

## Characteristics:

### General Description:

The Switch/Proximity Detector Repeater type D1031 is a DIN Rail unit with two or four independent channels. The unit can be configured for contact or proximity detector, NO or NC and for NO or NC optocoupled open collector transistor output.

Each channel enables a Safe Area load to be controlled by a switch, or a proximity detector, located in Hazardous Area.

**D1031Q quad channel** type has four independent input channels and actuates the corresponding output transistor. Two actuation modes can be independently DIP switch configured on each input channel: NO input/NC transistor or NO input/NO transistor. Contact or proximity sensor and its connection line short or open circuit fault detection is also DIP switch configurable: fault detection can be enabled (in case of fault it de-energizes the corresponding output transistor and turns the fault LED on) or disabled (in case of fault the corresponding output transistor repeats the input line open or closed status as configured).

**D1031D dual channel** type has two input channels and four output transistors; the unit has two DIP switch configurable operating modes:

Mode A) input channel actuates in parallel the two output transistors.

Transistor actuation mode can be independently configured for each output in two modes: NO input/NC transistor or NO input/NO transistor.

Mode B) input channel actuates output transistor A configurable in two modes as in mode A above. Output transistor B operates as a fault output (in case of input fault, transistor B actuates and the fault LED turns on while transistor A repeats the input line as configured). Actuation can be DIP switch configured in two modes:

No input fault/energized transistor (it de-energizes in case of fault) or No input fault/de-energized transistor (it energizes in case of fault).

### Function:

2 or 4 channels I.S. switch repeater for contact or EN60947-5-6 proximity.  
Provides 3 port isolation (input/output/supply).

### Signalling LEDs:

Power supply indication (green), output status (yellow), line fault (red).

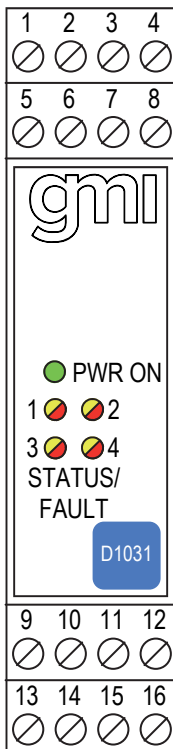
### Field Configurability:

NO/NC input for contact/proximitator, NO/NC transistor operation and fault detection enable/disable.

### EMC:

Fully compliant with CE marking applicable requirements.

## Front Panel and Features:



- SIL 2 according to IEC 61511.  
Tproof = 4 / 10 years ( $\leq 10\%$  /  $>10\%$  of total SIF)  
PFDAvg (1 year) 2.16 E-04, SFF 71.85 %;
- Input from Zone 0 (Zone 20), Division 1, installation in Zone 2, Division 2.
- NO/NC contact/proximity Detector Input.
- Four opto isolated voltage free Transistor Output Signals.
- Transistor Output for fault detection on dual channel version.
- Three port isolation, Input/Output/Supply.
- EMC Compatibility to EN61000-6-2, EN61000-6-4.
- In-field programmability by DIP Switch.
- ATEX, IECEx, UL & C-UL, FM & FM-C, INMETRO, EAC-EX, UKR TR n. 898, TÜV Certifications.
- Type Approval Certificate DNV and KR for maritime applications.
- High Reliability, SMD components.
- High Density, four 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:	D1031	
2 channels	D	
4 channels	Q	
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  $\leq 5$  Vpp.

**Current consumption @ 24 V:** 50 mA for 4 channels D1031Q, 40 mA for 2 channels D1031D with input closed and transistors energized.

**Current consumption @ 12 V:** 100 mA for 4 channels D1031Q, 80 mA for 2 channels D1031D with input closed and transistors energized.

**Power dissipation:** 1.2 W for 4 channels D1031Q, 1.0 W for 2 channels D1031D with 24 V supply voltage, input closed and transistors energized.

**Max. power consumption:** at 30 V supply voltage, short circuit input and transistors energized, 1.4 W for 4 channels D1031Q, 1.0 W for 2 channels D1031D.

### Isolation (Test Voltage):

I.S. In/Out 1.5 KV; I.S. In/Supply 1.5 KV; Out/Supply 500 V; Out 1-3/Out 2-4 500 V.

### Input switching current levels:

ON  $\geq 2.1$  mA, OFF  $\leq 1.2$  mA, switch current  $\approx 1.65$  mA  $\pm 0.2$  mA hysteresis.

**Fault current levels:** open fault  $\leq 0.2$  mA, short fault  $\geq 6.8$  mA

(when enabled both faults de-energize channel transistor with quad channel unit D1031Q or actuate fault transistor with dual channel unit D1031D).

**Input equivalent source:** 8 V 1 K $\Omega$  typical (8 V no load, 8 mA short circuit).

### Output:

voltage free SPST optocoupled open-collector transistor.

**Open-collector rating:** 100 mA at 35 V ( $\leq 2.0$  V voltage drop).

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

**Response time:** 500  $\mu$ s.

**Frequency response:** 1 KHz maximum.

### 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 90 % non condensing, up to 35 °C.

**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:** NI / I / 2 / ABCD / T4, AIS / I, II, III / 1 / ABCDEFG, AEx nC [ia] IIC

**C-UL:** NI / I / 2 / ABCD / T4, AIS / I, II, III / 1 / ABCDEFG, Ex nC [ia] IIC

**FM:** NI / I / 2 / ABCD / T4, NI / I / 2 / IIC / T4, AIS / I, II, III / 1 / ABCDEFG, AEx [ia] IIC

**FMC:** 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 X, [Ex ia Da] IIIC X, [Ex ia Ma] I X.

**UKR TR n. 898:** 2ExnAiaIIC T4 X, Exial X

associated apparatus and non-sparking electrical equipment.

Uo/Voc = 10.7 V, Io/Isc = 15 mA, Po/Po = 39 mW at terminals 13-14, 15-16.

Um = 250 Vrms, -20 °C  $\leq$  Ta  $\leq$  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.

UL & C-UL E222308 conforms to UL913, UL 60079-0, UL60079-11 for UL and

CSA-C22.2 No.157-92, CSA-E60079-0, CSA-E60079-11 for C-UL.

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.

C-IT.MH04.B.00306 conforms to GOST R IEC 60079-0, GOST R IEC 60079-11,

GOST R IEC 60079-15.

Cl $\Omega$  16.0034 X conforms to DCTY 7113, FOCT 22782.5-78, DCTY IEC 60079-15.

TUV Certificate No. C-IS-236198-02, SIL 2 according to IEC 61511.

DNV No.A-13778 and KR No.MIL20769-EL001 Certificates for maritime applications.

### Mounting:

T35 DIN Rail according to EN50022.

**Weight:** about 130 g D1031Q, 120 g D1031D.

**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.

**Parameters Table:**

Safety Description	Maximum External Parameters			
	Group Genelec	Co/Ca (μF)	Lo/La (mH)	Lo/Ro (μH/Ω)
Terminals 13-14, 15-16 9-10, 11-12 Uo/Voc = 10.7 V Io/Isc = 15 mA Po/Po = 39 mW				
	IIC	2.23	172	930
	IIB	15.60	689	3720
	IIA	69.00	1300	7440
	I	60	2263	12200
	IIIC	15.60	689	3720

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

