

## Characteristics:

### General Description:

The Switch/Proximity Detector Repeater type D1033 is a DIN Rail unit with two or four independent and isolated channels. The unit can be configured for contact or proximity detector, NO or NC and for NC or NO 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.

**D1033Q 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).

**D1033D 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). Line-fault detection, common to all input signals, available when using Power Bus enclosure.

### Signalling LEDs:

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

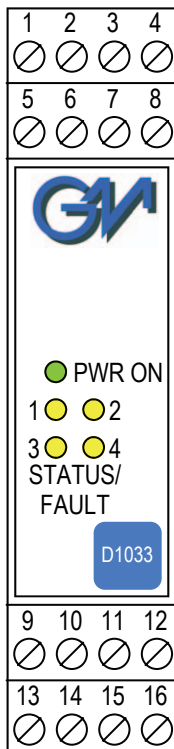
### Field Configurability:

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

### EMC:

Fully compliant with CE marking applicable requirements.

## Front Panel and Features:



- SIL 2 according to IEC 61508 for Tproof = 5 / 10 years (10 / 20 % of total SIF).
- PFDavg (1 year) 1.63 E-04, SFF 85.76 %.
- 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.
- Common negative or positive output both accepted in standard version D1033.
- Transistor Output for fault detection on dual channel version.
- Line fault detection with common signalling available when using Power Bus enclosure.
- 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, Russian and Ukrainian Certifications.
- Type Approval Certificate DNV and KR for marine 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:	D1033		
2 channels	D		
4 channels	Q		
Common negative and positive		blank	
Common negative only		-052	
Common positive only		-058	
Power Bus enclosure			/B

## Technical Data:

### Supply:

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

**Current consumption @ 24 V:** 55 mA for 4 channels D1033Q, 35 mA for 2 channels D1033D with input closed and transistors energized.

**Power dissipation:** 1.3 W for 4 channels D1033Q, 0.9 W for 2 channels D1033Q with 24 V supply voltage, input closed and transistors energized.

**Max. power consumption:** at 30 V supply voltage, short circuit input and transistors energized, 1.5 W for 4 channels D1033Q, 1.1 W for 2 channels D1033D.

### 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 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 D1033Q or actuate fault transistor with dual channel unit D1033D).

**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

( $\leq 2.5$  V voltage drop or  $\leq 1.0$  V voltage drop for versions -052 and -058).

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

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

**Frequency response:** 2 KHz maximum.

### Compatibility:

CE mark compliant, conforms to 94/9/EC Atex Directive and to 2004/108/CE 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 Ga] IIC, II (1) D [Ex ia Da] IIIC, I (M1) [Ex ia Ma] I, II 3G Ex nA II T4, [Ex ia Ga] IIC, [Ex ia Da] IIIC, [Ex ia Ma] I associated electrical apparatus. Uo/Voc = 9.6 V, Io/Isc = 10 mA, Po/Po = 24 mW at terminals 13-14, 15-16, 9-10, 11-12. 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, IMQ 09 ATEX 013 X conforms to EN60079-0, EN60079-15, UL & C-UL E222308 conforms to UL913 (Div.1), UL 60079-0 (General, All Zones), UL60079-11 (Intrinsic Safety "i" Zones 0 & 1), UL60079-15 ("n" Zone 2), UL 1604 (Div.2) for UL and CSA-C22.2 No.157-92 (Div.1), CSA-E60079-0 (General, All Zones), CSA-E60079-11 (Intrinsic Safety "i" Zones 0 & 1), CSA-C22.2 No. 213-M1987 (Div. 2) and CSA-E60079-15 ("n" Zone 2) for C-UL, refer to control drawing ISM0131 for complete UL and C-UL safety and installation instructions, 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, TUV Certificate No. C-IS-183645-01, SIL 2 according to IEC 61508. Please refer to Functional Safety Manual for SIL applications. DNV and KR Type Approval Certificate for marine applications.

### Mounting:

T35 DIN Rail according to EN50022.

**Weight:** about 165 g D1033Q, 140 g D1033D.

**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 Cenelec	Co/Ca (μF)	Lo/La (mH)	Lo/Ro (μH/Ω)
Terminals 13-14, 15-16				
9-10, 11-12				
Uo/Voc = 9.6 V	IIC	3.599	379	1530
Io/Isc = 10 mA	IIB	25.999	1517	6150
Po/Po = 24 mW	IIA	209.999	3035	12310

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

