

## 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 D2030M Digital Multiplexer Units, mounted in Hazardous Area, Zone 1, 2, Gas Group IIC T4, connected via a single / redundant 2 wire data communication / supply line to a Modbus Gateway Unit model D2050M, mounted in Safe Area and connected to a PLC, DCS or PC.

Multiplexer D2010M Units, and Expander D2011M Units can be installed in the field, close to input sensors, for data acquisition from Hazardous Area Zone 0, 1, 2.

The Units are primarily intended for Hazardous Area acquisition of low level signals from thermocouples, RTDs, mV or mA (via external shunt device) sources.

Expander D2011M Units are controlled by D2010M Units.

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 Mux 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 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 II C 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 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 Location.
- Universal Inputs (mV, TC, RTD) from Zone 0, 1, 2 (20, 21, 22) 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.
- High accuracy A/D converter, 18 bits.
- 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.
- EMC according to EN61000-2, EN61000-6-4.
- ATEX certified; IECEx, FM, FM-C, GOST applied for;
- 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.

## Technical Data:

### Supply:

Via D2050M Gateway Unit.

**Max. Power Consumption:** D2010M: 200 mW; D2011M: 10 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;  
Communication line / Ground: 500 V;  
I.S. In / I.S. In between Units: 500 V.

### Inputs:

mV or Thermocouple type A1, A2, A3, B, E, J, K, L DIN, L GOST, N, R, S, S GOST, T, U or 3, 4 wire RTD Pt 100, Pt 200, Pt 300 (DIN43760), Pt100 (0.3916), Ni 100 or Pt100, Pt50, Cu100, Cu53, Cu50, Cu 46 (GOST), mA signals with external shunt or V with external divider.

**Input Channels:** 16 on D2010M and D2011M, 15 using Automatic Reference Junction Compensation for thermocouples inputs.

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

**Input Ranges:** within sensor's rated limits.

mV range from -21.00 to + 80.00 mV or -21.000 to + 21.000 mV, Resistance range from 0.0 to 400.0  $\Omega$ .

**RTD Measuring Current:**  $\leq$  0.2 mA.

**RTD Line Resistance Compensation:**  $\leq$  10  $\Omega$ .

**TC Ref. Junction Compensation:** Automatic with external sensor on channel nr. 16 (OPT 2091 separately ordered or user selectable RTD) or fixed programmable from -60 to + 100  $^{\circ}$ C.

**Burnout:** up, down or none.

**Scan cycle Time:**

1600 ms for a system with four D2010M and twelve 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,  $\pm 0,05$  % of input value, whichever is greater.

**TC Ref. Junction Comp. influence:**  $\leq \pm 2$   $\mu$ V, 10 m $\Omega$ , 0,02 % or  $\pm 0,01$  % of input value for a 1  $^{\circ}$ C change.

**Ref. Junction Compensation Influence:**

$\leq \pm 1$   $^{\circ}$ C (thermocouple sensors only).

### Compatibility:

 CE mark compliant, conforms to 94/9/EC Atex Directive and to 89/336/CEE EMC Directive, EN60010-1.

### Environmental Condition:

**Operating:** - 40 to + 60  $^{\circ}$ C, Relative Humidity max 90 % non condensing, up to 35  $^{\circ}$ C.

**Storage:** - 40 to + 80  $^{\circ}$ C.

### Safety description of measuring inputs:



$U_0/V_{oc} = 10,7$  V,  $I_0/I_{sc} = 7$  mA,  $P_0/P_o = 19$  mW, at terminals 1-2-3-4.

II (1) 2G EEx ia IIC T4 Intrinsically Safe Apparatus.

### Approvals:

BVS 06 ATEX E 101 X.

IECEX, FM & FM-C, GOST applied for.

Conforms to EN 60079-0, EN 50020, EN 60079-25, IEC 60079-27, FM 3600, FM 3610, FM 3810, CSA-E60079-0 (General, All Zones), CSA-E60079-11 (Intrinsic Safety "i" Zones 0 & 1), CSA-C22.2 No. 142 and CSA-C22.2 No. 157, ANSI/NEMA 250, ANSI/IEC 60529.

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

**Weight:** About 300 g.

**Connections:** By screw terminals for up to 2,5 mm<sup>2</sup>.

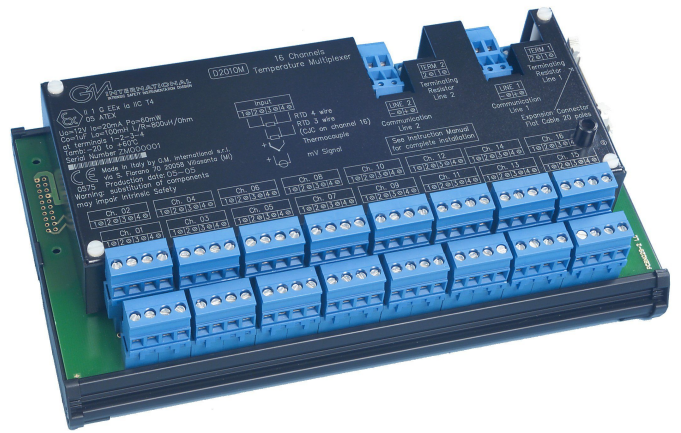
**Installation Area:** Zone 1, 2, Gas Group IIC T4 or Class I, II and III, Division 1 and Class I, Zone 1, 2 Hazardous Location.

**Protection Class:** IP 20.

**Dimensions:** 127W x 220L x 78D mm.

## Parameters Table:

Safety Description	Maximum External Parameters			
	Group Cenelec	Co/Ca (μF)	Lo/La (mH)	Lo/Ro (μH/Ω)
Terminals 1-2-3-4 for Channels 1-16				
Uo/Voc = 10,7 V	II C	2.23	725	1888
Io/Isc = 7 mA	II B	15.60	2902	7552
Po/Po = 19 mW	II A	69.00	5804	15105

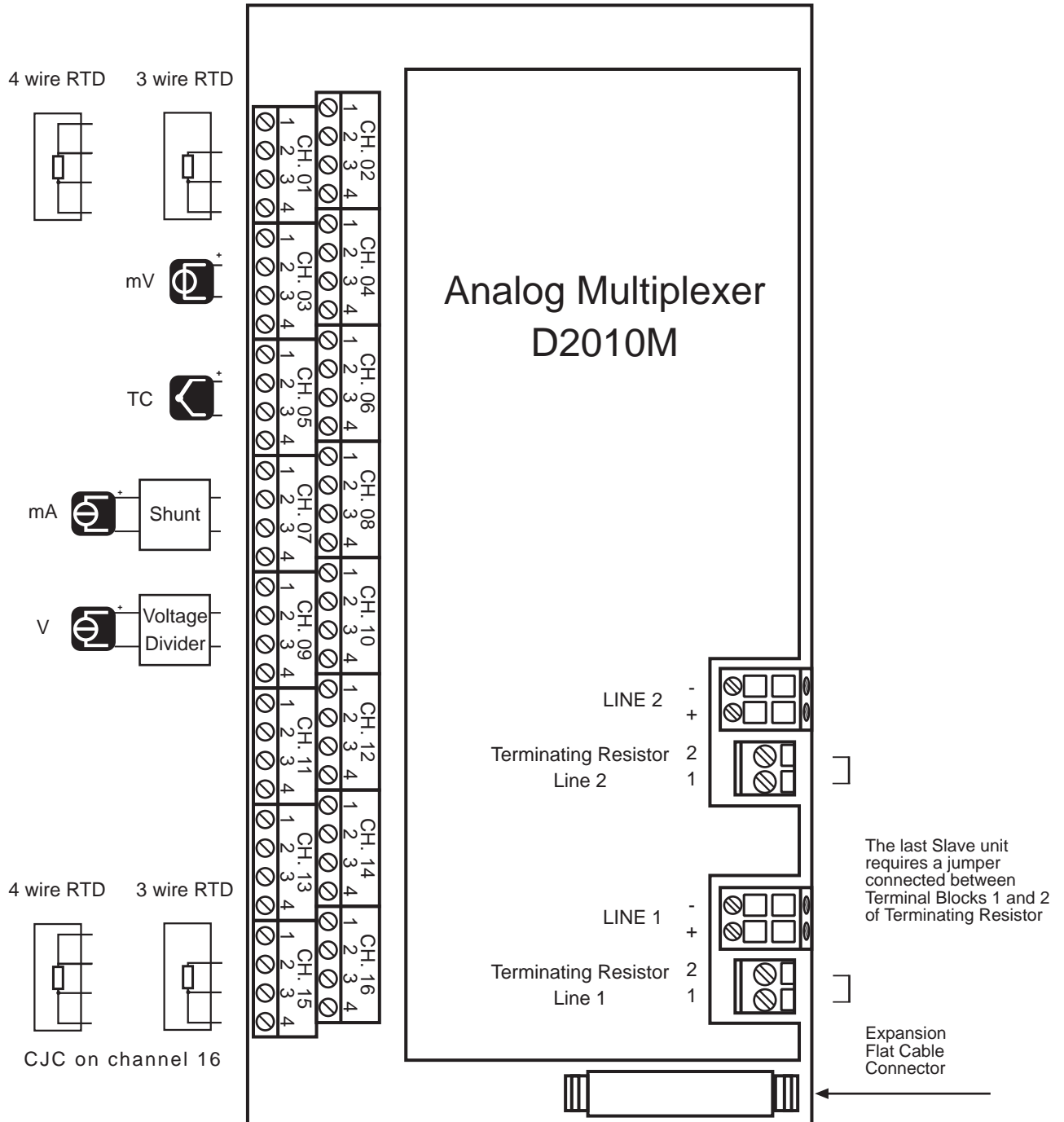


## Ordering Information:

**Model:** D2010M

16 Analog Channels

## Function Diagram:



## Parameters Table:

Safety Description	Maximum External Parameters			
	Group Cenelec	Co/Ca (μF)	Lo/La (mH)	Lo/Ro (μH/Ω)
Terminals 1-2-3-4 for Channels 1-16				
U <sub>o</sub> /V <sub>oc</sub> = 10,7 V	II C	2.23	725	1888
I <sub>o</sub> /I <sub>sc</sub> = 7 mA	II B	15.60	2902	7552
P <sub>o</sub> /P <sub>o</sub> = 19 mW	II A	69.00	5804	15105



## Ordering Information:

**Model:** D2011M

16 Analog Channels Expander

## Function Diagram:

