

SIL 2 Powered Isolating Driver

Fault detection Smart-Hart Compatible

DIN-Rail Model D1021S

Characteristics:

General Description:

The single 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 Ohm in Hazardous Area.

It has a high output capacity of 15 V at 20 mA combined with a low (2.0 V) 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 (>50 KΩ) 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).

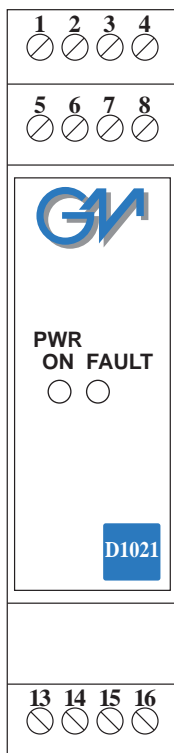
Smart Communication Frequency Band:

0.5 to 40 KHz within 3 dB (Hart and higher frequency protocols).

EMC:

Fully compliant with CE marking applicable requirements.

Front Panel and Features:



- SIL 2 according to IEC 61508, IEC 61511.
- 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, FM & FM-C, Russia and Ukraine Certifications.
- High Reliability, SMD components.
- Simplified installation using standard DIN Rail plug-in terminal blocks.
- 250 Vrms (Um) max. voltage applied to the instruments associated with barrier.

Technical Data:

Supply:

24 V nom (20 to 30 V) reverse polarity protected ripple within voltage limits ≤ 5 Vpp.

Current consumption @ 24 V: 75 mA at 20 mA output typical.

Max. power consumption: 2.30 W with 30 V supply voltage and overload condition.

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 1500 V, Supply/Fault Out 1500 V, Fault Out (relay)/Fault Out (transistor) 1500 V.

Input:

4 to 20 mA with ≤ 2.0 V voltage drop, reverse polarity protected.

Output:

4 to 20 mA, on max.750 Ω load, current limited at ≈ 24 mA .

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).

Fault detection:

Input Under/Overrange: Input current < 1 mA or > 25 mA (± 0.5 mA).

Short Output detection: load resistance configurable from 0 Ω (short fault disabled) to 200 Ω, default setting 50 Ω.

Open Output detection: load resistance > 50 KΩ.

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

Open-collector rating: 50 mA at 35 V or 100 mA at 12 V (≤ 1 V voltage drop).

Leakage current: ≤ 50 μA at 35 V.

Relay Contact rating: 2 A 250 V 100 VA or 2 A 250 V 80 W (resistive load).

Response time: from 20 to 500 ms typical.

Performance:

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

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 voltage 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 °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 °C,

relative humidity max 90 % non condensing, up to 35 °C.

Storage: Temperature limits - 40 to + 80 °C.

Safety Description:

Ex II (1) G D [EEx ia] IIC or I M2 [EEx ia] I associated electrical apparatus. $U_0/V_0c = 25.9$ V, $I_0/I_0c = 90$ mA, $P_0/P_0c = 576$ mW at terminals 14-15. $U_m = 250$ Vrms, -20 °C $\leq T_a \leq 60$ °C.

Approvals: DMT 01 ATEX E 042 X conforms to EN50014, EN50020. FM & FM-C No. 3024643, 3024643C, conforms to Class 3600, 3610, 3810 and C22.2 No.142, C22.2 No.157, E60079-0, E60079-11,

TCCEXEE (Russia) Nr.665 according to GOST R 51330.0-99, 51330.10-99 [Exia] IIC X, TCCEXEE (Ukraine) Nr.665 according to GOST 12.2.007.0, 22782.0, 22782.5 Exia IIC X, Gosgortekhnadzor of Russia Permit Nr. PPC 04-11284.

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 130 g.

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

Location: Safe Area / Non Hazardous Locations installation.

Protection class: IP 20.

Dimensions: Width 22.5 mm, Depth 99 mm, Height 114.5 mm.

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 = 25.9 V	II C	0.099	4.4	61.7
Io/Isc = 90 mA	II B	0.769	17.8	246.9
Po/Po = 576 mW	II A	2.630	35.7	493.8

NOTE for USA and Canada:

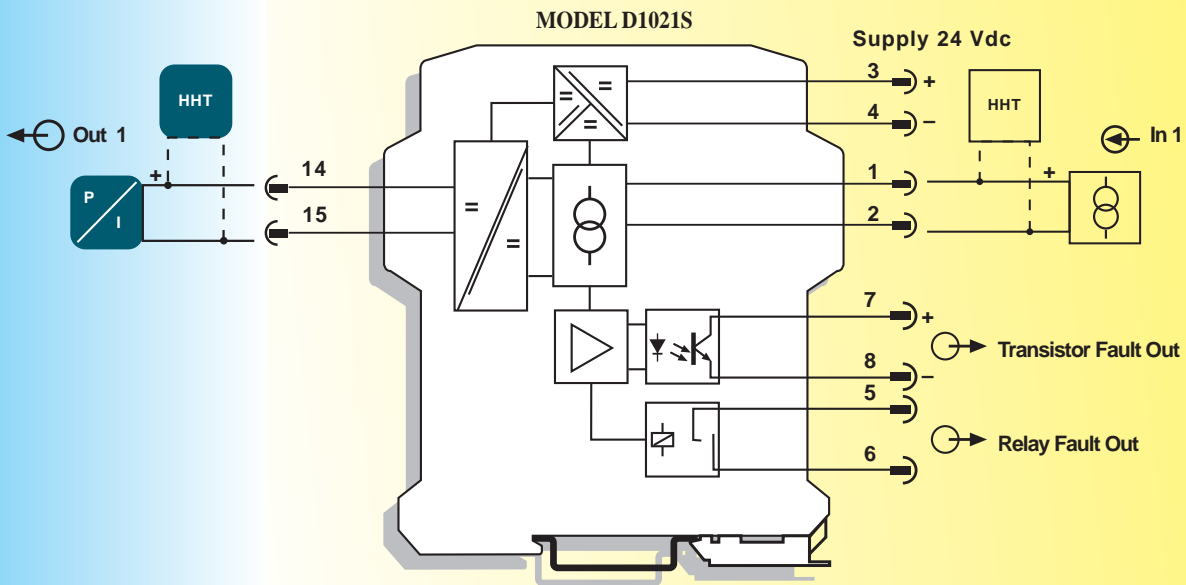
II C equal to Gas Groups A, B, C, D, E, F and G.
 II B equal to Gas Groups C, D, E, F and G.
 II A equal to Gas Groups D, E, F and G.



Function Diagram:

HAZARDOUS AREA / HAZARDOUS LOCATIONS
 CLASS I, DIVISION 1, GROUPS A, B, C, D and
 CLASS II, DIVISION 1, GROUPS E, F, G or CLASS I, Zone 0, GROUP IIC

SAFE AREA / NON HAZARDOUS LOCATIONS



Relay contact shown in de-energized position