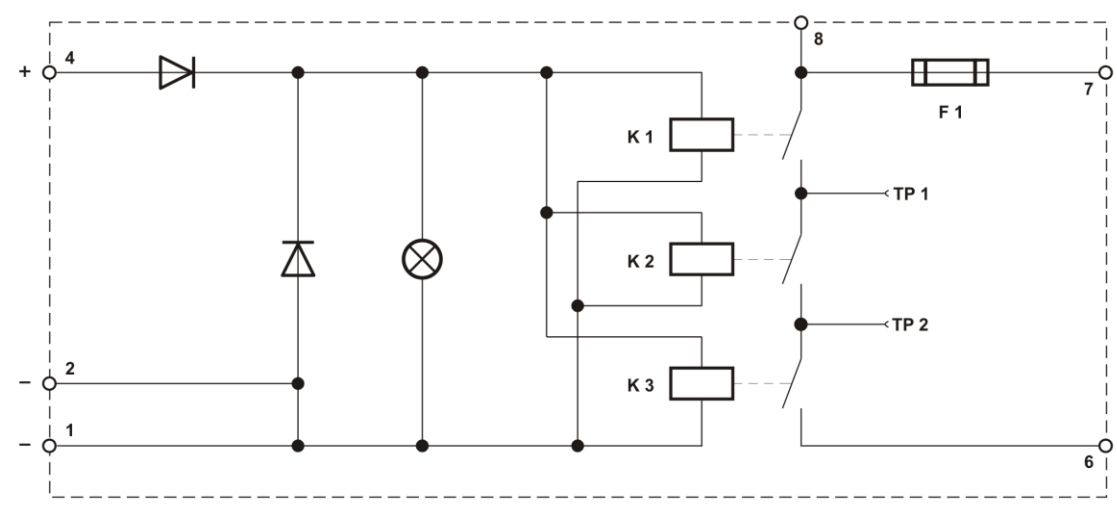
H 4135A: Relay in Terminal Housing

safety-related, for circuits up to SIL 3 in accordance with IEC 61508



F1: 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

The device is suitable for switching safety-related circuits. The device thus be used for safety shutdowns, e.g., for shutting down the entire fuel supply in combustion plants.

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English translation of the German original document: HI 803 002 D, H 4135A (1647)

The module is equipped with diverse relays.

i Terminal 8 may only be used for monitoring the F1 fuse and must not be used for supplying a voltage!

Input voltage	24 VDC, -15...+20 %
Current consumption	40 mA
Output	Potential-free make contact Relay data: see below
Switching time	approx. 8 ms
Reset time	approx. 6 ms
Ambient temperature	-25...+60 °C
Degree of protection	IP20 in accordance with EN 60529 (VDE 0470 Part 1)
Power dissipation	1…3 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.

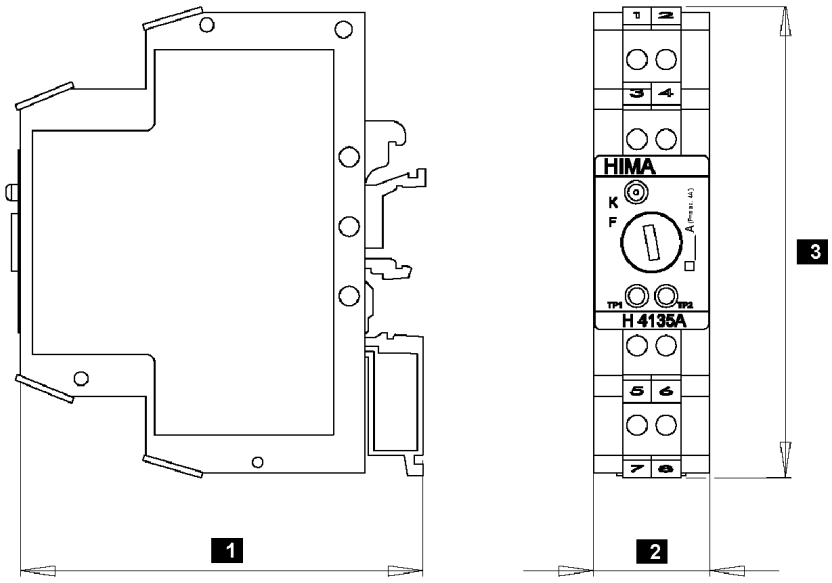
Relay Data

Contact material	AgNi, hard gold plated
Switching voltage	≥ 5 V, ≤ 250 VAC / ≤ 220 VDC
Switching current	≥ 10 mA ≤ 4 A
Fuse	≤ 4 A (time-lag), delivery condition: 4 A (time-lag)
Switching capacity AC	≤ 500 VA, cos φ > 0.5 ≤ 830 VA, cos φ > 0.9 ≤ 1000 VA, cos φ > 1.0
Switching capacity DC	Up to 30 V: ≤ 120 W Up to 70 V: ≤ 50 W Up to 127 V: ≤ 25 W Up to 220 V: ≤ 10 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	≥ 30 x 10^6 switching operations
electrical	≥ 2.5 x 10^5 switching operations (at ohmic full load and ≤ 0.1 switching operations per second)

Mechanical Design and Dimensions



1 Depth: 70.5 mm
2 Width: 20 mm
3 Height: 80 mm

Figure 2: Mechanical Design and Dimensions

Terminal cross-section	0.25…2.5 mm² (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 4135A device:

1.1 Use of H 4135A in Zone 2

The H 4135A 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 DescriptionH 4135A

Special conditions for H 4135A

1. To ensure compliance with category 3G, the specified devices 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. The maximum switching current permitted at ambient temperatures of 50 °C or higher and with no mounting distance 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 3 applications in accordance with IEC 61508 are subject to a proof test in intervals of no longer than 5 years (proof test interval).

SIL 2 applications must be subject to a proof test every 20 years.

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

1.2.1 Proof Test Execution

In particular, this test is intended to determine if each of the three relay contacts connected in series is open in the de-energized state.

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 7 and 8.
   ☑ If properly fused, continuity is reported (e.g., through an acoustic signal). Through this step, the continuity tester is also tested.
4. Connect the continuity tester to terminal 7 and TP1.
   ☑ No continuity must be reported.
5. Connect the continuity tester to TP1 and TP2.
   ☑ No continuity must be reported.
6. Connect the continuity tester to TP2 and terminal 6.
   ☑ No continuity must be reported.

► If no continuity is reported during steps 4 through 6, the contacts of the three relays are properly open.

The proof test is then successfully completed and the H 4135A 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.