D5290 -079

5 A SIL 3 Relay Out Module (115 Vac coil voltage) for NE or ND Loads with NE Relay condition DIN-Rail, Model D5290S-079

Characteristics:

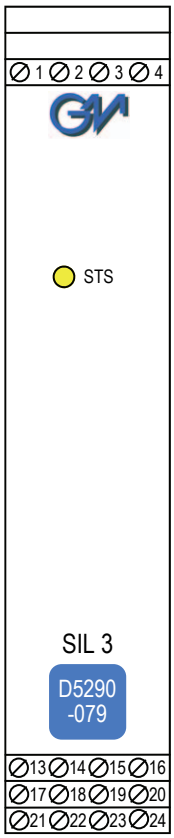
General Description:

The D5290S-079 is a relay module suitable for the switching of safety related circuits, up to SIL 3 level according to IEC 61508 for high risk industries.
It provides isolation between input channel and output contacts.
The input channel requires 115 Vac voltage signal to drive the relay coils.

See the following pages for Functional Safety applications with related SIL value.

Mounting on standard DIN-Rail in Safe Area.

Front Panel and Features:



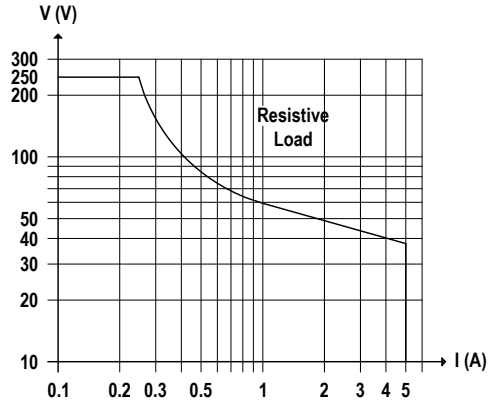
- SIL 3 according to IEC 61508
  for 10 years life time (10 % or more of total SIF)
  with PFDavg (1 year) 7.01 E-06, SFF = 99.07 %
  for two NE or ND loads with NE relay condition
  (see application n° 1, 2 and 4).
- SIL 2 according to IEC 61508
  for 7 / 10 years life time (10 / 20 % of total SIF)
  with PFDavg (1 year) 1.40 E-04, SFF = 65.22 %
  for four NE loads with NE relay condition
  (see application n° 3).
- 5 A SIL 3 / SIL 2 contacts for NE or ND loads with NE Relay condition.
- Input/Output isolation.
- EMC Compatibility to EN61000-6-2, EN61000-6-4, EN61326-1, EN61326-3-1 for safety system.
- Simplified installation using standard DIN-Rail.

Ordering Information:

Model: D5290S-079

Technical Data:

Input: 115 Vac nom (95 to 130 Vac).
Current consumption @ 115 Vac: 25 mA with relay energized, typical.
Power dissipation: 1.8 W with 115 Vac input voltage, relay energized, typical.
Isolation (Test Voltage): Input / All Outputs: 2.5 KV;
Out S_1 & Out P_1 / Out S_3 & Out P_2, Out S_2, Out S_4: 500 V;
Out S_3 & Out P_2 / Out S_2, Out S_4: 500 V;
Out S_2 / Out S_4: 500 V.
Output: 2 voltage free SPDT (= NO contact + parallel of 2 NC contacts) relay contacts identified with outputs: Out S_1 & Out P_1 and Out S_3 & Out P_2;
2 voltage free SPST (NO) relay contacts identified with: Out S_2 and Out S_4.
Terminals 13-14 (Out S_1), 15-16 (Out S_2), 21-22 (Out S_4) and 23-24 (Out S_3) are: open when relay is de-energized, closed in energized relay condition.
Terminals 17-18 (Out P_1) and 19-20 (Out P_2) are: closed when relay is de-energized, open in energized relay condition.
Contact material: Ag Alloy (Cd free).
Contact rating: 5 A 250 Vac 1250 VA, 5 A 250 Vdc 175 W (resistive load).
DC Load breaking capacity:



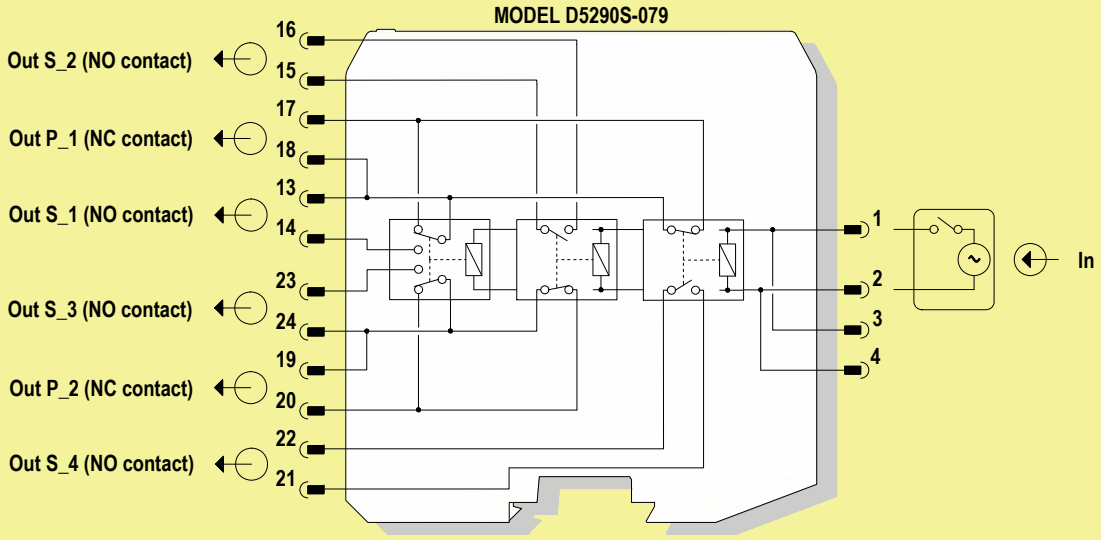
Mechanical / Electrical life: 5 * 10^6 / 5 * 10^4 operation, typical.
Bounce time NO / NC contact: 4 / 10 ms, typical.
Frequency response: 10 Hz maximum.
Compatibility:
CE mark compliant,
conforms to 2004/108/CE EMC Directive.
Environmental conditions:
Operating: temperature limits - 40 to + 60 °C, relative humidity 95 %, up to 55 °C.
Storage: temperature limits - 45 to + 80 °C.
Mounting:
T35 DIN-Rail according to EN50022.
Weight: about 145 g.
Connection: by polarized plug-in disconnect screw terminal blocks to accomodate terminations up to 2.5 mm^2.
Location: Safe Area installation.
Protection class: IP 20.
Dimensions: Width 22.5 mm, Depth 123 mm, Height 120 mm.

DIN-Rail accessories: Cover and fix MCHP196

Image:

Function Diagram:

SAFE AREA



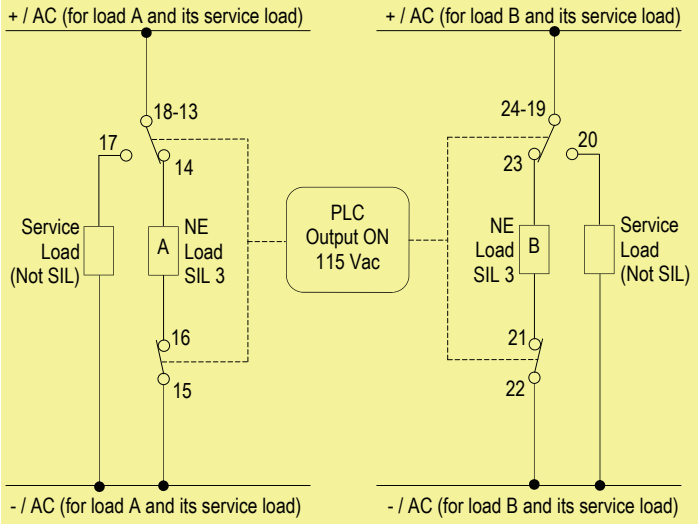
See the following pages for Functional Safety applications with related SIL value.

Relay contacts shown in de-energized position.
Terminals 13-14, 15-16, 21-22 and 23-24 are open.
Terminals 17-18 and 19-20 are closed.

Applications:

1) Application D5290S-079 - SIL 3 Load Normally Energized Condition (NE) and Normally Energized Relay: one common driving signal from PLC for both NE loads (A and B), with interruption of both load supply lines

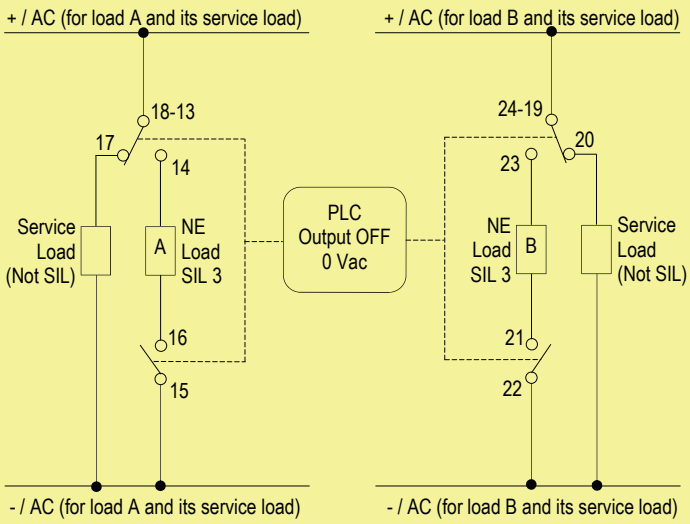
Normal state operation



Contacts 13-14 and 15-16: in normal operation relays are energized, contacts are closed, NE load (A) is energized.
Contact 17-18 (double contact in parallel): in normal operation relay is energized, contact is open, service load for NE load (A) is de-energized.

Contacts 21-22 and 23-24: in normal operation relays are energized, contacts are closed, NE load (B) is energized.
Contact 19-20 (double contact in parallel): in normal operation relay is energized, contact is open, service load for NE load (B) is de-energized.

De-energized to trip operation

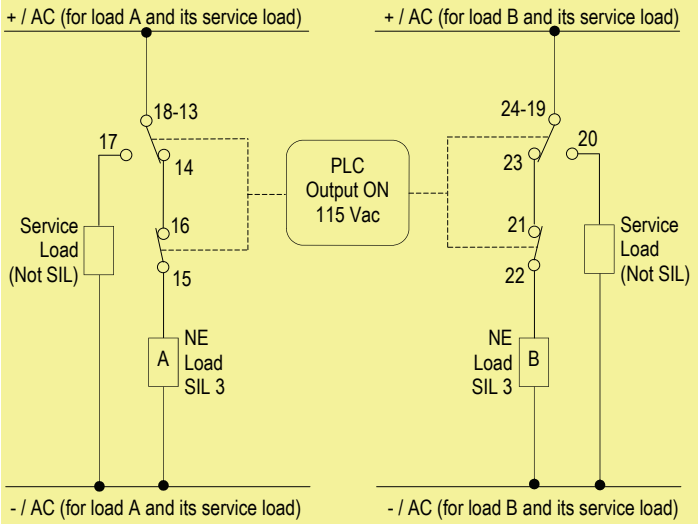


Contacts 13-14 and 15-16: the SIL 3 Safety Function is met when the relays are de-energized, contacts are open, NE load (A) is de-energized.
Contact 17-18 (double contact in parallel): in safe state the relay is de-energized, contact is closed, service load for NE load (A) is energized.

Contacts 21-22 and 23-24: the SIL 3 Safety Function is met when the relays are de-energized, contacts are open, NE load (B) is de-energized.
Contact 19-20 (double contact in parallel): in safe state the relay is de-energized, contact is closed, service load for NE load (B) is energized.

2) Application D5290S-079 - SIL 3 Load Normally Energized Condition (NE) and Normally Energized Relay: one common driving signal from PLC for both NE loads (A and B), with interruption of only one load supply line

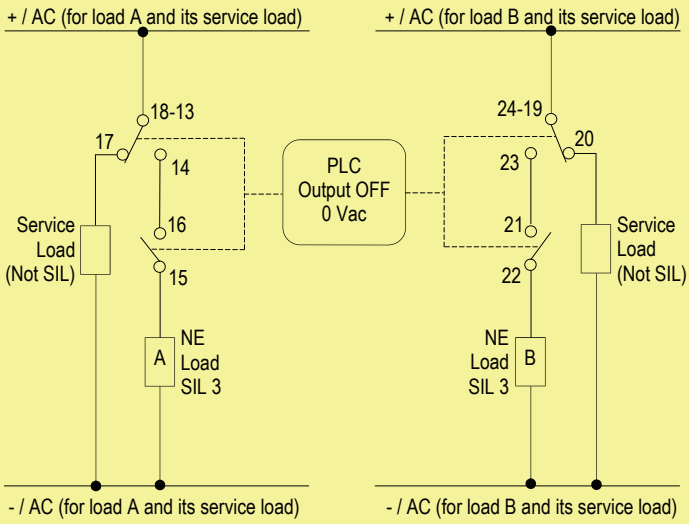
Normal state operation



Contacts 13-14 and 15-16: in normal operation relays are energized, contacts are closed, NE load (A) is energized.
Contact 17-18 (double contact in parallel): in normal operation relay is energized, contact is open, service load for NE load (A) is de-energized.

Contacts 21-22 and 23-24: in normal operation relays are energized, contacts are closed, NE load (B) is energized.
Contact 19-20 (double contact in parallel): in normal operation relay is energized, contact is open, service load for NE load (B) is de-energized.

De-energized to trip operation



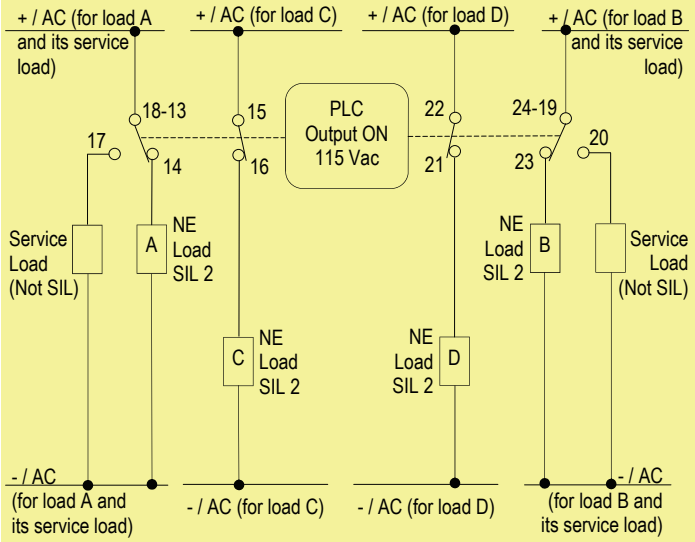
Contacts 13-14 and 15-16: the SIL 3 Safety Function is met when the relays are de-energized, contacts are open, NE load (A) is de-energized.
Contact 17-18 (double contact in parallel): in safe state the relay is de-energized, contact is closed, service load for NE load (A) is energized.

Contacts 21-22 and 23-24: the SIL 3 Safety Function is met when the relays are de-energized, contacts are open, NE load (B) is de-energized.
Contact 19-20 (double contact in parallel): in safe state the relay is de-energized, contact is closed, service load for NE load (B) is energized.

Applications:

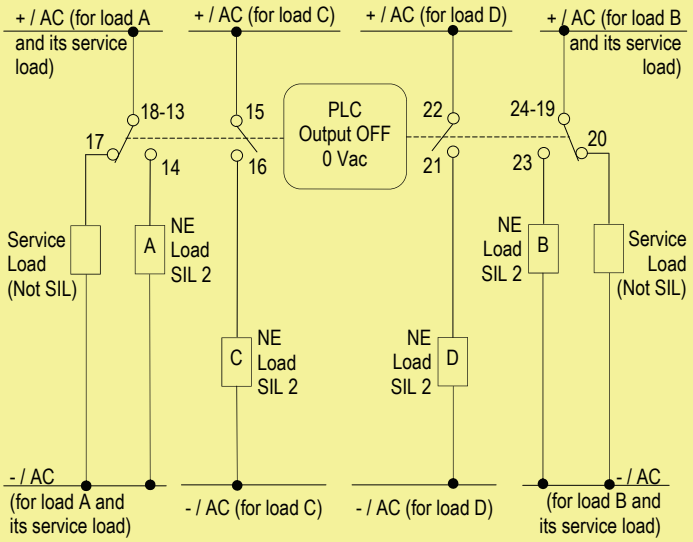
3) Application D5290S-079 - SIL 2 Load Normally Energized Condition (NE) and Normally Energized Relay: one common driving signal from PLC for all NE loads (A, B, C and D), with interruption of only one load supply line

Normal state operation



Contacts 13-14, 15-16, 21-22 and 23-24: in normal operation relays are energized, contacts are closed, NE loads (A, B, C and D) are energized.
Contact 17-18 and 19-20 (double contact in parallel): in normal operation relays are energized, contacts are open, service loads for NE loads (A and B) are de-energized.

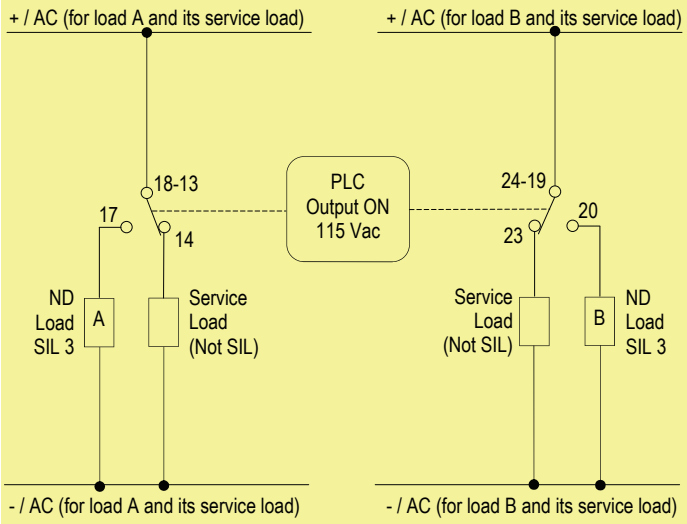
De-energized to trip operation



Contacts 13-14, 15-16, 21-22 and 23-24: the SIL 2 Safety Function is met when the relays are de-energized, contacts are open, NE loads (A, B, C and D) are de-energized.
Contact 17-18 and 19-20 (double contact in parallel): in safe state the relays are de-energized, contacts are closed, service loads for NE loads (A and B) are energized.

4) Application D5290S-079 - SIL 3 Load Normally De-energized Condition (ND) and Normally Energized Relay: one common driving signal from PLC for both ND loads (A and B), with interruption of only one load supply line

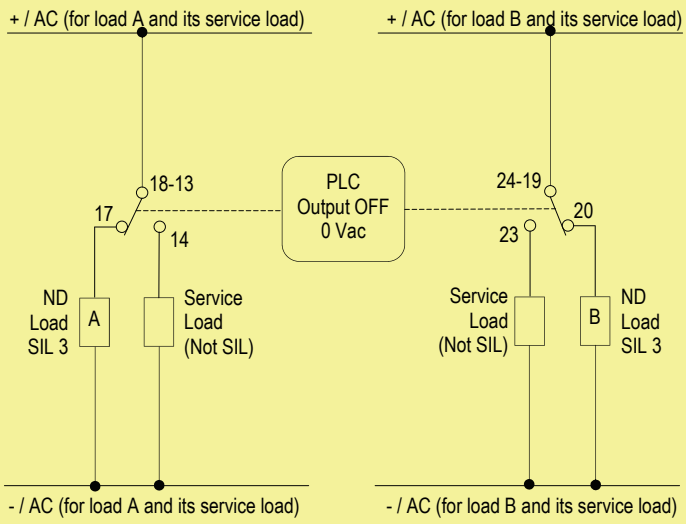
Normal state operation



Contact 17-18 (double contact in parallel): in normal operation relay is energized, contact is open, ND load (A) is de-energized.
Contact 13-14: in normal operation relay is energized, contact is closed, service load for ND load (A) is energized.

Contact 19-20 (double contact in parallel): in normal operation relay is energized, contact is open, ND load (B) is de-energized.
Contact 23-24: in normal operation relay is energized, contact is closed, service load for ND load (B) is energized.

De-energized to trip operation



Contact 17-18 (double contact in parallel): the SIL 3 Safety Function is met when the relay is de-energized, contact is closed, ND load (A) is energized.
Contact 13-14: in safe state the relay is de-energized, contact is open, service load for ND load (A) is de-energized.

Contact 19-20 (double contact in parallel): the SIL 3 Safety Function is met when the relay is de-energized, contact is closed, ND load (B) is energized.
Contact 23-24: in safe state the relay is de-energized, contact is open, service load for ND load (B) is de-energized.