

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).

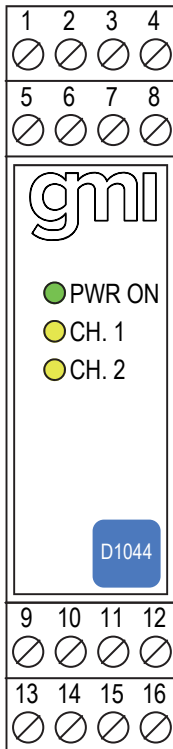
EMC: Fully compliant with CE marking applicable requirements.

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 D1044S or D1044D Bus Powered mode for each channel for Tproof = 6 / 10 yrs (≤10% / >10 % of total SIF).
- SIL 2 according to IEC 61508:2010 Ed. 2 D1044S Loop Powered mode for Tproof = 7 / 10 yrs (≤10% / >10 % of total SIF).
- SIL 3 according to IEC 61508:2010 Ed. 2 D1044S or D1044D Loop / Bus Powered mode with 1oo2 channel architecture for Tproof = 10 yrs (≤10% of total SIF).
- PFDavg (1 year) 1.63 E-04, SFF 77.24 % with 1oo1 channel architecture.
- PFDavg (1 year) 8.16 E-06, SFF 99.16 % with 1oo2 channel architecture.
- SIL 3 Systematic capability.
- 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, EN61326-1.
- ATEX, IECEx, FM & FM-C, INMETRO, EAC-EX, UKR n. 898, TÜV Certifications.
- TÜV Functional Safety Certification.
- Type Approval Certificate DNV 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:	D1044	
1 channel	S	
2 channels	D	
Power Bus enclosure		/B

Power Bus and DIN-Rail accessories:

DIN rail anchor MCHP065	DIN rail stopper MOR016
Terminal block male MOR017	Terminal block female MOR022

Technical Data:

Supply: 24 Vdc nom (20 to 30 Vdc) reverse polarity protected, ripple within voltage limits ≤ 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: switch contact, logic level.

Trip voltage levels: OFF status ≤ 1.0 V, ON status ≥ 6.0 V (maximum 30 V).

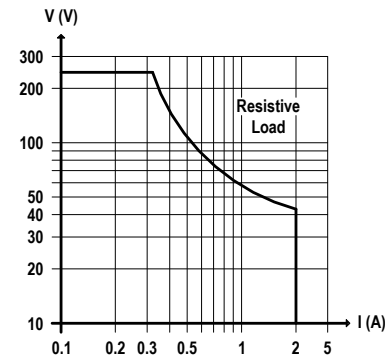
Current consumption @ 24 V: 3 mA (≈ 10 KΩ input impedance).

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 * 10⁶ / 1 * 10⁵ 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 Directive: 2014/34/EU ATEX, 2014/30/EU EMC, 2014/35/EU LVD, 2011/65/EU RoHS.

Environmental conditions:

Operating: temperature limits -20 to + 60 °C, relative humidity max 95 %.

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

Safety Description:



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

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

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

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

EAC-EX: 2Ex nA nC [ia Ga] IIC T4 Gc X, [Ex ia Da] IIC X, [Ex ia Ma] I X

UKR TR n. 898: 2ExnAnCialICT4 X, Exial X associated electrical apparatus.

Uo/Voc = 0 V, Io/Isc = 0 mA, Po/Po = 0 mW at terminals 13/14-15-16, 9/10-11-12 (Uo, Io, Po equal to the connected Intrinsic Safety circuit).

Ui/Vmax = 60 V, li/lmax = 2 A, Ci = 0 nF, Li = 0 nH at term. 13/14-15-16, 9/10-11-12.

Um = 250 Vrms, -20 °C ≤ Ta ≤ 60 °C.

Approvals:

DMT 01 ATEX E 042 X conforms to EN60079-0, EN60079-11, EN60079-26.

IECEx BVS 07.0027X conforms to IEC60079-0, IEC60079-11, IEC60079-26,

IMQ 09 ATEX 013 X conforms to EN60079-0, EN60079-15,

IECEx IMQ 13.0011X conforms to IEC60079-0, IEC60079-15

INMETRO DNV 13.0108 X conforms to ABNT NBR IEC60079-0, ABNT NBR IEC60079-11, ABNT NBR IEC60079-15, ABNT NBR IEC60079-26.

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

ANSI/ISA 12.12.02, ANSI/ISA 60079-0, ANSI/ISA 60079-11, C22.2 No.142,

C22.2 No.157, C22.2 No.213, E60079-0, E60079-11, E60079-15,

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

GOST R IEC 60079-15.

CL 16.0034 X conforms to DCTY 7113, GOCT 22782.5-78, DCTY IEC 60079-15.

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-13778 Certificates for maritime 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 mm².

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.

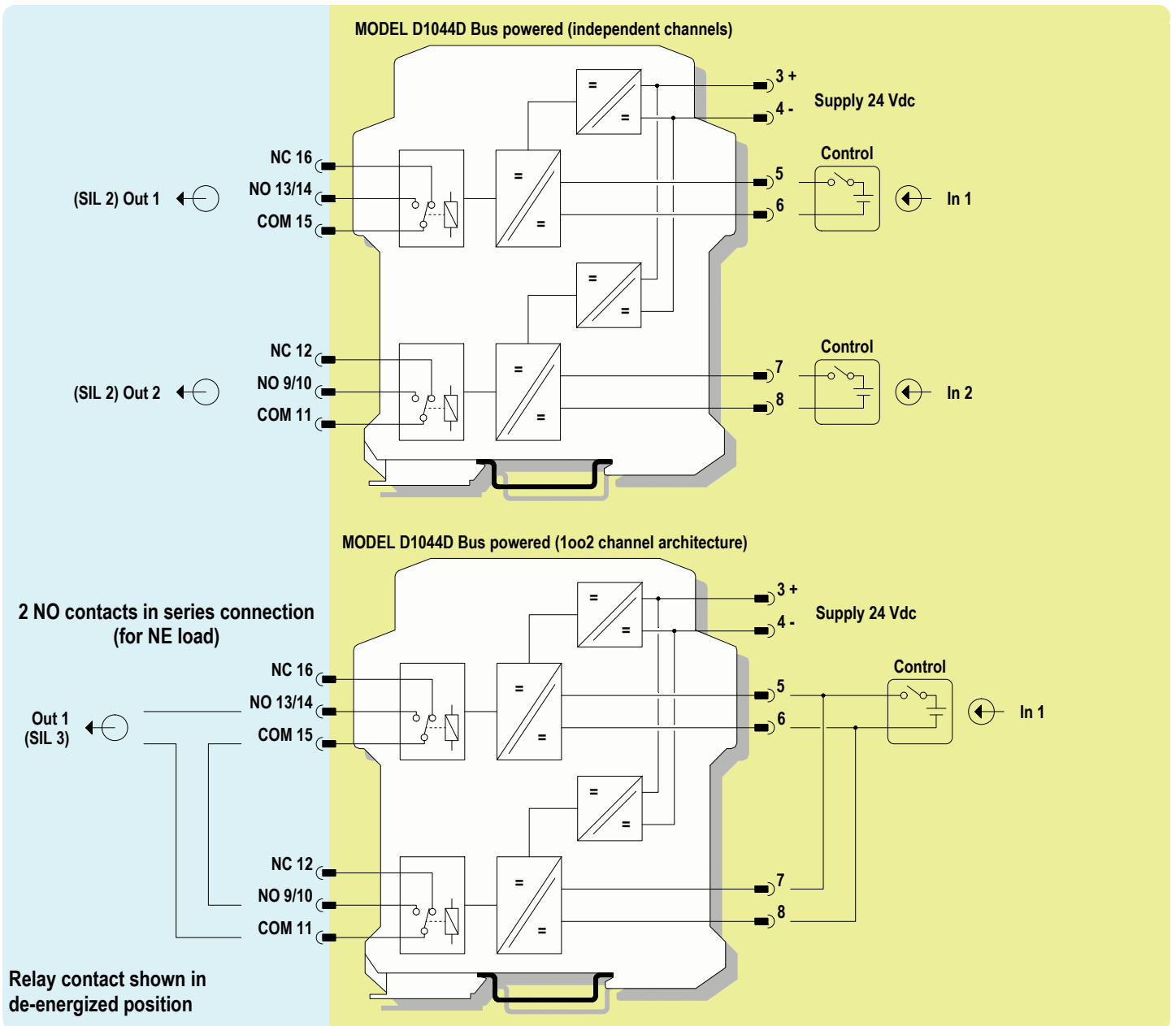
Image:



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

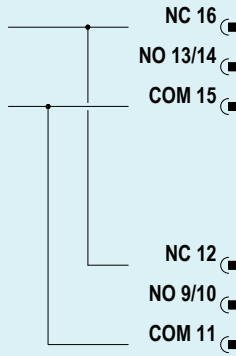


Function Diagram:

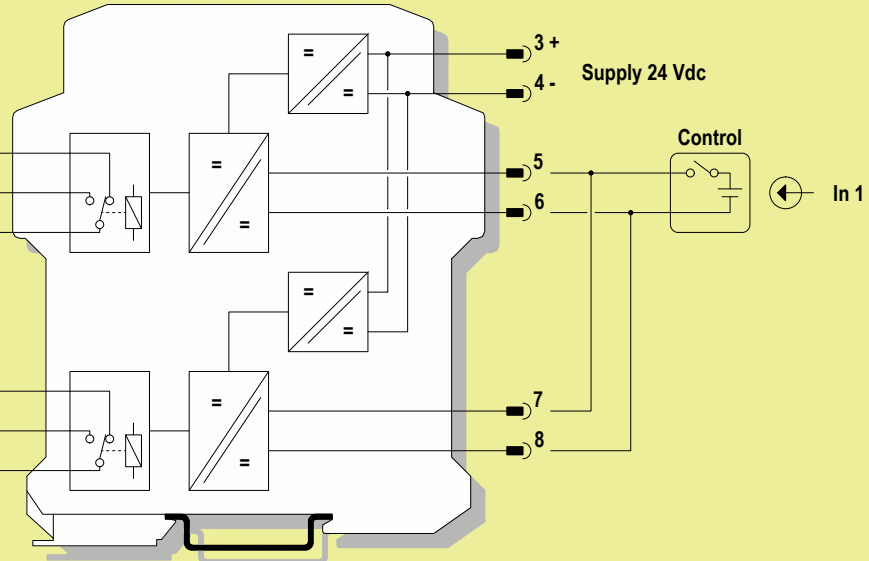
HAZARDOUS AREA ZONE 0 (ZONE 20) GROUP IIC,
HAZARDOUS LOCATIONS CLASS I, DIVISION 1, GROUPS A, B, C, D,
CLASS II, DIVISION 1, GROUPS E, F, G, CLASS III, DIVISION 1,
CLASS I, ZONE 0, GROUP IIC

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

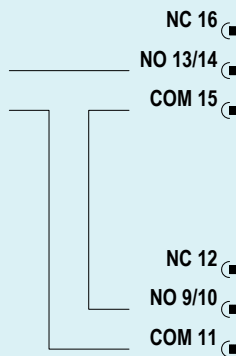
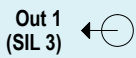
2 NC contacts in parallel connection
(for ND load)



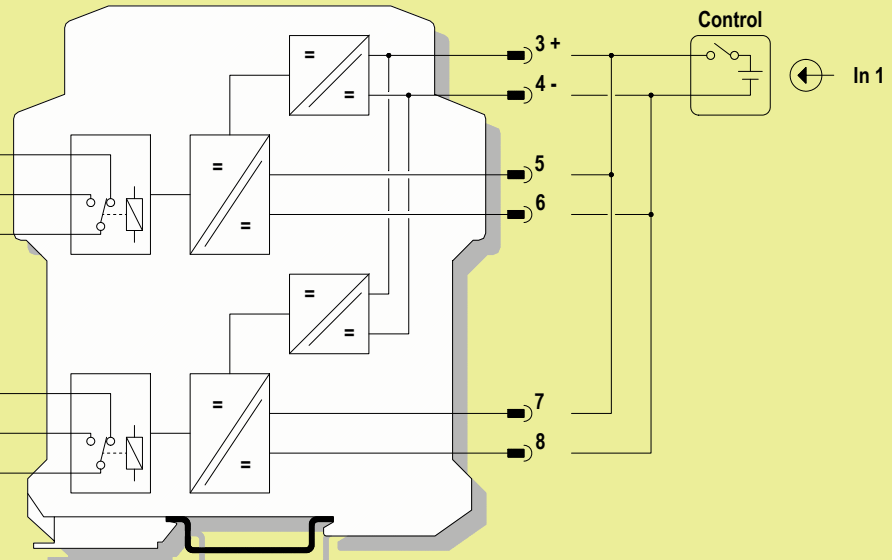
MODEL D1044D Bus powered (1oo2 channel architecture)



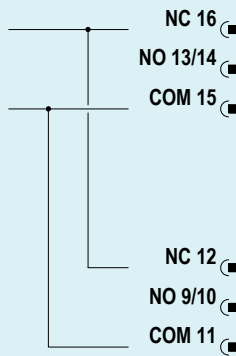
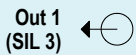
2 NO contacts in series connection
(for NE load)



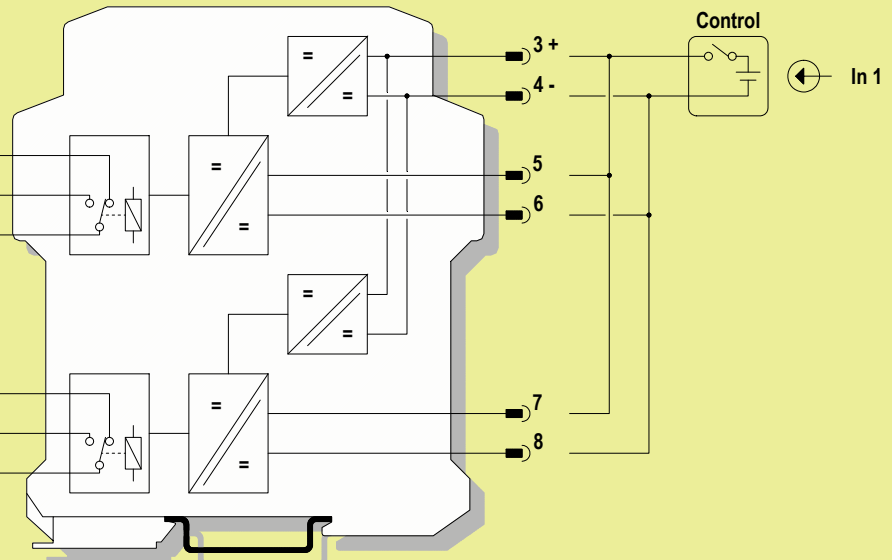
MODEL D1044D Loop powered (1oo2 channel architecture)



2 NC contacts in parallel connection
(for ND load)



MODEL D1044D Loop powered (1oo2 channel architecture)

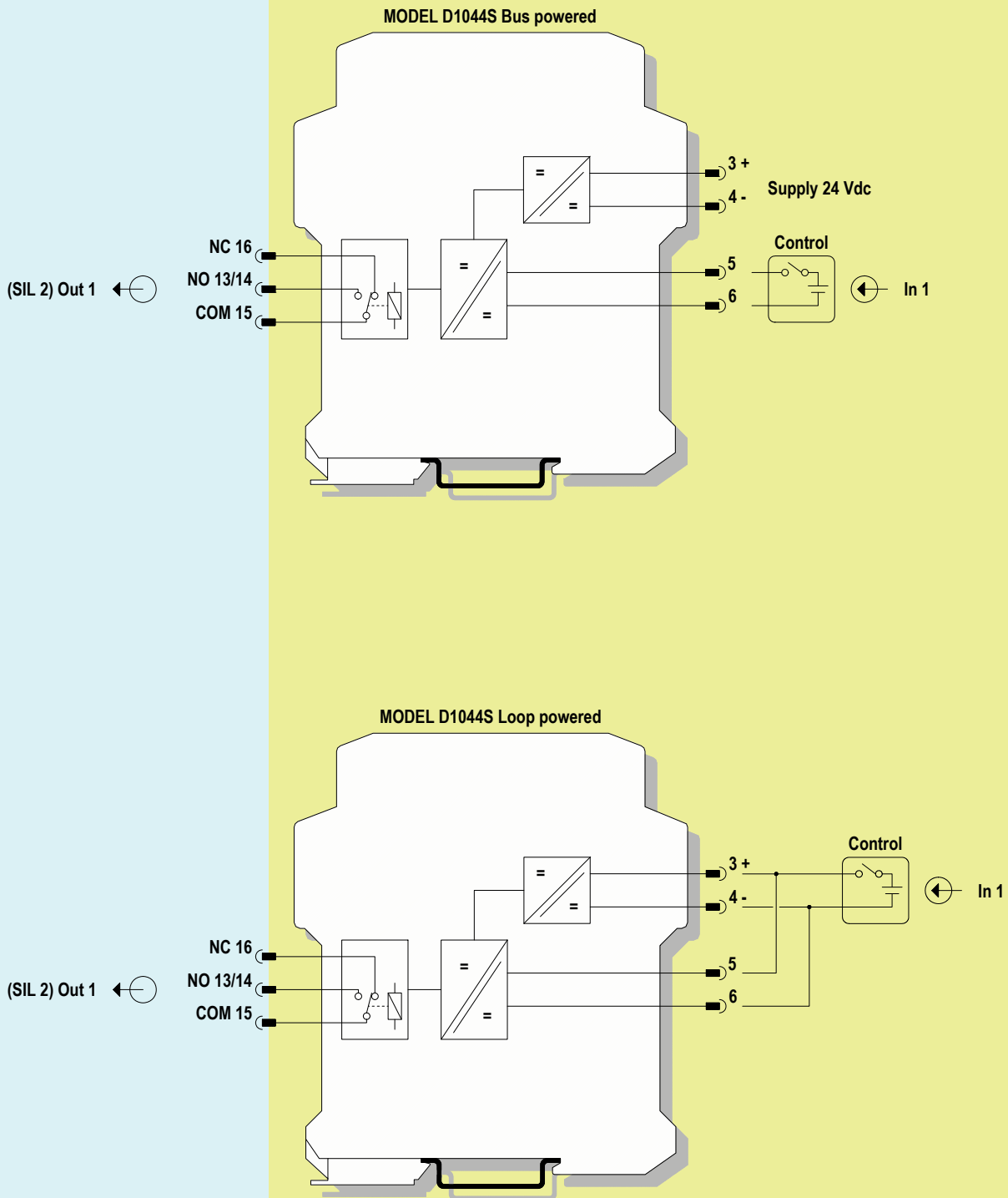


Relay contact shown in
de-energized position

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