

Characteristics:

General Description:

The single channel Bus Powered Digital Output Isolator, D5049S, 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 D5049S, 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 channel 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.

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

Front Panel and Features:



- SIL 3 according to IEC 61508 for Tproof = 12 / 20 yrs (10 / 20 % of total SIF).
- SIL 2 according to IEC 61508 for Tproof = 20 yrs (10 % of total SIF).
- PFDavg (1 year) 8.32 E-06, SFF 99.57 %.
- Output to Zone 0 (Zone 20), installation in Zone 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, EN61326-1, EN61326-3-1 for safety system.
- In-field programmability by DIP Switch.
- ATEX, IECEx Certifications.
- 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.

Ordering Information:

Model: D5049S

Power Bus and DIN-Rail accessories:
 Connector JDFT049 Cover and fix MCHP196
 Terminal block male MOR017 Terminal block female MOR022

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.

Isolation (Test Voltage): I.S. Out/In 2.5 KV; I.S. Out/Supply 2.5 KV; I.S. Out/Fault-Override 2.5 KV; In/Supply 500 V; In/Fault-Override 500 V; Supply/Fault-Override 500V.

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.

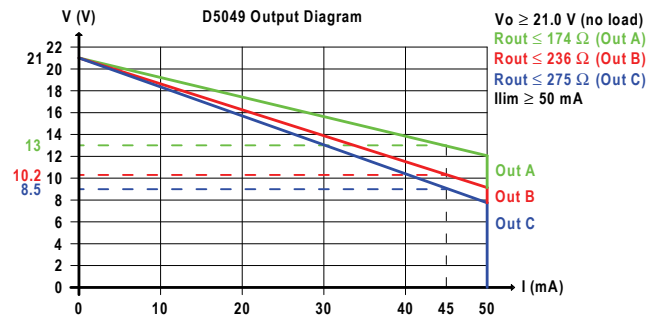
Current consumption @ 24 V: 5 mA.

Output:

45 mA at 13.0 V (21.0 V no load, 174 Ω series resistance) at terminals 7-10 Out A.

45 mA at 10.2 V (21.0 V no load, 236 Ω series resistance) at terminals 8-10 Out B.

45 mA at 8.5 V (21.0 V no load, 275 Ω series resistance) at terminals 9-10 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 K Ω .

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: $\leq 50 \mu$ A at 35 Vdc.

Response time: ≤ 5 ms.

Compatibility:

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

Environmental conditions:

Operating: temperature limits - 40 to + 70 $^{\circ}$ C, relative humidity 95 %, up to 55 $^{\circ}$ C.

Storage: temperature limits - 45 to + 80 $^{\circ}$ 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 = 24.8 V, Io/Isc = 147 mA, Po/Po = 907 mW at terminals 7-10 Out A.

Uo/Voc = 24.8 V, Io/Isc = 108 mA, Po/Po = 667 mW at terminals 8-10 Out B.

Uo/Voc = 24.8 V, Io/Isc = 93 mA, Po/Po = 571 mW at terminals 9-10 Out C.

Um = 250 Vrms, -40 $^{\circ}$ C \leq Ta \leq 70 $^{\circ}$ C.

Approvals:

BVS 10 ATEX E 113 X conforms to EN60079-0, EN60079-11, EN60079-15, EN60079-26, EN61241-11, EN50303,

IECEx BVS 10.0072 X conforms to IEC60079-0, IEC60079-11, IEC60079-15, IEC60079-26, IEC1241-11.

Russia according to GOST 12.2.007.0-75, R 51330.0-99, R 51330.10-99, R 51330.14-99 2ExnA[ia]IIC T4 X.

Ukraine according to GOST 12.2.007.0, 22782.0, 22782.3, 22782.5 2Exs[ia]IIC T4 X.

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

Mounting:

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

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 installation.

Protection class: IP 20.

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

Parameters Table:

Safety Description	Maximum External Parameters			
	Group Cenelec	Co/Ca (µF)	Lo/La (mH)	Lo/Ro (µH/Ω)
Out A	IIC	0.11	1.65	39.2
Terminals 7-10	IIB	0.86	6.63	156.8
Uo/Voc = 24.8 V	IIA	3.05	13.27	313.6
Io/Isc = 147 mA	I	4.35	21.78	514.6
Po/Po = 907 mW	iaD	0.86	6.63	156.8
Out B	IIC	0.11	3.07	53.3
Terminals 8-10	IIB	0.86	12.30	213.5
Uo/Voc = 24.8 V	IIA	3.05	24.60	427.0
Io/Isc = 108 mA	I	4.35	40.36	700.6
Po/Po = 667 mW	iaD	0.86	12.30	213.5
Out C	IIC	0.11	4.19	62.3
Terminals 9-10	IIB	0.86	16.79	249.4
Uo/Voc = 24.8 V	IIA	3.05	33.58	498.9
Io/Isc = 93 mA	I	4.35	55.09	818.5
Po/Po = 571 mW	iaD	0.86	16.79	249.4

Image:



Function Diagram:

HAZARDOUS AREA ZONE 0 (ZONE 20) GROUP IIC

SAFE AREA, ZONE 2 GROUP IIC T4

