



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 |
|--|--|---------|--|----------|
| Communication | | | | |
| 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) | | | |
| LED Indicators/Display | | | | |
| System LED Indicator | Yes, 1 as Power/Communication Indicator | | | |
| I/O LED Indicators | - | | | |
| 7-segment LED Display | - | Yes | - | Yes |
| Isolation | | | | |
| Intra-module Isolation, Field-to-Logic | 3000 Vdc | | | |
| EMS Protection | | | | |
| 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 | | | |
| Power | | | | |
| Reverse Polarity Protection | Yes | | | |
| Input Range | $+10 \sim +30$ Vdc | | | |
| Consumption | 0.7 W | 1.3 W | 0.6 W | 1.2 W |
| Mechanical | | | | |
| Dimensions (L x W x H) | 123 mm x 72 mm x 35 mm | | | |
| Installation | DIN-Rail or Wall Mounting | | | |
| Environment | | | | |
| Operating Temperature | -25 to +75°C | | | |
| Storage Temperature | -40 to +85°C | | | |
| Humidity | 10 to 95% RH, Non-condensing | | | |

I/O Specifications

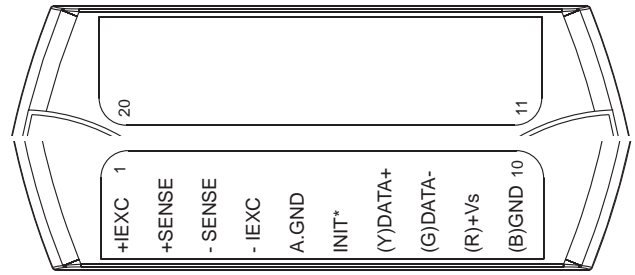
| Model | I-7013 | I-7013D | M-7013P | M-7013PD |
|--|----------------------|---------|---------------------------------------|----------|
| RTD Input Module | | | | |
| Channels | 1 | | | |
| Wiring | 2/3/4-wire | | | |
| Sensor Types | Pt100, Pt1000, Ni120 | | | |
| Resolution | 16-bit | | | |
| Accuracy | $\pm 0.05\%$ | | | |
| Sampling Rate | 10 Hz | | | |
| Individual Channel Configuration | - | | | |
| Overvoltage Protection | ± 5 Vdc | | ± 120 Vdc | |
| Open Wire Detection | Yes | | | |
| 3-wire RTD Lead Resistance Elimination | Yes | | | |
| Resistance Measurement | 3.2 k Ω Max. | | | |
| Digital Input | | | | |
| 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 | |
| Digital Output | | | | |
| 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)

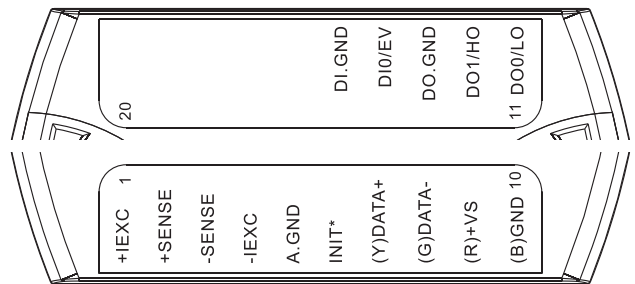
| Type Code | RTD Type | Temperature Range |
|-----------|-----------------------------------|-------------------|
| 20 | Platinum 100, $\alpha = 0.00385$ | -100 to +100°C |
| 21 | Platinum 100, $\alpha = 0.00385$ | 0 to +100°C |
| 22 | Platinum 100, $\alpha = 0.00385$ | 0 to +200°C |
| 23 | Platinum 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

I-7013/I-7013D

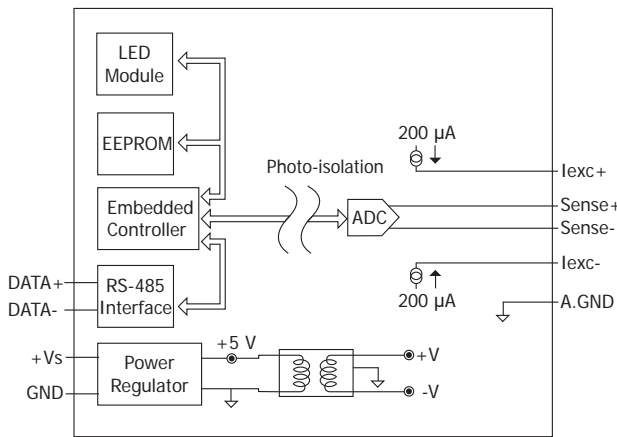


M-7013P/M-7013PD

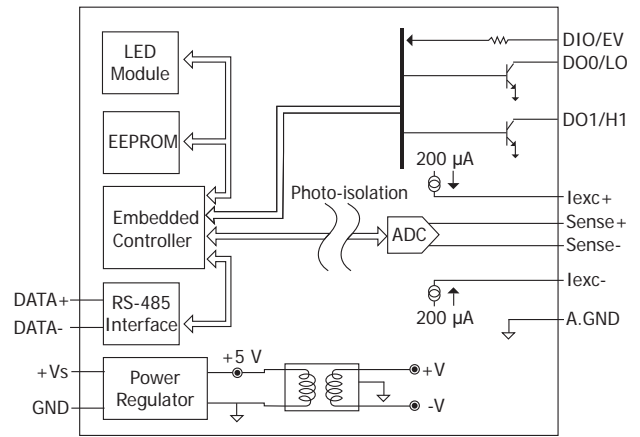


Internal I/O Structure

I-7013/I-7013D



M-7013P/M-7013PD



Wire Connections

I-7013/I-7013D

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

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 |