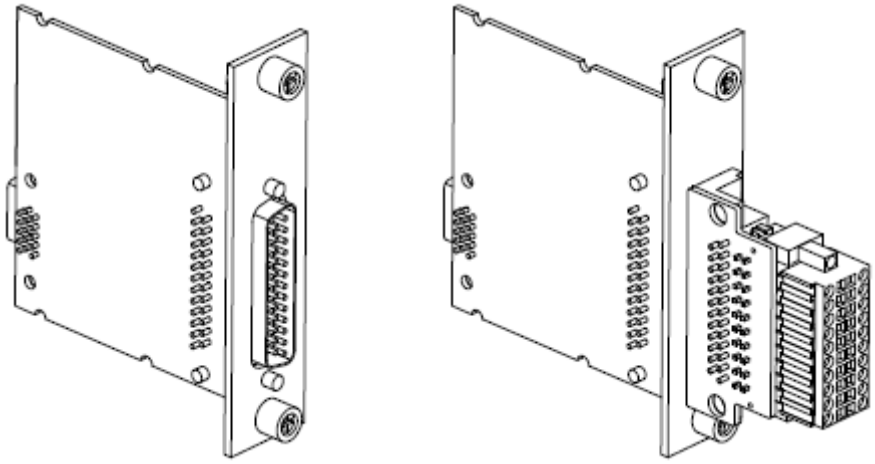
DATASHEET

MT E732

4-Channel,0 mA to 25 mA, 16 Bit Analog Output Module



- 4 channels, 125 kS/s per channel simultaneously analog Output
- 0 mA to 20 mA output range, 16-bit resolution
- Open-loop detection with interrupt, 0.0 mA power-on
- DSUB or push-in Spring Terminal connectivity
- 250 Vrms, CAT II, bank isolation
- -40 ℃ to 70 ℃ operating range, 5 g vibration, 50 g shock

The MT E732 is a 4-channel, 0 mA to 25 mA, 125 kS/s simultaneously updating E Series analog output module for any RobustRIO or FlexDAQ chassis. It is ideal for interfacing and controlling industrial current-driven actuators at high rates. The module has built-in open-loop detection, which generates an interrupt in software when an open loop is detected as well as zeroing outputs to ensure safety and avoid driving actuators at system power-on. There are two connector options for the MT E732—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

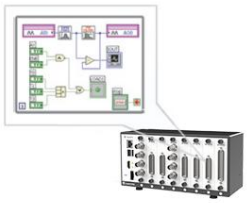
FlexDAQ is a portable, rugged data acquisition platform that integrates connectivity, data acquisition, and signal conditioning into modular I/O for directly interfacing to any sensor or signal. Using FlexDAQ with LabVIEW, you can easily customize how you acquire, analyze, visualize, and manage your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

Software

LabVIEW Professional Development System for Windows

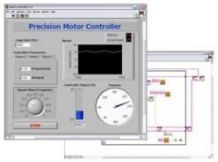
- Use advanced software tools for large project development
- Use advanced measurement analysis and digital signal processing
- Take advantage of open connectivity with DLLs, ActiveX, and .NET objects
- Build DLLs, executables, and MSI installers

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

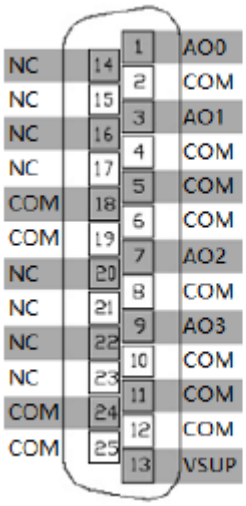


- Design deterministic real-time applications with LabVIEW graphical programming
- Take advantage of built-in PID control, signal processing, and analysis functions
- Automatically take advantage of multicore CPUs or set processor affinity manually
- Take advantage of real-time OS, development and debugging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

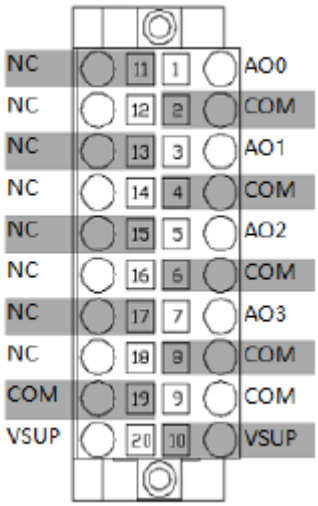
MT E732 Connectivity

Pin definition of DSUB connector and Spring Terminal connector.

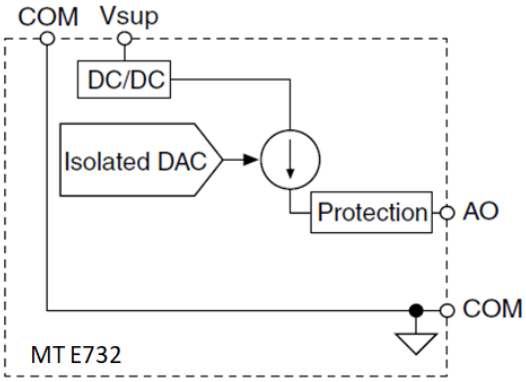
DSUB



Spring Terminal



MT E732 Circuitry



Each AO channel has a digital-to-analog converter (DAC) that produces a voltage signal. Each channel also has overvoltage and short-circuit protection.

MT E732 Specifications

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

Caution To ensure the specified EMC performance, operate this product only with shielded cables and accessories.

Caution Do not operate the MT E732 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 MT for repair.

Output Characteristics

Number of channels	4 analog output channels
DAC resolution	16 bits
Type of DAC	String
Startup current	0.0 mA
Power-down current	0.0 mA
Output range	0 mA to 25 mA
Output Resistance	>1GΩ
Output rate	125 kS/s maximum per channel

Table 1. Accuracy

Measurement Conditions		Percent of Reading (Gain Error)	Percent of Range (Offset Error)
Calibrated	Maximum (-40 ℃ to 70 ℃)	±0.20%	±0.09%
	Typical (25 ℃, ±5 ℃)	±0.08%	±0.03%

Stability	
Gain drift	30 ppm/ ℃
Offset drift	45 ppm/ ℃
External power supply voltage range (Vsup)	9 VDC to 36 VDC
Protection(AO, Vsup)	
Overvoltage	±40V
Short-circuit	Indefinitely

Noise	600 nArms
Crosstalk	-90 dB
Settling time (to 1 LSB)	
Full-scale step	10 µs
1 mA step	5 µs
Glitch energy	Unmeasurable
Monotonicity	16 bits
DNL	±1 LSB maximum
INL	±16 LSB maximum

Power Requirements

Power consumption from chassis	230mW maximum
Thermal dissipation (at 70 ℃)	1500 mW maximum
Power consumption from external power supply	1400 mW maximum

Safety Voltages

Connect only voltages that are within the following limits:

MT E732 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 E732 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 E732	with spring terminal	4,000 m
For MT E732	with DSUB	2,000 m

Indoor use only.