

**Characteristics:**

**General Description:**

The single channel Loop Powered Digital Output Isolator, D5048S, 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 61508:2010 Ed. 2) in safety related systems for high risk industries. The Safety PLC or DCS driving signal powers the field device through the D5048S, which provides isolation and is capable of monitoring the conditions of the line. Short and open circuit diagnostic monitoring, dip-switch selectable and active when input power is present, provides LED indication and NC transistor output signaling. When fault is detected output is de-energized until normal condition is restored. Line short and open output circuit fault detection is also reflected on the PLC / DCS input circuit providing less than 10 mA consumption. In alternative, input impedance can be set to be always lower than 2 kΩ. 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 to provide fault signal, or on customized Termination Boards, in Safe Area / Non Hazardous Location or in Zone 2 / Class I, Division 2 or Class I, 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 3 according to IEC 61508:2010 Ed. 2 for life time = 20 years.
- PFDavg (1 year) 0.00 E+00, SFF 100 %.
- SIL 3 Systematic capability
- Output to Zone 0 (Zone 20) / Division 1, installation in Zone 2 / Division 2.
- Loop powered for NE loads.
- Short and open circuit line diagnostic monitoring with LED, transistor output and current level on input.
- Output short circuit proof and current limited.
- Three port isolation, Input/Output/Fault.
- 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, UL & C-UL, FM, FMC, INMETRO, EAC-EX, UKR TR n. 898, NEPSI, TIIS, TÜV Certifications.
- TÜV Functional Safety Certification.
- Type Approval Certificate DNV and KR for maritime applications.
- 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:**

**Loop Input:** loop powered control signal.

**Loop Supply:** 24 Vdc nom (20 to 30 Vdc) reverse polarity protected, 2 A time lag fuse internally protected. Supplies also diagnostic monitoring control circuit.

**Current consumption @ 24 V:** 65 mA with 45 mA output typical in normal operation, ≤ 10 mA when fault circuit enabled and fault condition detected.

**Power dissipation:** 1.1 W with 24 V supply, output energized at 45 mA nominal load.

**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:** 15 mA max.

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

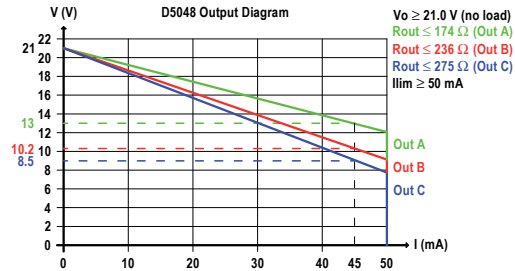
**Output:**

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:** ≤ 75 ms.

**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 ≤ 50 Ω (≈ 2 mA forcing to detect fault).

**Open output detection:** load resistance > 10 KΩ.

**Fault signalling:** voltage free NE SPST optocoupled open-collector transistor

(output de-energized in fault condition and when input power not present).

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

**Leakage current:** ≤ 50 µA at 35 Vdc.

**Input impedance:** < 10 mA when fault detected or Rin < 2 kΩ.

**Response time:** ≤ 75 ms.

**Compatibility:**

CE mark compliant, conforms to Directive:

2014/34/EU ATEX, 2014/30/EU EMC, 2014/35/EU 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] IIC, I (M1) [Ex ia Ma] I

**IECEx / INMETRO / NEPSI:** Ex nA [ia Ga] IIC T4 Gc, [Ex ia Da] IIC, [Ex ia Ma] I,

**UL:** NI / I / 2 / ABCD / T4, AIS / I, II, III / 1 / ABCDEFG, AEx nA [ia Ga] IIC T4 Gc

**C-UL:** NI / I / 2 / ABCD / T4, AIS / I, II, III / 1 / ABCDEFG, Ex nA [ia Ga] IIC T4 Gc

**FM:** NI-AIS / I / 2 / ABCD / T4, AIS / I,II,III / 1 / ABCDEFG, I / 2 / AEx nA [ia] / IIC / T4

**FMC:** NI-AIS / I / 2 / ABCD / T4, AIS / I,II,III / 1 / ABCDEFG, I / 2 / Ex nA [ia] / IIC / T4

**FMC-EX:** 2ExnA[ia]IIC T4 X

**UKR TR n. 898:** 2ExnAiaIIC T4 X, Exia X

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 °C ≤ Ta ≤ 70 °C.

**Approvals:**

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

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

INMETRO DNV 13.0109 X conforms to ABNT NBR IEC60079-0, ABNT NBR IEC60079-11,

ABNT NBR IEC60079-15, ABNT NBR IEC60079-26.

UL & C-UL E222308 conforms to UL913, UL 60079-0, UL 60079-11, UL 60079-15,

ANSI/ISA 12.12.01 for UL and CSA-C22.2 No. 157-92, CSA-E60079-0, CSA-E60079-11,

CSA-C22.2 No. 213 and CSA-E60079-15 for C-UL.

FM 3046304 and FMC 3046304C conforms to Class 3600, 3610, 3611, 3810,

ANSI/ISA-60079-0, ANSI/ISA-60079-11, ANSI/ISA-60079-15, C22.2 No. 142, C22.2 No. 157,

C22.2 No. 213, C22.2 No. 60079-0, C22.2 No. 60079-11, C22.2 No. 60079-15,

C-IT.ME92.B.00206 conforms to GOST 30852.0, 30852.10, 30852.14.

CLJ 16.0036 X conforms to DCTY 7113, GOCT 22782.5-78, DCTY IEC 60079-15.

GYJ14.1406X conforms to GB3836.1, GB3836.4, GB3836.8, GB3836.20.

TC21109 for TIIS approval.

TUV Certificate No. C-IS-236198-04, SIL 3 conforms to IEC61508:2010 Ed.2.

TUV Certificate No. C-IS-236198-09, SIL 3 Functional Safety Certificate conforms to

IEC61508:2010 Ed.2, for Management of Functional Safety.

DNV Type Approval Certificate No.A-13625 and KR No.MIL20769-EL002 Certificates for

maritime applications.

**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 mm<sup>2</sup>.

**Location:** installation in Safe Area/Non Hazardous Locations or Zone 2, Group IIC T4

or Class I, Division 2, Group A,B,C,D, T4 or Class I, Zone 2, Group IIC, T4.

**Protection class:** IP 20

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

**Ordering Information:**

Model: D5048S

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 (μH/Ω)
Out A	IIC	0.113	0.04	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	IIIC	0.86	6.63	156.8
Out B	IIC	0.113	1.42	53.3
Terminals 8-10	IIB	0.86	12.3	213.5
Uo/Voc = 24.8 V	IIA	3.05	24.6	427
Io/Isc = 108 mA	I	4.32	40.35	700.6
Po/Po = 667 mW	IIIC	0.86	12.3	213.5
Out C	IIC	0.113	2.54	62.3
Terminals 9-10	IIB	0.86	16.7	249.4
Uo/Voc = 24.8 V	IIA	3.05	33.5	498.9
Io/Isc = 93 mA	I	4.35	55.09	818.5
Po/Po = 571 mW	IIIC	0.86	16.7	249.4

### Image:



### 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

