Vaccuum Capacitance Manometers

XacTorr®
Digital Capacitance Manometer

XacTorr® CMX Series

Rugged, Stable Digital Capacitance Manometers for Process Vacuum Measurement

Brooks XacTorr® CMX Series digital vacuum capacitance manometers (also referred to as capacitance diaphragm gauges) incorporate industry-leading features that improve measurement reliability, minimize drift, resist diaphragm contamination, and minimize thermal effects. The result is an exceptionally reliable capacitance manometer family for all vacuum measurement applications.

An important benefit of the XacTorr® vacuum capacitance manometer is its advanced Mark-IV sensor. The sensor chamber contains surface areas that are not used in the pressure measurement; these surfaces provide locations for particles and condensable vapors to accumulate without affecting the sensor, dramatically reducing the need for re-zeroing and greatly extending sensor life. The sensor diaphragm is made from corrosion resistant Inconel®.

Because they are fully digital devices, XacTorr® vacuum capacitance manometers operate over a wide dynamic range with extremely good accuracy.

Flexible digital signal processor based electronics eliminates manual potentiometers and drift associated with the aging of old-style analog electronics.

Digital precision:
• Multi-decade digital calibration provides superior window of "known accuracy"
• Real-time compensation for ambient temperature variations which improves measurement repeatability
• Intelligent zero adjustment, local push-button, and remote zeroing for ease of maintenance capability that also improves long-term repeatability

Intelli-Touch zeroing ensures that the XacTorr® Series cannot be zeroed if the pressure is too high or if the capacitance manometer has not reached a stabilized operating temperature - a common operator error with analog capacitance manometers.
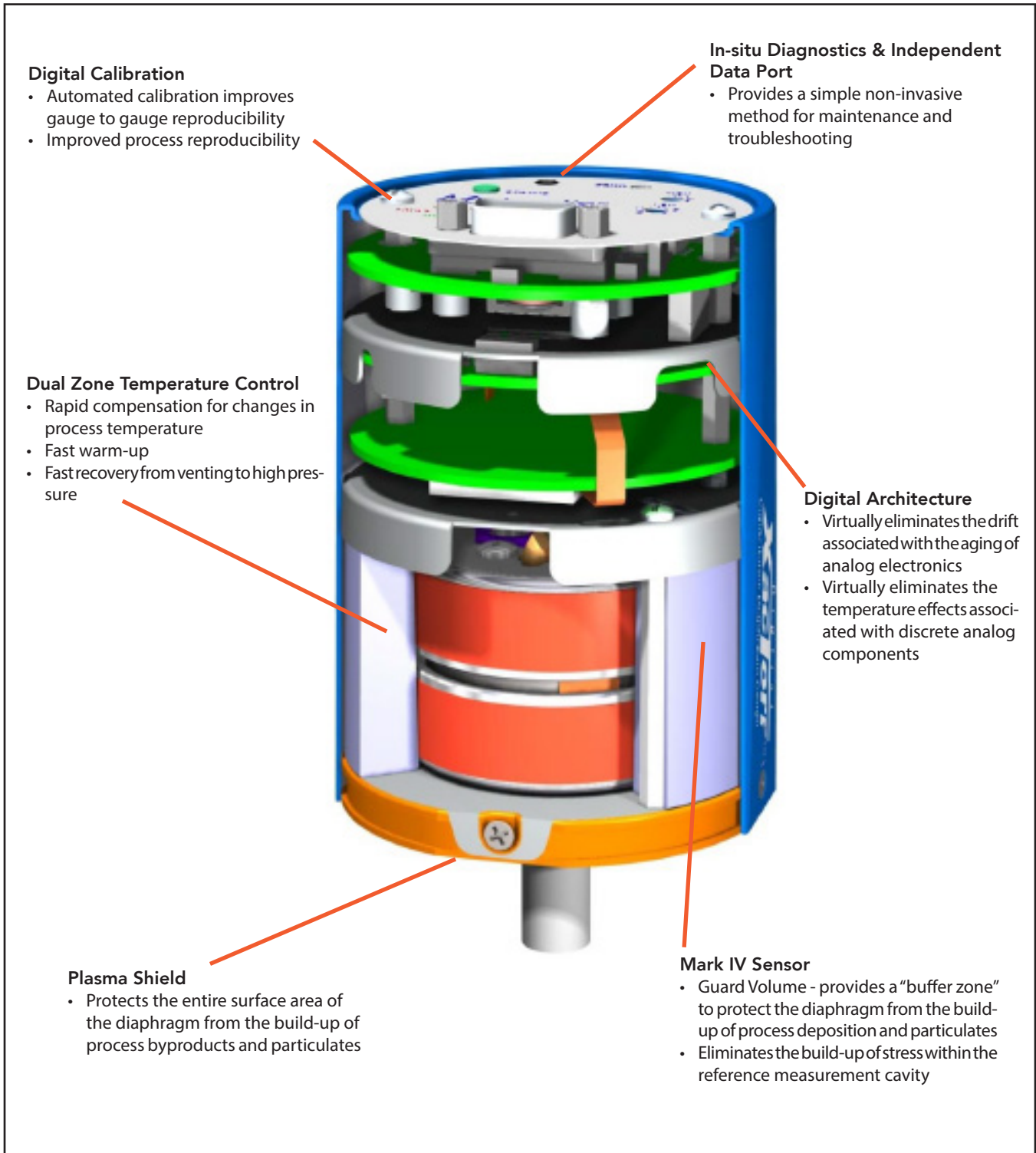
Highly efficient dual-zone temperature control:
• Real-time temperature control of the sensor for improved measurement stability & repeatability
• Fast warm-up with intuitive temperature status LED
• Rapid response to changing system conditions

View XacTorr® CMX Series Product Page

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Beyond Measure

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Digital Calibration
- Automated calibration improves gauge to gauge reproducibility
- Improved process reproducibility

In-situ Diagnostics & Independent Data Port
- Provides a simple non-invasive method for maintenance and troubleshooting

Dual Zone Temperature Control
- Rapid compensation for changes in process temperature
- Fast warm-up
- Fast recovery from venting to high pressure

Digital Architecture
- Virtually eliminates the drift associated with the aging of analog electronics
- Virtually eliminates the temperature effects associated with discrete analog components

Plasma Shield
- Protects the entire surface area of the diaphragm from the build-up of process byproducts and particulates

Mark IV Sensor
- Guard Volume - provides a "buffer zone" to protect the diaphragm from the build-up of process deposition and particulates
- Eliminates the build-up of stress within the reference measurement cavity

Features	Benefits
Patented Mark IV Sensor	Lower drift, superior protection from deposition of process gases
Dual Zone Temperature Control	Fast warm-up, close temperature control, rapid response to changes
Digital Calibration	Multi decade calibration provides superior window of known accuracy, real time compensation of ambient temp effects
Digital Architecture	Eliminates manual potentiometers and drift associated with electronics
Intelli-Touch Zero Adjustment	Cannot be zeroed if pressure is too high or desired temperature not reached

Patented Mark IV Sensor

The XacTorr® capacitance manometers utilize patented sensor technology. Unique corrosion resistant, shielded sensor design offers superior protection against condensable process byproducts. The sensor diaphragm is made from corrosion resistant Inconel®. This allows for extended operation of the capacitance manometers without degrading accuracy.


Mark IV Sensor
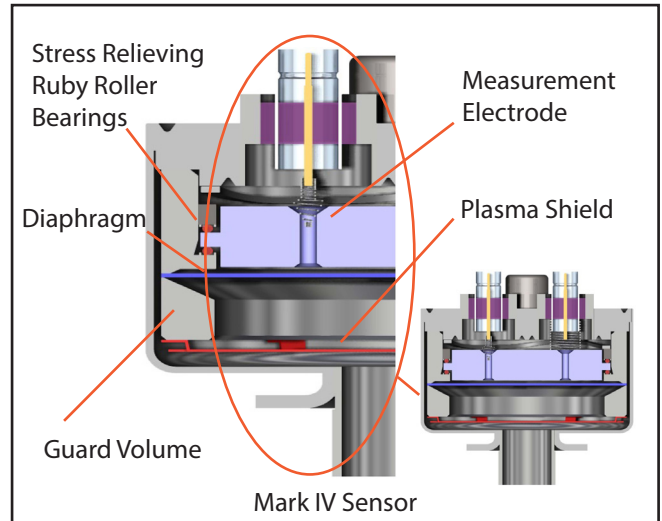
Highly Efficient Dual Zone Temperature Control

The XacTorr® capacitance manometers are offered with sensors that operate either at ambient temperature or at an elevated but regulated temperature. In case of the latter, two options are offered, 45^{0}C, or 100^{0}C. Brooks utilizes a highly efficient dual zone temperature control system to maintain the sensor diaphragm to within 0.1^{0}C of the specified temperature. Such real time and close temperature control improves measurement stability and repeatability.

This temperature management system also allows for fast warm up. An LED indicates when the instrument reaches the desired temperature level allowing for reliable measurements to be made.

The dual zone control also ensures rapid response to changing system conditions.

Dual Zone Temperature Control:
Precisely measures the reference temperature and ΔT
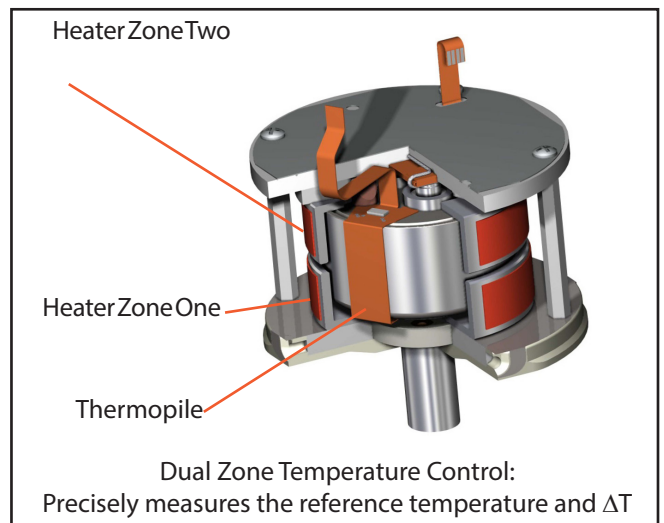
Flexible Digital Signal Processor

The XacTorr ®capacitance manometers incorporate patented advanced digital architecture. This eliminates manual potentiometers and drift associated with the aging of old style analog electronics.

The instrument is calibrated using multi decade digital calibration which provides a superior window of known accuracy.
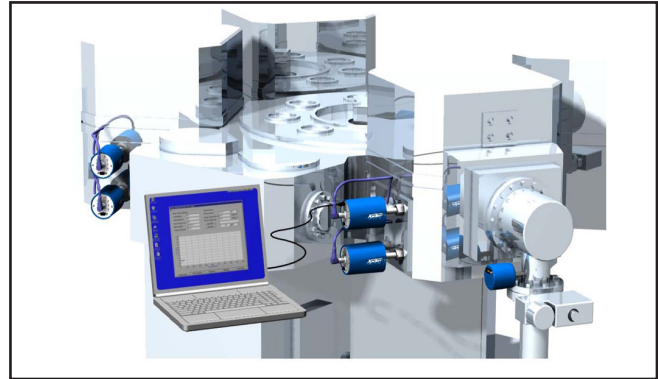
The digital precision allows for real time compensation of ambient temperature effect for improved measurement repeatability.

Intelli-Touch zeroing via a local push button or remote for ease of maintenance, ensures that the instrument cannot be zeroed if the pressure is too high of if the gauge has not reached a stable operating temperature. This is a common source of operator error with analog capacitance manometers.

Flexible Digital Signal Processor
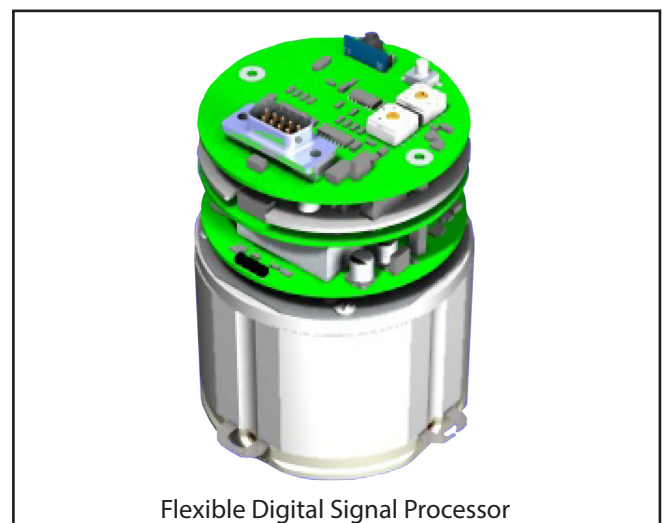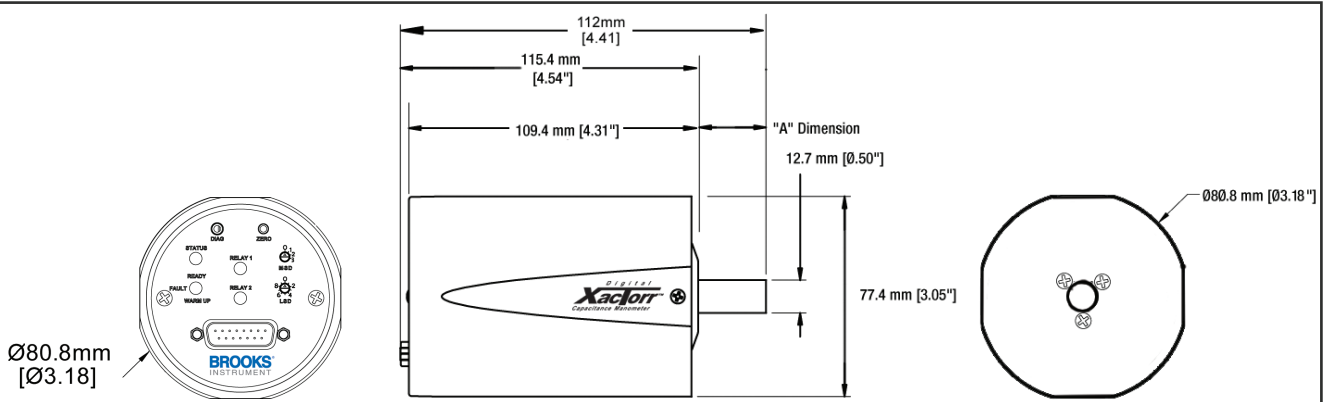
Independent Communications and Diagnostic Interface

The XacTorr®'s RS-485 diagnostic port provides a unique, independent means of communicating with the gauge without having to "interupt" tool communications. This allows monitoring and data acquisition capabilities simultaneously with gauge operation, for chamber and tool matching along with "real time" advanced troubleshooting.

PERFORMANCE	
Operating Temperatures:	
CMX0	Ambient
CMX45	45°C
CMX100	100°C
Full Scale Ranges	0.1, 1, 2, 10, 20, 100, 1000 Torr
Accuracy[1]	CMX0: 0.25% of Reading CMX1, CMX2: 1 to 1000 Torr Ranges = 0.15% of Reading, < 1 Torr Ranges = 0.25% of Reading
Measurement Range	4 Decades
Temperature Effect on Zero	0.002% F.S./°C
Temperature Effect on Span	0.02% F.S./°C

MECHANICAL	
Exposed Materials	Inconel® and/or AISI 316L Stainless Steel
Over-Pressure Limit	17 psia or 125% of Full Scale, whichever is greater
Approximate Shipping Weight	1.40 lbs. (726 grams)

OUTPUTS SUPPORTED	
Analog Models	Analog (010 Vdc 5k Ω load) - Yes RS485 - Yes DeviceNet - No
DeviceNet Models	Analog (010 Vdc 5k Ω load) - Yes RS485 - Yes DeviceNet - Yes

CONNECTORS	
Analog	9-Pin Male Sub D or 15-Pin Sub D
RS485	2.5mm Mini Jack
DeviceNet	5-Pin Eurofast (DeviceNet) & 9-Pin Female Sub D (Analog)

RELAY CONTACT RATING	
Available on 15-Pin Male Sub D interface	1A @ 30 Vdc/0.3A @ 125 Vac

ENVIORNMENTAL	
Ambient Operating Temperature	CMX0: 0-50°C CMX45: 15-35°C CMX100: 15-45°C

CERTIFICATIONS	
Electromagnetic Compatibility	Fully CE Certified to EMC Directive 89/336/EEC
RoHS Compliance	With "R" in the Part Number Code

| POWER REQUIRED		
CMX0 power required is 200 mA @ ±15 Vdc		
Power Input at Initial Warm-up Analog Models, Typical Values[2]	CMX45 - 270 mA@±15 Vdc (±5%)	CMX100 - 620 mA @ ± 15 Vdc (±5%)
Power Input at Steady State Analog Models, Typical Values[2]	CMX45 - 175 mA @ ±15 Vdc (±5%)	CMX100 - 350 mA @ ± 15 Vdc (±5%)
Power Input at Initial Warm-up DeviceNet Models, Typical Values	CMX45 - 400 mA @ 24 Vdc	CMX100 - 900 mA @ 24 Vdc
Power Input at Steady State DeviceNet Models, Typical Values	CMX45 - 300 mA @ 24 Vdc	CMX100 - 600 mA @ 24 Vdc

Notes:
1. Includes Hysteresis, linearity and repeatability within the calibrated range at 21°C specification for 1000 Torr tentative pending final qualification.
2. 15-Pin Male Sub D Model requires an additional 40 mA to power the internal relays (if energized).

112mm [4.41]
115.4 mm [4.54"]
109.4 mm [4.31"]
"A" Dimension
12.7 mm [Ø.50"]
Ø80.8 mm [Ø3.18"]
77.4 mm [3.05"]
Ø80.8mm [Ø3.18]

Fitting Type	Fitting Code	"A" Dimension
.05" OD Tube	0	26.3mm (1.04")
KF-10 Flange	1	39.0mm (1.54")
KF-16 Flange	2	39.0mm (1.54")
KF-25 Flange	3	30.1mm (1.19")
8 VCR Female	4	52.24mm (2.06")
Mini CF	5	27.56mm (1.09")

Port	Pinout	Description
Analog Port (9-pin Male D Sub)	1	Pressure Output
	2	Not Used
	3	Temperature Status
	4	+15 Vdc Supply
	5	-15 Vdc Supply
	6	Case Ground
	7	Remote Zero
	8	Signal Common
	9	Power Supply Common
RS-485 Port (2.5mm Jack)	Tip	RS_A
	Ring 1	RS_B
	Sleeve	Ground
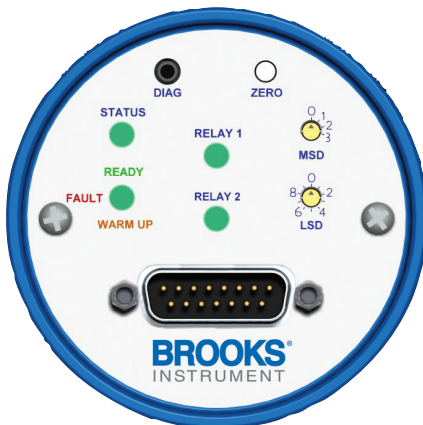
Port	Pinout	Description
Analog Port (15-pin Male D Sub)	1	Temperature Status
	2	Pressure Output
	3	Remote Zero
	4	Not Used
	5	Power Supply Common
	6	-15 VDC Supply
	7	+15 VDC Supply
	8	Relay 1-Normally Open
	9	Relay 1-Common
	10	Relay 1-Normally Closed
	11	Relay 2-Normally Open
	12	Signal Common
	13	Relay 2-Common
	14	Relay 2-Normally Closed
	15	Case Ground
RS-485 Port (2.5mm Jack)	Tip	RS_A
	Ring 1	RS_B
	Sleeve	Ground
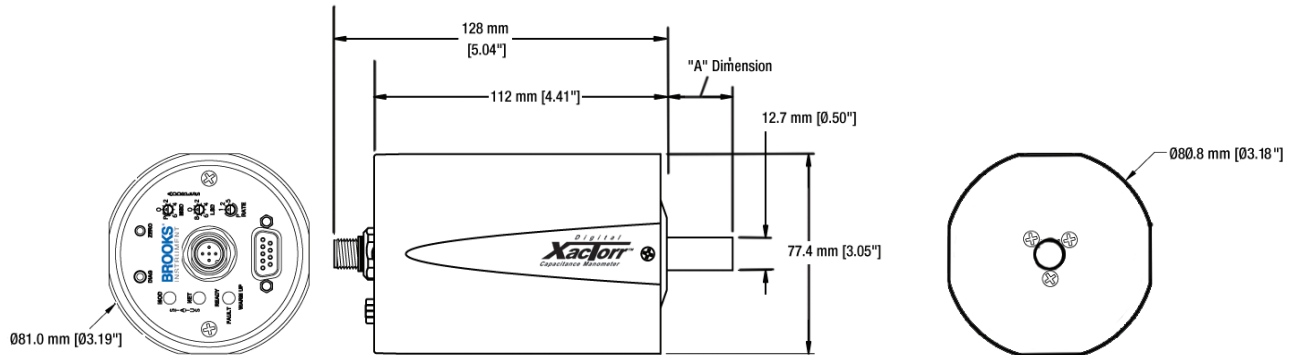
Fitting Type	Fitting Code	"A" Dimension
.05" OD Tube	0	26.3mm (1.04")
KF-10 Flange	1	39.0mm (1.54")
KF-16 Flange	2	39.0mm (1.54")
KF-25 Flange	3	30.1mm (1.19")
8 VCR Female	4	52.24mm (2.06")
Mini CF	5	27.56mm (1.09")

Port	Pinout	Description
DeviceNet Port (5-pin Eurofast)	1	Drain
	2	V+
	3	V-
	4	CAN_H
	5	CAN_L
Analog Port (9-pin D Sub)	1	Pressure Output
	2	Not Used
	3	Temperature Status
	4	Not Used
	5	Not Used
	6	Case Ground
	7	Remote Zero
	8	Signal Common
	9	Not Used
RS-485 Port (2.5mm Jack)	Tip	RS_A
	Ring 1	RS_B
	Sleeve	Ground

DeviceNet*	
Data Rate/Network Length	User Selectable: 125 kbps, 500m (1,640ft.), 250 kbps,250m (820ft.) 500 kbps, 100m (328ft.)
Digital Functions	Read Pressure, set zero, reset factory defaults, report run time (hours), change device address and baud rate
Data Rate Switch	4 positions: 125, 250, 500k, PGM (programmable over the network)
MAC ID Switches	2 switches, 10 positions each, 00 to 63 are valid MAC ID (addresses) numbers; Switch settings from 64 through 99 are in the PMG range, and the MAC ID can then be programmable over the network.
Network Message Size	Master/Slave informatiom flow (Group 2 only server)
Network Size	Up to 64 nodes
Network Topology	Linear (trunkline/dropline) power and signal on same network cable
Visual Communication Indicators	LED network status (green/red), LED module status (green/red)

*Meets SEMI E54 and ODVA SEMI SIG vacuum gauge profile

Code Description		Code Option	Option Description
I.	Base Model Code	CMX	Capacitance Manometer
II.	Model/Ordering Temperature	0	CMX0 (Ambient)
		1	CMX45 (45°C)
		2	CMX100 (100°C)
III.	Full Scale Range	M11	100 mTorr
		M25	250 mTorr
		M50	500 mTorr
		T01	1 Torr
		T02	2 Torr
		T05	5 Torr
		T07	7.5 Torr
		T11	10 Torr
		T12	20 Torr
		T15	50 Torr
		T21	100 Torr
		T22	200 Torr
		T23	300 Torr
		T25	500 Torr
		T31	1000 Torr
		PX1*	13.33 Pa (100 mTorr)
		PX2	33.32 Pa (250 mTorr)
		PX5	66.65 Pa (500 mTorr)
		P01	133.3 Pa (1 Torr)
		P02	266.6 Pa (2 Torr)
		P05	666.6 Pa (5 Torr)
		P11	1.333 kPa (10 Torr)
		P12	2.666 kPa (20 Torr)
		P21	13.33 kPa (100 Torr)
		P31	133.3 kPa (1000 Torr)
IV.	Electrical Connector	1	9 Pin Male Sub D
		2	15 Pin Male Sub D
		3	DeviceNet with 9-Pin Female Sub D, Default Configuration, Real Data
		4	15-Pin D Sub Connector with 2 Process Relays and a Temperature in Control Relay
		5	15-Pin D Sub Connector with 1 Process Relay, 1 Temperature in Control Relay, and an Overheat Indicator Relay
V.	Fitting	0	0.5" OD Tube Stub (No Fitting)
		1	KF 10 Flange
		2	KF 16 Flange
		3	KF 25 Flange
		4	8 VCR (1/2") Female
		5	Mini CF
		N	4 VCR (1/4") Female
VI.	Calibration	V	Vertical
VII.	Compliance	R	RoHS Compliant

Include Option Code "R" in the CMX Part Number field in order to receive RoHS Compliant devices.
Option "R" is not available for 9-pin or DeviceNet Connector options.

Sample Model Code

I	II	III	IV	V	VI	VII	
CMX	1	M11	2	1	V	R	

— Required for RoHS Devices

* Availablity depends on temperature selected.

Service and Support

Brooks is committed to assuring all of our customers receive the ideal flow solution for their application, along with outstanding service and support to back it up. We operate first class repair facilities located around the world to provide rapid response and support. Each location utilizes primary standard calibration equipment to ensure accuracy and reliability for repairs and recalibration and is certified by our local Weights and Measures Authorities and traceable to the relevant International Standards.

Visit www.BrooksInstrument.com to locate the service location nearest to you.

START-UP SERVICE AND IN-SITU CALIBRATION

Brooks Instrument can provide start-up service prior to operation when required. For some process applications, where ISO-9001 Quality Certification is important, it is mandatory to verify and/or (re)calibrate the products periodically. In many cases this service can be provided under in-situ conditions, and the results will be traceable to the relevant international quality standards.

CUSTOMER SEMINARS AND TRAINING

Brooks Instrument can provide customer seminars and dedicated training to engineers, end users, and maintenance persons. Please contact your nearest sales representative for more details. Due to Brooks Instrument's commitment to continuous improvement of our products, all specifications are subject to change without notice.

TRADEMARKS
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DS-VAC-CMX45-CMX100-eng/2019-9

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