

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.

Technical Data:
Supply:

24 Vdc nom (21.5 to 30 Vdc) reverse polarity protected, ripple within voltage limits ≤ 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 ≤ 1.0 V, ON status ≥ 6.0 V (maximum 30 V).
Current consumption @ 24 V: 3 mA (≈ 10 K Ω input impedance).

Output:

D1040Q: 22 mA at 13.2 V per channel (20.5 V no load, 334 Ω series resistance).
D1041Q: 10 mA for LED driving per channel (20.5 V no load, 484 Ω series resistance).
D1042Q: 22 mA at 14.5 V per channel (20.5 V no load, 273 Ω series resistance).
D1043Q: 22 mA at 9.8 V per channel (20.5 V no load, 484 Ω series resistance).
Short circuit current: ≥ 24 mA per channel (26 mA typical), ≤ 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.

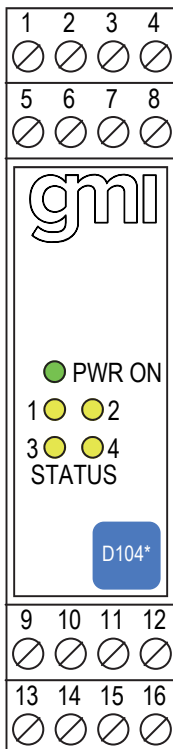
D1040Q single channel parameters:
Uo/Voc = 23.6 V, Io/Isc = 72 mA, Po/Po = 424 mW at terminals 13-14,15-16,9-10,11-12.
D1041Q single channel parameters:
Uo/Voc = 23.6 V, Io/Isc = 49.6 mA, Po/Po = 292 mW at terminals 13-14,15-16,9-10,11-12.
D1042Q single channel parameters:
Uo/Voc = 23.6 V, Io/Isc = 88.2 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 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.
Dimensions: Width 22.5 mm, Depth 99 mm, Height 114.5 mm.

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

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			
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			
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			
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

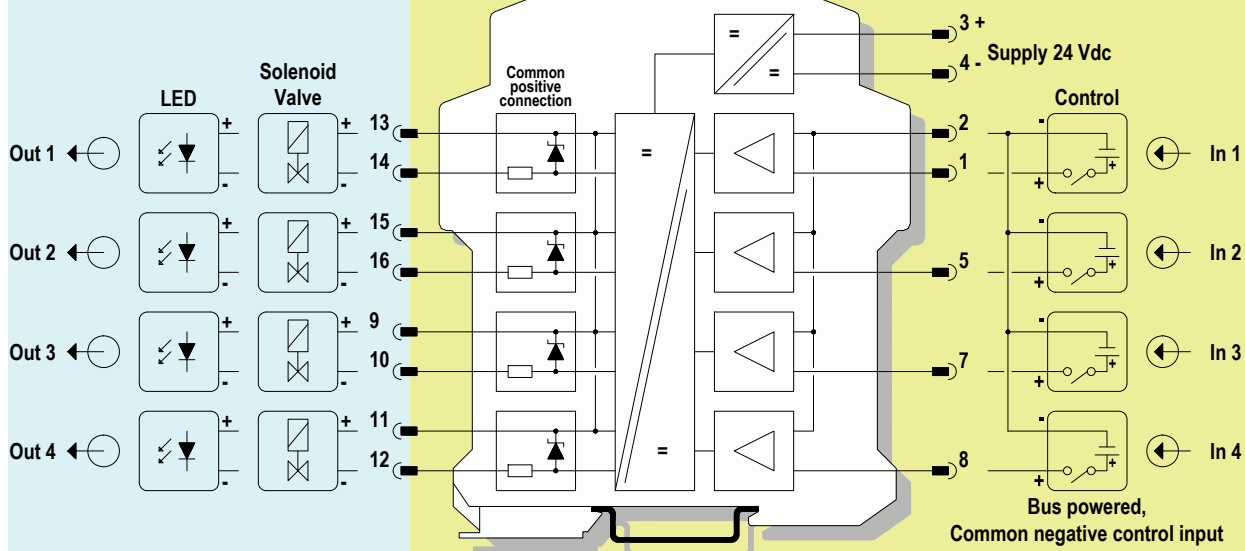
IIA equal to Gas Groups D, E, F and G

Function Diagram:

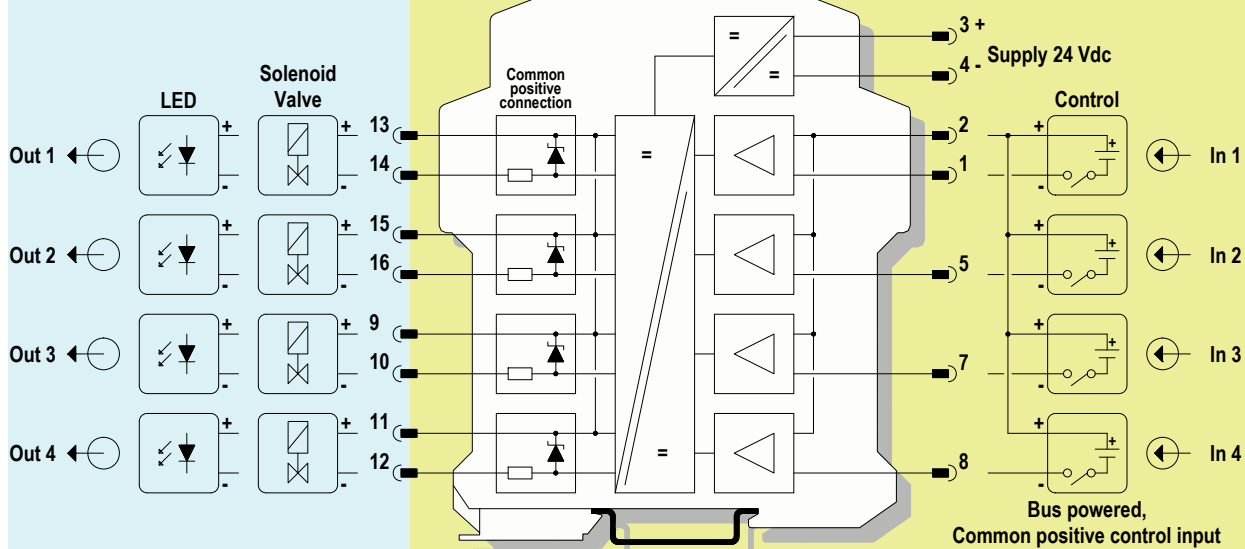
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CLASS II, DIVISION 1, GROUPS E, F, G, CLASS III, DIVISION 1,
CLASS I, ZONE 0, GROUP IIC

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

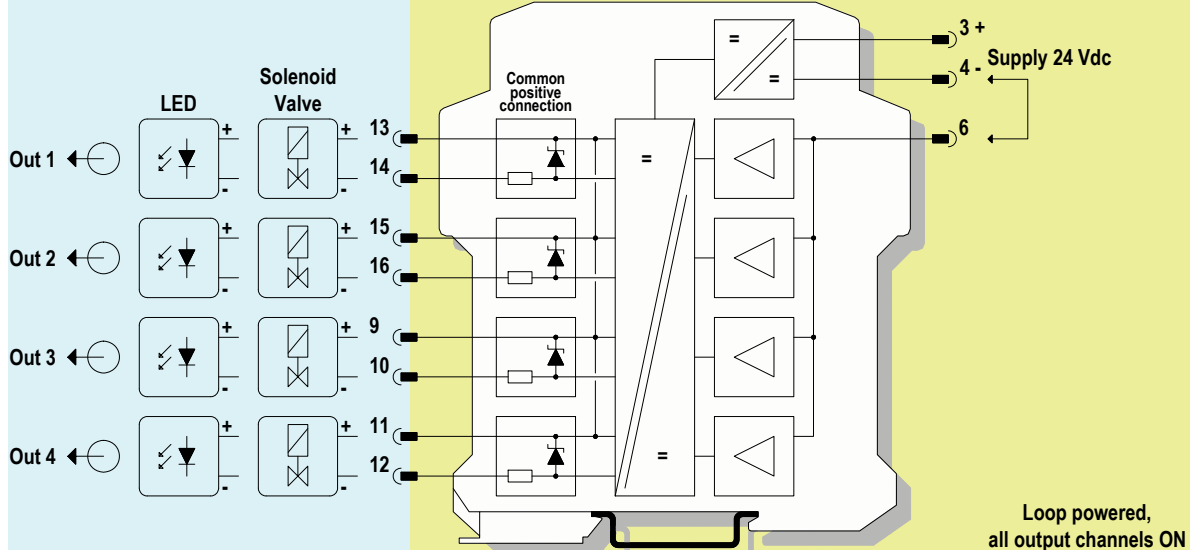
MODEL D104*Q



MODEL D104*Q



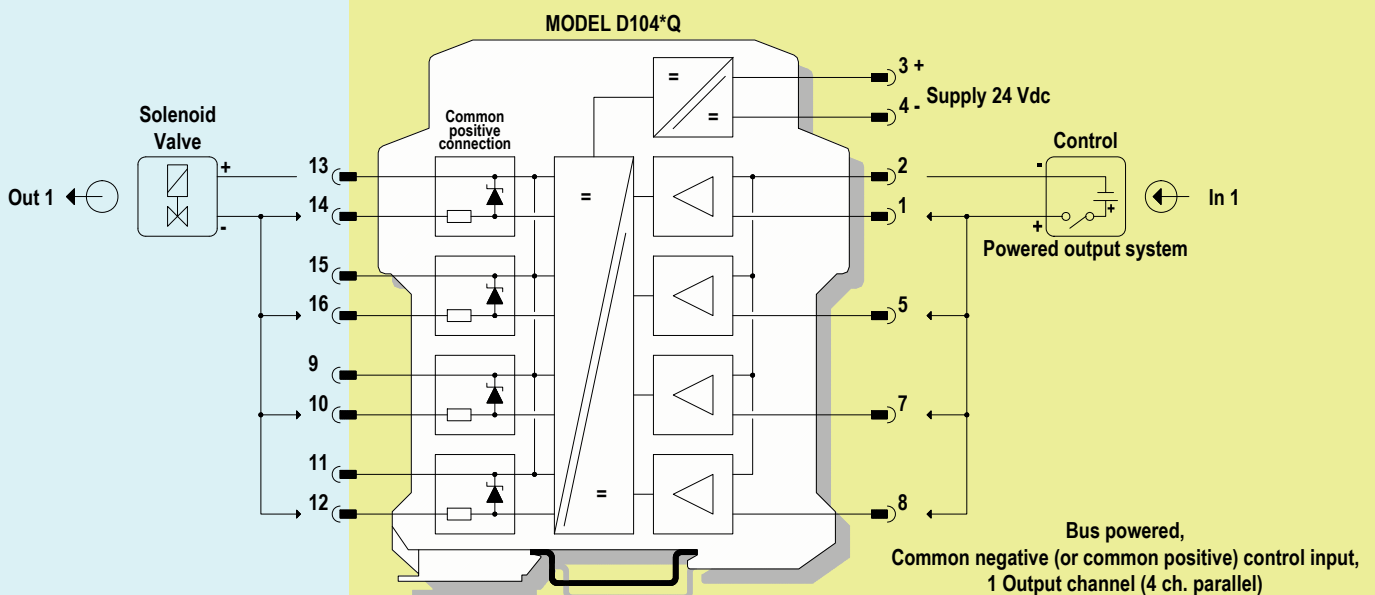
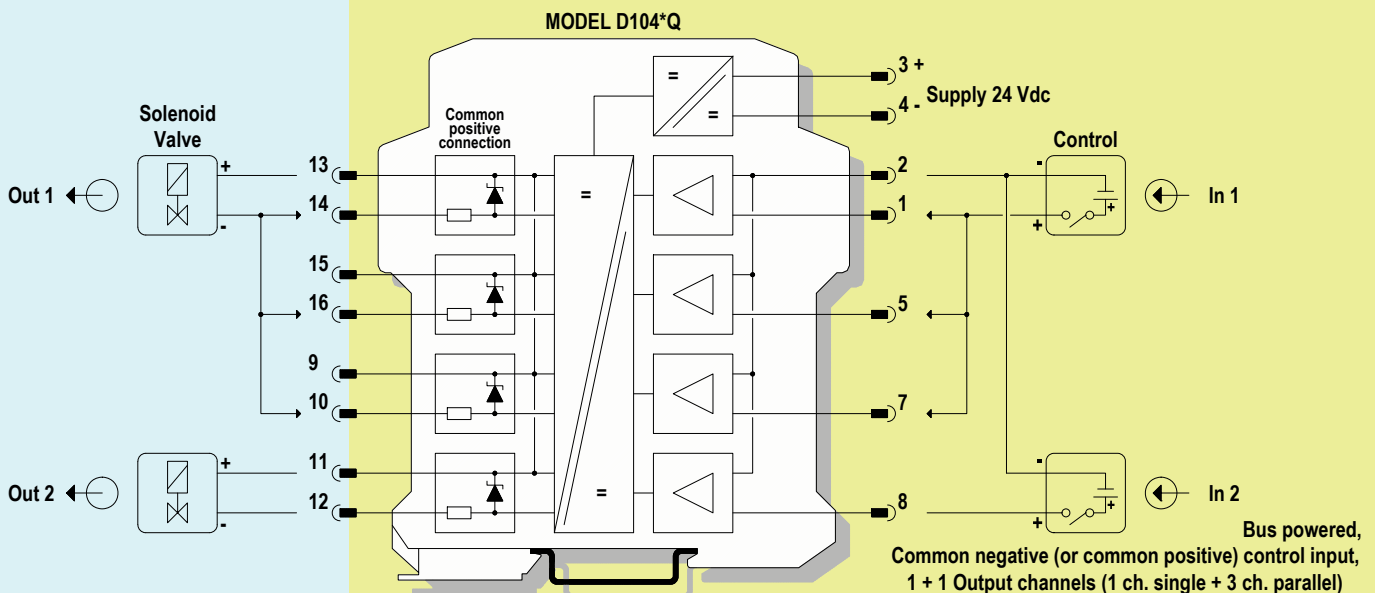
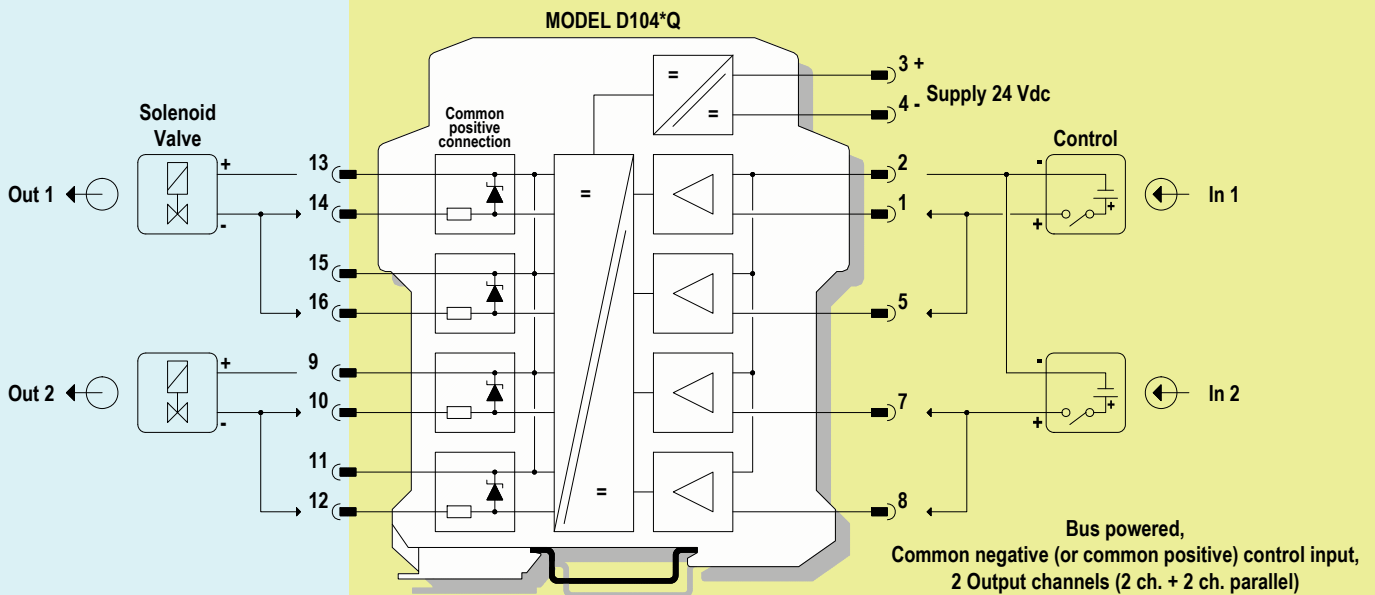
MODEL D104*Q



Function Diagram:

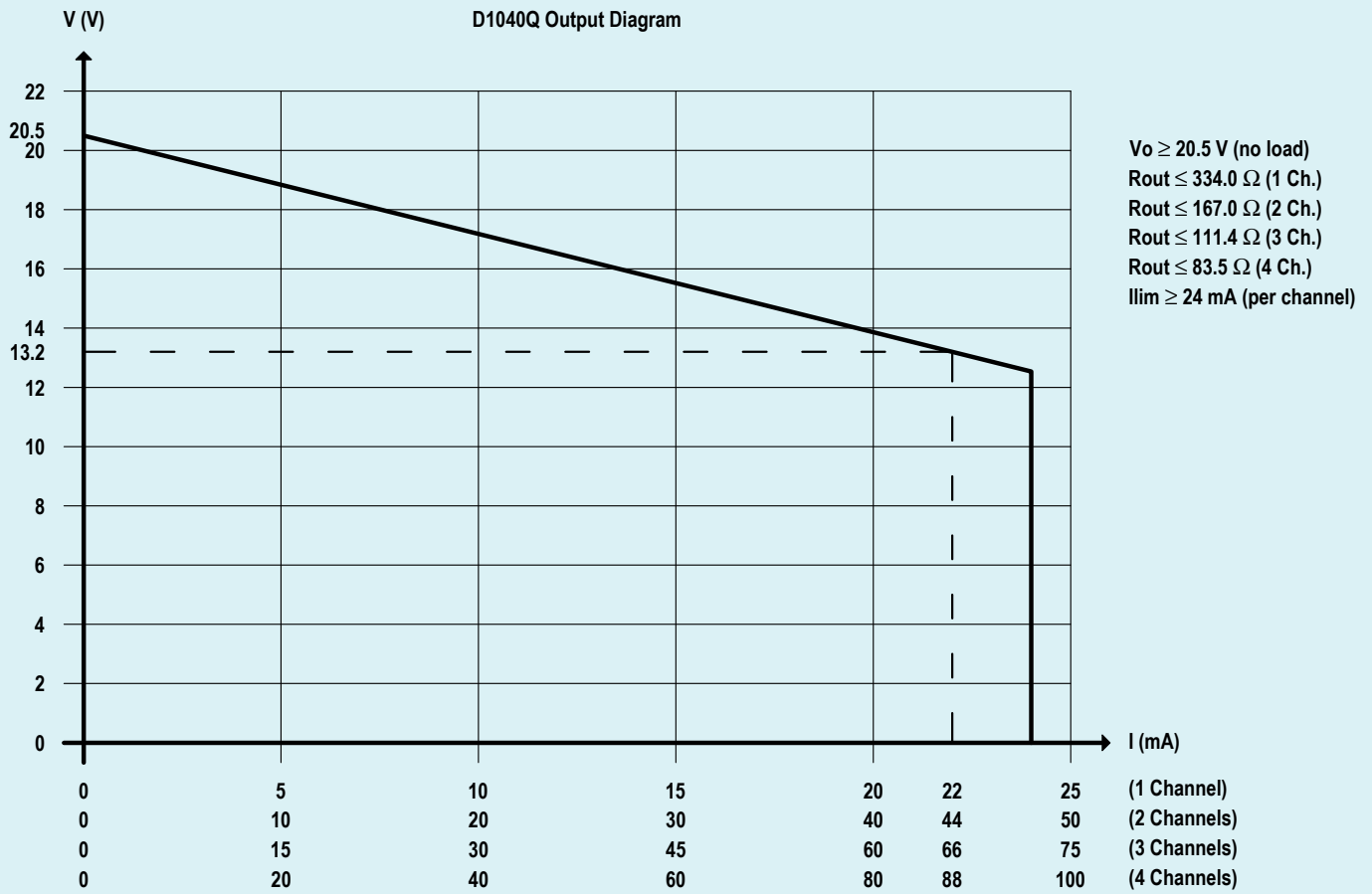
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CLASS I, ZONE 0, GROUP IIC

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

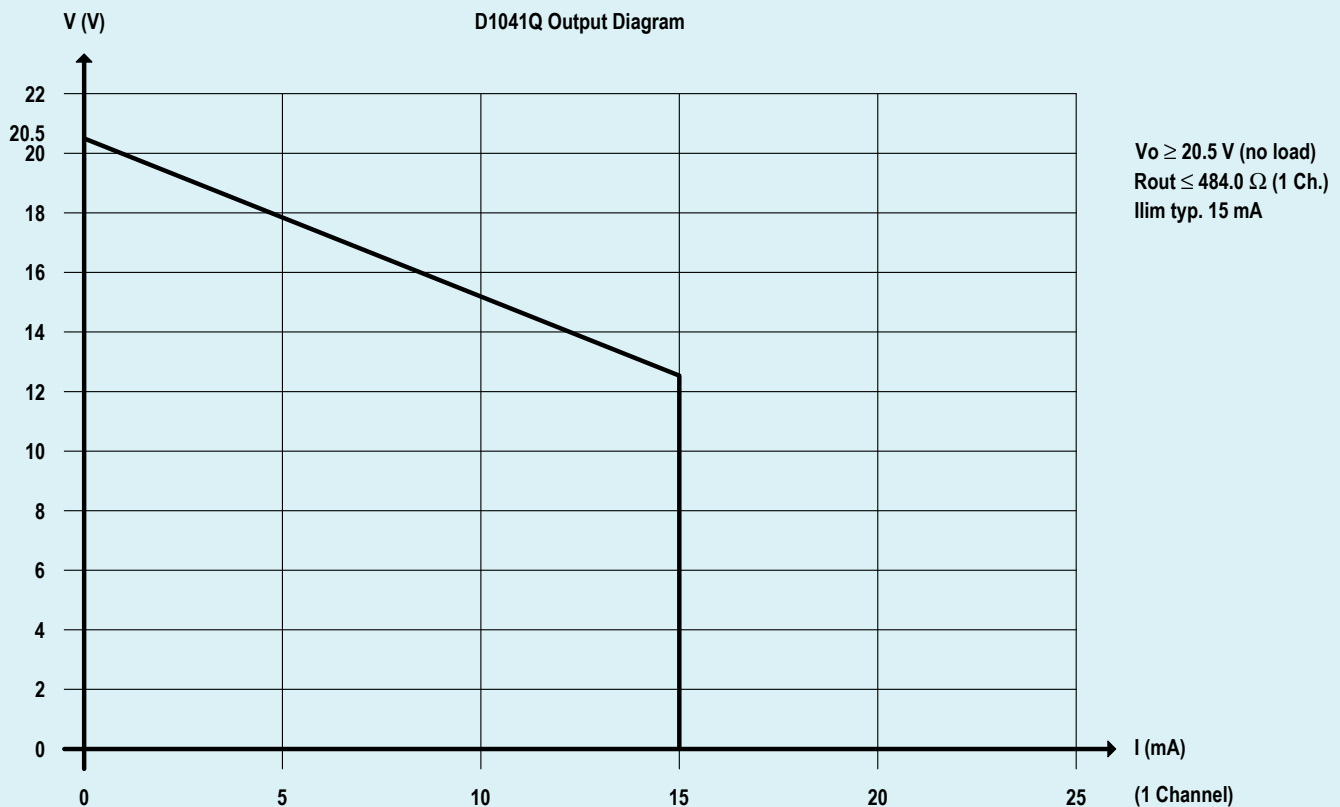


Output Diagram:

D1040Q OUTPUT DIAGRAM

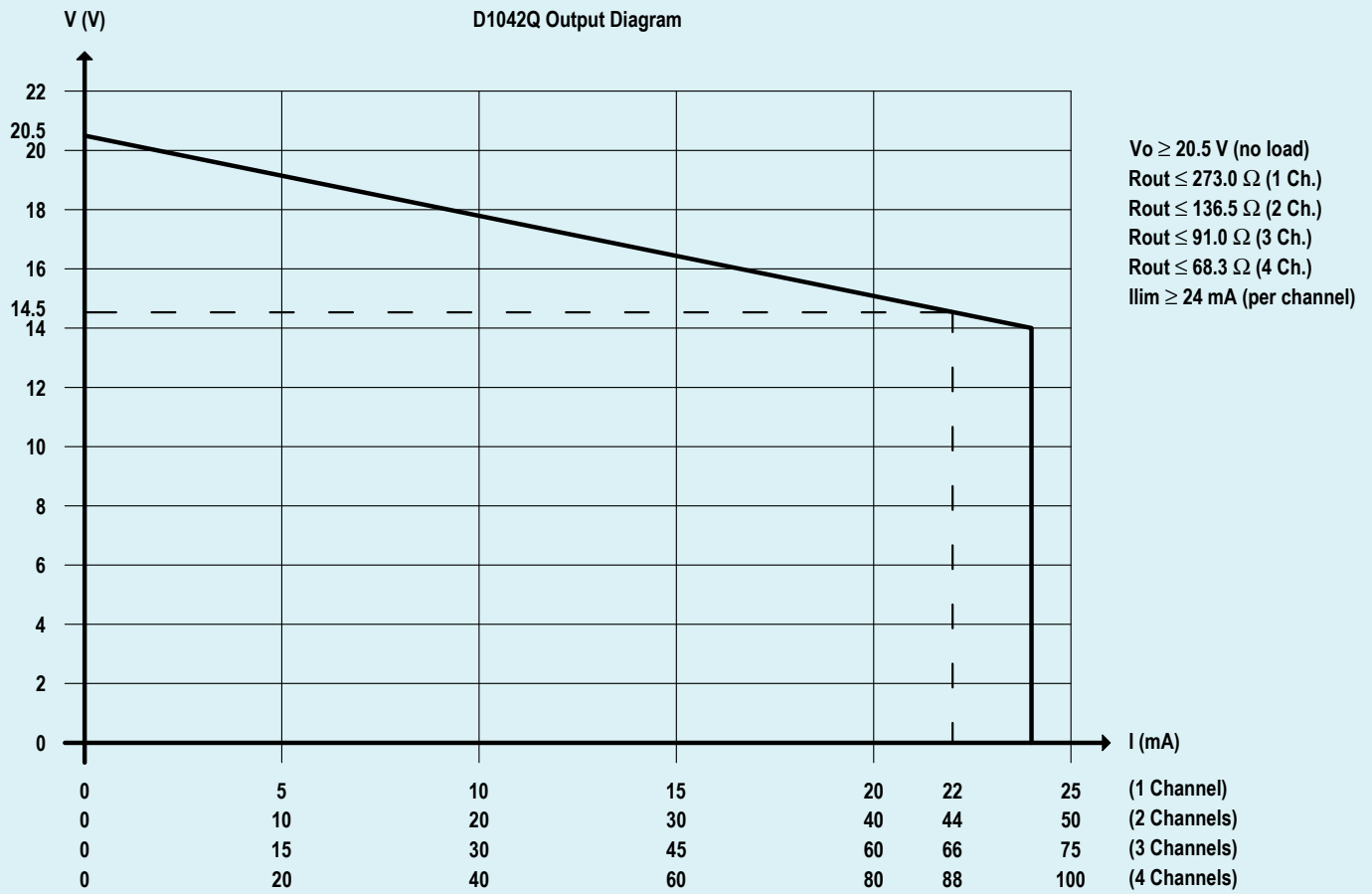


D1041Q OUTPUT DIAGRAM



Output Diagram:

D1042Q OUTPUT DIAGRAM



D1043Q OUTPUT DIAGRAM

