



## M-2018-16

16-channel Analog Input Module

### Features

- 16-channel Differential Analog Input
- $\pm 120$  VDC Overvoltage Protection
- Current, Voltage or Thermocouple Input
- 3000 VDC Intra-module Isolation
- Adjustable CJC offset
- Open Thermocouple Detection
- Dual Watchdog
- Wide Operating Temperature Range:  $-25^{\circ}\text{C}$  to  $+75^{\circ}\text{C}$



### Introduction

The M-2018-16 is an analog input module that includes 16 differential analog input channels. The voltage input range can be from  $\pm 15$  mV to  $\pm 2.5$  V, the current input range can be either  $+4$  to  $+20$  mA,  $0$  to  $+20$  mA, or  $\pm 20$  mA, and types J, K, T, E, R, S, B, N, C, L, M,  $L_{DIN43710}$  thermocouple can be used for the thermocouple input. Overvoltage protection of up to 120 VDC is provided. The module also features per-channel open wire detection for the thermocouple input types, and provides 4 kV ESD protection as well as 3000 VDC intra-module isolation.

### System Specifications

Communication	
Interface	RS-485
Bias Resistor	Switch Selectable (10 k $\Omega$ resistor)
Format	(N, 8, 1) (N, 8, 2) (E, 8, 1) (O, 8, 1)
Baud Rate	1200 to 115200 bps
Protocol	Modbus RTU, DCON
Dual Watchdog	Yes, Module (1.6 Seconds), Communication (Programmable)
LED Indicators/Display	
System LED Indicator	Yes, 1 as Power/Communication Indicator
I/O LED Indicators	-
7-segment LED Display	-
Isolation	
Intra-module Isolation, Field-to-Logic	3000 Vdc
EMS Protection	
ESD (IEC 61000-4-2)	$\pm 4$ kV Contact for each Terminal $\pm 8$ kV Air for Random Point
EFT (IEC 61000-4-4)	$\pm 4$ kV for Power Line
Surge (IEC 61000-4-5)	$\pm 1$ kV for Power Line
Power	
Reverse Polarity Protection	Yes
Input Range	$+10 \sim +48$ VDC
Consumption	0.5 W
Mechanical	
Dimensions (W x L x H)	132 mm x 157 mm x 31 mm
Installation	DIN-Rail or Wall Mounting
Environment	
Operating Temperature	$-25$ to $+75^{\circ}\text{C}$
Storage Temperature	$-40$ to $+85^{\circ}\text{C}$
Humidity	10 to 95% RH, Non-condensing

### Applications

- Building Automation
- Factory Automation
- Machine Automation
- Remote Maintenance
- Remote Diagnosis
- Testing Equipment

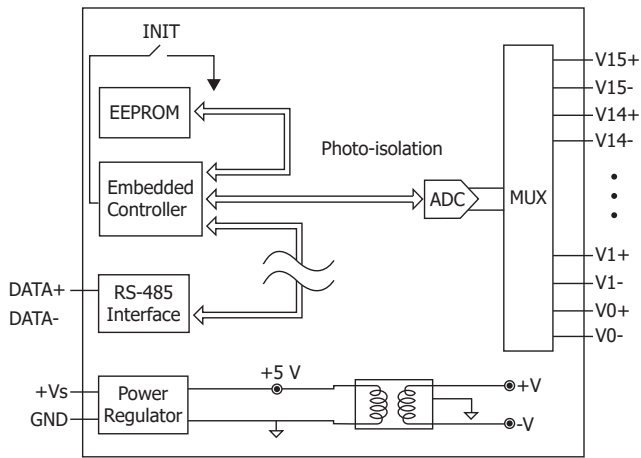
### I/O Specifications

Analog Input		
Channels	16	
Wiring	Differential	
Sensor Types	Thermocouple	J, K, T, E, R, S, B, N, C
	Voltage	$\pm 15$ mV, $\pm 50$ mV, $\pm 100$ mV, $\pm 500$ mV, $\pm 1$ V, $\pm 2.5$ V
	Current	$\pm 20$ mA, $0 \sim +20$ mA, $+4 \sim +20$ mA (requires an optional external 125 $\Omega$ resistor)
Resolution	16-bit	
Accuracy	0.1% of FSR	
Sampling Rate	10 Hz (Total)	
Input Impedance	$> 400$ k $\Omega$	
Common Voltage Protection	25 VDC	
Individual Channel Configuration	-	
Overvoltage Protection	120 VDC	
Open Wire Detection (for thermocouple only)	Yes	
Temperature Outputs Consistency	-	
Stable Temperature Output in the Field	-	

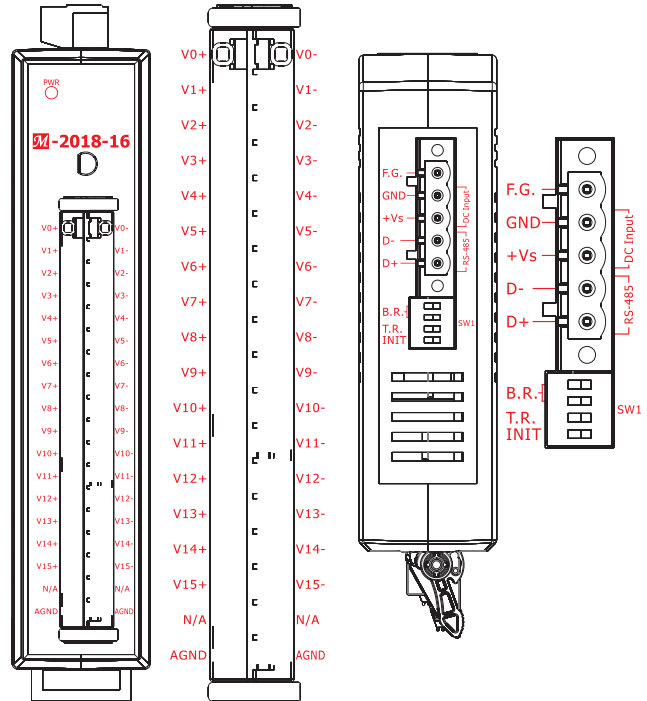
## Thermocouple Type

Type Code	Thermocouple Type	Temperature Range
0E	J	-210 to +760°C
0F	K	-270 to +1372°C
10	T	-270 to +400°C
11	E	-270 to +1000°C
12	R	0 to +1768°C
13	S	0 to +1768°C
14	B	0 to +1820°C
15	N	-270 to +1300°C
16	C	0 to +2320°C

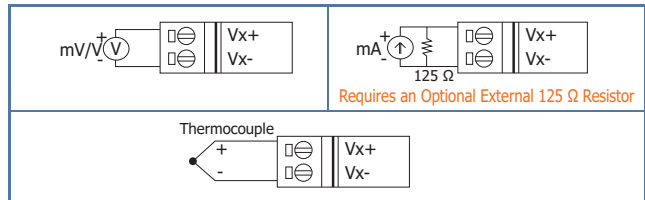
## Internal I/O Structure



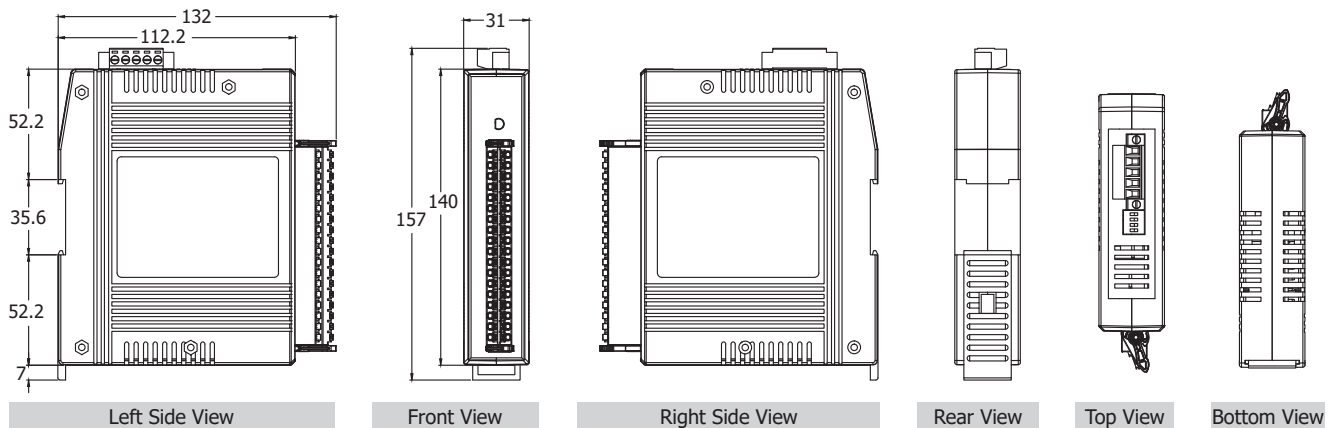
## Pin Assignments



## Wire Connections










## Dimensions (Units: mm)



## Ordering Information

M-2018-16 CR	16-channel Analog Input Module using the DCON and Modbus Protocols (RoHS)
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## Accessories

 tM-7520U CR	RS-232 to RS-485 Converter (RoHS)	 SG-770 CR	7-channel Differential or 14-channel Single-ended Surge Protector (RoHS)
 tM-7561 CR	USB to RS-485 Converter (RoHS)	 SG-3000 Series	Signal Conditioning Modules for Thermocouple, RTD, DC Voltage, DC Current and Power Input Transformers
 tM-SG4 CR	RS-485 Bias and Termination Resistor Module (RoHS)	 125 Ω, 0.1% DIP Resistor	125 Ω External Resistor for use with Current input on I-7011/I-7012/I-7017/I-7018 series modules
 I-7514U CR	4-channel RS-485 Hub (RoHS)		