

Flowmeters

UL-Recognized

OEM Mass Flowmeters for Gases

Model 4225

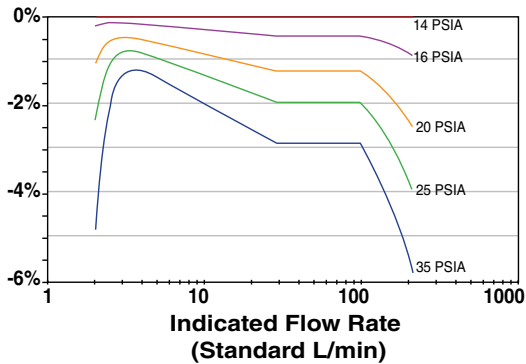
Intrinsically Safe

The Model 4225 mass flowmeter is a UL-recognized component designed for measuring methane, natural gas, propane, air and all inert gases. **It is not designed for environments where combustible gases are normally present outside the flow tube. It is not designed for use with hydrogen.**



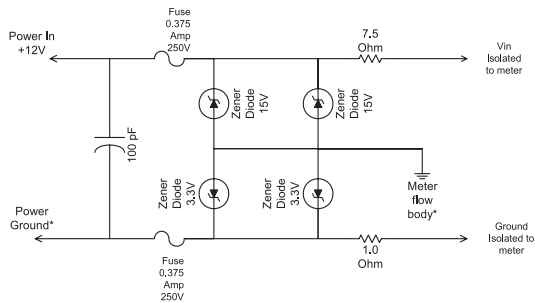
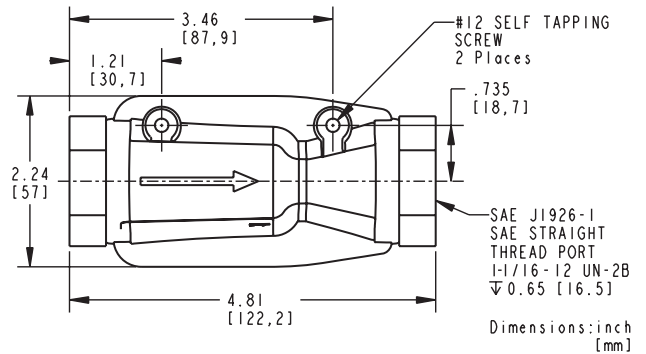
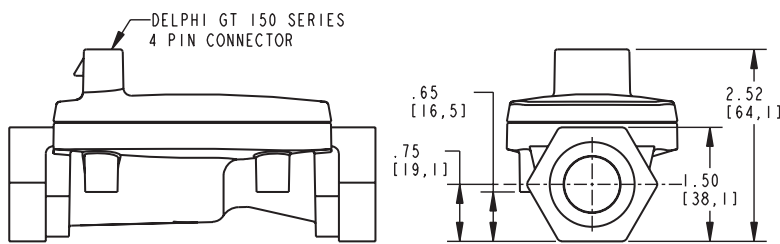
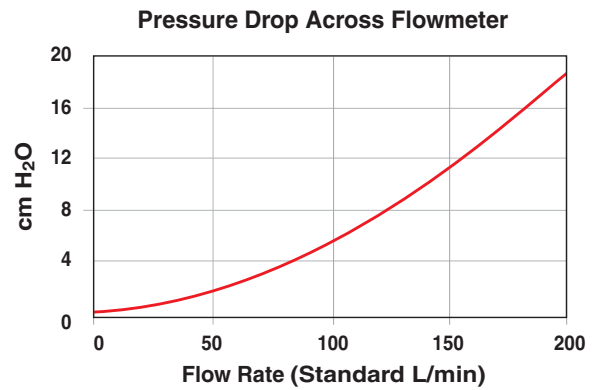
TSI Models	4225-01-01	4225-01-02	4225-08-02	4225-09-05
Gas	Air		Methane	Propane
Flow Range (Standard L/min)	2 to 200	2 to 50	1 to 50	1 to 40
Output (linear)	4-20 mA			
Accuracy* at 21°C and 1 Atmosphere pressure	±2% of reading		±4% of reading or 0.15 Standard L/min whichever is greater	±5% of reading or 0.15 Standard L/min whichever is greater
Resolution (Standard L/min)	0.08	0.02	0.02	0.016
Gas Temperature	-40°C to +60°C		-20°C to +60°C	-40°C to +60°C
Operating Temperature	-40°C to +60°C			
Additional Flow Uncertainty Due to Temperature	0.1% of reading or 0.005 Standard L/min per °C from 21°C, whichever is greater		Add 0.1% of reading per °C from 21°C	
Pressure Range <small>Limit for UL recognition</small>	0 to 20 PSIG			
Pressure Effects	See Figure 1.			
Pressure Drop	See Figure 2.			
Response Time	Less than 25 milliseconds for 95% of steady state change			
Supply Voltage	12 VDC ±5%, 350 mA peak, 150 mA average			
Inlet/Outlet	1-1/16 inch × 12 UNF-2B straight female thread			
Filtration	Requires HEPA grade filtration upstream			
Wetted Parts	Aluminum flowbody, Stainless steel, Ceramic, Gold, Alumina, Sn/Pb solder, Buna-N PVC			
Weight	240 grams without user-supplied fittings			
Notes	*Accuracy stated measuring dry gas (less than 10% R.H.) These flowmeters are designed and calibrated for unidirectional flow. Do not allow condensate or other liquids to enter flowmeter.			

Figure 1. Typical Pressure Correction (air)



Refer to Application Notes for details and other gases.

Figure 2. Pressure Drop Across Flowmeter



Grounding Requirements

For intrinsic safety the flow body must be attached to the earth ground externally. Power ground must be held near earth ground. Differences 0.7V below or 3.3V above earth ground will cause the 3.3V zeners to trip a fuse.

Specifications subject to change without notice.

Application Notes are available on the Internet website www.tsi.com, product group “Mass Flowmeters”



Pin#	Wire Color	Analog 4-20 mA
1	red	power
2	green	signal
3	white	not used
4	black	signal & power ground

An interface cable can be purchased from TSI (part number 1303775). This is a 10 foot long, 22 gauge, four wire, unshielded cable with sealed connector (Delphi GT 150 Series 4 Pin on one end).

4-20 mA Signal

The current output produces a linear signal where 4 mA indicates zero flow and 20 mA indicates the maximum specified flow rate. The maximum load resistance allowed on the current output is 350 Ohms.

Power Supply Requirements

The flow meter draws 20 microsecond pulsed current of 250mA on top of 50mA steady state current. The power supply needs to be capable of supplying at least 11.4V during current pulses. See applications note when using multiple flowmeters or switching power supplies.



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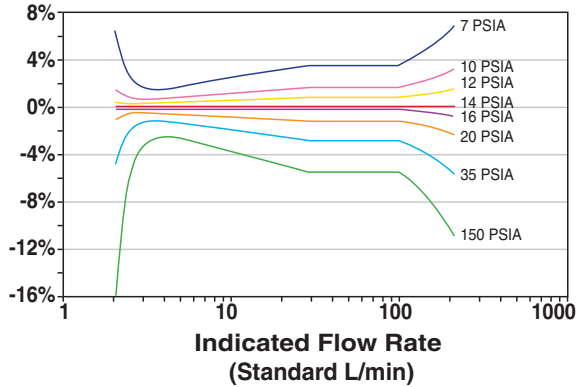
For current information <http://flowmeters.tsi.com>

OEM Mass Flowmeters for Gases Model 4226

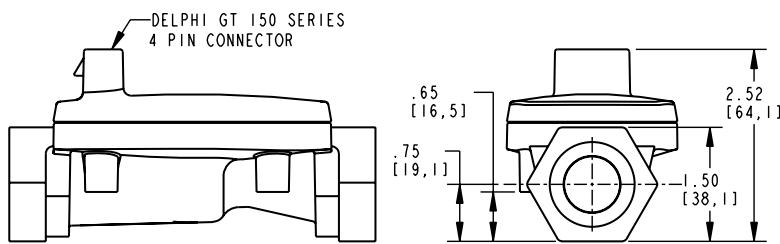


TSI Models	4226-01-01	4226-01-02
Gas	Air	
Flow Range (Standard L/min)	2 to 200	2 to 50
Output (linear)	4-20 mA	
Accuracy at 21°C and 1 Atmosphere pressure	±2% of reading	
Resolution (Standard L/min)	0.08	0.02
Gas Temperature	-40°C to +60°C	
Operating Temperature	-40°C to +60°C	
Additional Flow Uncertainty Due to Temperature	0.1% of reading or 0.005 Standard L/min per °C from 21°C, whichever is greater	
Pressure Range	Up to 150 PSIG	
Pressure Effects	See Figure 1.	
Pressure Drop	See Figure 2.	
Response Time	Less than 25 milliseconds for 95% of steady state change	
Supply Voltage	12 to 15 VDC ±10%, 300 mA peak, 100 mA average	
Inlet/Outlet	1-1/16 inch × 12 UNF-2B straight female thread	
Filtration	Requires HEPA grade filtration upstream	
Wetted Parts	Aluminum flowbody, Stainless steel, Ceramic, Gold, Alumina, Sn/Pb solder, Buna-N, Polycarbonate, PVC	
Weight	240 grams without user-supplied fittings	
Notes	*Accuracy stated measuring dry gas (less than 10% R.H.) These flowmeters are designed and calibrated for unidirectional flow. Do not allow condensate or other liquids to enter flowmeter.	

Figure 1. Typical Pressure Correction (air)



Refer to Application Notes for details.



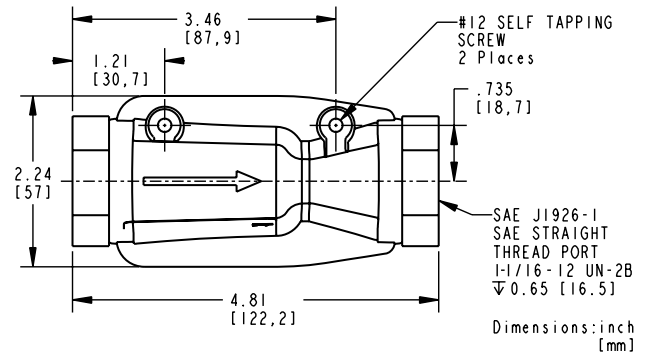
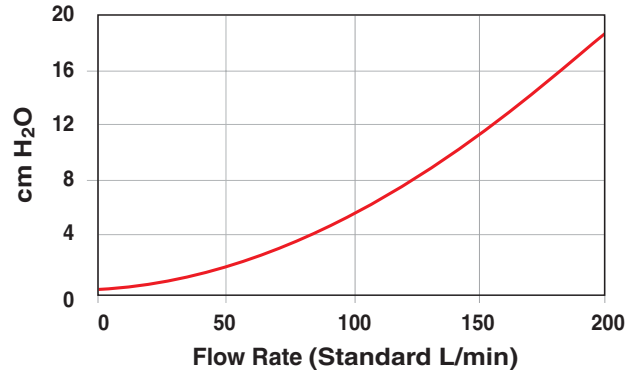
Flowmeter Connector (Top View)



Pin#	Wire Color	Analog 4-20 mA
1	red	power
2	green	signal
3	white	not used
4	black	signal & power ground

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Figure 2. Pressure Drop Across Flowmeter



4-20 mA Signal

The current output produces a linear signal where 4 mA indicates zero flow and 20 mA indicates the maximum specified flow rate. The maximum load resistance allowed on the current output is 350 Ohms.

Power Supply Requirements

The flow meter draws 20 microsecond pulsed current of 250mA on top of 50mA steady state current. The power supply needs to be capable of supplying at least 10.0V during current pulses. See applications note when using multiple flowmeters or switching power supplies.

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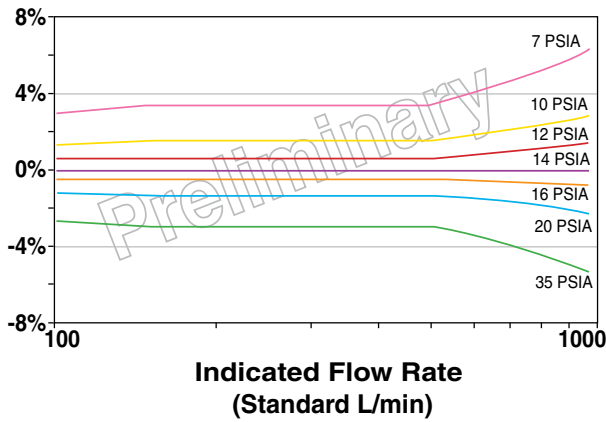
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OEM Mass Flowmeters for Gases Model 4235



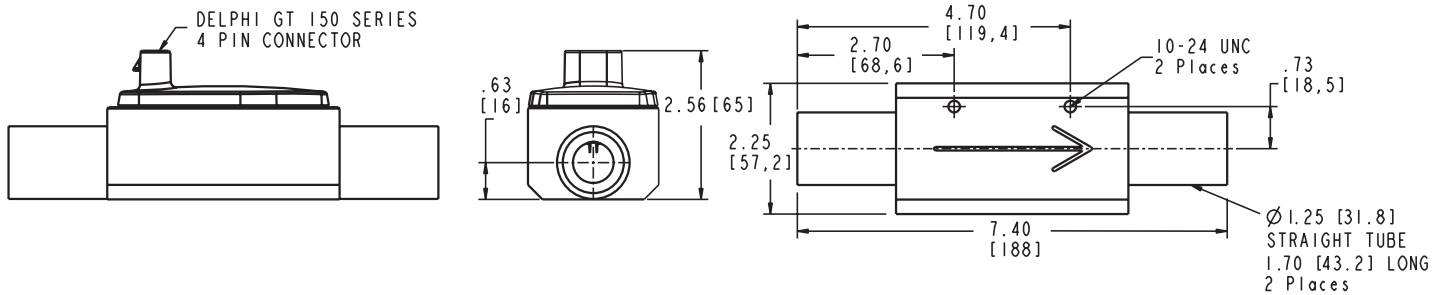
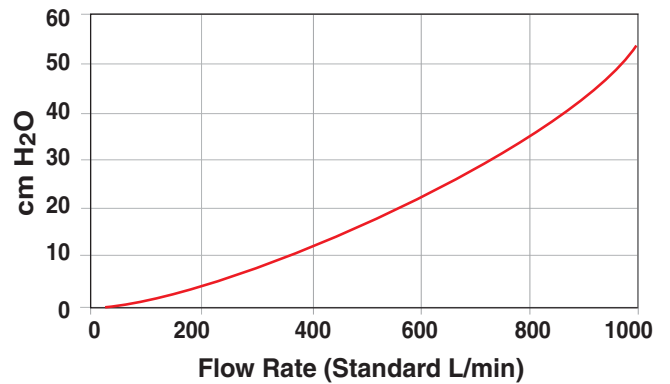
TSI Models	4235-01-01
Gas	Air
Flow Range (Standard L/min)	20 to 1000
Output (linear)	4-20 mA
Accuracy at 21°C and 1 Atmosphere pressure	±2.5% of reading
Resolution (Standard L/min)	0.4
Gas Temperature	-40°C to +60°C
Operating Temperature	-40°C to +60°C
Additional Flow Uncertainty Due to Temperature	0.1% of reading or 0.05 Standard L/min per °C from 21°C, whichever is greater
Pressure Range	Up to 150 PSIG
Pressure Effects	See Figure 1.
Pressure Drop	See Figure 2.
Response Time	Less than 25 milliseconds for 95% of steady state change
Supply Voltage	12 to 15VDC ±10%, 300 mA peak, 100 mA average
Inlet/Outlet	1.25 inch (31.8 mm) O.D. tube
Filtration	Requires HEPA grade filtration upstream
Wetted Parts	ABS, Stainless steel, Gold, Alumina, Sn/Pb solder, Buna-N, Polycarbonate
Weight	240 grams
Notes	*Accuracy stated measuring dry gas (less than 10% R.H.) These flowmeters are designed and calibrated for unidirectional flow. Do not allow condensate or other liquids to enter flowmeter.

Figure 1. Typical Pressure Correction (air)



Refer to Application Notes for details.

Figure 2. Pressure Drop Across Flowmeter



Flowmeter Connector (Top View)



Pin#	Wire Color	Analog 4-20 mA
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