

Characteristics:

General Description:

The single and dual channel Repeater Power Supply, D5011S and D5011D module is a high integrity analog input interface suitable for applications requiring SIL 3 level (according to IEC 61508:2010 Ed. 2) in safety related systems for high risk industries.

It provides a fully floating dc supply for energizing conventional 2 wires 4-20 mA transmitters located in Hazardous Area, and repeats the current in floating circuit to drive a Safe Area load.

The circuit allows bi-directional communication signals, for Hart transmitters.

Mounting on standard DIN-Rail, with or without Power Bus, 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 Tproof = 1 / 10 yrs ($\leq 10\%$ / $>10\%$ of total SIF).
- SIL 2 according to IEC 61508:2010 Ed. 2 for Tproof = 16 / 20 yrs ($\leq 10\%$ / $>10\%$ of total SIF).
- PFDavg (1 year) 6.03 E-05, SFF 90.71 %.
- Systematic capability SIL 3
- Input from Zone 0 (Zone 20) / Division 1, installation in Zone 2 / Division 2.
- 4-20 mA Input / Output Signal, Source mode.
- Hart compatible.
- Input and Output short circuit proof.
- High Accuracy.
- Three port isolation, Input/Output/Supply.
- EMC Compatibility to EN61000-6-2, EN61000-6-4, EN61326-1, EN61326-3-1 for safety system.
- ATEX, IECEx, UL & C-UL, FM, FMC, INMETRO, EAC-EX, UKR TR n. 898, NEPSI, TÜV Certifications.
- TÜV Functional Safety Certification.
- Type Approval Certificate DNV and KR for maritime applications.
- 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.

Ordering Information:

Model:	D5011	
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

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: 85 mA for 2 channels D5011D, 42.5 mA for 1 channel D5011S with 20 mA output typical.

Power dissipation: 1.25 W for 2 channels D5011D, 0.62 W for 1 channel D5011S with 24 V supply voltage and 20 mA output typical.

Isolation (Test Voltage):

I.S. In/Out 2.5 KV; I.S. In/Supply 2.5 KV; I.S. In/I.S. In 500 V; Out/Supply 500 V; Out/Out 500 V.

Input:

4 to 20 mA (2 wires Tx current limited at ≈ 25 mA), reading range 0 to 24 mA.

Transmitter line voltage:

15.0 V typical at 20 mA with max.

20 mVrms ripple on 0.5 to 2.5 KHz frequency band, 14.5 V minimum.

Output:

4 to 20 mA, on max. 550 Ω load in source mode (typical 12 V compliance).

Response time: 5 ms (0 to 100 % step change).

Output ripple: ≤ 20 mVrms on 250 Ω communication load on 0.5 to 2.5 KHz band.

Frequency response: 0.5 to 2.5 KHz bidirectional within 3 dB (Hart protocol).

Performance:

Ref. Conditions 24 V supply, 250 Ω load, 23 ± 1 °C ambient temperature.

Calibration accuracy: $\leq \pm 0.1$ % of full scale.

Linearity error: $\leq \pm 0.05$ % of full scale.

Supply voltage influence: $\leq \pm 0.02$ % of full scale for a min to max supply change.

Load influence: $\leq \pm 0.02$ % of full scale for a 0 to 100 % load resistance change.

Temperature influence: $\leq \pm 0.01$ % of full scale on zero and span for a 1 °C change.

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] IIIC, I (M1) [Ex ia Ma] I

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

EAC-EX: 2ExnA[ia]IIC T4 X

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

associated apparatus and non-sparking electrical equipment.

Uo/Voc = 25.9 V, Io/Isc = 92 mA, Po/Po = 594 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 10.0072 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, UL60079-11, UL60079-15.

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.

CL 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.

TÜV Certificate No. C-IS-236198-04, SIL 2 / SIL 3 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.

DNV 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 140 g D5011D, 125 g D5011S.

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

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.

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	0.10	4.2	59.9
Uo/Voc = 25.9 V	IIB	0.77	16.8	239.7
Io/Isc = 92 mA	IIA	2.63	33.7	479.4
Po/Po = 594 mW	I	4.02	55.2	786.6
	IIIC	0.77	16.8	239.7

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

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

