Product Data Sheet
PS-001483, Rev C
January 2014

Micro Motion® Gas Density Meters

Fiscal gas density meter

Accredited, traceable density measurement

- Fast-response, direct gas density measurement that is compliant with AGA 3 and ISO 5167
- Accuracy up to ±0.1% of reading over a range of 1–400 kg/m^3
- ISO 17025-compliant density laboratory ensures calibration integrity

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 status
- Application-specific factory configurations ensure fit-for-purpose operation

Installation flexibility and compatibility

- Unaffected by process or gas composition variations using proven Ni-Span-C vibrating cylinder technology
- Supports multiple protocols for connection to DCS, PLC, and flow computers
- Full backwards compatibility for Micro Motion 7812 gas density meters

Micro Motion®

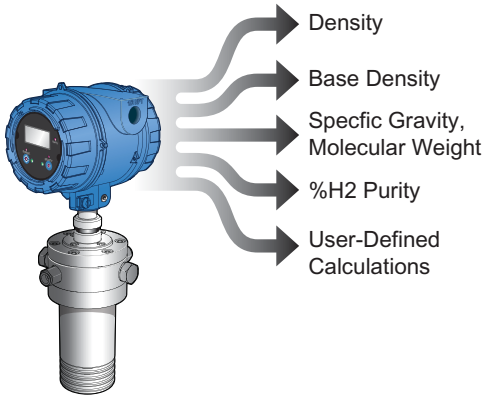
EMERSON™
Process Management

Micro Motion® Gas Density Meters

Micro Motion® gas density meters use proven Ni-Span-C vibrating cylinder technology to provide fast-response, precision gas density measurement over a wide operating range. These rugged meters are designed for the fiscal and custody transfer metering of high- value products such as natural gas, fuel gas, and hydrogen at temperatures up to 125 °C (257 °F) and pressures up to 250 bar (3625 psi).

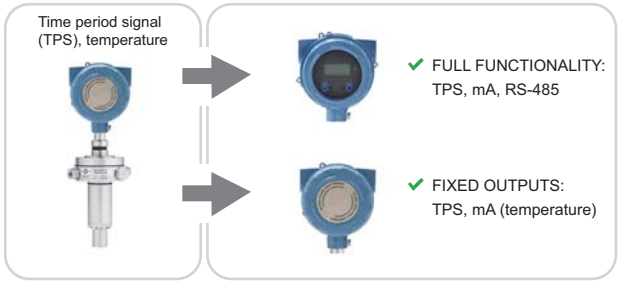
Application configurations

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



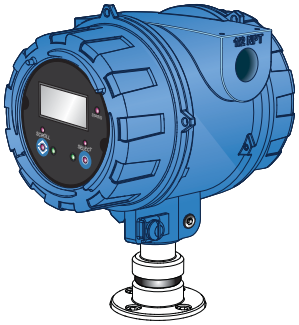
Retrofit capabilities

Full backwards compatibility that provides the same form and fit as the Micro Motion 7812 gas density meter.



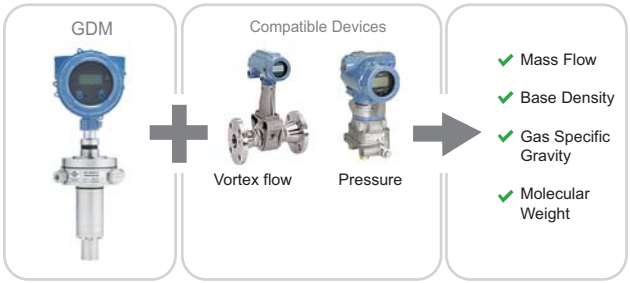
Integral transmitter

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.



Meter diagnostics

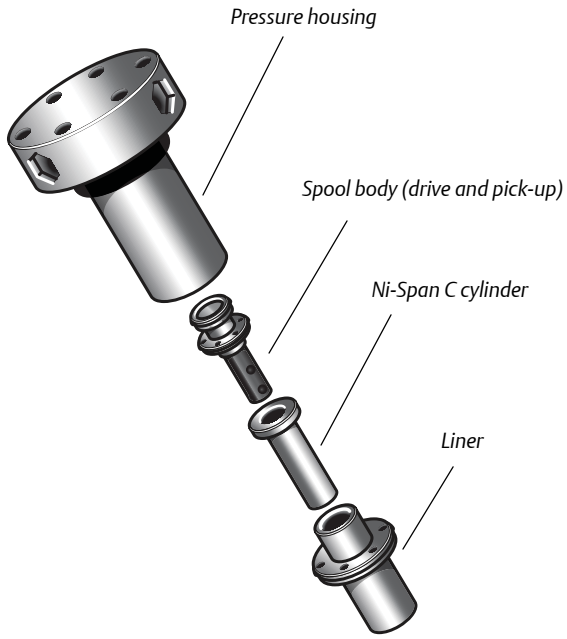
Ensure measurement health through known density verification (KDV) and other meter and installation diagnostic capabilities.

Accreditation and standards

Accredited calibrations and compliance with domestic and international standards.

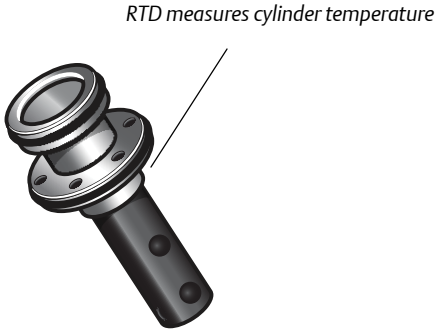
✓	ATEX, CSA, IECEx
✓	ISO17025
✓	AGA3, ISO 5167
✓	HART, WirelessHART, Modbus
✓	NAMUR, NACE

Operating principle



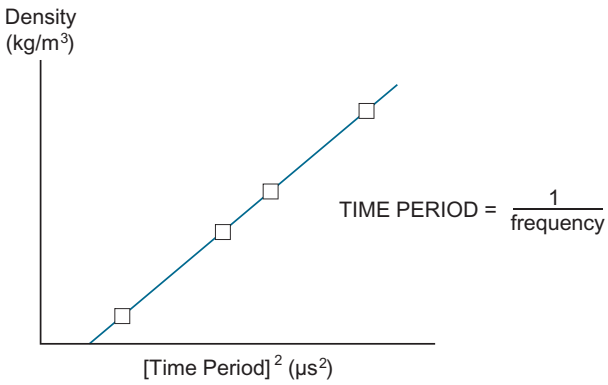
Cylinder vibration

- A Ni-Span C cylinder is mounted inside a pressure-retaining assembly containing the process gas.
- The Ni-Span C cylinder is vibrated electro-magnetically at its natural frequency.
- The natural frequency of the cylinder changes with the density of the surrounding gas.



Temperature measurement

- A class 'A' RTD measures the temperature.
- Micro Motion transmitters use this reading to optimize performance over a wide range of process conditions.



Density calibration

- Micro Motion transmitters accurately measure time period.
- Measured time periods are converted into density readings using meter calibration coefficients.
- Minimum of 12 calibration points ensures optimum meter performance.

Performance specifications

Density measurement

Specification	Value	
Density range	1–400 kg/m^3	0.001–0.4 g/cm^3
Accuracy	■ Argon: ±0.1% of reading ■ Nitrogen: ±0.1% of reading ■ Natural gas, ethylene: ±0.15% of reading	
Repeatability	±0.02% of reading	
Maximum operating pressure	250 bar	3625 psi
Process gas	Must be dry, dust free, and compatible with Ni-Span C 902, 316L stainless steel, Stycast catalyst 11, and Invar/Radiometal	

Temperature measurement

Specification		Value	
Temperature range	Standard model(1)	–20 °C to +85 °C	–4 °F to +185 °F
	High-temperature model	–20 °C to +125 °C	–4 °F to +257 °F
Temperature coefficient		0.001 kg/m^3 per °C	0.000001 g/cm^3 per °F
Integral temperature measurement		■ Technology: 100 Ω RTD ■ Accuracy: BS1904 Class, DIN 43760 Class A	

(1) Or, as limited by the dew point of the gas. See sensor temperature rating code A.

Transmitter specifications

Available transmitter versions

Application	Transmitter version(1)	Output channels		
		A	B	C
■ General purpose measurement ■ DCS/PLC connection	Analog	4–20 mA + HART	4–20 mA	Modbus/RS-485
■ General purpose measurement with output switch	Discrete	4–20 mA + HART	Discrete output	Modbus/RS-485
■ 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

Design	Features
Physical	■ 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	■ View process variables. ■ View and acknowledge alerts. ■ Configure mA and RS-485 outputs. ■ Supports Known Density Verification (KDV). ■ Supports multiple languages.

Process measurement variables

Variables	Value
Standard	■ Density ■ Temperature ■ Drive gain ■ External temperature input ■ External pressure input ■ User-defined calculation output
Derived	The derived output variables vary, depending on the application configuration of the meter. ■ Density at reference conditions ■ Molecular weight
Derived (when external device connected)	■ Mass flow ■ Base density

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:** ■ II 2G Ex ia IIC T4 Gb (–40 °C to +65 °C) **Without display:** ■ II 2G Ex ia IIC T6 Gb (–40 °C to +65 °C)
CSA C-US	■ Class I, Division I, Groups A, B, C & D ■ Class II, Division I, Groups E, F, & G
IECEx	**With display:** ■ Ex ia IIC T4 Ga (–40 °C to +65 °C) **Without display:** ■ Ex ia IIC T6 Ga (–40°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

Mechanical specifications

Type	Description
Process gas connection	1/4-inch NPT female
Integral filters	■ Inlet: 2 micron ■ Outlet: 90 micron

Materials of construction

Pressure-retaining wetted parts	
Interior liner	UNS S17400
Pressure housing	316L stainless steel
O-Rings	Viton
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

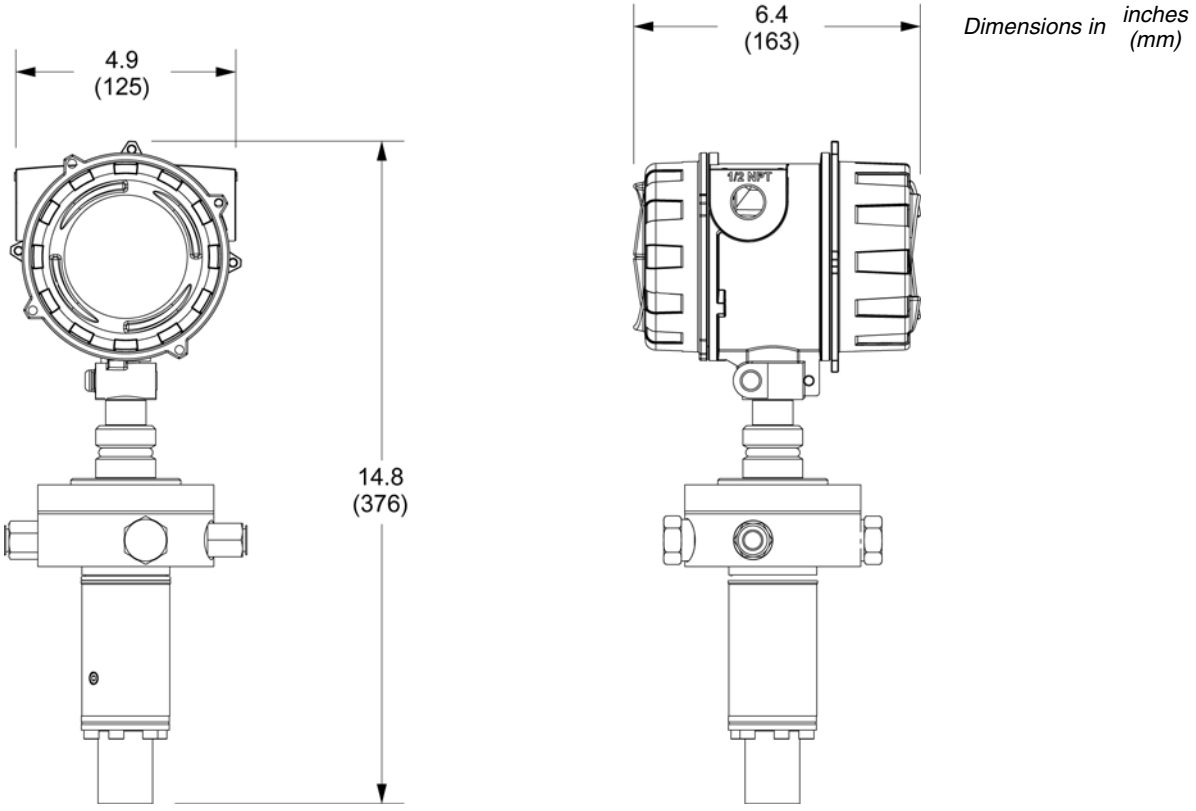
Weight

Specification	Value	
Weight	5 kg	11 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)*.

Figure 1: Gas density meter dimensions

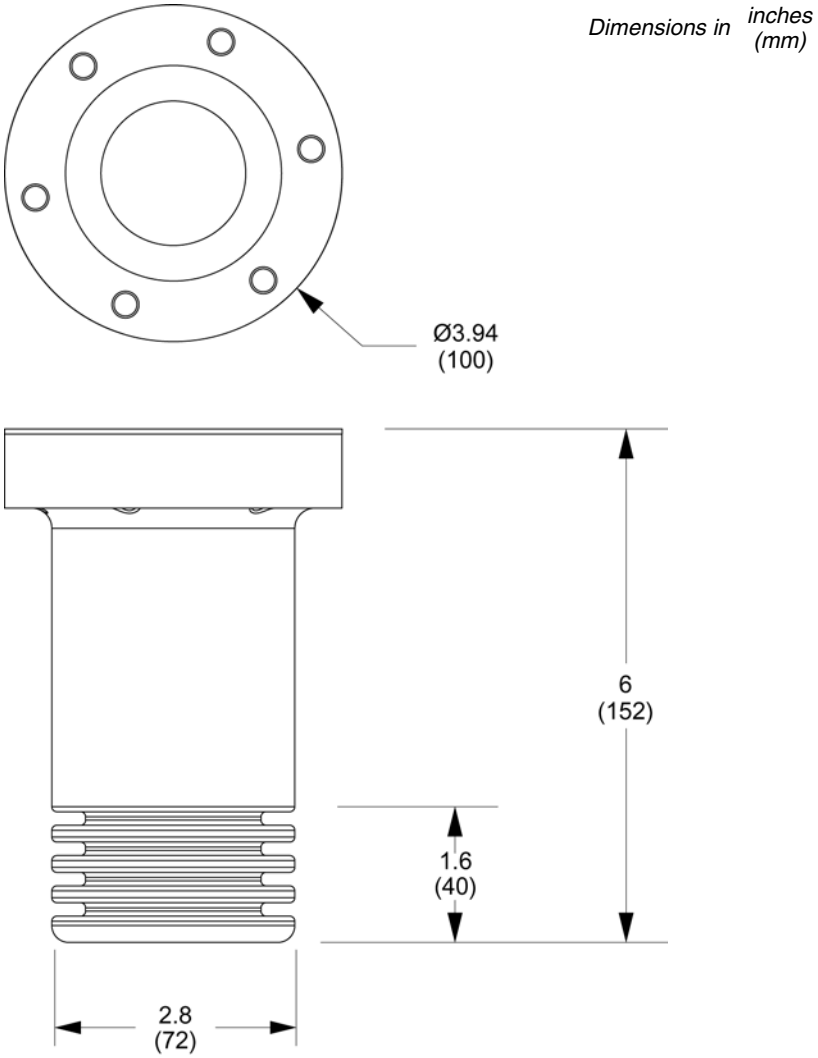


Additional options for installation and configuration

Density thermo-well pocket for pipeline installations

To maintain temperature equilibrium between the meter and pipeline, Micro Motion recommends that you install the meter in a density thermo-well pocket directly in the process pipeline (see Density thermo-well pocket dimensions).

Figure 2: Density thermo-well pocket dimensions



Thermo-well pocket kit ordering information

The following pocket kits are available for purchase through Micro Motion. Contact your local sales representative or Micro Motion Customer Support at *flow.support@emerson.com* for more information.

Model code	Description
78109AXXX	Pocket kit ASTM A350LF carbon steel
78109LXXX	Pocket kit ASTM 316L stainless steel

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.

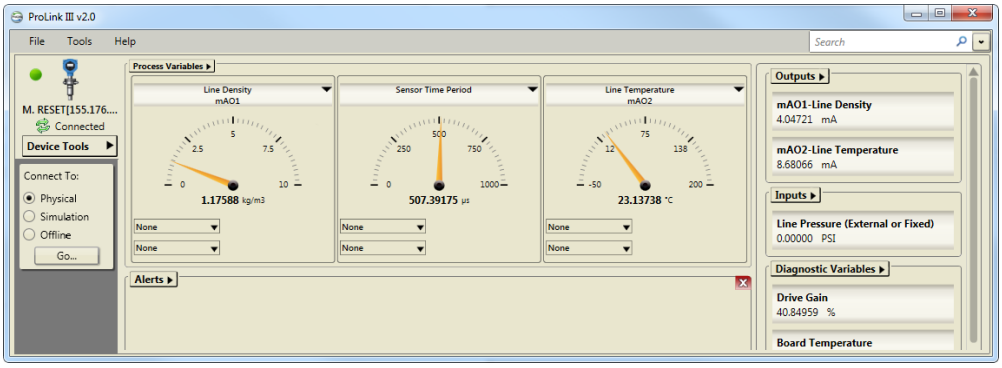
Safety barrier/galvanic isolator kits ordering information

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	

ProLink® III software: a configuration and service tool

ProLink® III software is an easy-to-use interface that allows you to view key process variables and diagnostics data for your meter. For more information on ordering the software, contact your local sales representative or Micro Motion Customer Support at *flow.support@emerson.com*.



Ordering information

Model	Description
GDM	Gas density meter with Viton O-rings
Code	**Sensor Calibration Range and Performance**
1	Calibration accuracy = ±0.1% reading (Low Limit = 1.5 kg/m^3, High Limit = 10 kg/m^3)
2	Calibration accuracy = ±0.1% reading (Low Limit = 9 kg/m^3, High Limit = 90 kg/m^3)
3	Calibration accuracy = ±0.1% reading (Low Limit = 25 kg/m^3, High Limit = 250 kg/m^3)
4	Calibration accuracy = ±0.1% reading (Low Limit = 40 kg/m^3, High Limit = 400 kg/m^3)
5	Calibration accuracy = ±0.5% FS, (Low Limit = 0 kg/m^3, High Limit = 3 kg/m^3)
X[(1)]	Custom (ETO) sensor calibration range and performance
Code	**Sensor Calibration Type**
A	Standard calibration
B	ISO 17025–accredited calibration
Code	**Sensor Temperature Rating**
A	Standard -20°C to +85°C (-4°F to +185°F)
B	High-temperature -20°C to +125°C (-4°F to +257°F)
Code	**Transmitter Housing Option**
A	Integral, Aluminum alloy
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)]	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	
0	No application configuration
7	Process temperature (4 mA = -20 °C, 20 mA = 85 °C)
8	Process temperature (4 mA = -20 °C, 20 mA = 125 °C)
9	Process temperature (4 mA = -0 °C, 20 mA = 100 °C)
X[(1)]	Custom (ETO) analog output configuration (customer data required)
Available with Transmitter Outputs codes C & D	
1	Line density (4 mA = Calibration range low limit, 20 mA = Calibration range high limit)

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 1**
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	Custom (ETO) product
Code	**Special Tests and Certificates, Tests, Calibrations and Services (Optional)(4)**
Material Quality Examination Tests and Certificates	
MC	Material Inspection Certificate 3.1 (Supplier Lot Traceability per EN 10204)
NC	NACE Certificate 2.1 (MR0175 and MR0103)
Pressure Testing	
HT	Hydrostatic Test Certificate 3.1 (Pressure retaining parts only)
Sensor Completion Options	
WG	Witness General
SP	Special Packaging
Instrument Tagging	
TG	Instrument Tagging - customer information required (max. 24 characters)

(1) Requires the Factory option X.
(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) Multiple test or certificate options may be selected.

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