



## *CEO™ Multivariable Transmitter Communications Interface Module*

The CEO multivariable transmitter (MVT) communications interface module (CIM) applies proven “smart” technology to simultaneously measure three independent variables for gas or water flows. The MVT provides fast, audit-quality measurement of differential pressure, static pressure, and temperature. It can be used as a gas flow transmitter for orifice and V-Cone® meters and also as a water flow transmitter for V-Cone meters. The MVT can be built into the enclosure system of a Weatherford CEO remote terminal unit (RTU) but is also available as a stand-alone, explosion-proof module.

Microprocessor-based electronics, coupled with sensor characterization, improve temperature and pressure compensation to enhance accuracy. The microprocessor performs one-second measurement averages and flow extension calculations to make readings available to a CEO K-500, CEO D-500, CEO D-2000, or CEO D-3000 RTU, allowing the RTU to produce flow calculations that meet the quality requirements of custody transfer. The RS-485 multi-drop serial communications interface allows up to four CEO MVTs to communicate with a single RTU.



Multivariable Transmitter CIM

### *Applications*

- The MVT is used as a gas flow transmitter for orifice and V-Cone meters.
- It also can be used as a water flow transmitter for V-Cone meters.
- The MVT’s accuracy and stability make it suitable for use in harsh environments where high-quality measurements are needed for accurate reporting. It can be used in situations where electromagnetic interference or radio frequency noise may be a problem, such as around compressor ignition systems. Explosion-proof rating of the stand-alone MVT is for Class 1, Division 1 hazardous areas.

V-Cone is a trademark of McCrometer, Inc.



## *CEO™ Multivariable Transmitter Communications Interface Module*

### *Features, Advantages and Benefits*

- Microprocessor-based electronics simultaneously measure differential pressure, static pressure, and temperature of gas and water flows. Used in both orifice and V-Cone flow transmitters, it is a multi-functional device that replaces up to three transmitters in a single unit, minimizing training requirements and capital expenditure.
- The 4-wire, 100-ohm platinum resistance temperature detector (RTD) interface provides accurate gas temperature measurement for more accurate overall gas flow measurement.
- The transmitter is designed for ultra-low power usage, using a smaller battery and solar panel to reduce system costs.
- The industry-standard RS-485 multi-drop serial communications interface is widely applied and supported in the field. With a single four-wire connection, the RTU can communicate with multiple devices for up to 5,000 ft (1,524 m). This capability reduces wiring requirements and simplifies hook-up.
- The MVT sensor technology has been widely proven throughout the industry to provide accurate pressure and temperature compensation, resulting in high-quality measurements that can withstand the scrutiny of an audit.
- Stability and accuracy make the MVT dependable in harsh environments. The MVT requires less frequent calibration, which reduces maintenance costs.

### *Supporting RTUs*

- CEO K-500
- CEO D-500
- CEO D-2000
- CEO D-3000



Enclosure Mount

- CEO K-500
- CEO D-500
- CEO D-2000



Remote Mount

- CEO K-500
- CEO D-2000
- CEO D-3000



# CEO™ Multivariable Transmitter Communications Interface Module

## Specifications

### Orifice or V-Cone Measurement

	High-Accuracy Model	Standard-Accuracy Model
Reference accuracy for differential and static pressure (DP and SP)	±0.075% of calibrated span	±0.25% of calibrated span
<b>Differential Pressure Measurement</b>		
Range	0 to 400 in. H <sub>2</sub> O (0 to 10,160 mm H <sub>2</sub> O), (250 mbar)	
Turndown ratio	400 to 1	
Minimum span	0 to 1 in. H <sub>2</sub> O	
Zero temperature effect per 50°F (28°C)	±0.1% of calibrated span	±0.3% of calibrated span
Combined zero + span temperature effect per 50°F (28°C)	±0.225% of calibrated span	±0.6% of calibrated span
Zero static pressure effect per 1,000 psi (70 bar)	±0.24% of calibrated span	±0.3% of calibrated span
Combined zero + SP effect per 1,000 psi (70 bar)	±1.04% of calibrated span	±1.0% of calibrated span
<b>Static Pressure Measurement</b>		
SP available ranges	0 to 750 psia (5.171 MPa), absolute	0 to 1,500 psia (10.342 MPa), absolute
	0 to 1,500 psia (10.342 MPa), absolute	
	0 to 4,500 psig (31.026 MPa), gauge	
Zero temperature effect per 50°F (28°C)	±0.1% of calibrated span	±0.9% of calibrated span
Combined zero + span temperature effect per 50°F (28°C)	±0.225% of calibrated span	±0.9% of calibrated span
Stability	±0.016% of upper range limit per year	±0.1% of upper range limit per year
<b>Temperature Measurement</b>		
Accuracy	±1.0°F (±2.12°C)	
Range	-50 to 250°F (-46 to 121°C)	
Sensor type	RTD, 100-ohm platinum (α = 0.00385), 4-wire; conforms to IEC 751 Class B	



## CEO™ Multivariable Transmitter Communications Interface Module

### Specifications

#### Orifice or V-Cone Measurement

Power Specifications	
Voltage range	10.0 to 18 VDC
Power consumption	Less than 4 mA at 13.5 VDC
Physical Specifications	
Overpressure limit	3,000 psig (20.68 MPa) for MVT ranges 750 and 1,500 psia (5.171 and 10.342 Mpa)
	4,500 psig (31.03 MPa) for MVT range 4,500 psig (31.03 MPa)
Process barrier diaphragm	316L stainless steel
Process head material	Zinc-plated carbon steel OR 316 stainless steel
Fill fluid	Silicone oil
Electronic housing*	Low copper-aluminum; meets NEMA 4 and NEMA 7
Hookup and Mounting	
Process connection	1/4-in. NPT female or standard instrument manifold flange connection
Conduit	1/2-in. female; one opening for RTD, one opening for communications
Mounting bracket	Straight or angle bracket available
Communications	
Interface	RS-485, multidrop, 4-wire (2-wire data, 2-wire power)
Format	9,600 baud, 8 data bits, no parity, 1 stop bit
Protocol	Kimray CIM Protocol (ASCII)
Addressable	Address range 1 to 255**
RS-485 termination resistor	Jumper selectable
Environment	
Temperature range	-40° to +158°F (-40° to +70°C)
Humidity	0 to 95% relative humidity, non-condensing
Approvals	
Hazardous area*	CSA (file 179619), Class 1 Div 1, Groups B, C, and D; T5@TA=70C; Class 2 Groups E, F, and G

\*Stand-alone version only

\*\*1 is factory default.