

## 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/proximator, NC/NO transistor operation and fault detection enable/disable.

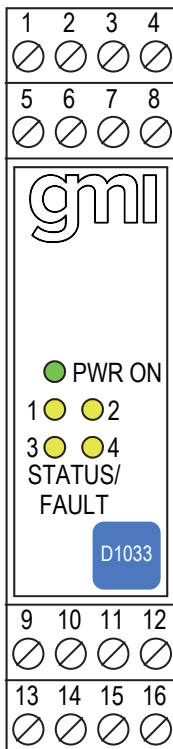
**EMC:** Fully compliant with CE marking applicable requirements.

### Functional Safety Management Certification:

G.M. International is certified by TUV to conform to IEC61508:2010 part 1 clauses 5-6 for safety related systems up to and included SIL3.



## Front Panel and Features:



- SIL 2 according to IEC 61508:2010 Ed.2 for Tproof = 6 / 10 years (≤10% / >10 % of total SIF).
- PFDavg (1 year) 1.54 E-04, SFF 75.41 %.
- SIL 3 Systematic capability
- 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, EN61326-1.
- In-field programmability by DIP Switch.
- ATEX, IECEx, UL & C-UL, FM & FM-C, INMETRO, EAC-EX, UKR TR n. 898, TÜV Certifications.
- TÜV Functional Safety Certification.
- 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:                       | 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 ≤ 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 ≥ 2.1 mA, OFF ≤ 1.2 mA, switch current ≈ 1.65 mA ± 0.2 mA hysteresis.

**Fault current levels:** open fault ≤ 0.2 mA, short fault ≥ 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 KΩ 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

(≤ 2.5 V voltage drop or ≤ 1.0 V voltage drop for versions -052 and -058).

**Leakage current:** ≤ 50 µA at 35 V.

**Response time:** 500 µs.

**Frequency response:** 2 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 95%.

**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 [Ma] I, [Ex ia Da] IIIC, 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

**FM-C:** 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 Gc X, [Ex ia Da] IIIC X, [Ex ia Ma] I X

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

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 °C ≤ Ta ≤ 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, UL60079-15

ANSI/ISA 12.12.01 for UL and CSA-C22.2 No. 157-92, CSA-E60079-0, CSA-E60079-11,

CSA-C22.2 No. 213 and CSA-E60079-15 for C-UL.

FM & FM-C No. 3024643, 3029921C, conforms to Class 3600, 3610, 3611, 3810,

ANSI/ISA 12.12.02, ANSI/ISA 60079-0, ANSI/ISA 60079-11, 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 16.0034 X conforms to DCTU 7113, GOCT 22782.5-78, DCTU IEC 60079-15.

TÜV Certificate No. C-IS-236198-03, SIL 2 conforms to IEC61508:2010 Ed.2.

TÜV Certificate No. C-IS-236198-09, SIL 3 Functional Safety Certificate conforms to

IEC61508:2010 Ed.2, for Management of Functional Safety.

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

Power Bus and DIN-Rail accessories:

DIN rail anchor MCHP065

Terminal block male MOR017

DIN rail stopper MOR016

Terminal block female MOR022

**Parameters Table:**

| Safety Description   | Maximum External Parameters |            |            |              |
|--|-----------------------------|------------|------------|--------------|
|  | Group Genelec               | Co/Ca (μF) | Lo/La (mH) | Lo/Ro (μH/Ω) |
| Terminals 13-14, 15-16<br>9-10, 11-12<br>Uo/Voc = 9.6 V<br>Io/Isc = 10 mA<br>Po/Po = 24 mW | IIC                         | 3.5        | 379        | 1530         |
|  | IIB                         | 25         | 1500       | 6150         |
|  | IIA                         | 209        | 3000       | 12310        |
|  | I                           | 99         | 4900       | 20200        |
|  | IIIC                        | 25         | 1500       | 6150         |

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

