FD-11614 Specifications

2025-08-05

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FD-11614 Specifications

These specifications apply to the FD-11614.

Revision History

Version	Date changed	Description
377534B-01	June 2025	Added pinout.
377534A-01	September 2018	Initial release.

Looking For Something Else?

For information not found in the specifications for your product, such as operating instructions, browse ***Related Information***.

Related information:

- FD-11614 User Manual
- FD-11613/11614 Calibration Procedure
- NI-DAQmx User Manual
- Software and Driver Downloads
- Release Notes
- License Setup and Activation
- Dimensional Drawings
- Product Certifications
- Letter of Volatility
- Discussion Forums
- NI Learning Center

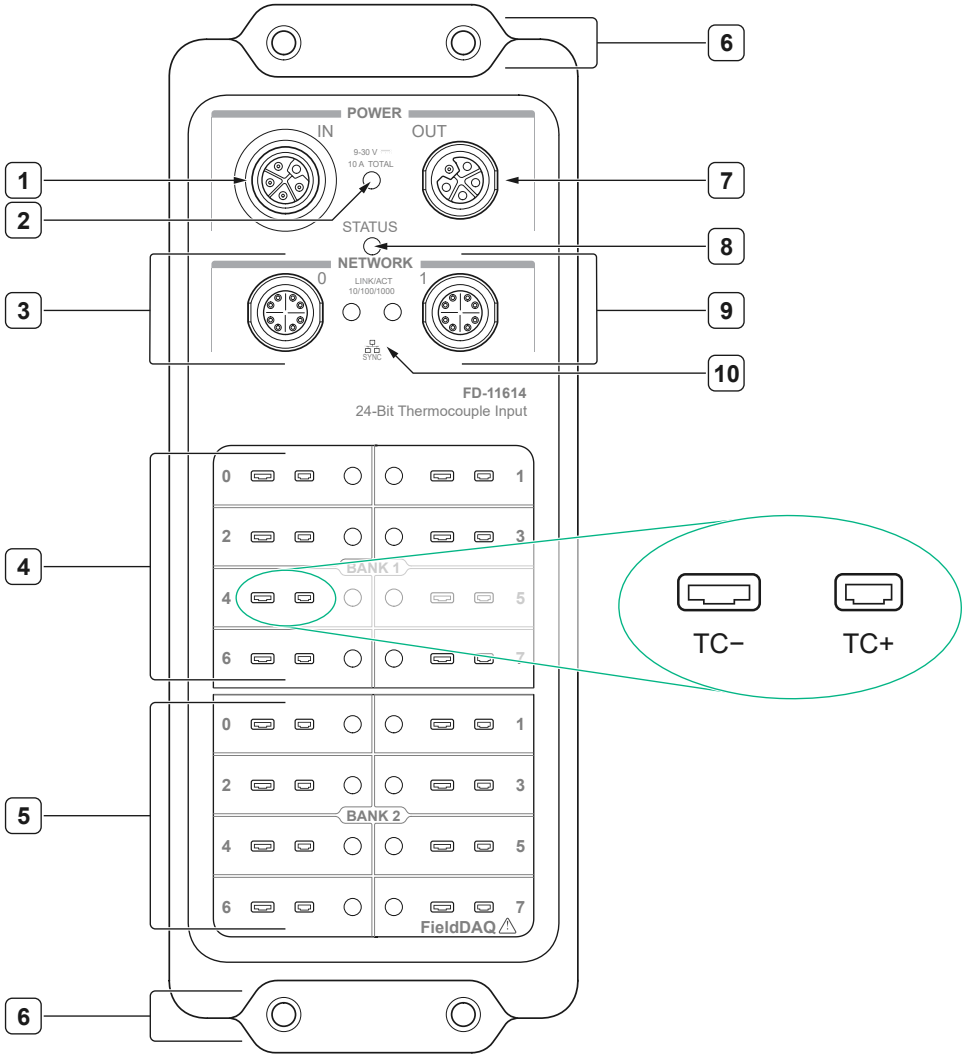
Conditions

Specifications are typical and valid at -40 °C to 85 °C unless otherwise noted.

FD-11614 Front Panel

Use the front panel to locate the connectors, LEDs, mounting holes on the FD-11614.

Figure 1. FD-11614 Front Panel



1. Power IN Connector
2. Power LED
3. Ethernet Port 0 and LED
4. Bank 1 Thermocouple Connectors 0 through 7 and LEDs
5. Bank 2 Thermocouple Connectors 0 through 7 and LEDs
6. Mounting Holes
7. Power OUT Connector
8. STATUS LED
9. Ethernet Port 1 and LED

10. SYNC Logo

Power Connector Pinout

The following figure shows the pinout of the Power IN connector.

Figure 2. Power Connector Pinout

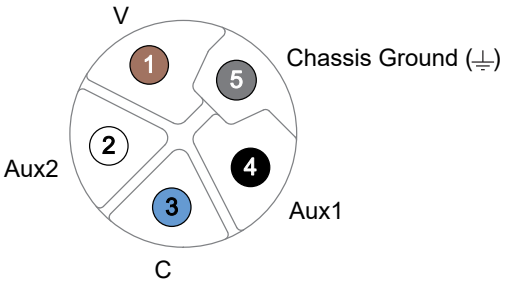


Table 1. Signal Descriptions

Pin Number	Wire Color*	Signal	Description
1	Brown	V	Positive voltage line
2	White	Aux2	Optional line for powering non-FieldDAQ devices
3	Blue	C	Common. Negative voltage line
4	Black	Aux1	Optional line for powering non-FieldDAQ devices
5	Gray	⏚	Chassis Ground. This terminal is internally connected to the C terminal.

* Wire color pertains to M125F power cables sold through NI. Other manufacturers' cable wire colors may vary.

Ethernet Ports

The FD-11614 has two 8-pin X-coded M12 Ethernet ports—0 and 1.

You can use a shielded straight-through Ethernet or an Ethernet crossover cable with either of the Ethernet ports to network your device to a computer host, NI Linux Real-Time controller, another FieldDAQ device, or any network connection on the same subnet. Refer to ***Topology Options*** for more information about using these ports in various topologies.

Figure 3. Ethernet Connector Pinout

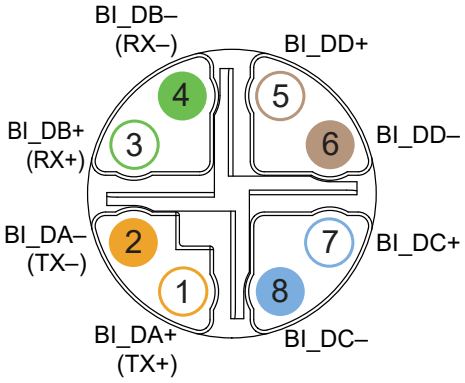


Table 2. Signal Descriptions

Pin Number	Wire Color	Gigabit Ethernet Signal	Fast Ethernet Signal
1	Orange/White	BI_DA+	TX+
2	Orange	BI_DA-	TX-
3	Green/White	BI_DB+	RX+
4	Green	BI_DB-	RX-
5	Brown/White	BI_DD+	No Connect
6	Brown	BI_DD-	No Connect
7	Blue/White	BI_DC+	No Connect
8	Blue	BI_DC-	No Connect

You can use the Ethernet ports to reset the FieldDAQ device to factory-default settings. Refer to ***Resetting the FieldDAQ to Factory-Default Settings*** for more information.

Cap the Ethernet ports when not in use.

Related information:

- Topology Options
- Resetting the FieldDAQ to Factory-Default Settings

Thermocouple Connector Pinout

The FD-11614 features 16 thermocouple connectors. The following figure shows the pinout of a thermocouple connector.

Figure 4. FD-11614 Pinout and Open Thermocouple LED

Table 3. Signal Descriptions

Signal	Description
TC-	Negative thermocouple terminal
TC+	Positive thermocouple terminal

Input Characteristics

Number of channels	16 isolated thermocouple channels, 4 CJC
Isolation	Galvanic isolation between channels and to chassis
ADC resolution	24 bits
Type of ADC	Delta-Sigma
Sample mode	Simultaneous
Sample rate	User configurable
Timebases[1]	80 MHz, 20 MHz, 100 kHz
Voltage measurement range	±78.125 mV
Temperature measurement ranges	Works over temperature ranges defined by NIST (J, K, T, E, N, B, R, and S thermocouple types)

Table 4. Conversion Time

Timing Mode	Conversion Time (ms)	Sample Rate (Samples/s)
High resolution	550	1.8

1. Base clocks can be synchronized with other FieldDAQ devices using the network synchronization feature.

Timing Mode	Conversion Time (ms)	Sample Rate (Samples/s)
Best 50 Hz rejection	140	7.1
Best 60 Hz rejection	120	8.3
High speed	11.7	85

Table 5. Common-mode Voltage Range

Channel-to-channel	Refer to the ***Safety Voltages*** section for more information
Channel-to-earth ground	Refer to the ***Safety Voltages*** section for more information

Table 6. Common-mode Rejection Ratio, Channel-to-earth Ground Voltages (DC to 60 Hz)

High resolution, best 50 Hz rejection, best 60 Hz rejection	165 dB
High speed	125 dB

Table 7. Thermocouple Signal Input Bandwidth

High resolution	1.0 Hz
Best 50 Hz rejection	4.0 Hz
Best 60 Hz rejection	4.7 Hz
High speed	31 Hz

Open thermocouple settling time	1.8 s

Table 8. Noise Rejection

High resolution (at 50/60 Hz)	78 dB
Best 50 Hz rejection	82 dB
Best 60 Hz rejection	89 dB

Differential input impedance	5.34 MΩ

Table 9. Input Noise

High resolution	85 nV RMS
Best 50 Hz rejection, best 60 Hz rejection	150 nV RMS
High speed	1 µV RMS

Table 10. Gain Error and Offset Error

Timing Mode	Temperature	Gain Error (% of Reading)	Offset Error (µV)
High resolution, Best 50 Hz rejection, Best 60 Hz rejection	5 °C to 40 °C, typical	0.020%	2.4 µV
	5 °C to 40 °C, maximum	0.062%	5.4 µV
	-40 °C to 85 °C, maximum	0.104%	12.3 µV
High speed	5 °C to 40 °C, typical	0.032%	2.4 µV
	5 °C to 40 °C, maximum	0.066%	5.4 µV
	-40 °C to 85 °C, maximum	0.116%	12.3 µV

Gain drift	±7 ppm/°C
Offset drift	±60 nV/°C
Offset error from source impedance	Add 95 nV per Ω
Input bias current	95 nA

Table 11. Cold-junction Compensation Accuracy

5 °C to 40 °C, typical	0.25 °C
5 °C to 40 °C, maximum	0.45 °C
-40 °C to 85 °C, maximum	1.2 °C

Temperature Measurement Accuracy

Measurement Sensitivity

Measurement sensitivity is a function of noise and represents the smallest change in temperature that a sensor can detect. The values assume the maximum of the full measurement range of the standard thermocouple sensor according to NIST Monograph 175.

Table 12. High Resolution

Types J, K, T, E, N	0.01 °C
Types R, S	0.02 °C
Type B	0.03 °C

Table 13. Best 50 Hz Rejection, Best 60 Hz Rejection

Types J, K, T, E, N	0.02 °C
Types R, S	0.04 °C
Type B	0.06 °C

Table 14. High Speed

Types J, K, T, E	0.05 °C
Type N	0.07 °C
Types R, S	0.18 °C
Type B	0.26 °C

Thermocouple Type Measurement Accuracy

The following thermocouple measurement tables and graphs show the module accuracy for each thermocouple type at 0 V common mode voltage. The tables include all measurement errors of the device including RMS noise. The tables do not include the accuracy of the thermocouple itself.

Table 15. Thermocouple Type K Measurement Accuracy (°C)

Temperature	High Resolution/Best 50 Hz Rejection/ Best 60 Hz Rejection			High Speed		
	5 °C to 40 °C, Typical	5 °C to 40 °C, Maximum	-40 °C to 85 °C, Maximum	5 °C to 40 °C, Typical	5 °C to 40 °C, Maximum	-40 °C to 85 °C, Maximum
-100 °C	0.43	0.83	1.73	0.47	1.02	2.78
0 °C	0.31	0.58	1.33	0.34	0.73	2.14
100 °C	0.32	0.6	1.39	0.36	0.77	2.18
300 °C	0.36	0.72	1.58	0.42	0.92	2.4
400 °C	0.37	0.77	1.65	0.44	0.97	2.47
700 °C	0.43	0.96	1.97	0.54	1.2	2.83
900 °C	0.49	1.13	2.28	0.63	1.41	3.2
1,000 °C	0.53	1.22	2.44	0.68	1.52	3.4
1,100 °C	0.56	1.32	2.62	0.74	1.65	3.62
1,300 °C	0.65	1.56	3.04	0.86	1.93	4.16

Table 16. Error Drift, Thermocouple Type K (-100 °C To 1,300 °C)

5 °C to 40 °C	0.1 °C/10 °C
-40 °C to 85 °C	0.16 °C/10 °C

Figure 5. Thermocouple Type K Errors (High Resolution/Best 50 Hz Rejection/Best 60 Hz Rejection)

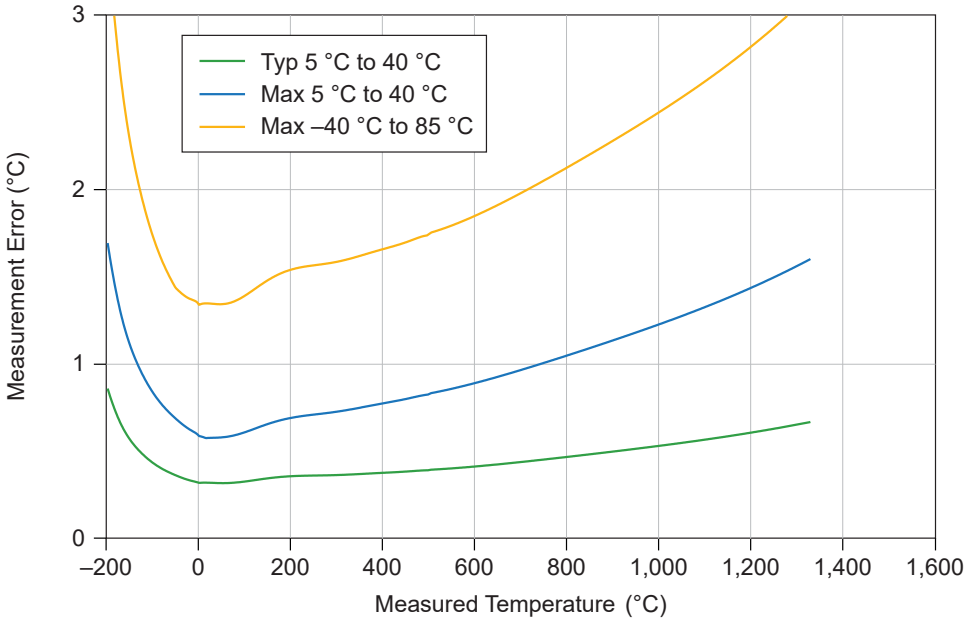


Figure 6. Thermocouple Type K Errors (High Speed)

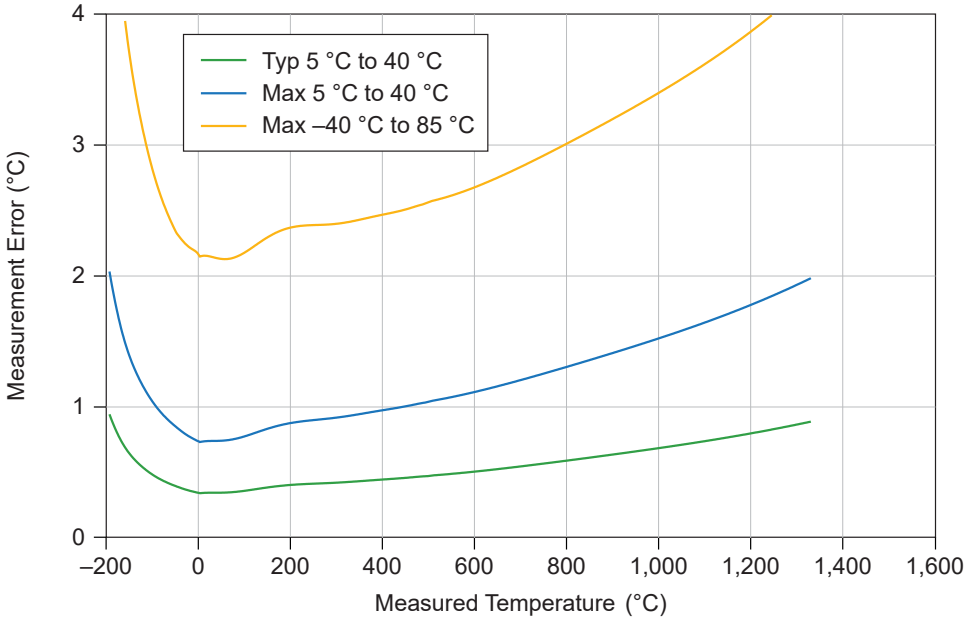


Table 17. Thermocouple Type J Measurement Accuracy (°C)

Temperature	High Resolution/Best 50 Hz Rejection/ Best 60 Hz Rejection			High Speed		
	5 °C to 40 °C, Typical	5 °C to 40 °C, Maximum	-40 °C to 85 °C, Maximum	5 °C to 40 °C, Typical	5 °C to 40 °C, Maximum	-40 °C to 85 °C, Maximum
-100 °C	0.42	0.8	1.57	0.46	0.96	2.57

Temperature	High Resolution/Best 50 Hz Rejection/ Best 60 Hz Rejection			High Speed		
	5 °C to 40 °C, Typical	5 °C to 40 °C, Maximum	-40 °C to 85 °C, Maximum	5 °C to 40 °C, Typical	5 °C to 40 °C, Maximum	-40 °C to 85 °C, Maximum
0 °C	0.32	0.59	1.29	0.34	0.73	2.1
100 °C	0.32	0.59	1.29	0.35	0.76	2.07
300 °C	0.35	0.71	1.48	0.41	0.9	2.26
400 °C	0.37	0.78	1.58	0.45	0.98	2.38
700 °C	0.39	0.87	1.68	0.49	1.09	2.43
900 °C	0.43	1.0	1.89	0.56	1.24	2.65
1,000 °C	0.48	1.12	2.09	0.62	1.39	2.91
1,100 °C	0.51	1.22	2.25	0.67	1.5	3.1

Table 18. Error Drift, Thermocouple Type J (-100 °C To 1,100 °C)

5 °C to 40 °C	0.07 °C/10 °C
-40 °C to 85 °C	0.15 °C/10 °C

Figure 7. Thermocouple Type J Errors (High Resolution/Best 50 Hz Rejection/Best 60 Hz Rejection)

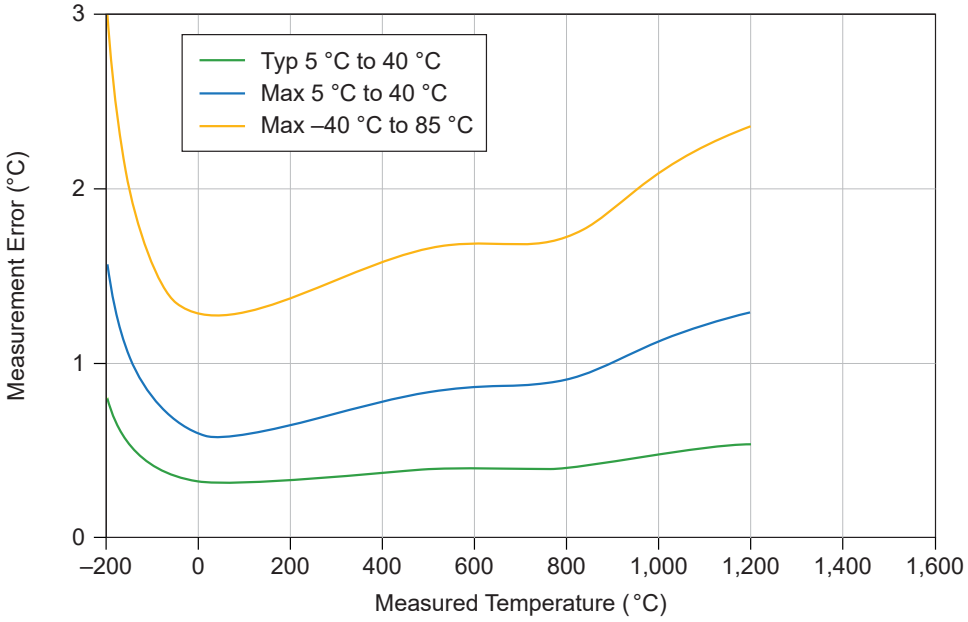


Figure 8. Thermocouple Type J Errors (High Speed)

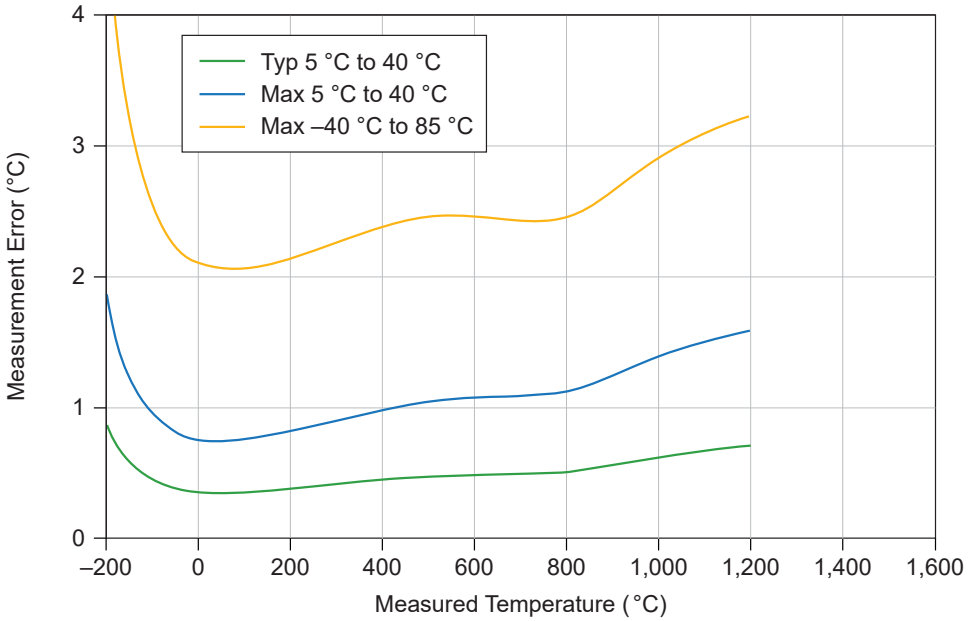


Table 19. Thermocouple Type N Measurement Accuracy (°C)

Temperature	High Resolution/Best 50 Hz Rejection/ Best 60 Hz Rejection			High Speed		
	5 °C to 40 °C, Typical	5 °C to 40 °C, Maximum	-40 °C to 85 °C, Maximum	5 °C to 40 °C, Typical	5 °C to 40 °C, Maximum	-40 °C to 85 °C, Maximum
-100 °C	0.5	1.01	1.92	0.55	1.22	2.99
0 °C	0.39	0.75	1.56	0.42	0.93	2.44
100 °C	0.35	0.69	1.46	0.39	0.88	2.24
300 °C	0.33	0.7	1.41	0.39	0.89	2.08
400 °C	0.34	0.73	1.44	0.41	0.92	2.1
700 °C	0.38	0.88	1.66	0.48	1.1	2.32
900 °C	0.43	1.02	1.88	0.55	1.26	2.57
1,000 °C	0.45	1.1	2.0	0.59	1.36	2.71
1,100 °C	0.48	1.18	2.14	0.64	1.46	2.87

Table 20. Error Drift, Thermocouple Type N (-100 °C To 1,100 °C)

5 °C to 40 °C	0.08 °C/10 °C

-40 °C to 85 °C	0.17 °C/10 °C

Figure 9. Thermocouple Type N Errors (High Resolution/Best 50 Hz Rejection/Best 60 Hz Rejection)

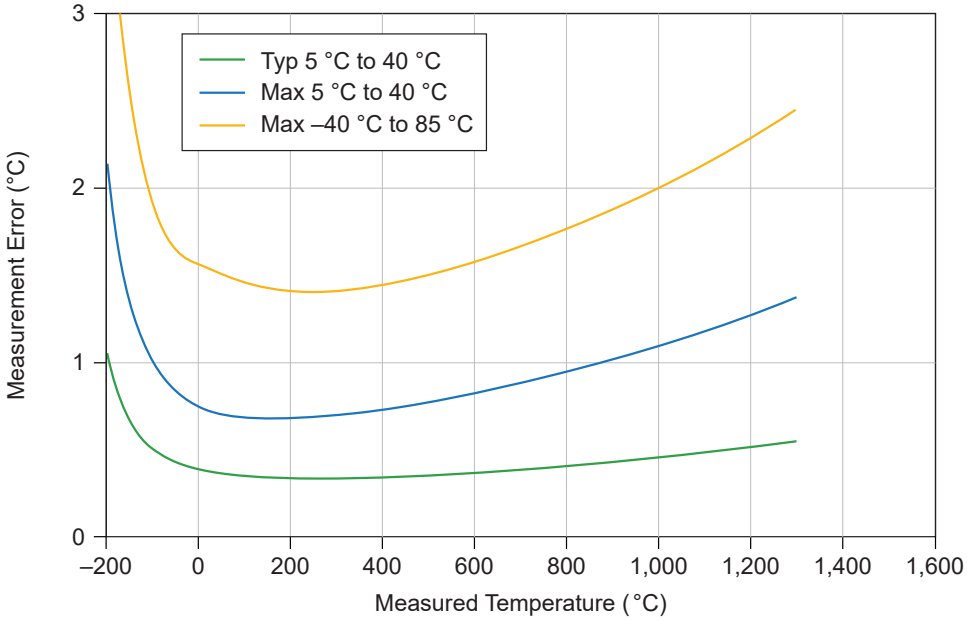


Figure 10. Thermocouple Type N Errors (High Speed)

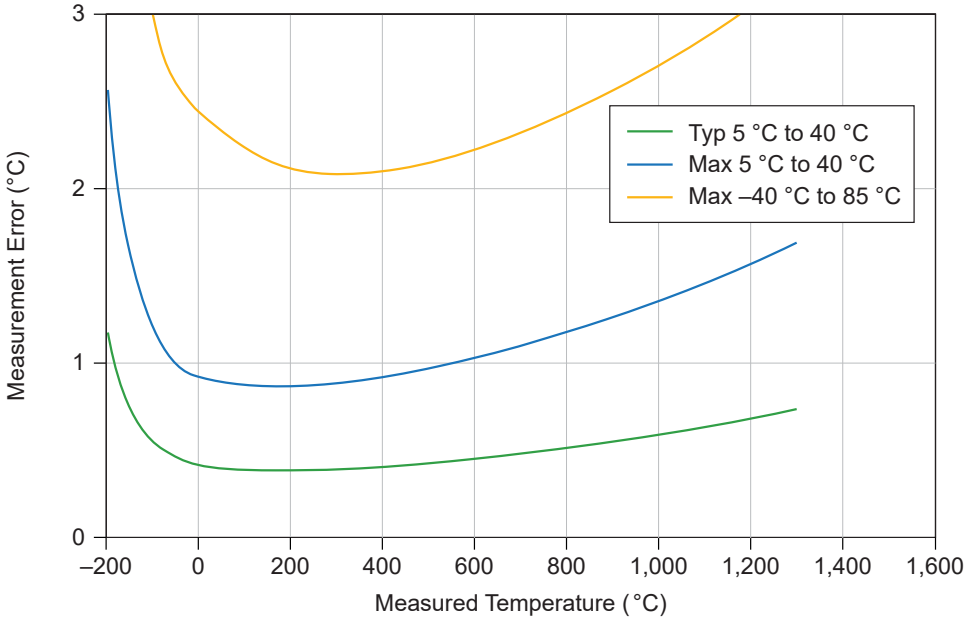


Table 21. Thermocouple Type T Measurement Accuracy (°C)

Temperature	High Resolution/Best 50 Hz Rejection/ Best 60 Hz Rejection			High Speed		
	5 °C to 40 °C, Typical	5 °C to 40 °C, Maximum	-40 °C to 85 °C, Maximum	5 °C to 40 °C, Typical	5 °C to 40 °C, Maximum	-40 °C to 85 °C, Maximum
-100 °C	0.51	0.99	1.91	0.56	1.14	2.85
0 °C	0.36	0.67	1.32	0.38	0.79	2.12
100 °C	0.3	0.56	1.18	0.33	0.72	1.85
300 °C	0.28	0.57	1.14	0.33	0.72	1.7
400 °C	0.28	0.6	1.16	0.34	0.75	1.7

Table 22. Error Drift, Thermocouple Type T (-100 °C To 400 °C)

5 °C to 40 °C	0.09 °C/10 °C
-40 °C to 85 °C	0.19 °C/10 °C

Figure 11. Thermocouple Type T Errors (High Resolution/Best 50 Hz Rejection/Best 60 Hz Rejection)

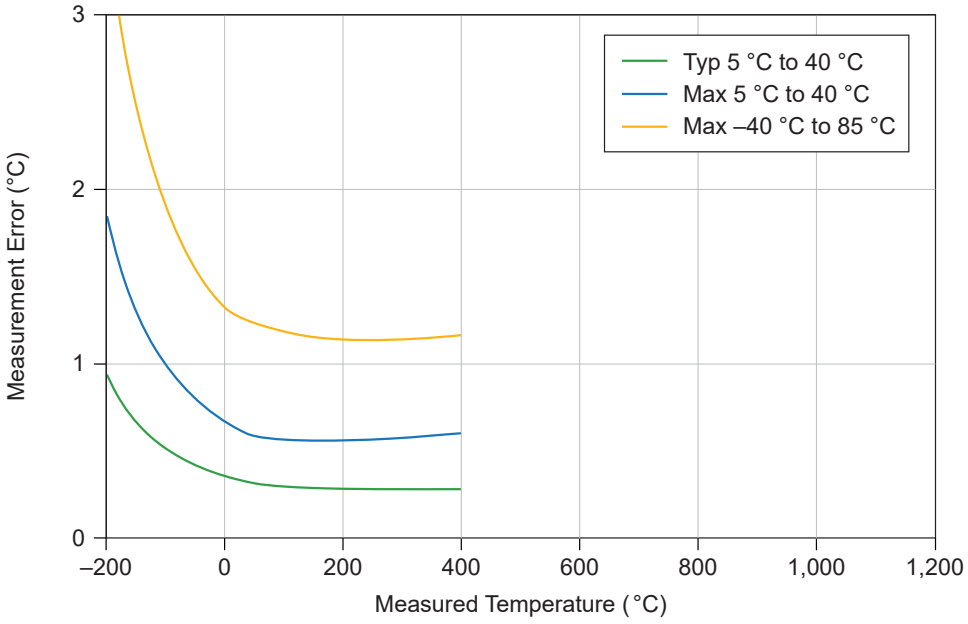


Figure 12. Thermocouple Type T Errors (High Speed)

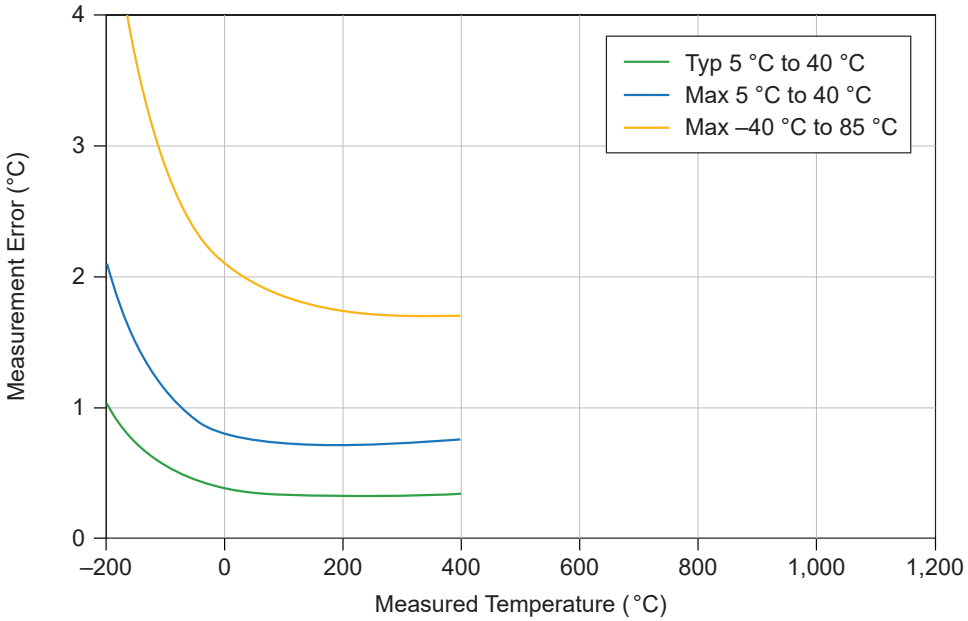


Table 23. Thermocouple Type E Measurement Accuracy (°C)

Temperature	High Resolution/Best 50 Hz Rejection/ Best 60 Hz Rejection			High Speed		
	5 °C to 40 °C, Typical	5 °C to 40 °C, Maximum	-40 °C to 85 °C, Maximum	5 °C to 40 °C, Typical	5 °C to 40 °C, Maximum	-40 °C to 85 °C, Maximum
-100 °C	0.44	0.84	1.61	0.48	0.98	2.59
0 °C	0.32	0.59	1.22	0.34	0.7	2.01
100 °C	0.29	0.53	1.16	0.32	0.68	1.85
300 °C	0.29	0.59	1.19	0.34	0.74	1.82
400 °C	0.3	0.64	1.26	0.37	0.8	1.88
700 °C	0.37	0.84	1.58	0.47	1.04	2.24
900 °C	0.42	1.0	1.84	0.55	1.24	2.56
1,000 °C	0.45	1.09	1.98	0.6	1.34	2.73

Table 24. Error Drift, Thermocouple Type E (-100 °C To 1,100 °C)

5 °C to 40 °C	0.07 °C/10 °C
-40 °C to 85 °C	0.17 °C/10 °C

Figure 13. Thermocouple Type E Errors (High Resolution/Best 50 Hz Rejection/Best 60 Hz Rejection)

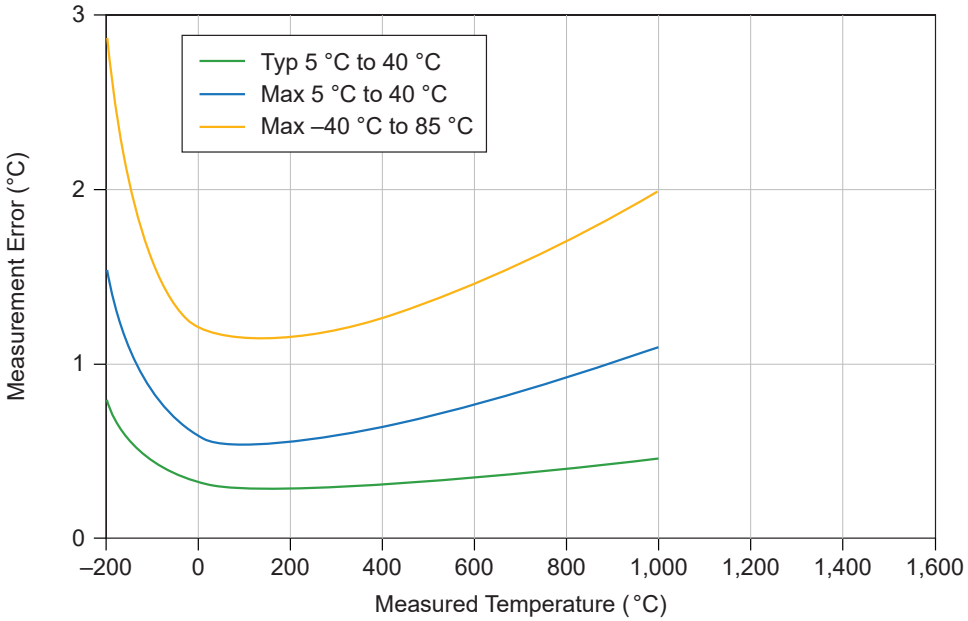


Figure 14. Thermocouple Type E Errors (High Speed)

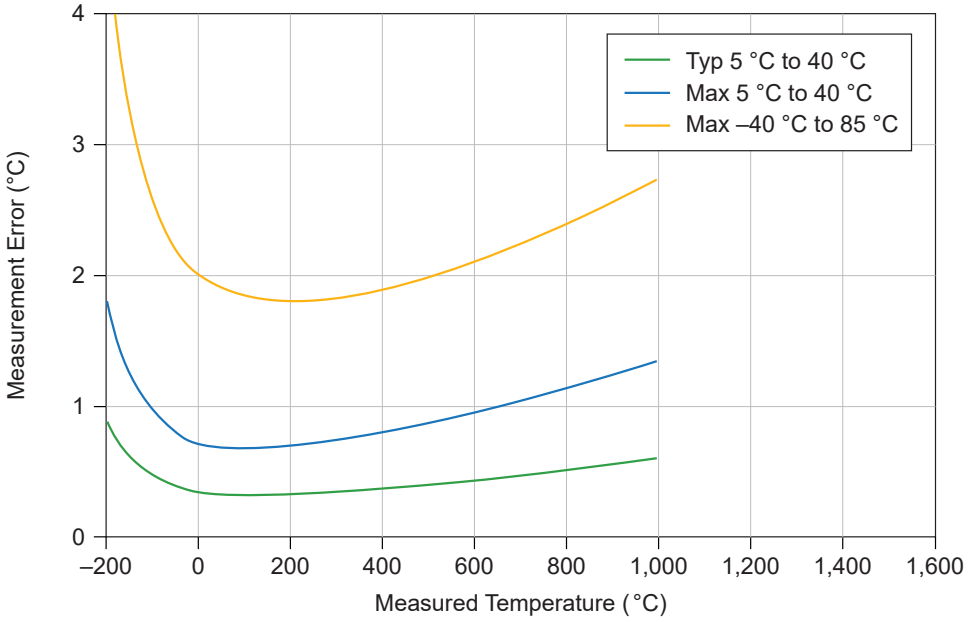


Table 25. Thermocouple Type B Measurement Accuracy (°C)

Temperature	High Resolution/Best 50 Hz Rejection/ Best 60 Hz Rejection			High Speed		
	5 °C to 40 °C, Typical	5 °C to 40 °C, Maximum	-40 °C to 85 °C, Maximum	5 °C to 40 °C, Typical	5 °C to 40 °C, Maximum	-40 °C to 85 °C, Maximum
300 °C	0.98	2.43	4.86	1.16	3.27	5.71

Temperature	High Resolution/Best 50 Hz Rejection/ Best 60 Hz Rejection			High Speed		
	5 °C to 40 °C, Typical	5 °C to 40 °C, Maximum	-40 °C to 85 °C, Maximum	5 °C to 40 °C, Typical	5 °C to 40 °C, Maximum	-40 °C to 85 °C, Maximum
500 °C	0.62	1.57	3.12	0.76	2.1	3.66
700 °C	0.52	1.3	2.51	0.64	1.71	2.93
900 °C	0.44	1.14	2.2	0.56	1.5	2.57
1,100 °C	0.41	1.1	2.09	0.54	1.43	2.43
1,400 °C	0.41	1.13	2.1	0.56	1.45	2.43
1,700 °C	0.46	1.27	2.34	0.64	1.63	2.7

Table 26. Error Drift, Thermocouple Type B (500 °C To 1,800 °C)

5 °C to 40 °C	0.12 °C/10 °C
-40 °C to 85 °C	0.13 °C/10 °C

Figure 15. Thermocouple Type B Errors (High Resolution/Best 50 Hz Rejection/Best 60 Hz Rejection)

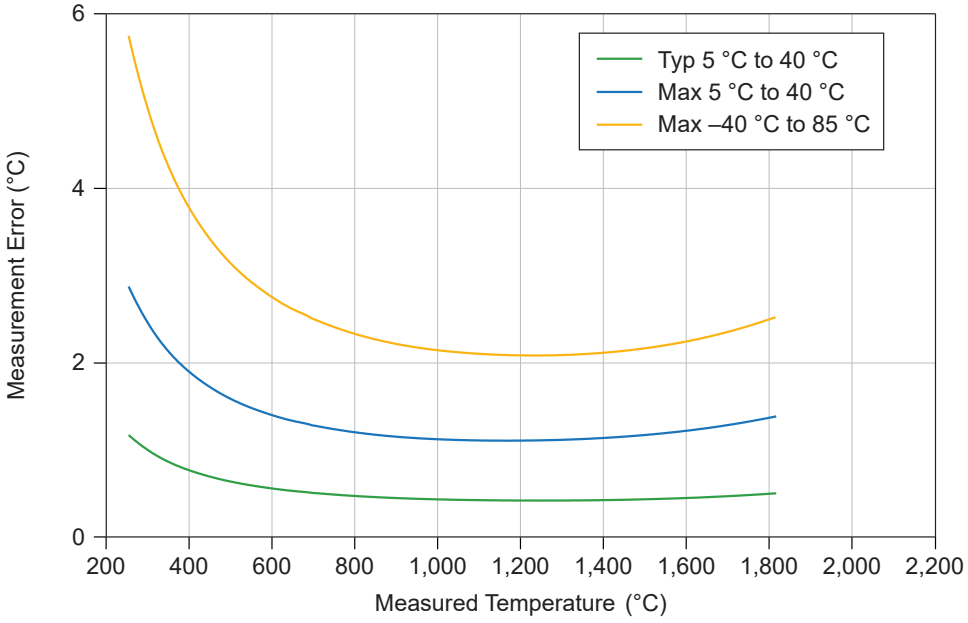


Figure 16. Thermocouple Type B Errors (High Speed)

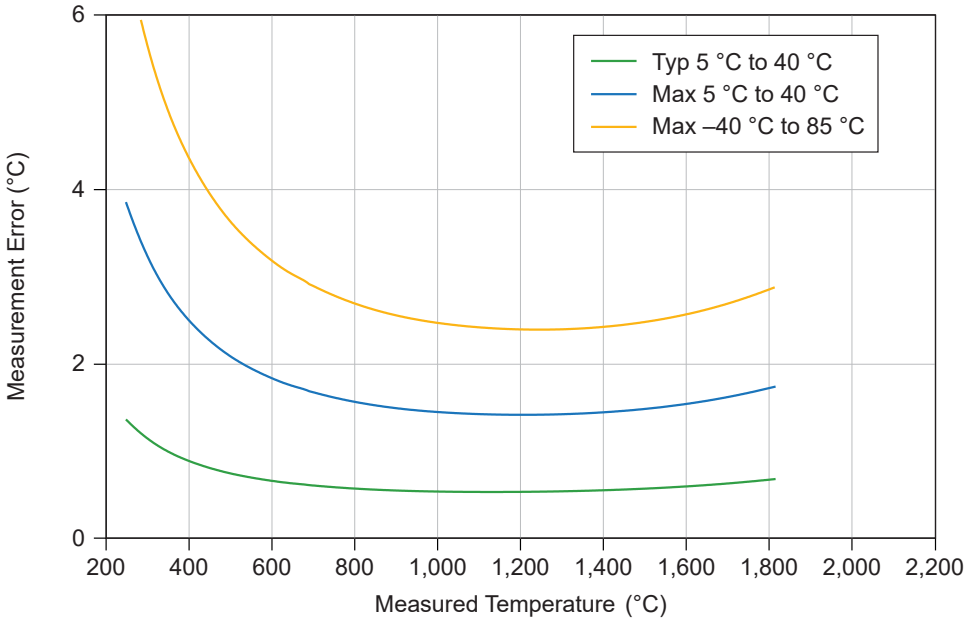


Table 27. Thermocouple Type R/S Measurement Accuracy (°C)

Temperature	High Resolution/Best 50 Hz Rejection/ Best 60 Hz Rejection			High Speed		
	5 °C to 40 °C, Typical	5 °C to 40 °C, Maximum	-40 °C to 85 °C, Maximum	5 °C to 40 °C, Typical	5 °C to 40 °C, Maximum	-40 °C to 85 °C, Maximum
0 °C	0.89	1.99	3.7	1.0	2.48	4.28
100 °C	0.64	1.43	2.58	0.72	1.81	3.27
300 °C	0.55	1.27	2.27	0.64	1.6	2.84
500 °C	0.55	1.28	2.27	0.64	1.6	2.82
700 °C	0.56	1.36	2.36	0.68	1.68	2.89
900 °C	0.57	1.41	2.41	0.71	1.73	2.93
1,100 °C	0.58	1.46	2.49	0.74	1.79	3.0
1,400 °C	0.63	1.63	2.74	0.82	1.99	3.27

Table 28. Error Drift, Thermocouple Type R/S (100 °C To 1,400 °C)

5 °C to 40 °C	0.11 °C/10 °C
-40 °C to 85 °C	0.17 °C/10 °C

Figure 17. Thermocouple Type R/S Errors (High Resolution/Best 50 Hz Rejection/Best 60 Hz Rejection)

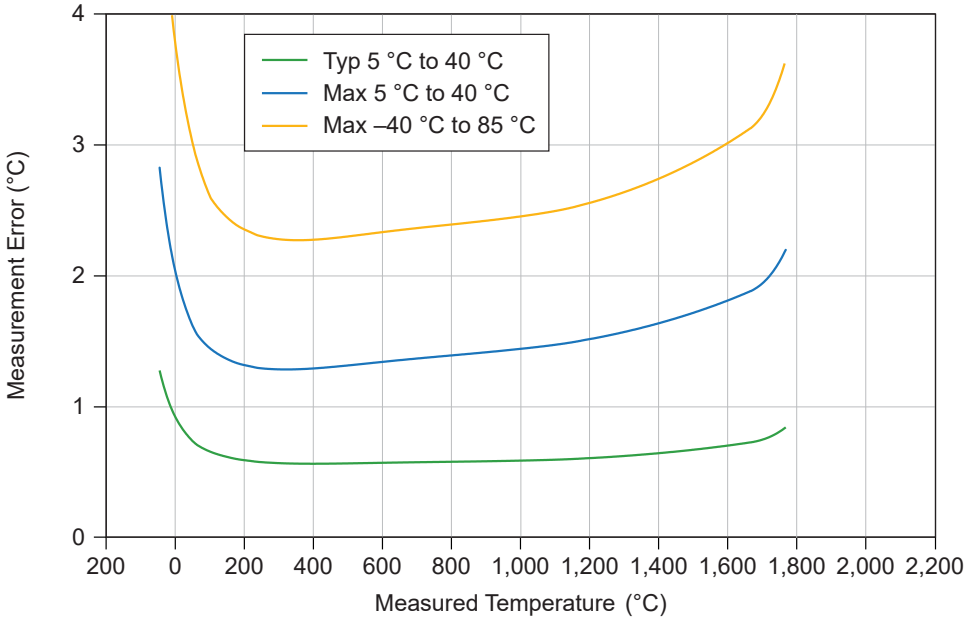
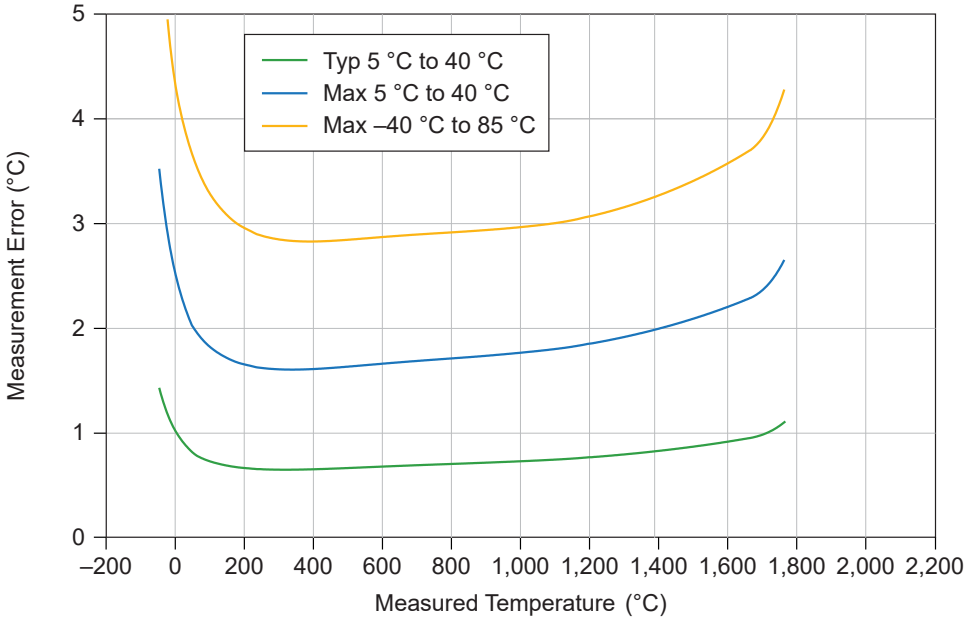


Figure 18. Thermocouple Type R/S Errors (High Speed)



Time-Based Triggers

Type	Start Trigger

Timing and Synchronization

Protocol	IEEE 802.1AS for network synchronization over

	1000 Base-TX, full-duplex
Network synchronization accuracy[2]	<1 µs
Network synchronization accuracy with optimized configuration[3]	<100 ns

Note When configured to use IEEE 1588, performance of synchronization may vary from these specifications.

For information about network synchronization accuracy, refer to ***NI-DAQmx-Based TSN Synchronization Accuracy Explained***. For information about achieving high-accuracy synchronization, refer to ***How to Achieve High-Accuracy Measurements With NI-DAQmx-Based TSN Devices***.

Related information:

- NI-DAQmx-Based TSN Synchronization Accuracy Explained
- How to Achieve High-Accuracy Measurements With NI-DAQmx-Based TSN Devices

Network Interface

Network protocols	TCP/IP, UDP
Network ports used	HTTP:80 (configuration only), TCP:3580; UDP:5353 (configuration only), TCP:5353 (configuration only); TCP:31415; UDP:7865 (configuration only), UDP:8473 (configuration only)
Network IP configuration	DHCP + Link-Local, DHCP, Static, Link-Local
Default MTU size	1,500 bytes

Ethernet

Number of ports	2 8-pin X-coded M12 ports, internally switched[4]

2. I/O synchronization is system-dependent. Assumes the devices are connected in a line topology.
3. I/O synchronization is system-dependent. Assumes a system containing one hop.

Network interface	1000 Base-TX, full-duplex; 1000 Base-TX, half-duplex; 100 Base-TX, full-duplex; 100 Base-TX, half-duplex; 10 Base-T, full-duplex; 10 Base-T, half-duplex
Communication rates	10/100/1,000 Mbps, auto-negotiated
Maximum cabling distance	100 m/segment
Maximum hops per line[5]	15

For information about creating reliable Ethernet-based systems, refer to ***Designing Distributed TSN Ethernet-Based Measurement Systems***.

Power Requirements

Caution The protection provided by the FD-11614 can be impaired if it is used in a manner not described in the ***FD-11614 User Guide*** .

Table 29. Voltage Input Range

V_{in}	9 V DC to 30 V DC
V_{aux}	Up to 30 V DC

Table 30. Device Power Consumption

Nominal	5.0 W
Maximum with sensor power excitation on	5.7 W

- **Device power consumption**—The total amount of power drawn by the device from the power input connector, including power delivered to external sensors.

Table 31. Power Connectors

Power input connector	5-pin L-coded male M12 connector
Power output connector	5-pin L-coded female M12 connector

4. This allows for line topologies or network redundancy.
5. With default software configuration.

Current Limits

Notice Exceeding the current limits may cause damage to the device. Stay below a maximum of 10 A shared between both Input and Aux terminals.

Table 32. Power IN/OUT Terminals

V_{in}	10 A maximum
V_{aux}	10 A maximum total (combined with V_{in})

Recommended external overcurrent protection	16 A, slow blow fuse

Physical Characteristics

Table 33. Dimensions and Weight

Dimensions	198.5 mm × 77.4 mm × 47.1 mm (7.8 in. × 3.0 in. × 1.9 in.)
Weight	1.18 kg (2 lb 9 oz)

Table 34. Input Connection

Number	16
Type	Universal miniature thermocouple jack

Torque for M12 connectors (power, Ethernet)	0.6 N · m (5.31 lb · in.)

Calibration

Calibration interval	1 year

Environmental Characteristics

Refer to the ***FD-11614 User Guide*** for more information about meeting these

specifications.

Table 35. Temperature

Operating	-40 °C to 85 °C
Storage	-40 °C to 100 °C

Table 36. Humidity

Operating	Up to 100% relative humidity, condensing or noncondensing
Storage	Up to 100% relative humidity, condensing or noncondensing

Ingress protection	IP65/IP67
Pollution Degree	4
Maximum altitude	5,000 m

Notice Failure to follow the mounting instructions in the ***FD-11614 User Guide*** can cause temperature derating.

Notice If your application is subject to high vibration or shock, NI recommends 0.5 mm^2 (20 AWG) or larger thermocouple wire. Strain relieve all cables as close to the device as possible.

Notice To protect against ESD, water, and dirt, install unconnected mini-TC plugs into all unused terminals, and install FD-11940, Mini-TC Connector Protection Boot (Qty 16) (NI part number 786395-01) on all mini-TC plugs.

Notice M12 connectors must be mated to cables or have caps installed on them to meet IP65/IP67 requirements. Cover the unused connectors with the included plastic caps or optional metal caps whenever water, dust, or dirt are present.

Notice Avoid long periods of exposure to sunlight.

Shock and Vibration

Table 37. Operating Vibration

Random	10 g RMS, 5 Hz to 2,000 Hz
Sinusoidal	10 g, 5 Hz to 2,000 Hz
Operating shock	100 g, 11 ms half sine, 3 shocks at 6 orientations, 18 total 40 g, 6 ms half sine, 4,000 shocks at 6 orientations, 24,000 total

Environmental Standards

This product meets the requirements of the following environmental standards for electrical equipment.

- IEC 60068-2-1 Cold
- IEC 60068-2-2 Dry heat
- IEC 60068-2-6 Sinusoidal vibration
- IEC 60068-2-27 Shock
- IEC 60068-2-30 Damp heat, cyclic (12 h + 12 h cycle)
- IEC 60068-2-64 Broadband random vibration

Safety Voltages

The FD-11637 is rated for use in DRY or WET LOCATIONS. Do not connect hazardous voltages to the FD-11614. A ***hazardous voltage*** is a voltage greater than 30 V RMS, 42.4 V peak, or 60 V DC in DRY LOCATIONS and 22.6 V peak or 35 V DC in WET LOCATIONS.

Rated Voltages

Connect only voltages that are within the following limits:

Between any two pins	60 V DC (Dry Locations); 35 V DC (Wet Locations)

Temporary Overvoltage Protection

Product has been designed to withstand power frequency overvoltage of relatively long duration as specified below. Voltages beyond these levels may cause permanent damage.

Between any two pins on the connector	±30 V DC

Isolation Voltages

- **Working Voltage**—The highest RMS value of the AC or DC voltage across the insulation that can continuously occur when the equipment is supplied at rated voltage.
- **Transient Overvoltage (Vpk)**—An overvoltage condition of a relatively short duration, a few milliseconds or less, oscillatory or non-oscillatory, usually highly damped.
- **Withstand**—The highest RMS value of AC or DC voltage to which the isolation barrier has been tested in order to verify the insulation can handle the working voltage electrical and mechanical stresses in normal use, verified with a 1 min. duration.

Table 38. Channel-to-Channel Isolation

Working Voltage	60 V DC (Dry Locations); 35 V DC (Wet Locations) Non-Mains
Withstand	1,000 V RMS, verified by 5 s withstand

Table 39. Channel-to-Earth Ground Isolation

Working Voltage	60 V DC (Dry Locations); 35 V DC (Wet Locations) Non-Mains
Withstand	1,000 V RMS, verified by 5 s withstand

These test and measurement circuits are not rated for measurements performed on circuits directly connected to the electrical distribution system referred to as MAINS.

MAINS is a hazardous live electrical supply system to which equipment is designed to be connected to for the purpose of powering equipment. This product is rated for measurements of voltages from specially protected secondary circuits. Such voltage measurements include signal levels, special equipment, limited energy parts of equipment, circuits powered by regulated low-voltage sources, and electronics.

Hazardous Voltage Do not connect the product to signals or use for measurements within Measurement Categories II, III, or IV, or for measurements on MAINs circuits or on circuits derived from Overvoltage Category II, III, or IV which may have transient overvoltages above what the product can withstand. The product must not be connected to circuits that have a maximum voltage above the continuous working voltage, relative to earth or to other channels, or this could damage and defeat the insulation. The product can only withstand transients up to the transient overvoltage rating without breakdown or damage to the insulation. An analysis of the working voltages, loop impedances, temporary overvoltages, and transient overvoltages in the system must be conducted prior to making measurements.

Tension dangereuse Ne pas connecter le produit à des signaux dans les catégories de mesure II, III ou IV et ne pas l'utiliser pour des mesures dans ces catégories, ou des mesures sur secteur ou sur des circuits dérivés de surtensions de catégorie II, III ou IV pouvant présenter des surtensions transitoires supérieures à ce que le produit peut supporter. Le produit ne doit pas être raccordé à des circuits ayant une tension maximale supérieure à la tension de fonctionnement continu, par rapport à la terre ou à d'autres voies, sous peine d'endommager et de compromettre l'isolation. Le produit peut tomber en panne et son isolation risque d'être endommagée si les tensions transitoires dépassent la surtension transitoire nominale. Une analyse des tensions de fonctionnement, des impédances de boucle, des surtensions temporaires et des surtensions transitoires dans le système doit être effectuée avant de procéder à des mesures.

Safety Compliance Standards

This product is designed to meet the requirements of the following electrical

equipment safety standards for measurement, control, and laboratory use:

- IEC 61010-1, EN 61010-1
- UL 61010-1, CSA C22.2 No. 61010-1

Note For safety certifications, refer to the product label or the Product Certifications and Declarations section.

Electromagnetic Compatibility Standards

This product meets the requirements of the following EMC standards for electrical equipment for measurement, control, and laboratory use:

- EN 61326-1 (IEC 61326-1): Class A emissions; Industrial immunity
- EN 55011 (CISPR 11): Group 1, Class A emissions
- AS/NZS CISPR 11: Group 1, Class A emissions
- ICES-001: Class A emissions

Note Group 1 equipment is any industrial, scientific, or medical equipment that does not intentionally generate radio frequency energy for the treatment of material or inspection/analysis purposes.

Note In Europe, Australia, New Zealand, and Canada (per CISPR 11) Class A equipment is intended for use in non-residential locations.

Note For EMC declarations and certifications, and additional information, refer to the ***Product Certifications and Declarations*** section.

Notice To ensure the specified EMC performance, operate this product only with shielded Ethernet cables.

Product Certifications and Declarations

Refer to the product Declaration of Conformity (DoC) for additional regulatory

compliance information. To obtain product certifications and the DoC for NI products, visit ni.com/product-certifications, search by model number, and click the appropriate link.