DATA SHEET AR16049-01DO

Version 1.2

Notice:

No liability or warranty can be accepted for any errors.

We reserve the right to make technical changes at any time

Data Sheet

Relay Card AR16049-01DO

All instructions and technical specifications in this data sheet have been prepared with great care and effective quality assurance measures have been applied to ensure their validity. If you have any questions, please contact AnTeCoS GmbH directly. AnTeCoS appreciates any suggestions regarding additional information that should be added to the data sheet.

We reserve the right to make changes. AnTeCoS also reserves the right to make changes to the written material without prior notice.

1 Contents

2 General Description

The relay device AR16049-01DO is a 1-fault-proof relay module with a electrically isolated, voltage-free output.

The output is operated via two control inputs (S1-ON and S2-ON) and can be switched on or off.

For diagnostic purposes, the opening of relay 1 and relay 2 can be read via the diagnostic outputs.

The correct switching off of relay 1 and relay 2 as well as the status of the control are indicated via indicator lamps.

The relay unit AR16049-01DO is equipped with two relays with forcibly guided contacts. The normally open contact is connected in series.

The NC contacts can be used independently for diagnostics.

Applications:

- The relay device AR16049-01DO is suitable for safety-related applications up to SIL3 according to IEC 61508.
- The relay device AR16049-01DO has an EC type approval for the Machinery Directive and complies with IEC 62061 up to SIL3
- The relay device AR16049-01DO complies with PL e according to EN ISO 13849-1
- The AR16049-01DO relay device can also be used in other safety applications such as ESD, burner management and process applications.
- The relay device AR16049-01DO can be used for switching off the power supply and for functional safety tasks in secured areas.

3 Technical Data

3.1 General technical data

Nominal voltage (U_N):	24VDC
Voltage range (U_B):	18 V … 30 V
Nominal consumption:	ca. 0,9 W
Contact material (Relay):	AgNi + 0,2 µm Au
Switching voltage min./max.	AC and DC 10 V / DC 250 V, AC 400[1]
Switching current min./max.	AC and DC 10 mA / 6 A[1]
Switching capacity min./max.	AC 3 VA, DC 0,1 W / AC 2000 VA, DC 240 W[1]
Relay operating frequency max.	20 cycles /s
Lifetime:	
○ Mechanical:	>40 x 10^6
○ Elektrical: at AC 230 V, 8 A, cos ϕ=1	>10^5
Environmental temperature:	-40…+70°C
Storage temperature:	-40 °C to 85 °C
Isolation according to IEC 60664-1	
○ Rated isolation voltage:	250 VAC
○ Pollution level:	2
○ Overvoltage category:	III
Switching times:	
DC-Last:	Switch-on time: 8 ms Switch-off time: 9 ms
AC-Last:	Switch-on time: 9 ms Switch-off time: 15 ms

[1] Please see the operating voltage limit curve (see characteristic curves for relays Figure 1 to Figure 4).

3.2 Safety-related data

DC13 application at 4 A; 24 VDC (1 switching cycle / year), proof test interval T1 = 10 years PHF_D [1/h]

Parameter	Application area Industry Temperature range -40 °C to + 40 °C	Application range Industry Extended temperature range up to + 70 °C
MTTF [a]	2842 Years	532 Years
PFD [1]	8,324E-05	3,180E-04
PFH_D [1/h]	1,900E-09	7,260E-09
HR [1/h]	1,900001E-09	7,440001E-9

DC13 application at 4 A; 24 VDC (3650 switching cycles / year), proof test interval T1 = 10 years

Parameter	Application area Industry Temperature range -40 °C to + 40 °C	Application range Industry Extended temperature range up to + 70 °C
MTTF [a]	191 Years	94 Years
PFD [1]	8,336E-05	3,1827E-4
PFH_D [1/h]	1,903E-09	7,2669E-9
HR [1/h]	1,902807E-09	7,265055E-9

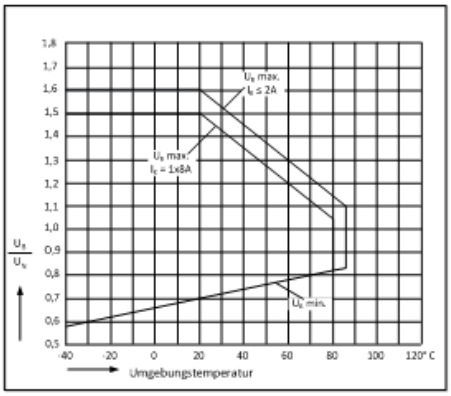
AC15 application at 3 A; 230 VAC (1 switching cycle / year), proof test interval T1 = 10 years

	Application area Industry Temperature range -40 °C to + 40 °C	Application range Industry Extended temperature range up to + 70 °C
MTTF [a]	2850 Years	609 Years
PFD [1]	8,324E-05	3,180E-04
PFH_D [1/h]	1,900E-09	7,260E-09
HR [1/h]	1,90000E-09	7,260000E-09

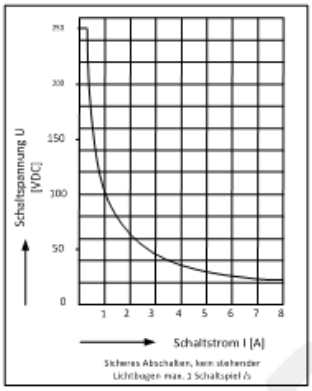
AC15 application at 3 A; 230 VAC (10 switching cycles / year), proof test interval T1 = 10 years

	Application area Industry Temperature range -40 °C to + 40 °C	Application range Industry Extended temperature range up to + 70 °C
MTTF [a]	548 Years	220 Years
PFD [1]	8,327E-05	3,181E-04
PFH_D [1/h]0	1,901E-09	7,261E-09
HR [1/h]	1,900848E-09	7,261526E-09

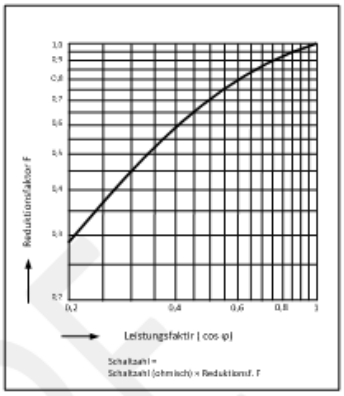
4 Relay Characteristics



Figure·1:·Betriebsspannungs-Grenzkurve¶



Figure·2:·Lichtbogengrenzkurve·(Lastgrenzkurve)¶



Figure·3:·Reduktionsfaktor·für·induktive·Lasten¶

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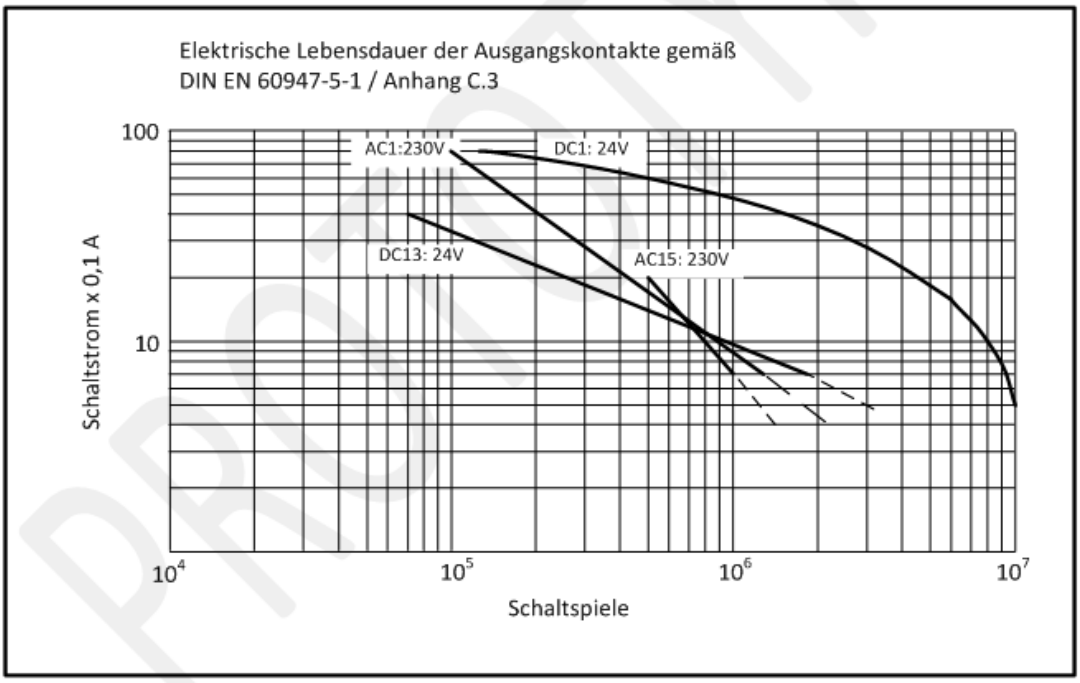


Figure·4:·Elektrische·Lebensdauer¶

4.1 Dimension

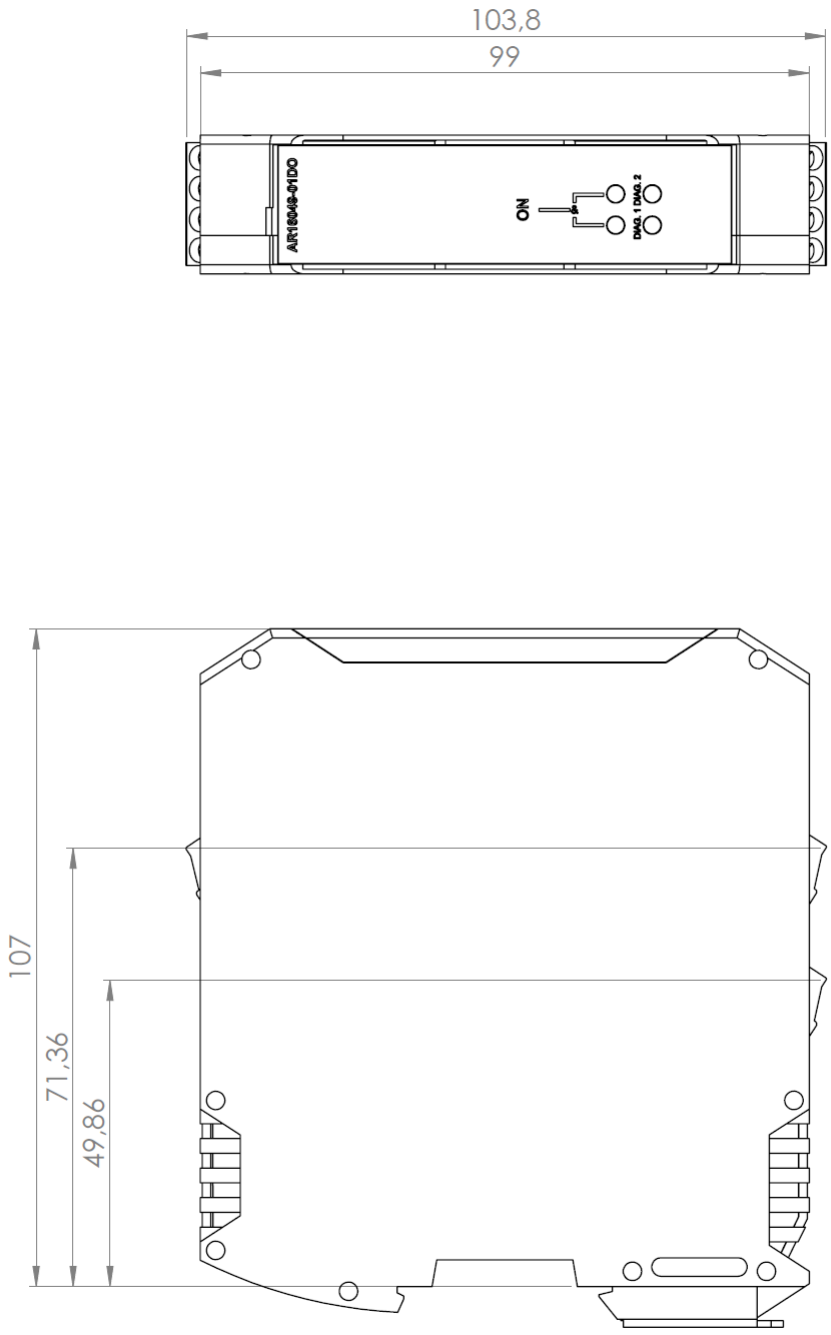


Figure 2.1: Dimensioning casing

5 Safety-Relevant Operating Conditions

The AR16049-01DO must only be operated and used under the specified safety-relevant operating conditions:

- An external fuse must be provided by the user at the load output.
- Operation with multi-phase voltage (three-phase current) is not permitted.
- The control voltage of the relays (S1-On and S2-On) must be protected against overvoltage. To protect against overvoltage at the control voltage input (30 V), a corresponding ten diode with back-up fuse must be provided if the control voltage cannot be kept within the operating limits of the AR16049-01DO by the controlling unit.
- Cascading must be carefully evaluated by the user due to mutual heating. The user must take care not to exceed the maximum ambient and electrical conditions.
- The user must use the diagnostic function (connect diagnostic supply voltage to MP24V, and diagnostic outputs Diag1-Out / Diag2-Out to the monitoring system) in two channels to monitor each relay individually to obtain the optimum diagnosis.
- The current for the diagnostic circuit must be limited to 300mA.
- Off-line test interval 10 years.
- The relay is suitable for use in a cabinet or in a control room.
- Industrial customers are responsible for proper disposal of the component.
- The relay device is designed to operate above sea level up to 2000m.

Outside the specified operating conditions, use is not permitted.

The relay is not certified for severe conditions such as:

- Salt spray
- High ozone concentration
- Occurrence of mold, sponges, etc.
- Rodents and other vermin

6 Circuit

6.1 Block diagram

Figure 5.1 shows the principle circuit of the AR16049-01DO. The diagnostics (see table below) provides diagnostic information in active (ON) and passive (OFF) mode.

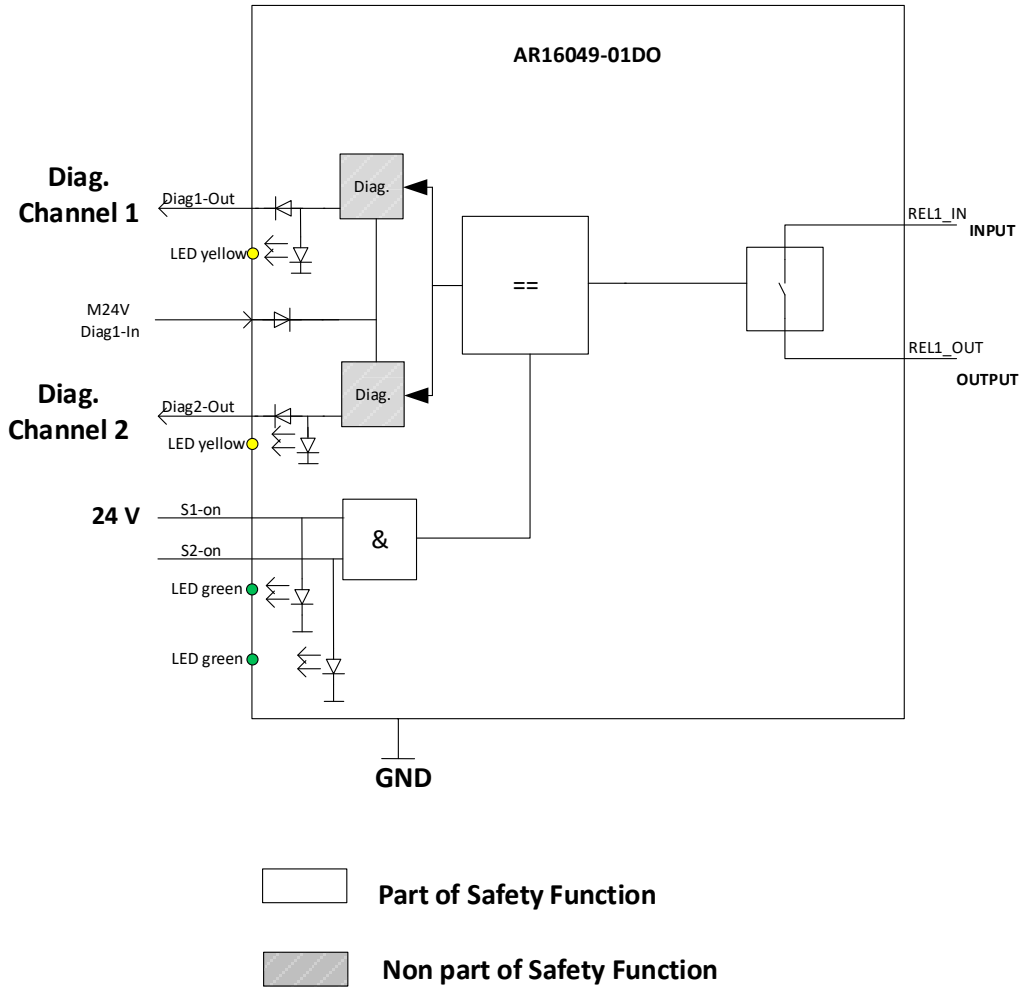
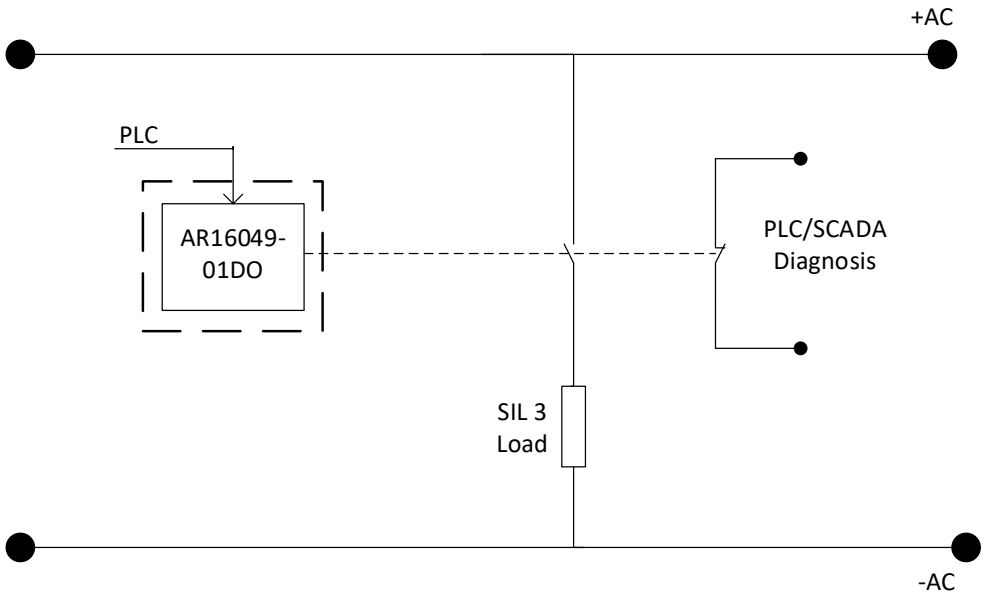


Figure 6.1: Block diagram

The relay can only be switched on by applying a high signal to the control inputs S1-ON and S2-ON on the safety relays K1 and K2. If only one control signal (S1-ON or S2-ON) is activated, the output is not switched.

If one of the two relays is not working properly, this is indicated via the diagnostic circuit (green and yellow LED on simultaneously).

6.2 Sample circuit



6.3 Assignment of the terminals

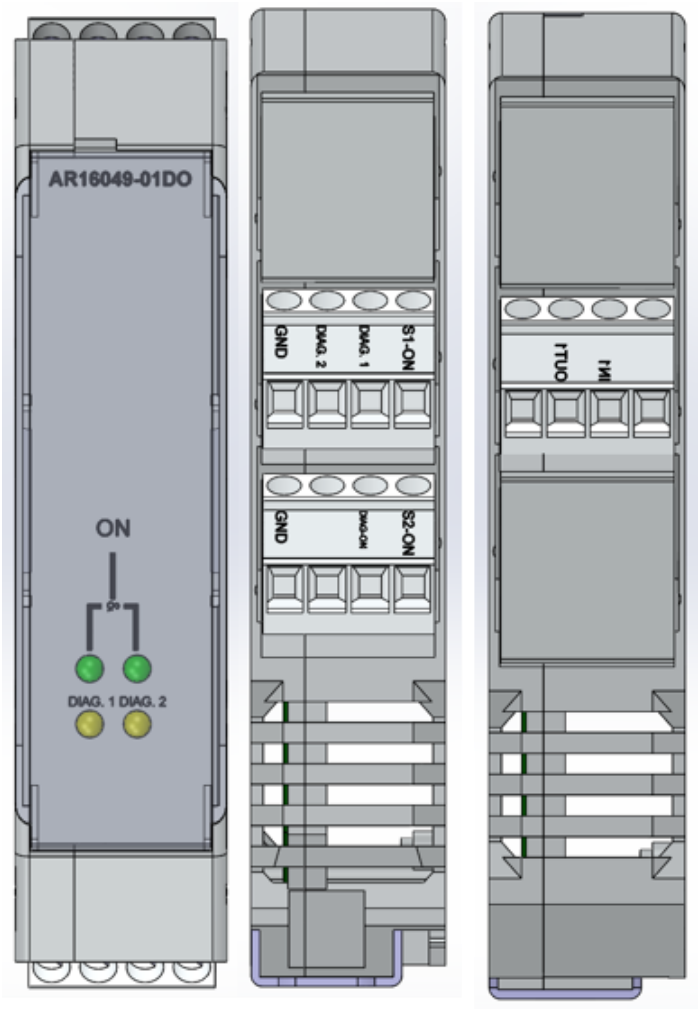


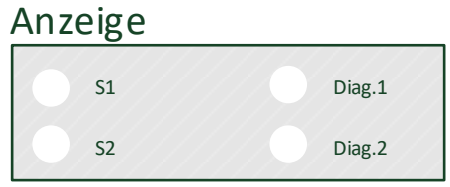
Figure 6.3: Assignment of the terminals

6.4 Displays for function / diagnostics

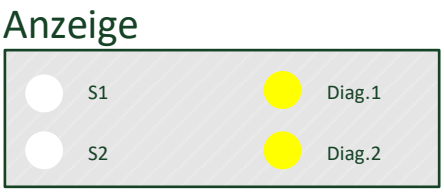
The display of the function / diagnosis is done with the help of 4 LEDs. Two green LEDs signal the 24 V operational readiness. Two yellow LEDs are used for diagnostics.
The diagnostic contacts are only displayed when the 24V supply is connected to M24V..

Green and yellow signal the switched on state

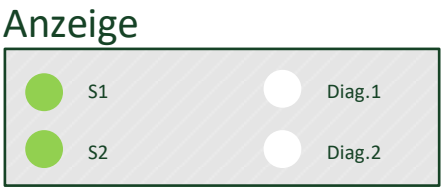
Normal: Relays are not energized, 24 V are not present at the diagnostic supply M24V.



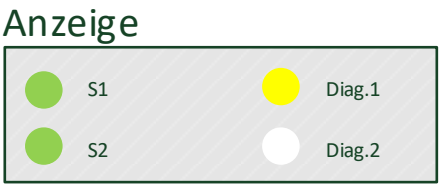
Normal: Relays are not energized, 24 V are connected to the diagnostic supply M24V.



Normal: Relays are energized, 24 are connected to both inputs S1-ON and S2-ON..

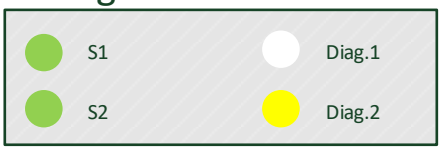


Error Relay no. 1 both inputs (S1-ON and S2-ON) are at 24 V.



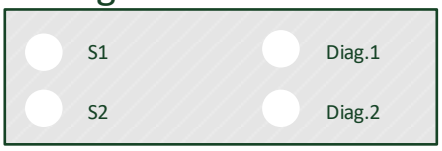
Error Relay no. 2 both inputs (S1-ON and S2-ON) have 24 V connected to them.

Anzeige



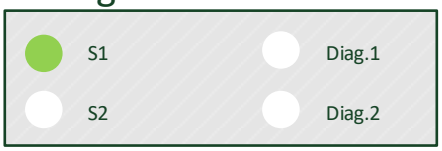
Switched off: Supply voltage of 24 V is not connected at both inputs S1-ON and S2-ON.
Error: Diagnostic supply M24V has failed.

Anzeige



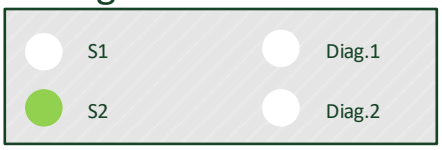
Switched off: 24 V Only connected to one input (S1-ON).
Error: Diagnostic supply M24V 24 V has failed.

Anzeige



Switched off: 24 V Only connected to one input (S2-ON).
Error: Diagnostic supply M24V 24 V has failed.

Anzeige



7 Maintenance

7.1 Preventative maintenance:

Before the maximum mechanical number of switching cycles (see section 2 Technical data) is reached, the relay must be replaced.

7.2 Repair:

Repair of the assembly must not be carried out by the operator.

Defective equipment should be sent to the manufacturer for repair after an inspection by the operator with a brief description of the fault.

Operating equipment that has a safety certificate is relevant to safety. The validity of the certificate expires if unauthorized repairs are carried out on the assembly.

Product responsibility and any warranty will expire for repairs carried out outside our influence.

Opening the housing or damaging the relay device will invalidate the warranty..