

2.2.2. Thermocouple, Voltage & Current Input Module

Thermocouple Introduction

A thermocouple is a temperature sensor which consists of two wires of different conductors. Based on the Seebeck effect in thermoelectricity, the temperature difference results voltage difference on the two wires. Thermocouples are widely used in scientific and industrial applications because they're generally accurate and can operate over wide range of temperature.



Applications



Thermocouple, Voltage & Current Input Module			
Model Name		I-7011(D) M-7011(D)	I-7018 M-7018
Pictures			
Channel		1	8 (6-channel differential and 2-channel single-ended, or 8-channel differential)
Wiring		Differential	
Sensor Type	Thermocouple	J, K, T, E, R, S, B, N, C	
	Voltage	+/-1.5 mV, +/-50 mV, +/-100 mV, +/-500 mV, +/-1 V, +/-2.5 V	
	Current	+/-20 mA (requires optional external 125 Ω resistor)	+/-20 mA, 0 ~ 20 mA, 4 ~ 20 mA (requires optional external 125 Ω resistor)
Resolution		16-bit	
Accuracy		0.1%	
Sampling Rate		10 Hz	
Input Impedance		> 400 kΩ	
Common Voltage Protection		+/-5 V _{DC}	+/-15 V _{DC}
Individual Channel Configuration		-	
Overvoltage Protection		+/-5 V _{DC}	+/-35 V _{DC}
Open Wire Detection (for thermocouple only)		Yes	-
Temperature outputs consistency		-	
Stable temperature output in the field		-	
System			
Dual Watchdog		Yes	
ESD (IEC 61000-4-2)		-	
EFT (IEC 61000-4-4)		-	
Intra-Module Isolation, Field-to-Logic		3000 V _{DC}	
Power Input		10 ~ 30 V _{DC}	
Power Consumption		0.9 W; 1.5 W for (D) version	1.0 W
Note1: I-7011(D) and M-7011(D) both include 1 DI and 2 DO channels. The specification is as following			
Digital Input		Digital Output	
Channel	1	Channel	2
Contact	Dry	Type	Open Collector
Sink/Source (NPN/PNP)	Source	Sink/Source (NPN/PNP)	Sink
On Voltage Level	Close to GND	Load Voltage	3.5 ~ 30 V _{DC}
Off Voltage Level	Open	Max. Load Current	30 mA/Channel
Counter (50 Hz, 16-bit)	Yes	Power-on Value	Yes
Input Impedance	3 kΩ	Safe Value	Yes
Overvoltage Protection	+/-30 V _{DC}		
		Thermocouple Type	
Type	Range (°C)	Type	Range (°C)
J	-210 ~ +760	B	0 ~ +1820
K	-270 ~ +1372	N	-270 ~ 1300
T	-270 ~ +400	C	0 ~ 2320
E	-270 ~ +1000	L	-200 ~ +800
R	0 ~ +1768	M	-200 ~ +100
S	0 ~ +1768	L (DIN43710)	-200 ~ +900