GM INTERNATIONAL
TECHNOLOGY FOR SAFETY

D1010 -046

SIL 2 - SIL 3 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-wire 4-20 mA Transmitter, or separately powered 3, 4 wire 4-20, 0-20 mA Transmitter 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 Smart Transmitters.

Function:
1 or 2 channels I.S. analog input for 2 wire 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.

Front Panel and Features:

- SIL 2 according to IEC 61508, IEC 61511 for T_{proof} = 5 years.
- SIL 3 according to IEC 61508, IEC 61511 for T_{proof} = 1 year.
- 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.
- Field programmability by DIP Switch.
- ATEX Certification.
- High Reliability, SMD components.
- High Density, two channels per unit.
- Simplified installation using standard DIN Rail plug-in terminal blocks.
- 250 Vrms (Um) max. voltage applied to the instruments associated with barrier.

Ordering Information:

Model:	**D1010**	
1 channel	S-046	
2 channels	D-046	
Power Bus enclosure		/B

Technical Data:

Supply:
24 V nom (20 to 30 V) 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.
Max. power consumption: 3.70 W for 2 channels, 2.00 W for 1 channel with 30 V supply voltage and short circuit condition.

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/Out 500 V; Out/Supply 500 V.

Input:
0/4 to 20 mA (separately powered input, voltage drop ≤ 1.2 V) or 4 to 20 mA (2 wire Tx current limited at ≈ 23 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 temp.

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 voltage 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 94/9/EC Atex Directive and to 89/336/CEE EMC Directive.

Environmental conditions:
Operating: Temperature limits -20 to + 60 °C, relative humidity max 90 % non condensing, up to 35 °C.
Storage: Temperature limits – 40 to + 80 °C.

Safety Description:
II (1) G D [EEx ia] IIC or I M2 [EEx ia] I, II 3 G EEx nA IIC T4 associated electrical apparatus.
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 = 45 mA, Po/Po = 13 mW at terminals 15-16, 11-12 (non energy storing apparatus connection).
Um = 250 Vrms, -20 °C ≤ Ta ≤ 60°C.
Approvals: DMT 01 ATEX E 042 X conforms to EN50014, EN50020 EXIDA Report No. GM03/07-24 R001, SIL 2 according to IEC 61508, IEC 61511. Please refer to Functional Safety Manual for SIL applications.

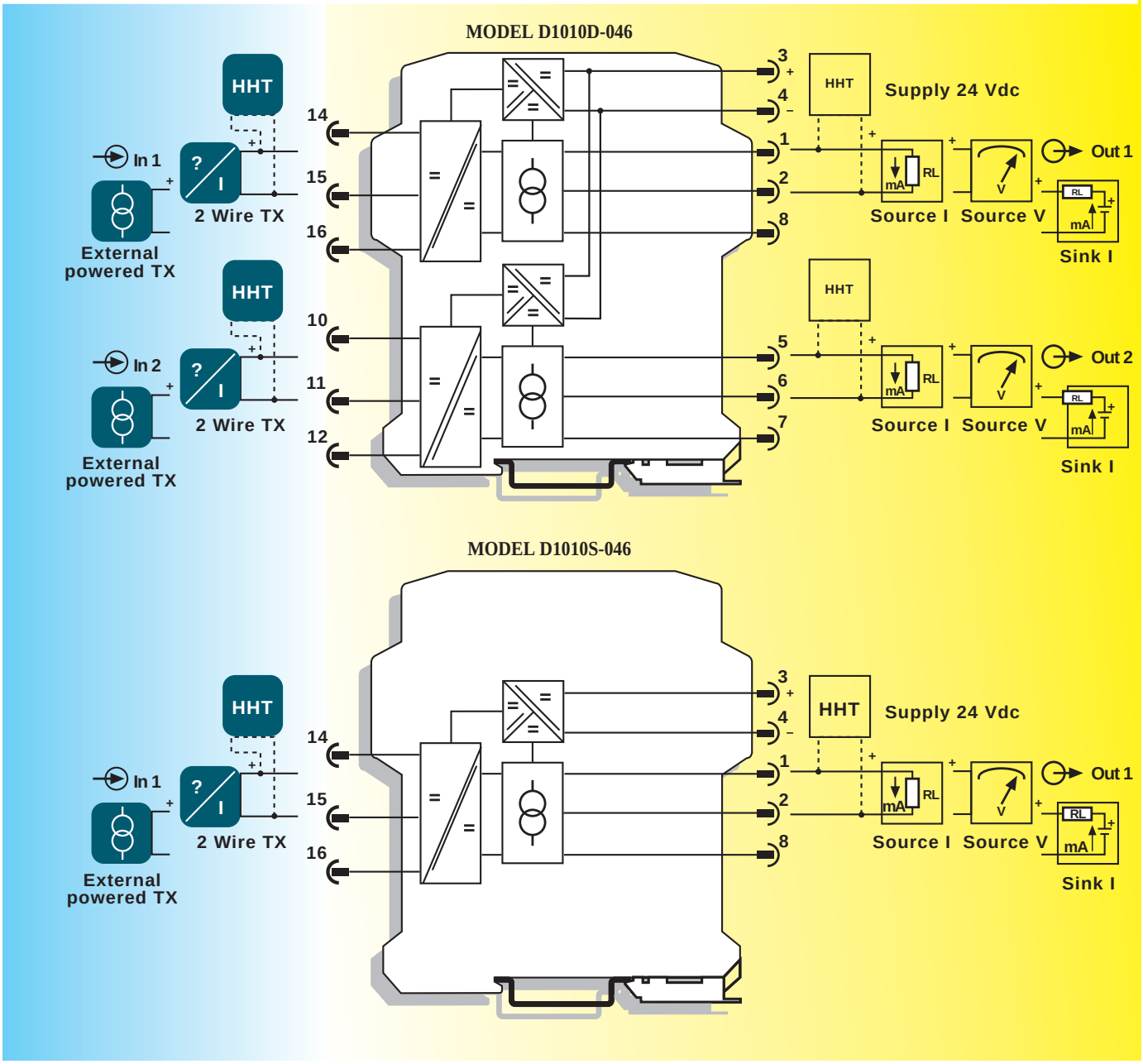
Mounting:
T35 DIN Rail according to EN50022.
Weight: about 175 g D1010D-046, 125 g D1010S-046.
Connection: By polarized plug-in disconnect screw terminal blocks to accomodate terminations up to 2.5 mm^2.
Location: Safe Area.
Protection class: IP 20.
Dimensions: Width 22.5 mm, Depth 99 mm, Height 114.5 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	II C	0.089	5.8	69.2
Io/Isc = 79 mA	II B	0.705	23.2	276.8
Po/Po = 514 mW	II A	2.320	46.5	553.6
Terminals 15-16, 11-12	**Non energy storing apparatus connection**			
Uo/Voc = 1.1 V	II C			
Io/Isc = 45 mA	II B			
Po/Po = 13 mW	II A			

Function Diagram:

HAZARDOUS AREA | SAFE AREA



Function Diagram:

HAZARDOUS AREA | SAFE AREA

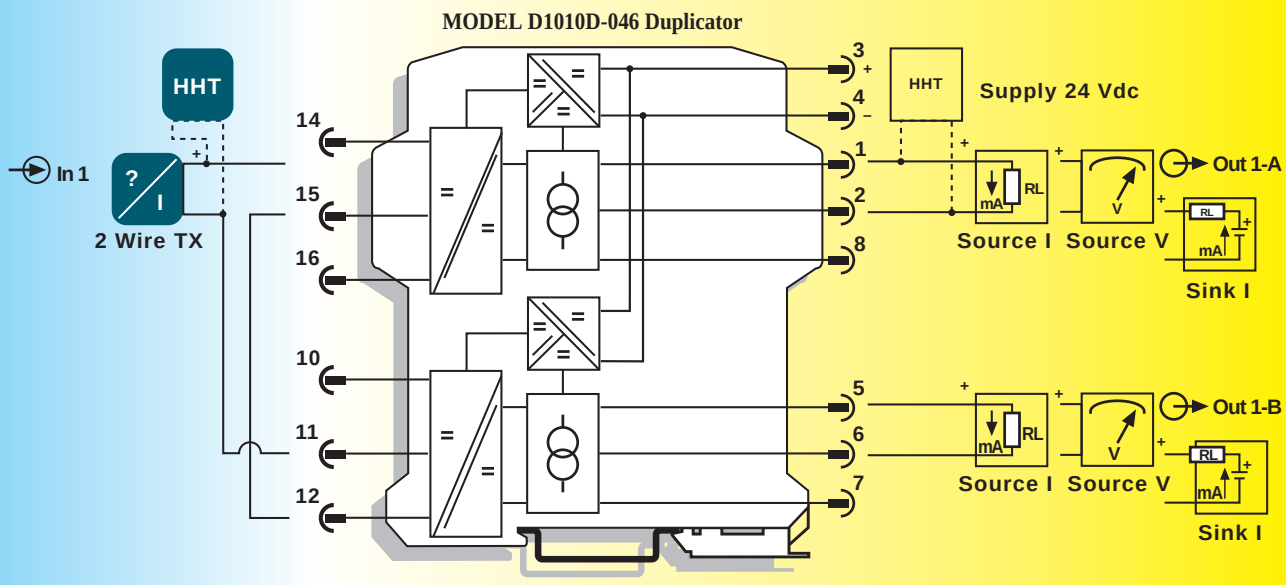
Safety Description

Terminals 14-15

Uo/Voc = 27.4 V

Io/Isc = 79 mA

Po/Po = 542 mW



Connections for Duplication of 2 wire Transmitter Input.

Restriction on Specifications for 2 wire Transmitter Input.

- Bi-directional communication for Smart Transmitter is provided only output channel 1.
- The minimum supply voltage available for transmitters (VTx) is 12.8 V at 20 mA input.
- The allowable safety parameters must be changed in: Uo/Voc = 27.4 V.
  Io/Isc = 79 mA.
  Po/Po = 542 mW.

Function Diagram:

HAZARDOUS AREA	SAFE AREA

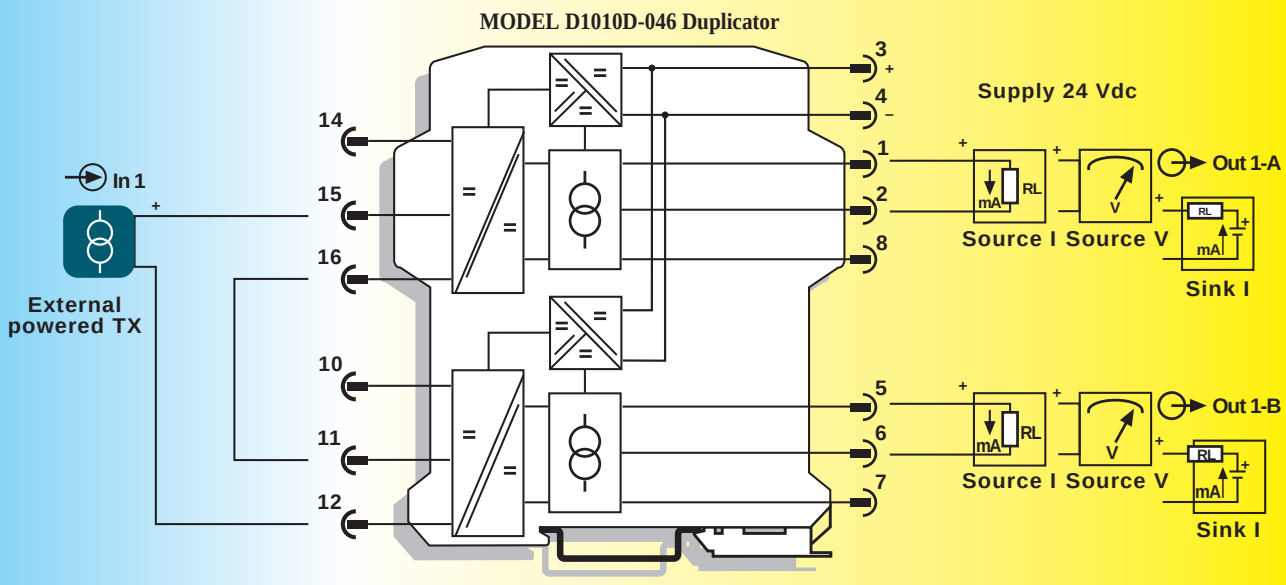
Safety Description

Terminals 15-16

Uo/Voc = 2.2 V

Io/Isc = 45 mA

Po/Po = 25 mW



Connections for Duplication of Active Input Signals.

Restriction on Specifications for external powered Transmitter.

- The voltage drop must be changed in 2.4 V max.
- The allowable safety parameters must be changed in: Uo/Voc = 2.2 V.
  Io/Isc = 45 mA.
  Po/Po = 25 mW.