

MVS205 Multi-Variable Sensor

The MVS205 Multi-Variable Sensor (MVS205R) provides static pressure, differential pressure, and process temperature inputs to a ROC800-Series, FloBoss™ 107, ROC300-Series, FloBoss 407, or FloBoss 500-Series Flow Manager. The inputs from an MVS205 transmitter are used for differential pressure type calculations. The MVS205 typically operates as a remote device that communicates via a serial format.

Variables

Functionally, the MVS205 is a digital transmitter that measures three flow-related variables simultaneously: differential pressure, static pressure, and temperature. These variables are continuously available to the FloBoss or ROC unit that polls the MVS205.

An external three or four-wire Resistance Temperature Detector (RTD) senses the process temperature. **The RTD sensor connects directly to the interface circuit board in the electronics head.** Connection requires user-supplied RTD field wiring. For more information, refer to the RTD Wiring on page 3.

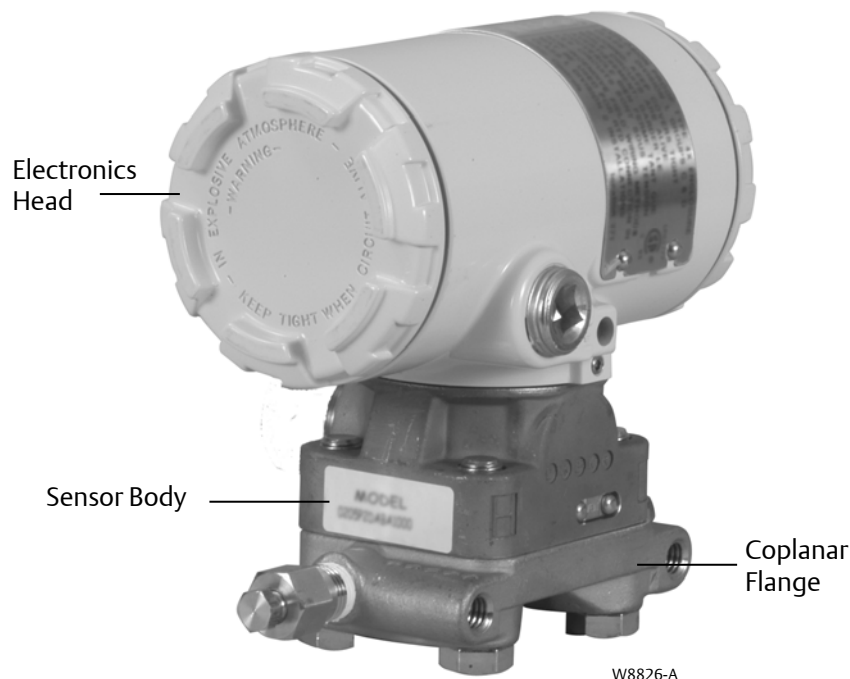
Transducer and Interface Circuit

The MVS205 contains a transducer and an interface circuit. The transducer, contained in the sensor body, uses capacitance-cell technology to sense differential pressure and piezo-resistive technology to sense the static (absolute or gauge) pressure.

The transducer electronics convert the pressure variables directly into a digital format, allowing accurate correction and compensation. A microprocessor linearizes and corrects the raw pressure signals (from the sensor) using characterization data stored in non-volatile memory.

The interface circuit, contained in the electronics head, converts the raw temperature from an RTD into digital format. The interface circuit also allows the MVS205 to communicate the digital pressure signals to a ROC or FloBoss using a serial EIA-485 (RS-485) connection. An explosion-proof electronics head encloses the interface circuit board.

Note: The MVS205 has a 10-pin terminal block that allows case isolation. For more information, refer to *MVS205 Case Isolation Installation Sheet* (part D301641X012).



MVS205 Multi-Variable Sensor

Accuracy

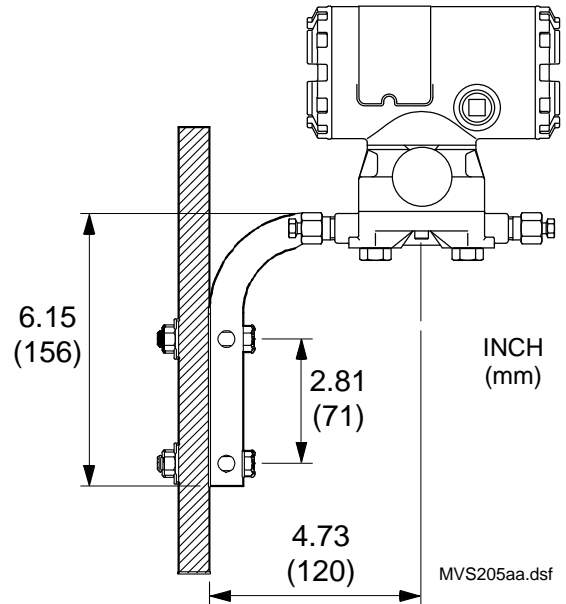
Two versions of the pressure transducer used in the MVS205 transmitter are available:

- 205P with reference accuracy of 0.075% of the full span.
- 205E with reference accuracy of 0.10% of the full span.

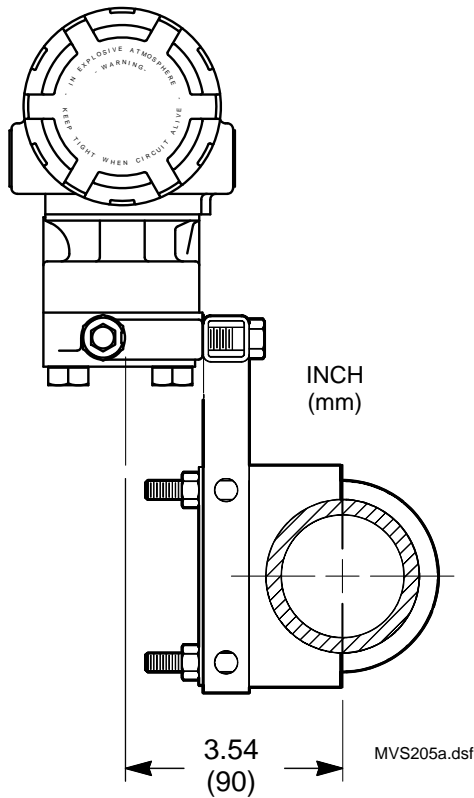
Mounting

Attached to the bottom of the sensor body is a Coplanar™ flange. This flange, which provides drain and vent valves, allows the MVS205 to mount on a pipestand, on a wall or panel, or on an integral orifice assembly or manifold valve.

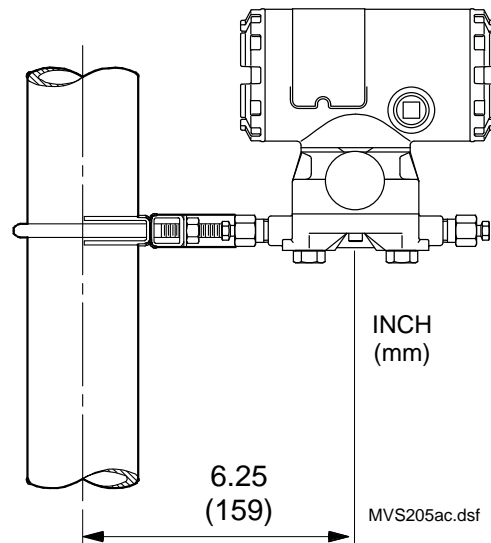
Note: CE marked assemblies come with cover clamps installed on both ends of the MVS205 to comply with ATEX and IECEx.



MVS205 Panel Mounting

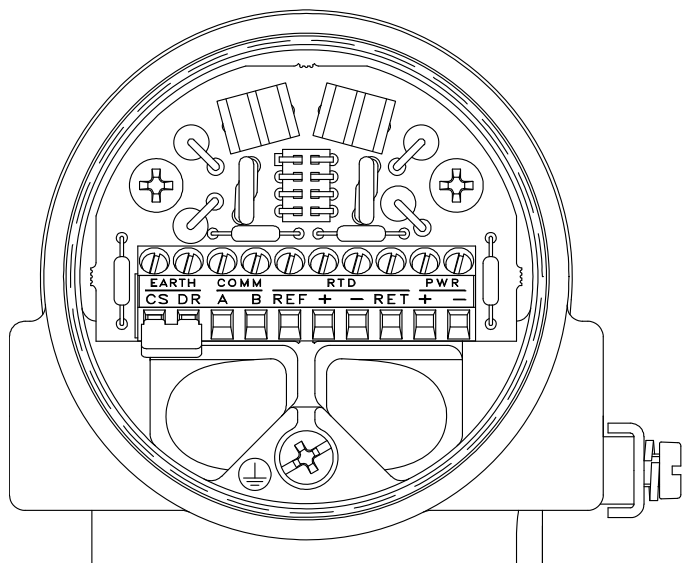


MVS205 Pipe Mounting (Horizontal and Vertical Pipe)



MVS205 Multi-Variable Sensor

Terminations



D0C0957A

Terminal	Description
EARTH CS ¹	Earth Case
EARTH DR ¹	Earth Drain
COMM A	RX / TX +
COMM B	RX / TX -
RTD REF	RTD REF
RTD +	RTD +
RTD -	RTD -
RTD RET	RTD RET
PWR +	Power -
PWR -	Power +

1. See part D301641X012 for information on isolating the case from power.

RTD Wiring

To connect a remote MVS205 to an RTD sensor assembly, install the sensor in the pipeline and connect a RTD cable to the terminations on the interface board inside the remote MVS sensor head. An armored cable requires no conduit to be used in a Class I, Division 2 hazardous non-incendiary area. In a Class I, Division 1 area, unarmored cable may be used if installed in conduit that includes seals per hazardous installation practices.

Note: When installing an RTD in the field, any length/gauge combination of wire that adds measurable resistance to the loop will cause a change in resistance that will affect the RTD readings. It is recommended that end users calibrate or bias out the excess resistance. To do this, perform a standard calibration at a process level (calibrate the RTD input using the desired length of wire). Calibrating the input and not compensating for the excess resistance caused by the length of the run will result in inaccurate readings.

2-Wire	RTD REF	Jumper to RTD+
	RTD +	Red with Jumper to RTD REF
	RTD -	White
	RTD RET	None
3-Wire	RTD REF	Red
	RTD +	Red
	RTD -	White
	RTD RET	None
4-Wire	RTD REF	Red
	RTD +	Red
	RTD -	White with Jumper to RTD RET
	RTD RET	White with Jumper to RTD -

Differential Pressure Input

Range ¹	0 to 62.2 kPa (0 to 250 InH ₂ O) 0 to 248.8 kPa (0 to 1000 InH ₂ O)		
Reference Accuracy	205E (10:1 rangeability allowed)	Turndowns from 1:1 to 10:1 of URL	±0.10% of span
		Turndowns from 10:1 to 100:1 of URL	Not allowed
	205P (100:1 rangeability allowed)	Turndowns from 1:1 to 10:1 of URL	±0.075% of span
		Turndowns from 10:1 to 100:1 of URL	±[0.025 + 0.005(URL/Span)]% of span
Stability	±0.125% of URL for five years, with up to ±50°F (28°C) ambient temperature changes and up to 1000 psi (68,9 bar) line pressure		
Ambient Temperature Effect per 50°F (28°C)	Spans from 1:1 to 30:1	±(0.025% URL + 0.125% of span)	
	Spans from 30:1 to 100:1	±(0.035% URL + 0.175% of span)	
Static Pressure Effects	Zero error	±0.05% of URL per 1000 psi (68,9 bar)	
	Span error	±0.20% of DP Reading per 1000 psi (68,9 bar)	
Over-Pressure Limit	3,626 psi (250 bar) applied on either or both sides without damage to the sensor		
Burst Pressure Limit	10,065 psi (694 bar)		

1. Consult factory for special ranges and materials which may be available. For example, 0 to 6.22 kPa (0 to 25 InH₂O) at ±0.10% reference accuracy.



Static Pressure Input



Range	Either Absolute or Gauge: 0 to 5516 kPa (0 to 800 psia/psig) 0 to 25,000 kPa (0 to 3626 psia/psig)		
Reference Accuracy	205E (10:1 rangeability allowed)	Turndowns from 1:1 to 10:1 of URL	±0.10% of span
		Turndowns from 10:1 to 100:1 of URL	Not allowed
	205P (100:1 rangeability allowed)	Turndowns from 1:1 to 10:1 of URL	±0.075% of span
		Turndowns from 10:1 to 100:1 of URL	±[0.03 + 0.0075(URL/Span)] % of span
Stability	±0.125% of URL for five years, with up to ±50 °F (28 °C) ambient temperature changes		

Ambient Temperature Effect per 50°F (28°C)	Spans from 1:1 to 30:1	$\pm(0.05\% \text{ URL} + 0.125\% \text{ of span})$
	Spans from 30:1 to 100:1	$\pm(0.06\% \text{ URL} + 0.175\% \text{ of span})$
Over-Pressure Limit	Same as URL	
Process Temperature Input		
Type	For 3- or 4-wire platinum 100-ohm RTD (conforming to IEC 751 Class B), with $\alpha = 0.00385$	
Range	-40 to 400 °C (-40 to 752 °F)	
Reference Accuracy	± 0.28 °C (± 0.5 °F), exclusive of RTD sensor and wiring errors (see Note under Terminations, RTD Wiring). Note: Includes linearity, hysteresis, and repeatability effects.	
Excitation Current	1.24 mA	
Output		
EIA-485 (RS-485)	Asynchronous serial communication using an MVS module-based proprietary communications protocol for up to 1220 m (4000 ft) distance (wired in daisy-chain pattern and properly terminated).	
Power		
Input at 0 to 75°C (32 to 167°F)	8 to 30 Vdc, 200 mW average	
Input at -40 to 0°C (-40 to 32°F)	8.5 to 30 Vdc, 200 mW average	
Isolation	The power input can optionally be isolated from the case, which may be grounded separately. For further information, see <i>MVS205 Case Isolation Installation Sheet</i> (part D301641X012).	
Physical		
Dimensions	147 mm H by 163 mm W by 84 mm D (5.8 in. H by 6.4 in. W by 3.3 in. D)	
Weight	3.0 kg (6.7 lb), including head	
Vibration Effect	Sensor outputs shall not shift more than +0.1% of upper range limit per g from 5 to 2000 Hz in any axis when tested per IEC 770, Section 6.2.14.	
Construction	Standard	Transducer is all stainless-steel construction with silicone fill fluid, 316L diaphragms and glass-filled PTFE o-rings. Electronics head is A360 Aluminum with urethane coating.
	Optional	Transducer includes Hastelloy® C-276 wetted parts (construction is NACE compliant per MR0103 and ISO15156/MR0175), inert fill fluid
Mounting	Pipestand	Mounts on 50 mm (2 in.) pipe with U-bolt and optional flange bracket
	Wall or Panel	Mounts with optional flange bracket, bolted on 71 mm (2.8 in.) centers
Connections	Conduit	Head has two 1/2-inch NPT connections
	Process	1/4-18 NPT on 2-1/8 inch centers (on coplanar flange)
Environmental		
Operating Temperature	-40 to 75 °C (-40 to 167 °F)	
Storage Temperature	-50 to 100 °C (-58 to 212 °F)	

Operating Humidity	0 to 99%, non-condensing	
Process Seals per ANSI/ISA 12.27.01	Meets requirements for a Single Seal device as defined by ANSI/ISA 12.27.01. Installation must adhere to the following process temperature limits.	
Process Temperature (at transmitter isolator flange)	Standard Silicone Fill Sensor	-40 to 100 °C (-40 to 212 °F)
	Inert Fill Sensor	-18 to 85 °C (0 to 185 °F)
<p>Note: Process temperatures above 85 °C (185 °F) require you to lower the product’s maximum ambient temperature rating by a 1.5:1 ratio. To determine the adjusted maximum temperature rating, perform the following calculation: Adjusted max T_{amb} = Product Max T_{amb} - [(Actual Process T_{amb} - 85 °C (185 °F)) * 1.5] Example: Adjusted Max T_{amb} = 75°C - [(95°C - 85°C) * 1.5] = 60°C.</p>		

Approvals

Product Markings for Hazardous Locations	CSA C/US	Class I, Division 1, Groups C and D. Class I, Division 2, Groups A, B, C, and D, T5 (T _{amb} =70 °C [158 °F]), T4 (T _{amb} =75 °C [167 °F]). Type 4X.
	CE Marked	Ex d IIB T5 (T _{amb} =75 °C) Ex tD A21 IP66 T85 °C  II 2 GD. 0081. ATEX Cert. KEMA 04ATEX2182 X IEC Cert. IECEx KEM 07.0055X
	TR CU 012/2011	Certified by NANIO “CCVE” RU C-US.ГБ05.B.01184 valid from 16.06.2015 to 16.06.2020 1Ex d IIB T5X -40C°≤T _a ≤+75C° IP66 
Approval Standards	CSA/UL	CSA C22.2 No. 30 CSA C22.2 No. 213 UL 1203, UL 1604 ANSI/ISA 12.27.01-2003
	EMC	EN 61000-4-2 (2001) EN 61000-4-3 (2002) EN 61000-4-4 (1995) EN 61000-4-5 (2001) EN 61000-4-6 (2003)
	ATEX	EN 60079-0 (2006) EN 60079-1 (2007) EN 61241-0 (2004) EN 61241-1 (2006)
	IECEX	EN 60079-0 (2004 Edition 4) EN 60079-1 (2007-04 Edition 6) EN 61241-0 (2004 Edition 1) EN 61241-1 (2004 Edition 1) EN 60529 (2001)

	Measurement (Industry) Canada	Approved for use with approved flow computers. Approved as MVS205R Series Remote Sensors (Measurement Canada approval #AG-0412).
Miscellaneous Approval Certificates	Canadian Registration to Category 'F' Fittings	CRN 0F7768 Note: Applies to all Canadian provinces and territories.
	Customs Union	 TR CU 004/2011, TR CU 020/2011 Certified by "Technoneftegaz" TC RU C-US.HO03.B.00155 valid from 19.05.2015 to 18.05.2020
	RoHS2	RoHS (2) EU Directive 2011/65/EU: This product may be considered out-of-scope when used for the intended design purpose in a Large Scale Fixed Installation (LSFI). Consult https://www.emerson.com/compliance for up-to-date product information.
	RoHS (China)	

For customer service and technical support, visit www.EmersonProcess.com/Remote/Support.

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