for non-sparking equipment.
nC	Type of protection for sparking, sealed equipment.
IIC	Gas group for explosive gas atmospheres, typical gas is hydrogen.
T4	Temperature class T4, with a maximum surface temperature of 135 °C.
Gc	Equipment protection level, it corresponds to ATEX equipment category 3G.

Table 2: Ex Marking Description H 4116

Special conditions for H 4116

1. To ensure compliance with category 3G, the specified device, H 4116, must be installed in an enclosure that fulfils the requirements of the EN/IEC 60079-15 with degree of protection IP54 or better.
2. The device must be provided with a warning:

Warning: Work is only permitted in the de-energized state

Exception:

If a potentially explosive atmosphere has been precluded, work can also be performed when the device is under voltage.

3. The device is designed for operation not exceeding pollution degree 2.
4. The enclosure in use must be able to safely handle the generated power dissipation.
5. With no mounting distance, the maximum switching current permitted is 3 A. With a 5 mm mounting distance, the maximum switching current value is 4 A.

Applicable standards:

IEC 60079-14:2013 / EN 60079-14:2014

Explosive atmospheres - Part 14: Electrical installations design, selection and erection

The requirements for type of protection "n" must be observed.

1.2 Proof Test

The users must ensure that SIL 2 applications in accordance with IEC 61508 are subject to a proof test in intervals of no longer than 5 years (proof test interval).

The required proof test can be performed on site without removing the device.

1.2.1 Proof Test Execution

Both states of the relay contact must be checked during the proof test.

A multimeter or a continuity tester is needed to perform the test.

To perform the proof test

1. Shut off the device.
 2. De-energize the contact circuit.
 3. Connect the continuity tester to terminals 5 and 7 or 8.
 Continuity must be reported.
 4. Connect the continuity tester to terminals 6 and 7 or 8.
 No continuity must be reported.
 5. Apply the nominal voltage to energize the device.
 6. Connect the continuity tester to terminals 5 and 7 or 8.
 No continuity must be reported.
 7. Connect the continuity tester to terminals 6 and 7 or 8.
 Continuity must be reported.
- If the results of steps 3 through 7 do not deviate from the specification, the change-over contact operates properly.

The proof test is then successfully completed and the H 4116 device can be used for another proof test interval.

1.3 Replacing the Fuses

After a fuse has triggered, it must be replaced. The relay operation must then be checked, see Chapter 1.2.1 for further details.

1.4 Repair

Components may only be repaired or replaced by the manufacturer in accordance with the valid standards and the TÜV requirements.

1.5 Certificate and Declaration of Conformity

The certificate and declaration of conformity are available on the HIMA website, at www.hima.de and www.hima.com.

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