

Characteristics:
General Description:

The single channel DIN-Rail Bus Powered Digital Output Isolator, D1049S, is suitable for driving solenoid valves, visual or audible alarms to alert a plant operator, or other process control devices in Hazardous Area from a driving signal in Safe Area. It can also be used as a controllable supply to power measuring or process control equipment. Its use is allowed in applications requiring up to SIL 3 level (according to IEC 61508) in safety related systems for high risk industries. The Safety PLC or DCS driving signal controls the field device through the D1049S, which provides isolation and is capable of monitoring the conditions of the line. Short and open circuit diagnostic monitoring, dip-switch selectable, operates irrespective of the output condition and provides LED indication and NC transistor output signaling. When fault is detected output is de-energized until normal condition is restored. An override input, dip-switch selectable, is provided to permit a safety system to override the control signal. When enabled, a low input voltage always de-energizes the field device regardless of the input signal. Three basic output circuits are selectable, with different safety parameters, to interface the majority of devices on the market. The selection among the three output characteristics is obtained by connecting the field device to a different terminal block.

Function:

1 channel I.S. digital output to operate Hazardous Area normally energized loads from contacts, logic levels or driven logics in Safe Area. It provides 3 port isolation (input/output/supply).

Signalling LEDs:

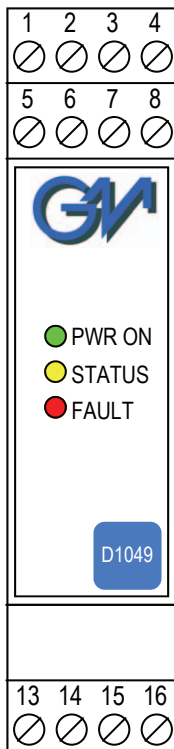
Power supply indication (green), outputs status (yellow), fault condition (red).

Field Configurability:

Line Fault Detection enable or disable and Override Control Input enable or disable.

EMC:

Fully compliant with CE marking applicable requirements.

Front Panel and Features:


- SIL 3 according to IEC 61508 for T_{proof} = 12 / 20 yrs (10 / 20 % of total SIF).
- SIL 2 according to IEC 61508 for T_{proof} = 20 yrs (10 of total SIF).
- PFDavg (1 year) 9.39 E-05, SFF 93.92 %.
- Output to Zone 0 (Zone 20), Division 1, installation in Zone 2, Division 2.
- Bus powered for NE loads.
- Short and open circuit line diagnostic monitoring with LED, transistor output.
- Output short circuit proof and current limited.
- Three port isolation, Input/Output/Supply.
- EMC Compatibility to EN61000-6-2, EN61000-6-4.
- In-field programmability by DIP Switch.
- ATEX, IECEx, FM & FM-C Certifications.
- High Reliability, SMD components.
- Simplified installation using standard DIN-Rail and plug-in terminal blocks.
- 250 Vrms (Um) max. voltage allowed to the instruments associated with the barrier.

Ordering Information:

Model: D1049S
 Power Bus enclosure /B

Technical Data:

Supply: 24 Vdc nom (20 to 30 Vdc) reverse polarity protected, ripple within voltage limits ≤ 5 Vpp, 2 A time lag fuse internally protected.
Current consumption @ 24 V: 65 mA with 45 mA output typical in normal operation.
Power dissipation: 1.1 W with 24 V supply, output energized at 45 mA nominal load.
Max. power consumption: at 30 V supply voltage, 1.8 W.

Isolation (Test Voltage):

I.S. Out/In 1.5 kV; I.S. Out/Supply 1.5 kV; I.S. Out/Fault 1.5 kV;
 I.S. Out/Override 1.5 kV; In/Supply 500 V; In/Fault 500 V; In/Override 500 V;
 Supply/Fault 500 V; Supply/Override 500 V; Fault/Override 500 V.

Control Input: voltage free contact, logic level reverse polarity protected.

Trip voltage levels: OFF status ≤ 5.0 V, ON status ≥ 20.0 V (maximum 30 V).

Current consumption @ 24 V: 5 mA.

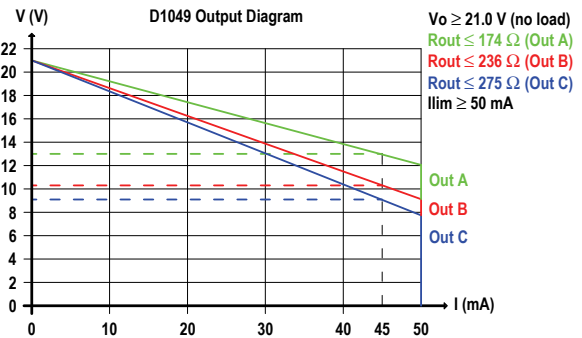
Override Input: override control signal de-energizes output when enabled by dip-switch.

Override range: 24 Vdc nom (20 to 30 Vdc) to disable (field device controlled by input), 0 to 5 Vdc to de-energize field device, reverse polarity protected.

Current consumption @ 24 V: 5 mA.

Output:

45 mA at 13.0 V (21.0 V no load, 174 Ω series resistance) at terminals 13-16 Out A.
 45 mA at 10.2 V (21.0 V no load, 236 Ω series resistance) at terminals 14-16 Out B.
 45 mA at 8.5 V (21.0 V no load, 275 Ω series resistance) at terminals 15-16 Out C.



Short circuit current: ≥ 50 mA (55 mA typical).

Response time: ≤ 10 ms.

Frequency response: 50 Hz

Fault detection:

field device and wiring open circuit or short circuit detection dip-switch selectable.

When fault is detected output is de-energized until normal condition is restored.

Short output detection: load resistance $\leq 50 \Omega$ (≈ 2 mA forcing to detect fault).

Open output detection: load resistance $> 10 \text{ k}\Omega$.

Fault signalling: voltage free NE SPST optocoupled open-collector transistor (output de-energized in fault condition).

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

Leakage current: $\leq 50 \mu\text{A}$ at 35 Vdc.

Response time: ≤ 5 ms.

Compatibility:

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

Environmental conditions:

Operating: temperature limits -20 to $+60$ $^{\circ}\text{C}$,

relative humidity max 90 % non condensing, up to 35 $^{\circ}\text{C}$.

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

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 Ma] I,

associated apparatus and non-sparking electrical equipment.

Uo/Voc = 24.8 V, Io/Isc = 147 mA, Po/Po = 907 mW at terminals 13-16 Out A.

Uo/Voc = 24.8 V, Io/Isc = 108 mA, Po/Po = 667 mW at terminals 14-16 Out B.

Uo/Voc = 24.8 V, Io/Isc = 93 mA, Po/Po = 571 mW at terminals 15-16 Out C.

Um = 250 Vrms, -20 $^{\circ}\text{C} \leq \text{Ta} \leq 60$ $^{\circ}\text{C}$.

Approvals:

DMT 01 ATEX E 042 X conforms to EN60079-0, EN60079-11, EN60079-15,

EN60079-26, EN61241-11,

IECEx BVS 07.0027X conforms to IEC60079-0, IEC60079-11, IEC60079-15,

IEC60079-26, IEC61241-11,

FM & FM-C No. 3024643, 3029921C, conforms to Class 3600, 3610, 3611, 3810 and

C22.2 No.142, C22.2 No.157, C22.2 No.213, E60079-0, E60079-11, E60079-15.

TUV Certificate No. C-IS-204194-01, SIL 2 / SIL 3 conforms to IEC61508.

Please refer to Functional Safety Manual for SIL applications.

Mounting: T35 DIN Rail according to EN50022.

Weight: about 130 g.

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

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.

Parameters Table:

Safety Description	Maximum External Parameters			
	Group Cenelec	Co/Ca (μF)	Lo/La (mH)	Lo/Ro (μH/Ω)
Terminals 13-16				Out A
Uo/Voc = 24.8 V	IIC	0.11	1.65	39.2
Io/Isc = 147 mA	IIB	0.86	6.63	156.8
Po/Po = 907 mW	IIA	3.05	13.27	313.6
Terminals 14-16				Out B
Uo/Voc = 24.8 V	IIC	0.11	3.07	53.3
Io/Isc = 108 mA	IIB	0.86	12.30	213.5
Po/Po = 667 mW	IIA	3.05	24.60	427.0
Terminals 15-16				Out C
Uo/Voc = 24.8 V	IIC	0.11	4.19	62.3
Io/Isc = 93 mA	IIB	0.86	16.79	249.4
Po/Po = 571 mW	IIA	3.05	33.58	498.9

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

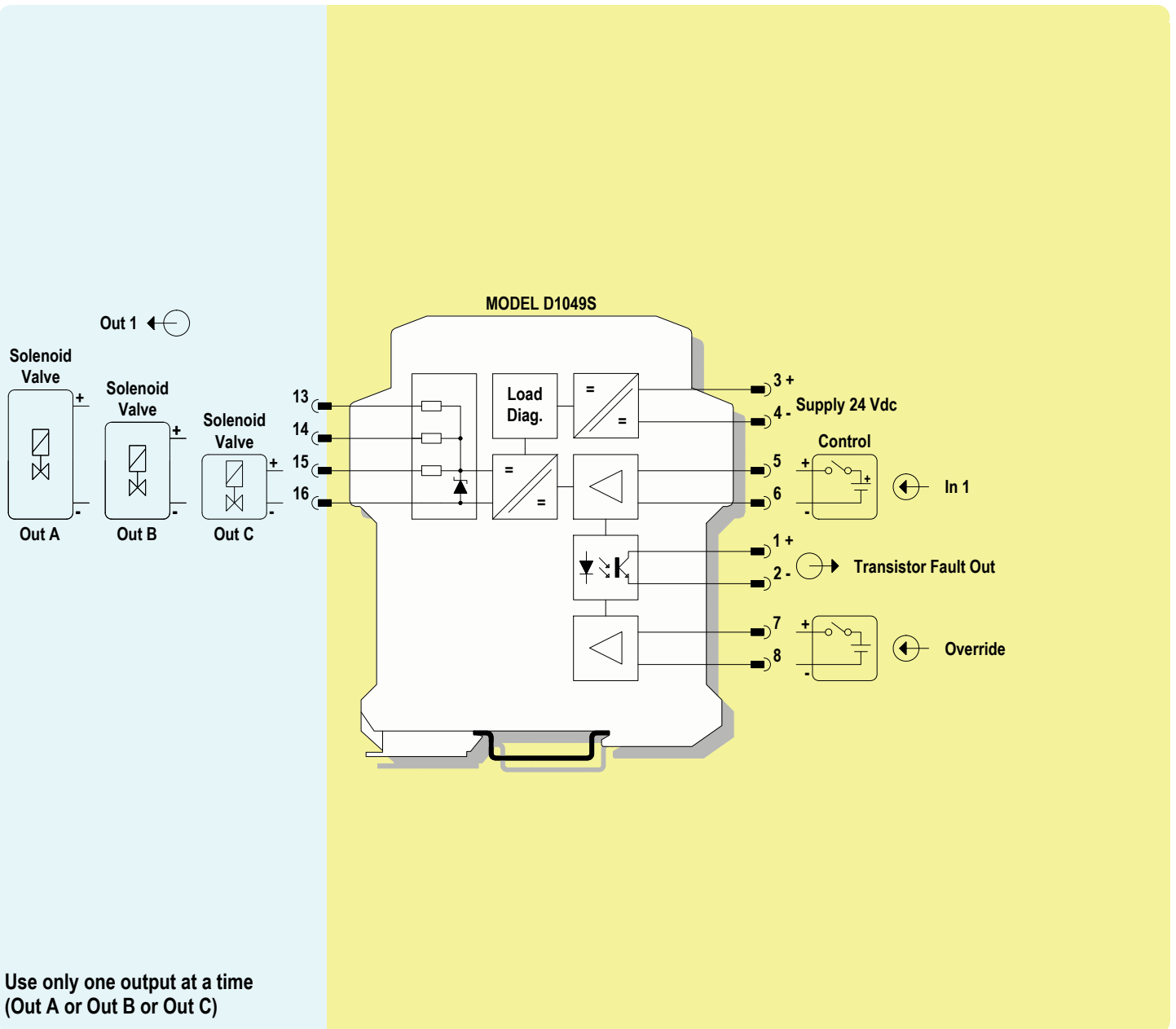
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Function Diagram:

HAZARDOUS AREA ZONE 0 (ZONE 20) GROUP IIC,
HAZARDOUS LOCATIONS CLASS I, DIVISION 1, GROUPS A, B, C, D,
CLASS II, DIVISION 1, GROUPS E, F, G, CLASS III, DIVISION 1,
CLASS I, ZONE 0, GROUP IIC

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



Use only one output at a time
(Out A or Out B or Out C)