



# INSTRUCTION MANUAL

SIL 2 - SIL 3 Digital Relay Output  
Loop / Bus Powered  
DIN-Rail Models D1044S, D1044D

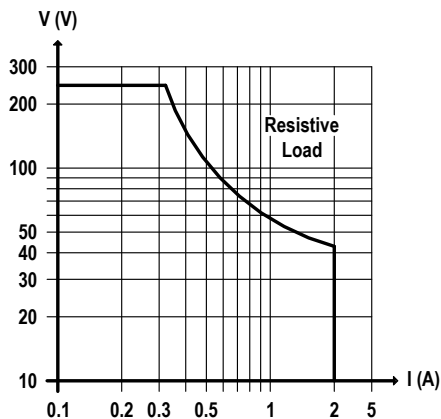
For Safety Related System and SIL2, SIL3 Applications according IEC61508 & IEC61511 Standards refer to "Functional Safety Manual" document number ISM0071.


### Characteristics

**General Description:** The single and dual channel DIN Rail Digital Relay Output, D1044S and D1044D, are 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).  
 Outputs are galvanically isolated and inputs are depolarized to ease wiring operations. Typical applications include switching of Hazardous Area circuits, changing of polarities and sounder tones, calibrating of strain gauge bridges, resetting of field devices, testing of fire detectors.  
 Each input channel can be isolated from supply (Bus Powered mode) or externally connected (by wiring) to supply (Loop Powered mode, where the safety PLC directly supplies the module and its input channel).  
 Each output channel provides a SPDT relay, with two contacts defined NO (Normally Open) and NC (Normally Close) when the output relay is de-energized.  
 Considering each channel NE (Normally Energized), the output relay is energized, so that NO contact is closed (useful for NE loads or Hazardous Area circuits) and NC contact is open (useful for ND loads or Hazardous Area circuits). The safe state is reached when the channel and the output relay are de-energized, so that NO contact is open (de-energizing loads or Hazardous Area circuits) and NC contact is closed (energizing loads or Hazardous Area circuits).  
**Function:** 1 or 2 channels I.S. relay output, provides 3 port isolation (input/output/supply).  
**D1044S (Loop / Bus Powered mode) or D1044D (Bus Powered mode with independent channels),** as shown in function diagrams:  
 SIL 2 Safety Function for NE load (de-energized in safe state) is available at Terminal Blocks 9/10-11 and Terminal Blocks 13/14-15.  
 SIL 2 Safety Function for ND load (energized in safe state) is available at Terminal Blocks 12-11 and Terminal Blocks 16-15.  
**D1044D (Loop / Bus Powered mode with 1oo2 channel architecture),** as shown in function diagram:  
 SIL 3 Safety Function for NE load (de-energized in safe state) is available at Terminal Blocks 13/14-11.  
 SIL 3 Safety Function for ND load (energized in safe state) is available at Terminal Blocks 16-15 (or 12-11 because externally connected in parallel).  
**Signalling LEDs:** Power supply indication (green), output status (yellow).  
**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:** 55 mA for 2 channels D1044D, 35 mA for 1 channel D1044S with relays energized.  
**Power dissipation:** 1.35 W for 2 channels D1044D, 0.85 W for 1 channel D1044S with 24 V supply voltage and relays energized.  
**Max. power consumption:** at 30 V supply voltage and relays energized, 1.5 W for 2 channels D1044D, 0.9 W for 1 channel D1044S.  
**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:** voltage free contact, logic level.  
**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 I.S.:** voltage free SPDT relay contact.  
**Contact material:** AgNi90/10.  
**Contact rating:** 60 Vdc, 2 A for use in Intrinsic Safety applications, 2 A 250 Vac 500 VA, 2 A 250 Vdc 80 W (resistive load) for non Intrinsic Safety applications.  
**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 In / Out:** 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.  
 $U_o/V_o = 0$  V,  $I_o/I_s = 0$  mA,  $P_o/P_o = 0$  mW at terminals 13/14-15-16, 9/10-11-12 ( $U_o$ ,  $I_o$ ,  $P_o$  equal to the connected Intrinsic Safety circuit).  
 $U_i/V_{max} = 60$  V,  $I_i/I_{max} = 2$  A,  $C_i = 0$  nF,  $L_i = 0$  nH at term. 13/14-15-16, 9/10-11-12.  
 $U_m = 250$  Vrms,  $-20$  °C  $\leq T_a \leq 60$  °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, 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. TÜV Certificate No. C-IS-204194-01, SIL 2 / SIL 3 conforms to IEC61508. Please refer to Functional Safety Manual for SIL applications.

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

**Weight:** about 140 g D1044D, 120 g D1044S.

**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.

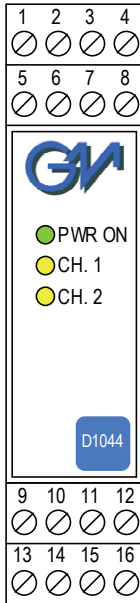
**Protection class:** IP 20.

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

## Ordering information

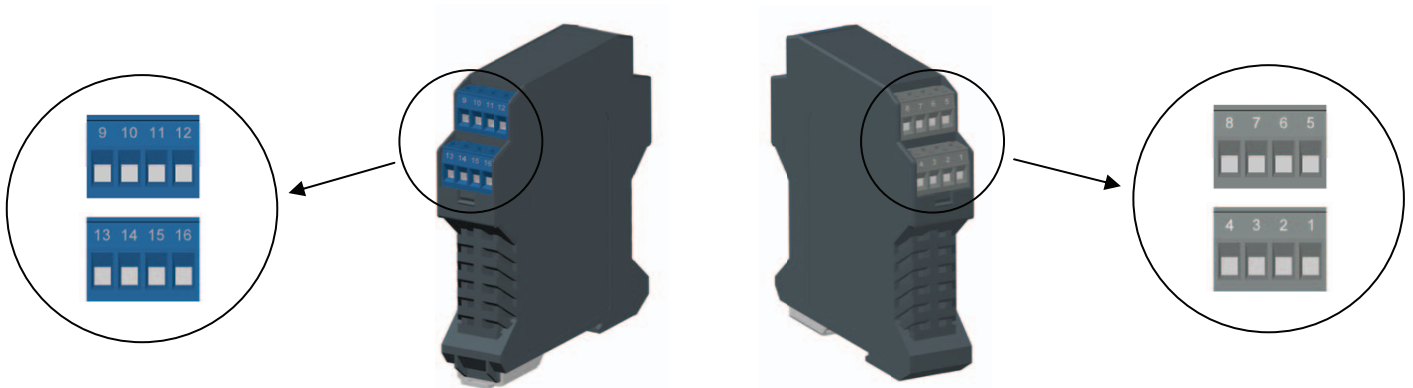
Model:	D1044			
1 channel		S		
2 channels		D		
Power Bus enclosure			/B	

## Front Panel and Features



- SIL 2 according to IEC 61508 D1044S or D1044D Bus Powered mode for Tproof = 6 / 10 yrs (10 / 20 % of total SIF).
- SIL 2 according to IEC 61508 D1044S Loop Powered mode for Tproof = 7 / 10 yrs (10 / 20 % of total SIF).
- SIL 3 according to IEC 61508 D1044S or D1044D Loop / Bus Powered mode with 1oo2 channel architecture for Tproof = 10 yrs (10 % or more of total SIF).
- PFDavg (1 year) 1.66 E-04, SFF 85.92 % with single channel architecture.
- PFDavg (1 year) 8.32 E-06, SFF 99.59 % with 1oo2 channel architecture.
- Output to Zone 0 (Zone 20), Division 1, installation in Zone 2, Division 2.
- Voltage, contact, logic level input.
- Two SPDT Relay Output Signals.
- Three port isolation, Input/Output/Supply.
- EMC Compatibility to EN61000-6-2, EN61000-6-4.
- ATEX, IECEx, FM & FM-C, Russian and Ukrainian Certifications.
- 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.

## Terminal block connections



### HAZARDOUS AREA

<b>9</b>	Output Ch 2 NO (Normally Opened)
<b>10</b>	Output Ch 2 NO (Normally Opened)
<b>11</b>	Output Ch 2 COM (Common)
<b>12</b>	Output Ch 2 NC (Normally Closed)
<b>13</b>	Output Ch 1 NO (Normally Opened)
<b>14</b>	Output Ch 1 NO (Normally Opened)
<b>15</b>	Output Ch 1 COM (Common)
<b>16</b>	Output Ch 1 NC (Normally Closed)

### SAFE AREA

<b>1</b>	Not used
<b>2</b>	Not used
<b>3</b>	+ Power Supply 24 Vdc
<b>4</b>	- Power Supply 24 Vdc
<b>5</b>	Input Ch 1 for Control
<b>6</b>	Input Ch 1 for Control
<b>7</b>	Input Ch 2 for Control
<b>8</b>	Input Ch 2 for Control

## Parameters Table

In the system safety analysis, always check the Hazardous Area/Hazardous Locations devices to conform with the related system documentation, if the device is Intrinsically Safe check its suitability for the Hazardous Area/Hazardous Locations and gas group encountered and that its maximum allowable voltage, current, power ( $U_i/V_{max}$ ,  $I_i/I_{max}$ ,  $P_i/P_i$ ) are not exceeded by the safety parameters ( $U_o/V_{oc}$ ,  $I_o/I_{sc}$ ,  $P_o/P_o$ ) of the D1044 series Associated Apparatus connected to it. Also consider the maximum operating temperature of the field device, check that added connecting cable and field device capacitance and inductance do not exceed the limits ( $C_o/C_a$ ,  $L_o/L_a$ ,  $L_o/R_o$ ) given in the Associated Apparatus parameters for the effective gas group. See parameters on enclosure side and the ones indicated in the table below:

D1044 Terminals		D1044 Associated Apparatus Parameters	Must be	Hazardous Area/ Hazardous Locations Device Parameters
Ch1	13/14 - 15 - 16	$U_o / V_{oc} = 0 \text{ V}$ ( $U_o$ equal to the connected I.S. circuit)	$\leq$	$U_i / V_{max}$
Ch2	9/10 - 11 - 12			
Ch1	13/14 - 15 - 16	$I_o / I_{sc} = 0 \text{ mA}$ ( $I_o$ equal to the connected I.S. circuit)	$\leq$	$I_i / I_{max}$
Ch2	9/10 - 11 - 12			
Ch1	13/14 - 15 - 16	$P_o / P_o = 0 \text{ mW}$ ( $P_o$ equal to the connected I.S. circuit)	$\leq$	$P_i / P_i$
Ch2	9/10 - 11 - 12			

When connected to other intrinsically safe devices or associated apparatus, check that maximum allowable voltage, current ( $U_i/V_{max}$ ,  $I_i/I_{max}$ ) of the D1044 Associated Apparatus are not exceeded by the safety parameters ( $U_o/V_{oc}$ ,  $I_o/I_{sc}$ ) of the Intrinsically Safe device, indicated in the table below:

D1044 Terminals		D1044 Associated Apparatus Parameters	Must be	Hazardous Area/ Hazardous Locations Device Parameters
Ch1	13/14 - 15 - 16	$U_i / V_{max} = 60\text{V}$	$\geq$	$U_o / V_{oc}$
Ch2	9/10 - 11 - 12			
Ch1	13/14 - 15 - 16	$I_i / I_{max} = 2 \text{ A}$	$\geq$	$I_o / I_{sc}$
Ch2	9/10 - 11 - 12			
Ch1	13/14 - 15 - 16	$C_i = 0 \text{ nF}$ , $L_i = 0 \text{ nH}$		
Ch2	9/10 - 11 - 12			

**For installations in which both the  $C_i$  and  $L_i$  of the Intrinsically Safe apparatus exceed 1 % of the  $C_o$  and  $L_o$  parameters of the Associated Apparatus (excluding the cable), then 50 % of  $C_o$  and  $L_o$  parameters are applicable and shall not be exceeded** (50 % of the  $C_o$  and  $L_o$  become the limits which must include the cable such that  $C_i \text{ device} + C \text{ cable} \leq 50 \% \text{ of } C_o$  and  $L_i \text{ device} + L \text{ cable} \leq 50 \% \text{ of } L_o$ ).

If the cable parameters are unknown, the following value may be used: Capacitance 60pF per foot (180pF per meter), Inductance 0.20 $\mu$ H per foot (0.60 $\mu$ H per meter).

The Intrinsic Safety Entity Concept allows the interconnection of Intrinsically Safe devices approved with entity parameters not specifically examined in combination as a system when the above conditions are respected.

For Division 1 and Zone 0 installations, the configuration of Intrinsically Safe Equipment must be FM approved under Entity Concept (or third party approved);

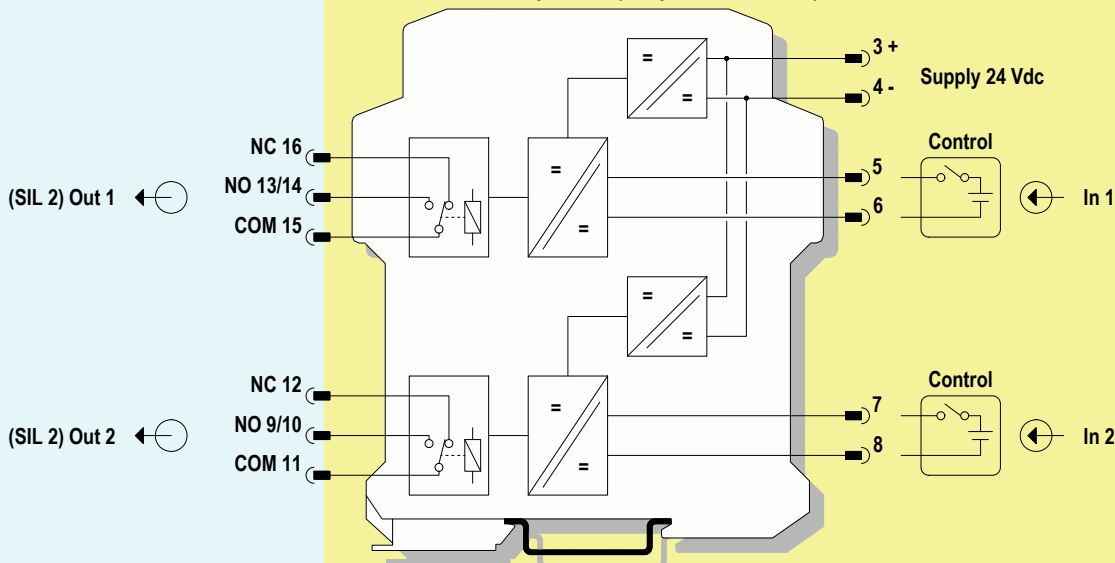
For Division 2 installations, the configuration of Intrinsically Safe Equipment must be FM approved under non-incendive field wiring or Entity Concept (or third party approved).

## 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

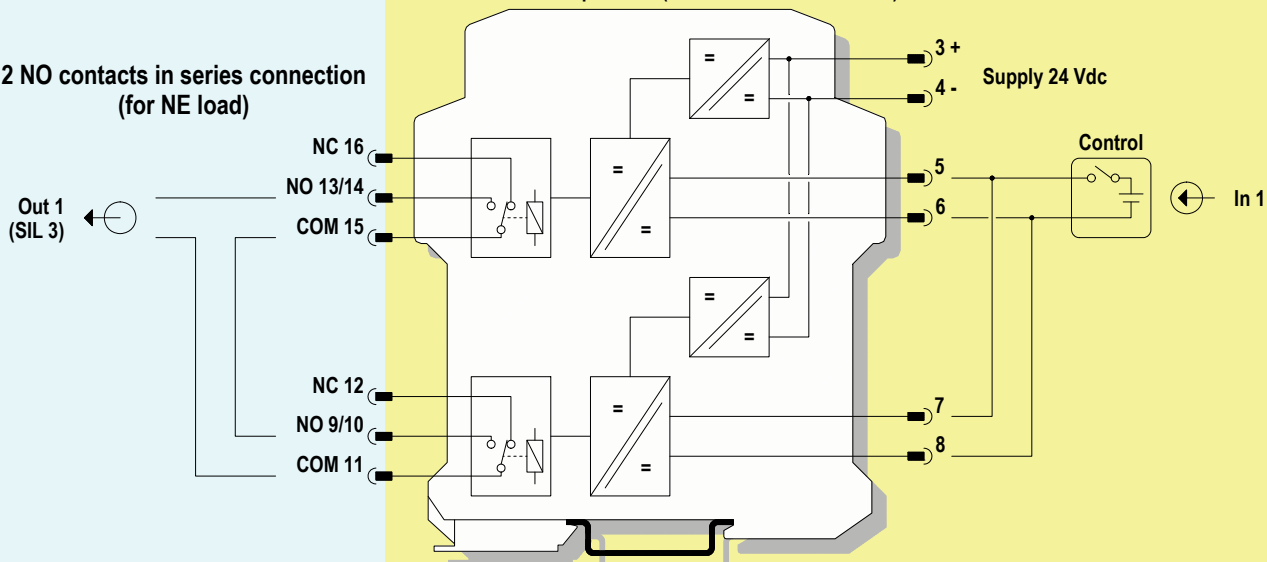
SAFE AREA, ZONE 2 GROUP IIC T4,  
NON HAZARDOUS LOCATIONS, CLASS I, DIVISION 2,  
GROUPS A, B, C, D T-Code T4, CLASS I, ZONE 2, GROUP IIC T4

**MODEL D1044D Bus powered (independent channels)**



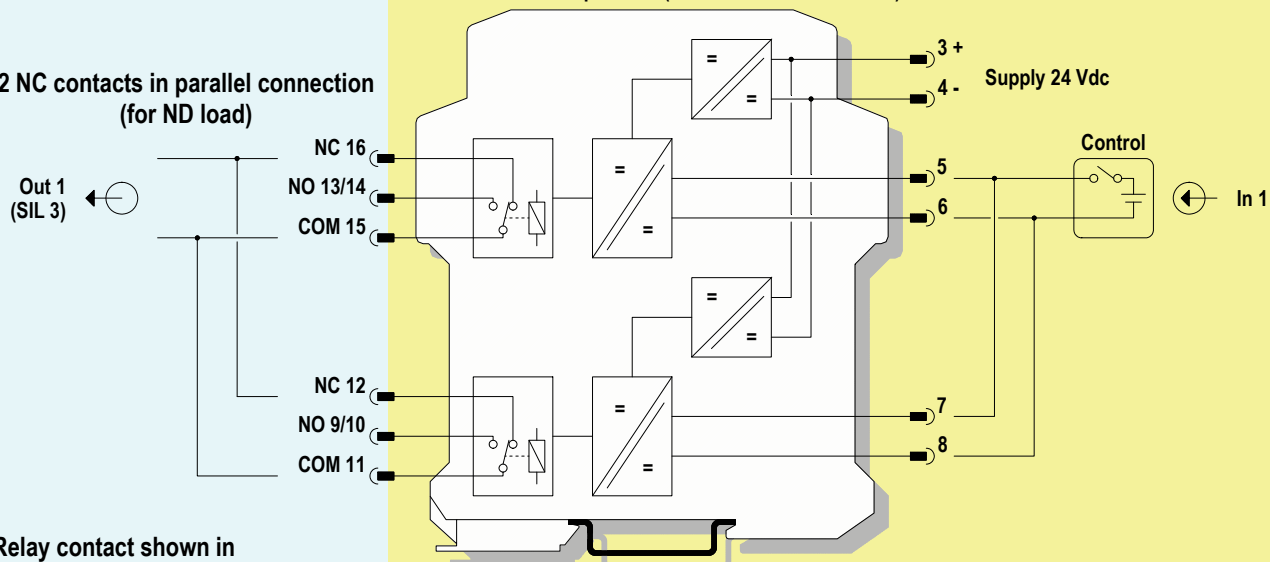
**MODEL D1044D Bus powered (1oo2 channel architecture)**

2 NO contacts in series connection  
(for NE load)



**MODEL D1044D Bus powered (1oo2 channel architecture)**

2 NC contacts in parallel connection  
(for ND load)

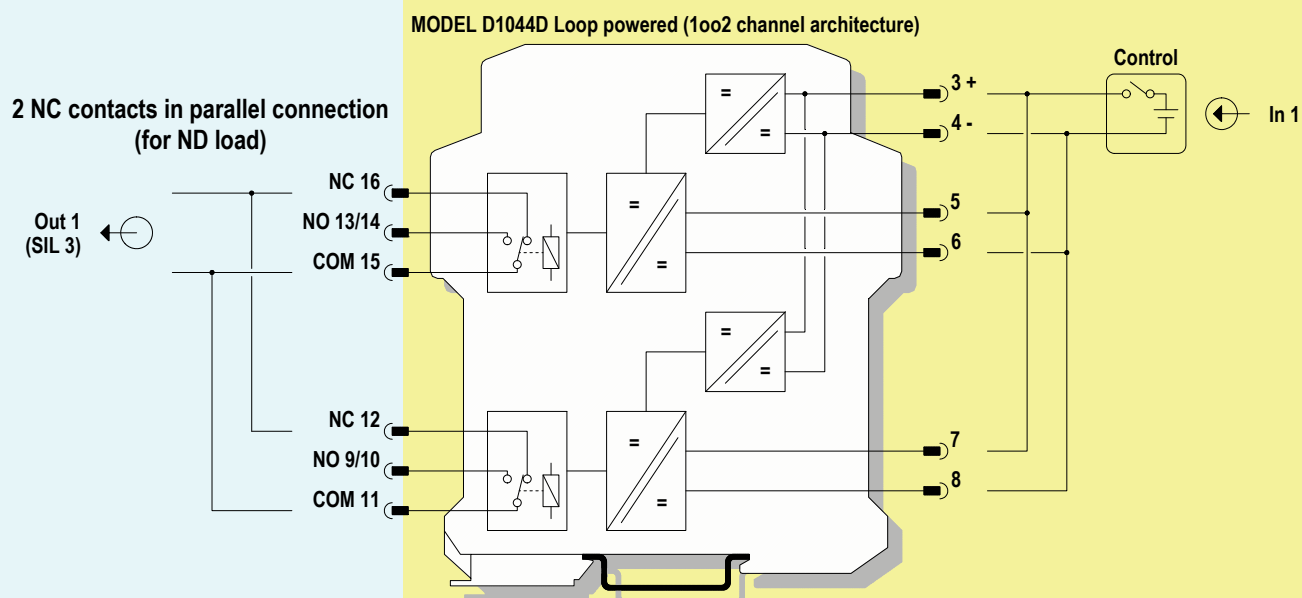
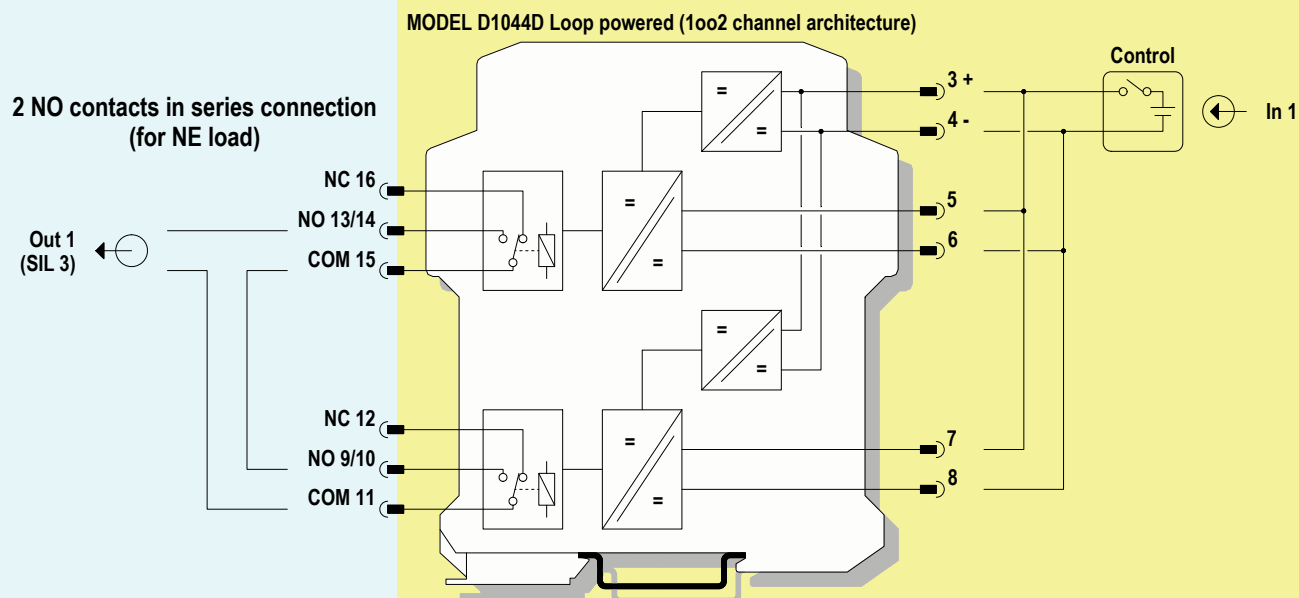


Relay contact shown in de-energized position

## 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

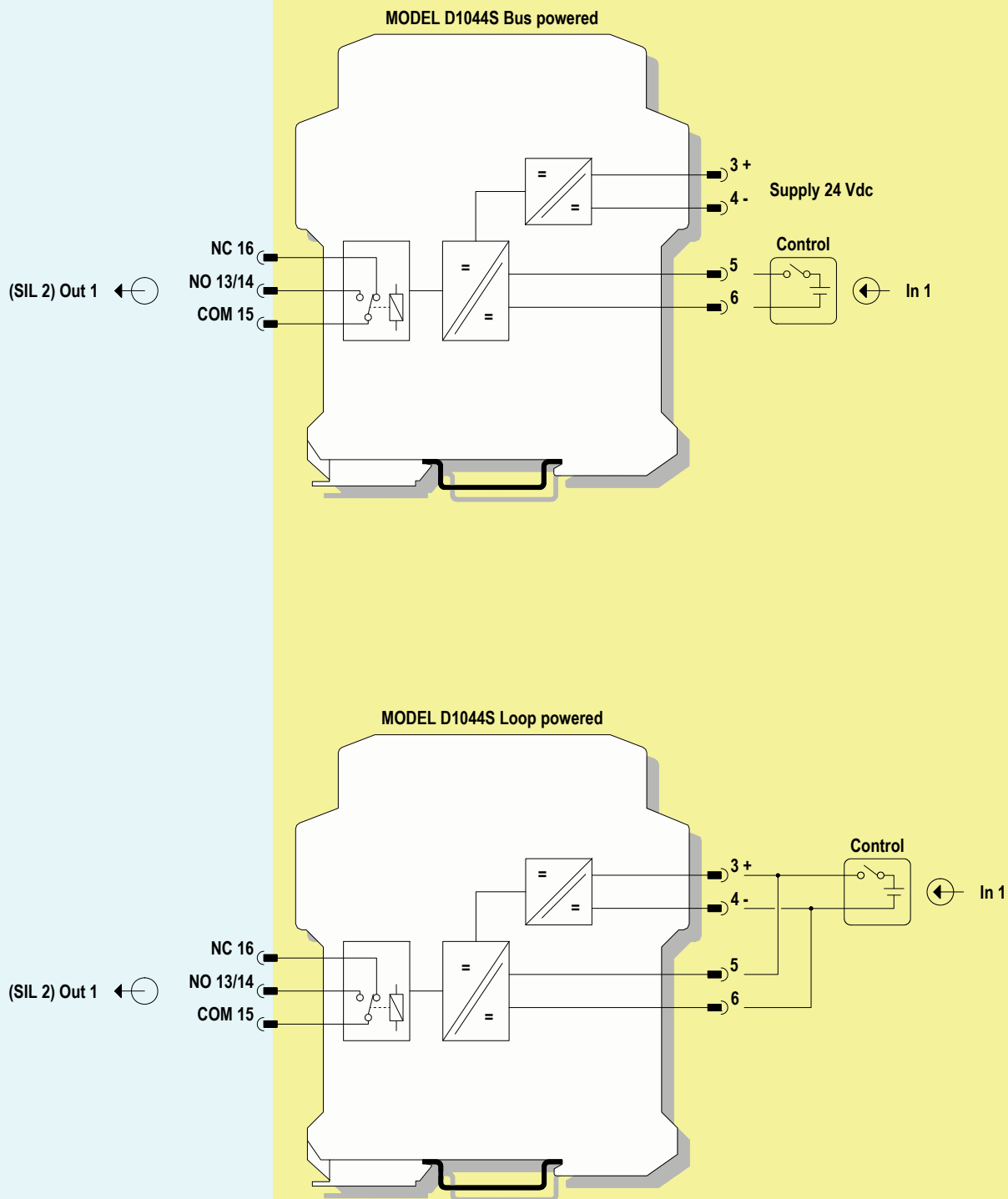


Relay contact shown in  
de-energized position

## 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

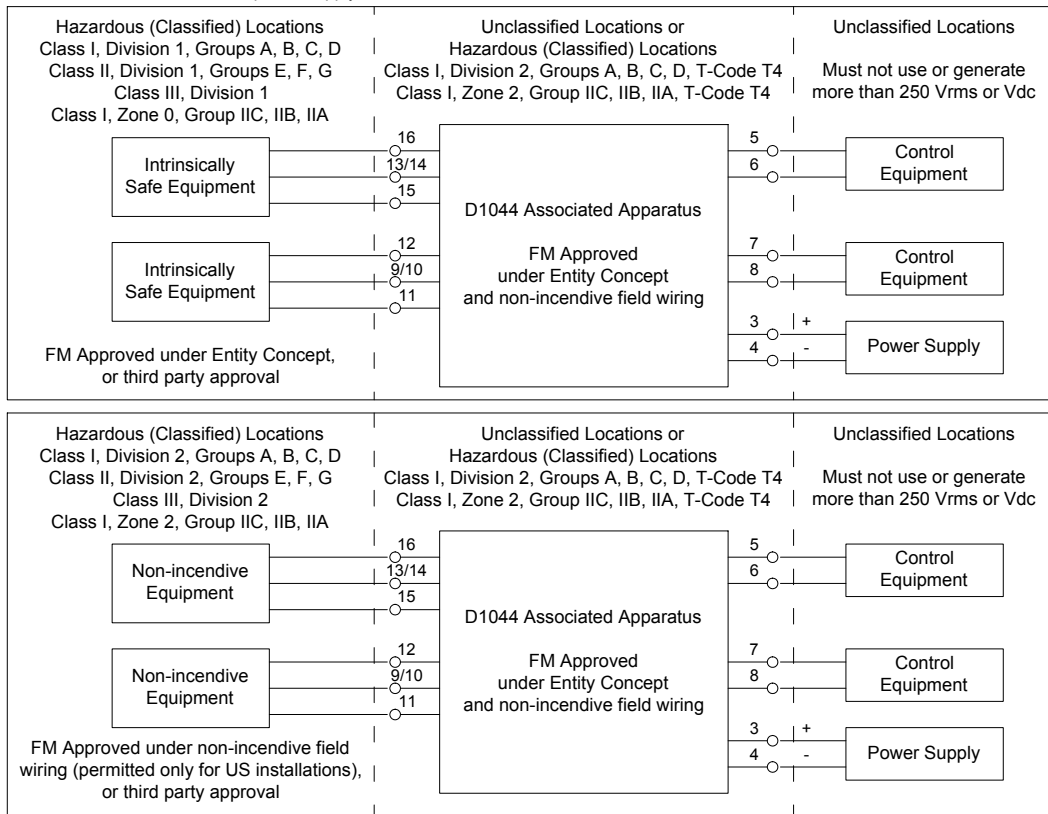
SAFE AREA, ZONE 2 GROUP IIC T4,  
NON HAZARDOUS LOCATIONS, CLASS I, DIVISION 2,  
GROUPS A, B, C, D T-Code T4, CLASS I, ZONE 2, GROUP IIC T4



Relay contact shown in de-energized position

## Warning

D1044 series are isolated Intrinsically Safe Associated Apparatus installed into standard EN50022 T35 DIN Rail located in Safe Area/Non Hazardous Locations or Zone 2, Group IIC, Temperature Classification T4, Class I, Division 2, Groups A, B, C, D, Temperature Code T4 and Class I, Zone 2, Group IIC, IIB, IIA Temperature Code T4 Hazardous Area/Hazardous Locations (according to EN/IEC60079-15, FM Class No. 3611, CSA-C22.2 No. 213-M1987, CSA-E60079-15) within the specified operating temperature limits Tamb -20 to +60 °C, and connected to equipment with a maximum limit for AC power supply Um of 250 Vrms.



Non-incendive field wiring is not recognized by the Canadian Electrical Code, installation is permitted in the US only.

For installation of the unit in a Class I, Division 2 or Class I, Zone 2 location, the wiring between the control equipment and the D1044 associated apparatus shall be accomplished via conduit connections or another acceptable Division 2, Zone 2 wiring method according to the NEC and the CEC.

Not to be connected to control equipment that uses or generates more than 250 Vrms or Vdc with respect to earth ground.

D1044 series must be installed, operated and maintained only by qualified personnel, in accordance to the relevant national/international installation standards (e.g. IEC/EN60079-14 Electrical apparatus for explosive gas atmospheres - Part 14: Electrical installations in hazardous areas (other than mines), BS 5345 Pt4, VDE 165, ANSI/ISA RP12.06.01 Installation of Intrinsically Safe System for Hazardous (Classified) Locations, National Electrical Code NEC ANSI/NFPA 70 Section 504 and 505, Canadian Electrical Code CEC) following the established installation rules, particular care shall be given to segregation and clear identification of I.S. conductors from non I.S. ones. De-energize power source (turn off power supply voltage) before plug or unplug the terminal blocks when installed in Hazardous Area/Hazardous Locations or unless area is known to be nonhazardous.

**Warning: substitution of components may impair Intrinsic Safety and suitability for Division 2, Zone 2.**

**Warning: de-energize main power source (turn off power supply voltage) and disconnect plug-in terminal blocks before opening the enclosure to avoid electrical shock when connected to live hazardous potential.**

**Explosion Hazard: to prevent ignition of flammable or combustible atmospheres, disconnect power before servicing or unless area is known to be nonhazardous.**

Failure to properly installation or use of the equipment may risk to damage the unit or severe personal injury.

The unit cannot be repaired by the end user and must be returned to the manufacturer or his authorized representative. Any unauthorized modification must be avoided.

## Operation

D1044 series are 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). Outputs are galvanically isolated and inputs are depolarized to ease wiring operations. Typical applications include switching of Hazardous Area circuits, changing of polarities and sounder tones, calibrating of strain gauge bridges, resetting of field devices, testing of fire detectors.

Each input channel can be isolated from supply (Bus Powered mode) or externally connected (by wiring) to supply (Loop Powered mode, where the safety PLC directly supplies the module and its input channel).

Each output channel provides a SPDT relay, with two contacts defined NO (Normally Open) and NC (Normally Close) when the output relay is de-energized.

Considering each channel NE (Normally Energized), the output relay is energized, so that NO contact is closed (useful for NE loads or Hazardous Area circuits) and NC contact is open (useful for ND loads or Hazardous Area circuits). The safe state is reached when the channel and the output relay are de-energized, so that NO contact is open (de-energizing loads or Hazardous Area circuits) and NC contact is closed (energizing loads or Hazardous Area circuits).

Presence of supply power and status of output (energized or de-energized) are displayed by signaling LEDs (green for power, yellow for status).



## Installation

D1044 series are digital relay output housed in a plastic enclosure suitable for installation on T35 DIN Rail according to EN50022.

D1044 unit can be mounted with any orientation over the entire ambient temperature range, see section "Installation in Cabinet" and "Installation of Electronic Equipments in Cabinet" Instruction Manual D1000 series for detailed instructions.

Electrical connection of conductors up to 2.5 mm<sup>2</sup> are accommodated by polarized plug-in removable screw terminal blocks which can be plugged in/out into a powered unit without suffering or causing any damage (**for Zone 2 or Division 2 installations check the area to be nonhazardous before servicing**).

The wiring cables have to be proportionate in base to the current and the length of the cable.

On the section "Function Diagram" and enclosure side a block diagram identifies all connections.

Identify the number of channels of the specific card (e.g. D1044S is a single channel model and D1044D is a dual channel model), the function and location of each connection terminal using the wiring diagram on the corresponding section, as an example (considering a Bus Powered mode application):

Connect 24 Vdc power supply positive at terminal "3" and negative at terminal "4".

For model D1044S connect input signal at terminal "5" and "6" regardless the polarity.

For model D1044D in addition to channel 1 connections above, connect terminal "7" and "8" regardless the polarity.

For model D1044S connect common relay contact output of channel 1 at terminal "15", normally closed contact at "16" and normally opened contact at "13" or "14".

For model D1044D connect common relay contact output of channel 2 at terminal "11", normally closed contact at "12" and normally opened contact at "9" or "10".

Intrinsically Safe conductors must be identified and segregated from non I.S. and wired in accordance to the relevant national/international installation standards (e.g. EN/IEC60079-14 Electrical apparatus for explosive gas atmospheres - Part 14: Electrical installations in hazardous areas (other than mines), BS 5345 Pt4, VDE 165, ANSI/ISA RP12.06.01 Installation of Intrinsically Safe System for Hazardous (Classified) Locations, National Electrical Code NEC ANSI/NFPA 70 Section 504 and 505, Canadian Electrical Code CEC), make sure that conductors are well isolated from each other and do not produce any unintentional connection.

Connect SPDT relay contacts checking the load rating to be within the contact maximum rating (2 A, 60 V for use in Intrinsic Safety applications or 2 A, 250 V, 500 VA 80 W resistive load for non Intrinsic Safety applications).

The enclosure provides, according to EN60529, an IP20 minimum degree of mechanical protection (or similar to NEMA Standard 250 type 1) for indoor installation, outdoor installation requires an additional enclosure with higher degree of protection (i.e. IP54 to IP65 or NEMA type 12-13) consistent with the effective operating environment of the specific installation.

Units must be protected against dirt, dust, extreme mechanical (e.g. vibration, impact and shock) and thermal stress, and casual contacts.

If enclosure needs to be cleaned use only a cloth lightly moistened by a mixture of detergent in water.

**Electrostatic Hazard: to avoid electrostatic hazard, the enclosure of D1044 must be cleaned only with a damp or antistatic cloth.**

Any penetration of cleaning liquid must be avoided to prevent damage to the unit. Any unauthorized card modification must be avoided.

According to EN61010, D1044 series must be connected to SELV or SELV-E supplies.

Relay output contact must be connected to loads non exceeding category I, pollution degree I overvoltage limits.

**Warning: de-energize main power source (turn off power supply voltage) and disconnect plug-in terminal blocks before opening the enclosure to avoid electrical shock when connected to live hazardous potential.**

## Start-up

Before powering the unit check that all wires are properly connected, particularly supply conductors and their polarity, input and output wires, also check that Intrinsically Safe conductors and cable trays are segregated (no direct contacts with other non I.S. conductors) and identified either by color coding, preferably blue, or by marking.

Check conductors for exposed wires that could touch each other causing dangerous unwanted shorts.

Turn on power, the "power on" green led must be lit, status led on each channel must be in accordance with condition of the corresponding input line.

If possible close and open input lines one at time checking the corresponding status leds condition as well as output to be correct.

**Power Dissipation of D1044 Isolators**

Section "Technical Data" of D1044 isolator specifies the current consumption (maximum current from the nominal power supply, typical 24 Vdc, in normal operation); this data serves to dimension the current rating of the power supply unit. Section "Technical Data" indicates also the maximum power consumption (maximum power required from the power supply in the worst (abnormal) operating conditions like for example supply voltage at 30 Vdc, short circuit on the outputs and on the inputs terminals).

The power dissipated  $P_d$  inside the enclosure for analog signal isolators is:  $P_d = \text{Current Consumption (A)} * \text{Supply Voltage (V)} - \text{Power Dissipated into the input/output loads}$


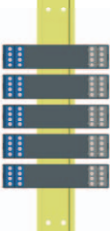
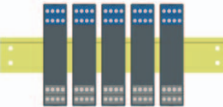
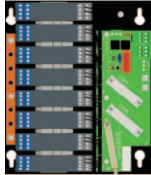
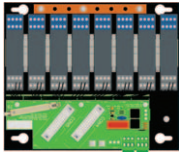
Digital signal isolators have lower dissipation than analog signal isolators, in addition 2 channels barriers (D1044D) have higher dissipation than single channel units (D1044S).

Isolators are not running at the maximum current all at the same time, the average power consumption of a multitude of isolators can be considered to be only 70 % of the value obtained from the section "Technical Data". Considering the 1/3 load power and the 70 % above discussed, the power effectively dissipated internally by the isolators can therefore become 1/2 of the actual power delivered by the power supply. Digital barriers dissipate all the supply power inside the enclosure consequently the total power dissipation into a cabinet, with mixed analog and digital barriers, is determined by the number of channels more than by the number of isolator enclosures.

The following tables give advises for the DIN rail orientation (vertical or horizontal) of the barriers mounting, D1044D (double channel) and D1044S (single channel) isolators, installed on DIN rail, bus or custom board assembly.

**A) Cabinet with Natural Ventilation**




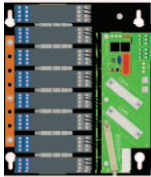
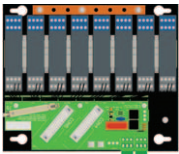
Maximum recommended ambient temperature in °C depending on barrier type and installation method:

Type of Isolator	Single unit Installation	Installation of Multiple units with DIN-rail Bus		Installation on Custom Boards	
	Any orientation	Vertical	Horizontal	Vertical	Horizontal
					
D1044S	60°C	30°C	35°C	35°C	40°C
D1044D	60°C	Not recommended <sup>(1)</sup>	30°C	30°C	35°C

<sup>(1)</sup> Installation is not recommended since it would significantly shorten the units life and increase the probability of failures.

**B) Cabinet with Forced Ventilation**

Maximum recommended ambient temperature in °C depending on barrier type and installation method:

Type of Isolator	Single unit Installation	Installation of Multiple units with DIN-rail Bus		Installation on Custom Boards	
	Any orientation	Vertical	Horizontal	Vertical	Horizontal
					
D1044S	60°C	40°C	45°C	45°C	50°C
D1044D	60°C	40°C	45°C	45°C	50°C