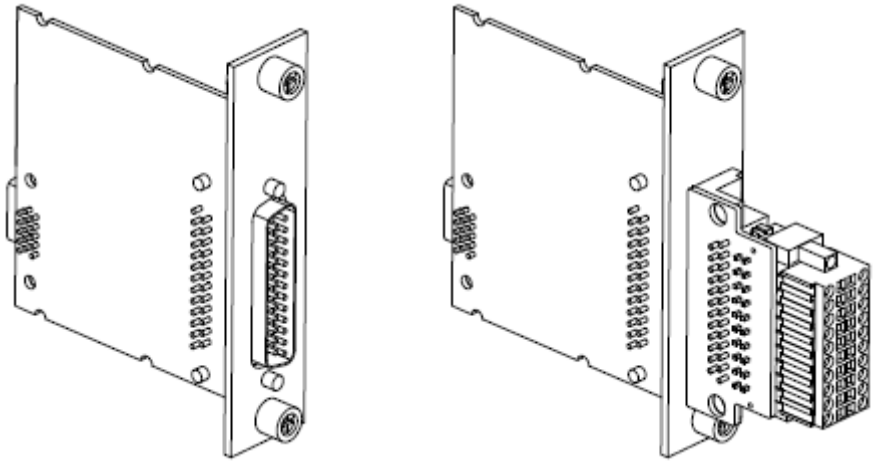
DATASHEET

MT E720

8-Channel, 10S/s/ch, Simultaneous, ±78 mV Temperature Input module



- 50 Hz/60 Hz noise rejection
- DSUB or push-in spring terminal connectivity;
- 250 Vrms, CAT II, channel- to-earth isolation (Spring Terminal);60 VDC, CAT I, channel-to-earth isolation (DSUB)

The MT E720 is a high-accuracy thermocouple input module for RobustRIO and FlexDAQ systems. The MT E720 includes open-thermocouple detection,over- and undertemperature fault detection and cold-junction compensation. There are two connector options for the MT E720—a 20-position spring-terminal connector and a 25-position DSUB connector.

MANGOTREE

MT E Series Overview

MT provides more than 20 E Series modules for measurement, control, and communication applications. E Series modules can connect to any sensor or bus and allow for high-accuracy measurements that meet the demands of advanced data acquisition and control applications.

- Measurement-specific signal conditioning that connects to an array of sensors and signals
- Isolation options such as bank-to-bank, channel-to-channel, and channel-to-earth ground
- -40 ℃ to 70 ℃ temperature range to meet a variety of application and environmental needs
- Hot-swappable

The majority of E Series modules are supported in both RobustRIO and FlexDAQ platforms and you can move modules from one platform to the other with no modification.

RobustRIO

RobustRIO combines an open-embedded architecture with small size, extreme ruggedness, and E Series modules in a platform powered by the Redefinable I/O (RIO) architecture. Each system contains an FPGA for custom timing, triggering, and processing with a wide array of available modular I/O to meet any embedded application requirement.

FlexDAQ

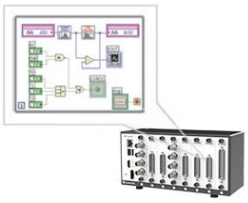
FlexDAQ is a portable, rugged data acquisition platform that integrates connectivity, data acquisition, and signal conditioning into modular I/O for directly interfacing to any sensor or signal. Using FlexDAQ with LabVIEW, you can easily customize how you acquire, analyze, visualize, and manage your measurement data.

Software

LabVIEW Professional Development System for Windows

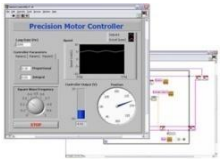
- Use advanced software tools for large project development
- Use advanced measurement analysis and digital signal processing
- Take advantage of open connectivity with DLLs, ActiveX, and .NET objects
- Build DLLs, executables, and MSI installers

LabVIEW FPGA Module



- Design FPGA applications for MT RIO hardware
- Program with the same graphical environment used for desktop and real-time applications
- Execute control algorithms with loop rates up to 300 MHz
- Implement custom timing and triggering logic, digital protocols, and DSP algorithms
- Incorporate existing HDL code and third-party IP including Xilinx IP generator functions

LabVIEW Real-Time Module

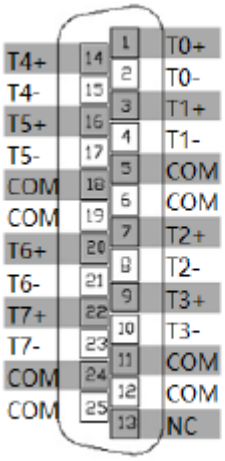


- Design deterministic real-time applications with LabVIEW graphical programming
- Take advantage of built-in PID control, signal processing, and analysis functions
- Automatically take advantage of multicore CPUs or set processor affinity manually
- Take advantage of real-time OS, development and debugging support, and board support

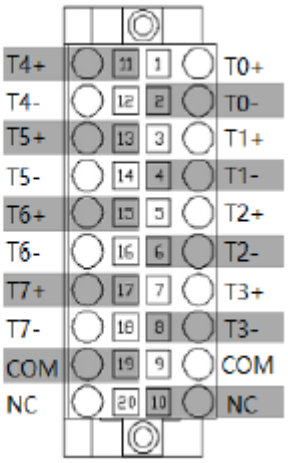
MT E720 Connectivity

Pin definition of DSUB connector and Spring Terminal connector.

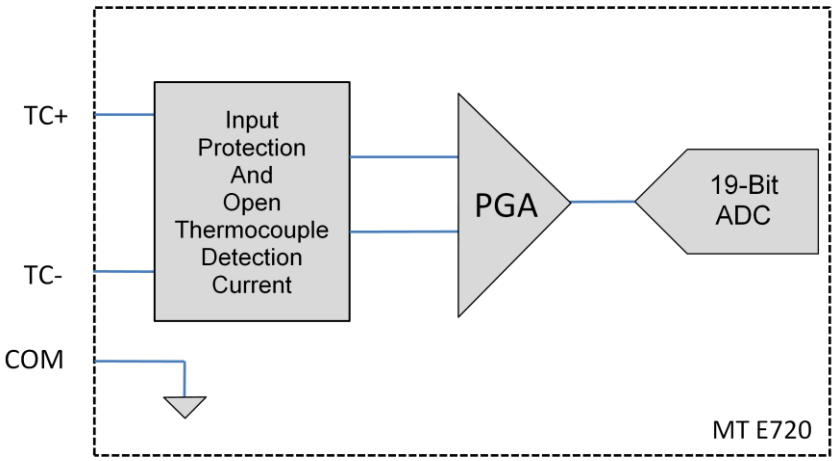
DSUB



Spring Terminal



MT E720 Circuitry



Each channel passes through a differential filter and then is multiplexed and sampled by a 19-bit ADC.The channels share a common ground, COM, that is isolated from other modules in the system.

MT E720 Specifications

The following specifications are typical for the range -40 ℃ to 70 ℃ unless otherwise noted.

Caution Do not operate the MT E720 in a manner not specified in this document. product misuse can result in a hazard. You can compromise the safety protection built into the product if the product is damaged in any way. If the product is damaged, return it to NI for repair.

Input Characteristics

Number of channels	8 thermocouple channels,1 internal autozero channel,1 internal cold-junction compensation channel
ADC resolution	19 bits
Type of ADC	Delta-Sigma
Sample mode	Simulaneous
Voltage measurement rage	±78.125mV
Temperrature measurement range	Works over temperrature ranges defined by NIST(J, K, T, E, N, B, R, and S thermocouple types)

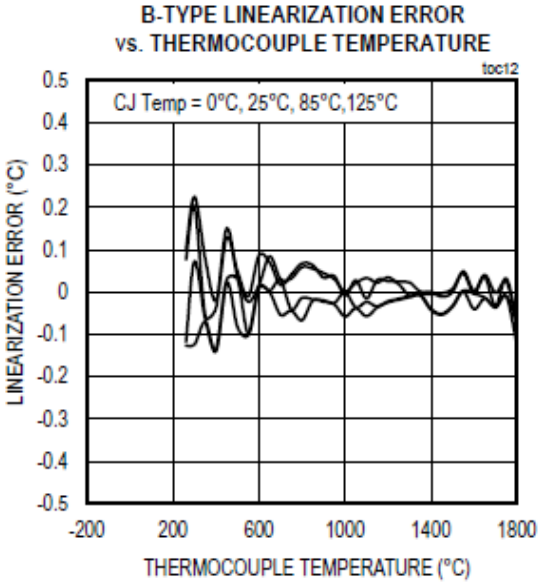
Conversion time(simulaneously sampled)

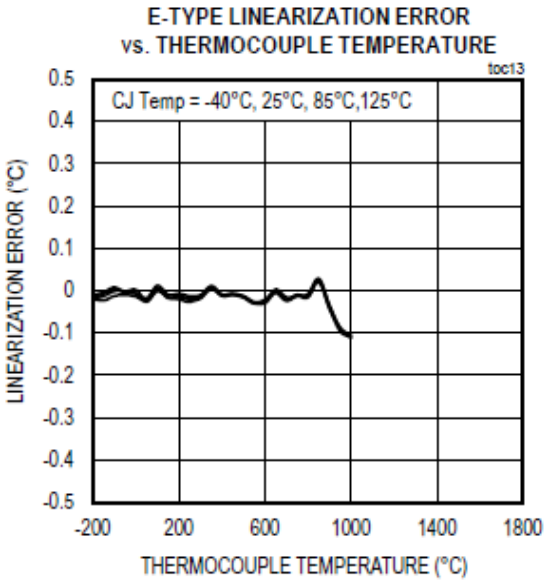
Timing Mode	Conversion Time(ms)	Sample Rate (S/s)
1-shot conversion(60Hz)	143	7
1-shot conversion(50Hz)	169	6
Auto conversion mode(60Hz)	82	12.2
Auto conversion mode(50Hz)	98	10.2

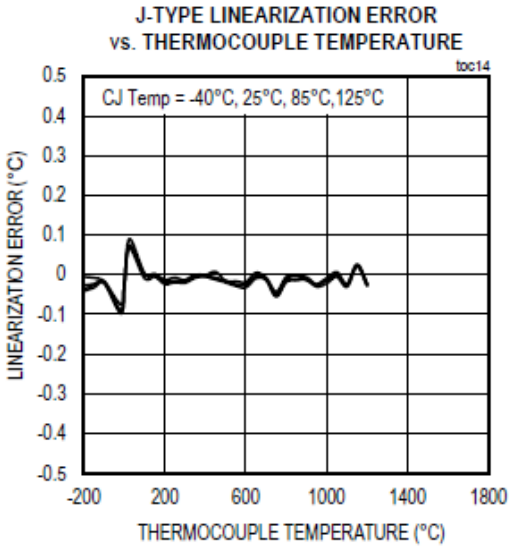
Common-Mode Rejection	70 dB
50/60 Hz Noise Rejection	91 dB
Overvoltage protection	±45V between TC+ and TC-
Input noise	1.3 uV RMS
Cold-junction compensation accuracy	±0.7 ℃ (-20 ℃ to +85 ℃)
Thermocouple voltage measurement accuracy	±0.15%

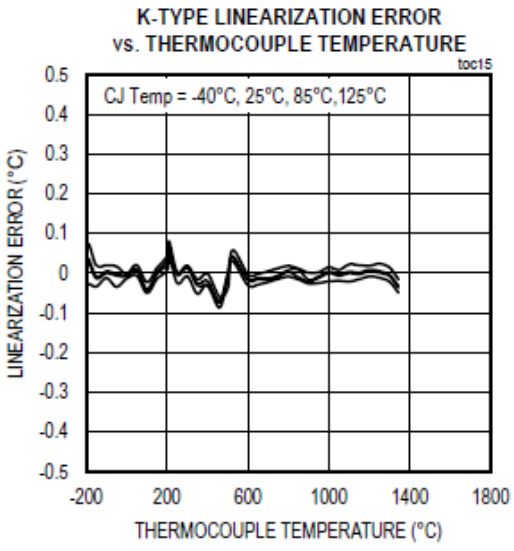
Temperature Measurement Accuracy

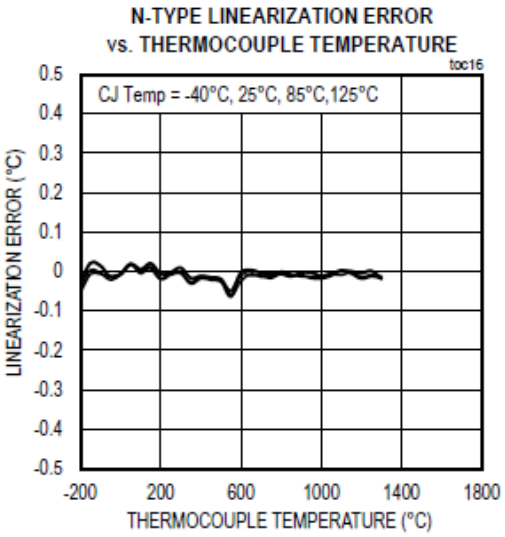
The following figures show the errors for each thermocouple type when connected to the MT E720.

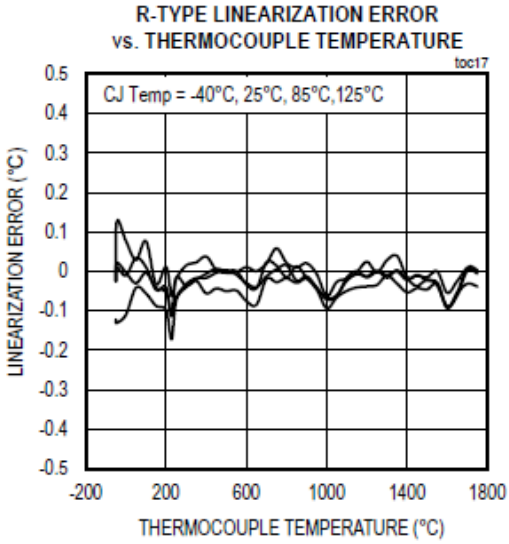


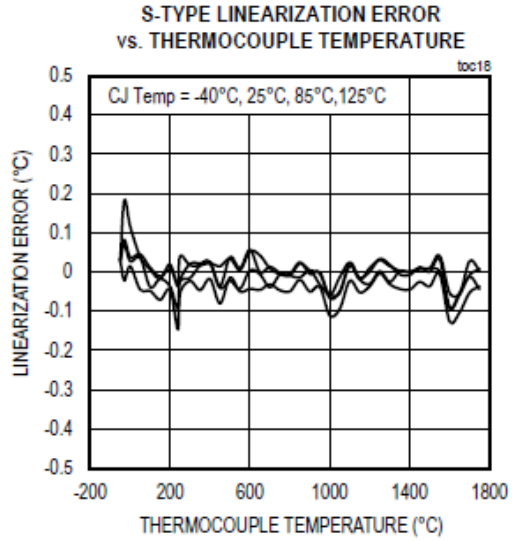


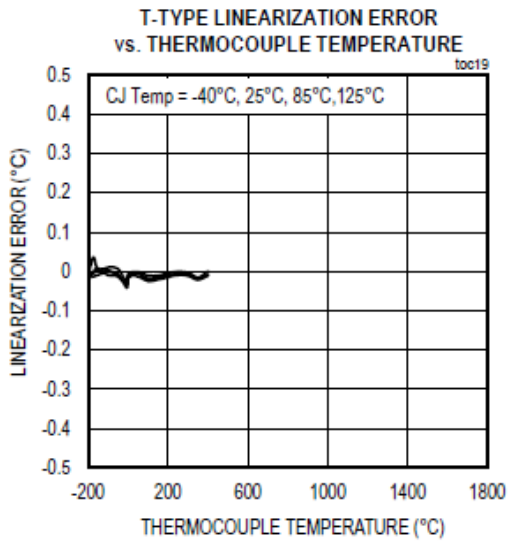












Power Requirements

Power consumption from chassis	490 mW maximum
Thermal dissipation (at 70 ℃)	840W maximum

Safety Voltages

Connect only voltages that are within the following limits:

MT E720 with Spring Terminal Isolation Voltages

Channel-to-channel	None
Channel-to-earth ground	

Continuous	250 Vrms, Measurement Category II
Withstand up to 4,000 m	3,000 Vrms, verified by a 5 s dielectric withstand test

Measurement Category II is for measurements performed on circuits directly connected to the electrical distribution system. This category refers to local-level electrical distribution, such as that provided by a standard wall outlet, for example, 115 V for U.S. or 230 V for Europe.

MT E720 with DSUB Safety Voltages

Isolation

Channel-to-COM	None
Channel-to-earth ground	
Continuous	60 VDC, Measurement Category I
Withstand up to 2,000 m	1,000 Vrms, verified by a 5 s dielectric withstand test

Measurement Category I is for measurements performed on circuits not directly connected to the electrical distribution system referred to as MAINS voltage. MAINS is a hazardous live electrical supply system that powers equipment. This category is 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.

CE Compliance CE

This product meets the essential requirements of applicable European Directives, as follows:

- 2014/35/EU; Low-Voltage Directive (safety)
- 2014/30/EU; Electromagnetic Compatibility Directive (EMC)
- 2014/34/EU; Potentially Explosive Atmospheres (ATEX)

Shock and Vibration

To meet these specifications, you must panel mount the system.

Operating vibration	
Random (IEC 60068-2-64)	5 g_{rms}, 10 Hz to 500 Hz

Sinusoidal (IEC 60068-2-6)	5 g, 10 Hz to 500 Hz
Operating shock (IEC 60068-2-27)	30 g, 11 ms half sine; 50 g, 3 ms half sine; 18 shocks at 6 orientations

Environmental

Refer to the manual for the chassis you are using for more information about meeting these specifications.

Operating temperature (IEC 60068-2-1, IEC 60068-2-2)	-40 ℃ to 70 ℃
Storage temperature (IEC 60068-2-1, IEC 60068-2-2)	-40 ℃ to 85 ℃
Ingress protection	IP40
Operating humidity (IEC 60068-2-78)	10% RH to 90% RH, noncondensing Storage
humidity (IEC 60068-2-78)	5% RH to 95% RH, noncondensing Pollution
Degree	2
Maximum altitude	
For MT E720 with spring terminal	4,000 m
For MT E720 with DSUB	2,000 m

Indoor use only.