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 input and Raspberry Pi ground*	*500 Vpk withstand max*
Differential input voltage range		*±78.125 mV*
Common mode voltage range	*Between any CHx+ or – input and any other input*	*0.8 V max*
Absolute maximum input voltage	*Between any two TCx inputs*	*±25 V (power on)* *±25 V (power off)*
Differential input impedance		*40 MΩ*
Input current		*83 nA*
Common mode rejection	*f_{IN} = 50 Hz or 60 Hz*	*93 dB*
Update interval		1 second min
Open thermocouple detection response time		2 seconds
Recommended warm-up time		15 minutes min
Calibration method		Factory

Compatible thermocouples

Table 2. Compatible sensor type specifications

Parameter	Specification
Thermocouple type	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: 50 °C to 1820 °C

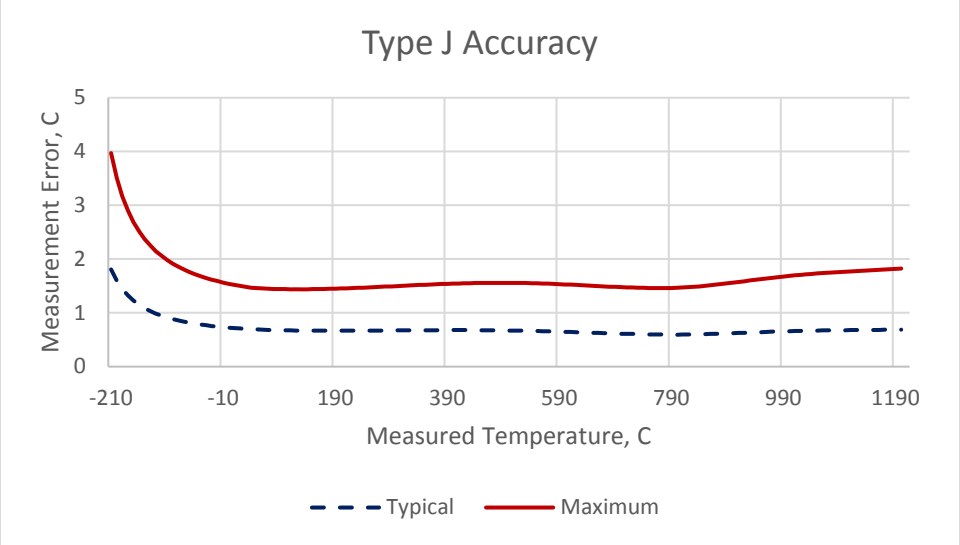
Accuracy

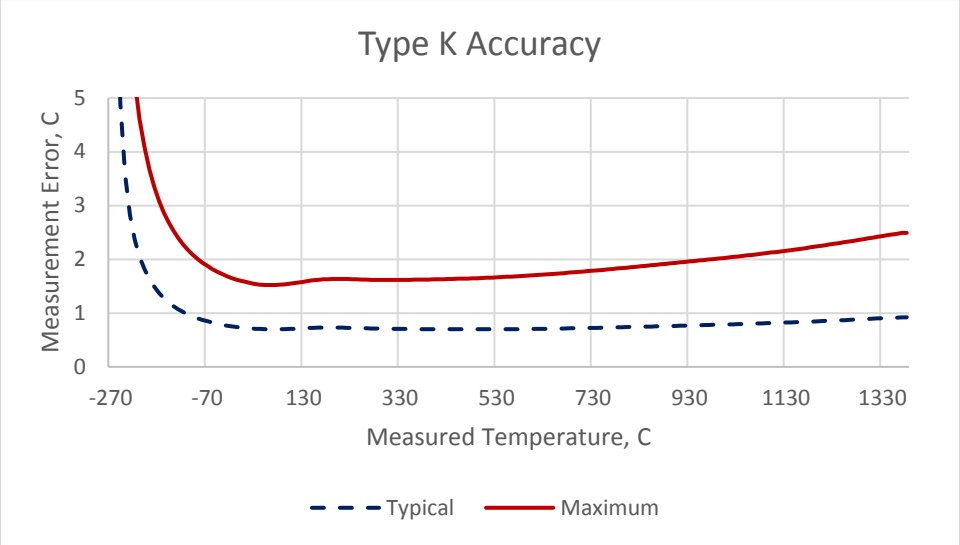
Thermocouple measurement accuracy

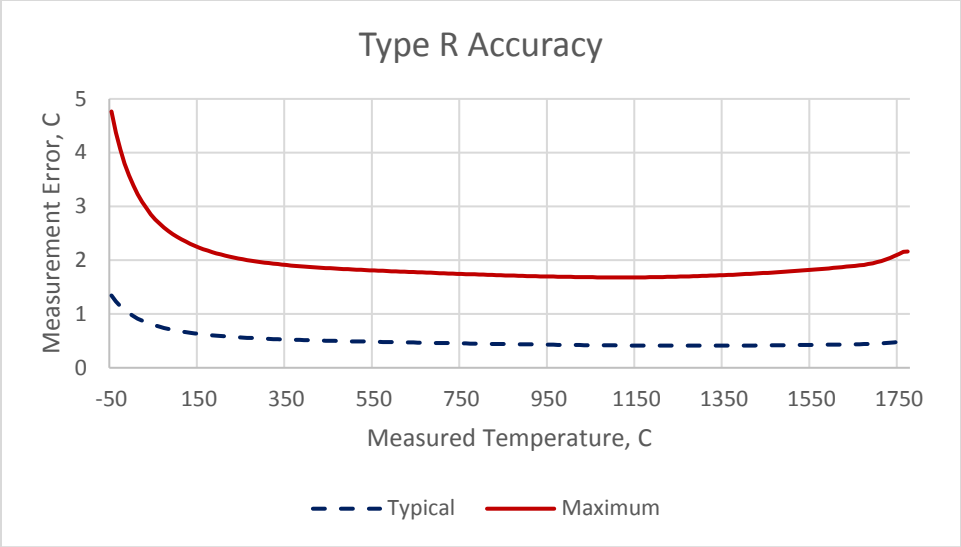
Thermocouple accuracy specifications, including typical CJC measurement error.
All specifications are (±).

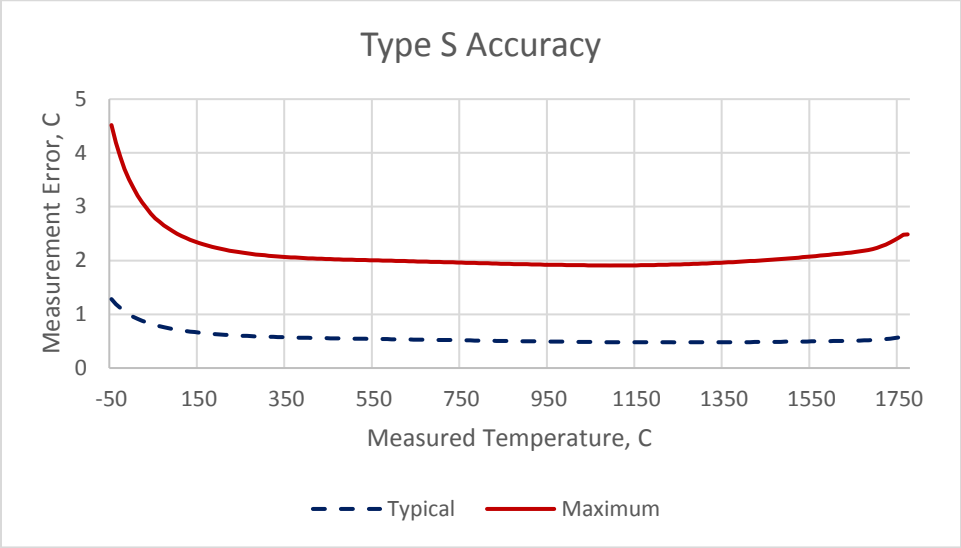
Note 1: Thermocouple measurement accuracy specifications include polynomial linearization, cold-junction compensation error, and system noise. The accuracy specifications assume the device has been warmed up for the recommended 15 minutes. Accuracies shown do not include inherent thermocouple error, rapid changes in ambient temperature, or self-heating due to abnormally high Raspberry Pi processor loading. Contact your thermocouple supplier for details on the inherent thermocouple accuracy error. The largest error factor will be the cold-junction compensation temperature differing from the actual screw terminal temperature; refer to the documentation for ways to decrease this error.

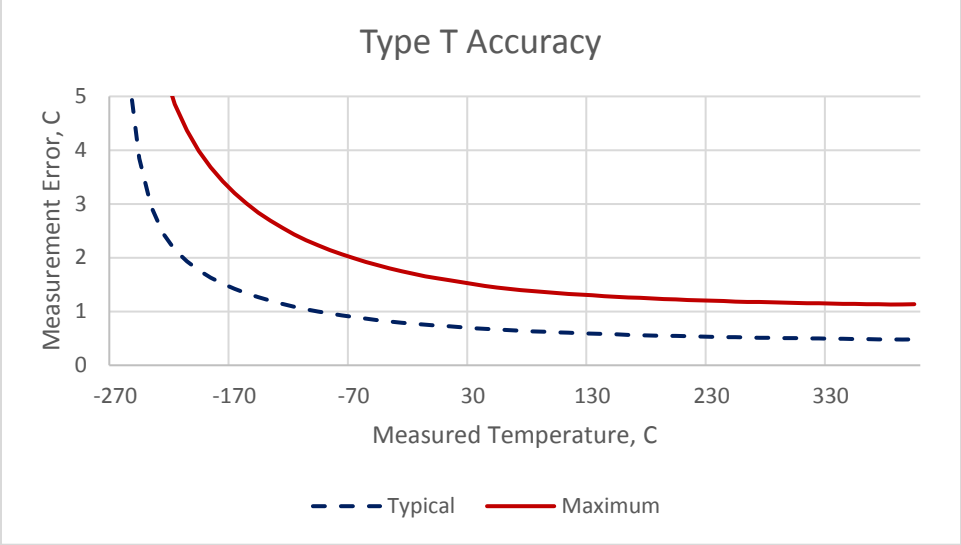
Note 2: When thermocouples are attached to conductive surfaces, the voltage differential between multiple thermocouples must remain within ±0.8 V. For best results MCC recommends using electrically insulated thermocouples when possible.

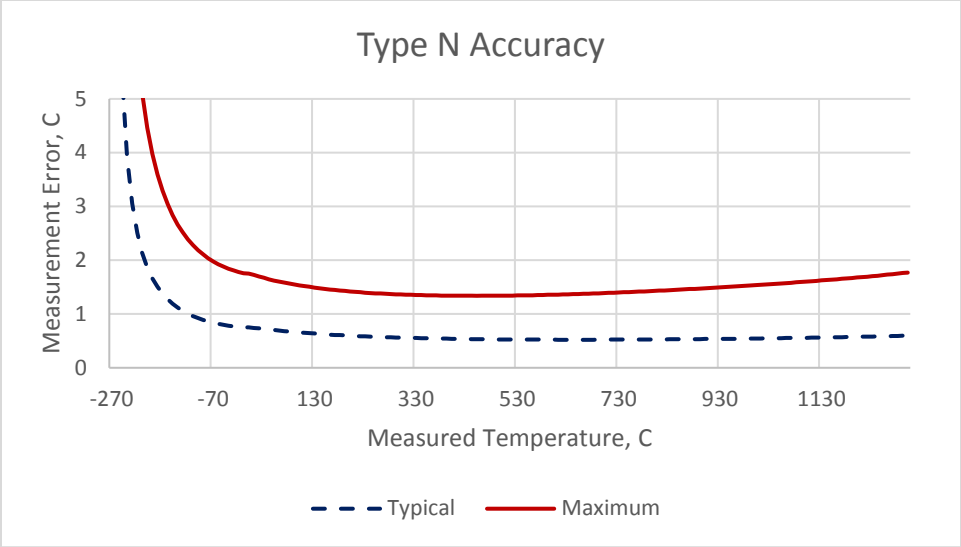


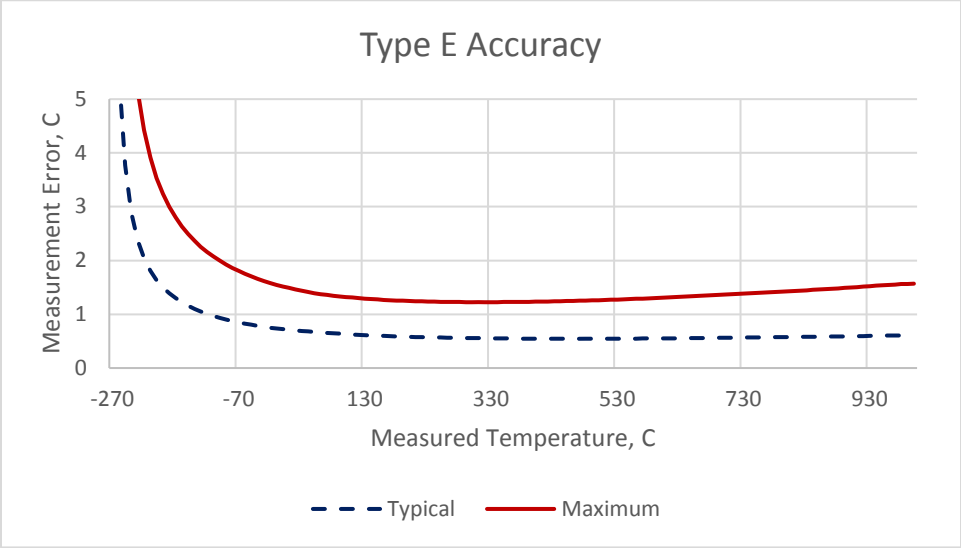


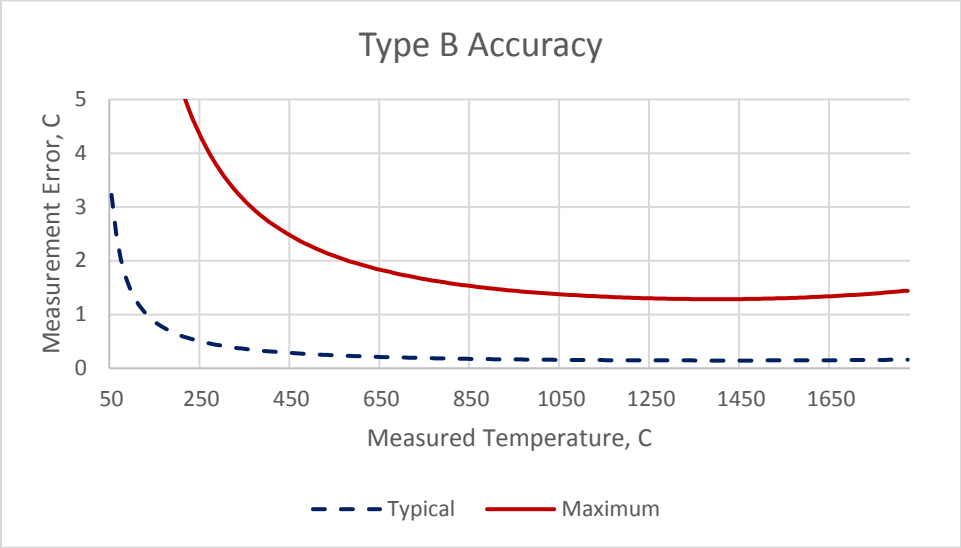

Type R Accuracy
Measurement Error, C
0
1
2
3
4
5
-50
150
350
550
750
950
1150
1350
1550
1750
Measured Temperature, C
Typical
Maximum


Type S Accuracy
Measurement Error, C
0
1
2
3
4
5
-50
150
350
550
750
950
1150
1350
1550
1750
Measured Temperature, C
Typical
Maximum


Type T Accuracy
Measurement Error, C
0
1
2
3
4
5
-270
-170
-70
30
130
230
330
Measured Temperature, C
Typical
Maximum


Type N Accuracy
Measurement Error, C
0
1
2
3
4
5
-270
-70
130
330
530
730
930
1130
Measured Temperature, C
Typical
Maximum


Type E Accuracy
Measurement Error, C
0
1
2
3
4
5
-270
-70
130
330
530
730
930
Measured Temperature, C
Typical
Maximum


Type B Accuracy
Measurement Error, C
0
1
2
3
4
5
50
250
450
650
850
1050
1250
1450
1650
Measured Temperature, C
Typical
Maximum

Memory

Table 3. Memory specifications

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

Power

Table 4. Power specifications

Parameter	Conditions	Specification
Supply current, 5V supply	Typical	16 mA
	Maximum	24 mA
Supply current, 3.3V supply	Typical	1 mA
	Maximum	5 mA

Interface specifications

Table 5. Interface specifications

Parameter	Specification
Raspberry Pi ™ GPIO pins used	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 chip select
SPI mode	1
SPI clock rate	2 MHz, max

Environmental

Table 6. 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 7. 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 8. Screw terminal connector specifications

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

Table 9. 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 (–)