



M-7002

4-channel AI, 5-channel DI and 4-channels Relay Output Module

# **■** Features

- Voltage and Current Inputs
- ±240 Vrms Overvoltage Protection
- High Resolution: 16 bit
- 2500 VDC Intra-module Isolation
- Sink and Source Type Digital Inputs
- Photocouple Isolation
- Support Relay Outputs
- DIN-Rail Mountable
- Dual Watchdog
- Wide Operating Temperature Range: -25 to +75°C









#### Introduction

The M-7002 is a 16-bit, 4-channel differential analog inputs 5-channel digital inputs and 4-channels for relay output. All of its channels are Form A type relay module that provides programmable input range on all analog channels ( $\pm 150$  mV,  $\pm 500$  mV,  $\pm 1$  V,  $\pm 5$  V,  $\pm 10$  V,  $\pm 20$  mA,  $0 \sim 20$  mA and  $4 \sim 20$  mA) and digital output can be set alarm output with short-circuit protection and overload protection. Each analog channel is allowed to configure an individual range and has 240 Vrms high overvoltage protection. Jumper selectable for voltage or current input. The sampling rate of M-7002 is changeable; there are fast mode and normal mode for your consideration. M-7002 also has qualification for 4 kV ESD protection as well as 2500 VDC intra-module isolation.

# System Specifications

Model	M-7002
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
Baud Rate	1200 to 115200 bps
Protocol	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
Isolation	
Intra-module Isolation, Field-to-Logic	2500 VDC
<b>EMS Protection</b>	
ESD (IEC 61000-4-2)	±4 kV Contact for each Terminal
EFT (IEC 61000-4-4)	±4 kV for Power Line
Surge (IEC 61000-4-5)	±3 kV for Power Line
Power	
Reverse Polarity Protection	Yes
Input Range	+10 ~ +30 VDC
Consumption	1.8 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

### Applications

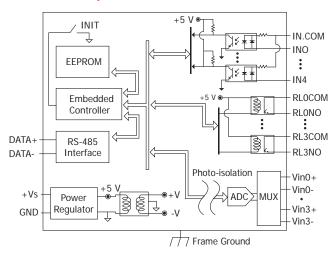
- Building Automation
- Machine Automation
- Remote Diagnosis
- Factory Automation • Remote Maintenance
- Testing Equipment

### **■ I/O Specifications**

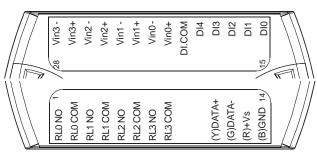
Model       Analog Input       Channels     4       Wiring     Differential       Input Range     ±150 mV, ±500 mV, ±1 V, ±5 V, ±10 V ±20 mÅ, 0~20 mÅ, 4~20 mÅ (Jumper selectable)       Resolution     12/16-bit       Accuracy     Normal Mode Normal Normal Mode Normal Normal Mode Normal Normal Mode Normal Mode Normal Mode Normal Mode Normal Mode Normal Normal Mode Normal Normal Mode Normal Mode Normal Mode Normal Mode Normal Mode Normal Normal Mode Normal M	■ I/O Specifications				
Channels	Model		M-7002		
Differential	Analog Inpu	t			
Linput Range			4		
#20 mA , 0~20 mA , 4~20 mA (Jumper selectable)  Resolution	Wiring		Differential		
Normal Mode   0.1%	Input Range				
Accuracy   Fast Mode   0.5%	Resolution		12/16-bit		
Fast Mode   0.5%	Aggurage	Normal Mode	0.1%		
Rate       Fast Mode       60 Hz         Input Impedance       Voltage       2 M         Common Voltage Protection       ±200 Vpc         Individual Channel Configuration       Yes         Overvoltage Protection       240 Vrms         Digital Input/Counter       5         Contact       Wet         Sink/Source (NPN/PNP)       Sink/Source         ON Voltage Level       10 ~ 50 Vpc         OFF Voltage Level       +4 Vpc Max.         Counter (50 Hz, 16-bit)       Yes         Input Impedance       10 kΩ         Overvoltage Protection       ±70 Vpc         Isolation Voltage       3750 Vpc         Relay Output         Channels       4         Type       Power Relay (Form A)         Contact Rating       5 A @ 250 Vac         5 A @ 30 Vpc         Surge Strength       3000 Vpc         Operate Time       6 ms         Release Time       3 ms         Mechanical Endurance       2 × 107 ops.	Accuracy	Fast Mode	0.5%		
Input Impedance Currnet 139 Ω  Common Voltage Protection ±200 Vpc  Individual Channel Configuration  Overvoltage Protection 240 Vrms  Digital Input/Counter  Channels 5  Contact Wet  Sink/Source (NPN/PNP) Sink/Source  ON Voltage Level 10 ~ 50 Vpc  OFF Voltage Level +4 Vpc Max.  Counter (50 Hz, 16-bit) Yes  Input Impedance 10 kΩ  Overvoltage Protection ±70 Vpc  Isolation Voltage 3750 Vpc  Relay Output  Channels 4  Type Power Relay (Form A)  Contact Rating 5 A @ 250 Vac 5 A @ 30 Vpc  Surge Strength 3000 Vpc  Operate Time 6 ms  Release Time 3 ms  Mechanical Endurance 2 × 10 <sup>7</sup> ops.	Sampling	Normal Mode	10 Hz		
Impedance Currnet 139 Ω  Common Voltage Protection ±200 Vpc  Individual Channel Configuration 240 Vrms  Digital Input/Counter  Channels 5  Contact Wet  Sink/Source (NPN/PNP) Sink/Source  ON Voltage Level 10 ~ 50 Vpc  OFF Voltage Level +4 Vpc Max.  Counter (50 Hz, 16-bit) Yes  Input Impedance 10 kΩ  Overvoltage Protection ±70 Vpc  Isolation Voltage 3750 Vpc  Relay Output  Channels 4  Type Power Relay (Form A)  Contact Rating 5 A @ 250 Vac 5 A @ 30 Vpc  Surge Strength 3000 Vpc  Operate Time 6 ms  Release Time 3 ms  Mechanical Endurance 2 × 10 <sup>7</sup> ops.	Rate	Fast Mode	60 Hz		
Common Voltage Protection ±200 Vpc   Individual Channel Configuration yes   Overvoltage Protection 240 Vrms   Digital Input/Counter Tohannels   Channels 5   Contact Wet   Sink/Source (NPN/PNP) Sink/Source   ON Voltage Level 10 ~ 50 Vpc   OFF Voltage Level +4 Vpc Max.   Counter (50 Hz, 16-bit) Yes   Input Impedance 10 kΩ   Overvoltage Protection ±70 Vpc   Isolation Voltage 3750 Vpc   Relay Output 4   Type Power Relay (Form A)   Contact Rating 5 A @ 250 Vac 5 A @ 30 Vpc   Surge Strength 3000 Vpc   Operate Time 6 ms   Release Time 3 ms   Mechanical Endurance 2 × 107 ops.	Input	Voltage	2 M		
Individual Channel Configuration  Overvoltage Protection  Digital Input/Counter  Channels  Source (NPN/PNP)  OrF Voltage Level  OFF Voltage Level  OFF Voltage Level  Input Impedance  Overvoltage Protection  Isolation Voltage  470 VDC  Relay Output  Channels  4  Type  Power Relay (Form A)  Contact Rating  S A @ 250 VAC  5 A @ 30 VDC  Surge Strength  3 ms  Mechanical Endurance  2 × 10 <sup>7</sup> ops.	Impedance	Currnet	139 Ω		
tion Vess Overvoltage Protection 240 Vrms  Digital Input/Counter  Channels 5 Contact Wet Sink/Source (NPN/PNP) Sink/Source ON Voltage Level 10 ~ 50 VDC  OFF Voltage Level +4 VDC Max.  Counter (50 Hz, 16-bit) Yes Input Impedance 10 kΩ Overvoltage Protection ±70 VDC Isolation Voltage 3750 VDC  Relay Output  Channels 4 Type Power Relay (Form A)  Contact Rating 5 A @ 250 VAC 5 A @ 30 VDC  Surge Strength 3000 VDC  Operate Time 6 ms Release Time 3 ms  Mechanical Endurance 2 × 10 <sup>7</sup> ops.	Common Volta	age Protection	±200 V <sub>DC</sub>		
Digital Input/Counter           Channels         5           Contact         Wet           Sink/Source (NPN/PNP)         Sink/Source           ON Voltage Level         10 ~ 50 VDC           OFF Voltage Level         +4 VDC Max.           Counter (50 Hz, 16-bit)         Yes           Input Impedance         10 kΩ           Overvoltage Protection         ±70 VDC           Isolation Voltage         3750 VDC           Relay Output         4           Type         Power Relay (Form A)           Contact Rating         5 A @ 250 VAC 5 A @ 30 VDC           Surge Strength         3000 VDC           Operate Time         6 ms           Release Time         3 ms           Mechanical Endurance         2 × 10 <sup>7</sup> ops.		nnel Configura-	Yes		
Channels         5           Contact         Wet           Sink/Source (NPN/PNP)         Sink/Source           ON Voltage Level         10 ~ 50 Vpc           OFF Voltage Level         +4 Vpc Max.           Counter (50 Hz, 16-bit)         Yes           Input Impedance         10 kΩ           Overvoltage Protection         ±70 Vpc           Isolation Voltage         3750 Vpc           Relay Output         4           Type         Power Relay (Form A)           Contact Rating         5 A @ 250 Vac 5 A @ 30 Vpc           Surge Strength         3000 Vpc           Operate Time         6 ms           Release Time         3 ms           Mechanical Endurance         2 × 10 <sup>7</sup> ops.	Overvoltage P	rotection	240 Vrms		
Contact         Wet           Sink/Source (NPN/PNP)         Sink/Source           ON Voltage Level         10 ~ 50 Vpc           OFF Voltage Level         +4 Vpc Max.           Counter (50 Hz, 16-bit)         Yes           Input Impedance         10 kΩ           Overvoltage Protection         ±70 Vpc           Isolation Voltage         3750 Vpc           Relay Output         4           Type         Power Relay (Form A)           Contact Rating         5 A @ 250 Vac 5 A @ 30 Vpc           Surge Strength         3000 Vpc           Operate Time         6 ms           Release Time         3 ms           Mechanical Endurance         2 × 107 ops.	Digital Input	/Counter			
Sink/Source (NPN/PNP)       Sink/Source         ON Voltage Level       10 ~ 50 Vpc         OFF Voltage Level       +4 Vpc Max.         Counter (50 Hz, 16-bit)       Yes         Input Impedance       10 kΩ         Overvoltage Protection       ±70 Vpc         Isolation Voltage       3750 Vpc         Relay Output       4         Type       Power Relay (Form A)         Contact Rating       5 A @ 250 Vac         5 A @ 30 Vpc         Surge Strength       3000 Vpc         Operate Time       6 ms         Release Time       3 ms         Mechanical Endurance       2 × 107 ops.	Channels		5		
ON Voltage Level $10 \sim 50 \text{ VDC}$ OFF Voltage Level $+4 \text{ VDC Max}$ .  Counter (50 Hz, 16-bit) Yes  Input Impedance $10 \text{ k}\Omega$ Overvoltage Protection $\pm 70 \text{ VDC}$ Isolation Voltage $3750 \text{ VDC}$ Relay Output  Channels $4$ Type Power Relay (Form A)  Contact Rating $5 \text{ A} @ 250 \text{ VAc} \\ 5 \text{ A} @ 30 \text{ VDC}$ Surge Strength $3000 \text{ VDC}$ Operate Time $6 \text{ ms}$ Release Time $3 \text{ ms}$ Mechanical Endurance $2 \times 10^7 \text{ ops.}$	Contact		Wet		
$\begin{array}{cccccccccccccccccccccccccccccccccccc$	Sink/Source (NPN/PNP)		Sink/Source		
$ \begin{array}{llllllllllllllllllllllllllllllllllll$	ON Voltage Le	vel	10 ~ 50 VDC		
$ \begin{array}{cccccccccccccccccccccccccccccccccccc$	OFF Voltage L	evel	+4 VDC Max.		
Overvoltage Protection         ±70 VDC           Isolation Voltage         3750 VDC           Relay Output         4           Type         Power Relay (Form A)           Contact Rating         5 A @ 250 VAC 5 A @ 30 VDC           Surge Strength         3000 VDC           Operate Time         6 ms           Release Time         3 ms           Mechanical Endurance         2 × 10 <sup>7</sup> ops.	Counter (50 H	z, 16-bit)	Yes		
Isolation Voltage         3750 VDC           Relay Output         4           Channels         4           Type         Power Relay (Form A)           Contact Rating         5 A @ 250 VAC 5 A @ 30 VDC           Surge Strength         3000 VDC           Operate Time         6 ms           Release Time         3 ms           Mechanical Endurance         2 × 10 <sup>7</sup> ops.	Input Impeda	nce	10 kΩ		
Relay Output           Channels         4           Type         Power Relay (Form A)           Contact Rating         5 A @ 250 VAC 5 A @ 30 VDC           Surge Strength         3000 VDC           Operate Time         6 ms           Release Time         3 ms           Mechanical Endurance         2 × 10 <sup>7</sup> ops.	Overvoltage Protection		±70 VDC		
Channels         4           Type         Power Relay (Form A)           Contact Rating         5 A @ 250 VAC           5 A @ 30 VDC           Surge Strength         3000 VDC           Operate Time         6 ms           Release Time         3 ms           Mechanical Endurance         2 × 10 <sup>7</sup> ops.	Isolation Voltage		3750 VDC		
Type         Power Relay (Form A)           Contact Rating         5 A @ 250 VAC 5 A @ 30 VDC           Surge Strength         3000 VDC           Operate Time         6 ms           Release Time         3 ms           Mechanical Endurance         2 × 10 <sup>7</sup> ops.	Relay Output				
Contact Rating       5 A @ 250 VAC         5 A @ 30 VDC         Surge Strength       3000 VDC         Operate Time       6 ms         Release Time       3 ms         Mechanical Endurance       2 × 10 <sup>7</sup> ops.	Channels		4		
Contact Rating         5 A @ 30 Vbc           Surge Strength         3000 Vbc           Operate Time         6 ms           Release Time         3 ms           Mechanical Endurance         2 × 10 <sup>7</sup> ops.	Туре		Power Relay (Form A)		
Operate Time         6 ms           Release Time         3 ms           Mechanical Endurance         2 × 10 <sup>7</sup> ops.	Contact Rating				
Release Time $3 \text{ ms}$ Mechanical Endurance $2 \times 10^7 \text{ ops.}$	Surge Strength		3000 VDC		
Mechanical Endurance $2 \times 10^7$ ops.	Operate Time		6 ms		
·	Release Time		3 ms		
105	Mechanical Endurance		2 × 10 <sup>7</sup> ops.		
Electrical Endurance 10° ops.	Electrical Endurance		10 <sup>5</sup> ops.		
Power-on Value Yes	Power-on Value		Yes		
Safe Value Yes	Safe Value		Yes		

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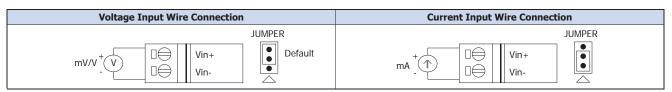
### **■ Internal I/O Structure**

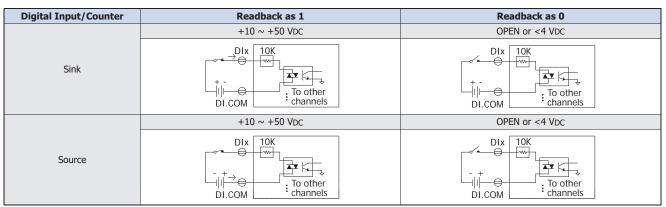


## **Pin Assignments**



#### **■ Wire Connections**





Power Relay	ON State Readback as 1	OFF State Readback as 0
Relay Output	RLx.COM Relay Close AC/DC To other RLx.NO Relay Close To other channels	Relay Open  AC/DC X  Solve To other channels

# Ordering Information

M-7002 CR 4-channel AI, 5-channel DI and 4-channels Relay Output Module using the DCON and Modbus Protocol (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

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