D1010 -046

SIL 2 Repeater Power Supply Smart-Hart compatible DIN-Rail Models D1010S-046, D1010D-046

Characteristics:

General Description:
The single and dual channel DIN Rail Repeater Power Supply, D1010S-046 and D1010D-046, provides a fully floating dc supply for energizing conventional 2 wires 4-20 mA transmitters, or separately powered 3, 4 wires 4-20, 0-20 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-Smart transmitters.

Function:
1 or 2 channels I.S. analog input for 2 wires loop powered or separately powered Smart 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.

Smart Communication Frequency Band:
0.5 to 40 KHz within 3 dB (Hart and higher frequency protocols).

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 = 7 / 10 years (≤10% / >10 % of total SIF) with active input.
- SIL 2 according to IEC 61508:2010 Ed. 2 for Tproof = 6 / 10 years (≤10% / >10 % of total SIF) with passive input.
- PFDavg (1 year) 1.30 E-04, SFF 80.51 % with active input.
- PFDavg (1 year) 1.47 E-04, SFF 80.81 % with passive input.
- SIL 3 Systematic capability.
- Input from Zone 0 (Zone 20), installation in Zone 2.
- 4-20 or 0-20 mA Input, Output Signal.
- Wide Band Smart Communication, 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, 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:	D1010	
1 channel	S-046	
2 channels	D-046	
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:
24 Vdc nom (20 to 30 Vdc) reverse polarity protected,
ripple within voltage limits ≤ 5 Vpp.
Current consumption @ 24 V: 115 mA for 2 channels D1010D-046,
60 mA for 1 channel D1010S-046 with 20 mA output typical.
Power dissipation: 1.9 W for 2 channels D1010D-046,
1.0 W for 1 channel D1010S-046 with 24 V supply voltage and 20 mA output typical.
Max. power consumption: at 30 V supply voltage and short circuit condition,
3.7 W for 2 channels D1010D-046, 2.0 W for 1 channel D1010S-046.

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:
0/4 to 20 mA (separately powered input, voltage drop ≤ 1.1 V) or
4 to 20 mA (2 wire Tx current limited at ≈ 25 mA).

Transmitter line voltage:
≥ 14.0 V at 20 mA with max. 20 mVrms ripple on 0.5 to 40 KHz frequency band.

Output:
0/4 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 ≈ 23 mA or
0/1 to 5 V on internal 250 Ω shunt (or 0/2 to 10 V on internal 500 Ω shunt on request).
Response time: 50 ms (10 to 90 % step change).
Output ripple: ≤ 20 mVrms on 250 Ω communication load on 0.5 to 40 KHz band.
Frequency response: 0.5 to 40 KHz bidirectional within 3 dB
(Hart and higher frequency protocols).

Performance:
Ref. Conditions 24 V supply, 250 Ω load, 23 ± 1 °C ambient temperature.
Calibration accuracy: ≤ ± 0.1 % of full scale.
Linearity error: ≤ ± 0.05 % 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
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 = 26.3 V, Io/Isc = 79 mA, Po/Po = 514 mW at terminals 14-15, 10-11.
Uo/Voc = 1.1 V, Io/Isc = 28 mA, Po/Po = 8 mW at terminals 15-16, 11-12.
Ui/Vmax = 30 V, Ii/Imax = 104 mA, Ci = 1.05 nF, Li = 0 nH at terminals 15-16, 11-12.
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.
C-IT.MH04.B.00306 conforms to GOST R IEC 60079-0,GOST R IEC 60079-11, GOST R IEC 60079-15.
СЦ 16.0034 X conforms to ДСТУ 7113, ГОСТ 22782.5-78, ДСТУ IEC 60079-15.
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-13778 and KR No.MIL20769-EL001 Certificates for maritime applications.

Mounting:
T35 DIN Rail according to EN50022.
Weight: about 175 g D1010D-046, 125 g D1010S-046.
Connection: by polarized plug-in disconnect screw terminal blocks to accomodate terminations up to 2.5 mm^2.
Location: Safe Area or Zone 2, Group IIC T4 installation.
Protection class: IP 20.
Dimensions: Width 22.5 mm, Depth 99 mm, Height 114.5 mm.

Parameters Table:

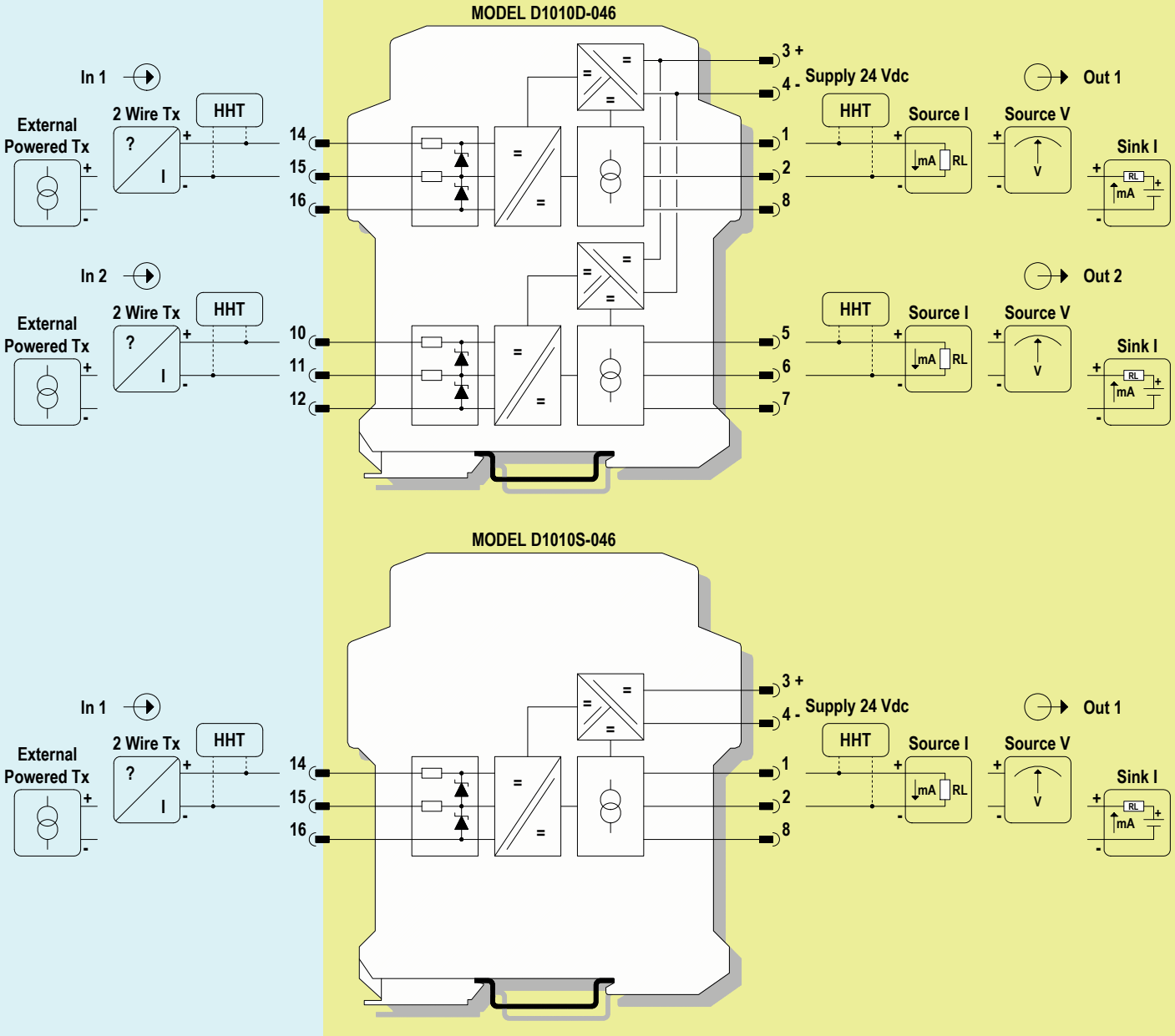
Safety Description	Maximum External Parameters			
	Group Cenelec	Co/Ca (µF)	Lo/La (mH)	Lo/Ro (µH/Ω)
Terminals 14-15, 10-11				
Uo/Voc = 26.3 V	IIC	0.095	5.8	69.2
Io/Isc = 79 mA	IIB	0.738	23.2	276.8
Po/Po = 514 mW	IIA	2.51	46.5	553.6
	I	3.95	76.3	908.3
	IIIC	0.738	23.2	276.8
Terminals 15-16, 11-12				
Uo/Voc = 1.1 V	IIC	100	45	4654
Io/Isc = 28 mA	IIB	1000	181.4	18618
Po/Po = 8 mW	IIA	1000	362.8	37236
Ui/Vmax=30 V, Ii/Imax=104 mA	I	1000	595.2	61090
Ci = 1.05 nF, Li = 0 nH	IIIC	1000	181.4	18618

Image:

Function Diagram:

HAZARDOUS AREA ZONE 0 (ZONE 20), GROUP IIC

SAFE AREA, ZONE 2, GROUP IIC T4



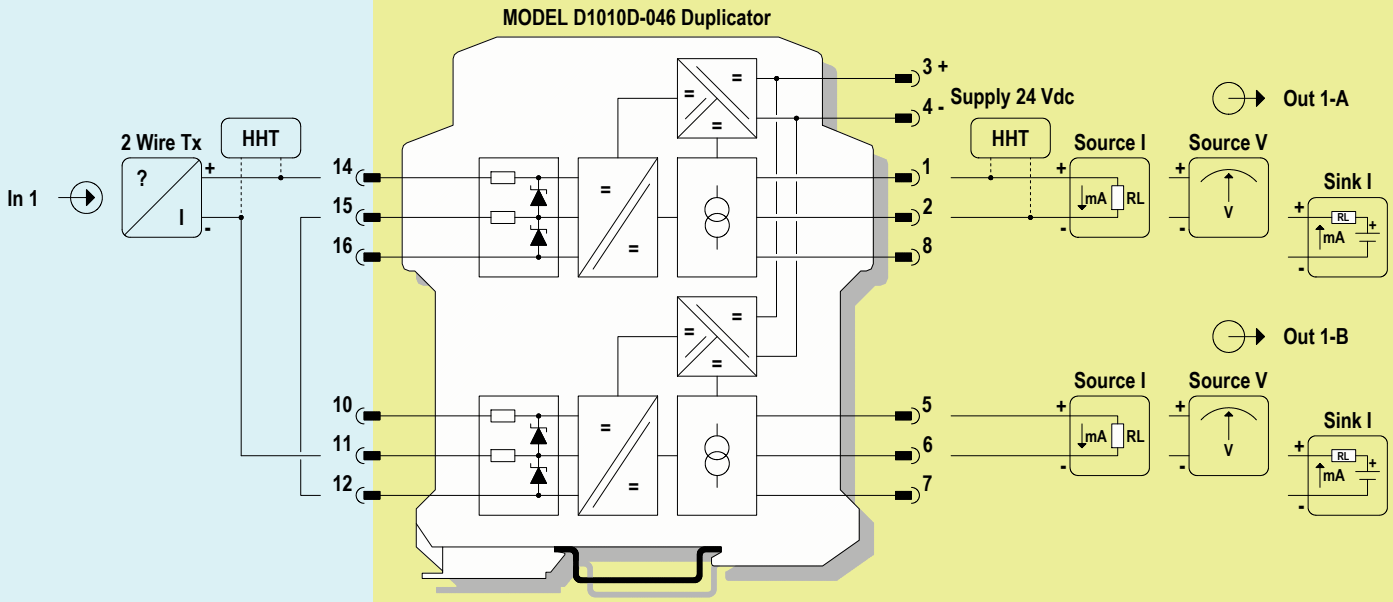
Function Diagram:

HAZARDOUS AREA ZONE 0 (ZONE 20), GROUP IIC	SAFE AREA, ZONE 2, GROUP IIC T4

Safety Description

Terminals 14-11
Uo/Voc = 27.4 V
Io/Isc = 79 mA
Po/Po = 542 mW

Group Cenelec	Co/Ca (µF)	Lo/La (mH)	Lo/Ro (µH/Ω)
IIC	0.085	5.8	63.0
IIB	0.675	23.2	252.2
IIA	2.258	46.5	504.5



Connections for Duplication of 2 wires Transmitter Input
Restriction on specifications for 2 wires Transmitter Input:
Bidirectional communication for Smart Transmitter is provided only on channel 1
The minimum supply voltage available for Transmitter (Vtx) is 12.9 V at 20 mA input
The safety parameters must be changed in: Uo/Voc = 27.4 V, Io/Isc = 79 mA, Po/Po = 542 mW

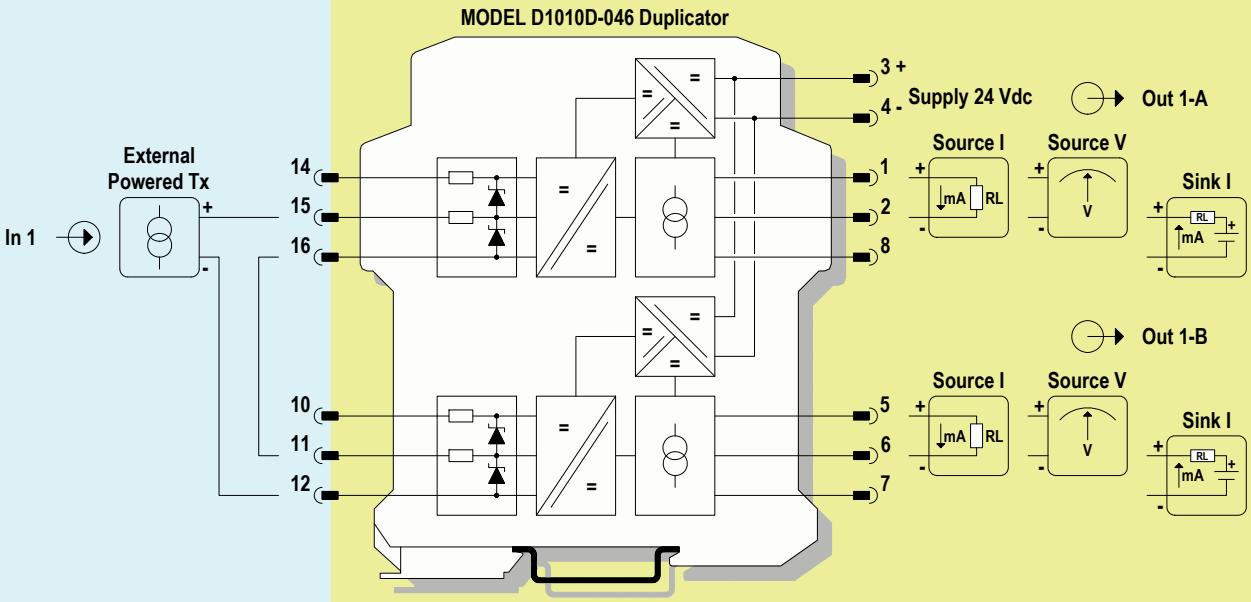
Function Diagram:

HAZARDOUS AREA ZONE 0 (ZONE 20), GROUP IIC	SAFE AREA, ZONE 2, GROUP IIC T4

Safety Description

Terminals 15-12
Uo/Voc = 2.2 V
Io/Isc = 28 mA
Po/Po = 16 mW

Group Cenelec	Co/Ca (µF)	Lo/La (mH)	Lo/Ro (µH/Ω)
IIC	100	45.3	1151
IIB	1000	181.4	4607
IIA	1000	362.8	9215



Connections for Duplication of Active Input Signals
Restriction on specifications for external powered Transmitter:
The voltage drop must be changed in 2.2 V maximum
The safety parameters must be changed in: Uo/Voc = 2.2 V, Io/Isc = 28 mA, Po/Po = 16 mW