

### Characteristics:

#### General Description:

The single channel DIN Rail Isolating Driver D1021S isolates and transfers a 4-20 mA signal from a controller located in Safe Area to a load of up to 750  $\Omega$  in Hazardous Area. It has a high output capacity of 15 V at 20 mA combined with a low drop across its input terminals. The circuit allows bi-directional communication signals, for Smart I/P.

In the 4-20 mA input range, a field open / short circuit (load or wire fault) reflects a high impedance to the control device output circuit and actuates (de-energizes) the fault indication relay / transistor.

An output underrange or overrange (< 1 mA or > 25 mA) also de-energizes the fault indication relay / transistor.

#### Function:

1 channel I.S. mA analog output for 2 wire I/P Smart converters or valve positioners, provides 3 port isolation (input/output/supply).

#### Signalling LEDs:

Power supply indication (green), fault condition (red).

#### 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.

### Technical Data:

#### Supply:

24 Vdc nom (20 to 30 Vdc) reverse polarity protected, ripple within voltage limits  $\leq 5$  Vpp.

**Current consumption @ 24 V:** 70 mA with 20 mA output typical.

**Power dissipation:** 1.5 W with 24 V supply voltage and 20 mA output typical.

**Max. power consumption:** at 30 V supply voltage and overload condition 2.2 W.

#### Isolation (Test Voltage):

I.S. Out/In 1.5 KV; I.S. Out/Supply 1.5 KV; I.S. Out/Fault Out 1.5 KV;

In/Supply 500 V; In/Fault Out 1.5 KV; Supply/Fault Out 1.5 KV;

Fault Out (relay)/Fault Out (transistor) 1.5 KV.

#### Input:

4 to 20 mA with  $\leq 2.0$  V voltage drop, reverse polarity protected.

#### Output:

4 to 20 mA, on max. 750  $\Omega$  load, current limited at  $\approx 24$  mA.

**Response time:** 50 ms (10 to 90 % step change).

**Output ripple:**  $\leq 20$  mVrms on 250  $\Omega$  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).

#### Fault detection:

**Input under/overrange:** input current < 1 mA or > 25 mA ( $\pm 0.5$  mA).

**Short output detection:** load resistance configurable from 0  $\Omega$  (short fault disabled) to 200  $\Omega$ , default setting 50  $\Omega$ .

**Open output detection:** load resistance > 50 K $\Omega$ .

**Fault signalling:** voltage free NE SPST optocoupled open-collector transistor and voltage free NE SPST relay contact (each output is de-energized in fault condition).

**Open-collector rating:** 100 mA at 35 V ( $\leq 1$  V voltage drop).

**Leakage current:**  $\leq 50$   $\mu$ A at 35 V.

**Relay contact rating:** 2 A 250 Vac 500 VA, 2 A 250 Vdc 80 W (resistive load).

**Response time:** from 20 to 500 ms typical.

#### Performance:

Ref. Conditions 24 V supply, 250  $\Omega$  load,  $23 \pm 1$   $^{\circ}$ C ambient temperature.

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

**Linearity error:**  $\leq \pm 0.1$  % of full scale.

**Supply voltage influence:**  $\leq \pm 0.05$  % of full scale for a min to max supply change.

**Load influence:**  $\leq \pm 0.05$  % of full scale for a 0 to 100 % load resistance change.

**Temperature influence:**  $\leq \pm 0.01$  % on zero and span for a  $1^{\circ}$ C change.

#### Compatibility:

**CE** 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  $^{\circ}$ C,

relative humidity max 90 % non condensing, up to 35  $^{\circ}$ C.

**Storage:** temperature limits -45 to +80  $^{\circ}$ C.

#### Safety Description:



II (1) G [Ex ia] IIC, II (1) D [Ex iaD], I (M2) [Ex ia] I, II 3G Ex nA IIC T4,

[Zone 0] [Ex ia] IIC, [Ex ia] I, [Ex iaD] associated electrical apparatus.

Uo/Voc = 25.2 V, Io/Isc = 87 mA, Po/Po = 548 mW at terminals 14-15.

Um = 250 Vrms, -20  $^{\circ}$ C  $\leq$  Ta  $\leq$  60  $^{\circ}$ C.

#### Approvals:

DMT 01 ATEX E 042 X conforms to EN60079-0, EN60079-11, EN60079-26, EN61241-0, EN61241-11, IECEx BVS 07.0027X conforms to IEC60079-0, IEC60079-11, IEC60079-26, IEC61241-0, IEC61241-11, GM International CRR028 conforms to EN60079-0, EN60079-15, FM & FM-C No. 3024643, 3029921C, conforms to Class 3600, 3610, 3611, 3810 and C22.2 No.142, C22.2 No.157, C22.2 No.213, E60079-0, E60079-11, E60079-15, Russia according to GOST 12.2.007.0-75, R 51330.0-99, R 51330.10-99 [Exia] IIC X, Ukraine according to GOST 12.2.007.0.22782.0, 22782.5 Exia IIC X, EXIDA Report No. GM03/07-24 R001, SIL 2 according to IEC 61508.

Please refer to Functional Safety Manual for SIL applications.

DNV A-10169, KR ITA20769-EL001 Type Approval Certificate for marine applications.

#### Mounting:

T35 DIN Rail according to EN50022.

**Weight:** about 130 g.

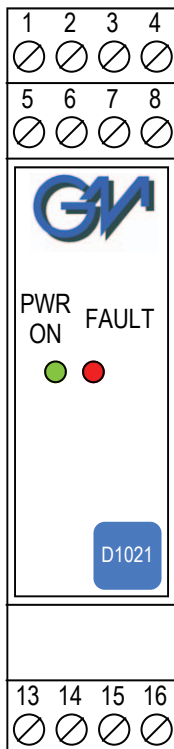
**Connection:** by polarized plug-in disconnect screw terminal blocks to accommodate terminations up to 2.5 mm<sup>2</sup>.

**Location:** 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.

### Front Panel and Features:



- SIL 2 according to IEC 61508 for Tproof = 1 / 3 years (10 / 20 % of total SIF).
- PFDavg (1 year) 5.18 E-04, SFF 70.66 %.
- Output to Zone 0 (Zone 20), Division 1, installation in Zone 2, Division 2.
- 4-20 mA Input, Output Signal.
- Wide Band Smart Communication, Hart compatible.
- Field fault circuit detection with signalling.
- Control input fault detection with signalling.
- High Accuracy.
- Three port isolation, Input/Output/Supply.
- EMC Compatibility to EN61000-6-2, EN61000-6-4.
- ATEX, IECEx, FM & FM-C, Russian and Ukrainian Certifications.
- Type Approval Certificate DNV A-10169, KR ITA20769-EL001 for marine applications.
- High Reliability, SMD components.
- 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:	D1021S	
Power Bus enclosure	/B	

Parameters Table:

Safety Description	Maximum External Parameters			
	Group Cenelec	Co/Ca (μF)	Lo/La (mH)	Lo/Ro (μH/Ω)
Terminals 14-15				
Uo/Voc = 25.2 V	IIC	0.106	4.6	64.9
Io/Isc = 87 mA	IIB	0.819	18.7	259.6
Po/Po = 548 mW	IIA	2.899	37.5	519.3

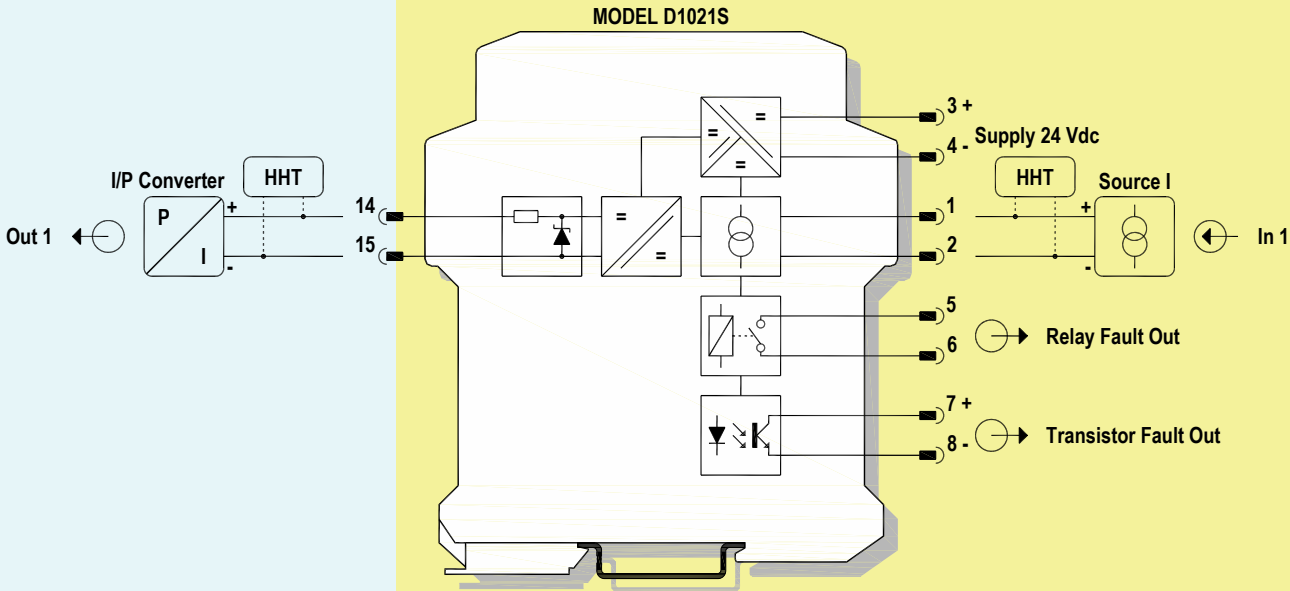
NOTE for USA and Canada:  
IIC equal to Gas Groups A, B, C, D, E, F and G  
IIB equal to Gas Groups C, D, E, F and G  
IIA equal to Gas Groups D, E, F and G

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
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Relay contact shown in de-energized position