

# AECO®

MORE THAN SENSORS



## INTRINSIC SAFETY BARRIERS - ATEX



**Characteristics:**

**General Description:**

The single and dual channel DIN Rail Repeater Power Supply, D1010S and D1010D, provides a fully floating dc supply for energizing conventional 2 wires 4-20 mA transmitters, or separately powered 3, 4 wires 4-20, 0-20 mA transmitters located in Hazardous Area, and repeats the current in floating circuit to drive a Safe Area load. The circuit allows bi-directional communication signals, for Hart-Smart transmitters.

**Function:**

1 or 2 channels I.S. analog input for 2 wires loop powered or separately powered Smart transmitters, provides 3 port isolation (input/output/supply) and current (source or sink) or voltage output signal.

**Signalling LED:**

Power supply indication (green).

**Field Configurability:**

mA (source or sink) or V output signal.

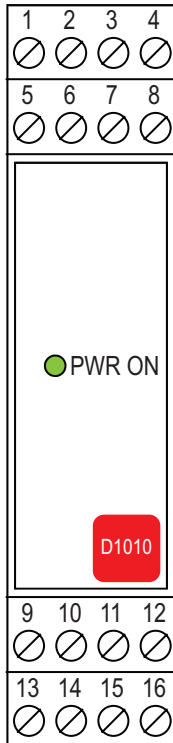
**Smart Communication Frequency Band:**

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 3 according to IEC 61508 for Tproof = 1 year (20 % of total SIF).
- SIL 2 according to IEC 61508 for Tproof = 5 / 10 years (10 / 20 % of total SIF).
- PFDavg (1 year) 1.50 E-04, SFF 91.85 %.
- Input from Zone 0 (Zone 20), Division 1, installation in Zone 2, Division 2.
- 4-20 or 0-20 mA Input, Output Signal.
- Wide Band Smart Communication, Hart compatible.
- Input and Output short circuit proof.
- High Accuracy.
- 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, two 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:	D1010	
1 channel		S
2 channels		D
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:** 115 mA for 2 channels D1010D, 60 mA for 1 channel D1010S with 20 mA output typical.

**Power dissipation:** 1.9 W for 2 channels D1010D, 1.0 W for 1 channel D1010S with 24 V supply voltage and 20 mA output typical.

**Max. power consumption:** at 30 V supply voltage and short circuit condition, 3.7 W for 2 channels D1010D, 2.0 W for 1 channel D1010S.

**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/Out 500 V.

**Input:**

0/4 to 20 mA (separately powered input, voltage drop  $\leq 0.9$  V) or 4 to 20 mA (2 wire Tx current limited at  $\approx 25$  mA).

**Transmitter line voltage:**

$\geq 15.0$  V at 20 mA with max. 20 mVrms ripple on 0.5 to 40 KHz frequency band.

**Output:**

0/4 to 20 mA, on max. 600  $\Omega$  load in source mode;

V min. 5 V at 0  $\Omega$  load V max. 30 V in sink mode, current limited at  $\approx 23$  mA or

0/1 to 5 V on internal 250  $\Omega$  shunt (or 0/2 to 10 V on internal 500  $\Omega$  shunt on request).

**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).

**Performance:**

Ref. Conditions 24 V supply, 250  $\Omega$  load,  $23 \pm 1$  °C ambient temperature.

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


**Linearity error:**  $\leq \pm 0.05$  % 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 °C change.

**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 °C,

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

**Storage:** temperature limits -45 to +80 °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 = 26.3 V, Io/Isc = 91 mA, Po/Po = 597 mW at terminals 14-15, 10-11.

Uo/Voc = 1.1 V, Io/Isc = 38 mA, Po/Po = 11 mW at terminals 15-16, 11-12.

Ui/Vmax = 30 V, Ii/Imax = 104 mA, Ci = 1.05 nF, Li = 0 nH at terminals 15-16, 11-12.

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,

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 ISM0125 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 / SIL 3 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 175 g D1010D, 125 g D1010S.

**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:**

**Image:**

Safety Description	Maximum External Parameters			
	Group Cenelec	Co/Ca (μF)	Lo/La (mH)	Lo/Ro (μH/Ω)
Terminals 14-15, 10-11				
Uo/Voc = 26.3 V	IIC	0.095	4.3	59.6
Io/Isc = 91 mA	IIB	0.738	17.2	238.4
Po/Po = 597 mW	IIA	2.508	34.5	476.8
Terminals 15-16, 11-12				
Uo/Voc = 1.1 V	IIC	100	11.3	3490
Io/Isc = 38 mA	IIB	1000	45.3	13963
Po/Po = 11 mW	IIA	1000	90.7	27927



NOTE for USA and Canada:

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

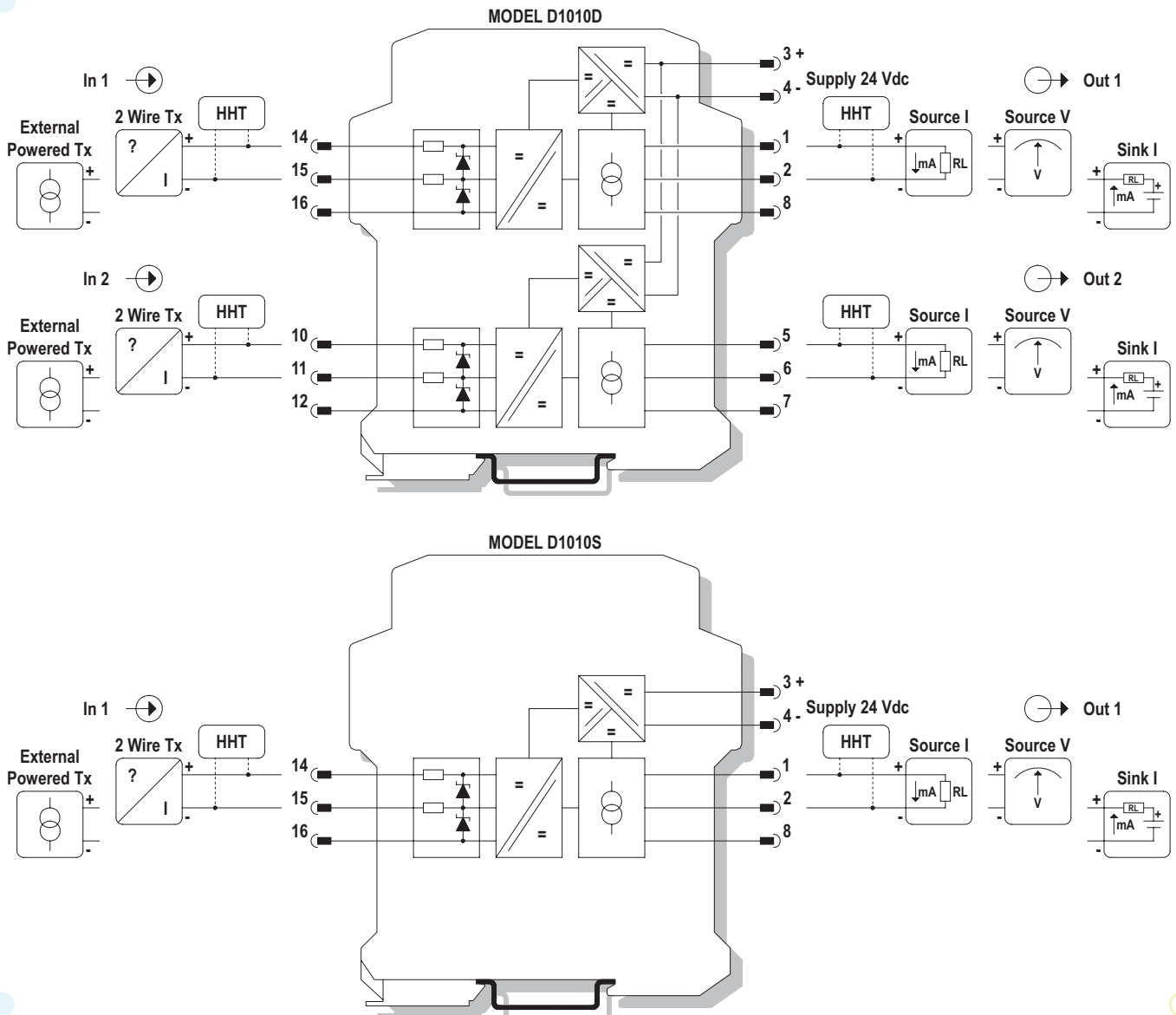
IIB equal to Gas Groups C, D, E, F and G

IIA equal to Gas Groups D, E, F and G

**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



## Function Diagram:

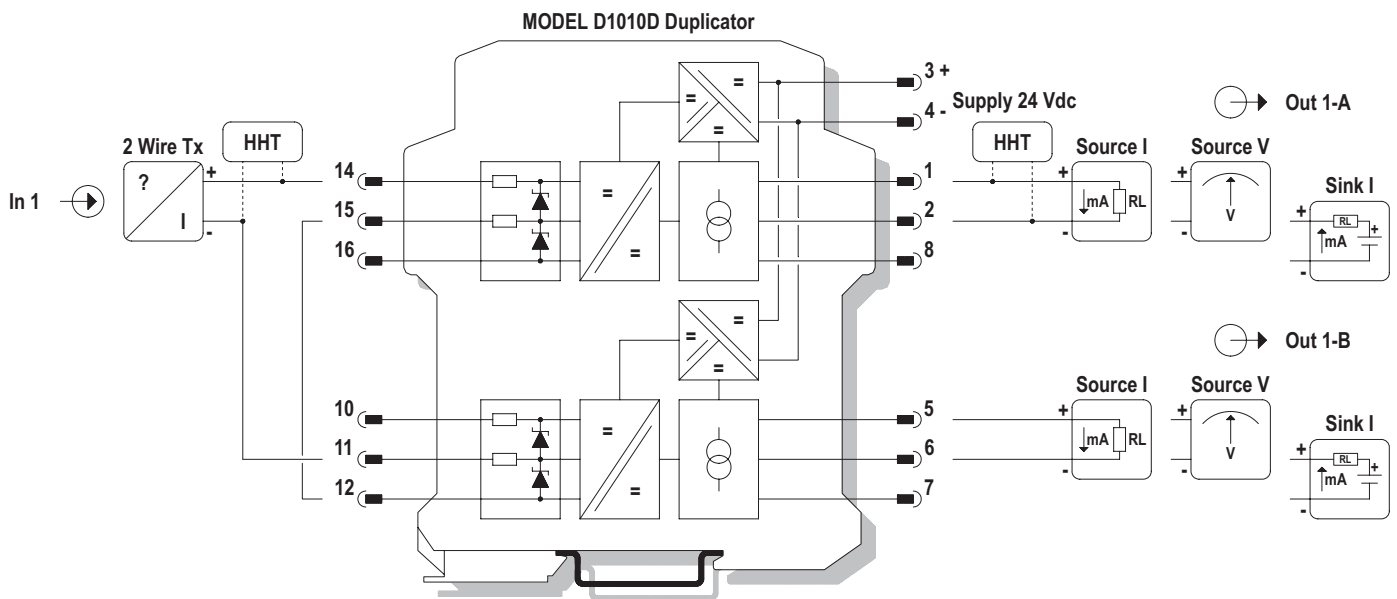
HAZARDOUS AREA ZONE 0 (ZONE 20) GROUP IIC,  
HAZARDOUS LOCATIONS CLASS I, DIVISION 1, GROUPS A, B, C, D,  
CLASS II, DIVISION 1, GROUPS E, F, G, CLASS III, DIVISION 1,  
CLASS I, ZONE 0, GROUP IIC

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

## Safety Description

Terminals 14-11  
(with 15-12 shorted)  
 $U_o/V_{oc} = 27.4 \text{ V}$   
 $I_o/I_{sc} = 91 \text{ mA}$   
 $P_o/P_o = 624 \text{ mW}$

Group	Co/Ca ( $\mu\text{F}$ )	Lo/La (mH)	Lo/Ro ( $\mu\text{H}/\Omega$ )
Cenelec			
IIC	0.085	4.3	54.7
IIB	0.675	17.2	218.9
IIA	2.258	34.5	437.9



### Connections for Duplication of 2 wires Transmitter Input

Restriction on specifications for 2 wires Transmitter Input:

Bidirectional communication for Smart Transmitter is provided only on channel 1

The minimum supply voltage available for Transmitter ( $V_{tx}$ ) is 14.1 V at 20 mA input

The safety parameters must be changed in:  $U_o/V_{oc} = 27.4 \text{ V}$ ,  $I_o/I_{sc} = 91 \text{ mA}$ ,  $P_o/P_o = 624 \text{ mW}$

## Function Diagram:

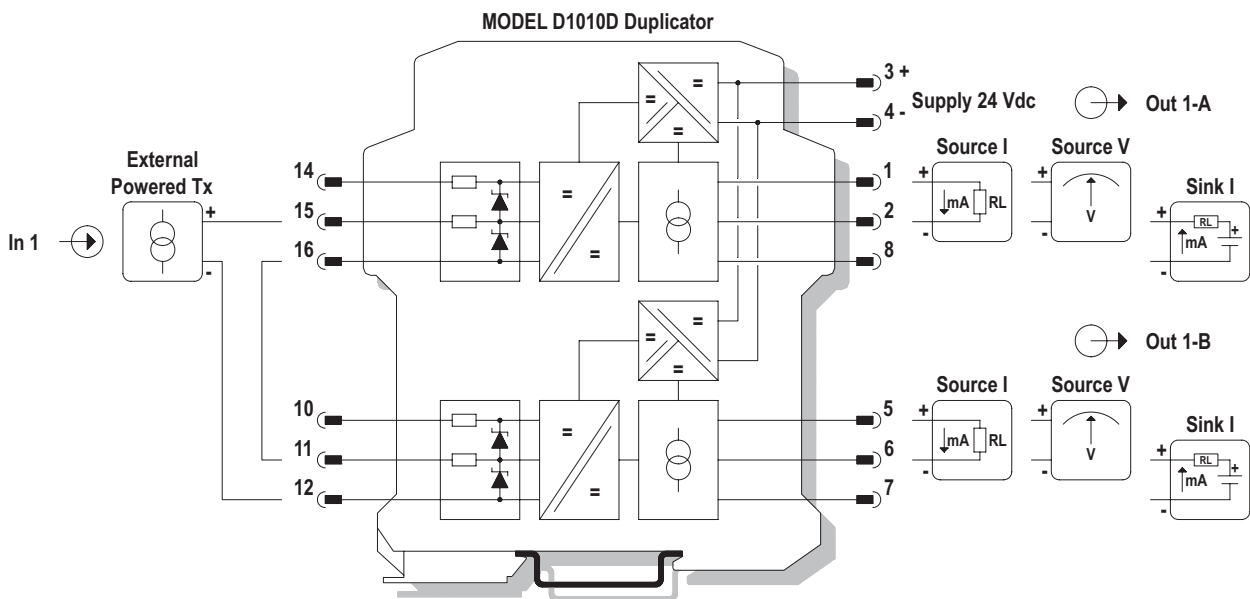
HAZARDOUS AREA ZONE 0 (ZONE 20) GROUP IIC,  
HAZARDOUS LOCATIONS CLASS I, DIVISION 1, GROUPS A, B, C, D,  
CLASS II, DIVISION 1, GROUPS E, F, G, CLASS III, DIVISION 1,  
CLASS I, ZONE 0, GROUP IIC

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

## Safety Description

Terminals 15-12  
(with 16-11 shorted)  
 $U_o/V_{oc} = 2.2\text{ V}$   
 $I_o/I_{sc} = 38\text{ mA}$   
 $P_o/P_o = 21\text{ mW}$

Group	Co/Ca ( $\mu\text{F}$ )	Lo/La (mH)	Lo/Ro ( $\mu\text{H}/\Omega$ )
Cenelec			
IIC	100	11.3	849
IIB	1000	45.3	3396
IIA	1000	90.7	6793



### Connections for Duplication of Active Input Signals

Restriction on specifications for external powered Transmitter:

The voltage drop must be changed in 1.8 V maximum

The safety parameters must be changed in:  $U_o/V_{oc} = 2.2\text{ V}$ ,  $I_o/I_{sc} = 38\text{ mA}$ ,  $P_o/P_o = 21\text{ mW}$

**Characteristics:**

**General Description:**

The quadruple channel DIN Rail Repeater Power Supply D1012Q provides a fully floating dc supply for energizing conventional 2 wires 4-20 mA transmitters located in Hazardous Area, and repeats the current in Safe Area to drive a load.

**Function:**

4 channels I.S. analog input for 2 wires loop powered transmitters, provides isolation between input versus output and supply, and current (source mode) output signal. On demand it is possible to supply the following combination of input/output: 2 independent input // 2+2 independent groups of output or 1 input // 4 outputs.

**Signalling LED:**

Power supply indication (green).

**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:** 160 mA with 20 mA output typical.

**Power dissipation:** 2.3 W for 4 channels with 24 V supply voltage and 20 mA output typical.

**Max. power consumption:** at 30 V supply voltage, 4.0 W for 4 channels.

**Isolation (Test Voltage):**

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

**Input:**

4 to 20 mA (2 wire Tx current limited at  $\approx 22$  mA).

**Transmitter line voltage:**

14.0 V typical at 20 mA with max. 30 mVrms ripple.

**Output:**

4 to 20 mA, on max. 300  $\Omega$  load source mode, current limited at 20.6 mA.

**Response time:** 500 ms (10 to 90 % step change).

**Output ripple:**  $\leq 30$  mVrms.

**Performance:**

Ref. Conditions 24 V supply, 250  $\Omega$  load,  $23 \pm 1$  °C ambient temperature.

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


**Linearity error:**  $\leq \pm 0.05$  % 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 °C change.

**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 °C,

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

**Storage:** temperature limits -45 to +80 °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 = 21.5 V, Io/Isc = 93 mA, Po/Po = 496 mW

at terminals 13-14, 15-16, 9-10, 11-12.

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,

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,

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,

DNV and KR Type Approval Certificate for marine applications.

**Mounting:**

T35 DIN Rail according to EN50022.

**Weight:** about 140 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,

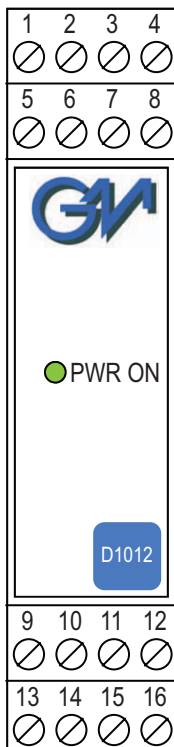
Class I, Division 2, Groups A, B, C, D Temperature Code T4 and

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:**



- Input from Zone 0 (Zone 20), Division 1, installation in Zone 2, Division 2.
- Quadruple channels for 2 wires Transmitters.
- 4-20 mA Input, Output Signal.
- Input and Output short circuit proof.
- High Accuracy.
- EMC Compatibility to EN61000-6-2, EN61000-6-4.
- ATEX, IECEx, FM & FM-C, Russian 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: D1012Q

**Parameters Table:**

**Image:**

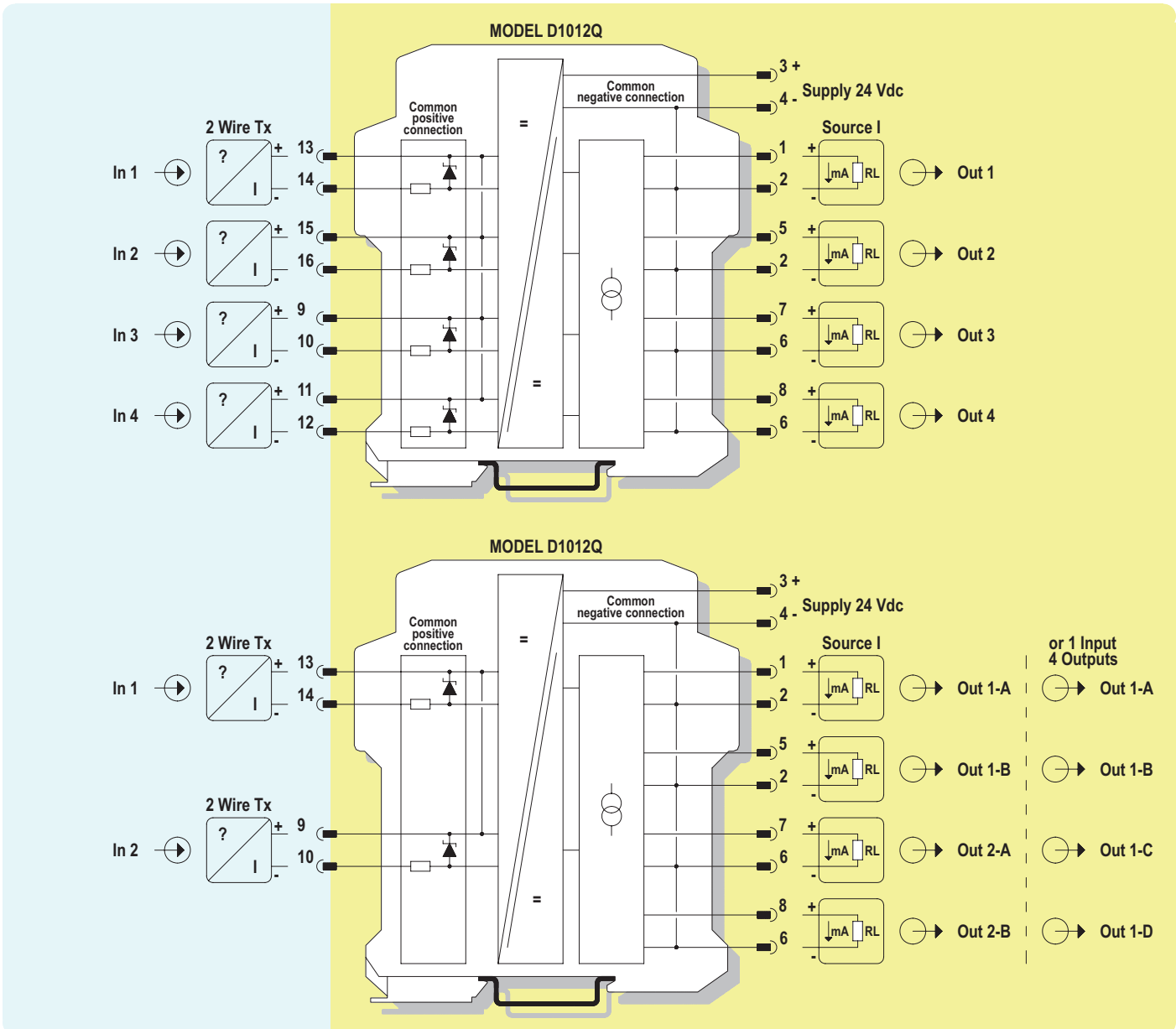
Safety Description	Maximum External Parameters			
	Group Cenelec	Co/Ca (μF)	Lo/La (mH)	Lo/Ro (μH/Ω)
Terminals 13-14, 15-16 9-10, 11-12				
Uo/Voc = 21.5 V	IIC	0.176	4.1	71.7
Io/Isc = 93 mA	IIB	1.200	16.4	287.0
Po/Po = 496 mW	IIA	4.500	32.8	574.0



**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



**Characteristics:**

**General Description:**

The single and dual channel DIN Rail Isolating Driver, D1020S and D1020D, isolates and transfers a 4-20, 0-20 mA signal from a controller located in Safe Area to a load of up to 750 Ω 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 circuit reflects a high impedance to the control device output circuit.

**Function:**

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

**Signalling LED:**

Power supply indication (green).

**Smart Communication Frequency Band:**

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

**EMC:**

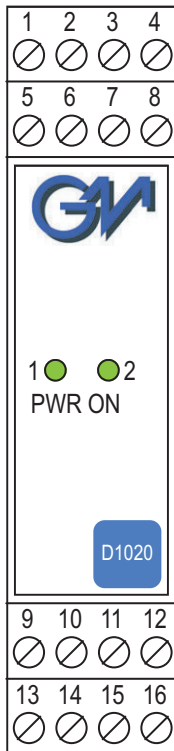
Fully compliant with CE marking applicable requirements.

**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 = 3 / 7 years (10 / 20 % of total SIF).  
PF Davg (1 year) 2.60 E-04, SFF 62.04 %.  
2 fully independent channels.  
Output to Zone 0 (Zone 20), Division 1, installation in Zone 2, Division 2.  
4-20 or 0-20 mA Input, Output Signal.  
Wide Band Smart Communication, Hart compatible.  
Field open circuit detection.  
High Accuracy.  
Three port isolation, Input/Output/Supply.  
EMC Compatibility to EN61000-6-2, EN61000-6-4, EN61326-1.  
ATEX, IECEx, UL & C-UL, FM & FM-C, GOST, TÜV Certifications.  
TÜV Functional Safety Certification.  
Type Approval Certificate DNV and KR for marine applications.  
High Reliability, SMD components.  
High Density, two 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:	D1020		
1 channel		S	
2 channels		D	
Power Bus enclosure			/B

Power Bus accessories: Cover and fix MCHP196  
Terminal block male MOR017 Terminal block female MOR022

**Technical Data:**

**Supply:**

24 Vdc nom (20 to 30 Vdc) reverse polarity protected, ripple within voltage limits ≤ 5 Vpp.  
**Current consumption @ 24 V:** 95 mA for 2 channels D1020D, 50 mA for 1 channel D1020S with 20 mA output typical.  
**Power dissipation:** 1.9 W for 2 channels D1020D, 1.0 W for 1 channel D1020S with 24 V supply voltage and 20 mA output typical.  
**Max. power consumption:** at 30 V supply voltage and overload condition, 2.7 W for 2 channels D1020D, 1.4 W for 1 channel D1020S.

**Isolation (Test Voltage):**

I.S. Out/In 1.5 KV; I.S. Out/Supply 1.5 KV; I.S. Out/I.S. Out 500 V; In/Supply 500 V; In/In 500 V.

**Input:**

0/4 to 20 mA with ≤ 2.0 V voltage drop, reverse polarity protected.

**Output:**

0/4 to 20 mA, on max. 750 Ω load, current limited at ≈ 23 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).

**Performance:**

Ref. Conditions 24 V supply, 250 Ω load, 23 ± 1 °C ambient temperature.  
**Calibration accuracy:** ≤ ± 0.1 % of full scale.  
**Linearity error:** ≤ ± 0.05 % of full scale.  
**Supply voltage influence:** ≤ ± 0.05 % of full scale for a min to max supply change.  
**Load influence:** ≤ ± 0.05 % of full scale for a 0 to 100 % load resistance change.  
**Temperature influence:** ≤ ± 0.01 % on zero and span for a 1 °C change.

**Compatibility:**

CE mark compliant, conforms to Directives: 94/9/EC ATEX, 2004/108/CE EMC, 2006/95/EC 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, I (M1) [Ex ia Ma] I, II (1) D [Ex ia Da] IIC  
**IMQ ATEX:** II 3G Ex nA IIC T4 Gc **IMQ IECEx:** Ex nA IIC T4 Gc  
**IECEx:** [Ex ia Ga] IIC, [Ex ia Ma] I, [Ex ia Da] IIC  
**UL:** AEx nC [ia] IIC **C-UL:** Ex nC [ia] IIC  
**FM:** NI / I / 2 / ABCD / T4, AIS / I / II / III / 1 / ABCDEFG  
**FM-C:** NI / I / 2 / ABCD / T4, AIS / I, II, III / 1 / ABCDEFG  
**GOST R:** [Exia] IIC X, 2ExnAII T4 X. **GOST:** [Ex ia] IIC X, 2ExnAII T4 X associated electrical apparatus.  
Uo/Voc = 25.2 V, Io/Isc = 87 mA, Po/Po = 548 mW at terminals 14-15, 10-11.  
Um = 250 Vrms, -20 °C ≤ Ta ≤ 60 °C.  
**Approvals:**  
DMT 01 ATEX E 042 X conforms to EN60079-0, EN60079-11, EN60079-26, EN50303.  
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  
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,  
GOST R 12.2.007.0-75, R 51330.0-99, R 51330.10-99  
GOST 12.2.007.0,22782.0,22782.5  
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 marine applications .

**Mounting:**

T35 DIN Rail according to EN50022.  
**Weight:** about 180 g D1020D, 120 g D1020S.  
**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:**

**Image:**

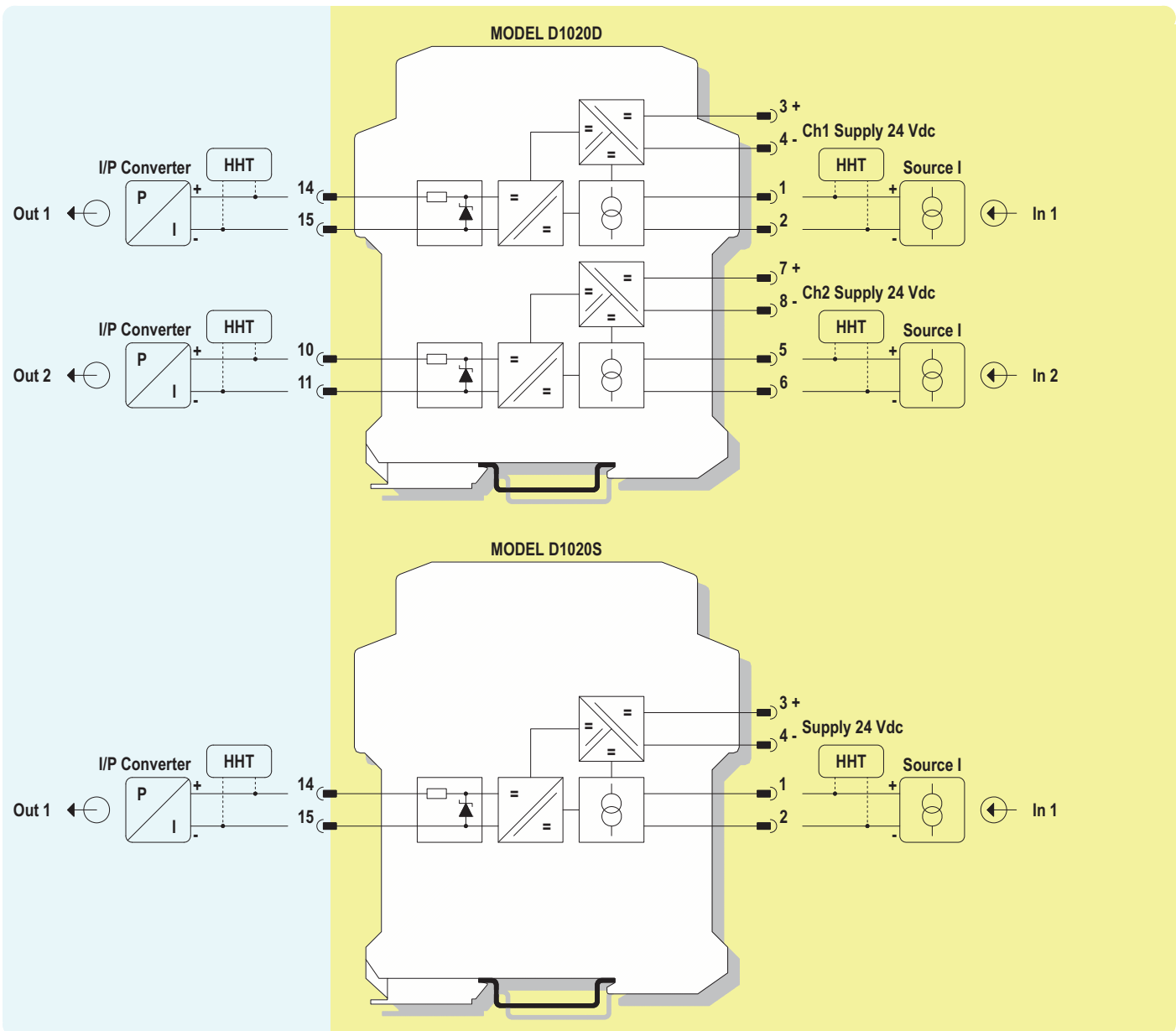
Safety Description	Maximum External Parameters			
	Group Cenelec	Co/Ca ( $\mu$ F)	Lo/La (mH)	Lo/Ro ( $\mu$ H/ $\Omega$ )
Terminals 14-15, 10-11				
Uo/Voc = 25.2 V	IIC	0.106	4.6	64.9
Io/Isc = 87 mA	IIB	0.819	18.7	259.6
Po/Po = 548 mW	IIA	2.899	37.5	519.3



**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



**Characteristics:**

**General Description:**

The Switch/Proximity Detector Repeater type D1030 is a DIN Rail unit with one or two independent channels. The unit can be configured for contact or proximity detector, NO or NC and for NE or ND SPDT relay output contact.

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

**D1030D dual channel** type has two independent input channels and actuates the corresponding output relay. Two actuation modes can be independently DIP switch configured on each input channel: NO input/NE relay or NO input/ND relay. 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 relay and turns the fault LED on) or disabled (in case of fault the corresponding output relay repeats the input line open or closed status as configured).

**D1030S single channel** type has one input channel and two output relays; the unit has two DIP switch configurable operating modes:  
Mode A) input channel actuates in parallel the two output relays (DPDT contact). Relay actuation mode can be independently configured for each output in two modes: NO input/NE relay or NO input/ND relay.  
Mode B) input channel actuates output relay A configurable in two modes as in mode A above. Output relay B operates as a fault output (in case of input fault, relay B actuates and the fault LED turns on while relay A repeats the input line as configured). Actuation can be DIP switch configured in two modes:  
No input fault/energized relay (it de-energizes in case of fault) or  
No input fault/de-energized relay (it energizes in case of fault).

**Function:**

1 or 2 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).

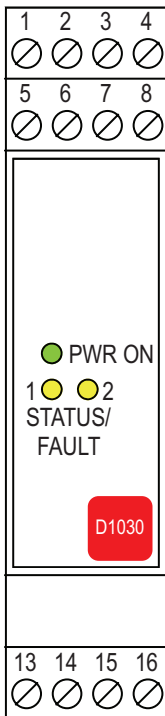
**Field Configurability:**

NO/NC input for contact/proximitior, NE/ND relay operation and fault detection enable/disable.

**EMC:**

Fully compliant with CE marking applicable requirements.

**Front Panel and Features:**



- Input from Zone 0 (Zone 20), Division 1, installation in Zone 2, Division 2.
- NO/NC contact/proximity Detector Input.
- Two SPDT Relay Output Signals.
- SPDT Relay Output for fault detection on single 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, Russian and Ukrainian Certifications.
- Type Approval Certificate DNV and KR for marine applications.
- High Reliability, SMD components.
- High Density, two 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:	D1030	
1 channel		S
2 channels		D
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:** 60 mA for 2 channels D1030D, 55 mA for 1 channel D1030S with input closed and relays energized.

**Power dissipation:** 1.4 W for 2 channels D1030D, 1.3 W for 1 channel D1030S with 24 V supply voltage, input closed and relays energized.

**Max. power consumption:** at 30 V supply voltage, short circuit input and relays energized, 1.8 W for 2 channels D1030D, 1.7 W for 1 channel D1030S.

**Isolation (Test Voltage):**

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

**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 relay with dual channel unit D1030D or actuate fault relay with single channel unit D1030S).

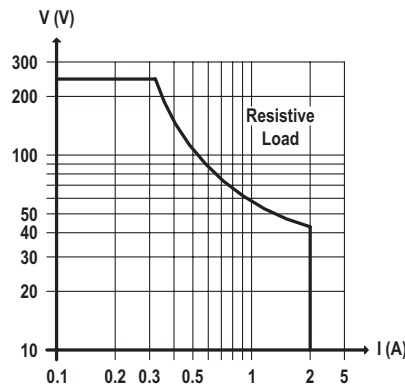
**Input equivalent source:** 8 V 1 K $\Omega$  typical (8 V no load, 8 mA short circuit).

**Output:** voltage free SPDT relay contact.

**Contact material:** AgCdO.

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

**DC Load breaking capacity:**



**Mechanical / Electrical life:**  $30 * 10^6 / 1 * 10^5$  operation, typical.

**Operate / Release time:** 7 / 3 ms typical.

**Bounce time NO / NC contact:** 3 / 5 ms.

**Response time:** 20 ms.

**Frequency response:** 10 Hz 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 °C, relative humidity max 90 % non condensing, up to 35 °C.

**Storage:** temperature limits - 45 to + 80 °C.

**Safety Description:**



II (1) G [Ex ia Ga] IIC, II (1) D [Ex ia Da] IIC, I (M1) [Ex ia Ma] I, II 3G Ex nA IIC T4, [Ex ia Ga] IIC, [Ex ia Da] IIC, [Ex ia Ma] I associated electrical apparatus. 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, 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, UL & C-UL E222308 conforms to UL913 (Div.1), UL 60079-0 (General, All Zones), UL60079-11 (Intrinsic Safety "i" Zones 0 & 1) 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) for C-UL, refer to control drawing ISMO128 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, DNV and KR Type Approval Certificate for marine applications.

**Mounting:** T35 DIN Rail according to EN50022.

**Weight:** about 135 g D1030D, 130 g D1030S.

**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				
Uo/Voc = 10.7 V	IIC	2.23	172	930
Io/Isc = 15 mA	IIB	15.60	689	3720
Po/Po = 39 mW	IIA	69.00	1379	7440

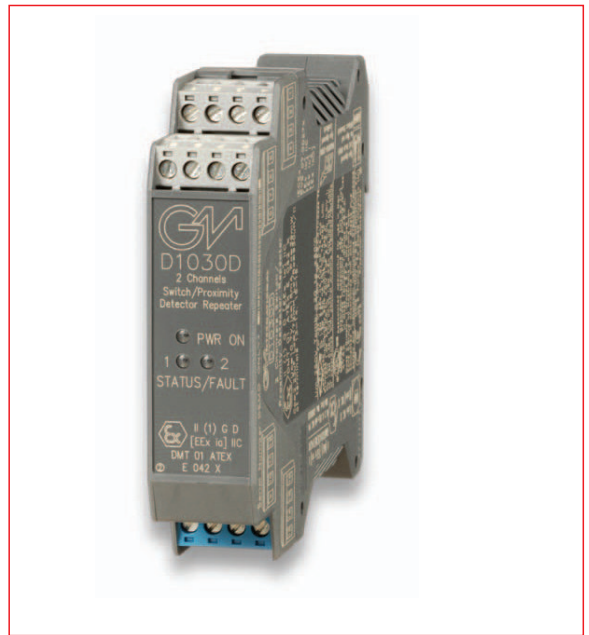
NOTE for USA and Canada:

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

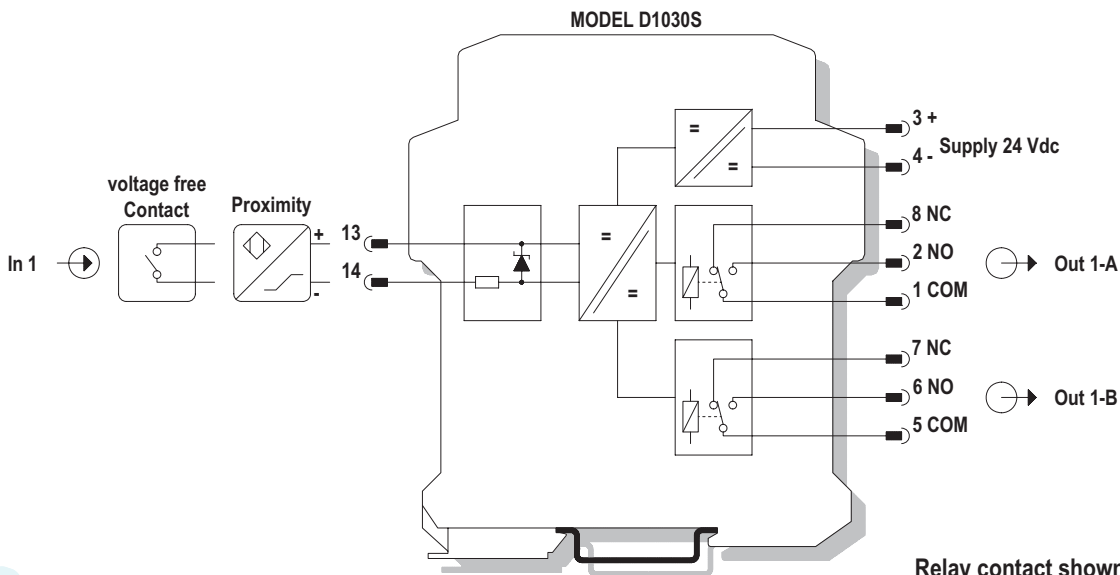
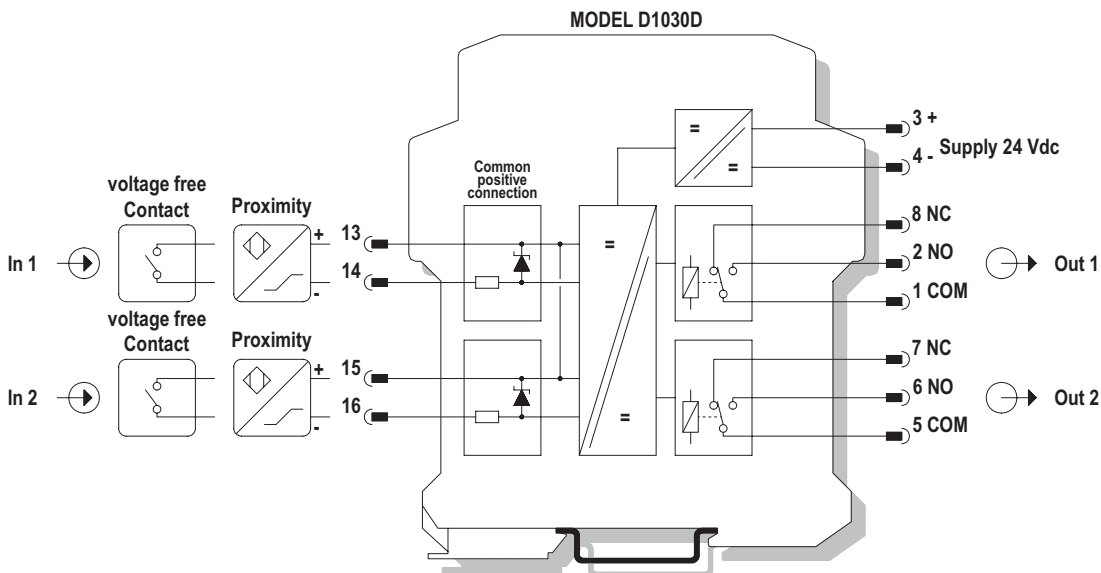
**Image:**



**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



Relay contact shown in de-energized position

**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).

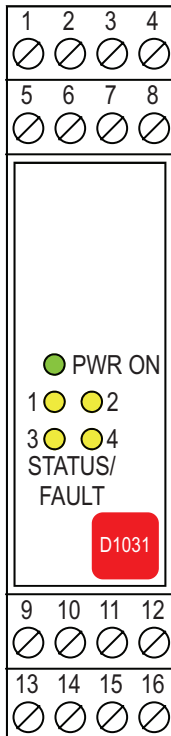
**Field Configurability:**

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

**EMC:**

Fully compliant with CE marking applicable requirements.

**Front Panel and Features:**



- 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, 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:	D1031	
2 channels		D
4 channels		Q
Power Bus enclosure		/B

**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 94/9/EC Atex Directive and to 2004/108/CE EMC Directive.

**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:**



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 = 10.7 V, Io/Isc = 15 mA, Po/Po = 39 mW at terminals

13-14, 15-16, 9-10, 11-12.

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, 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 ISM0129 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, DNV and KR Type Approval Certificate for marine 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:**

**Image:**

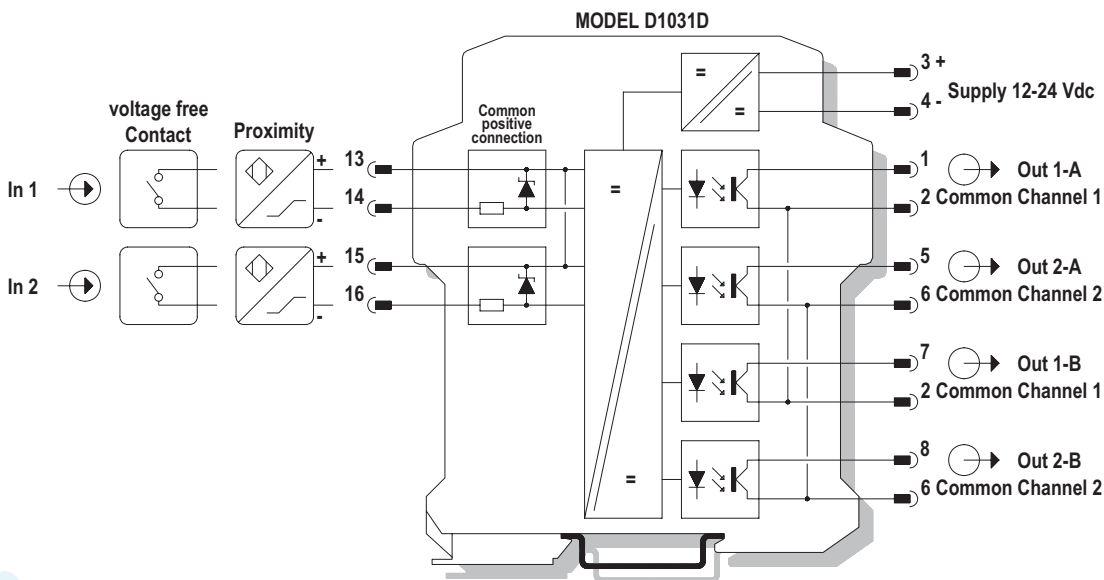
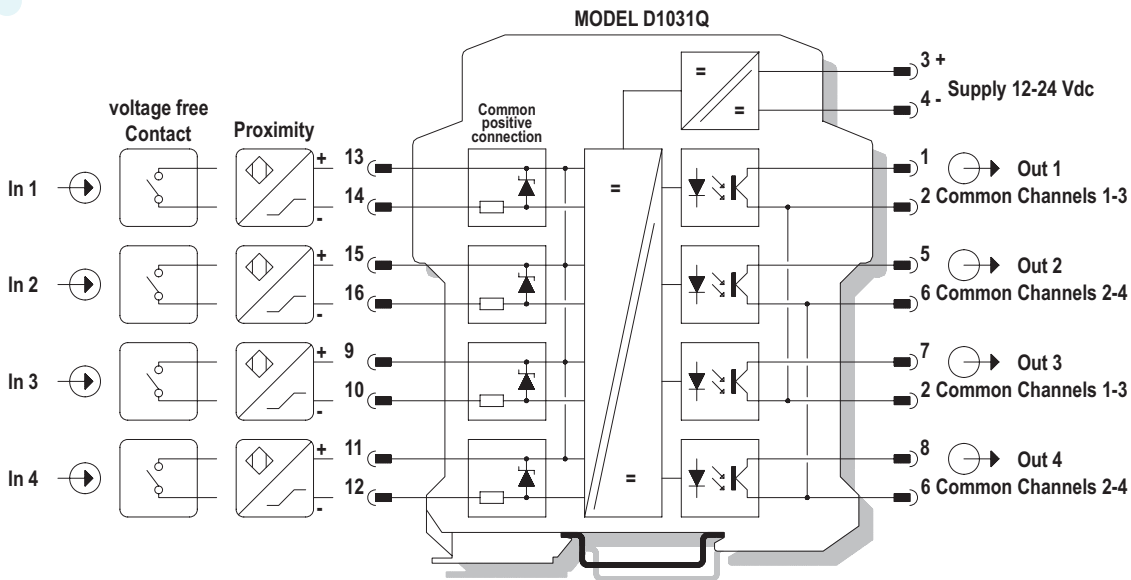
Safety Description	Maximum External Parameters			
	Group Cenelec	Co/Ca (μF)	Lo/La (mH)	Lo/Ro (μH/Ω)
Terminals 13-14, 15-16				
9-10, 11-12				
Uo/Voc = 10.7 V	IIC	2.23	172	930
Io/Isc = 15 mA	IIB	15.60	689	3720
Po/Po = 39 mW	IIA	69.00	1379	7440



**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



**Characteristics:**

**General Description:**

The Switch/Proximity Detector Repeater type D1032 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 NE or ND relay output.

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

**D1032Q quad channel** type has four independent input channels and actuates the corresponding output relay. Two actuation modes can be independently DIP switch configured on each input channel: NO input/NE relay or NO input/ND relay. 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 relay and turns the fault LED on) or disabled (in case of fault the corresponding output relay repeats the input line open or closed status as configured).

**D1032D dual channel** type has two input channels and four output relays; the unit has two DIP switch configurable operating modes: Mode A) input channel actuates in parallel the two output relays. Relay actuation mode can be independently configured for each output in two modes: NO input/NE relay or NO input/ND relay.

Mode B) input channel actuates output relay A configurable in two modes as in mode A above. Output relay B operates as a fault output (in case of input fault, relay B actuates and the fault LED turns on while relay A repeats the input line as configured). Actuation can be DIP switch configured in two modes: No input fault/energized relay (it de-energizes in case of fault) or No input fault/de-energized relay (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).

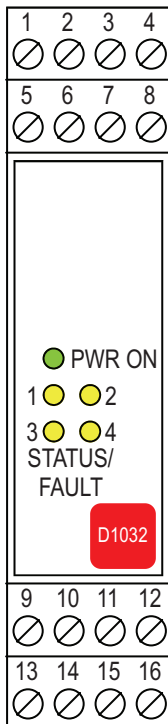
**Field Configurability:**

NO/NC input for contact/proximity, NE/ND relay 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 = 3 / 7 years (10 / 20 % of total SIF).
- PFDavg (1 year) 2.65 E-04, SFF 81.34 %.
- Input from Zone 0 (Zone 20), Division 1, installation in Zone 2, Division 2.
- NO/NC contact/proximity Detector Input.
- Four voltage free SPST Relay contact Output Signals.
- Relay 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:	D1032	
2 channels		D
4 channels		Q
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:** 75 mA for 4 channels D1032Q, 60 mA for 2 channels D1032D with input closed and relays energized.

**Power dissipation:** 1.8 W for 4 channels D1032Q, 1.4 W for 2 channels D1032D with 24 V supply voltage, input closed and relays energized.

**Max. power consumption:** at 30 V supply voltage, short circuit input and relays energized, 2.4 W for 4 channels D1032Q, 2.0 W for 2 channels D1032D.

**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 1.5 KV; Out 1-3/Out 2-4 1.5 KV.

**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 relay with quad channel unit D1032Q or actuate fault relay with dual channel unit D1032D).

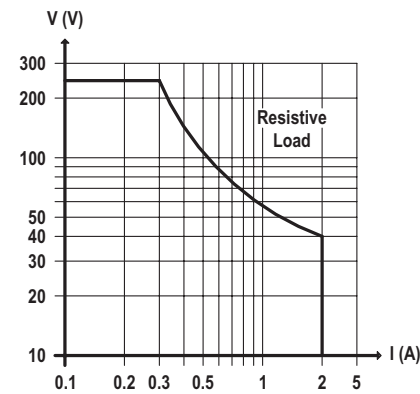
**Input equivalent source:** 8 V 1 K $\Omega$  typical (8 V no load, 8 mA short circuit).

**Output:** voltage free SPST relay contact.

**Contact material:** AgNi90/10.

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

**DC Load breaking capacity:**



**Mechanical / Electrical life:**  $15 * 10^6 / 1 * 10^5$  operation, typical.


**Operate / Release time:** 5 / 2 ms typical.

**Bounce time NO / NC contact:** 1 / 5 ms.

**Response time:** 20 ms.

**Frequency response:** 10 Hz 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 °C, relative humidity max 90 % non condensing, up to 35 °C.

**Storage:** temperature limits - 45 to + 80 °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 IIC 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 °C  $\leq$  Ta  $\leq$  60 °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, UL & C-UL E222308 conforms to UL913 (Div.1), UL 60079-0 (General, All Zones), UL60079-11 (Intrinsic Safety "i" Zones 0 & 1) 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) for C-UL, refer to control drawing ISM0130 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 185 g D1032Q, 165 g D1032D.

**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.

**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

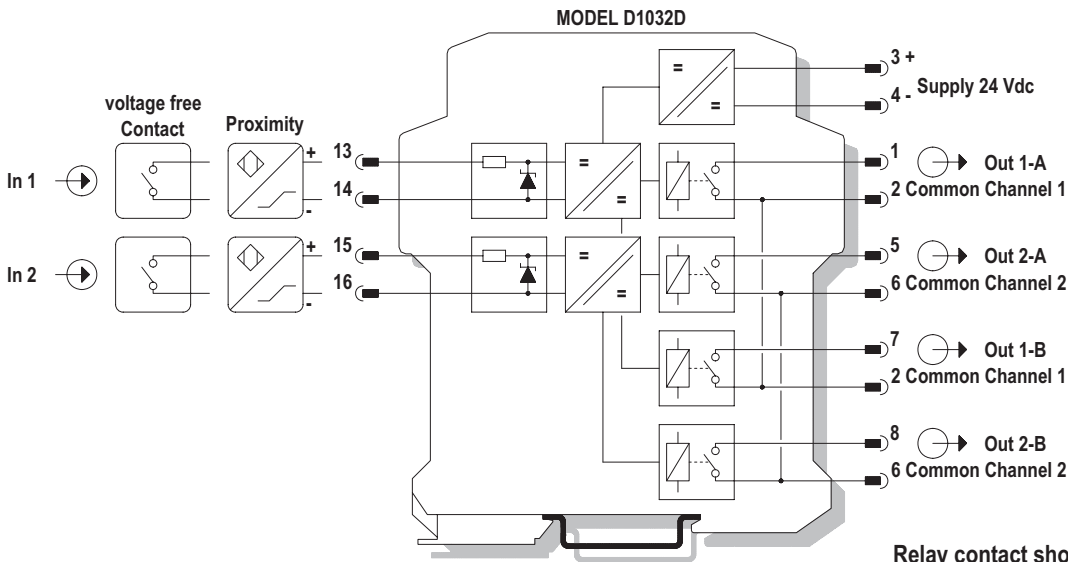
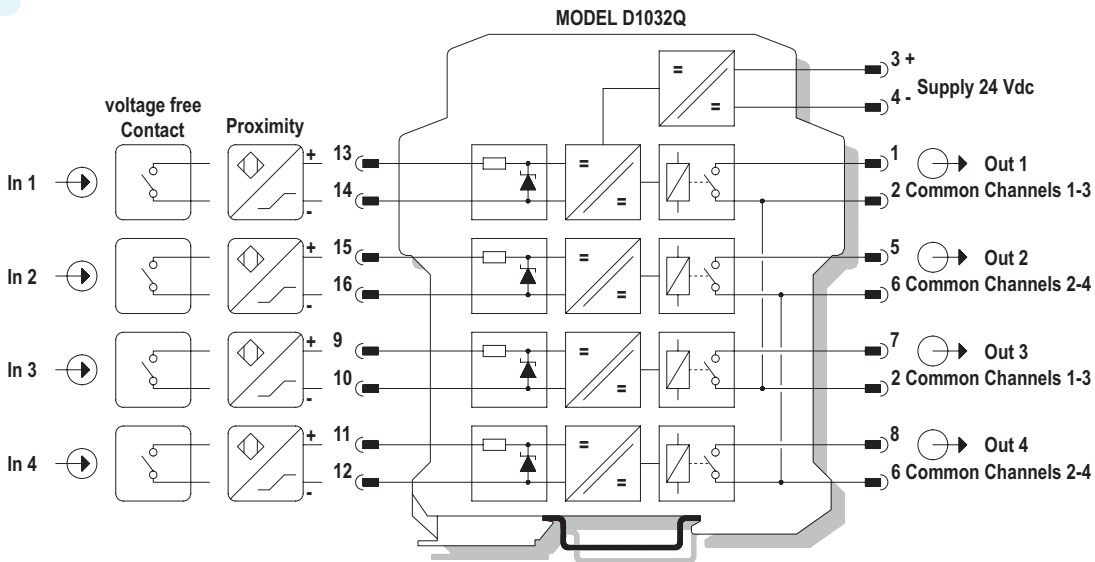
**Image:**



**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



Relay contact shown in de-energized position

**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).

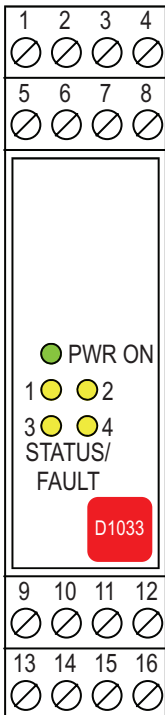
**Field Configurability:**

NO/NC input for contact/proximitator, 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 $^2$ .

**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:**

**Image:**

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

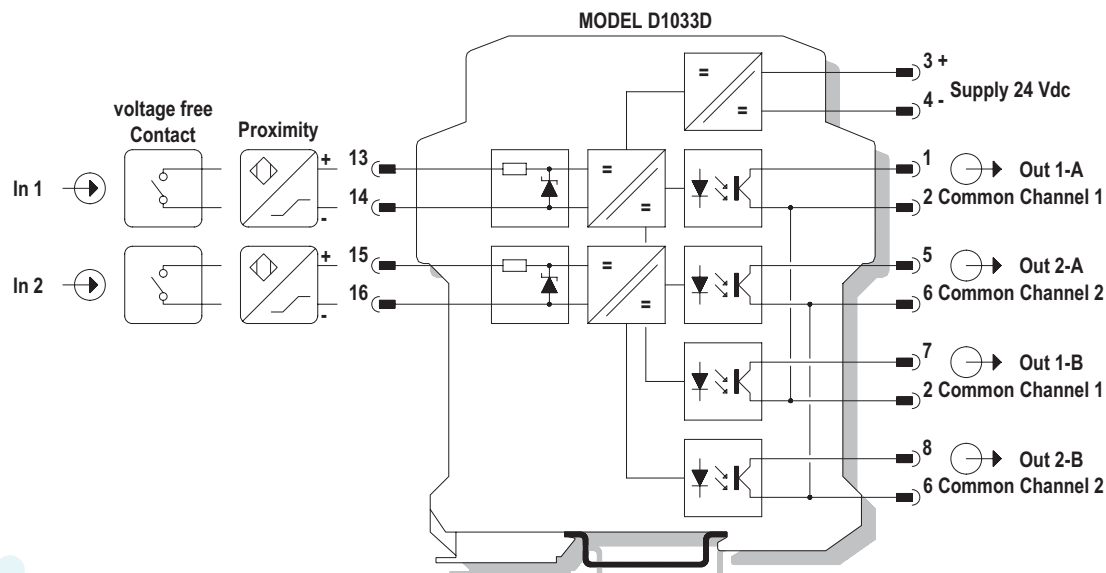
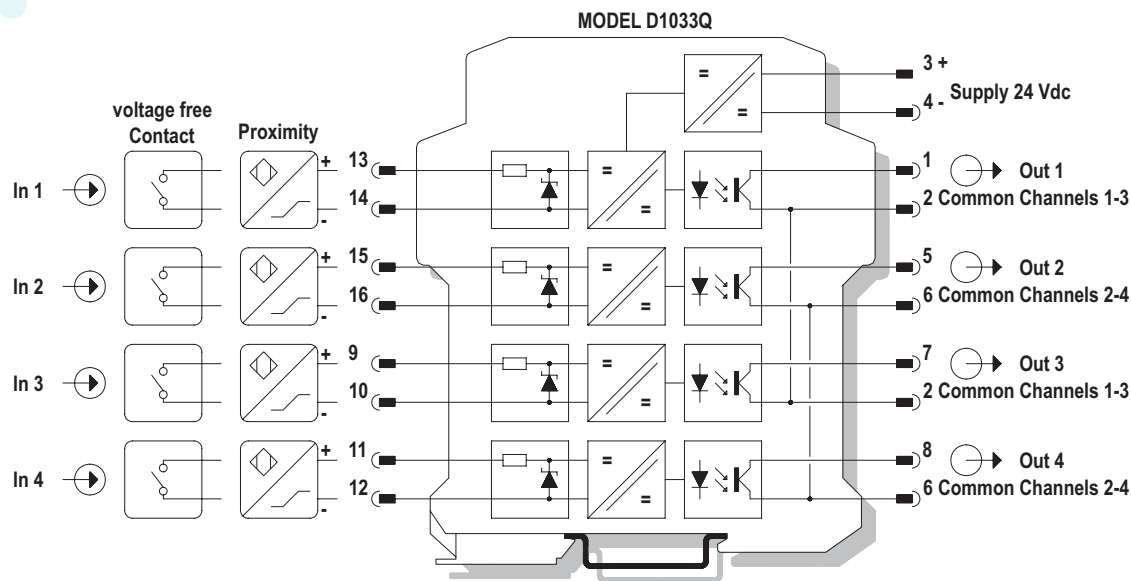


NOTE for USA and Canada:  
 IIC equal to Gas Groups A, B, C, D, E, F and G  
 IIB equal to Gas Groups C, D, E, F and G  
 IIA equal to Gas Groups D, E, F and G

**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



## Characteristics:

### General Description:

The single channel DIN Rail Frequency-Pulse Repeater D1035S, repeats a low level frequency signal from magnetic pick-up, contact, proximity, open-collector transistor sensor, TTL CMOS located in Hazardous Area, into pulse signal to drive a Safe Area load.

### Function:

1 channel I.S. input from frequency-pulse signals, provides 3 port isolation (input/output/supply). Repeats the frequency input and provides one SPST transistor output.

### Signalling LED:

Power supply indication (green), frequency input (yellow).

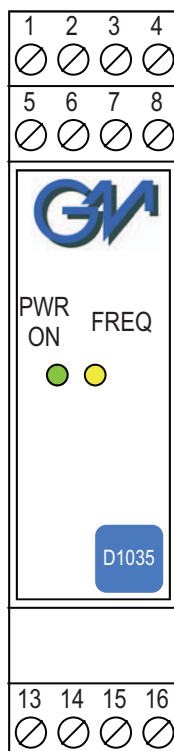
### Field Configurability:

DIP switch configurable for hardware setting of input sensor.

### EMC:

Fully compliant with CE marking applicable requirements.

## Front Panel and Features:



- Input from Zone 0 (Zone 20), Division 1, installation in Zone 2, Division 2.
- Magnetic pick-up or proximity input sensor.
- Input frequency range from 0 to 50 KHz.
- Three port isolation, Input/Output/Supply.
- EMC Compatibility to EN61000-6-2, EN61000-6-4.
- In-field programmability by DIP Switch.
- ATEX, IECEx, FM & FM-C, Russian Certifications.
- Type Approval Certificate KR 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:	D1035S
Power Bus enclosure	/B

## 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:** 40 mA with output transistor energized.

**Current consumption @ 12 V:** 60 mA with output transistor energized.

**Power dissipation:** 1.0 W with 24 V supply voltage and output transistor energized.

**Max. power consumption:** at 30 V supply voltage, output transistor energized, 1.2 W.

### Isolation (Test Voltage):

I.S. In/Out 1.5 KV; I.S. In/Supply 1.5 KV; Out/Supply 500 V.

### Input:

magnetic pick-up, contact, proximity to EN60947-5-6, open-collector transistor for frequency signals up to 50 KHz, TTL CMOS.

**Input range:** 0 to 50 KHz maximum.

**Magnetic pick-up sensitivity:**  $\geq 20$  mVpp up to 100 Hz input,  $\geq 50$  mVpp up to 1 KHz,  $\geq 100$  mVpp up to 5 KHz,  $\geq 500$  mVpp up to 20 KHz,  $\geq 1$  Vpp up to 50 KHz.

**Switching current levels:** ON  $\geq 2.1$  mA, OFF  $\leq 1.2$  mA, switch current  $\approx 1.65$  mA  $\pm 0.2$  mA hysteresis (for proximity or transistor input).

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

### Repeater Output:

voltage free SPST optocoupled open-collector transistor.

**Open-collector rating:** 100 mA at 35 V ( $\leq 1.5$  V voltage drop).

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

**Frequency response:** 50 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 °C,

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

**Storage:** temperature limits -45 to +80 °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 = 10.9 V, Io/Isc = 1.1 mA, Po/Po = 3 mW at terminals 13-16.

Uo/Voc = 15.5 V, Io/Isc = 13 mA, Po/Po = 48 mW at terminals 14-15.

Uo/Voc = 10.9 V, Io/Isc = 23 mA, Po/Po = 60 mW at terminals 15-16.

Ui/Vmax = 30 V, Ci = 0 nF, Li = 0 nH at terminals 13-16.

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,

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,

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,

KR Type Approval Certificate for marine applications.

### Mounting:

T35 DIN Rail according to EN50022.

**Weight:** about 145 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.

**Parameters Table:**

**Image:**

Safety Description	Maximum External Parameters			
	Group Cenelec	Co/Ca (μF)	Lo/La (mH)	Lo/Ro (μH/Ω)
Terminals 13-16 Uo/Voc = 10.9 V Io/Isc = 1.1 mA Po/Po = 3 mW	IIC	2.05	29000	12000
	IIB	14.40	117000	48100
	IIA	63.00	235000	96200
Terminals 14-15 Uo/Voc = 15.5 V Io/Isc = 13 mA Po/Po = 48 mW	IIC	0.508	235	585
	IIB	3.110	941	2342
	IIA	12.500	1883	4685
Terminals 15-16 Uo/Voc = 10.9 V Io/Isc = 23 mA Po/Po = 60 mW	IIC	2.05	72	594
	IIB	14.40	290	2378
	IIA	63.00	580	4757

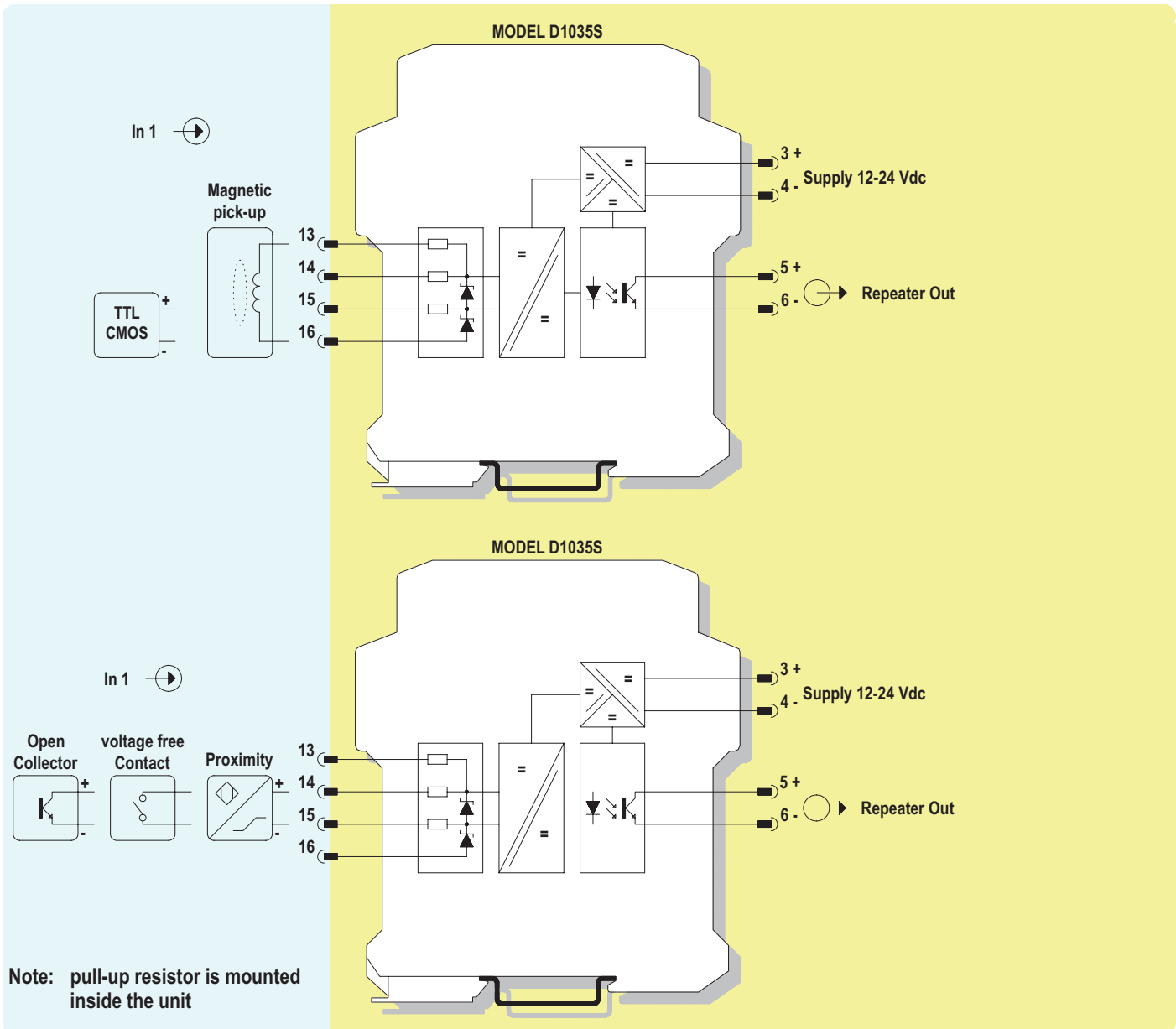


NOTE for USA and Canada:  
 IIC equal to Gas Groups A, B, C, D, E, F and G  
 IIB equal to Gas Groups C, D, E, F and G  
 IIA equal to Gas Groups D, E, F and G

**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



**Characteristics:**

**General Description:**

The D104\* series are quad channel DIN Rail Digital Output Modules enabling a Safe Area contact, logic level or drive signal, to control a device in Hazardous Area, providing 3 port isolation (input/output/supply).  
Typical applications includes driving signalling LED's, visual or audible alarms to alert a plant operator or driving a solenoid valve or other process control devices.  
It can also be used as a controllable supply to power measuring or process control equipments in Hazardous Area.  
Output channels can be paralleled if more power is required; 2 or 3 channels in parallel (depending on the model) are still suitable for Gas Group II C.  
Four basic models meet a large number of applications: it is possible to obtain 16 different combinations of safety parameters and driving currents.

**Function:**

4 channels I.S. actuated independently or in parallel to operate Hazardous Area loads from contacts, logic levels or drive logics in Safe Area providing 3 port isolation (input/output/supply), loop or bus powered.

**Signalling LEDs:**

Power supply indication (green), outputs status (yellow).

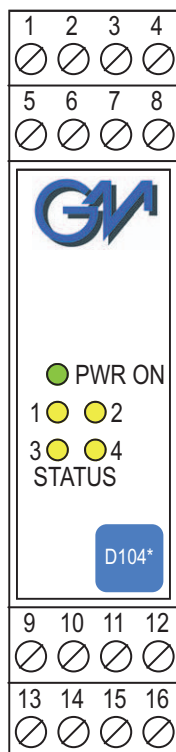
**Field Configurability:**

Contact / logic levels inputs, loop powered operating mode, configurable by external wiring.

**EMC:**

Fully compliant with CE marking applicable requirements.

**Front Panel and Features:**



SIL 3 according to IEC 61508, IEC 61511 in Loop Powered mode for Lifetime = 10 years.  
SIL 2 according to IEC 61508, IEC 61511 in Bus Powered mode  
for Tproof = 2 / 5 years (10 / 20 % of total SIF).  
PFDavg (1 year) 0.00 E-00, SFF 100 % (Loop Powered mode).  
PFDavg (1 year) 3.64 E-04, SFF 80.12 % (Bus Powered mode).  
Output to Zone 0 (Zone 20), Division 1, installation in Zone 2, Division 2.  
Voltage input, contact, logic level, common positive or common negative, loop powered or bus powered.  
Flexible modular multiple output capability.  
Output short circuit proof and current limited.  
Three port isolation, Input/Output/Supply.  
EMC Compatibility to EN61000-6-2, EN61000-6-4.  
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:	D104*Q		
22 mA at 13.2 V (per channel)		0	
10 mA for LED driving (per channel)		1	
22 mA at 14.5 V (per channel)		2	
22 mA at 9.8 V (per channel)		3	
Power Bus enclosure			/B

**Technical Data:**

**Supply:**

24 Vdc nom (21.5 to 30 Vdc) reverse polarity protected, ripple within voltage limits  $\leq 5$  Vpp.  
**Current consumption @ 24 V:** 130 mA with four channels energized at nominal load, 150 mA with short circuit output (90 mA type D1041Q).  
**Power dissipation:** 2.3 W (1.9 W type D1041Q) with 24 V supply voltage and four channels energized at nominal load.  
**Max. power consumption:** at 30 V supply voltage and short circuit output, 4.0 W (2.4 W type D1041Q).

**Isolation (Test Voltage):**

I.S. Out/In 1.5 KV; I.S. Out/Supply 1.5 KV; In/Supply 500 V.


**Input:**

switch contact, logic level common positive or common negative or loop powered.  
**Trip voltage levels:** OFF status  $\leq 1.0$  V, ON status  $\geq 6.0$  V (maximum 30 V).  
**Current consumption @ 24 V:** 3 mA ( $\approx 10$  K $\Omega$  input impedance).

**Output:**

D1040Q: 22 mA at 13.2 V per channel (20.5 V no load, 334  $\Omega$  series resistance).  
D1041Q: 10 mA for LED driving per channel (20.5 V no load, 484  $\Omega$  series resistance).  
D1042Q: 22 mA at 14.5 V per channel (20.5 V no load, 273  $\Omega$  series resistance).  
D1043Q: 22 mA at 9.8 V per channel (20.5 V no load, 484  $\Omega$  series resistance).  
**Short circuit current:**  $\geq 24$  mA per channel (26 mA typical),  $\leq 15$  mA per channel for D1041Q (13 mA typical).  
**Response time:** 20 ms (power up in 600 ms typical in loop powered mode).

**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 °C, relative humidity max 90 % non condensing, up to 35 °C.  
**Storage:** temperature limits -45 to +80 °C.

**Safety Description:**

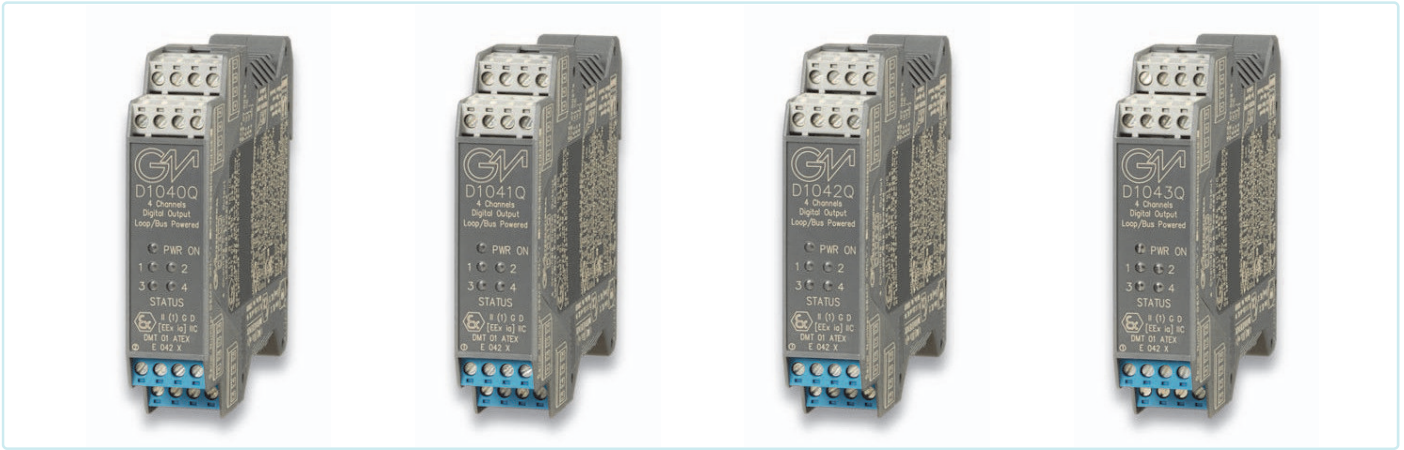


II (1) G [Ex ia Ga] IIC, II (1) D [Ex ia Da] IIIC, I (M1) [Ex ia Ma] I, II 3G Ex nA II T4, [Ex ia Ga] IIC, [Ex ia Da] IIIC, [Ex ia Ma] I associated electrical apparatus.  
D1040Q single channel parameters:  
Uo/Voc = 23.6 V, Io/Isc = 72 mA, Po/Po = 424 mW at terminals 13-14,15-16,9-10,11-12.  
D1041Q single channel parameters:  
Uo/Voc = 23.6 V, Io/Isc = 49.6 mA, Po/Po = 292 mW at terminals 13-14,15-16,9-10,11-12.  
D1042Q single channel parameters:  
Uo/Voc = 23.6 V, Io/Isc = 88.2 mA, Po/Po = 519 mW at terminals 13-14,15-16,9-10,11-12.  
D1043Q single channel parameters:  
Uo/Voc = 23.6 V, Io/Isc = 49.6 mA, Po/Po = 292 mW at terminals 13-14,15-16,9-10,11-12.  
For channels in parallel see Safety Parameters tables  
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,  
EN61241-11, EN50303, IECEx BVS 07.0027X conforms to IEC60079-0,  
IEC60079-11, IEC60079-26, 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),  
ANSI/ISA 12.12.01 (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 ISM0133 for complete UL and C-UL safety and installation instructions,  
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 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. GM04/10-26 R002, SIL 2 / SIL 3 according to IEC 61508, IEC 61511.  
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 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.

Images:



Parameters Table:

Safety Description	Maximum External Parameters			
D1040Q	Group Cenelec	Co/Ca (μF)	Lo/La (mH)	Lo/Ro (μH/Ω)
Terminals 13-14, 15-16				
9-10, 11-12		Single channel		
Uo/Voc = 23.6 V	IIC	0.13	6.8	83.9
Io/Isc = 72 mA	IIB	0.97	27.4	335.9
Po/Po = 424 mW	IIA	3.50	54.8	671.9
		Two channels in parallel		
Uo/Voc = 23.6 V	IIC	0.13	1.7	41.9
Io/Isc = 144 mA	IIB	0.97	6.8	167.9
Po/Po = 847 mW	IIA	3.50	13.7	335.9
		Three channels in parallel		
Uo/Voc = 23.6 V	IIB	0.97	3.0	111.9
Io/Isc = 216 mA	IIB	0.97	3.0	111.9
Po/Po = 1271 mW	IIA	3.50	6.0	223.9
		Four channels in parallel		
Uo/Voc = 23.6 V	IIB	0.97	1.7	83.9
Io/Isc = 288 mA	IIB	0.97	1.7	83.9
Po/Po = 1674 mW	IIA	3.50	3.4	167.9

Safety Description	Maximum External Parameters			
D1041Q	Group Cenelec	Co/Ca (μF)	Lo/La (mH)	Lo/Ro (μH/Ω)
Terminals 13-14, 15-16				
9-10, 11-12		Single channel		
Uo/Voc = 23.6 V	IIC	0.13	14.2	121.9
Io/Isc = 49.6 mA	IIB	0.97	57.0	487.6
Po/Po = 292 mW	IIA	3.50	114.0	975.3
		Two channels in parallel		
Uo/Voc = 23.6 V	IIC	0.13	3.6	60.9
Io/Isc = 99.2 mA	IIB	0.97	14.4	243.8
Po/Po = 584 mW	IIA	3.50	28.9	487.6
		Three channels in parallel		
Uo/Voc = 23.6 V	IIC	0.13	1.6	40.6
Io/Isc = 148.8 mA	IIB	0.97	6.4	162.5
Po/Po = 875 mW	IIA	3.50	12.8	325.0
		Four channels in parallel		
Uo/Voc = 23.6 V	IIB	0.97	3.6	121.9
Io/Isc = 198.4 mA	IIB	0.97	3.6	121.9
Po/Po = 1167 mW	IIA	3.50	7.2	243.8

Safety Description	Maximum External Parameters			
D1042Q	Group Cenelec	Co/Ca (μF)	Lo/La (mH)	Lo/Ro (μH/Ω)
Terminals 13-14, 15-16				
9-10, 11-12		Single channel		
Uo/Voc = 23.6 V	IIC	0.13	4.5	68.6
Io/Isc = 88.2 mA	IIB	0.97	18.2	274.4
Po/Po = 519 mW	IIA	3.50	36.5	548.9
		Two channels in parallel		
Uo/Voc = 23.6 V	IIC	0.13	1.1	34.3
Io/Isc = 176.4 mA	IIB	0.97	4.5	137.2
Po/Po = 1038 mW	IIA	3.50	9.1	274.4
		Three channels in parallel		
Uo/Voc = 23.6 V	IIB	0.97	2.0	91.4
Io/Isc = 264.6 mA	IIB	0.97	2.0	91.4
Po/Po = 1556 mW	IIA	3.50	4.0	182.9
		Four channels in parallel		
Uo/Voc = 23.6 V	IIB	0.97	1.1	68.6
Io/Isc = 352.8 mA	IIB	0.97	1.1	68.6
Po/Po = 1674 mW	IIA	3.50	2.2	137.2

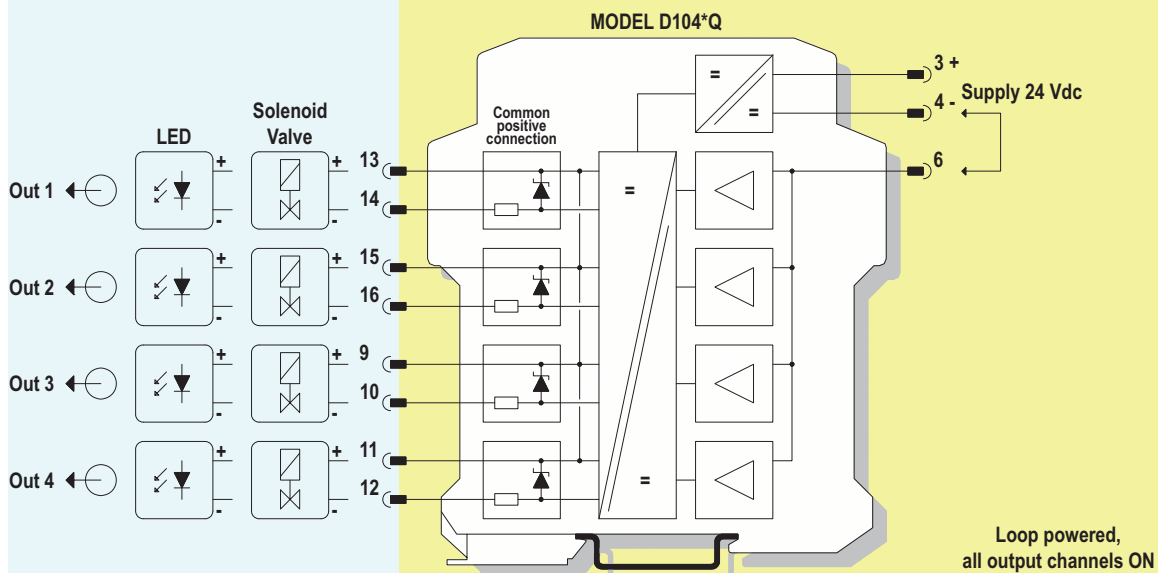
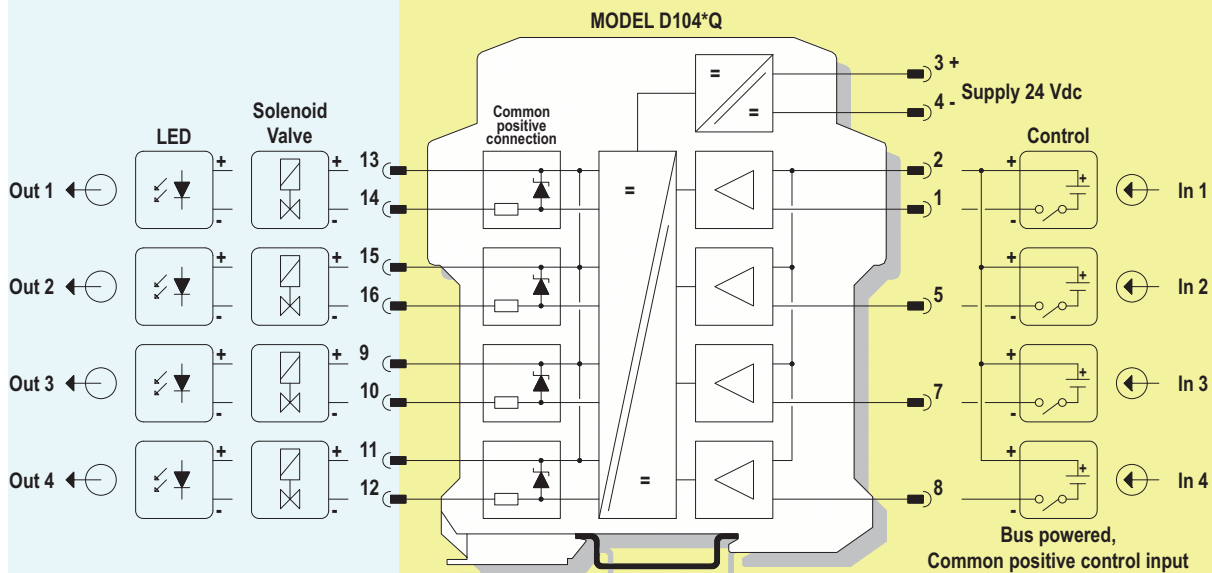
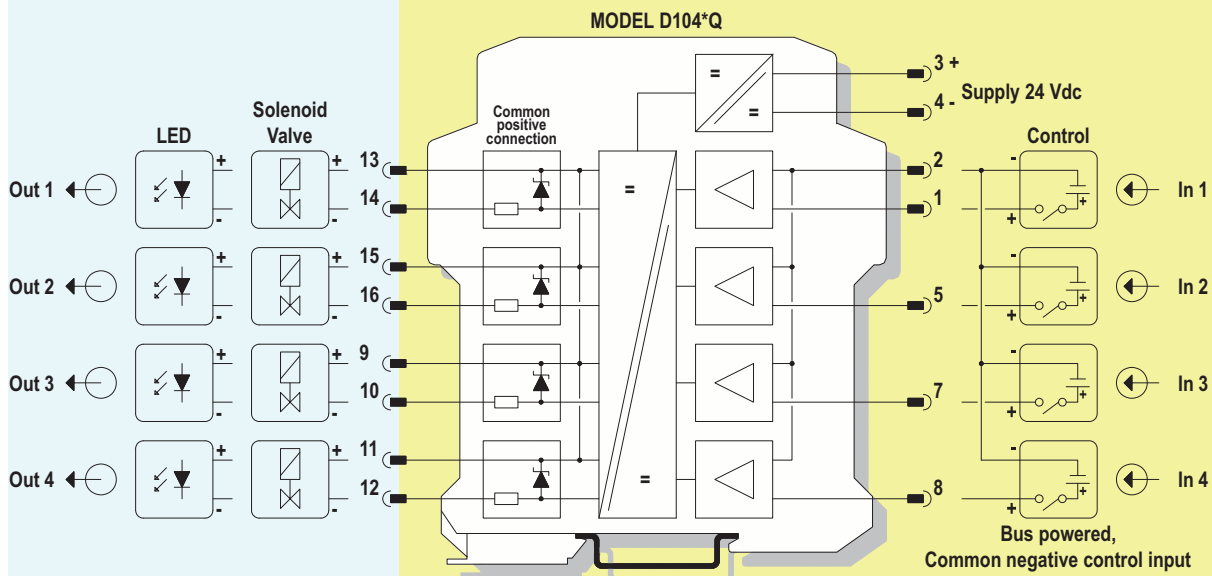
Safety Description	Maximum External Parameters			
D1043Q	Group Cenelec	Co/Ca (μF)	Lo/La (mH)	Lo/Ro (μH/Ω)
Terminals 13-14, 15-16				
9-10, 11-12		Single channel		
Uo/Voc = 23.6 V	IIC	0.13	14.2	121.9
Io/Isc = 49.6 mA	IIB	0.97	57.0	487.6
Po/Po = 292 mW	IIA	3.50	114.0	975.3
		Two channels in parallel		
Uo/Voc = 23.6 V	IIC	0.13	3.6	60.9
Io/Isc = 99.2 mA	IIB	0.97	14.4	243.8
Po/Po = 584 mW	IIA	3.50	28.9	487.6
		Three channels in parallel		
Uo/Voc = 23.6 V	IIC	0.13	1.6	40.6
Io/Isc = 148.8 mA	IIB	0.97	6.4	162.5
Po/Po = 875 mW	IIA	3.50	12.8	325.0
		Four channels in parallel		
Uo/Voc = 23.6 V	IIB	0.97	3.6	121.9
Io/Isc = 198.4 mA	IIB	0.97	3.6	121.9
Po/Po = 1167 mW	IIA	3.50	7.2	243.8

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

## 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

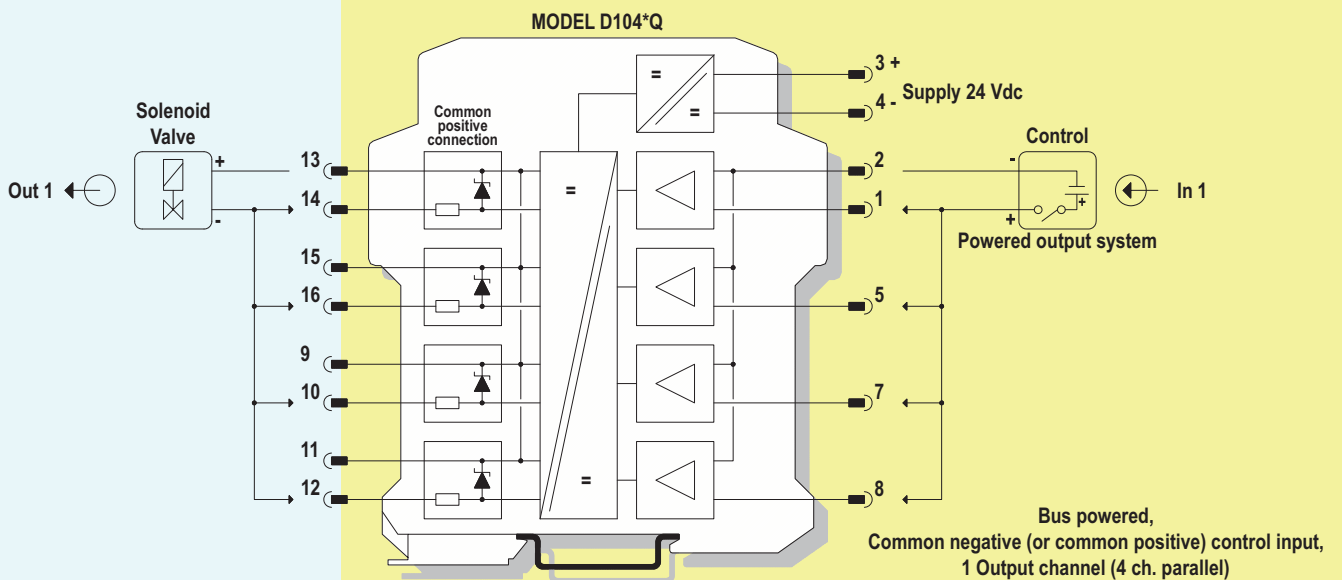
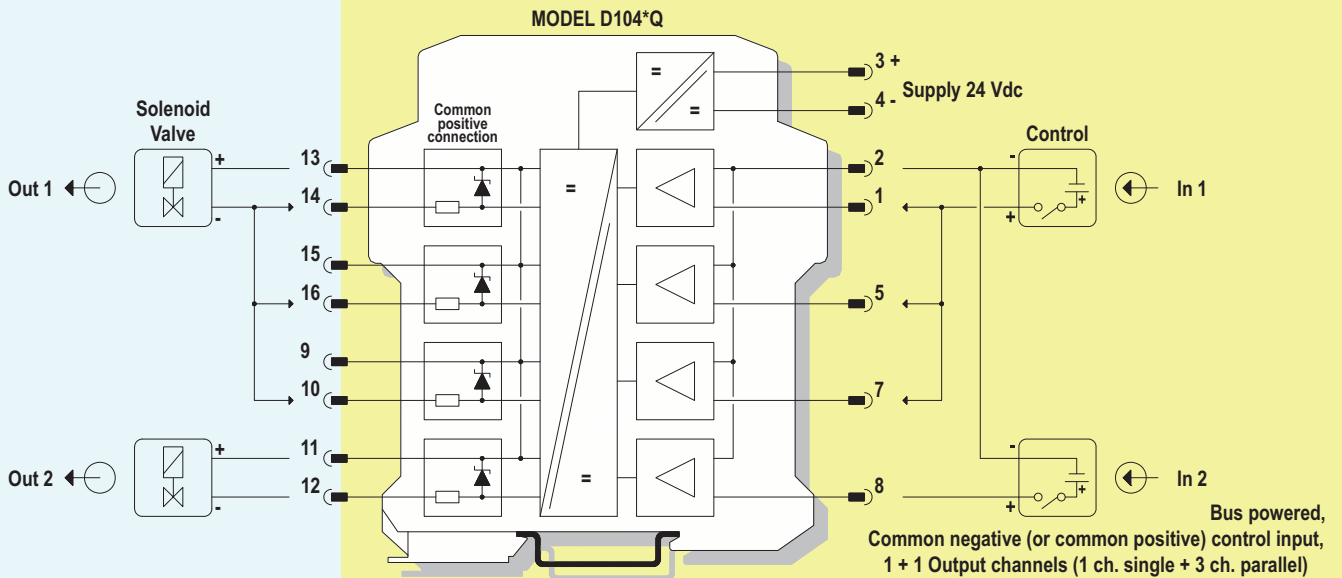
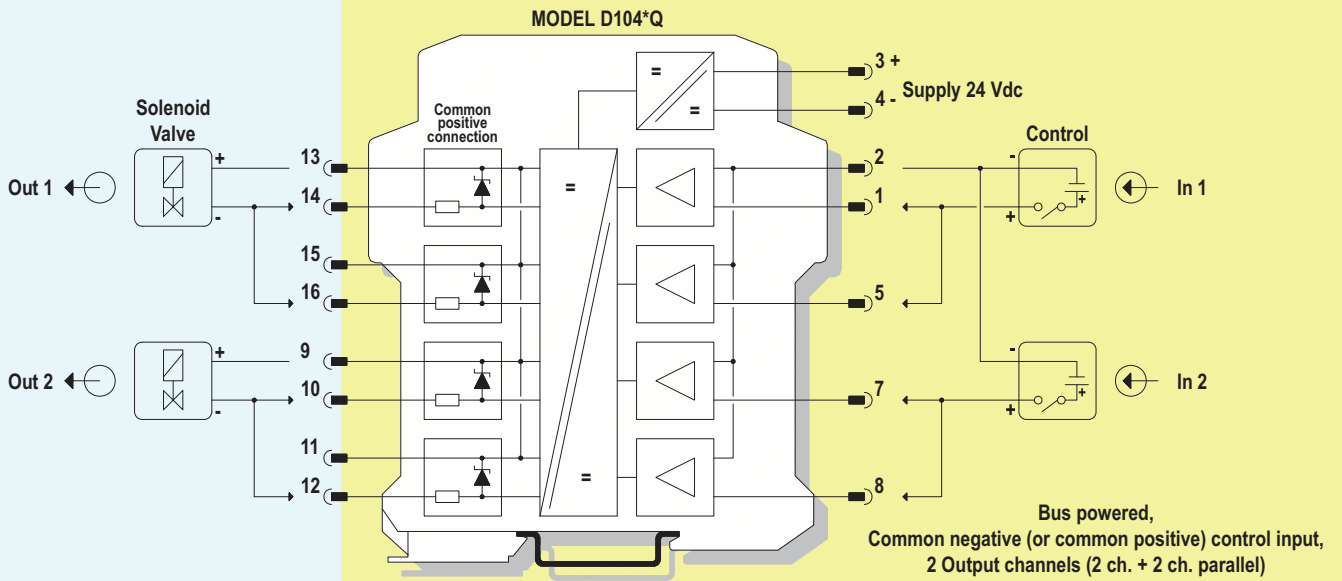
SAFE AREA, ZONE 2 GROUP IIC T4,  
NON HAZARDOUS LOCATIONS, CLASS I, DIVISION 2,  
GROUPS A, B, C, D T-Code T4, CLASS I, ZONE 2, GROUP IIC T4



**Function Diagram:**

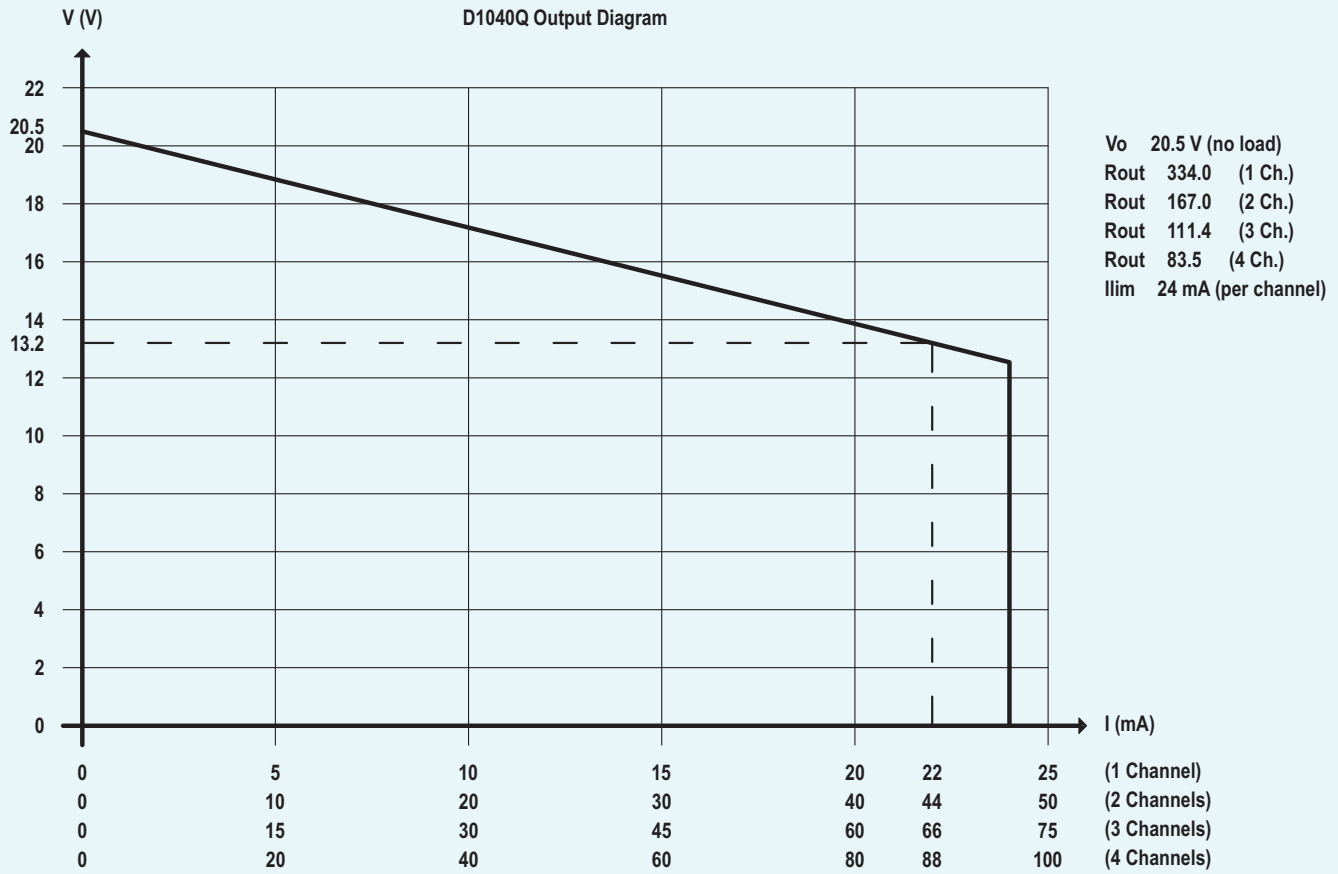
HAZARDOUS AREA ZONE 0 (ZONE 20) GROUP IIC,  
HAZARDOUS LOCATIONS CLASS I, DIVISION 1, GROUPS A, B, C, D,  
CLASS II, DIVISION 1, GROUPS E, F, G, CLASS III, DIVISION 1,  
CLASS I, ZONE 0, GROUP IIC

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

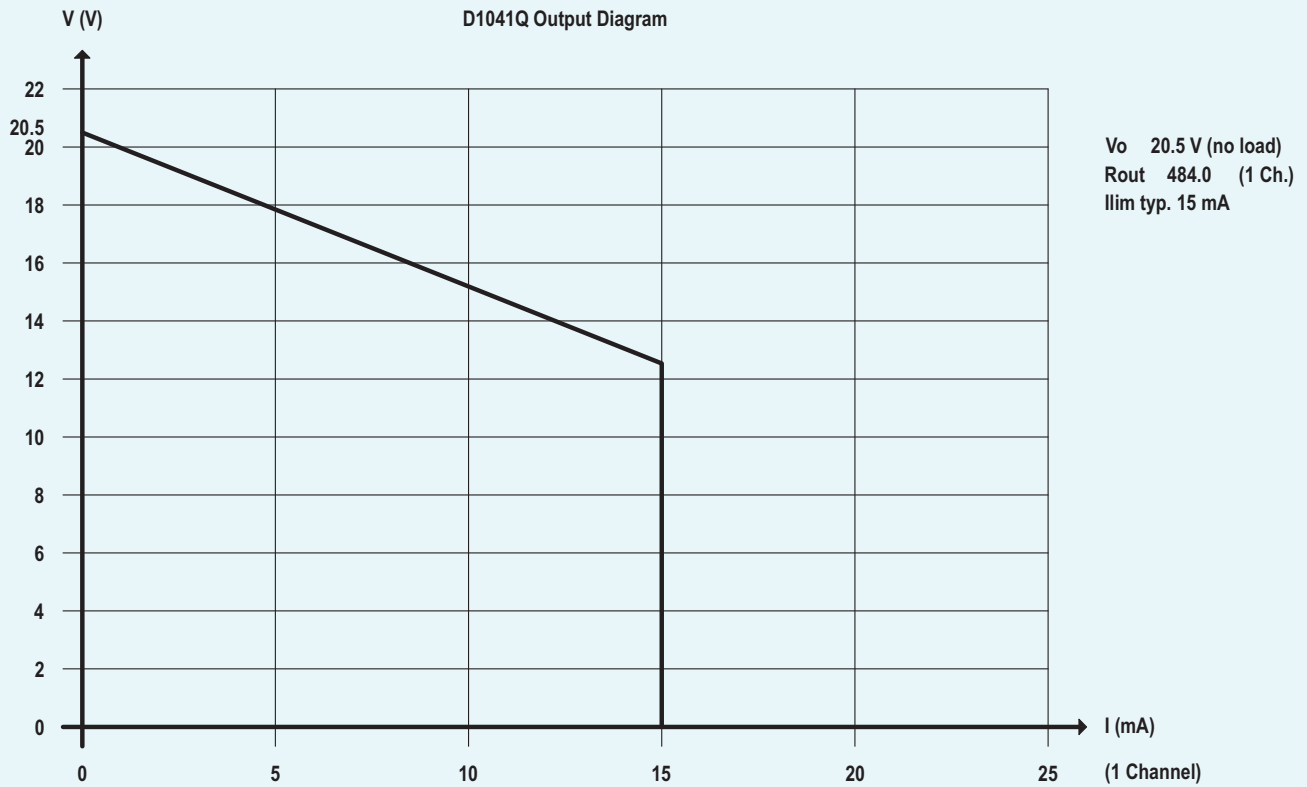


**Output Diagram:**

**D1040Q OUTPUT DIAGRAM**



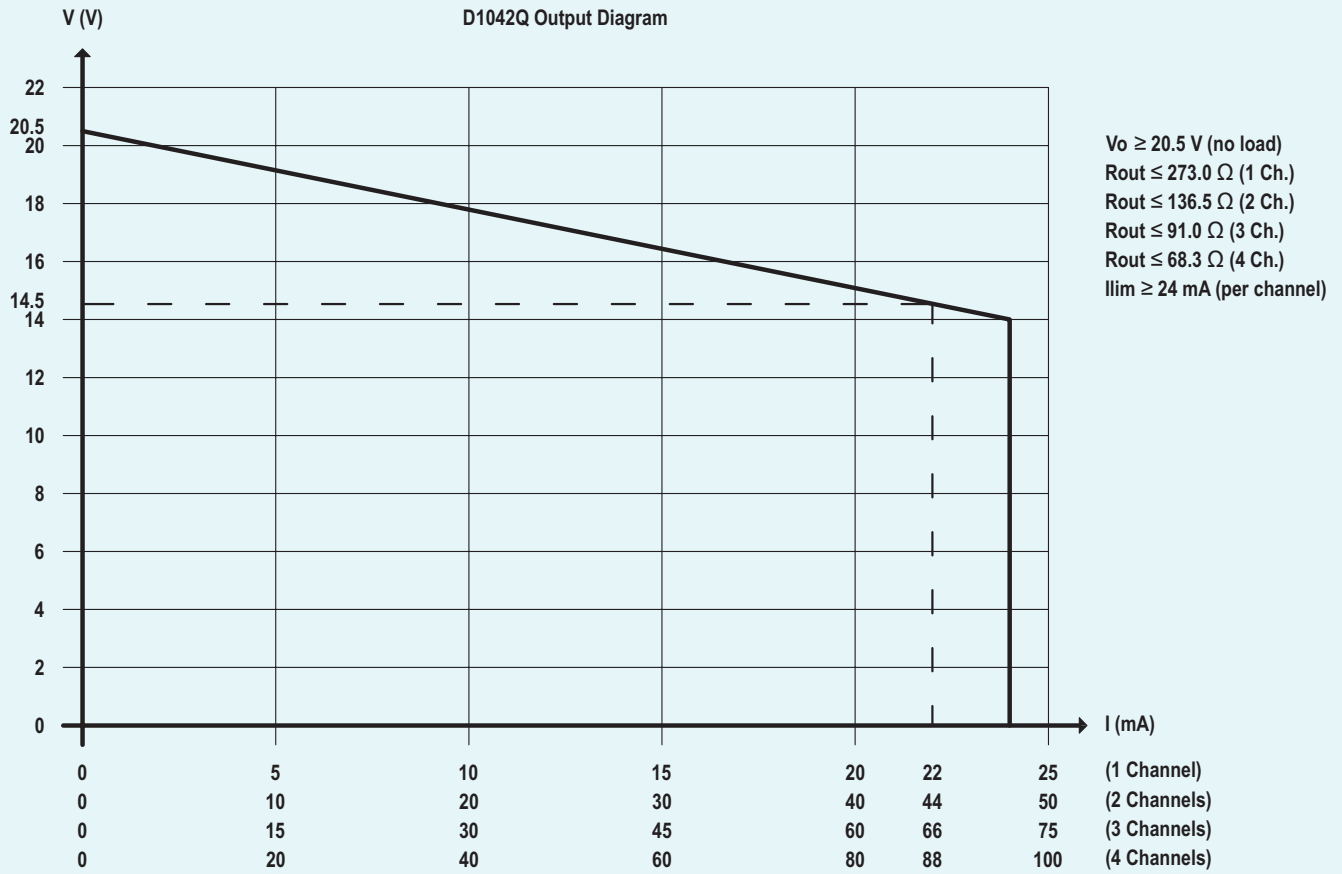
**D1041Q OUTPUT DIAGRAM**



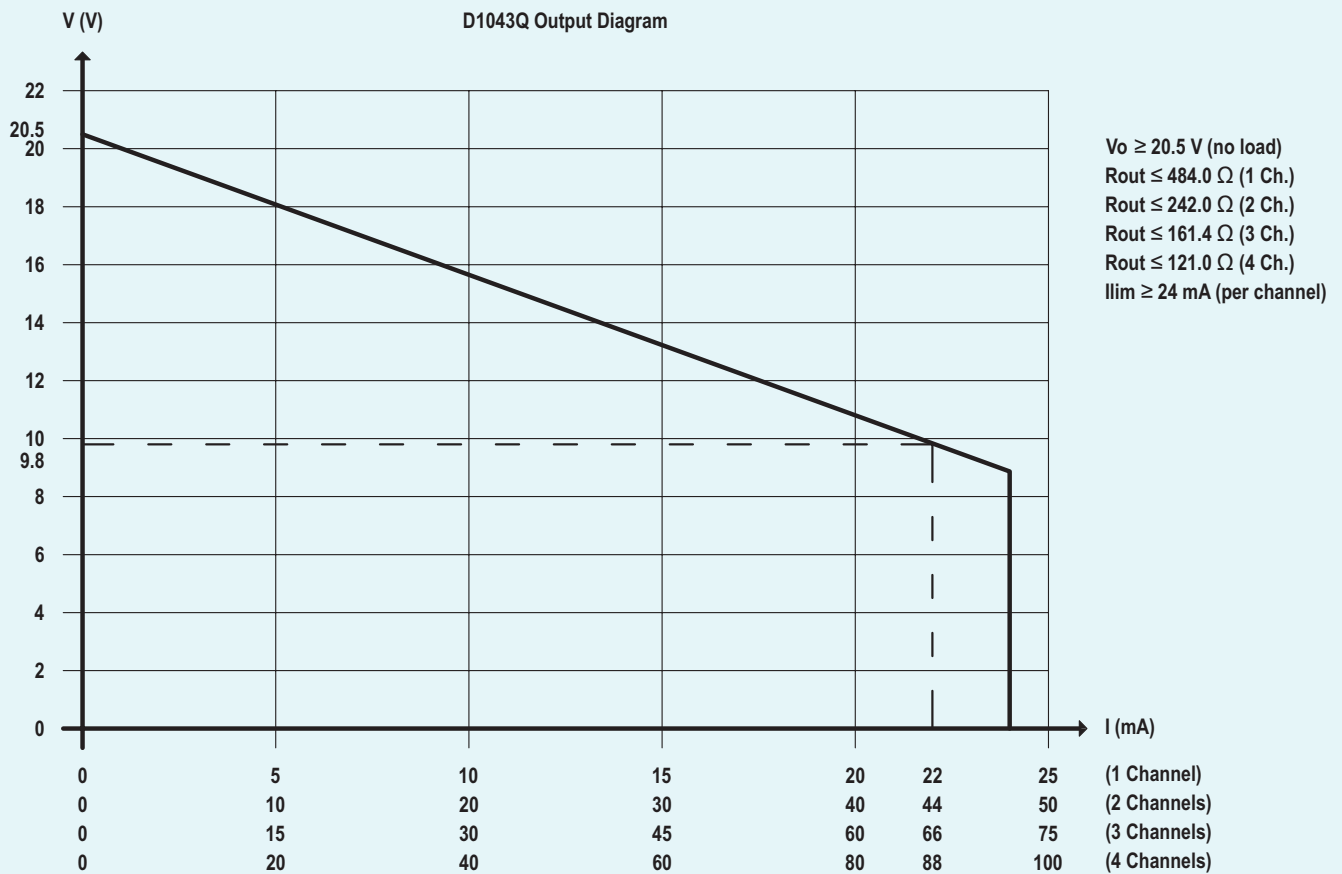


**Output Diagram:**

**D1042Q OUTPUT DIAGRAM**



**D1043Q OUTPUT DIAGRAM**



**Characteristics:**

**General Description:**

The Switch/Proximity Detector Repeater type D1130 is a DIN Rail unit with one or two independent channels. The unit can be configured for contact or proximity detector, NO or NC and for NE or ND SPDT relay output contact.

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

**D1130D dual channel** type has two independent input channels and actuates the corresponding output relay. Two actuation modes can be independently DIP switch configured on each input channel: NO input/NE relay or NO input/ND relay. 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 relay and turns the fault LED on) or disabled (in case of fault the corresponding output relay repeats the input line open or closed status as configured).

**D1130S single channel** type has one input channel and two output relays; the unit has two DIP switch configurable operating modes: Mode A) input channel actuates in parallel the two output relays (DPDT contact). Relay actuation mode can be independently configured for each output in two modes: NO input/NE relay or NO input/ND relay. Mode B) input channel actuates output relay A configurable in two modes as in mode A above. Output relay B operates as a fault output (in case of input fault, relay B actuates and the fault LED turns on while relay A repeats the input line as configured). Actuation can be DIP switch configured in two modes: No input fault/energized relay (it de-energizes in case of fault) or No input fault/de-energized relay (it energizes in case of fault).

**Function:**

1 or 2 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).

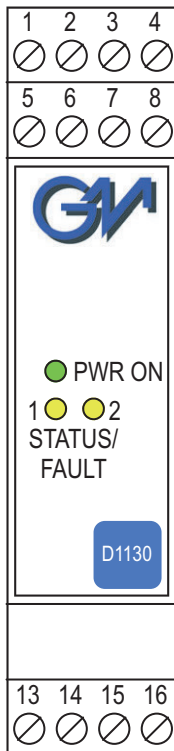
**Field Configurability:**

NO/NC input for contact/proximitator, NE/ND relay 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 = 2 / 10 years ( $\leq 10\%$  /  $> 10\%$  of total SIF)  
PFDAvg (1 year) 3.60 E-04, SFF 71.28 %;  
Input from Zone 0 (Zone 20), Division 1,  
installation in Zone 2, Division 2.  
Universal AC supply voltage  
(85 to 250 Vac, 48 to 400 Hz).  
NO/NC contact/proximity Detector Input.  
Two SPDT Relay Output Signals.  
SPDT Relay Output for fault detection on  
single 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, two 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:	D1130	
1 channel		S
2 channels		D

DIN-Rail accessories:  
DIN rail stopper MOR016

**Technical Data:**

**Supply:** 115-230 Vac, 50-60 Hz nom (85 to 250 Vac, 48 to 400 Hz), ripple within voltage limits  $\leq 10$  Vpp, 500 mA time lag fuse and 275 Vrms transient voltage surge suppressor protected.

Limit supply voltage to 250 Vrms for Intrinsic Safety applications.

**Current consumption @ 115 Vac:** 25 mA with short input and relays energized.

**Current consumption @ 230 Vac:** 15 mA with short input and relays energized.

**Max. power consumption:** at 264 Vac supply voltage, short circuit input and relays energized, 2.0 W for 2 channels D1130D, 1.9 W for 1 channel D1130S.

**Isolation (Test Voltage):**

I.S. In/Out 2.5 KV; I.S. In/Supply 2.5 KV; Out/Supply 2.5 KV; Out/Out 2.5 KV.

**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 relay with dual channel unit D1130D or actuate fault relay with single channel unit D1130S).

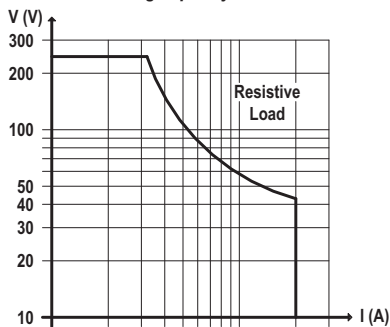
**Input equivalent source:** 8 V 1 K $\Omega$  typical (8 V no load, 8 mA short circuit).

**Output:** voltage free SPDT relay contact.

**Contact material:** AgCdO.

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

**DC Load breaking capacity:**



**Mechanical / Electrical life:** 30 \* 10<sup>6</sup> / 1 \* 10<sup>5</sup> operation, typical.

**Operate / Release time:** 7 / 3 ms typical.

**Bounce time NO / NC contact:** 3 / 5 ms.

**Response time:** 20 ms. **Frequency response:** 10 Hz 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] IIC,I (M1) [Ex ia Ma] I, II 3G Ex nAC IIC T4 Gc  
IECEx / INMETRO: [Ex ia Ga] IIC, [Ex ia Da] IIC, [Ex ia Ma] I  
UL: AIS / I, II, III / 1 / ABCDEFG, [AEx ia] IIC  
C-UL: AIS / I, II, III / 1 / ABCDEFG, [Ex 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 nC [ia Ga] IIC T4 X, [Ex ia Da] IIC X, [Ex ia Ma] I X.  
UKR TR n. 898: 2ExnAnCialICT4 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.  
CLJ 16.0034 X conforms to DCTY 7113, GOCT 22782.5-78, DCTY IEC 60079-15.  
TUV Certificate No. C-IS-236198-02, SIL 2 according to IEC 61511.  
DNV and KR Type Approval Certificate for maritime applications.

**Mounting:** T35 DIN Rail according to EN50022.

**Weight:** about 145 g D1130D, 140 g D1130S.

**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:**

**Image:**

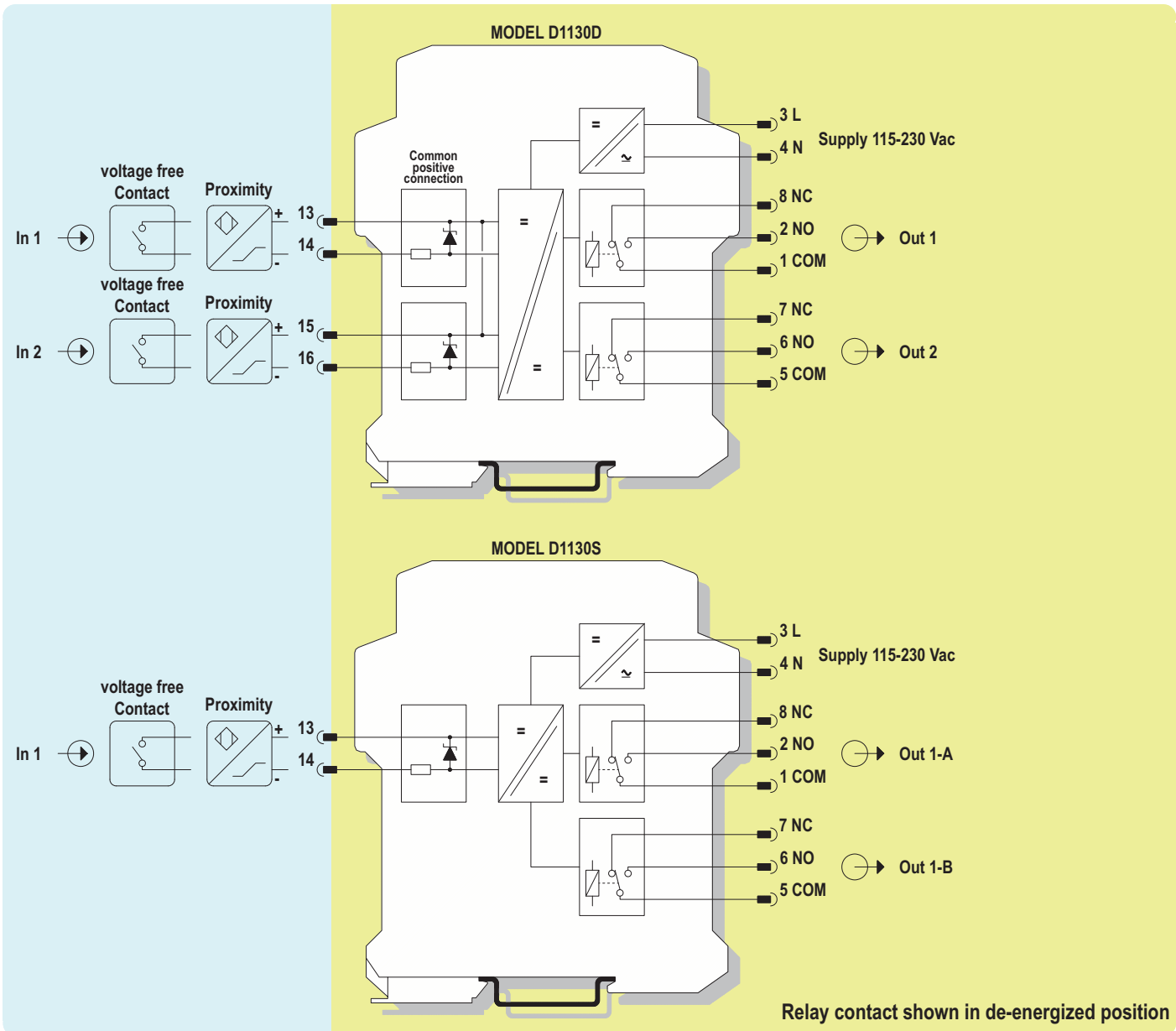
Safety Description	Maximum External Parameters			
	Group Cenelec	Co/Ca (μF)	Lo/La (mH)	Lo/Ro (μH/Ω)
Terminals 13-14, 15-16 Uo/Voc = 10.7 V Io/Isc = 15 mA Po/Po = 39 mW	IIC	2.23	172	930
	IIB	15.60	689	3720
	IIA	69.00	1300	7440
	I	60	2263	12200
	IIIC	15.60	689	3720



**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



**Characteristics:**

**General Description:**

The single and dual channel Repeater Power Supply, D5014S and D5014D module is a high integrity analog input interface suitable for applications requiring SIL 3 level (according to IEC 61508:2010 Ed.2) in safety related systems for high risk industries.

Provides a fully floating dc supply for energizing conventional 2 wires 4-20 mA, active or passive, transmitters located in Hazardous Area, and repeats the current in floating circuit to drive a Safe Area load.

The circuit allows bi-directional communication signals, for Hart transmitters.

Mounting on standard DIN-Rail, with or without Power Bus, or on customized Termination Boards, in Safe Area / Non Hazardous Location or in Zone 2 / Class I, Division 2 or Class I, Zone 2.

**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:**

5	6
3	4
1	2



PWR	2
PWR	1

SIL 3

D5014

7	8
9	10
11	12

SIL 3 according to IEC 61508:2010 Ed.2 for Tproof = 1 / 10 yrs ( $\leq 10\%$  /  $> 10\%$  of total SIF).

SIL 2 according to IEC 61508:2010 Ed.2 for Tproof = 15 / 20 yrs ( $\leq 10\%$  /  $> 10\%$  of total SIF).

PFDavg (1 year) 6.69 E-05, SFF 90.47 %.

Systematic capability SIL 3.

2 fully independent channels.

Input from Zone 0 (Zone 20) / Division 1, installation in Zone 2 / Division 2

4-20 mA Input / Output Signal

Active-Passive / Source-Sink

Hart compatible.

Input and Output short circuit proof.

High Accuracy.

Three port isolation, Input/Output/Supply.

EMC Compatibility to EN61000-6-2, EN61000-6-4, EN61326-1, EN61326-3-1 for safety systems.

In-field programmability by DIP Switch.

ATEX, IECEx, UL & C-UL, FM, FMC, INMETRO, EAC-EX, UKR TR n. 898, NEPSI, TIIS, TÜV Certifications.

TÜV Functional Safety Certification.

Type Approval Certificate DNV and KR for maritime applications.

High Density, two channels per unit.

Simplified installation using standard DIN-Rail and plug-in terminal blocks, with or without Power Bus, or customized Termination Boards.

250 Vrms (Um) max. voltage allowed to the instruments associated with the barrier.

**Ordering Information:**

Model:	D5014	
1 channel		S
2 channels		D

Power Bus and DIN-Rail accessories:

Connector JDFT049

Cover and fix MCHP196

Terminal block male MOR017

Terminal block female MOR022

**Technical Data:**

**Supply:**

24 Vdc nom (18 to 30 Vdc) reverse polarity protected, ripple within voltage limits  $\leq 5$  Vpp, 2 A time lag fuse internally protected.

**Current consumption @ 24 V:** 85 mA for 2 channels D5014D, 42.5 mA for 1 channel D5014S with 20 mA output typical.

**Power dissipation:** 1.25 W for 2 channels D5014D, 0.62 W for 1 channel D5014S with 24 V supply voltage and 20 mA output typical.

**Isolation (Test Voltage):**

I.S. In/Out 2.5 KV; I.S. In/Supply 2.5 KV; I.S. In/I.S. In 500 V; Out/Supply 500 V; Out/Out 500 V.

**Input:**

4 to 20 mA (separately powered input, voltage drop  $\leq 0.5$  V) or

4 to 20 mA (2 wires Tx current limited at  $\approx 25$  mA), reading range 0 to 24 mA.

**Transmitter line voltage:**

15.0 V typical at 20 mA with max.

20 mVrms ripple on 0.5 to 2.5 KHz frequency band, 14.5 V minimum.

**Output:**

4 to 20 mA, on max. 550  $\Omega$  load in source mode (typical 12 V compliance);

V min. 8 V at 0  $\Omega$  load V max. 30 V in sink mode, current limited at  $\approx 25$  mA or

1 to 5 V on internal 250  $\Omega$  shunt (or 2 to 10 V on internal 500  $\Omega$  shunt on request).

**Response time:** 5 ms (0 to 100 % step change).

**Output ripple:**  $\leq 20$  mVrms on 250  $\Omega$  communication load on 0.5 to 2.5 KHz band.

**Frequency response:** 0.5 to 2.5 KHz bidirectional within 3 dB (Hart protocol).

**Performance:**

Ref. Conditions 24 V supply, 250  $\Omega$  load, 23  $\pm 1$  °C ambient temperature.

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

**Linearity error:**  $\leq \pm 0.05$  % of full scale.

**Supply voltage influence:**  $\leq \pm 0.02$  % of full scale for a min to max supply change.

**Load influence:**  $\leq \pm 0.02$  % of full scale for a 0 to 100 % load resistance change.

**Temperature influence:**  $\leq \pm 0.01$  % of full scale on zero and span for a 1 °C change.

**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 - 40 to + 70 °C, relative humidity 95 %, up to 55 °C.

**Storage:** temperature limits - 45 to + 80 °C.

**Safety Description:**



**ATEX:** II 3(1)G Ex nA [ia Ga] IIC T4 Gc, II (1)D [Ex ia Da] IIC, I (M1) [Ex ia Ma] I

**IECEx / INMETRO / NEPSI:** Ex nA [ia Ga] IIC T4 Gc, [Ex ia Da] IIC, [Ex ia Ma] I

**UL:** NI / I / 2 / ABCD / T4, AIS / I, II, III / 1 / ABCDEFG, AEx nA [ia Ga] IIC T4 Gc

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

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

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

**EAC-EX:** 2ExnA[ia]IIC T4 X

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

associated apparatus and non-sparking electrical equipment.

Uo/Voc = 25.9 V, Io/Isc = 92 mA, Po/Po = 594 mW at terminals 7-8, 9-10.

Uo/Voc = 1.1 V, Io/Isc = 56 mA, Po/Po = 16 mW at terminals 8-11, 10-12.

Ui/Vmax = 30 V, Ii/Imax = 128 mA, Ci = 0 nF, Li = 0 nH at terminals 8-11, 10-12.

Um = 250 Vrms, -40 °C  $\leq$  Ta  $\leq$  70 °C.

**Approvals:**

BVS 10 ATEX E 113 X conforms to EN60079-0, EN60079-11, EN60079-15.

IECEx BVS 10.0072 X conforms to IEC60079-0, IEC60079-11, IEC60079-15.

INMETRO DNV 13.0109 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 3046304 and FMC 3046304C conforms to Class 3600, 3610, 3810, 3611,

ANSI/ISA-60079-0, ANSI/ISA-60079-11, ANSI/ISA-60079-15, C22.2 No.142, C22.2 No.157,

C22.2 No.213, C22.2 No. 60079-0, C22.2 No. 60079-11, C22.2 No. 60079-15.

C-IT.ME92.B.00206 conforms to GOST 30852.0, 30852.10, 30852.14.

CL 16.0036 X conforms to DCTY 7113, FOCT 22782.5-78, DCTY IEC 60079-15.

GYJ14.1406X conforms to GB3836.1, GB3836.4; GB3836.8, GB3836.20.

TC21005 for TIIS approval.

TÜV Certificate No. C-IS-236198-04, SIL 2 / SIL 3 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-13625 and KR No. MIL20769-EL002 Certificates for maritime applications.

**Mounting:**

T35 DIN-Rail according to EN50022, with or without Power Bus or

on customized Termination Board.

**Weight:** about 155 g D5014D, 130 g D5014S.

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

**Location:** installation in Safe Area/Non Hazardous Locations or Zone 2, Group IIC T4 or Class I, Division 2, Group A,B,C,D, T4 or Class I, Zone 2, Group IIC, T4.

**Protection class:** IP 20.

**Dimensions:** Width 12.5 mm, Depth 123 mm, Height 120 mm.

**Parameters Table:**

**Image:**

Safety Description	Maximum External Parameters			
	Group Cenelec	Co/Ca (μF)	Lo/La (mH)	Lo/Ro (μH/Ω)
Terminals 7-8, 9-10 Uo/Voc = 25.9 V Io/Isc = 92 mA Po/Po = 594 mW	IIC	0.10	3	59.9
	IIB	0.77	16.8	239.7
	IIA	2.63	33.7	479.4
	I	4.02	55.2	786.6
	IIIC	0.77	16.8	239.7
Terminals 8-11, 10-12 Uo/Voc = 1.1 V Io/Isc = 56 mA Po/Po = 16 mW Ui/Vmax = 30 V, Ii/Imax = 128 mA Ci = 0 nF, Li = 0 nH	IIC	100	11.3	2327.2
	IIB	1000	45.3	9309
	IIA	1000	90.7	18618.1
	I	1000	151.1	30545.4
	IIIC	1000	45.3	9309

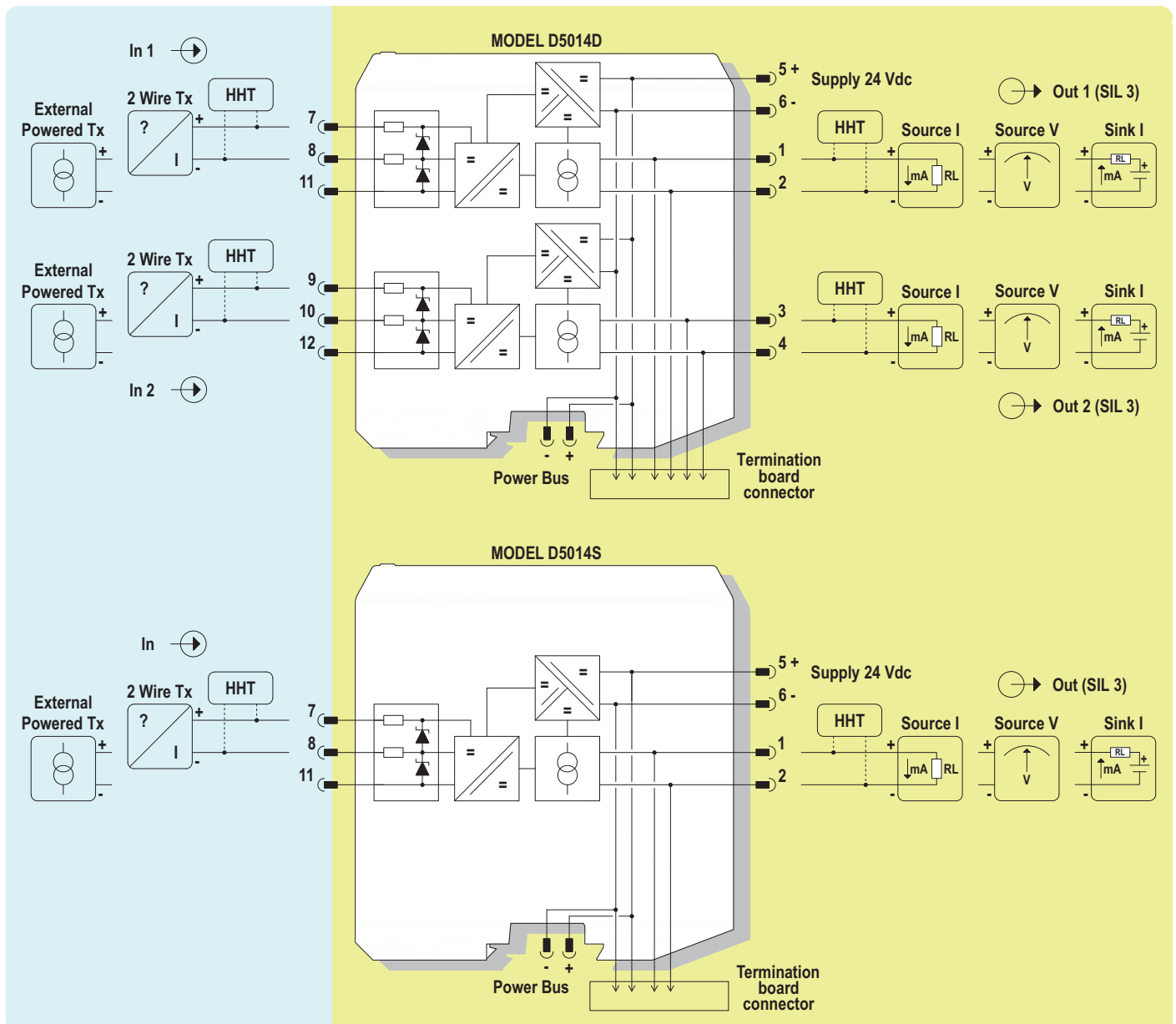


NOTE for USA and Canada:  
 IIC equal to Gas Groups A, B, C, D, E, F and G  
 IIB equal to Gas Groups C, D, E, F and G  
 IIA equal to Gas Groups D, E, F and G

**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



## 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

## Safety Description

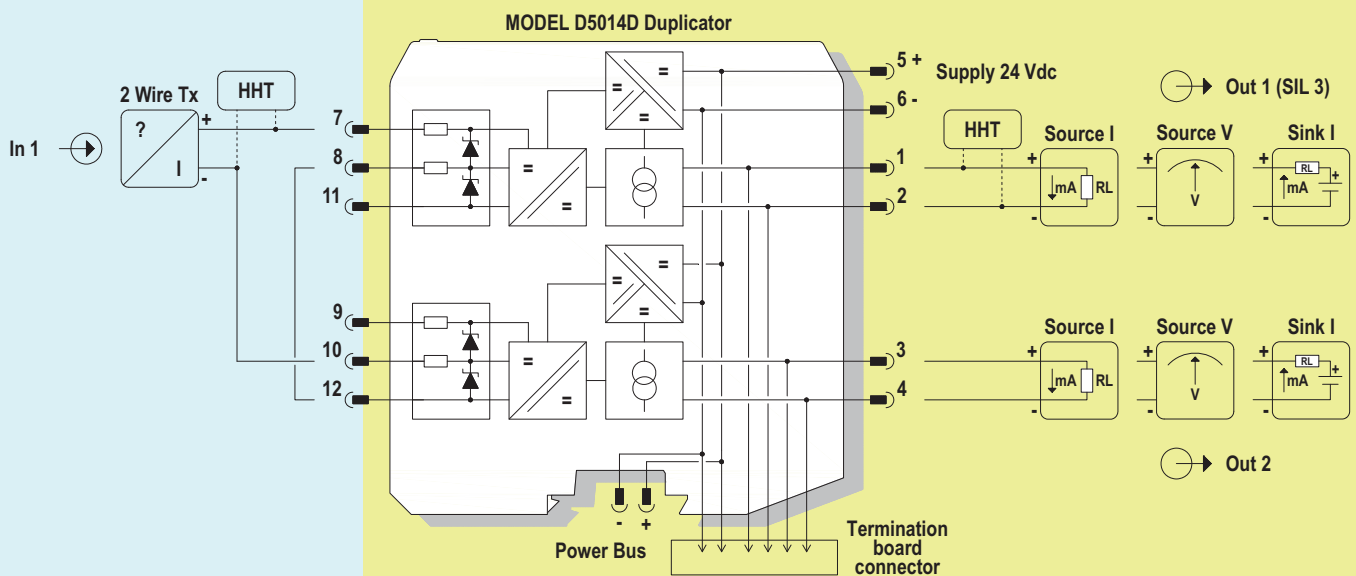
Terminals 7-10

$U_o/V_{oc} = 27\text{ V}$

$I_o/I_{sc} = 93\text{ mA}$

$P_o/P_o = 623\text{ mW}$

Group	Co/Ca ( $\mu\text{F}$ )	Lo/La (mH)	Lo/Ro ( $\mu\text{H}/\Omega$ )
Cenelec			
IIC	0.090	3	57.0
IIB	0.705	16.6	228.3
IIA	2.330	33.2	456.6
I	3.750	54.5	749.1
IIIC	0.705	16.6	228.3



### Connections for Duplication of 2 wires Transmitter Input

Restrictions on specifications for 2 wires Transmitter Input:

Bidirectional communication for Smart Transmitter is provided only on channel 1

The minimum supply voltage available for Transmitter ( $V_{tx}$ ) is 14 V at 20 mA input

Safety parameters must be changed in:  $U_o/V_{oc} = 27\text{ V}$ ,  $I_o/I_{sc} = 93\text{ mA}$ ,  $P_o/P_o = 623\text{ mW}$

## Function Diagram:

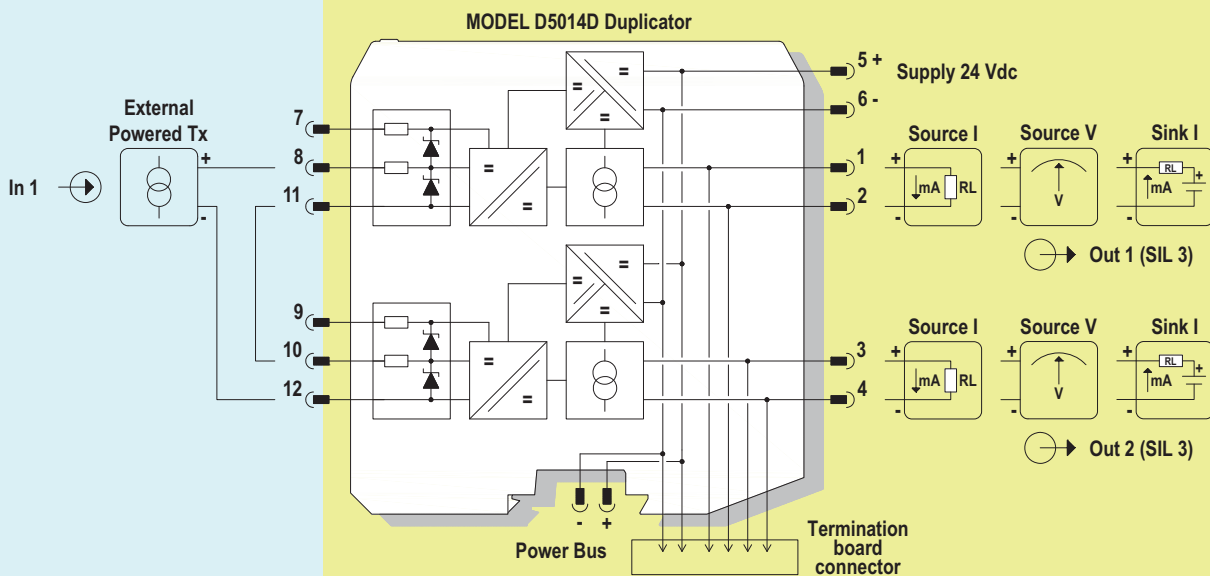
HAZARDOUS AREA ZONE 0 (ZONE 20) GROUP IIC,  
HAZARDOUS LOCATIONS CLASS I, DIVISION 1, GROUPS A, B, C, D,  
CLASS II, DIVISION 1, GROUPS E, F, G, CLASS III, DIVISION 1,  
CLASS I, ZONE 0, GROUP IIC

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

## Safety Description

Terminals 8-12  
 $U_o/V_{oc} = 2.2 \text{ V}$   
 $I_o/I_{sc} = 56 \text{ mA}$   
 $P_o/P_o = 31 \text{ mW}$

Group	Co/Ca ( $\mu\text{F}$ )	Lo/La (mH)	Lo/Ro ( $\mu\text{H}/\Omega$ )
Cenelec			
IIC	100	11.3	1163.6
IIB	1000	45.3	4654.5
IIA	1000	90.7	9309
I	1000	151.1	15272.7
IIC	1000	45.3	4654.5



### Connections for Duplication of Active Input Signals

Restrictions on specifications for external powered Transmitter:

Voltage drop  $\leq 1.0 \text{ V}$

Safety parameters must be changed in:  $U_o/V_{oc} = 2.2 \text{ V}$ ,  $I_o/I_{sc} = 56 \text{ mA}$ ,  $P_o/P_o = 31 \text{ mW}$

**Characteristics:**

**General Description:**

The single and dual channel Switch/Proximity Detector Repeater, D5030S and D5030D module is a unit suitable for applications requiring SIL 3 level (according to IEC 61508:2010 Ed. 2) in safety related systems for high risk industries.

The unit can be configured for switch or proximity detector (EN60947-5-6, NAMUR), NO or NC and for NE or ND SPST (D5030D) or SPDT (D5030S) relay output contact. Each channel enables a Safe Area load to be controlled by a switch, or a proximity detector, located in Hazardous Area.

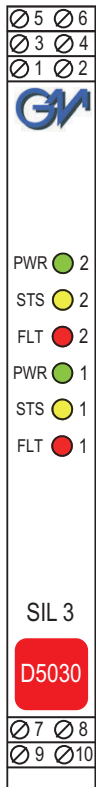
Fault detection circuit (DIP switch configurable) is available for both proximity sensor and switch equipped with end of line resistors. In case of fault, when enabled it de-energizes the corresponding output relay and turns the fault LED on; when disabled the corresponding output relay repeats the input line open or closed status as configured.

D5030D is programmable via dip switches as single input and two independent outputs. Out 2 can be programmed for output duplicating Out 1 or Fault detection Out.

In case of duplication, relay actuation can be independently configured for each output. In case of fault output, relay actuation can be programmed as normally energized or normally de-energized.

Mounting on standard DIN-Rail, with or without Power Bus, in Safe Area / Non Hazardous Location or in Zone 2 / Class I, Division 2 or Class I, Zone 2.

**Front Panel and Features:**



SIL 3 according to IEC 61508:2010 Ed. 2 for Tproof = 2 / 4 years (10 / 20 % of total SIF), considering 100 mA max contact current.

SIL 2 according to IEC 61508:2010 Ed. 2 for Tproof = 5 / 11 years (10 / 20 % of total SIF), considering 4 A max contact current.

PFDavg (1 year) 4.92 E-05, SFF 90.06 %, considering 100 mA max contact current.

PFDavg (1 year) 1.72 E-04, SFF 78.55 %, considering 4 A max contact current.

Systematic capability SIL 3

2 fully independent channels.

Input from Zone 0 (Zone 20) / Division 1, installation in Zone 2 / Division 2.

NO/NC switch/proximity Detector Input, NE/ND relay actuation mode.

Field open and short circuit detection.

Three port isolation, Input/Output/Supply.

EMC Compatibility to EN61000-6-2, EN61000-6-4, EN61326-1, EN61326-3-1 for safety system.

In-field programmability by DIP Switch.

ATEX, IECEx, FM, FMC, INMETRO, GOST, TÜV Certifications.

Type Approval Certificate DNV for marine applications.

High Density, two channels per unit.

Simplified installation using standard DIN-Rail and plug-in terminal blocks, with or without Power Bus.

250 Vrms (Um) max. voltage allowed to the instruments associated with the barrier.

**Technical Data:**

**Supply:**

24 Vdc nom (18 to 30 Vdc) reverse polarity protected, ripple within voltage limits  $\leq 5$  Vpp, 2 A time lag fuse internally protected.

**Current consumption @ 24 V:** 35 mA for 2 channels D5030D, 18 mA for 1 channel D5030S with short circuit input and relay energized, typical.

**Power dissipation:** 0.85 W for 2 channels D5030D, 0.45 W for 1 channel D5030S with 24 V supply voltage, short circuit input and relay energized, typical.

**Isolation (Test Voltage):**

I.S. In/Out 2.5 KV; I.S. In/Supply 2.5 KV; I.S. In/ I.S In 500 V;

Out/Supply 2.5 KV; Out/Out 2.5 KV.

**Input switching current levels:**

ON  $\geq 2.1$  mA (1.9 to 6.2 mA range), OFF  $\leq 1.2$  mA (0.4 to 1.3 mA range), 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 relay with single channel unit D5030S or de-energize channel relay with D5030D used as dual channel unit or actuate the fault relay out with D5030D used as fault signaling unit).

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

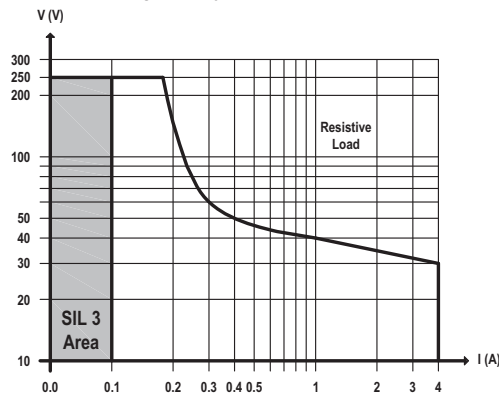
**Output:**

voltage free SPST (D5030D) or SPDT (D5030S) relay contact.

**Contact material:** Ag Alloy (Cd free), gold plated.

**Contact rating:** 4 A 250 Vac 1000 VA, 4 A 250 Vdc 120 W (resistive load).

Min. switching current 1 mA.  
**DC Load breaking capacity:**



**Mechanical / Electrical life:**  $5 * 10^6 / 3 * 10^4$  operation, typical.

**Operate / Release time:** 8 / 4 ms typical.

**Bounce time NO / NC contact:** 3 / 8 ms typical.

**Frequency response:** 10 Hz maximum.

**Compatibility:**

CE mark compliant, conforms to Directives:

94/9/EC Atex, 2004/108/CE EMC, 2006/95/EC LVD, 2011/65/EU RoHS.

**Environmental conditions:**

**Operating:** temperature limits - 40 to + 70 °C, relative humidity 95 %, up to 55 °C.

**Storage:** temperature limits - 45 to + 80 °C.

**Safety Description:**



**ATEX:** II 3(1) G Ex nA nC [ia Ga] IIC T4 Gc, II (1) D [Ex ia Da] IIIC, I (M1) [Ex ia Ma] I

**IECEx / INMETRO:** Ex nA nC [ia Ga] IIC T4 Gc, [Ex ia Da] IIIC, [Ex ia Ma] I,

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

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

**GOST R:** 2ExnAnC[ia]IIC T4 X. **GOST:** 2Exs[ia]IIC T4 X

associated apparatus and non-sparking electrical equipment.

Uo/Voc = 10.5 V, Io/Isc = 22 mA, Po/Po = 56 mW at terminals 7-8, 9-10.

Um = 250 Vrms, -40 °C  $\leq$  Ta  $\leq$  70 °C.

**Approvals:**

BVS 10 ATEX E 113 X conforms to EN60079-0, EN60079-11, EN60079-15,

EN60079-26, EN50303,

IECEx BVS 10.0072 X conforms to IEC60079-0, IEC60079-11, IEC60079-15,

IEC60079-26,

INMETRO DNV 13.0109 X conforms to ABNT NBR IEC60079-0, ABNT NBR IEC60079-11,

ABNT NBR IEC60079-15, ABNT NBR IEC60079-26.

FM 3046304 and FMC 3046304C conforms to Class 3600, 3610, 3810, 3611,

ANSI/ISA-60079-0, ANSI/ISA-60079-11, ANSI/ISA-60079-15, C22.2 No.142, C22.2 No.157,

C22.2 No.213, C22.2 No. 60079-0, C22.2 No. 60079-11, C22.2 No. 60079-15.

Conforms to GOST 12.2.007.0-75, R 51330.0-99, R 51330.10-99, R 51330.14-99.

Conforms to GOST 12.2.007.0, 22782.0, 22782.3, 22782.5.

TÜV Certificate No. C-IS-236198-04, SIL 2 / SIL 3 conforms to IEC61508:2010 Ed. 2.

DNV Type Approval Certificate for marine applications No.A-13625.

**Mounting:**

T35 DIN-Rail according to EN50022, with or without Power Bus.

**Weight:** about 140 g D5030D, 120 g D5030S.

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

**Location:** installation in Safe Area/Non Hazardous Locations or Zone 2, Group IIC T4 or Class I, Division 2, Group A,B,C,D, T4 or Class I, Zone 2, Group IIC, T4.

**Protection class:** IP 20.

**Dimensions:** Width 12.5 mm, Depth 123 mm, Height 120 mm.

**Ordering Information:**

Model:	D5030	
1 channel		S
2 channels		D

Power Bus and DIN-Rail accessories:

Connector JDFT049

Cover and fix MCHP196

Terminal block male MOR017

Terminal block female MOR022



**Parameters Table:**

Safety Description	Maximum External Parameters			
	Group Cenelec	Co/Ca (μF)	Lo/La (mH)	Lo/Ro Ω
Terminals 7-8, 9-10	IIC	2.41	78.3	635.9
Uo/Voc = 10.5 V	IIB	16.80	313.4	2543.9
Io/Isc = 22 mA	IIA	75.00	626.9	5087.9
Po/Po = 56 mW	I	66.00	1028.6	8347.4
	IIIC	16.80	313.4	2543.9

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

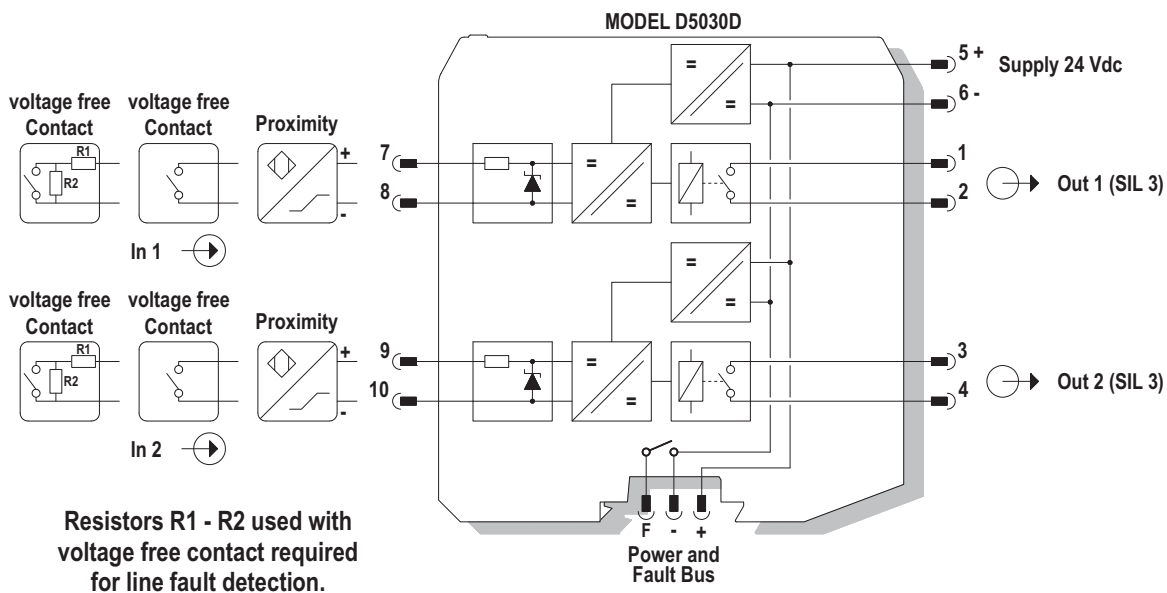
**Image:**



**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

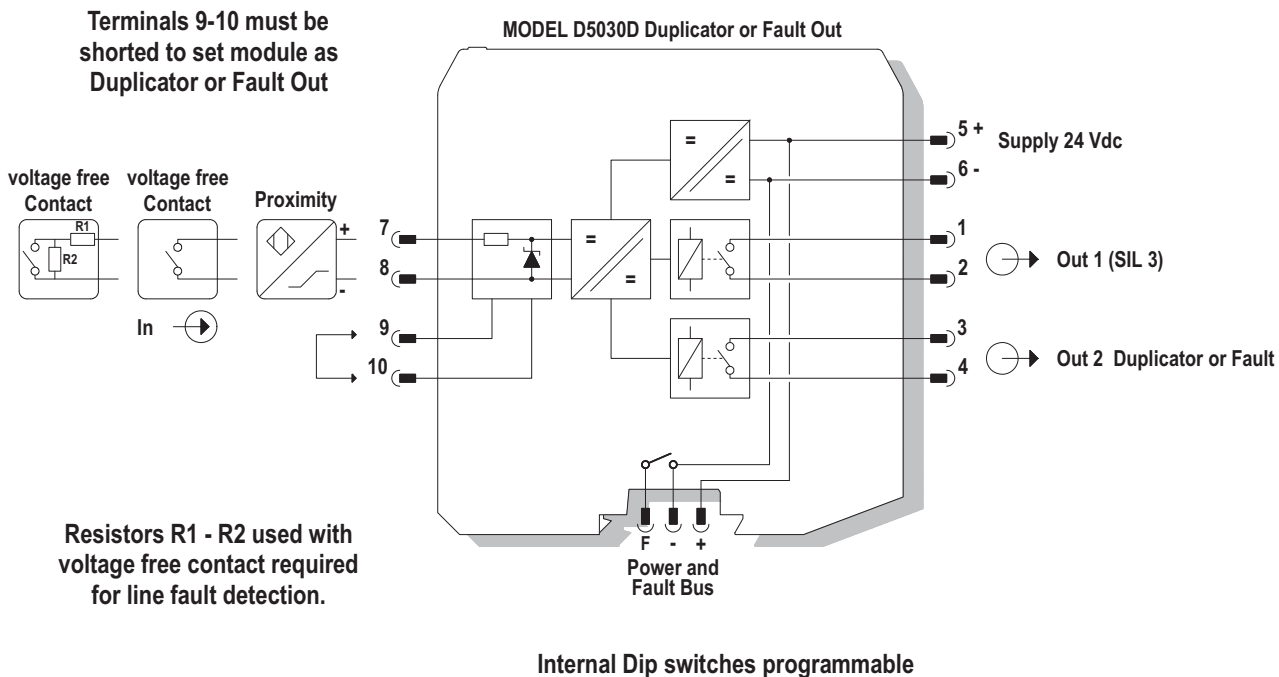


Relay contact shown in de-energized position.  
 Terminals 1-2 and 3-4 open.

**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

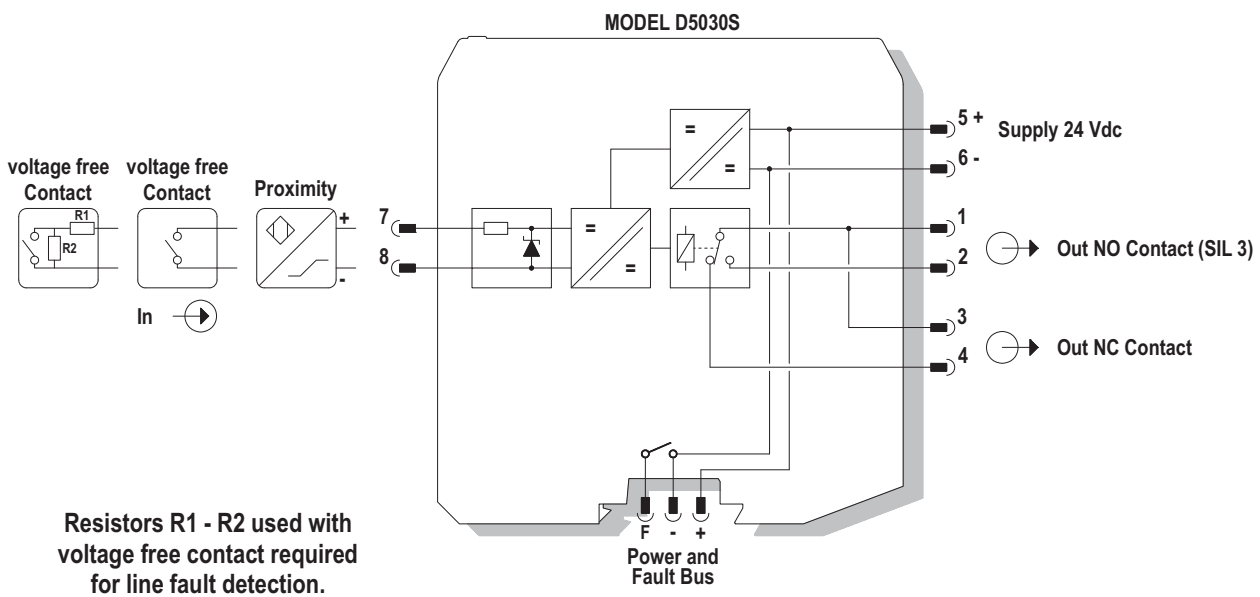


Relay contact shown in de-energized position.  
 Terminals 1-2 and 3-4 open.

**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



Relay contact shown in de-energized position.  
 Terminals 1-2 open, terminals 3-4 close.

**Characteristics:**

**General Description:**

The Switch/Proximity Detector Repeater type D5231E is a unit with eight independent channels suitable for applications requiring SIL 2 level (according to IEC 61508) in safety related systems for high risk industries.

The unit can be configured for switch or proximity detector (EN60947-5-6 NAMUR), NO or NC input and for NO or NC floating solid-state relay (photo-MOS) isolated output compatible with logic circuits. Configuration is programmable from PC by the GM Pocket Portable Adapter PPC5092 via USB serial line and SWC5090 Configurator software.

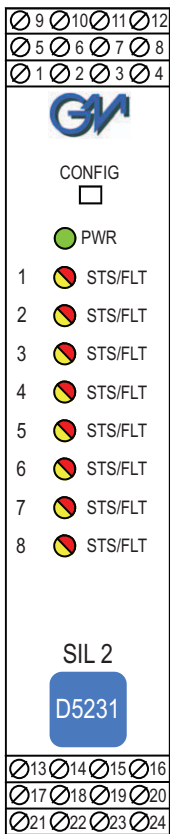
Each channel enables a Safe Area load to be controlled by a switch, or a proximity detector, located in Hazardous Area.

Fault detection circuit (configurable by PC) is available for all proximity sensors and switches equipped with end of line resistors. In case of fault, when enabled it de-energizes the corresponding solid-state relay (photo-MOS) and turns the fault red LED on; when disabled the corresponding solid-state relay (photo-MOS) repeats the input line open or closed status as configured.

D5231E has eight inputs and eight independent outputs.  
Modbus RTU RS-485 output is available on Bus connector.

Mounting on standard DIN-Rail, with or without Power Bus, or on customized Termination Boards, in Safe Area or in Zone 2.

**Front Panel and Features:**



- SIL 2 according to IEC 61508 for Tproof = 5 yrs (10 / 20 % of total SIF).
- 8 fully independent channels
- Input from Zone 0 (Zone 20), installation in Zone 2.
- NO/NC switch/proximity Detector Input, NO/NC solid-state output relay .
- Field open and short circuit detection.
- High Accuracy,  $\mu$ P controlled A/D converter.
- Three port isolation, Input/Output/Supply.
- Modbus RTU RS-485 Output.
- EMC Compatibility to EN61000-6-2, EN61000-6-4, EN61326-1, EN61326-3-1 for safety system.
- Fully programmable operating parameters.
- Any input can be assigned to any number of outputs. Logical output functions available.
- ATEX, IECEx Certifications.
- High Density, eight channels per unit.
- Simplified installation using standard DIN-Rail and plug-in terminal blocks, with or without power Bus, or customized Termination Boards.
- 250 Vrms (Um) max. voltage allowed to the instruments associated with the barrier.

**Technical Data:**

**Supply:**

24 Vdc nom (18 to 30 Vdc) reverse polarity protected, ripple within voltage limits  $\leq 5$  Vpp, 2 A time lag fuse internally protected.

**Current consumption @ 24 V:** 75 mA for 8 channels with short circuit input and solid-state relay (photo-MOS) closed, typical.

**Power dissipation:** 1.8 W with 24 V supply voltage, for 8 channels with short circuit input and solid-state relay (photo-MOS) closed, typical.

**Isolation (Test Voltage):**

I.S. In/Out 1.5 KV; I.S. In/Supply 1.5 KV; Out/Supply 500 V.

**Input switching current levels:**

ON  $\geq 2.1$  mA (1.9 to 6.2 mA range), OFF  $\leq 1.2$  mA (0.4 to 1.3 mA range), 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.

**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 (solid-state relay, photo-MOS).

**Open-collector rating:** 100 mA at 35 V ( $\leq 1.0$  V voltage drop).


**Leakage current:**  $\leq 10$   $\mu$ A at 35 V.

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

**Frequency response:** 500 Hz maximum.

**Modbus Output:** Modbus RTU protocol up to 115.200 baud on Bus connector.

**Compatibility:**

 CE mark compliant, conforms to 94/9/EC Atex Directive and to 2004/108/CE EMC Directive.

**Environmental conditions:**

**Operating:** temperature limits – 40 to + 70 °C, relative humidity 95 %, up to 55 °C.

**Storage:** temperature limits – 45 to + 80 °C.

**Safety Description:**



**ATEX:** II 3(1) G Ex nA [ja Ga] IIC T4 Gc, II (1) D [Ex ia Da] IIIC, I (M1) [Ex ia Ma] I

**IECEx:** Ex nA [ja Ga] IIC T4 Gc, [Ex ia Da] IIIC, [Ex ia Ma] I,

associated apparatus and non-sparking electrical equipment.

Uo/Voc = 11.2 V, Io/Isc = 12 mA, Po/Po = 34 mW at terminals 21-13, 21-14, 22-15, 22-16, 23-17, 23-18, 24-19, 24-20.

Um = 250 Vrms, -40 °C  $\leq$  Ta  $\leq$  70 °C.

**Approvals:**

ATEX conforms to EN60079-0, EN60079-11, EN60079-15, EN60079-26,

IECEx conforms to IEC60079-0, IEC60079-11, IEC60079-15, IEC60079-26.

SIL 2 conforms to IEC61508.

**Mounting:**

T35 DIN-Rail according to EN50022, with or without Power Bus or on customized Termination Board.

**Weight:** about 145 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 installation.

**Protection class:** IP 20.

**Dimensions:** Width 22.5 mm, Depth 123 mm, Height 120 mm.

**Ordering Information:**

Model:	D5231	Power Bus and DIN-Rail accessories:
8 channels	E	Connector JDFT050 Cover and fix MCHP196 Terminal block male MOR017 Terminal block female MOR022

Operating parameters are programmable from PC by the GM Pocket Portable Adapter PPC5092 via USB serial line and SWC5090 Configurator software.

**Parameters Table:**

**Image:**

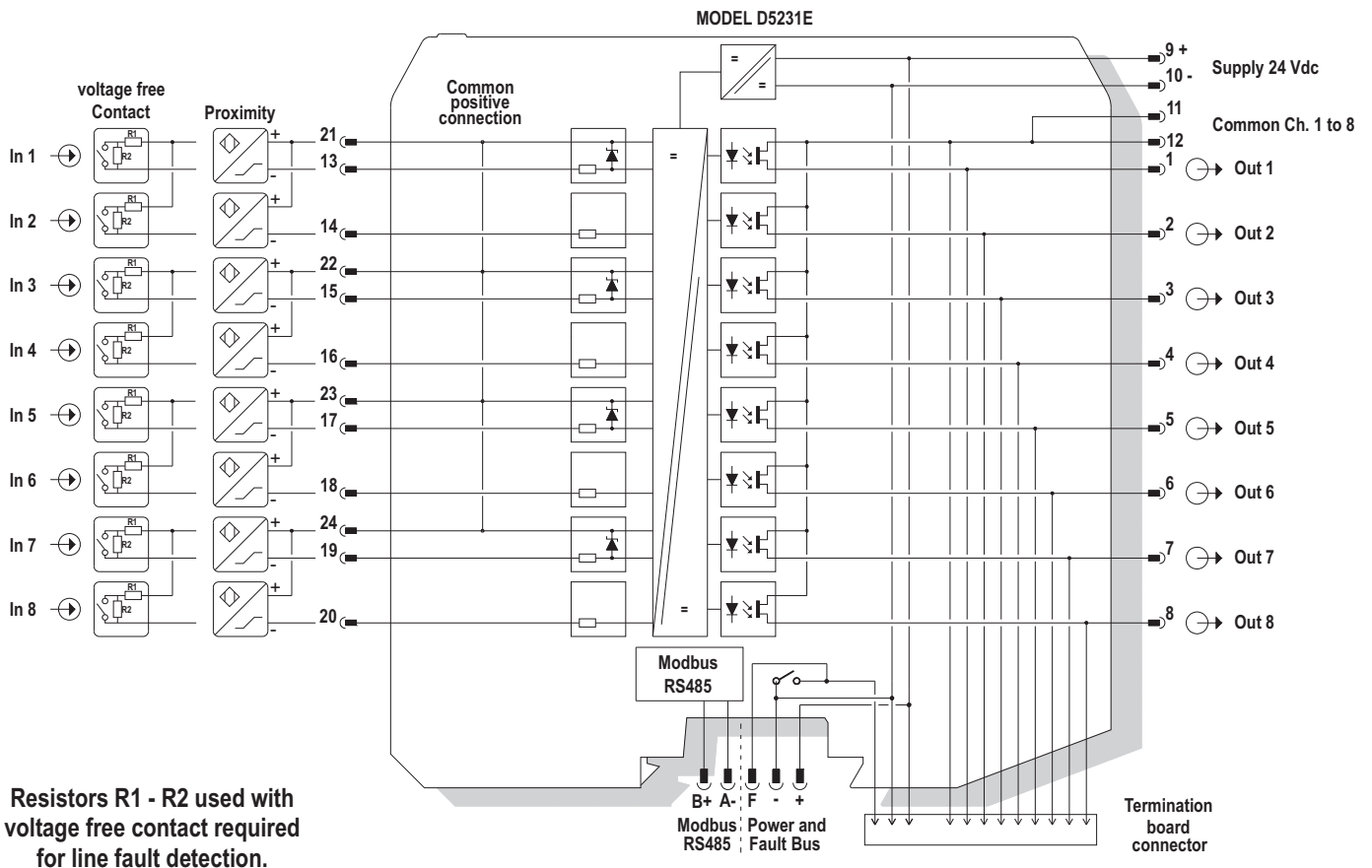
Safety Description	Maximum External Parameters			
	Group Cenelec	Co/Ca (μF)	Lo/La (mH)	Lo/Ro (μH/Ω)
Terminals 21-13, 21-14, 22-15, 22-16, 23-17, 23-18, 24-19, 24-20	IIC	1.84	253	1070
	IIB	12.6	1009	4277
Uo/Voc = 11.2 V	IIA	54	2017	8554
Io/Isc = 12 mA	I	49	3309	14033
Po/Po = 34 mW	iaD	12.6	1009	4277



**Function Diagram:**

HAZARDOUS AREA ZONE 0 (ZONE 20) GROUP IIC

SAFE AREA, ZONE 2 GROUP IIC T4



## Configuring and Monitoring via Software:

### CONFIGURATION

Configuration parameters can be read and written from the module or from saved file. It is also possible to reset the module configuration to factory default settings. A report sheet containing complete configuration can be printed.

### INPUTS 1 to 8:

#### Sensor Type:

- Proximity
- Voltage free contact

Note: To enable line diagnostic on Voltage free contacts, configure sensor as "Proximity" and follow instructions in Section "Operation" of Manual ISM0172.

### TAGS 1 to 8:

16 alphanumerical characters.

### OUTPUTS 1 to 8:

#### Source:

- Input 1 Output represents Input 1,
- Input 2 Output represents Input 2,
- Input 3 Output represents Input 3,
- Input 4 Output represents Input 4,
- Input 5 Output represents Input 5,
- Input 6 Output represents Input 6,
- Input 7 Output represents Input 7,
- Input 8 Output represents Input 8,

Logical function Output represents AND/OR function of selected inputs.

#### Contact: normal condition of output contact

- NC Normally Closed,
- NO Normally Open.

#### In case of fault: Output behaviour when Input fault is detected

- Ignore Ignore,
- Go On Switch to ON status (Open when NC, Closed when NO),
- Go Off Switch to OFF status (Closed when NC, Open when NO).

#### Fault repeater: Output represents Input Fault status

#### Logical Function: visible only when selected in "Output source"

Select 2 or more (up to 8) Inputs to connect logically.

- AND Output represents AND logical function of selected Inputs.
  - NO: On AND On = Close; On AND Off = Open; Off AND Off = Open
  - NC: On AND On = Open; On AND Off = Close; Off AND Off = Close
- OR Output represents OR logical function of selected Inputs
  - NO: On OR On = Close; On OR Off = Close; Off OR Off = Open
  - NC: On OR On = Open; On OR Off = Open; Off OR Off = Close

### MONITOR

Allows the real-time monitoring of every Input and Output status.

Note that configuration is disabled when Monitoring is active.

#### INPUT STATUS: The status of each input is shown

- Open circuit Open circuit fault (only for Proximity Inputs),
- Off Off,
- On On,
- Short circuit Short circuit fault (only for Proximity Inputs).

#### OUTPUT STATUS: The status of each output contact is shown

- Open
- Closed

### DATA LOGGER

The status of all Inputs and all Outputs is acquired at constant chosen intervals and saved to user selected file in Comma Separated Value format (.csv).

Note that configuration is disabled when Data Logger is active.

#### PARAMETERS SETUP:

- Days: Number of days to acquire.
- Hours: Number of hours to acquire.
- Minutes: Number of minutes to acquire.
- Scan rate: Frequency interval for acquisitions.

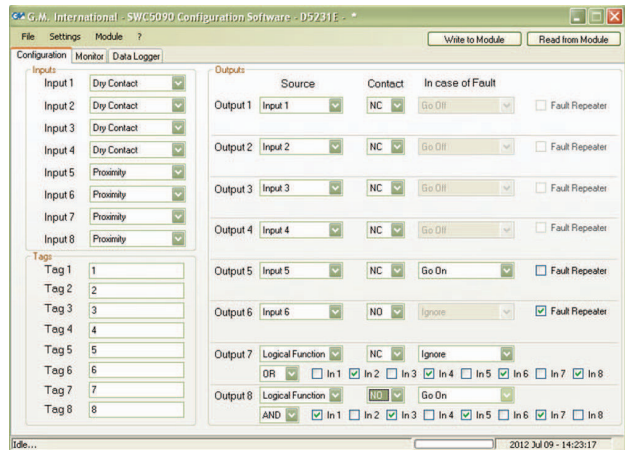
#### General Notes:

- SWC5090 Software can be downloaded for free at [www.gmintsl.com](http://www.gmintsl.com)
- PPC5092 Adapter is needed to interface PC to D5231E module.
- The PC supplies the module via USB, therefore operating power supply (24 Vdc) is not strictly needed when configuring the module.

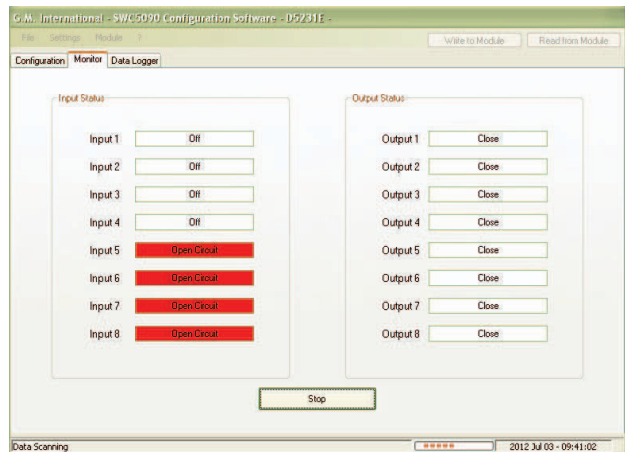
## Screenshots:



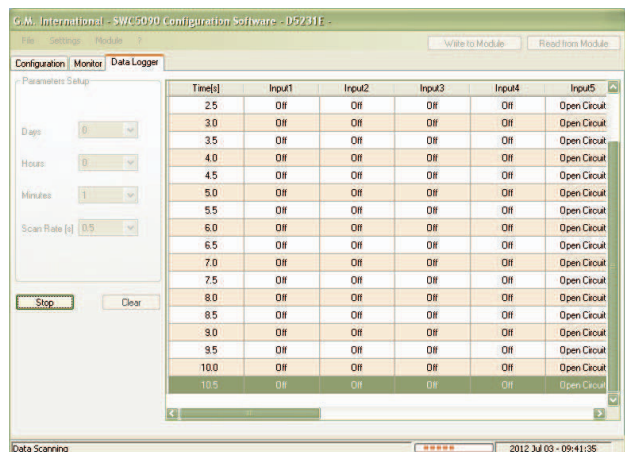
SWC5090 Software and PPC5092 USB Adapter



Input / Output configuration



Input / Output status real-time monitor



Real-time data logging to file





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