

**I-7013(D)**                      **M-7013P(D)**  
1-channel RTD Input Module

**Features**

- M-7013P and M-7013PD
  - High/Low Alarm for Digital Output
  - 50Hz Event Counter for Digital Input
  - ±120 VDC Overvoltage Protection
- 1-channel RTD Input
- Lead Resistance Elimination for 3/4-wire Connection
- Open Wire Detection
- 3000 Vdc Intra-module Isolation
- Dual Watchdog
- Wide Operating Temperature Range: -25 to +75°C



**Introduction**

The I-7013(D) and M-7013P(D) is a 1-channel RTD Input module that is used for measuring temperatures via an RTD sensor and supports Pt100, Ni120, and Pt1000 type sensors. The module allows 2/3/4-wire RTD connections and features open wire detection. In addition, the I-7013(D) and M-7013P(D) also includes 3000 Vdc intra-module isolation and supports lead resistance elimination for 3/4-wire connections. The M-7013P and M-7013PD added support for 1-channel digital input as 50 Hz event counter and 2-channel digital output as high/low alarm. The M-7013P and M-7013PD support both the Modbus RTU and DCON protocols, which can be configured via software.

**Applications**

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

**System Specifications**

Model	I-7013	I-7013D	M-7013P	M-7013PD
<b>Communication</b>				
Interface	RS-485			
Bias Resistor	No (Usually supplied by the RS-485 Master. Alternatively, add a tM-SG4 or SG-785.)			
Format	(N, 8, 1) (N, 8, 2) (E, 8, 1) (O, 8, 1)			
Baud Rate	1200 to 115200 bps			
Protocol	DCON		DCON Modbus/RTU	
Dual Watchdog	Yes, Module (1.6 Seconds), Communication (Programmable)			
<b>LED Indicators/Display</b>				
System LED Indicator	Yes, 1 as Power/Communication Indicator			
I/O LED Indicators	-			
7-segment LED Display	-	Yes	-	Yes
<b>Isolation</b>				
Intra-module Isolation, Field-to-Logic	3000 Vdc			
<b>EMS Protection</b>				
ESD (IEC 61000-4-2)	±2 kV Contact for each Terminal		±4 kV Contact for each Terminal and 8 kV Air for random point	
EFT (IEC 61000-4-4)	±4 kV to Power Line			
Surge (IEC 61000-4-5)	±0.5 kV for Power Line			
<b>Power</b>				
Reverse Polarity Protection	Yes			
Input Range	+10 ~ +30 Vdc			
Consumption	0.7 W	1.3 W	0.6 W	1.2 W
<b>Mechanical</b>				
Dimensions (L x W x H)	123 mm x 72 mm x 35 mm			
Installation	DIN-Rail or Wall Mounting			
<b>Environment</b>				
Operating Temperature	-25 to +75°C			
Storage Temperature	-40 to +85°C			
Humidity	10 to 95% RH, Non-condensing			

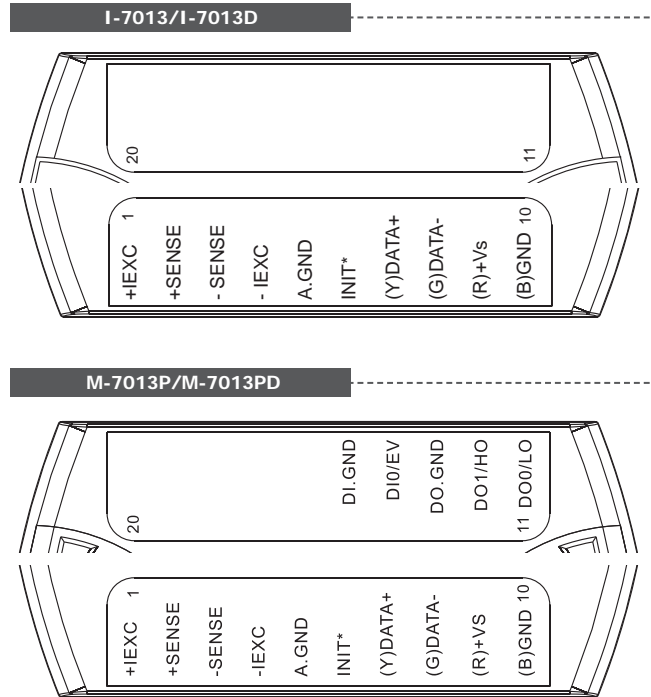
**I/O Specifications**

Model	I-7013	I-7013D	M-7013P	M-7013PD
<b>RTD Input Module</b>				
Channels	1			
Wiring	2/3/4-wire			
Sensor Types	Pt100, Pt1000, Ni120			
Resolution	16-bit			
Accuracy	±0.05%			
Sampling Rate	10 Hz			
Individual Channel Configuration	No			
Overvoltage Protection	±5 VDC		±120 Vdc	
Open Wire Detection	Yes			
3-wire RTD Lead Resistance Elimination	Yes			
Resistance Measurement	3.2 kΩ Max.			
<b>Digital Input</b>				
Channels				1
Sink/Source (NPN/PNP)				Source, Dry Contact
ON Voltage Level				Close to GND
OFF Voltage Level				Open
Counter(50 Hz, 16-bit)				Yes
Overvoltage Protection				±30 Vdc
<b>Digital Output</b>				
Channels				2
Type				Open Collector, MOSFET
Sink/Source (NPN/PNP)				Sink
Load Voltage				3.5 ~ 50 Vdc
Max. Load Current				700 mA/Channel
Overvoltage Protection				60 Vdc
Overload Protection				1.4 A (with Short-circuit Protection)
Power-on Value				Yes
Safe Value				Yes

### RTD Type Settings (TT)

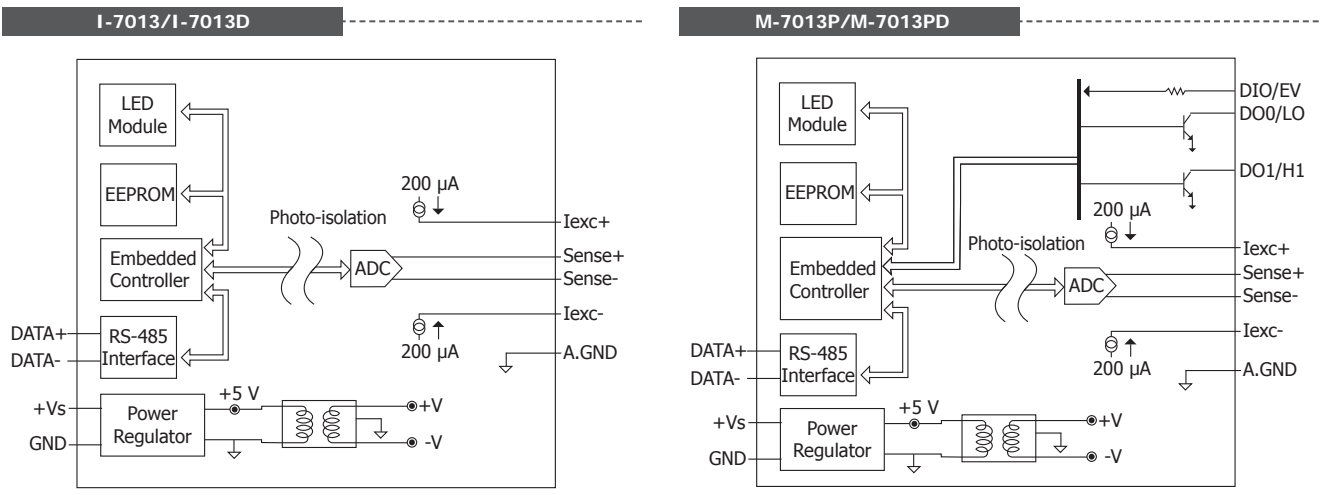
Type Code	RTD Type	Temperature Range
20	Platinum 100, $\alpha = 0.00385$	-100 to +100°C
21	Platinum 100, $\alpha = 0.00385$	0 to +100°C
22	Platinum 100, $\alpha = 0.00385$	0 to +200°C
23	Platinum 100, $\alpha = 0.00385$	0 to +600°C
24	Platinum 100, $\alpha = 0.003916$	-100 to +100°C
25	Platinum 100, $\alpha = 0.003916$	0 to +100°C
26	Platinum 100, $\alpha = 0.003916$	0 to +200°C
27	Platinum 100, $\alpha = 0.003916$	0 to +600°C
28	Nickel 120	-80 to +100°C
29	Nickel 120	0 to +100°C
2A	Platinum 1000, $\alpha = 0.00385$	-200 to +600°C
2E	Platinum 100, $\alpha = 0.00385$	-200 to +200°C
2F	Platinum 100, $\alpha = 0.003916$	-200 to +200°C
80	Platinum 100, $\alpha = 0.00385$	-200 to +600°C
81	Platinum 100, $\alpha = 0.003916$	-200 to +600°C
82	Cu 50 at 0°C	-50 to +150°C

### Pin Assignments

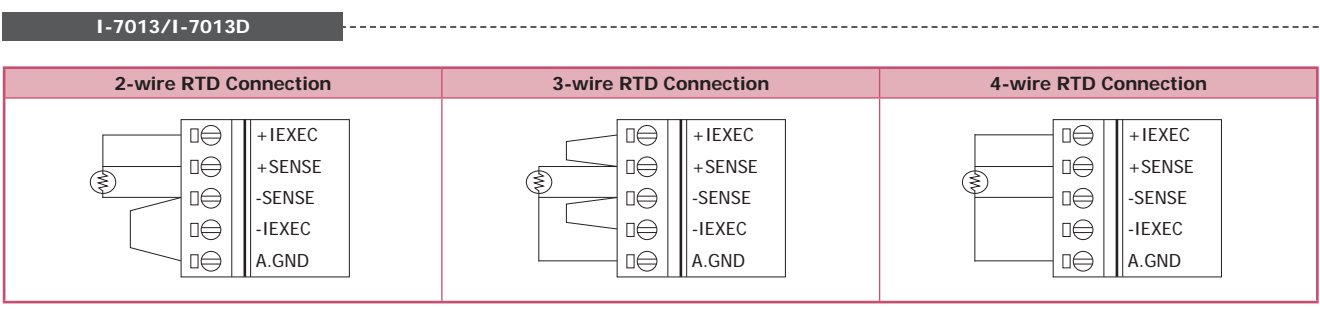


2  
3  
RS-485 Remote I/O Modules

### Internal I/O Structure



### Wire Connections



I-7013/I-7013D/M-7013P/M-7013PD

M-7013P/M-7013PD

2-wire RTD Connection	3-wire RTD Connection	4-wire RTD Connection

Digital Input/Counter	Readback as 0	Readback as 1
Dry Contact	Open	Closed to GND

Digital Output	ON State Readback as 1	OFF State Readback as 0
Resistance Load		
Inductance Load		

Ordering Information

I-7013 CR	1-channel RTD Input Module using the DCON Protocol (Blue Cover) (RoHS)
I-7013-G CR	1-channel RTD Input Module using the DCON Protocol (Gray Cover) (RoHS)
I-7013D CR	I-7013 with 7-segment LED Display (Blue Cover) (RoHS)
M-7013P-G CR	1-channel RTD Input Module using the DCON and Modbus Protocols (Gray Cover) (RoHS)
M-7013PD-G CR	M-7013P with 7-segment LED Display (Gray Cover) (RoHS)

Accessories

	tM-7520U CR	RS-232 to RS-485 Converter (RoHS)
	tM-7561 CR	USB to RS-485 Converter (RoHS)
	tM-SG4 CR	RS-485 Bias and Termination Resistor Module (RoHS)
	I-7514U CR	4-channel RS-485 Hub (RoHS)
	SG-770 CR	7-channel Differential or 14-channel Single-ended Surge Protector (RoHS)
	SG-3000 Series	Signal Conditioning Modules for Thermocouple, RTD, DC Voltage, DC Current and Power Input Transformers