



MX2A Thermocouple Active Vacuum Gauge

Part Number: 2-8910-1XX

Operating Specifications	
Operating Range	1*10 ⁻⁴ Torr to 1000 Torr
Communications	RS-485
Analog Output	7 selectable 0 V DC to 10 V DC
Programmable Set Points	2
Set Point 1	Open collector
Set Point 2	Relay
Supply Voltage	22 V DC to 26 V DC
Maximum Power	8 W
Calibration Medium	Dry air or nitrogen
Overpressure	150 psi
Digital Output Resolution	2 significant digits with exponent
Analog Output Resolution	16 bits
Operating Temperature	0 °C to 50 °C
Storage Temperature	-20 °C to 60 °C
Bakeout Temperature	
Brass (P/N: 2-8910-110)	100 °C (electronics removed)
Stainless (P/N: All Others)	200 °C (electronics removed)
Response Time	≤ 2 s
Display Readable Distance	3 m (10 ft)
Accuracy	
0.1 mTorr to 1 mTorr	0.1 mTorr resolution
1 mTorr to 10 mTorr	±1 mTorr
10 mTorr to 1 Torr	±10% of reading
1 Torr to 100 Torr	±30% of reading (vertical mount)
100 Torr to 1000 Torr	±10% of reading (vertical mount)
Analog Output	±10 mV

Physical Characteristics	
Housing	Aluminum
Electrical Connections	D-Sub 15-pin male
Weight with Sensor (typical)	345 g (0.76 lbs)
Weight without Sensor	181 g (0.40 lbs)
Dimensions	See dimensional drawings

Key Features and Benefits

- Simple sensor replacement - no screws to remove
- Selectable 0 V DC to 10 V DC analog output
- Selectable units of measurement including Torr, mbar, and kPa
- Supports air, dry nitrogen, and argon gas types
- Excellent resolution and accuracy of measurements
- Compact design with an easy to read color OLED display

Applications and Industries

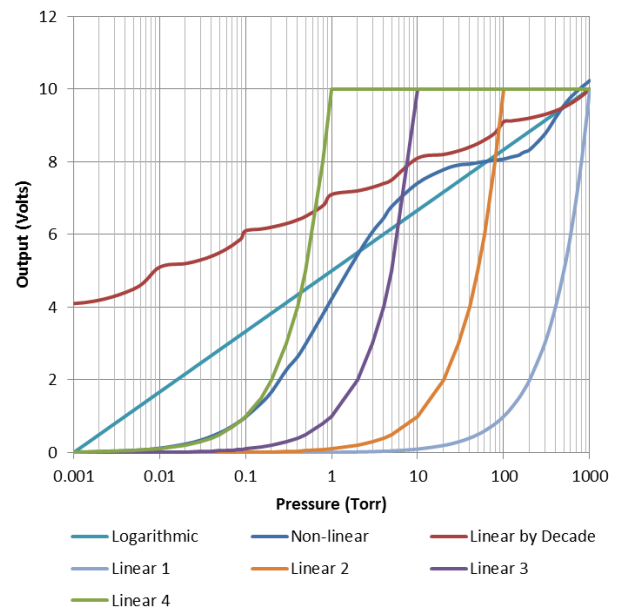
- E-beam welding
- Freeze dryers
- Liquefied National Gas (LNG), industrial gas, cryogenics
- Particle accelerators
- National labs, research and development
- Semiconductor
- Thin film deposition
- Vacuum distillation
- Vacuum furnace, heat treat
- Vacuum glove boxes

Description

The MX2A Thermocouple Active Gauge utilizes an easily replaceable (no screws) Televac® 2A thermocouple vacuum sensor. It has a variety of features including a wide range of measurement from 1*10⁻⁴ Torr up to 1000 Torr, RS-485 communications, two programmable set points, and a selectable analog output. The bright OLED display makes it easy to read from a distance.

Options can be set from four capacitive touch controls located on the top of the unit or through RS-485 communications. The extensive selection of fittings, simplicity of use, ease of sensor replacement, and competitive cost make this unit an excellent choice for a variety of vacuum applications.

Analog Output Behavior



Materials Exposed to Vacuum

MX2A PN: -110, -116, -125	MX2A PN: All Others
Nickel	Nickel
Glass	Glass
Gold	Gold
Tophet	Tophet
Cupron	Cupron
Solder	Stainless Steel

Certifications, Compliance, and Ratings

- Certified to CAN/CSA C22.2 No. 61010-1-12
- CE certified to EN 61010-1, EN 61236-1, EN 55011
- RoHS
- IP40
- EAC certified
- NIST traceable calibration optional



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Sample RS-485 Commands (assume address 0)

*0S1<CR>	Read vacuum measurement
*0R1<CR>	Read units of measurement
*0R2<CR>	Read SP1L and SP1H

Electrical Connections

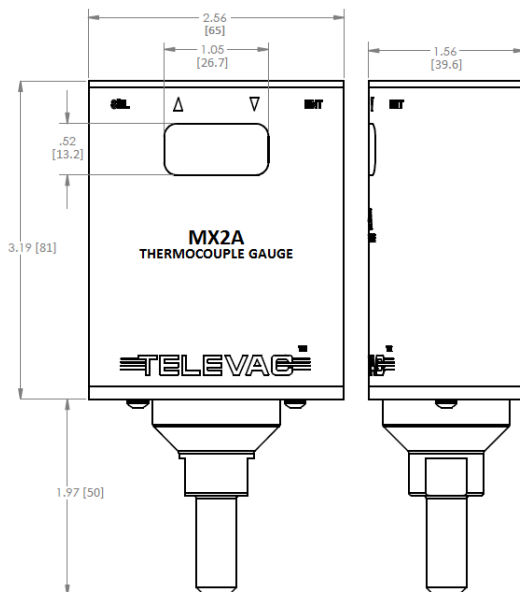
Pin	Description
1	Analog Out (Ground)
2	RS-485 A (-)
3	SP2 NC
4	SP2 NO
5	SP1 Open Drain
6	Floating
7	Floating
8	Supply Voltage (+)
9	Analog Out (0 to 10) V
10	RS-485 B (+)
11	SP2 Com
12	SP1 Source
13	Floating
14	Floating
15	Supply Voltage (-)

Set Points

The MX2A has two set points. Set point 1 is an N-Channel 60 V MOSFET open collector. It has a maximum current rating of 1 A. The datasheet can be found at www.vishay.com/en/product/69958/.

Set point 2 is a relay with a maximum switching voltage of 220 V DC (250 V AC) and a maximum switching current of 2 A. The datasheet can be found at www.te.com/catalog/pn/en/1393788-3.

Dimensional Drawing



*Dimensions are drawn with 1/8" NPT fitting installed

Ordering Information

Part Number	Description
2-8910-101	1/8" NPT Stainless Steel
2-8910-110	1/8" NPT Nickel Plated Brass
2-8910-111	1/2" Straight Stainless Steel
2-8910-116	NW16/KF16 Nickel Plated Brass
2-8910-130	NW16/KF16 Stainless Steel
2-8910-125	NW25/KF25 Nickel Plated Brass
2-8910-131	NW25/KF25 Stainless Steel
2-8910-132	NW40/KF40 Stainless Steel
2-8910-150	CF16/1.33" CF-F Stainless Steel
2-8910-152	CF40/2.75" CF-F Stainless Steel

D-Sub 15, 6 Conductor Cable (flying leads)

Part Number	Length
2-9857-010	10 ft (3 m)
2-9857-020	20 ft (6 m)
2-9857-035	35 ft (10 m)
2-9857-050	50 ft (15 m)
2-9857-065	65 ft (20 m)
2-9857-100	100 ft (30 m)

D-Sub 15, 15 Conductor Cable (flying leads)

Part Number	Length
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2-9858-020	20 ft (6 m)
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2-9858-050	50 ft (15 m)
2-9858-065	65 ft (20 m)
2-9858-100	100 ft (30 m)

Wall Power Supply

Part Number	Description
2-7900-097	100-240 V AC/47-63 Hz, plug types A, C, G, I

Replacement Sensors

Part Number	Description
2-2100-10	1/8" NPT Nickel-Plated Brass
2-2126-001	1/8" NPT Stainless Steel
2-2100-016	NW16/KF16 Nickel-Plated Brass
2-2100-025	NW25/KF25 Nickel-Plated Brass
2-2126-030	NW16/KF16 Stainless Steel
2-2126-031	NW25/KF25 Stainless Steel
2-2126-032	NW40/KF40 Stainless Steel
2-2126-050	CF16/1.33" CF-F Stainless Steel
2-2126-052	CF40/2.75" CF-F Stainless Steel

Compatible Vacuum Controller

Part Number	Description
2-8900-100	MX Active Gauge EthernetIP Gateway

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Full Range Active Vacuum Gauge Solutions

Part Number	Description	Supporting Document
2-8940-XXX	MX7B Cold Cathode	Application Note AN3023
2-9850-XXXX	MX7M Cold Cathode	Application Note AN3023

Additional Documentation

Manual	MX2A Thermocouple Active Vacuum Gauge Manual
AN3001	Comparison of the MX2A and MX4A Active Gauges
AN3010	Torr Scientific/Torr Decimal/mTorr/Micron Conversions
AN3015	Recommended Practices for Vacuum Calibration
AN3023	Automatic Control of an MX7B/MX7M with an MX2A
Video	MX2A Thermocouple Overview
Video	MX2A Thermocouple Demonstration
Video	MX2A Thermocouple Sensor Replacement
Resource	Televac® Tolerances

Company Information

Specialty manufacturing services that promise precision -
 For more than 85 years, Fredericks has specialized exclusively in tilt and vacuum measurement products. Today, our precise manufacturing processes produce the most accurate and advanced products on the market, ensuring perfection every time. A true specialty service provider, we are willing and eager to put our experience and capabilities to good use, helping OEMs achieve even the most complex designs.

High performance products designed and manufactured with pride -
 Fredericks is a global provider and U.S. manufacturer and designer of high-performance tilt and vacuum measurement products. Built to last, our products are made with state-of-the-art sensing technology, proven processes, and an intrinsic passion for the trade. Offering simple integration and quality and safety benchmarks, our customers benefit not just from standard-setting reliability, but from our commitment to competitive pricing and performance.

A partnership that prioritizes uptime, lead time, and service -
 Fredericks guarantees customer satisfaction and our ‘not too big, not too small’ operation is what enables us to offer a true partnership experience. Our dedicated representatives and engineers offer exceptionally responsive service and some of the fastest lead times in the industry, knowing that uptime is the key to your success. With anytime-access to our leadership team and solutions that enhance your products, you will feel the Fredericks difference.

Vacuum measurement tools built for the toughest jobs -
 Fredericks’ world-class vacuum sensors, gauges, and control instrumentation are engineered for the most demanding applications and environments. Our patented Televac® and ETI vacuum brands feature cold-cathode technology, thermocouple and convection gauges, and precision-manufactured hot ionization gauges. Dedicated solely to vacuum gauging and calibration services, we provide industrial heating, national laboratories, cryogenics, and industrial gas applications, among many others, with fast lead times and industry-leading performance. Covering the entire practical vacuum range, our products deliver rapid response vacuum readings and superior sensitivity.

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