All specifications are subject to change without notice.
Typical for 25 °C unless otherwise specified.
Specifications in *italic* text are guaranteed by design.

Thermocouple input

Table 1. Thermocouple input specifications

Parameter	Condition	Specification
A/D converter		Delta-Sigma
ADC resolution		24 bits
Number of channels		4
Input isolation	*Between any TCx channel and host system ground.*	*500 VDC absolute max*
Differential input voltage range		±0.128 V
Absolute maximum input voltage	*Between any two TCx inputs*	*±25 V (power on)* *±25 V (power off)*
Differential input impedance		*40 MΩ*
Input current		*65 nA*
Common mode rejection	*f_{IN} = 50 Hz or 60 Hz*	*100 dB*
Noise rejection	*f_{IN} = 50 Hz or 60 Hz*	*75 dB*
Input bandwidth		10 Hz
Crosstalk	Between any two TCx inputs	–90 dB
Sample time		53 ms
Input noise		250 nV rms
Gain error		0.006 %
Offset error		3 µV
Measurement sensitivity (Note 1)	Thermocouple type J, K, T, E, N	0.09 °C
	Thermocouple type R, S	0.11 °C
	Thermocouple type B	0.13 °C
Open thermocouple detect response time		1 second
Recommended warm-up time		15 minutes min

Note 1: Measurement sensitivity is the smallest change in temperature that can be detected.

Compatible thermocouples

Table 2. Compatible sensor type specifications

Parameter	Specification
Thermocouple	J: –210 °C to 1200 °C
	K: –270 °C to 1372 °C
	R: –50 °C to 1768 °C
	S: –50 °C to 1768 °C
	T: –270 °C to 400 °C
	N: –270 °C to 1300 °C
	E: –270 °C to 1000 °C
	B: 40 °C to 1820 °C

Accuracy

Thermocouple measurement accuracy

Table 3. Thermocouple accuracy specifications, including CJC measurement error (Note 2, Note 3)
All specifications are (±).

Sensor Type	Sensor Temperature (°C)	Accuracy Error Typical (°C)
J	–210	1.65
	0	0.63
	1200	0.82
K	–210	1.90
	0	0.65
	1372	1.12
S	–50	1.60
	250	0.77
	1768	1.05
R	–50	1.69
	250	0.73
	1768	0.92
B	250	1.30
	700	0.56
	1820	0.56
E	–200	1.48
	0	0.63
	1000	0.71
T	–200	1.64
	0	0.66
	400	0.48
N	–200	1.80
	0	0.70
	1300	0.79

Note 2: Thermocouple measurement accuracy specifications include polynomial linearization, cold-junction compensation error, and system noise. The accuracy specifications assume the device has been warmed up for the recommended 15 minutes. Errors shown do not include inherent thermocouple error. Contact your thermocouple supplier for details on the actual thermocouple accuracy error.

Note 3: When thermocouples are attached to conductive surfaces, the voltage differential between multiple thermocouples must remain within ±1.8 V. For best results MCC recommends using electrically insulated thermocouples when possible.

Memory

Table 4. Memory specifications

Parameter	Specification
Non-volatile memory	4 KB (ID and calibration storage, no user-modifiable memory)

Power

Table 5. Power specifications

Parameter	Conditions	Specification
Supply current, 3.3V supply	Typical	17 mA
	Maximum	32 mA

Interface specifications

Table 6. Interface specifications

Parameter	Specification
Raspberry Pi ™ GPIO pins used	GPIO 7, GPIO 8, GPIO 9, GPIO 10, GPIO 11 (SPI interface) ID_SD, ID_SC (ID EEPROM) GPIO 12, GPIO 13, GPIO 26, (Board address)
Data interface type	SPI slave device, CE0 / CE1 chip selects
SPI mode	ADC: 1 CJC sensor: 3
SPI clock rate	ADC: 2 MHz, max CJC sensor: 4 MHz, max

Environmental

Table 7. Environmental specifications

Parameter	Specification
Operating temperature range	0 °C to 55 °C
Storage temperature range	–40 °C to 85 °C
Humidity	0 °C to 90% non-condensing

Mechanical

Table 8. Mechanical specifications

Parameter	Specification
Dimensions (L × W × H)	65 × 56.5 × 12 mm (2.56 × 2.22 × 0.47 in.) max

Screw terminal connector

Table 9. Screw terminal connector specifications

Parameter	Specification
Connector type	Screw terminal
Wire gauge range	16 AWG to 30 AWG

Table 10. Screw terminal pinout

Pin	Signal Name	Pin Description
1	CH0H	CH0 sensor input (+)
2	CH0L	CH0 sensor input (–)
3	CH1H	CH1 sensor input (+)
4	CH1L	CH1 sensor input (–)
5	CH2H	CH2 sensor input (+)
6	CH2L	CH2 sensor input (–)
7	CH3H	CH3 sensor input (+)
8	CH3L	CH3 sensor input (–)