

Micro Motion® Gas Specific Gravity Meters

Gas specific gravity and gas energy meter

Precision gas specific gravity measurement

- Direct, fast response gas specific gravity, molecular weight, relative and base density measurement
- Gas specific gravity and molecular weight measurement accuracy up to $\pm 0.1\%$ reading
- Multi-variable outputs including Hydrogen purity, Calorific Value/BTU and Wobbe Index

Superior multi-variable I/O, meter health, and application capabilities

- Hazardous-area approved, head-mounted transmitter that supports local configuration and display
- Internal diagnostics for fast verification of meter health and installation
- Application-specific factory configurations ensure fit-for-purpose operation

Installation flexibility and compatibility

- Unaffected by process or compositional variations using proven Ni-Span-C vibrating cylinder technology
- Supports multiple protocols for connection to DCS, PLC, and flow computers
- Wide range of process conditions accommodated by an integrated sample conditioning system option



Compact Density Meter	Fork Density Meter	Gas Density Meter	Specific Gravity Meter	Fork Viscosity Meter	Heavy Fuel Viscosity Meter
Peak performance precision density meter	Direct insertion density meter	Fiscal gas density meter	Gas specific gravity meter	High performance industrial viscosity meter	High performance marine and power HFO viscosity meter

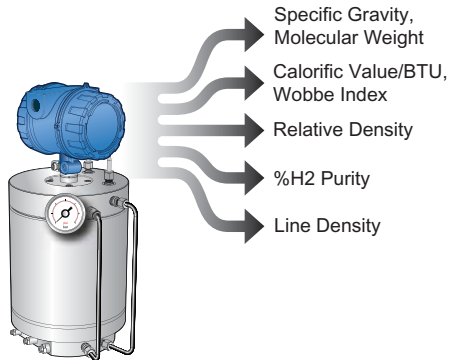


Micro Motion® Gas Specific Gravity Meters

Micro Motion® gas specific gravity meters use proven Ni-Span-C vibrating cylinder technology to provide fast-response, precision gas specific gravity measurement over a wide operating range. These meters can be calibrated to directly measure specific gravity, molecular weight, relative density, and base density; and, can be configured for Hydrogen purity, Calorific Value/BTU and Wobbe Index. No additional calculation using temperature and pressure compensation is required. The gas specific gravity meter can be used in applications such as natural gas custody transfer, fuel gas combustion control and Hydrogen purity monitoring.

Application configurations

Allows you to preselect an application-specific configuration for your meter from a wide range of options.



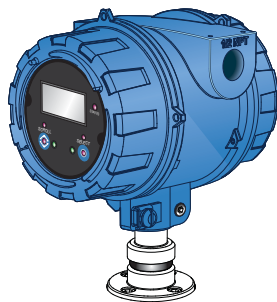
Installation capabilities

Modular design with an optional sample conditioning system enhances installation flexibility.



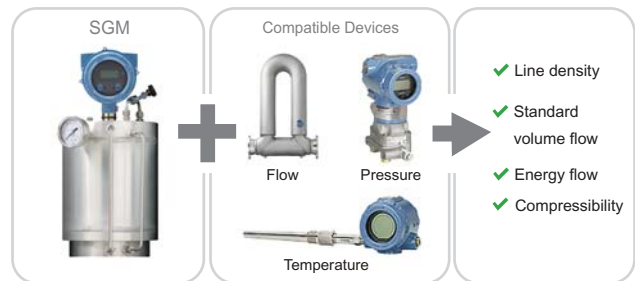
Integral transmitter

Supports Time Period Signal (TPS), Analog (4-20 mA), HART, WirelessHART®, and Modbus RS-485 communications.



Interconnectivity

Integral HART I/O allows direct input of external temperature, pressure, and flow measurements for enhanced measurements, such as energy flow and compressibility.



Meter diagnostics

Ensure measurement health through known density verification (KDV) and other meter and installation diagnostic capabilities.

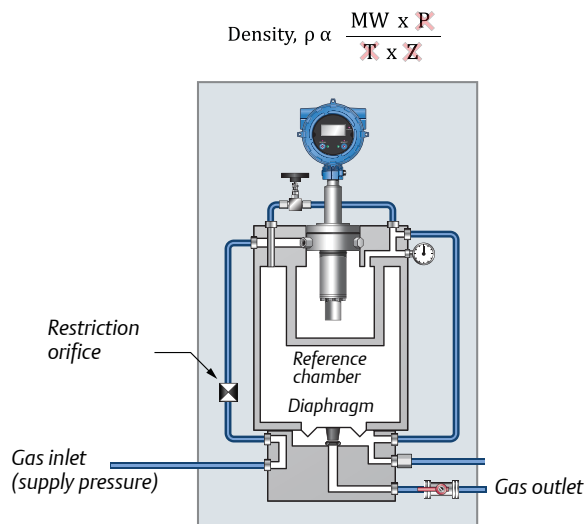


ProLink® III software

An easy-to-use interface that allows you to view key process variables and diagnostics data.

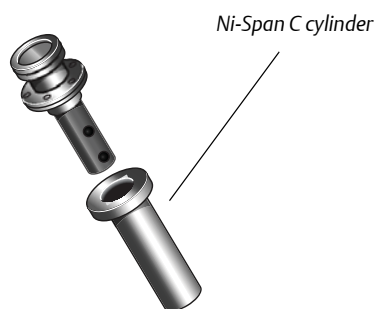


Operating principle



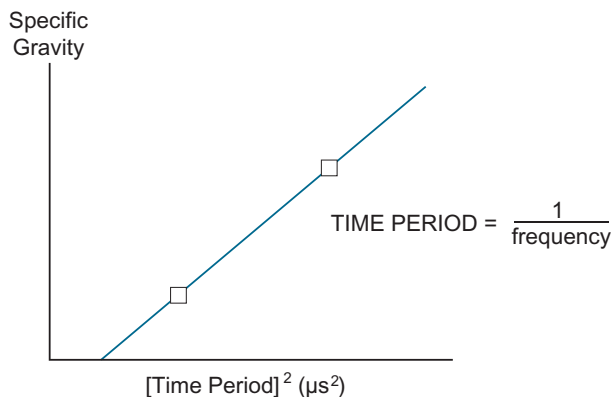
Sample gas conditioning

- The gas to be measured is conditioned by an integral restriction orifice, reference chamber and pressure control diaphragm.
- After conditioning, the density of this gas is insensitive to changes in pressure (P), temperature (T), and compressibility (Z).
- The density of the gas is now only sensitive to changes in molecular weight.



Cylinder vibration

- A Ni-Span C cylinder is mounted inside a pressure retaining assembly containing the conditioned gas.
- The Ni-Span C cylinder is vibrated electro-magnetically at its natural frequency.
- Changes in sample gas composition and, thus density, which is now proportional to molecular weight, cause the natural frequency of the cylinder to change.



Customer cylinder calibration

- Micro Motion® transmitters accurately measure time period.
- Measured time periods are converted into molecular weight or specific gravity readings using meter calibration coefficients.
- Up to three calibration points for gas blending and Hydrogen purity provided.

Performance specifications

Specific gravity measurement

Specification	Value	
Specific gravity range	0.1 to 3.0 typical	
Process gas	Dry, clean, non-corrosive gas	
Accuracy	Up to $\pm 0.1\%$ of reading	
Repeatability	$\pm 0.02\%$ of reading	
Reference chamber pressure	1.2 to 7.0 bara at 20 °C	17 to 101 psia at 68 °F
Supply pressure	<ul style="list-style-type: none"> ■ Minimum: 1.4 bara (20 psia) ■ Maximum: 12 bara (174 psia) 	
Gas flow rate	0.2 to 60 cm ³ /sec	0.012 to 3.66 in ³ /sec
Response time	Less than 5 seconds upon entry into device	
Calibration	Using gas samples with known specific gravity	

Temperature measurement

Specification	Value	
Temperature range ⁽¹⁾	-18 °C to +50 °C	-0 °F to +122 °F
Temperature coefficient	0.01% per °C	0.005% per °F

(1) Or, as limited by the dew point of the gas.

Transmitter specifications

Available transmitter versions

Application	Transmitter version ⁽¹⁾	Output channels		
		A	B	C
<ul style="list-style-type: none"> ■ General purpose measurement ■ DCS/PLC connection 	Analog	4–20 mA + HART	4–20 mA	Modbus/RS-485
<ul style="list-style-type: none"> ■ General purpose measurement with output switch 	Discrete	4–20 mA + HART	Discrete output	Modbus/RS-485
<ul style="list-style-type: none"> ■ Fiscal/Custody Transfer ■ Flow Computer connection 	Time Period Signal (TPS)	4–20 mA + HART	Time Period Signal (TPS)	Modbus/RS-485
	Fixed	4–20 mA (temperature)	Time period signal (TPS)	Disabled

(1) For more information on the transmitter outputs and ordering codes, see the product ordering information.

Local display

Specification	Value
Physical	<ul style="list-style-type: none"> ■ Segmented two-line LCD screen. ■ Can be rotated on transmitter, in 90-degree increments, for ease of viewing. ■ Suitable for hazardous area operation. ■ Optical switch controls for hazardous area configuration and display. ■ Glass lens. ■ Three-color LED indicates meter and alert status.
Functions	<ul style="list-style-type: none"> ■ View process variables. ■ View and acknowledge alerts. ■ Configure mA and RS-485 outputs. ■ Supports Known Density Verification (KDV). ■ Supports multiple languages.

Process measurement variables

Type	Description
Standard	<ul style="list-style-type: none"> ■ Specific gravity ■ Molecular weight ■ Relative density ■ Base density ■ Temperature
Derived	<p>The derived output variables vary, depending on the application configuration of the meter.</p> <ul style="list-style-type: none"> ■ Wobbe index ■ Calorific Value/BTU ■ % Hydrogen in air ■ % Hydrogen in CO₂ ■ % Air in CO₂ ■ % Nitrogen in air
Derived (when external device connected)	<ul style="list-style-type: none"> ■ Line density ■ Compressibility ■ Standard volume flow ■ Energy flow

Additional communication options

The following communications accessories are purchased separately from the meter.

Type	Description
WirelessHART [®]	Wireless HART is available via the THUM adapter
HART [®] Tri-Loop	Three additional 4–20 mA outputs are available via connection to a HART Tri-Loop

Hazardous area approvals

Ambient and process temperature limits are defined by temperature graphs for each meter and electronics interface option. Detailed approval specifications, including temperature graphs for all meter configurations, can be found at the Micro Motion web site (at www.micromotion.com).

Type	Description
ATEX	With display: <ul style="list-style-type: none"> ■ II 2G Ex ia IIC T4 Gb (–18 °C to +65 °C) ■ II 2G c T4 Without display: <ul style="list-style-type: none"> ■ II 2G Ex ia IIC T6 Gb (–18 °C to +65 °C) ■ II 2G c T6
CSA C-US	<ul style="list-style-type: none"> ■ Class I, Division I, Groups A, B, C & D ■ Class II, Division I, Groups E, F, & G
IECEX	With display: <ul style="list-style-type: none"> ■ Ex ia IIC T4 Ga (–18 °C to +65 °C) Without display: <ul style="list-style-type: none"> ■ Ex ia IIC T6 Ga (–18 °C to +65 °C)

Environmental specifications

Type	Rating
Electromagnetic compatibility	All versions conform to the latest international standards for EMC, and are compliant with EN 61326
Ingress protection rating	IP66/67, NEMA4

Physical specifications

Materials of construction

Pressure-retaining wetted parts	
Interior liner	416 stainless steel
Pressure housing	316L stainless steel
Reference chamber	Aluminum alloy
Non-pressure-retaining wetted parts	
Cylinder	Ni-Span C
Spool body	Stycast catalyst 11, Invar/Radiometal
Non-wetted part materials	
Transmitter housing	Polyurethane-painted aluminum

Weight

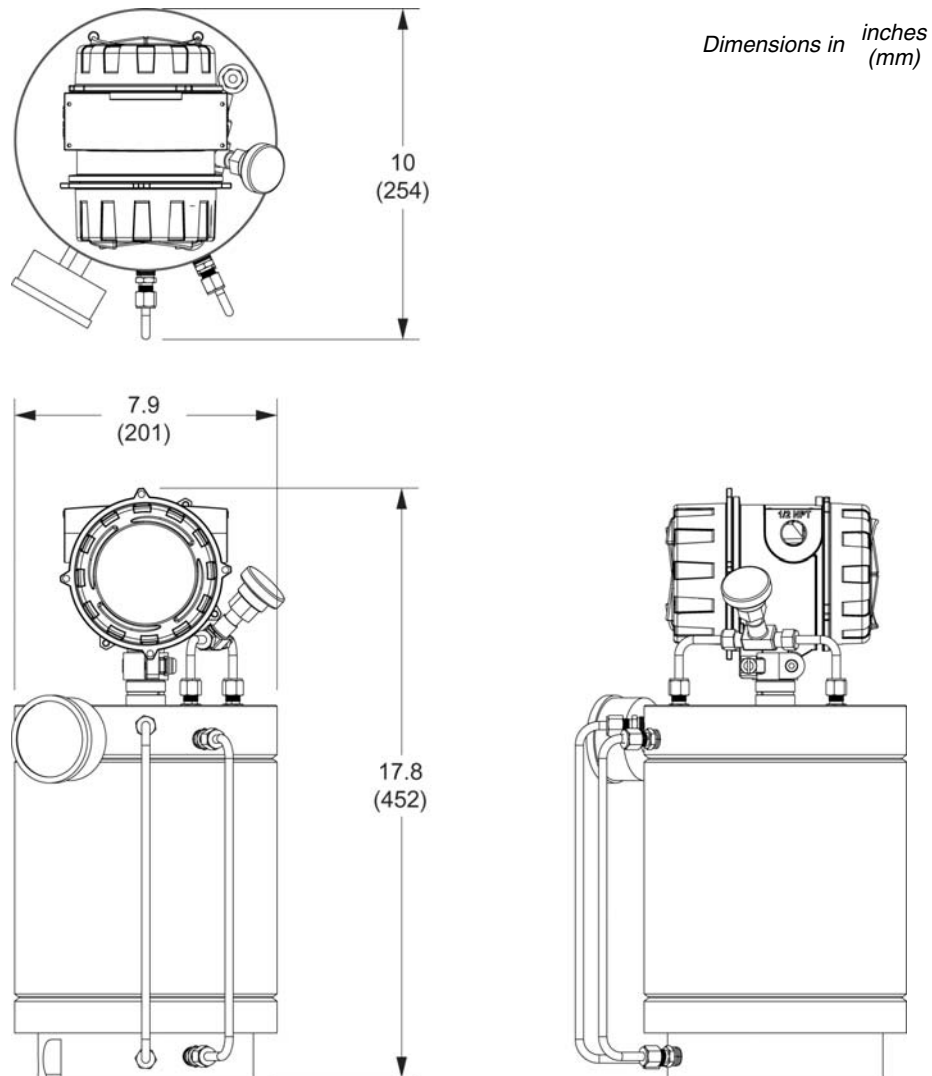
Specification	Value	
Specific gravity meter: without enclosure	7 kg	15.4 lbs
Specific gravity meter: with small enclosure	20 kg	44 lbs
Specific gravity meter: with large enclosure	31 kg	68 lbs

Dimensions

These dimensional drawings are intended to provide a basic guideline for sizing and planning. Complete and detailed dimensional drawings can be found through the product drawings link in our online store (www.micromotion.com/onlinestore).

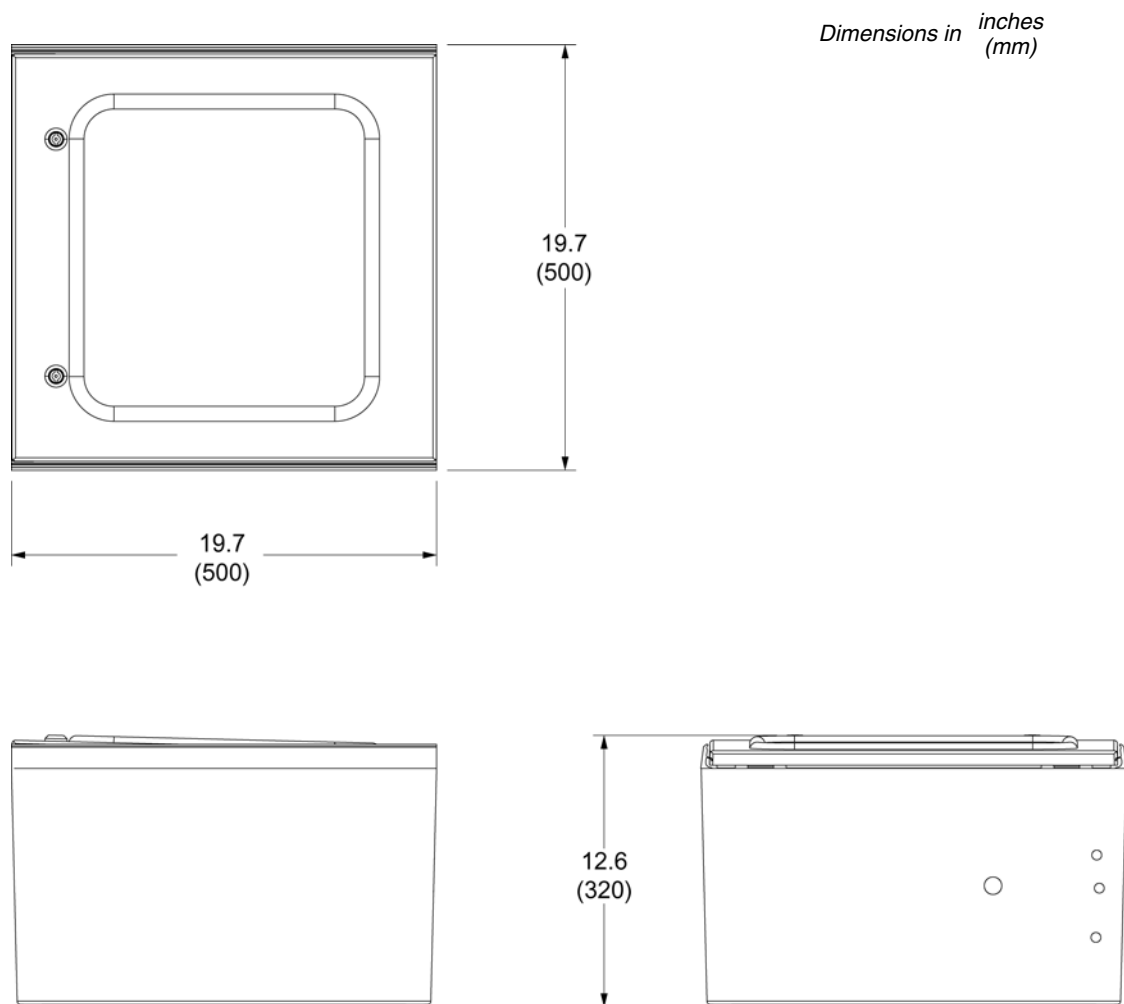
Gas specific gravity meter dimensions

Figure 1: Gas specific gravity meter dimensions



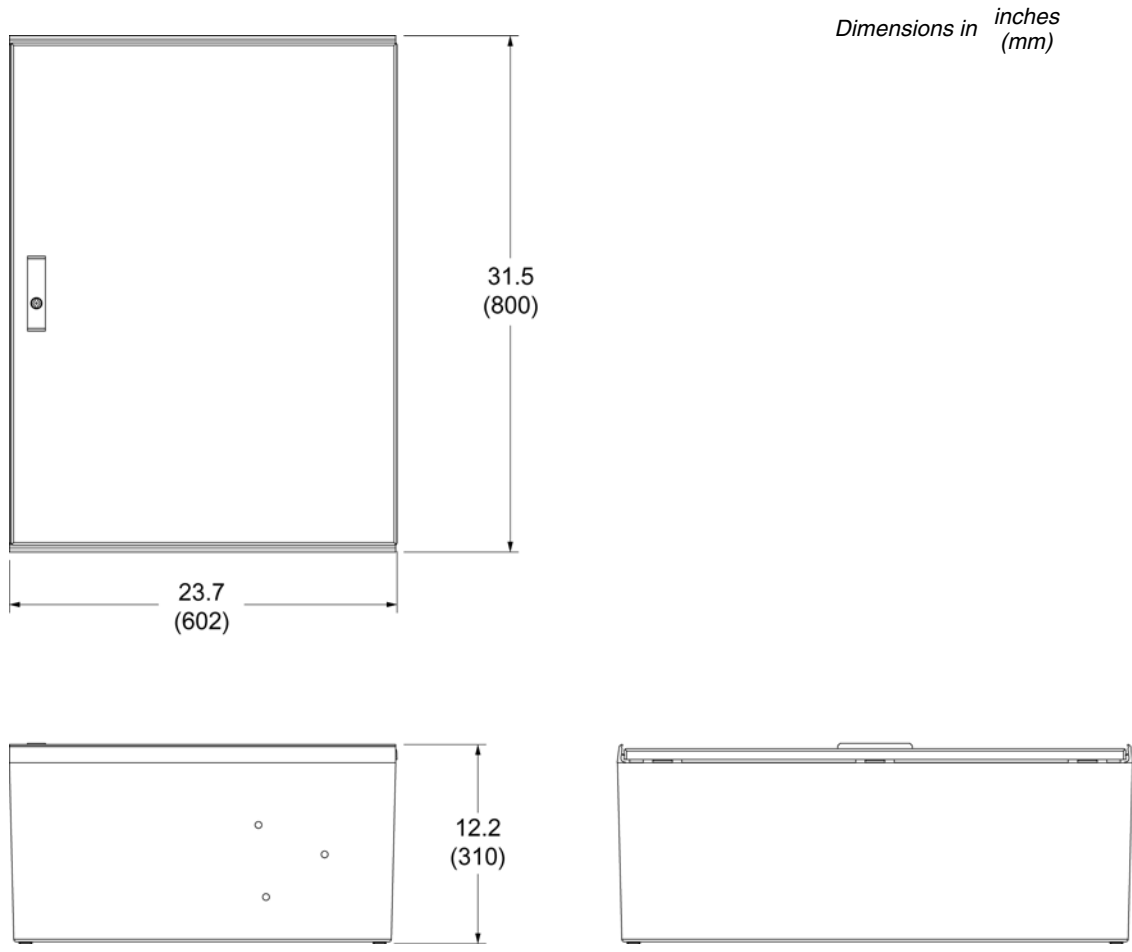
Small enclosure dimensions

Figure 2: Small enclosure dimensions for gas specific gravity meter



Large enclosure dimensions

Figure 3: Large enclosure dimensions for gas specific gravity meter



Additional options for installation

SGM sample conditioning system

Micro Motion provides an option to order the meter installed and configured in a sample conditioning system.

The sample conditioning system preconditions the measurement gas from pipeline pressures and temperatures to those required by the meter.

This option reduces installation complexity and simplifies commissioning. Contact your local sales representative or Micro Motion Customer Support at flow.support@emerson.com for more information.



Required barriers and isolators for hazardous area installations

When installing the meter in a hazardous area, safety barriers and galvanic isolators must be installed between the meter and the signal processing equipment. Micro Motion provides the required barriers and isolators for purchase according to the transmitter output type.

Safety barrier/galvanic isolator kits ordering information

The following kits are available for purchase through Micro Motion. For more information on ordering these barriers, contact your local sales representative or Micro Motion Customer Support at flow.support@emerson.com.

Model code	Description	Barrier/Isolator	Output	Notes
BARRIERSETAA	Barrier set, including barriers for all transmitter versions (CH B: mA, TPS, or DO)	MTL7728P+	mA + HART	
		MTL7728P+	mA / TPS / DO	
		MTL7761AC	RS-485	
		MTL7728P+	Power	
ISOLATORSETBB	Isolator set, including isolators for Analog version (CH B: mA)	MTL5541	mA + HART	RS-485 barrier is not isolated.
		MTL5541	mA	
		MTL7761AC	RS-485	
		MTL5523	Power	
ISOLATORSETCC	Isolator set, including isolators for Time Period Signal (TPS)/ Discrete versions (CH B: TPS or DO)	MTL5541	mA + HART	RS-485 barrier is not isolated.
		MTL5532	TPS/DO	
		MTL7761AC	RS-485	
		MTL5523	Power	

Ordering information

Model	Description
SGM	Gas specific gravity meter
Code	Enclosure type ⁽¹⁾
1	Insulating enclosure (500 mm x 500 mm x 320 mm)
2	Insulating enclosure (602 mm x 800 mm x 310 mm)
3	No enclosure
Code	Future Option 1
A	Reserved for future use
Code	Future Option 2
A	Reserved for future use
Code	Future Option 3
A	Reserved for future use
Code	Future Option 4
A	Reserved for future use
Code	Transmitter Outputs Option
B	Integral transmitter, Channel B = Time Period Signal, Channel A = mA + HART, Channel C = Modbus/RS-485
C	Integral transmitter, Channel B = mA output, Channel A = mA + HART, Channel C = Modbus/RS-485
D	Integral transmitter, Channel B = Discrete output, Channel A = mA + HART, Channel C = Modbus/RS-485
E	Integral transmitter, fixed outputs, Channel A = mA (Temperature), Channel B = Time Period Signal, Channel C = Inactive
Code	Display Option
2 ⁽²⁾	Integral-mount two-line display (non-backlit)
3	No display
Code	Approvals
Z	ATEX: Intrinsically safe (Zone 1)
B	CSA (US and Canada): Intrinsically safe Class 1 Div. 1 Groups A, B, C, D
E	IECEx: Intrinsically safe (Zone 0)
Code	Application Configuration ⁽³⁾
Available with all Transmitter Outputs codes	
7	Process temperature (4 mA = -20 °C, 20 mA = 50 °C)
X ⁽⁴⁾	Special (ETO) analog output configuration (customer data required)
Available with Transmitter Outputs codes C & D	
0	No application configuration
1	Specific gravity (4 mA = 0, 20 mA = 1)
2	Specific gravity (4 mA = 0.5, 20 mA = 1)
3	Specific gravity (4 mA = 0.5, 20 mA = 1.5)
4	Relative Density (4 mA = 0, 20 mA = 1)
5	Relative Density (4 mA = 0.5, 20 mA = 1.5)
6	Molecular Weight (4 mA = 15 g/mol, 20 mA = 20 g/mol)
A	Molecular Weight (4 mA = 0 g/mol, 20 mA = 5 g/mol)
B	Molecular Weight (4 mA = 0 g/mol, 20 mA = 20 g/mol)
C	Calorific Value (4 mA = 25 MJ/m ³ , 20 mA = 35 MJ/m ³)
D	Calorific Value (4 mA = 30 MJ/m ³ , 20 mA = 40 MJ/m ³)
E	Calorific Value (4 mA = 35 MJ/m ³ , 20 mA = 45 MJ/m ³)

Code	Application configuration ⁽³⁾ (continued)
Available with Transmitter Outputs codes C & D	
F	Wobbe Index (4 mA = 35 MJ/m ³ , 20 mA = 45 MJ/m ³)
G	Wobbe Index (4 mA = 40 MJ/m ³ , 20 mA = 50 MJ/m ³)
H	Wobbe Index (4 mA = 45 MJ/m ³ , 20 mA = 55 MJ/m ³)
J	% Hydrogen concentration in Air (4 mA = 85%, 20 mA = 100%) – (requires pure Hydrogen and pure dry Air gas calibration)
K	% Hydrogen concentration in CO ₂ (4 mA = 0%, 20 mA = 100%) – (requires pure Hydrogen and pure CO ₂ gas calibration)
L	% Air concentration in CO ₂ (4 mA = 0%, 20 mA = 100%) – (requires pure dry Air and pure CO ₂ gas calibration)
M	% Nitrogen concentration in Air (4 mA = 0%, 20 mA = 100%) – (requires pure Nitrogen and pure dry Air gas calibration)
N	Base Density (4 mA = 0 kg/m ³ , 20 mA = 1 kg/m ³)
P	Base Density (4 mA = 0.5 kg/m ³ , 20 mA = 1.5 kg/m ³)
Code	Language (Manual and Software)
Transmitter display language English	
E	English installation manual and English configuration manual
I	Italian installation manual and English configuration manual
M	Chinese installation manual and English configuration manual
R	Russian installation manual and English configuration manual
Transmitter display language French	
F	French installation manual and English configuration manual
Transmitter display language German	
G	German installation manual and English configuration manual
Transmitter display language Spanish	
S	Spanish installation manual and English configuration manual
Code	Future Option 5
Z	Reserved for future use
Code	Conduit Connections
Z	Standard 1/2-inch NPT fittings (no adapters)
B	M20 stainless steel adapters
Code	Factory Options
Z	Standard product
X ⁽⁴⁾	Special (ETO) product
Code	Special Tests and Certificates, Tests, Calibrations and Services (Optional) ⁽⁵⁾
Pressure Testing	
HT	Hydrostatic Test Certificate 3.1 (Pressure retaining parts only)

(1) Safety approval for the SGM model does not include insulating enclosure; therefore, hazardous area labeling only applies to the enclosed instrument. However, the published performance specification of the meter is with the instrument fitted inside an insulated enclosure.

(2) Not available with the Transmitter Outputs code E

(3) When Transmitter Outputs model code is B, C or D, the chosen Application configuration code low & high limits are also programmed as the Channel A mA output 4 mA and 20 mA points.

(4) Requires Factory Option X.

(5) Multiple test or certificate options may be selected.

Code	Special Tests and Certificates, Tests, Calibrations and Services (Optional) ⁽¹⁾ (continued)
Sensor Completion Options	
WG	Witness General
SP	Special Packaging
Instrument Tagging	
TG	Instrument Tagging - customer information required (max. 24 characters)

(1) Multiple test or certificate options may be selected.



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