



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 (General Grade)		
Model Name	I-7011(D)	I-7018
Pictures		
Channel	1	8
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)
Resolution	16-bit	
Accuracy	0.1%	
Sampling Rate	10 Hz	
Input Impedance	> 400 kΩ	
Common Voltage Protection	+/-5 V _{oc}	+/-15 V _{oc}
Individual Channel Configuration	-	
Overvoltage Protection	+/-5 V _{oc}	+/-35 V _{oc}
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 _{oc}	
Power Input	10 ~ 30 V _{oc}	
Power Consumption	0.9 W; 1.5 W for (D) version	1.0 W





Note1: I-7011(D) and I-7011P(D) both include 1 DI and 2 DO channels. The specification is as following

Digital Input	
Channel	1
Contact	Dry
Sink/Source (NPN/PNP)	Source
On Voltage Level	Close to GND
Off Voltage Level	Open
Counter (50 Hz, 16-bit)	Yes
Input Impedance	3 kΩ
Overvoltage Protection	+/-30 V _{oc}

Digital Output	
Channel	2
Type	Open Collector
Sink/Source (NPN/PNP)	Sink
Load Voltage	3.5 ~ 30 V _{oc}
Max. Load Current	30 mA/Channel
Power-on Value	Yes
Safe Value	Yes

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







Thermocouple, Voltage & Current Input Module (Industrial Grade)				
Model Name	I-7018R	I-7018Z	I-7019R	M-7019Z
	M-7018R	M-7018Z	M-7019R	
Pictures				
Channel	8	10	8	10
Wiring	J, K, T, E, R, S, B, N, C, L, M, LDIN43710			
Sensor Type	Thermocouple	J, K, T, E, R, S, B, N, C, L, M, LDIN43710		
	Voltage	+/-1.5 mV, +/-50 mV, +/-100 mV, +/-500 mV, +/-1 V, +/-2.5 V		+/-15 mV, +/-50 mV, +/-100 mV, +/-150 mV, +/-500 mV, +/-1 V, +/-2.5 V, +/-5 V, +/-10 V
	Current	+/-20 mA (requires optional external 125 Ω resistor)		+/-20 mA, 0 ~ 20 mA, 4 ~ 20 mA (Jumper selectable)
Resolution	16-bit			
Accuracy	0.1%			
Sampling Rate	10 Hz		8 Hz	10 Hz
Input Impedance				
Common Voltage Protection	+/-200 V _{DC}		+/-200 V _{DC}	
Individual Channel Configuration		Yes		Yes
Overvoltage Protection	240 V _{rms}		240 V _{rms}	
Open Wire Detection (for thermocouple only)	Yes		Yes	
Temperature outputs consistency	-	Yes	-	Yes
Stable temperature output in the field	-	Yes	-	Yes
System				
Dual Watchdog	Yes			
ESD (IEC 61000-4-2)	+/-4 kV			
EFT (IEC 61000-4-4)	+/-4 kV			
Intra-Module Isolation, Field-to-Logic	3000 V _{DC}			
Power Input	10 ~ 30 V _{DC}			
Power Consumption	1.0 W	1.1 W	1.2 W	1.8 W

Note1: We recommend to choose I-7018Z/M-7018Z and M-7019Z for accurate thermocouple measurement.

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

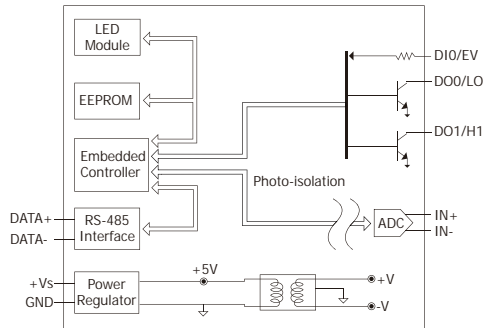
Accessories for I-7018Z, M-7018Z and M-7019Z

					
I-7018Z-G/S = I-7018Z-G Connects DB-1820 Directly	I-7018Z-G/2S = I-7018Z-G Connect DN-1822 Directly +1.8 m Cable	I-7018Z-G/S + CD-2518D	CD-2518D = 1.8 m Cable + DB-1820	I-7018Z-G/S + CD-25015 + 4PAPP-006-G	CD-25015 = 15 cm Cable + DB-1820 4PAPP-006-G

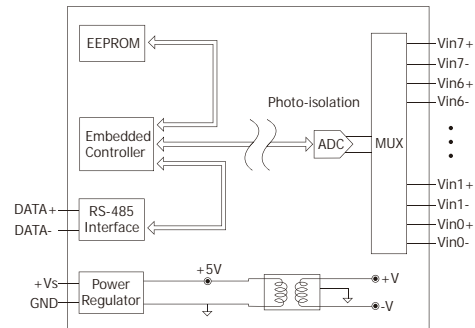


Internal I/O Structure

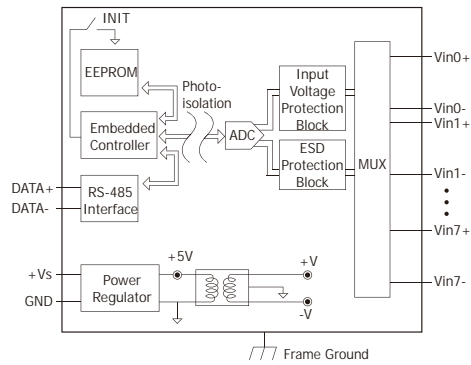
I-7011(D)



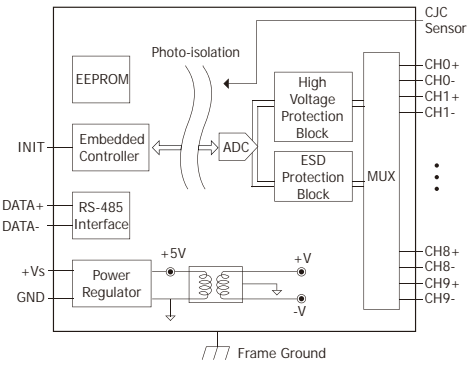
I-7018/M-7018



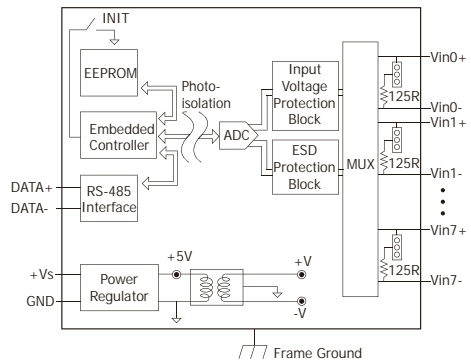
I-7018R/M-7018R



I-7018Z/M-7018Z



I-7019R/M-7019R



M-7019Z

