

Characteristics:

General Description:

The single and dual channel Switch/Proximity Detector Repeater, D5037S and D5037D module is a unit suitable for applications requiring SIL 2 level (according to IEC 61508:2010 Ed. 2) in safety related systems for high risk industries.

The unit can be configured for switch or proximity detector (EN60947-5-6, NAMUR), NO or NC and for NO or NC optocoupled open collector transistor output.

Each channel enables a Safe Area load to be controlled by a switch, or a proximity detector, located in Hazardous Area.

A fault detection circuit (DIP switch enabled) is available for both proximity sensor and switch equipped with end of line resistors. In case of fault, when enabled, it de-energizes the corresponding output transistor and turns the fault LED on; when disabled the corresponding output transistor repeats the input line open or closed status as configured.

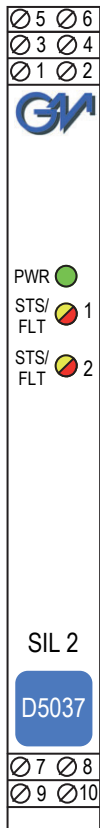
Mounting on standard DIN-Rail, with or without Power Bus, or on customized Termination Boards, in Safe Area or in Zone 2.

Functional Safety Management Certification:

G.M. International is certified by TUV to conform to IEC61508:2010 part 1 clauses 5-6 for safety related systems up to and included SIL3.



Front Panel and Features:



- SIL 2 according to IEC 61508:2010 Ed. 2 for Tproof = 8 / 16 years (10 / 20 % of total SIF) for D5037S and D5037D.
- PFDavg (1 year) 1.21 E-04, SFF 77.15 % for D5037S.
- PFDavg (1 year) 1.21 E-04, SFF 78.15 % for D5037D.
- Systematic capability SIL 3
- Input from Zone 0 (Zone 20), installation in Zone 2
- NO/NC switch/proximity Detector Input, NO/NC transistor driving mode.
- Field open and short circuit detection.
- Three port isolation, Input/Output/Supply.
- EMC Compatibility to EN61000-6-2, EN61000-6-4, EN61326-1, EN61326-3-1 for safety system.
- In-field programmability by DIP Switch.
- ATEX, IECEx, TÜV Certifications.
- TÜV Functional Safety Certification.
- High Density, two channels per unit.
- Simplified installation using standard DIN-Rail and plug-in terminal blocks, with or without Power Bus, or customized Termination Boards.
- 250 Vrms (Um) max. voltage allowed to the instruments associated with the barrier.

Technical Data:

Supply:

24 Vdc nom (18 to 30 Vdc) reverse polarity protected, ripple within voltage limits ≤ 5 Vpp, 2 A time lag fuse internally protected.

Current consumption @ 24 V: 22 mA for 2 channels D5037D,

12 mA for 1 channel D5037S with short circuit input and transistor closed, typical.

Power dissipation: 0.53 W for 2 channels D5037D, 0.30 W for 1 channel D5037S with 24 V supply voltage, short circuit input and transistor closed, typical.

Isolation (Test Voltage):

I.S. In/Out 1.5 KV; I.S. In/Supply 1.5 KV; I.S. In/ I.S In 500 V;

Out/Supply 500 V; Out /Out 500 V.

Input switching current levels:

ON ≥ 2.1 mA (1.9 to 6.2 mA range), OFF ≤ 1.2 mA (0.4 to 1.3 mA range),

switch current ≈ 1.65 mA ± 0.2 mA hysteresis.

Fault current levels: open fault ≤ 0.2 mA, short fault ≥ 6.8 mA

Input equivalent source: 8 V 1 K Ω typical (8 V no load, 8 mA short circuit).

Output:

voltage free SPST optocoupled open-collector transistor.

Open-collector rating: 100 mA at 35 Vdc (≤ 1.5 V voltage drop).

Leakage current: ≤ 50 μ A at 35 Vdc.

Response time: ≤ 100 μ s.

Frequency response: 5 KHz maximum.

Compatibility:

CE CE mark compliant, conforms to Directives:

94/9/EC Atex, 2004/108/CE EMC, 2006/95/EC LVD, 2011/65/EU RoHS.

Environmental conditions:

Operating: temperature limits - 40 to + 70 °C, relative humidity 95 %, up to 55 °C.

Storage: temperature limits - 45 to + 80 °C.

Safety Description:



ATEX: II 3(1) G Ex nA [ia Ga] IIC T4 Gc, II (1) D [Ex ia Da] IIIC, I (M1) [Ex ia Ma] I

IECEx: Ex nA [ia Ga] IIC T4 Gc, [Ex ia Da] IIIC, [Ex ia Ma] I

associated apparatus and non-sparking electrical equipment.

Uo/Voc = 10.5 V, Io/Isc = 22 mA, Po/Po = 56 mW at terminals 7-8, 9-10.

Um = 250 Vrms, -40 °C \leq Ta \leq 70 °C.

Approvals:

BVS 10 ATEX E 113 X conforms to EN60079-0, EN60079-11, EN60079-15,

IECEx BVS 10.0072X conforms to IEC60079-0, IEC60079-11, IEC60079-15,

TÜV Certificate No. C-IS-236198-04, SIL 2 conforms to IEC61508:2010 Ed. 2.

TÜV Certificate No. C-IS-236198-09, SIL 3 Functional Safety Certificate conforms to IEC61508:2010 Ed.2, for Management of Functional Safety.

Mounting:

T35 DIN-Rail according to EN50022, with or without Power Bus or on customized Termination Board.

Weight: about 130 g D5037D, 110 g D5037S.

Connection: by polarized plug-in disconnect screw terminal blocks to accommodate terminations up to 2.5 mm².

Location: installation in Safe Area or Zone 2, Group IIC T4.

Protection class: IP 20.

Dimensions: Width 12.5 mm, Depth 123 mm, Height 120 mm.

Ordering Information:

| | | |
|------------|-------|---|
| Model: | D5037 | |
| 1 channel | | S |
| 2 channels | | D |

Power Bus and DIN-Rail accessories:

Connector JDFT049

Cover and fix MCHP196

Terminal block male MOR017

Terminal block female MOR022

Parameters Table:

| Safety Description | Maximum External Parameters | | | |
|-------------------------------|-----------------------------|-------------------------|------------|--------------------------------|
| | Group Cenelec | Co/Ca (μF) | Lo/La (mH) | Lo/Ro ($\mu\text{H}/\Omega$) |
| Terminals 7-8, 9-10 | IIC | 2.41 | 78.3 | 635.9 |
| $U_0/V_{oc} = 10.5 \text{ V}$ | IIB | 16.80 | 313.4 | 2543.9 |
| $I_0/I_{sc} = 22 \text{ mA}$ | IIA | 75.00 | 626.9 | 5087.9 |
| $P_0/P_o = 56 \text{ mW}$ | I | 66.00 | 1028.6 | 8347.4 |
| | IIIC | 16.80 | 313.4 | 2543.9 |

NOTE for USA and Canada:

IIC equal to Gas Groups A, B, C, D, E, F and G

IIB equal to Gas Groups C, D, E, F and G

IIA equal to Gas Groups D, E, F and G

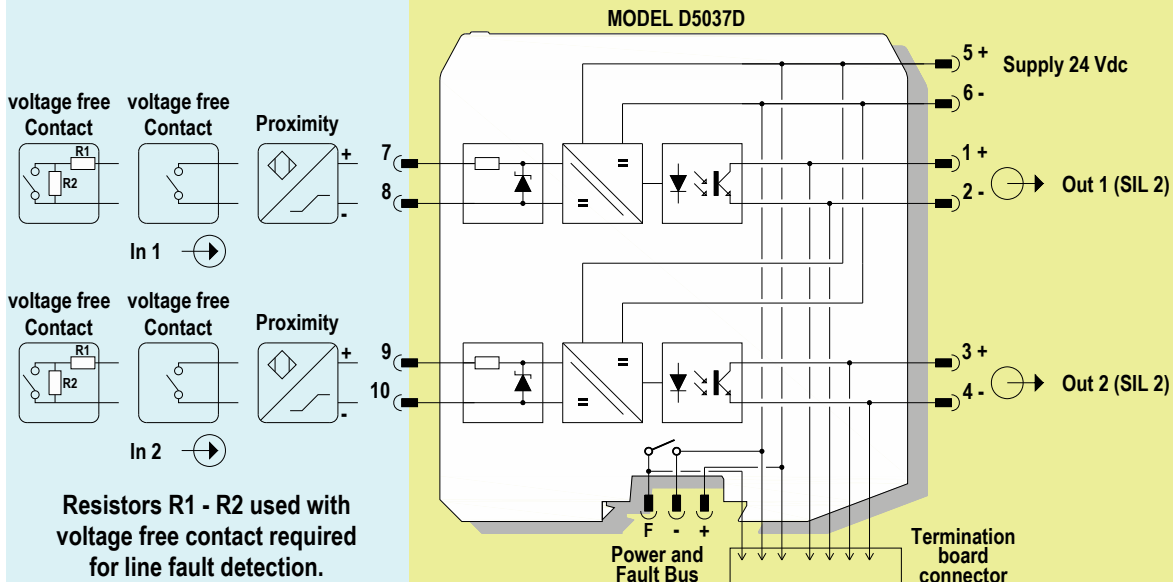
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Function Diagram:

HAZARDOUS AREA ZONE 0 (ZONE 20)
GROUP IIC

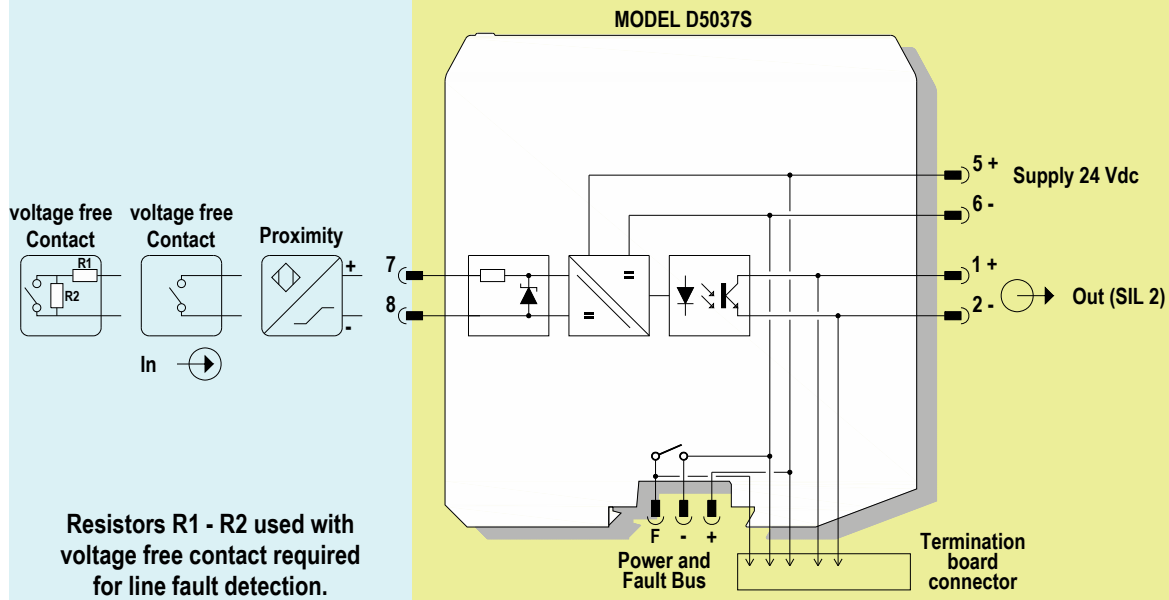
SAFE AREA, ZONE 2 GROUP IIC T4



Function Diagram:

HAZARDOUS AREA ZONE 0 (ZONE 20)
GROUP IIC

SAFE AREA, ZONE 2 GROUP IIC T4



Resistors R1 - R2 used with voltage free contact required for line fault detection.