

**Characteristics:**
**General Description:**

The single channel DIN Rail Relay Output D1093S is a relay module suitable for the switching of safety related circuits, up to SIL 3 level according to IEC61508, for high risk industries. It provides isolation between the input and output contact. D1093S provides 1 DPST contact for normally energized loads and 1 SPST contact for normally de-energized loads.

**Diagnostic:**

Line breakage detection for NE and ND load conditions.  
 Provides 1 SPST normally energized relay contact (closed) for fault indication.  
 It de-energizes (open contact) in case of load or line fault.

**Function:**

1 relay for safety related circuits, provides isolation between input/output/fault. D1093S provides 1 DPST for NE loads and 1 SPST for ND loads. SIL 3 Safety Function for NE load (de-energized in safe state) is available at Terminal Blocks 5-6; in this case, the safety function is met when the relay is de-energized (open contact). SIL 3 Safety Function for ND load (energized in safe state) is available at Terminal Blocks 7-8; in this case, the safety function is met when the relay is energized (closed contact).

**Signalling LEDs:**

Power supply indication (green), relay status (yellow), line fault (red).

**EMC:**

Fully compliant with CE marking applicable requirements.

**Technical Data:**

**Supply:** 24 Vdc nom (20 to 30 Vdc) reverse polarity protected, ripple within voltage limits  $\leq 5$  Vpp.  
**Current consumption @ 24 V:** 25 mA typical.  
**Power dissipation:** 0.6 W with 24 V supply voltage and fault relay energized, typical.  
**Max. power consumption:** at 30 V supply voltage and fault relay energized, 0.9 W.

**Isolation (Test Voltage):**

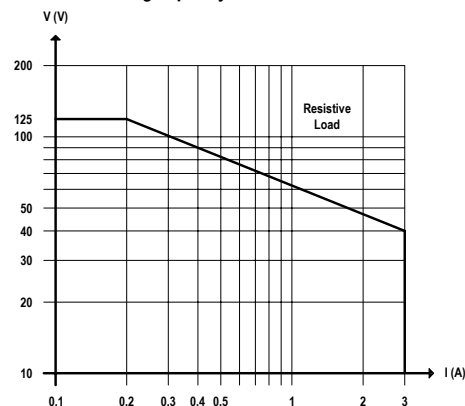
Output/Input 2.5 KV; Output/Supply 2.5 KV; Output/Fault Output 2.5 KV; Input/Supply 500 V; Input/Fault Output 500 V; Fault Output/Supply 500 V.  
**Input:** 24 Vdc nom (20.4 to 27.6 Vdc) reverse polarity protected.  
**Current consumption @ 24 V:** 50 mA with relay energized, typical.  
**Power dissipation:** 1.2 W with 24 V input voltage and relay energized, typical.  
**Max. power consumption:** at 27.6 V input voltage and relay energized, 1.5 W.

**Output:** voltage free relay contact, normally open.

**Contact material:** Ag Alloy (Cd free).

**Contact rating:** 3 A 250 Vac 750 VA, 3 A 125 Vdc 120 W (resistive load).

**DC Load breaking capacity:**



**Mechanical / Electrical life:**  $50 * 10^6 / 1 * 10^5$  operation, typical.

**Operate / Release time:** 5 / 3 ms typical.

**Bounce time NO / NC contact:** 3 ms.

**Frequency response:** 10 Hz maximum.

**Fault detection:**

**De-energized fault signal:**  $\leq 150$   $\mu$ A continuous.

**De-energized open output detection:** load current  $\leq 50$   $\mu$ A.

**Energized open output detection:** load current  $\leq 10$  mA.

**Fault signalling:** voltage free NE SPST relay contact (output de-energized in fault condition).

**Contact rating:** 3 A 250 Vac 750 VA, 3 A 125 Vdc 120 W (resistive load).

**Response time:** 200 ms typical.

**Compatibility:**

CE mark compliant, conforms to 94/9/EC Atex Directive and to 2004/108/CE EMC Directive.

**Environmental conditions:**

**Operating:** temperature limits  $-20$  to  $+60$   $^{\circ}$ C, relative humidity max 90 % non condensing, up to  $35$   $^{\circ}$ C.

**Storage:** temperature limits  $-45$  to  $+80$   $^{\circ}$ C.

**Safety Description:**


II 3G Ex nAC IIC T4 non-incendive electrical apparatus.  $-20$   $^{\circ}$ C  $\leq$  Ta  $\leq 60$   $^{\circ}$ C.

**Approvals:** IMQ 09 ATEX 013 X conforms to EN60079-0, EN60079-15, FM & FM-C No. 3024643, 3029921C, conforms to Class 3600, 3611, 3810 and C22.2 No.142, C22.2 No.213, E60079-0, E60079-15.

TUV Certificate No. C-IS-183645-01, SIL 3 according to IEC 61508.

Please refer to Functional Safety Manual for SIL applications.

**Proof Test Interval:** 10 years for SIL3 application with NE load or 7 years with ND load or 10 years with ND load (20 % of SIF).

**Mounting:** T35 DIN Rail according to EN50022.

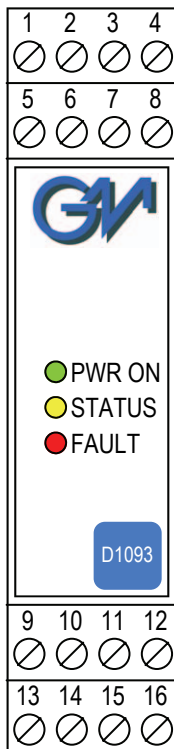
**Weight:** about 160 g.

**Connection:** by polarized plug-in disconnect screw terminal blocks to accommodate terminations up to 2.5 mm<sup>2</sup>.

**Location:** Safe Area/Non Hazardous Locations or Zone 2, Group IIC T4, Class I, Division 2, Groups A, B, C, D Temperature Code T4 and Class I, Zone 2, Group IIC, IIB, IIA T4 installation.

**Protection class:** IP 20.

**Dimensions:** Width 22.5 mm, Depth 99 mm, Height 114.5 mm.

**Front Panel and Features:**


- SIL 3 according to IEC 61508 for Tproof = 10 years (10 % of total SIF) with NE Load.
- SIL 3 according to IEC 61508 for Tproof = 7 / 10 years (10 / 20 % of total SIF) with ND Load.
- PFDavg (1 year) 7.01 E-06, SFF 99.19 % with NE Load.
- PFDavg (1 year) 1.14 E-05, SFF 98.14 % with ND Load.
- Installation in Zone 2, Division 2.
- Line and Load open diagnostic in NE and ND conditions.
- 1 DPST contact for NE load and 1 SPST contact for ND load.
- Three port isolation, Input/Output/Supply.
- EMC Compatibility to EN61000-6-2, EN61000-6-4.
- ATEX, FM & FM-C Certifications.
- TUV Certification for SIL.
- High Reliability, SMD components.
- Simplified installation using standard DIN Rail and plug-in terminal blocks.

**Ordering Information:**

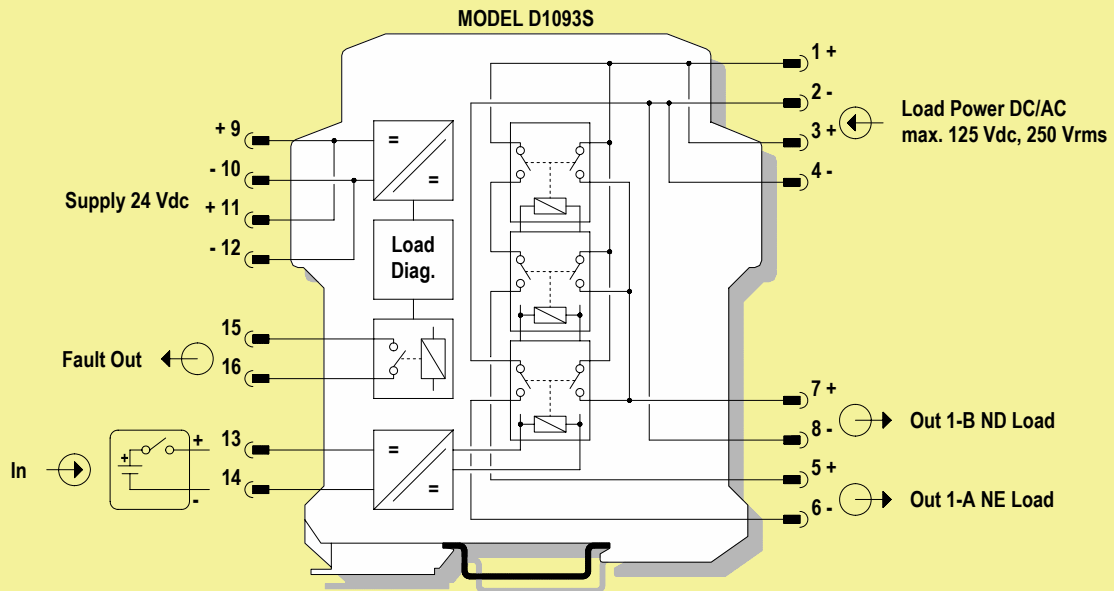
Model:	D1093S
Power Bus enclosure	/B

**Image:**



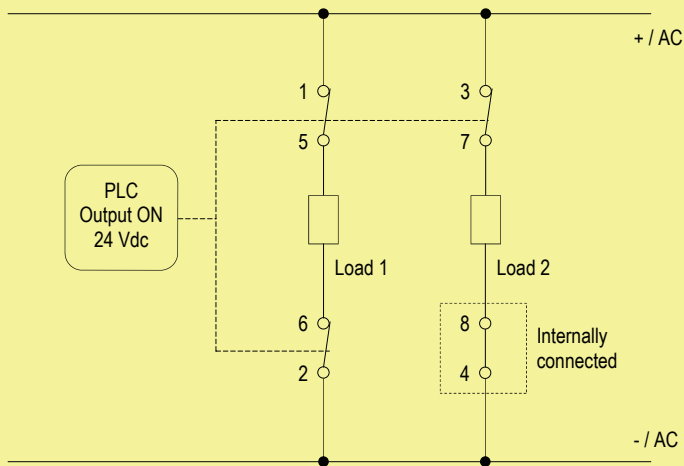
**Function Diagram:**

SAFE AREA, ZONE 2 GROUP IIC T4,  
NON HAZARDOUS LOCATIONS, CLASS I, DIVISION 2, GROUPS A, B, C, D T-Code T4, CLASS I, ZONE 2, GROUP IIC T4

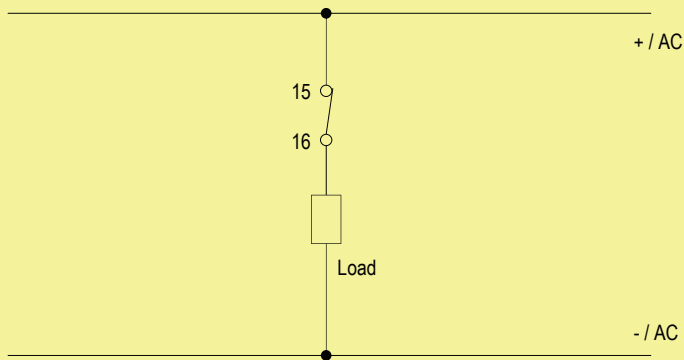


Relay contact shown in de-energized position

Application for D1093S - Normally Energized Condition (NE)

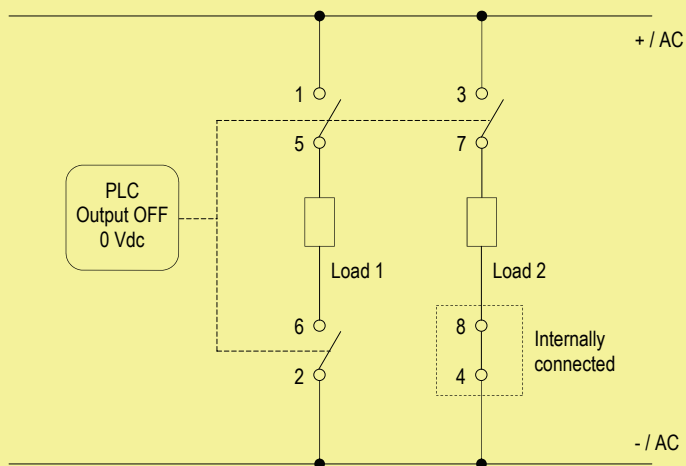


**Contacts 1-5 and 2-6:** SIL 3 Function is met when contacts are in open state.  
**Contacts 3-7:** Opening of contacts can be used for monitoring Contacts 1-5 and 2-6. No SIL Function.  
**Contacts 4-8:** Internally connected, cannot be changed.

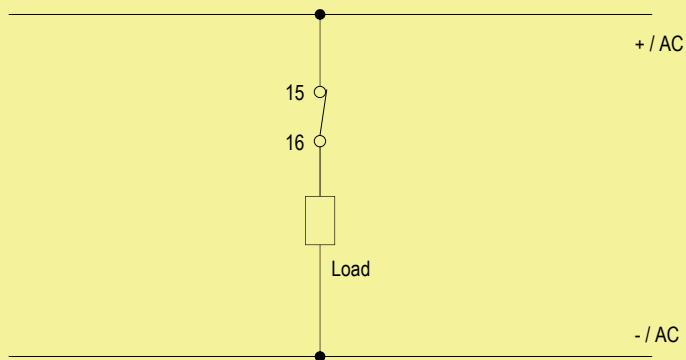


**Contacts 15-16:** Voltage free contact for Line and Load Fault detection. Can be connected in series with other relay units for common monitoring.

Application for D1093S - Normally De-Energized Condition (ND)



**Contacts 1-5 and 2-6:** Closing of contacts can be used for monitoring Contacts 3-7. No SIL Function.  
**Contacts 3-7:** SIL 3 Function is met when contacts are in closed state.  
**Contacts 4-8:** Internally connected, cannot be changed.



**Contacts 15-16:** Voltage free contact for Line and Load Fault detection. Can be connected in series with other relay units for common monitoring.