technology for safety

D1014

SIL 2 Repeater Power Supply Hart compatible DIN-Rail Models D1014S, D1014D

Characteristics:

General Description:
The single and dual channel DIN Rail Repeater Power Supply, D1014S and D1014D is a high integrity analog input interface suitable for applications requiring SIL 2 level (according to IEC61508:2010) in safety related system for high risk industries.
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.

Function:
1 or 2 totally independent and isolated channels I.S. analog input for 2 wires loop powered Hart transmitters, provides 3 port isolation (input/output/supply) and current (source or sink) or voltage output signal.

Signalling LED:
Power supply indication (green).

Field Configurability:
mA (source or sink) or V output signal.

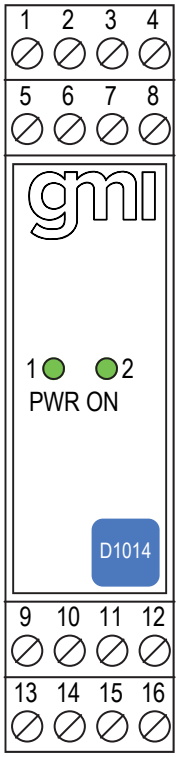
Hart Communication Frequency Band:
0.5 to 2.5 KHz within 3 dB.

EMC:
Fully compliant with CE marking applicable requirements.

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.

FSM SIL 3

Front Panel and Features:



- SIL 2 according to IEC 61508:2010 Ed. 2 for Tproof = 9 / 10 years (≤10% / >10 % of total SIF).
- PFDavg (1 year) 1.05 E-04, SFF 87.01%.
- SIL 3 Systematic capability.
- 2 fully independent channels.
- Input from Zone 0 (Zone 20), Division 1, installation in Zone 2, Division 2.
- 4-20 mA Input, Output Signal.
- 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
- In-field programmability by DIP Switch.
- ATEX, IECEx, UL & C-UL, FM & FM-C, INMETRO, EAC-EX, UKR TR n. 898, TÜV Certifications.
- TÜV Functional Safety Certification.
- Type Approval Certificate DNV and KR for maritime applications.
- High Reliability, SMD components.
- High Density, two channels per unit.
- 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:	D1014	
1 channel	S	
2 channels	D	
Power Bus enclosure		/B

Power Bus and DIN-Rail accessories:

DIN rail anchor MCHP065	DIN rail stopper MOR016
Terminal block male MOR017	Terminal block female MOR022

Technical Data:

Supply:
12-24 Vdc nom (10 to 30 Vdc) reverse polarity protected,
ripple within voltage limits ≤ 5 Vpp.
Current consumption @ 24 V: 110 mA for 2 channels D1014D,
55 mA for 1 channel D1014S with 20 mA output typical.
Current consumption @ 12 V: 220 mA for 2 channels D1014D,
110 mA for 1 channel D1014S with 20 mA output typical.
Power dissipation: 1.8 W for 2 channels D1014D, 0.9 W for 1 channel D1014S with 24 V supply voltage and 20 mA output typical.
Max. power consumption: at 30 V supply voltage and short circuit condition, 3.4 W for 2 channels D1014D, 1.7 W for 1 channel D1014S.

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:
4 to 20 mA (2 wire Tx current limited at ≈ 25 mA).

Transmitter line voltage:
≥ 15.0 V at 20 mA with max. 20 mVrms ripple on 0.5 to 2.5 KHz frequency band.

Output:
4 to 20 mA, on max. 600 Ω load in source mode;
V min. 5 V at 0 Ω load V max. 30 V in sink mode, current limited at ≈ 25 mA or 1 to 5 V on internal 250 Ω shunt (or 2 to 10 V on internal 500 Ω shunt on request).
Response time: 20 ms (10 to 90 % 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: ≤ ± 0.1 % of full scale.
Linearity error: ≤ ± 0.1 % of full scale.
Supply voltage influence: ≤ ± 0.05 % of full scale for a min to max supply change.
Load influence: ≤ ± 0.05 % of full scale for a 0 to 100 % load resistance change.
Temperature influence: ≤ ± 0.01 % 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 -20 to + 60 °C, relative humidity max 95 %.
Storage: temperature limits – 45 to + 80 °C.

Safety Description:
ATEX: II (1)G [Ex ia Ga] IIC, II (1)D [Ex ia Da] IIIC, I (M1) [Ex ia Ma] I; II 3G Ex nA IIC T4 Gc
IECEx / INMETRO: [Ex ia Ga] IIC, [Ex ia Da] IIIC, [Ex ia Ma] I; Ex nA IIC T4 Gc
UL: AIS / I, II, III / 1 / ABCDEFG, [AEx ia] IIC
C-UL: AIS / I, II, III / 1 / ABCDEFG, [Ex ia] IIC
FM: NI / I / 2 / ABCD / T4, NI / I / 2 / IIC / T4, AIS / I, II, III / 1 / ABCDEFG, AEx [ia] IIC
FM-C: NI / I / 2 / ABCD / T4, NI / I / 2 / IIC / T4, AIS / I, II, III / 1 / ABCDEFG, Ex [ia] IIC
EAC-EX: 2Ex nA [ia Ga] IIC T4 Gc X, [Ex ia Da] IIIC X, [Ex ia Ma] I X
UKR TR n. 898: 2ExnAiaIICT4 X, Exial X
associated apparatus and non-sparking electrical equipment.
Uo/Voc = 25.2 V, Io/Isc = 93 mA, Po/Po = 585 mW at terminals 14-15, 10-11.
Um = 250 Vrms, -20 °C ≤ Ta ≤ 60 °C.
Approvals:
DMT 01 ATEX E 042 X conforms to EN60079-0, EN60079-11, EN60079-26.
IECEx BVS 07.0027X conforms to IEC60079-0, IEC60079-11, IEC60079-26.
IMQ 09 ATEX 013 X conforms to EN60079-0, EN60079-15.
IECEx IMQ 13.0011X conforms to IEC60079-0, IEC60079-15.
INMETRO DNV 13.0108 X conforms to ABNT NBR IEC60079-0, ABNT NBR IEC60079-11, ABNT NBR IEC60079-15, ABNT NBR IEC60079-26, ABNT NBR IEC 61241-11.
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 & FM-C No. 3024643, 3029921C, conforms to Class 3600, 3610, 3611, 3810, ANSI/ISA 12.12.02, ANSI/ISA 60079-0, ANSI/ISA 60079-11, C22.2 No.142, C22.2 No.157, C22.2 No.213, E60079-0, E60079-11, E60079-15,
GOST R 12.2.007.0-75, R 51330.0-99, R 51330.10-99
GOST 12.2.007.0,22782.0,22782.5
TÜV Certificate No. C-IS-236198-03, 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.
DNV No.A-13625 and KR No.MIL20769-EL001 Certificates for maritime applications .

Mounting:
T35 DIN Rail according to EN50022.
Weight: about 170 g D1014D, 115 g D1014S.
Connection: by polarized plug-in disconnect screw terminal blocks to accomodate 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 14-15, 10-11				
Uo/Voc = 25.2 V	IIC	0.105	4.1	60.7
Io/Isc = 93 mA	IIB	0.819	16.4	242.9
Po/Po = 585 mW	IIA	2.899	32.8	485.8
	I	4.15	54	797.1
	IIIC	0.819	16.4	242.9

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

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