

## Characteristics:

### General description:

D2000M series Intrinsically Safe Multiplexing System consists of one to four Analog-Temperature Multiplexer units model D2010M, up to twelve Expander units model D2011M, or up to four Digital Multiplexer units model D2030M, mounted in Hazardous Area/Hazardous Locations Zone 1-2, Gas Group IIC-IIB-IIA T4 or Class I, Division 1-2, Group A, B, C, D T4 and connected via a single/redundant 2 wires data communication/supply line to a Modbus Gateway unit model D2050M, mounted in Safe Area/Non Hazardous Locations and connected to a PLC, DCS or PC. Multiplexer D2010M units can be installed in the field, close to input sensors, for data acquisition of signal from Hazardous Area/Hazardous Locations Zone 0-1-2 or Class I, Class II, Class III, Division 1-2. The units are primarily intended for Hazardous Area/Hazardous Locations acquisition of low level signals from mV, thermocouples, thermoresistances or mA (via external shunt device like D1090Q four channel shunt resistor) sources. D2010M scans all channels using state of the art solid state isolated relays, and stores all data in a memory buffer, where they can be rapidly accessed by the Modbus Gateway D2050M unit. Each D2010M unit accepts directly up to 16 input channels and, by adding from one to three D2011M units, is expandable to 64 channels in blocks of 16 channels each. Four D2010M units, connected to twelve D2011M Expander units, achieve 256 inputs with a single Modbus Gateway D2050M unit. Redundant communication is obtained by dual data/supply interface line. Safety parameters maintain compatibility with Gas Group IIC or Gas Group A and B, even in redundant mode. An integrating type, high rejection, high accuracy (18 bits) A/D converter, provides accurate and stable measurements. All parameters are software configurable by serial commands via D2050M Gateway unit. Functions and serial commands for RS-232 and RS-485 protocols are provided in the instruction manual.

## Features:

- Intrinsically Safe for installation in Zone 1, 2 Gas Group IIC, IIB, IIA T4 or Class I, Division 1, 2 Groups A, B, C, D, Temperature Code T4 and Class I, Zone 1, 2 Groups IIC, IIB, IIA, Temperature Code T4 Hazardous Area/Hazardous Location.
- Universal inputs (mV, TC, RTD) from Zone 0, 1, 2 or Class I, II, III, Division 1, 2, Groups A, B, C, D, E, F, G, and Class I, Zone 0, 1, 2 Groups IIC, IIB, IIA Hazardous Location.
- Isolation of 200 V input to input (mV or TC), 60 V input to input (RTD) and 500 V input to ground, allows grounded sensors.
- Expandability up to 256 analog channels per system and 31 systems on a single Modbus serial link for up to 7936 channels.
- Redundant field lines for communication/supply.
- High accuracy A/D converter, 18 bits.
- EMC Compatibility to EN61000-6-2, EN61000-6-4.
- ATEX, FM & FM-C, Russian and Ukrainian Certifications.
- High reliability, SMD components.
- High density, 16 channels per unit, 256 channels per system.
- Configurable via D2050M Gateway using PC SWC2090 software (free of charge) or user software.
- Modbus output allows savings on PLC/DCS I/O cards cost.
- Lower cables, installation and maintenance costs.
- 1 terminal block per input, no external terminal block required.
- Simplified installation using standard DIN Rail mounting units.

## Ordering Information:

Model: D2010M

## Technical Data:

### Supply:

via D2050M gateway unit.

**Max. power consumption:** 200 mW.

### Isolation (Test Voltage):

I.S. In/Supply-Communication line 500 V;  
I.S. In/I.S. In 200 V for mV/TC, 60 V for RTD;  
I.S. In/Ground 500 V;  
I.S. In/I.S. In between units 500 V.  
Communication line/Ground 500 V;

### Input:

millivolt or thermocouple type A1, A2, A3, B, E, J, K, L DIN, L GOST, N, R, S, S GOST, T, U or 3-4 wires RTD Pt100, Pt200, Pt300 to DIN43760, Pt100 (0.3916), Ni 100 or Pt100, Pt50, Cu100, Cu53, Cu50, Cu 46 (GOST) or mA signals with external shunt (D1090Q) or V signals with external divider (D1094Q).

**Input channels:** 16 for mV, RTD or TC without automatic reference junction compensator or 15 using automatic reference junction compensator for thermocouples inputs (channel 16 is used for compensator connection).

**Resolution:** 2  $\mu$ V on mV or thermocouple, 10 m $\Omega$  on RTD.

**Input range:** within sensor's rated limits; mV range from - 21 to + 80 mV or - 21 to + 21 mV, resistance range from 0.0 to 400.0  $\Omega$ .

**Measuring RTD current:**  $\leq$  200  $\mu$ A.

**RTD line resistance compensation:**  $\leq$  10  $\Omega$ .

**Thermocouple Reference Junction Compensation:** automatic with external sensor on channel nr. 16 (OPT2091 separately ordered or user selectable RTD) or fixed programmable from - 60 to + 100  $^{\circ}$ C.

**Burnout:** up, down or disabled.

**Scan cycle time:** 1700 ms for a system with 4 D2010M and 12 D2011M (256 ch.).

### Performance:


field units powered by D2050M gateway at  $23 \pm 1$   $^{\circ}$ C ambient temperature.

**Calibration and linearity accuracy:**  $\leq \pm 20$   $\mu$ V on mV or thermocouple, 200 m $\Omega$  on RTD or  $\pm 0.05$  % of input value, whichever is greater.

**Temperature influence:**  $\leq \pm 2$   $\mu$ V, 10 m $\Omega$  or  $\pm 0.01$  % of input value for a 1  $^{\circ}$ C change.

**Reference Junction Compensation Influence:**  $\leq \pm 1$   $^{\circ}$ C (thermocouple sensors only).

### 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 + 60  $^{\circ}$ C, relative humidity max 90 % non condensing, up to 35  $^{\circ}$ C.

**Storage:** temperature limits - 45 to + 80  $^{\circ}$ C.

### Safety description of measuring inputs:



II (1) 2G EEx ia IIC T4 intrinsically safe apparatus.

Uo/Voc = 10.7 V, Io/Isc = 7 mA, Po/Po = 19 mW at terminals 1-2-3-4 of channel 1 to 16. -40  $^{\circ}$ C  $\leq$  Ta  $\leq$  60  $^{\circ}$ C.

### Approvals:

BVS 06 ATEX E 101 X conforms to EN50014, EN50020, EN50284, EN60079-25, EN60079-27, 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.94, E60079-0, E60079-11, 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.

### Mounting:

T35 DIN Rail according to EN50022.

**Weight:** about 750 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 1, 2, Group IIC, IIB, IIA T4, Class I, Division 1, Groups A, B, C, D Temperature Code T4 and Class I, Zone 1, 2, Group IIC, IIB, IIA T4 installation.

**Protection class:** IP 20.

**Dimensions:** Width 127 mm, Length 220 mm, Depth 78 mm.

## Parameters Table:

Safety Description	Maximum External Parameters			
	Group Cenelec	Co/Ca ( $\mu\text{F}$ )	Lo/La (mH)	Lo/Ro ( $\mu\text{H}/\Omega$ )
Terminals 1-2-3-4 for channels 1 to 16				
$U_o/V_{oc} = 10.7 \text{ V}$	IIC	2.23	725	1888
$I_o/I_{sc} = 7 \text{ mA}$	IIB	15.60	2902	7552
$P_o/P_o = 19 \text{ mW}$	IIA	69.00	5804	15105

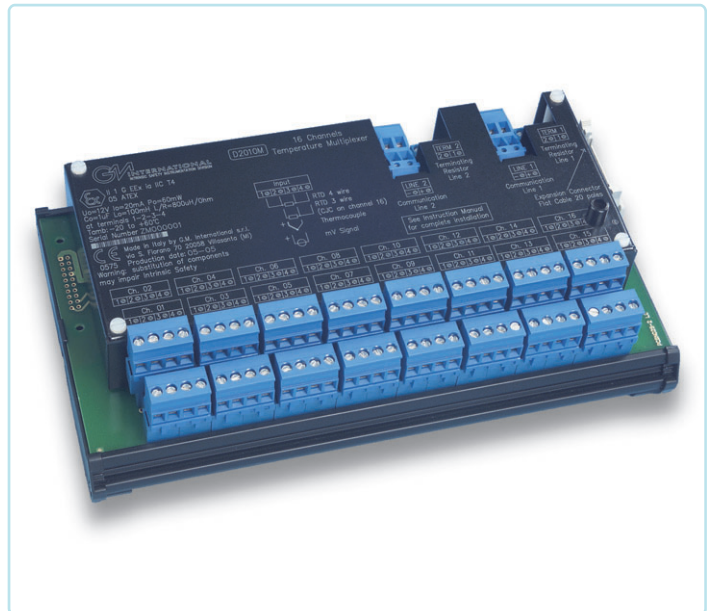
NOTE for USA and Canada:

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:

INPUT FROM HAZARDOUS AREA ZONE 0 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

INSTALLATION IN HAZARDOUS AREA, ZONE 1 GROUP IIC T4,  
HAZARDOUS LOCATIONS, CLASS I, DIVISION 1, GROUPS A, B, C, D T4,  
CLASS I, ZONE 1, GROUP IIC T4

