

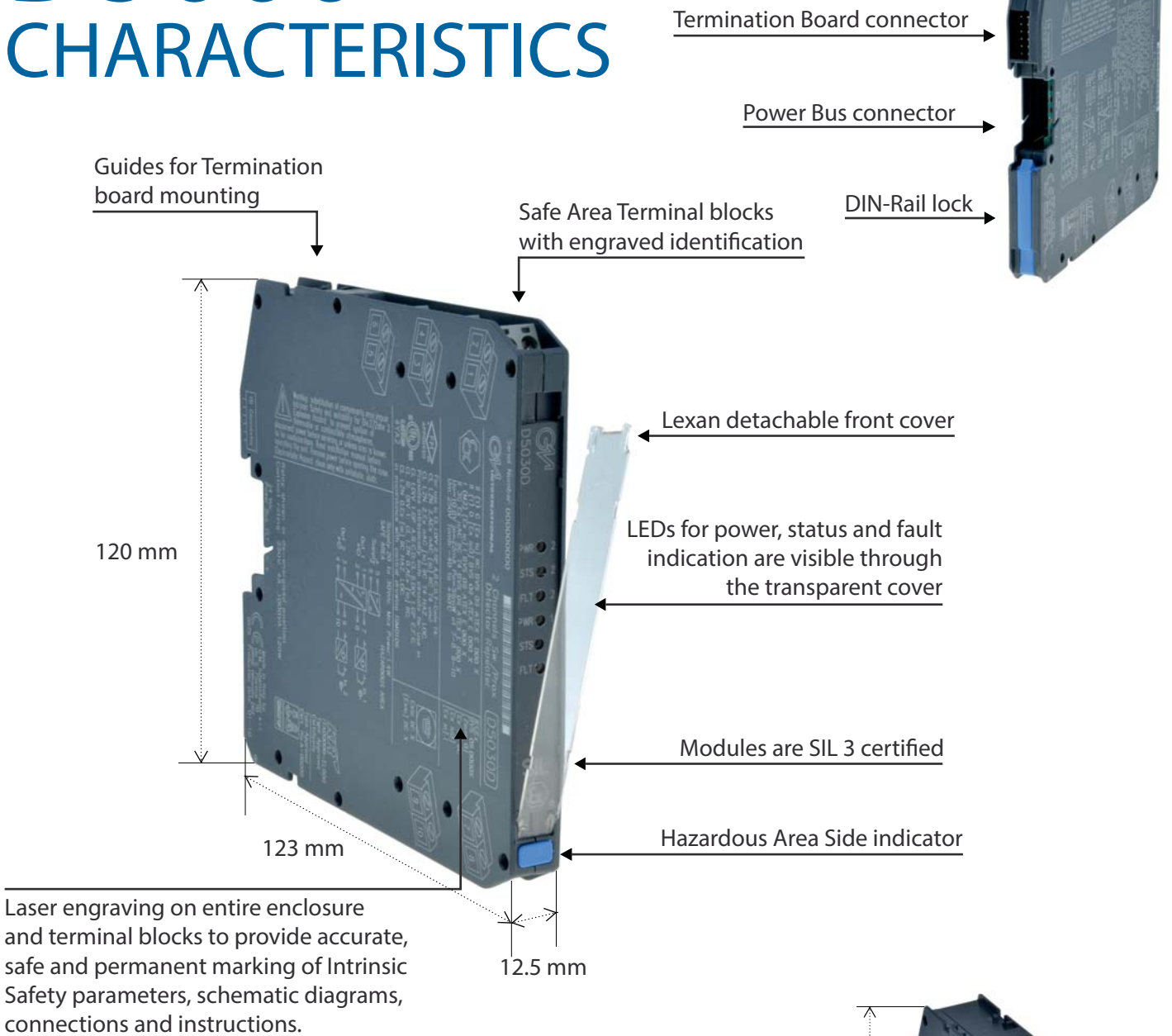


# D5000 SERIES

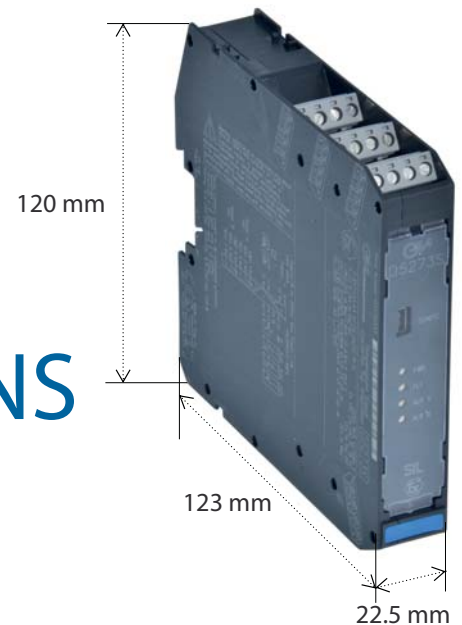
D5040S/D  
D5240T



# D5000 CHARACTERISTICS



# D5200 DIMENSIONS



## Characteristics:

### General Description:

The single or dual channel Loop Powered Digital Output Isolators, D5040S and D5040D, are suitable for driving solenoid valves, visual or audible alarms to alert a plant operator, or other process control devices in Hazardous Area from driving signals in Safe Area. They can also be used as controllable supplies to power measuring or process control equipment.

Their use is allowed in applications requiring up to SIL 3 level (according to IEC 61508:2010 Ed. 2) in safety related systems for high risk industries.

The Safety PLC or DCS driving signals control the field devices through D5040S and D5040D, which provide isolation.

For each channel two basic output circuits are selectable, with different safety parameters, to interface the majority of devices on the market. The selection among the two output characteristics is obtained by connecting the field device to a different couple of terminal blocks.

Mounting on standard DIN-Rail 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:



- SIL 3 according to IEC 61508:2010 Ed. 2 for lifetime = 20 yrs.
- PFDavg (1 year) 0.00 E+00, SFF 100 %.
- SIL 3 Systematic capability.
- Output to Zone 0 (Zone 20), installation in Zone 2.
- Loop powered for NE loads.
- Output short circuit proof and current limited.
- Two port isolation, Input/Output.
- EMC Compatibility to EN61000-6-2, EN61000-6-4, EN61326-1, EN61326-3-1 for safety systems.
- ATEX, IECEx, UL & C-UL, UKR TR n. 898, KCs, TÜV Certifications.
- TÜV Functional Safety Certification.
- Type Approval Certificate DNV and KR for maritime applications.
- Simplified installation using standard DIN-Rail and plug-in terminal blocks, or customized Termination Boards.
- 250 Vrms (Um) max. voltage allowed to the instruments associated with the barrier.

## Ordering Information:

Model:	D5040	
1 channel		S
2 channels		D

DIN-Rail accessories:  
Cover and fix MCHP196

## Technical Data:

### Loop Input:

loop powered control signal.

**Loop Supply:** 24 Vdc nom (18 to 30 Vdc) reverse polarity protected, 2 A time lag fuse internally protected.

**Current consumption @ 24 V:** 45 mA with 30 mA output for each channel of D5040D, typical in normal operation. 55 mA with 40 mA output (typical for D5040S).

**Power dissipation:** 0.75 W with 24 V supply, output energized at 35 mA nominal load for each channel of D5040D; 0.85 W with 24 V supply, output energized at 45 mA nominal load for D5040S.

### Isolation (Test Voltage):

I.S. Out/In 1.5 KV.

Out/Out 500 V.

In/In 500 V.

### Output:

See next page for detailed output diagrams and characteristics.

#### Short circuit current:

≥ 45 mA (50 mA typical) for single output configuration (D5040S);

≥ 35 mA (40 mA typical) for single output configurations (D5040D);

≥ 70 mA (80 mA typical) for parallel output configurations (D5040D).

**Response time:** ≤ 75 ms.

**Frequency response:** 50 Hz

### 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] IIIC, I (M1) [Ex ia Ma] I

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

**UKR TR n. 898:** 2ExnAiaIICT4 X, Exial X

**KCs:** Ex nA [ia Ga] IIC T4 Gc

associated apparatus and non-sparking electrical equipment.

See next page for safety parameters.

Um = 250 Vrms, -40 °C ≤ Ta ≤ 70 °C.

#### Approvals:

BVS 14 ATEX E 159 X conforms to EN60079-0, EN60079-11, EN60079-15

IECEx BVS 14.0111X conforms to IEC60079-0, IEC60079-11, 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.

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

KTL 16-KA4BO-443X for KCs approval (for D5040S).

KTL 16-KA4BO-444X for KCs approval (for D5040D).

TÜV Certificate No. C-IS-236198-04, 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 Type Approval Certificate No.A-13625 and KR No.MIL20769-EL002 Certificates for maritime applications.

### Mounting:

T35 DIN-Rail according to EN50022, or on customized Termination Board.

**Weight:** about 110 g.

**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:

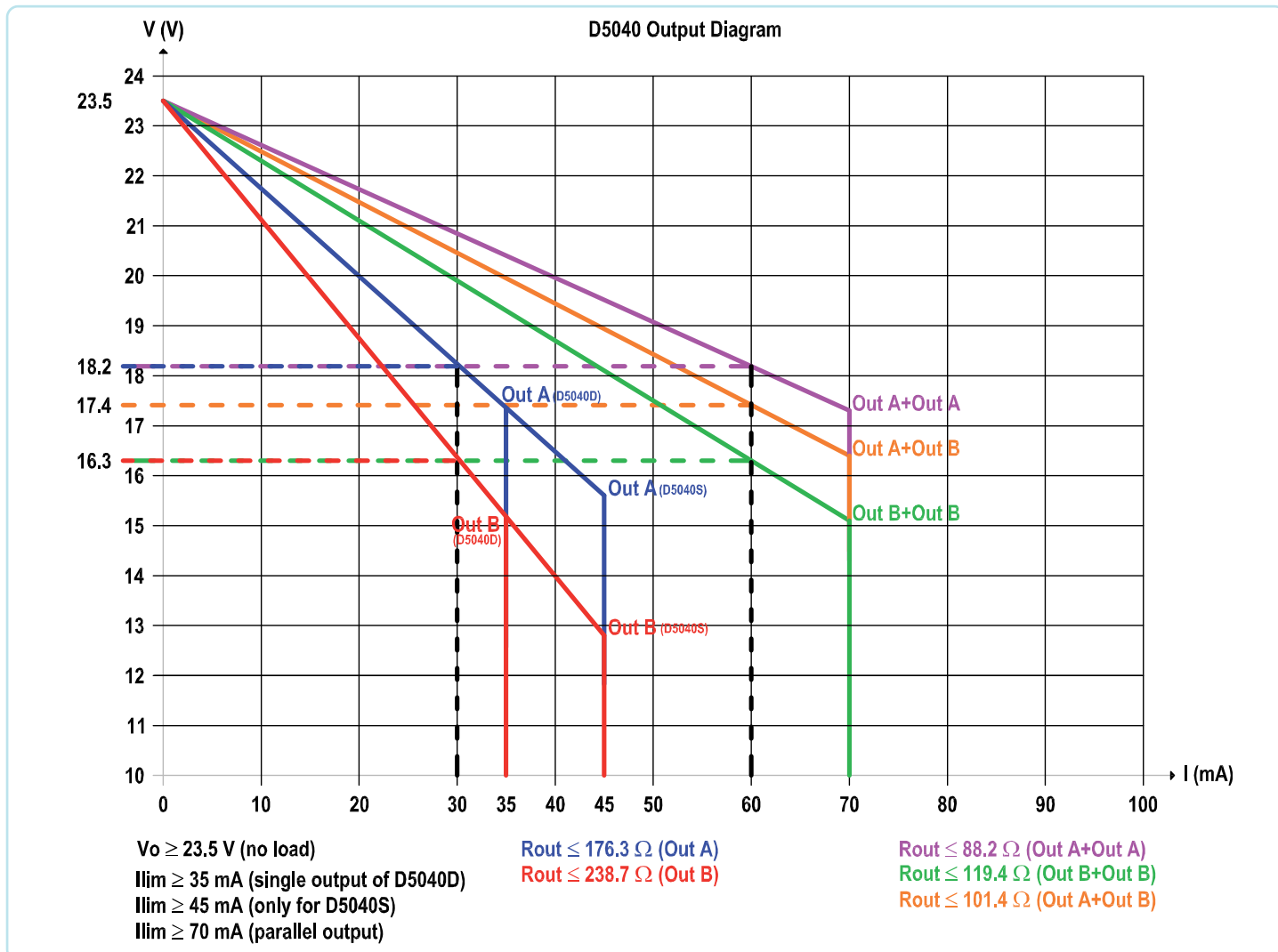
Safety Description	Maximum External Parameters			
	Group Cenelec	Co/Ca ( $\mu\text{F}$ )	Lo/La (mH)	Lo/Ro ( $\mu\text{H}/\Omega$ )
<b>Out A</b>	IIC	0.107	1.67	38.8
Terminals 7-8 or 10-11	IIB	0.82	6.71	155.3
$U_o/V_{oc} = 25.2\text{ V}$	IIA	2.9	13.4	310.7
$I_o/I_{sc} = 146\text{ mA}$	I	4.8	22	509.8
$P_o/P_o = 916\text{ mW}$	IIIC	0.82	6.7	155.3
<b>Out B</b>	IIC	0.107	3	52.6
Terminals 7-9 or 10-12	IIB	0.82	12.3	210.4
$U_o/V_{oc} = 25.2\text{ V}$	IIA	2.9	24.6	420
$I_o/I_{sc} = 108\text{ mA}$	I	4.8	40	690.3
$P_o/P_o = 676\text{ mW}$	IIIC	0.82	12.3	210.4
<b>Out A + Out A</b>				
Terminals 7//10 - 8//11	IIB	0.82	1.67	77.6
$U_o/V_{oc} = 25.2\text{ V}$	IIA	2.9	3.3	155.3
$I_o/I_{sc} = 292\text{ mA}$	I	4.8	5.5	254.9
$P_o/P_o = 1831\text{ mW}$	IIIC	0.82	1.67	77.6
<b>Out B + Out B</b>				
Terminals 7//10 - 9//12	IIB	0.82	3	105.2
$U_o/V_{oc} = 25.2\text{ V}$	IIA	2.9	6.1	210.4
$I_o/I_{sc} = 216\text{ mA}$	I	4.8	10.09	345.1
$P_o/P_o = 1352\text{ mW}$	IIIC	0.82	3	105.2
<b>Out A + Out B</b>				
Terminals 7//10-8//12 or 7//10-9//11	IIB	0.82	2.2	89.3
$U_o/V_{oc} = 25.2\text{ V}$	IIA	2.9	4.4	178.7
$I_o/I_{sc} = 254\text{ mA}$	I	4.8	7.28	293.2
$P_o/P_o = 1592\text{ mW}$	IIIC	0.82	2.2	89.3

## Image:



**NOTE:** “//” sign means parallel connection.  
E.g. 7//10 is obtained shortening pins 7 and 10

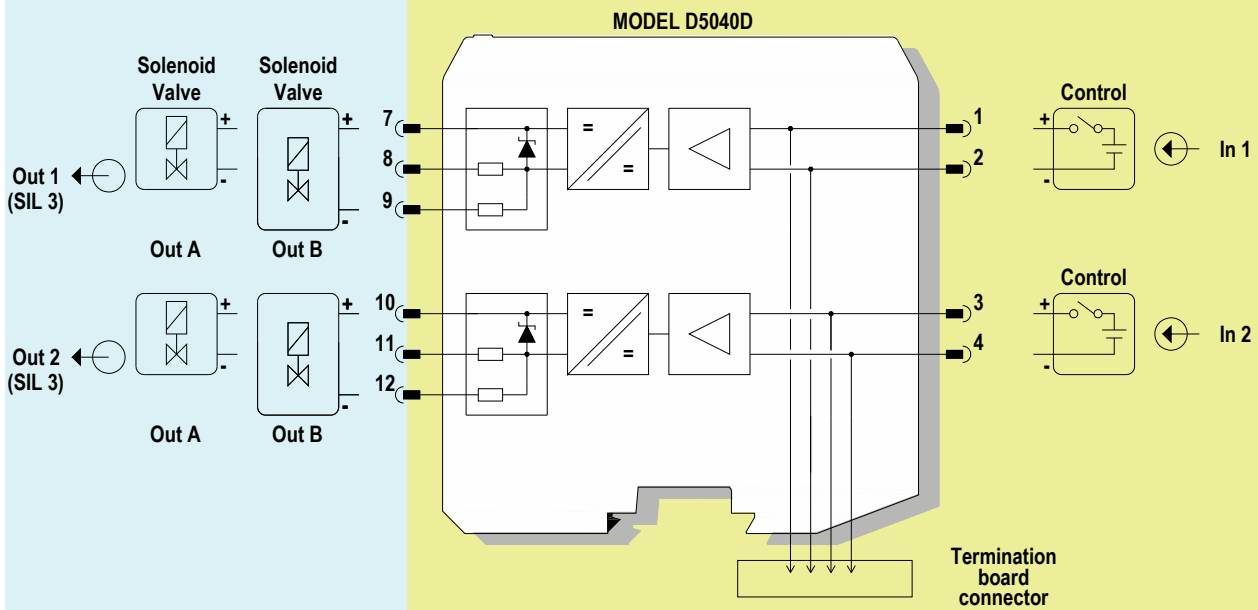
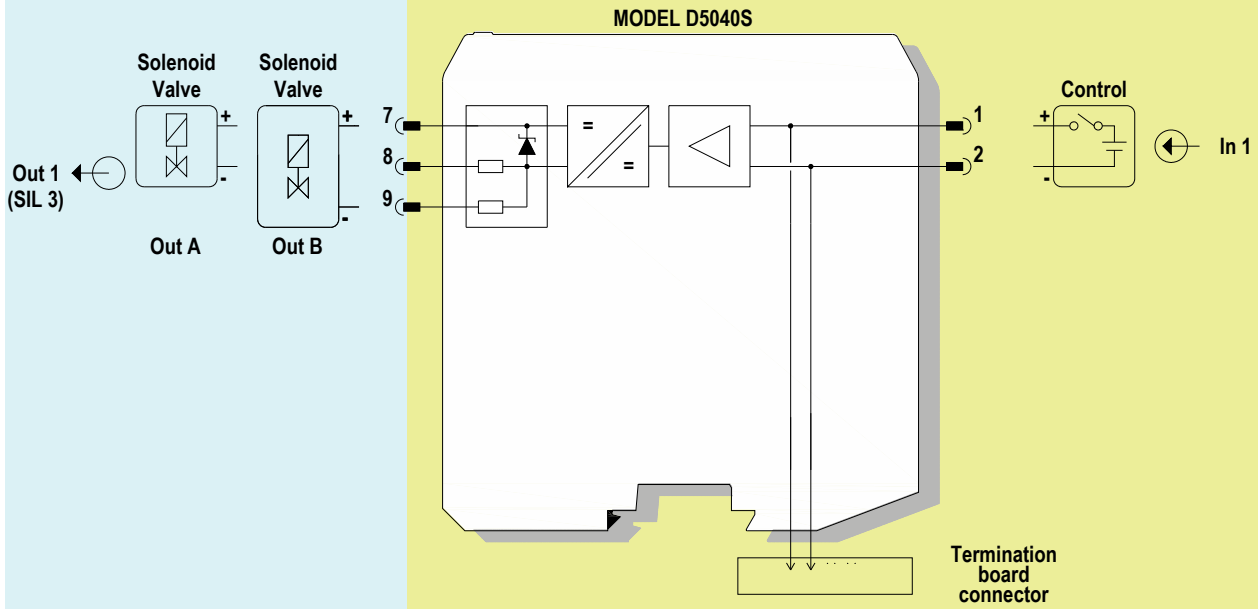
## Output Diagram:



**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 triple channel Bus Powered Digital Output Isolator, D5240T, is suitable for driving solenoid valves, visual or audible alarms to alert a plant operator, or other process control devices in Hazardous Area from driving signals in Safe Area. It can also be used as a controllable supply to power measuring or process control equipment. Its use is allowed in applications requiring up to SIL 2 level (according to IEC 61508) in safety related systems for high risk industries. Configuration is programmable from PC by the GM Pocket Portable Adapter PPC5092 via USB serial line and SWC5090 Configurator software. The Safety PLC or DCS driving signals control the field devices through D5240T, which provides isolation. Three basic output circuits are selectable, with different safety parameters, to interface the majority of devices on the market. The selection among the three output characteristics is obtained by connecting the field device to different terminals.

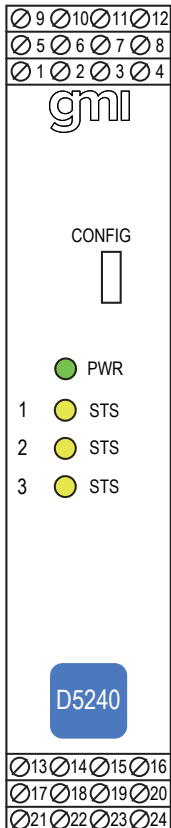
Mounting on standard DIN-Rail, with or without Power Bus, or on customized Termination Boards, in Safe Area or in Zone 2.

### 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:



- SIL 2 according to IEC 61508.
- Output to Zone 0 (Zone 20), installation in Zone 2.
- Bus powered for NE loads.
- Output short circuit proof and current limitation.
- Three port isolation, Input/Output/Supply.
- Modbus RTU RS-485
- EMC Compatibility to EN61000-6-2, EN61000-6-4, EN61326-1, EN61326-3-1 for safety system.
- ATEX, IECEx, TÜV (pending) Certifications.
- TÜV Functional Safety Certification.
- Type Approval Certificate DNV and KR for maritime applications.
- 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 (21.5 to 30 Vdc) reverse polarity protected, ripple within voltage limits  $\leq 5$  Vpp, 2 A time lag fuse internally protected.

**Current consumption @ 24 V:** 200 mA with 35 mA typical in normal operation.

**Power dissipation:** 3.3 W with 24 V supply, output energized at 35 mA nominal load.

**Isolation (Test Voltage):** I.S. Out/In 1.5 KV; I.S. Out/Supply 1.5 KV; Out/Modbus 1.5 KV; In/Supply 500 V, In/In 500 V, In/Modbus 500V.

### Control Input:

logic level reverse polarity protected.

**Trip voltage levels:** OFF status  $\leq 5.0$  V, ON status  $\geq 18.0$  V (maximum 30 V).

**Current consumption @ 24 V:** 5 mA.

### Output:

See next page for detailed output diagrams and characteristics.

#### Short circuit current:

$\geq 35$  mA (40 mA typical) for single output configuration.

$\geq 70$  mA (80 mA typical) for 2 ch. in parallel output configuration

$\geq 105$  mA (120 mA typical) for 3 ch. in parallel output configuration

**Response time:**  $\leq 50$  ms.

**Frequency response:** 10 Hz

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

### 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 [ia Ga] IIC T4 Gc, II (1) D [Ex ia Da] IIIC, I (M1) [Ex ia Ma] I

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

associated apparatus and non-sparking electrical equipment.

See safety parameters at next page.

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

### Approvals:

BVS 14 ATEX E 159 X conforms to EN60079-0, EN60079-11, EN60079-15.

IECEx BVS 14.0111X conforms to IEC60079-0, IEC60079-11, IEC60079-15.

SIL 2 conforms to IEC61508 (pending).

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

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

DNV Type Approval Certificate 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 175 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: D5240T

Power Bus and DIN-Rail accessories:

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.

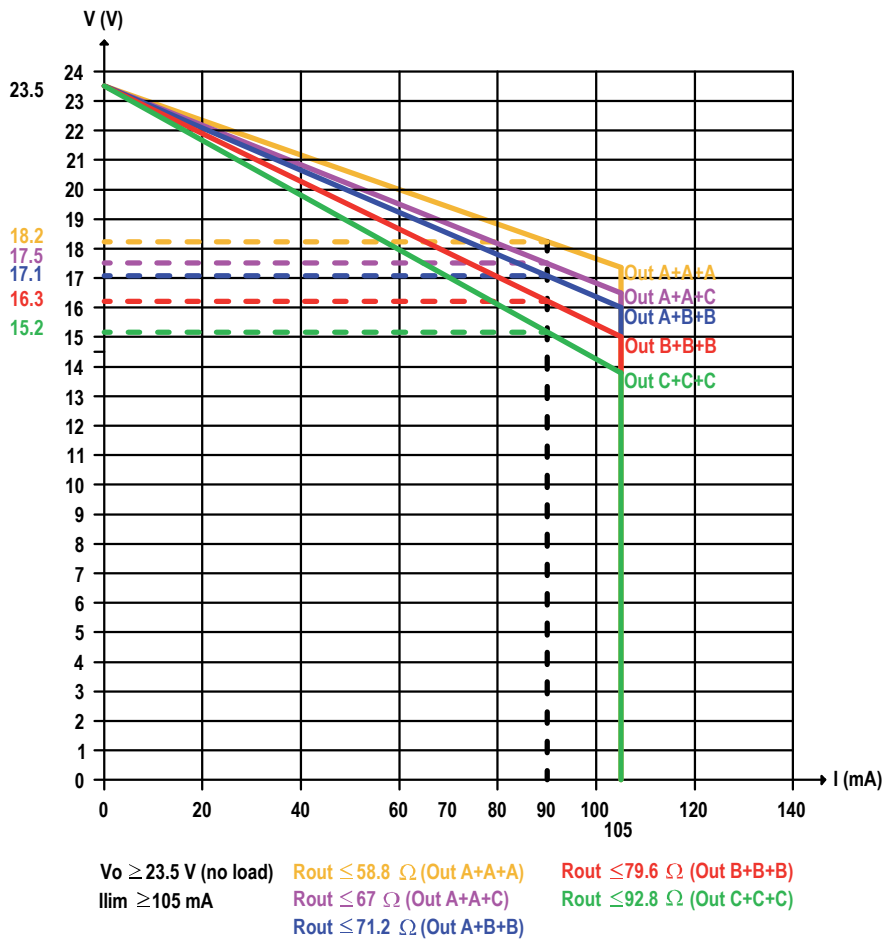
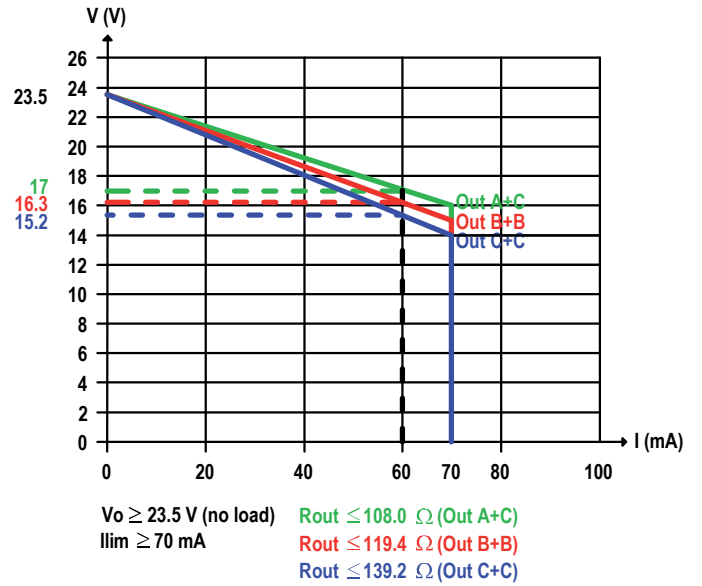
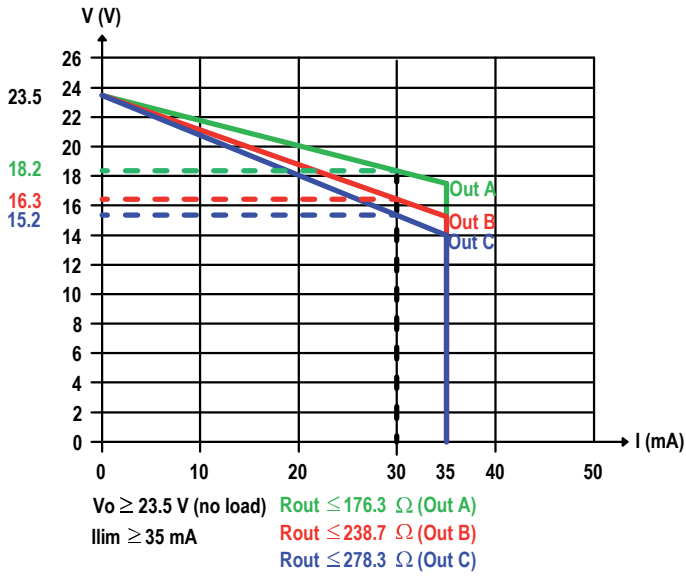
**Parameters Table:**

Safety Description	Terminals	Maximum External Parameters				
		Group Cenelec	Co/Ca (μF)	Lo/La (mH)	Lo/Ro (μH/Ω)	
<b>Out A</b> Rout = 176.3 Ω Uo/Voc = 25.2 V Io/Isc = 146 mA Po/Po = 916 mW	13-14 or 17-18 or 21-22	IIC	0.096	1.67	38.8	
		IIB	0.809	6.71	155.3	
		IIA	2.889	13.42	310.7	
		I	4.789	22.01	509.8	
		IIIC	0.809	6.71	155.3	
<b>Out B</b> Rout = 238.7 Ω Uo/Voc = 25.2 V Io/Isc = 108 mA Po/Po = 676 mW	13-15 or 17-19 or 21-23	IIC	0.096	3.07	52.6	
		IIB	0.809	12.3	210.4	
		IIA	2.889	24.61	420.8	
		I	4.789	40.37	690.3	
		IIIC	0.809	12.3	210.4	
<b>Out C</b> Rout = 278.3 Ω Uo/Voc = 25.2 V Io/Isc = 93 mA Po/Po = 580 mW	13-16 or 17-20 or 21-24	IIC	0.096	4.18	61.3	
		IIB	0.809	16.72	245.3	
		IIA	2.889	33.45	490.6	
		I	4.789	54.88	804.9	
		IIIC	0.809	16.72	245.3	
<b>Out C + Out C</b> Rout = 139.2 Ω Uo/Voc = 25.2 V Io/Isc = 185 mA Po/Po = 1160 mW	13//17 - 16//20 or 13//21 - 16-24 or 17//21 - 20//24	IIB	0.798	4.18	122.6	
		IIA	2.878	8.36	245.3	
		I	4.778	13.72	402.4	
		IIIC	0.798	4.18	122.6	
<b>Out B + Out B</b> Rout = 119.4 Ω Uo/Voc = 25.2 V Io/Isc = 216 mA Po/Po = 1352 mW	13//17 - 15//19 or 13//21 - 15//23 or 17//21 - 19//23	IIB	0.798	3.07	105.2	
		IIA	2.878	6.15	210.4	
		I	4.778	10.09	345.1	
		IIIC	0.798	3.07	105.2	
<b>Out A + Out C</b> Rout = 108 Ω Uo/Voc = 25.2 V Io/Isc = 238 mA Po/Po = 1496 mW	13//17 - 14//20 or 13//21 - 14//24 or 17//13 - 18//16 or 17//21 - 18//24 or 21//13 - 22//16 or 21//17 - 22-20	IIB	0.798	2.51	95.1	
		IIA	2.878	5.03	190.2	
		I	4.778	8.25	312.1	
		IIIC	0.798	2.51	95.1	
<b>Out C + Out C + Out C</b> Rout = 92.8 Ω Uo/Voc = 25.2 V Io/Isc = 277 mA Po/Po = 1740 mW	13//17//21 - 16//20//24	IIB	0.787	1.85	81.7	
		IIA	2.867	3.71	163.5	
		I	4.767	6.09	268.3	
		IIIC	0.787	1.85	81.7	
<b>Out B + Out B + Out B</b> Rout = 79.6 Ω Uo/Voc = 25.2 V Io/Isc = 323 mA Po/Po = 2028 mW	13//17//21 - 15//19//23	IIB	0.787	1.36	70.1	
		IIA	2.867	2.73	140.2	
		I	4.767	4.48	230.1	
		IIIC	0.787	1.36	70.1	
<b>Out A + Out B + Out B</b> Rout = 71.2 Ω Uo/Voc = 25.2 V Io/Isc = 361 mA Po/Po = 2138 mW	13//17//21 - 14//19//23 or 17//13//21 - 18//15//23 or 21//13//17 - 22//15//19	IIA	2.867	2.18	125.4	
		I	4.767	3.58	205.8	
		IIIC	0.787	1.09	62.7	
<b>Out A + Out A + Out C</b> Rout = 67 Ω Uo/Voc = 25.2 V Io/Isc = 384 mA Po/Po = 2138 mW	13//17//21 - 14//18//24 or 13//21//17 - 14//22//20 or 17//21//13 - 18//22//16	IIA	2.867	1.93	118	
		I	4.767	3.17	193.6	
		IIIC	0.787	0.96	59	
<b>Out A + Out A + Out A</b> Rout = 58.8 Ω Uo/Voc = 25.2 V Io/Isc = 437 mA Po/Po = 2138 mW	13//17//21 - 14//18//22	IIA	2.867	1.49	103.5	
		I	4.767	2.44	169.9	

**NOTE:** “//” sign means parallel connection.

E.g. 13//17 is obtained shortening pins 13 and 17

# Output Diagram:

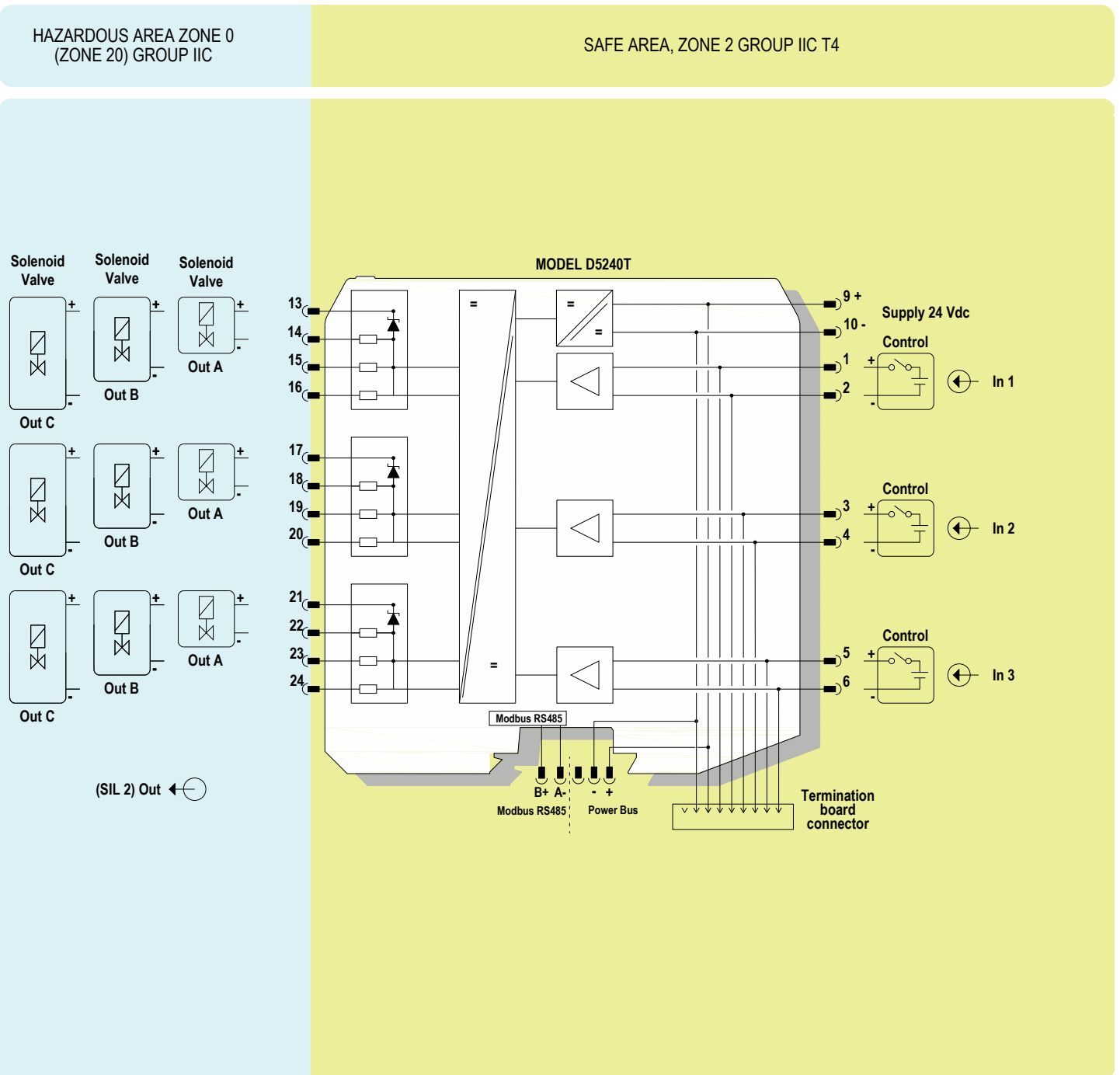




**Image:**



**Function Diagram:**



## Configuration parameters:

### 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.

### TAG:

Identification of the specific operating loop of the module.

### EXTERNAL INPUTS STATUS:

Status of each Input channel is indicated in the related field.

### OUTPUTS CONFIGURATION:

Each Output can be configured to be driven by an independent Input, or by its opposite. D5240T Input can be Hardware (via Terminal blocks) and/or Software (via Modbus). Both types can be used to drive the Output.

### HARDWARE INPUT:

#### Output 1 to 3:

- Input 1      Output represents Input 1,
- Input 2      Output represents Input 2,
- Input 3      Output represents Input 3,
- Not Input 1    Output represents Not Input 1,
- Not Input 2    Output represents Not Input 2,
- Not Input 3    Output represents Not Input 3,

### DATA LOGGER

The SWC5090 can monitor and record data from the module at constant configurable time intervals.

By changing the parameters, the user can decide the duration of the recording period and the frequency of readings.

After pressing "Start" button, the SWC5090 will prompt for a filename where the values will be stored in .CSV format.

Note that while the module is being recorded, Configuration screens are disabled, while Monitoring remains 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:

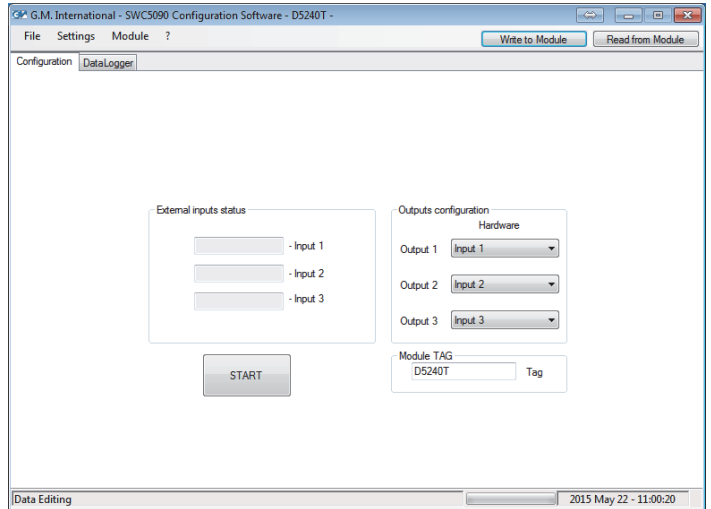
SWC5090 Software can be downloaded for free at [www.gmintsr.com](http://www.gmintsr.com)  
PPC5092 Adapter is needed to interface PC to D5240T module.

The PC supplies the module via USB, therefore operating power supply (24 Vdc) is not strictly needed when configuring the module.

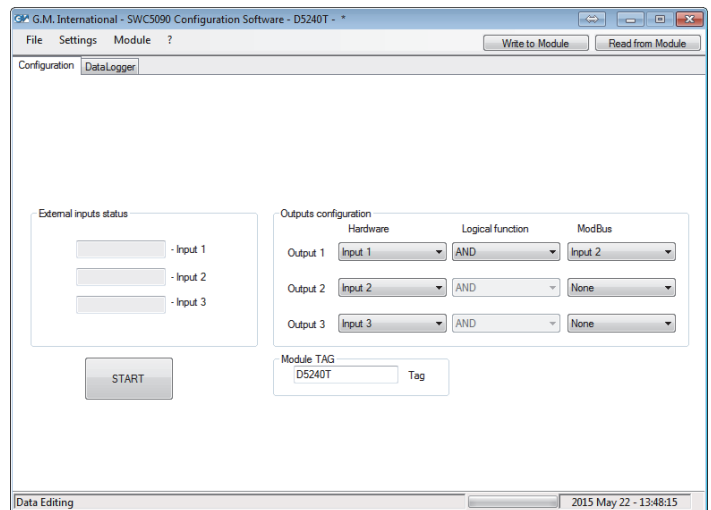
Each channel has completely independent configurations.

See ISM0154 Manual for advanced option and details on SWC5090 software.

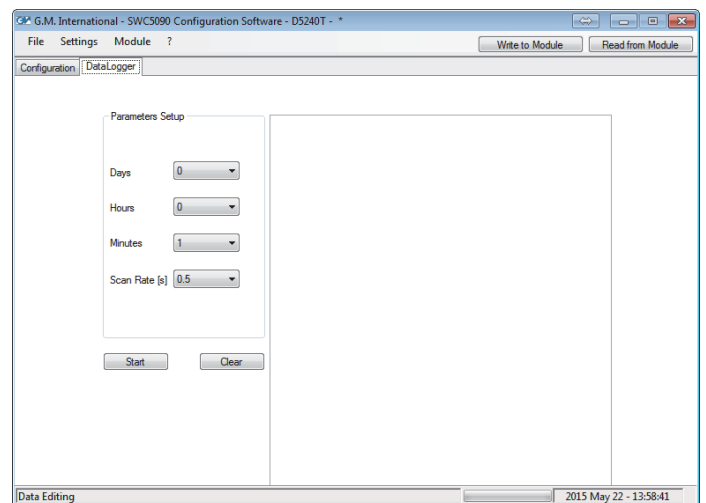
## Screenshots:



D5240T configuration screen



D5240T Advanced configuration options



D5240T Data Logger screen



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